



Passive RF Components  
Isolators/Circulators  
Custom Waveguide Assemblies

**Edition VI**

M2 Global Technology Ltd. is a premier worldwide supplier of microwave products and precision manufacturing services that has been serving the defense, telecommunications, and aerospace industries for over 30 years. The company's products are used in cellular communication systems, satellite up and down links, line-of-sight communications, radar countermeasures, broadcast equipment, and airframe systems.

M2 Global specializes in applying advanced microwave technologies to provide high-performance radio frequency (RF) microwave components and subsystems in standard and custom configurations for coaxial, wave-guide, and drop-in circulators, power dividers, couplers, splitters, diplexers, filters, and wave-guide assemblies. In addition, we offer a wide variety of precision manufacturing services and welcome requests for prototype precision machining, fabrication, welding, brazing, and electromechanical assembly.

Our company is known for being a quick turn, vertically integrated operation that offers rapid-response quotations, lean manufacturing, and short product lead times. We are a **"one-stop shop!"**

M2 Global is built on a decades-long history of providing outstanding products and services. The microwave products side of the business was founded in the early 1950's as Webb Ferrites. Farinon Electric acquired the company to gain better integration of the supply chain for enhanced quality control and increased flexibility in implementing technology enhancements. In 1981, Harris Corporation, a worldwide supplier of complex point-to-point microwave communication systems, purchased Farinon Electric and created the Harris Farinon Division. In September 1999, this business unit was sold to Douglas Carlberg, a former Harris vice president, who formed M2 Global Inc. and a limited partnership M2 Global Technology Ltd. M2 Global's microwave products business unit has become one of the world's foremost suppliers of RF passive components and subsystems.

M2 Global's ferrite products cover a frequency range from 300 MHz to 40 GHz and are backed by a best-in-industry, two-year warranty. This catalog describes our standard ferrite and wave-guide products. For requirements outside our catalog offerings, we design and manufacture a wide range of products to your custom specifications. Please contact our sales personnel or our local representative to obtain a price and delivery quote for standard or custom-configured products. We look forward to reviewing your specifications and helping determine the products or services that will best meet your needs.

M2 Global is a service disabled veteran-owned small business that is ISO 9001 and AS9100 registered. Headquartered in beautiful San Antonio, Texas, with sales offices around the world, M2 Global is well positioned to service its global markets. Our highly capable management team; experienced workforce; top-notch equipment and facilities; dedication to quality; and long track record of customer satisfaction make us the company with the **right stuff!**

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A Service Disabled  
Veteran-Owned Business

# General Information



## STANDARD FERRITE PRODUCTS

M2 Global Technology, Ltd. offers a standard line of circulators and isolators over the frequency range 300 MHz to 40 GHz. Coax, Waveguide or Drop-in configurations are available for all major frequency bands. If you do not find a suitable match for your requirement in our catalog, please contact customer support or your local sales representative. We have many other products available which may meet your requirements. We also do fast turn around custom designs routinely.

Standard options include direction of rotation for circulators and choice of input and terminated ports for isolators (Coax, Drop-in and Waveguide).

## CONNECTORS AND FLANGES

Coax ports may be specified with male or female connectors, either SMA, N-Type, or 2.92mm as applicable. Many designs are available with mixed SMA and N-Type ports. Flanges on Waveguide ports may be specified with mounting holes that are clearance, tapped, or alternating clearance/tapped. Flanges are CMR or UG, and grooved versions are also available. Isoadaptors are generally configured with SMA coax connectors.

## AVERAGE POWER

Power ratings for drop-in devices are for CW conditions. Contact customer support for specific power requirements, either CW or peak power. All power ratings are based on the component case temperature not exceeding the specified maximum operating temperature.

## PEAK POWER

Drop-in and coax devices are available with encapsulation providing high peak power capability of up to 5 kW.

## TEMPERATURE

All M2 Global devices are designed with magnetic and ferrite components that have complementary thermal characteristics. Operating ranges for most devices are specified in the catalog. Higher temperature ranges are available upon request. Devices should not be operated beyond the rated temperature range to avoid causing permanent damage and possibly also voiding your warranty.

## MAGNETIC SHIELDING AND RFI SHIELDING

Most standard devices are magnetically shielded and may be operated within a distance equal to their own width from any steel equipment without degraded performance. Coax devices without RFI sealing have a typical rating of 40dBc. Standard RFI sealing for a nominal additional cost is rated at 60dBc. For RFI needs in excess of 60dBc, please call customer support.

## PHASE VARIATION

Devices are available with phase matching, and with specified maximum phase variation. Please call customer support for information.

## IMD PERFORMANCE

M2 Global Technology has a range of select Drop-in units that are guaranteed -78 dBc for two 20 W input tones. Select Waveguide units perform at -84 dBc for two 20 W tones. For specific ratings on a particular model, please contact customer support.

## SHOCK AND VIBRATION

Each unit is intrinsically rugged and resistant to shock and vibration of the type encountered in normal transportation and use. For special shock, vibration, and environmental protection please contact customer support.

## DIMENSIONS

In addition to the outlines provided in this catalog, product dimensions and mechanical drawings are provided on product specification sheets, which are available on request.

## FINISH AND MARKINGS

Standard finish is alodine or nickel plating. Special finishes are available on request. Each unit is marked with a date code and the direction of signal flow. Standard marking of ports for circulators is "1", "2", and "3." Isolators are marked "IN" and "OUT." Waveguide flange isolators and isoadaptors have the input port marked "IN."

## CUSTOM DESIGNS

For custom designs and non-standard specifications, please contact your M2 Global Technology Ltd. sales representative, or call customer support.

## STANDARD WAVEGUIDE SECTIONS, BENDS, COUPLERS, ADAPTORS, FILTERS AND DIPLEXERS

M2 Global Technology, Ltd. offers a standard line of Waveguide Sections, Couplers, Filters, Terminations, Switches and Waveguide to Coax Adaptors. Waveguide sections include straight, E and H plane bends, transitions, flex, and twistable flex. M2 Global can build waveguide assemblies from any combination of standard sections to meet special customer requirements. We also build filters and diplexers to customer requirements.

## QUALITY ASSURANCE AND TEST DATA

### Quality Certification

**M2 Global Technology is certified to both ISO 9001:2000 and AS 9100.**

### Test Data

All M2 Global ferrite devices are 100% tested to ensure they meet electrical specifications. Each shipment is accompanied by a Certificate of Compliance. Complete test data is available by special order. Individual QA provisions can also be met.

## RoHS

All components manufactured by M2 Global are RoHS compliant unless built to special customer requirements. The M2 Global RoHS compliance statement may be obtained from the M2 Global web site or by calling customer support.

## HOW TO ORDER

Orders may be placed with M2 Global Technology, Ltd. sales representatives or with customer support. Final acceptance of all orders will be made by M2 Global. Orders may be paid for by Visa, Mastercard, or American Express.

## M2 GLOBAL TECHNOLOGY, Ltd.

**5714 Epsilon  
San Antonio, TX 78249  
Phone: (210) 561-4800  
Fax: (210) 561-4874  
e-mail: [sales@m2global.com](mailto:sales@m2global.com)  
Web: [www.m2global.com](http://www.m2global.com)**

Please specify both the catalog number and the options desired for each type of device.

## SHIPPING

Domestic shipments are made via the most economical method to meet your ship date. Shipping is prepaid and billed on invoice, unless other instructions are given.

## PRICES AND TERMS

Prices and delivery information may be obtained from our sales representatives or from customer support. All prices are given FOB factory and are subject to change without notice. Payment terms are net 30 days to approved accounts. **For complete details, see our standard terms and conditions, which are available on our web site or from customer support.**

## SPECIFICATIONS

We reserve the right to discontinue any item or change specifications without notice.

## WARRANTY

All ferrite products are warranted to the original purchaser to be free of defects in material and workmanship for a period of 2 years from the date of manufacture. Other products are warranted for 1 year. Our obligation under these warranties is limited to repair, replacement, or credit. For details, see our standard terms and conditions, which are available on our web site or from customer support. Please visit our website at [www.m2global.com](http://www.m2global.com) and see why our materials and construction provide the highest reliability.





## The M2 Global Advantage

A high degree of vertical integration enables M2 Global Technology to carry out almost all production and testing processes within its modern facility. Lean Manufacturing techniques are continuously updated, earning the company the annual award from the Association for Manufacturing Excellence. In order to meet the additional requirements of a growing list of aerospace customers, M2 Global added AS9100 certification to its existing ISO 9000 certification. As a small business (disabled veteran owned), M2 Global is well positioned to execute set aside awards from prime government contractors.

### Engineering

M2 Global's engineers design components and assemblies with Solid Works 3D enabling greater efficiency, design accuracy, and direct interface with CNC equipment. RF and microwave designs are developed with full 3D Electromagnetic modeling and optimization using commercial and proprietary software to produce fast turn around prototypes with minimum iterations. Electrical circuit prototypes are manufactured in a matter of minutes with special prototype circuit cutting equipment.



### Machining

M2 Global has invested in state of the art CNC equipment and engineering software. Drawings in electronic format are fed directly into the most suitable of several CNC machines. Machining accuracy is checked with a state of the art coordinate measuring machine.

### Testing

Electrical performance specifications are measured on 100% of products on one of multiple test stations equipped with a VNA or Network Analyzer. Testing is carried out at frequencies up to 40 GHz for insertion loss, reflection coefficient, and isolation. Ferrite devices can also be tuned for phase and amplitude matching.



### Environmental

New component designs are tested for electrical performance over their required temperature ranges using hot/cold plates and environmental chambers. M2 Global has also conducted temperature shock, mechanical shock and vibration, humidity and altitude testing on a variety of ferrite components. Many designs are available with encapsulation for use at high peak powers and in high altitude environments. Finishes include painting and most types of plating.

# SECTION 1: FERRITE COMPONENTS

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## Drop-in Circulators

### Electrical Specifications

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Power Rating (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page15
0.400-0.450	0.45	1.25	200	-40 to +85	1.50 x 1.50	990-400450-901	D39	
0.740-0.770	0.30	1.20	150	-40 to +85	1.00 x 1.00	990-740770-501	D08	13
0.764-0.870	0.45	1.28	150	0 to +60	1.00 x 1.00	990-764870-501	D08	13
0.790-0.830	0.30	1.20	150	-10 to +85	1.00 X 1.00	990-790830-501	D08	13
0.800-0.825	0.20	1.15	200	-20 to +70	1.00 X 1.00	990-800825-501	D08	
0.800-0.960	0.40	1.28	200	0 to +85	1.00 X 1.00	990-800960-501	D08	
0.800-1.000	0.50	1.35	150	-20 to +85	1.00 X 1.00	990-800100-501	D08	
0.824-0.960	0.35	1.22	200	-20 to +85	1.00 X 1.00	990-824960-501	D08	
0.850-0.960	0.40	1.12	200	-15 to +65	1.00 X 1.00	990-850960-501	D08	
0.860-0.870	0.25	1.18	200	-10 to +70	1.00 X 1.00	890-860870-501	D02	
0.869-0.894	0.25	1.18	200	-10 to +70	1.00 X 1.00	890-869894-501	D02	
0.925-0.960	0.25	1.18	200	-10 to +70	1.00 X 1.00	890-925960-501	D02	
0.960-1.230	0.60	1.42	100	-40 to +85	1.00 X 1.00	990-960123-501	D08	
1.010-1.100	0.30	1.22	100	-40 to +85	1.00 X 1.00	990-101110-501	D08	
1.030-1.090	0.40	1.22	100	-40 to +85	1.00 X 1.00	990-103109-503	D08	12
1.200-1.400	0.25	1.20	150	-40 to +85	1.00 X 1.00	990-120140-501	D08	
1.520-1.660	0.30	1.20	150	-20 to +70	1.00 X 1.00	890-152166-501	D02	
1.600-1.800	0.40	1.22	100	-40 to +85	0.75 X 0.75	990-160180-301	D03	4



# Drop-in Circulators

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Power Rating (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
1.750-1.850	0.30	1.20	220	-20 to +70	1.00 X 1.00	990-175185-501	D02	
1.760-2.170	0.40	1.25	50	-10 to +85	0.75 X 0.75	990-176217-301	D03	
1.700-2.000	0.40	1.22	30	-40 to +100	0.75 X 0.75	990-170200-301	D03	
1.710-1.990	0.35	1.22	75	-40 to +85	0.75 X 0.75	990-171199-301	D09	
1.710-2.170	0.40	1.22	150	0 to +70	1.00 X 1.00	890-171217-501	D02	
1.800-2.000	0.40	1.25	30	-40 to +100	0.75 X 0.75	094-039034-001	D03	
1.800-2.170	0.40	1.25	50	-10 to +85	0.75 X 0.75	990-180217-301	D03	
1.805-1.880	0.25	1.20	150	-20 to +70	0.75 X 0.75	890-180188-301	D01	
1.805-1.880	0.28	1.20	200	-20 to +70	1.00 X 1.00	890-180188-501	D02	
1.850-1.990	0.45	1.25	70	-20 to +70	0.75 X 0.75	890-185199-301	D01	
1.880-1.920	0.20	1.20	70	-40 to +100	0.75 X 0.75	094-039040-002	D03	
1.900-2.100	0.40	1.25	30	-40 to +100	0.75 X 0.75	094-039039-001	D03	
1.920-2.170	0.35	1.22	70	-20 to +85	0.75 X 0.75	990-192217-301	D09	
1.930-1.990	0.25	1.25	50	-40 to +100	0.75 X 0.75	094-039040-001	D03	
1.930-1.990	0.25	1.20	150	-20 to +70	0.75 X 0.75	890-193199-301	D01	
1.930-1.990	0.28	1.20	200	-20 to +70	1.00 X 1.00	890-193199-501	D02	
1.930-1.990	0.30	1.18	150	-10 to +85	1.00 X 1.00	994-039064-005	D04	2, 8
2.000-2.300	0.30	1.25	75	-20 to +85	0.75 X 0.75	990-200230-301	D09	
2.000-2.150	0.30	1.20	70	-30 to +85	0.75 X 0.75	994-039029-015	D03	
2.050-2.250	0.33	1.22	100	-20 to +70	0.75 X 0.75	890-205225-301	D01	
2.090-2.190	0.25	1.20	150	-30 to +85	1.00 X 1.00	994-039067-003	D04	
2.100-2.200	0.25	1.20	150	-30 to +85	1.00 X 1.00	994-039067-002	D04	
2.100-2.200	0.30	1.22	100	-20 to +85	0.75 X 0.75	990-210220-301	D09	
2.100-2.300	0.40	1.25	70	-40 to +100	0.75 X 0.75	094-039033-013	D03	
2.110-2.170	0.23	1.20	50	-40 to +100	0.75 X 0.75	994-039038-051	D03	
2.110-2.170	0.28	1.17	100	-20 to +70	0.75 X 0.75	890-211217-301	D01	
2.200-2.300	0.30	1.25	70	-30 to +70	0.75 X 0.75	994-039029-011	D03	4
2.200-2.500	0.40	1.25	70	-20 to +85	0.75 X 0.75	990-220250-301	D09	
2.250-2.280	0.30	1.25	70	-30 to +70	0.75 X 0.75	994-039029-013	D03	4

# Drop-in Circulators

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Power Rating (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
2.300-2.400	0.26	1.20	70	-20 to +70	0.75 X 0.75	890-230240-303	D01	
2.400-2.500	0.25	1.22	75	-10 to +85	0.75 X 0.75	990-240250-301	D09	
2.400-2.700	0.30	1.25	70	-10 to +75	0.75 X 0.75	094-039037-003	D03	5
3.300-3.800	0.30	1.22	50	-40 to +85	0.75 X 0.75	990-330380-301	D09	
3.400-3.600	0.35	1.25	100	-40 to +85	0.75 x 0.75	994-037063-015	D03	5, 13
3.475-3.600	0.35	1.22	50	-40 to +85	0.75 X 0.75	990-347360-301	D09	
3.700-3.900	0.35	1.25	50	-40 to +85	0.75 X 0.75	990-370390-301	D09	
4.400-5.100	0.40	1.28	20	-20 to +70	0.50x0.50	990-440510-203	D06	9
4.500-4.800	0.40	1.22	50	-30 to +70	0.75 X 0.75	994-039063-006	D03	5, 6
4.625-4.725	0.30	1.22	50	0 to +85	0.50x0.50	990-462472-201	D06	
5.150-5.825	0.40	1.14	50	-40 to +85	0.375x0.500	994-039052-009	D05	
5.200-5.900	0.35	1.20	50	-40 to +85	0.50x0.50	990-520590-203	D06	9
5.700-5.900	0.40	1.14	50	-40 to +85	0.375x0.500	990-570590-101	D05	
5.725-5.850	0.30	1.22	50	0 to +85	0.50x0.50	990-572582-201	D06	
5.800-6.700	0.40	1.25	25	-40 to +100	0.50x0.50	094-039042-004	D06	
5.800-7.100	0.40	1.25	50	-40 to +85	0.350x0.475	990-580710-901	D07	
6.700-7.500	0.40	1.22	30	-40 to +85	0.50x0.50	990-670750-203	D06	
7.100-7.900	0.50	1.25	25	-40 to +85	0.50x0.50	990-710790-201	D06	
13.500-14.500	0.40	1.18	10	-40 to +85	0.350x0.475	990-135145-901	D07	

# Drop-in Isolators - Low Power

All part numbers have clockwise rotation. Counter clockwise rotation is available.

## Electrical Specifications

\* Case Temperature Not To Exceed Operating Temperature

Non-BeO Terminations Available

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Power Rating (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
0.800-0.960	18	0.60	1.28	10	150	-0 to +85	1.00 x 1.00	891-800960-501	D12	
0.800-1.050	15	0.50	1.43	10	100	-10 to +85	1.00 x 1.00	991-800105-501	D20	
0.810-0.855	18	0.38	1.30	10	200	-10 to +70	1.00 x 1.00	891-810855-501	D12	
0.850-0.960	20	0.40	1.22	10	200	-20 to +70	1.00 x 1.00	891-850960-501	D12	
0.869-0.894	22	0.25	1.18	10	200	-10 to +70	1.00 x 1.00	891-869894-551	D12	





# Drop-in Isolators - Low Power

All part numbers have clockwise rotation.  
Counter clockwise rotation is available.

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

## Non-BeO Terminations Available

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
0.920-0.928	21	0.27	1.20	10	200	-20 to +70	1.00 x 1.00	891-902928-501	D12	
0.925-0.960	22	0.25	1.18	10	200	-10 to +70	1.00 x 1.00	891-925960-551	D12	
1.000-1.100	20	0.30	1.22	10	150	-40 to +85	1.00 x 1.00	991-100110-501	D28	
1.300-1.550	18	0.40	1.28	10	75	-30 to +70	0.75 x 0.75	991-130155-301	D26	
1.400-1.600	19	0.30	1.20	10	75	-30 to +70	0.75 x 0.75	991-140160-301	D26	
1.600-1.800	19	0.30	1.20	10	75	-30 to +70	0.75 x 0.75	991-160180-301	D26	
1.625-1.666	20	0.30	1.25	10	100	-40 to +70	0.75 x 0.75	991-162166-301	D17	
1.700-2.000	20	0.30	1.25	10	50	-20 to +85	0.75 x 0.75	994-039031-011	D17	
1.750-1.860	20	0.32	1.22	10	200	-20 to +70	1.00 x 1.00	891-175186-501	D12	
1.800-1.880	20	0.35	1.22	10	30	-40 to +100	0.75 x 0.75	994-039034-007	D17	
1.800-2.000	20	0.30	1.22	10	75	-30 to +70	0.75 x 0.75	991-180200-301	D26	
1.805-1.880	21	0.25	1.20	10	150	-20 to +70	0.75 x 0.75	891-180188-351	D14	
1.805-1.880	21	0.28	1.20	10	200	-20 to +70	1.00 x 1.00	891-180188-551	D12	
1.900-2.100	20	0.40	1.25	10	30	-40 to +100	0.75 x 0.75	094-039032-001	D17	
1.930-1.990	20	0.25	1.25	10	50	-40 to +100	0.75 x 0.75	094-039041-001	D17	
1.930-1.990	21	0.25	1.20	10	150	-20 to +70	0.75 x 0.75	891-193199-351	D14	
1.930-1.990	21	0.28	1.20	10	200	-20 to +70	1.00 x 1.00	891-193199-551	D12	
1.990-2.500	17	0.50	1.33	10	50	0 to +65	0.75 x 0.75	991-199250-301	D26	
2.000-2.150	20	0.30	1.20	10	30	-40 to +100	0.75 x 0.75	094-039032-003	D17	
2.000-2.300	20	0.30	1.22	10	75	-30 to +70	0.75 x 0.75	991-200230-301	D26	
2.100-2.200	20	0.30	1.25	10	30	-40 to +100	0.75 x 0.75	094-039033-010	D17	
2.100-2.200	21	0.27	1.20	10	150	-20 to +70	0.75 x 0.75	891-210220-351	D14	
2.100-2.300	20	0.40	1.25	10	30	-40 to +100	0.75 x 0.75	094-039033-003	D17	
2.110-2.170	22	0.28	1.17	10	150	-20 to +70	0.75 x 0.75	891-211217-351	D14	
2.190-2.390	23	0.28	1.20	10	150	-20 to +70	0.75 x 0.75	891-219239-301	D14	
2.200-2.300	23	0.25	1.15	10	70	-40 to +85	0.75 x 0.75	094-039033-004	D17	
2.200-2.400	20	0.38	1.22	10	70	-20 to +70	0.75 x 0.75	891-220240-301	D14	
2.300-2.500	20	0.25	1.22	10	70	-30 to +70	0.75 x 0.75	094-039029-004	D17	
2.300-2.700	20	0.25	1.22	10	70	-30 to +70	0.75 x 0.75	991-230270-301	D26	

# Drop-in Isolators - Low Power

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

Non-BeO Terminations Available

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
2.450-2.500	22	0.25	1.17	10	70	-10 to +80	0.75 x 0.75	991-245250-301	D26	
2.500-2.700	20	0.30	1.22	10	70	-30 to +70	0.75 x 0.75	094-039029-003	D17	
2.600-2.700	21	0.27	1.20	10	150	-20 to +70	0.75 x 0.75	891-260270-301	D14	
2.710-2.730	21	0.27	1.20	10	100	-20 to +70	0.75 x 0.75	891-271273-301	D14	
2.800-3.500	21	0.35	1.20	10	150	-20 to +70	0.75 x 0.75	891-280350-301	D14	
3.200-3.600	20	0.40	1.22	10	20	-20 to +85	0.75 x 0.75	991-320360-301	D26	
3.400-3.600	20	0.35	1.25	10	100	-40 to +85	0.75 x 0.75	994-039063-011	D17	5, 6
3.400-4.200	20	0.40	1.22	10	20	0 to +70	0.75 x 0.75	991-340420-301	D17	
3.500-5.100	16	0.50	1.38	3	20	-10 to +85	0.75 x 0.75	991-350510-301	D17	5, 7
3.700-4.200	20	0.40	1.22	10	20	-10 to +85	0.75 x 0.75	991-370420-301	D15	
4.200-4.400	20	0.05	1.20	10	60	-20 to +70	0.375 x 0.620	991-420440-901	D23	
4.400-5.000	19	0.50	1.25	3	50	0 to +65	0.50 x 0.50	991-440500-201	D18	
4.500-4.800	20	0.30	1.22	10	20	-30 to +70	0.75 x 0.75	994-039063-007	D17	5, 7
4.500-5.300	19	0.50	1.25	10	50	0 to +65	0.50 x 0.50	991-450530-201	D18	
4.625-4.725	20	0.30	1.22	10	50	0 to +85	0.50 x 0.50	991-462472-201	D18	
5.000-5.300	20	0.40	1.22	10	50	-40 to +85	0.50 x 0.50	994-039048-003	D18	7
5.200-5.800	20	0.40	1.20	10	50	-40 to +85	0.375 x 0.500	994-039052-006	D20	
5.200-5.900	23	0.40	1.14	10	75	-20 to +70	0.375 x 0.500	994-039052-010	D20	
5.250-5.850	20	0.50	1.25	10	50	-40 to +80	0.375 x 0.620	991-525585-901	D23	
5.400-5.900	20	0.50	1.22	5	50	-20 to +85	0.50 x 0.50	991-540590-201	D18	9
5.700-6.700	20	0.40	1.25	10	50	-40 to +85	0.50 x 0.50	994-039042-019	D18	
5.725-5.825	20	0.30	1.22	10	50	0 to +85	0.50 x 0.50	991-572582-201	D18	
5.725-7.125	18	0.40	1.30	3	50	0 to +85	0.50 x 0.50	991-572712-202	D18	
5.800-6.500	20	0.40	1.20	10	50	-40 to +85	0.375 x 0.500	094-039052-001	D20	
5.800-6.500	20	0.40	1.25	10	50	-40 to +85	0.50 x 0.50	991-580650-201	D18	
5.800-6.700	20	0.50	1.25	10	50	-40 to +85	0.50 x 0.50	094-039042-003	D18	
5.800-7.100	20	0.40	1.25	10	25	-40 to +85	0.50 x 0.50	991-580710-201	D18	
5.850-6.425	18	0.40	1.22	3	25	-30 to +85	0.350 x 0.475	094-039059-001	D21	
5.850-6.725	20	0.50	1.20	10	25	-30 to +80	0.350 x 0.475	991-585672-901	D21	



# Drop-in Isolators - Low Power

All part numbers have clockwise rotation.  
Counter clockwise rotation is available.

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

## Non-BeO Terminations Available

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
5.850-6.725	20	0.50	1.25	10	25	-30 to +80	0.50 x 0.50	094-039042-007	D18	
5.850-6.725	20	0.50	1.20	10	25	-30 to +80	0.375 x 0.500	094-039052-002	D20	
6.400-7.200	20	0.40	1.20	10	25	-40 to +85	0.375 x 0.625	994-039052-015	D29	
6.400-7.200	21	0.30	1.18	10	25	-40 to +85	0.375 x 0.500	994-039052-013	D20	
6.400-7.200	20	0.40	1.22	10	25	-40 to +85	0.350 x 0.475	994-039066-010	D21	
6.400-7.200	20	0.40	1.22	10	25	-40 to +85	0.50 x 0.50	994-039042-013	D18	
6.400-7.800	20	0.50	1.25	10	20	-40 to +85	0.50 x 0.50	994-039042-017	D18	
6.600-7.100	20	0.40	1.22	10	25	-40 to +85	0.350 x 0.475	994-039066-008	D21	
6.700-7.500	20	0.40	1.22	10	25	-40 to +85	0.50 x 0.50	994-039042-014	D18	
6.700-7.750	20	0.50	1.25	10	20	-40 to +85	0.50 x 0.50	994-039042-016	D18	
7.000-7.800	20	0.40	1.25	10	20	-40 to +80	0.375 x 0.620	991-700780-901	D23	
7.100-7.900	20	0.50	1.25	10	20	-40 to +85	050 x 0.50	991-710790-201	D18	
7.200-8.400	19	0.50	1.25	5	10	0 to +65	050 x 0.50	991-720840-201	D18	7
7.250-7.750	20	0.50	1.20	10	20	-20 to +70	0.50 x 0.50	994-039042-015	D18	
7.400-8.100	20	0.40	1.20	3	10	-20 to +70	0.375 x 0.500	991-740810-101	D20	
7.500-8.500	19	0.50	1.25	3	10	-30 to +60	0.375 x 0.500	991-750850-101	D20	
7.700-8.500	21	0.45	1.20	3	10	-20 to +70	0.375 x 0.500	991-770850-101	D20	
7.700-8.500	20	0.50	1.30	3	10	-40 to +85	0.50 x 0.50	991-770850-201	D18	
7.700-8.800	20	0.40	1.25	3	10	-30 to +80	0.375 x 0.620	991-770880-903	D23	
7.700-10.500	18	0.65	1.29	3	10	0 to +65	0.350 x 0.475	991-770105-901	D21	
7.900-8.400	20	0.40	1.20	10	10	-20 to +70	0.375 x 0.500	991-790840-203	D20	
7.900-8.400	20	0.40	1.25	3	10	-30 to +80	0.375 x 0.620	991-790840-901	D23	
7.900-8.400	20	0.40	1.20	3	20	-20 to +70	0.50 x 0.50	094-039052-016	D18	7
8.500-9.000	20	0.40	1.25	3	10	-30 to +70	0.350 x 0.475	991-850900-901	D21	
8.500-10.100	20	0.40	1.22	3	10	-30 to +70	0.350 x 0.475	991-850101-901	D21	
9.000-9.200	20	0.35	1.25	5	10	-30 to +70	0.350 x 0.475	994-039066-013	D21	
9.500-11.000	19	0.40	1.25	40	10	0 to +65	0.350 x 0.475	991-950110-901	D21	
9.700-9.900	20	0.40	1.22	5	10	-30 to +70	0.350 x 0.475	994-039066-004	D21	
9.900-10.100	20	0.30	1.22	5	10	-30 to +70	0.50 x 0.50	991-990101-203	D18	

# Drop-in Isolators - Low Power

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

Non-BeO Terminations Available

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
10.000-11.700	20	0.40	1.22	5	10	-30 to +70	0.50 x 0.50	991-100117-201	D18	
10.150-10.425	20	0.40	1.25	5	10	-30 to +70	0.350 x 0.475	994-039066-019	D21	
10.700-12.750	20	0.40	1.22	5	5	-30 to +70	0.350 x 0.475	994-039066-001	D21	
10.700-12.750	20	0.40	1.22	5	5	-30 to +70	0.50 x 0.50	994-039066-014	D18	
10.900-12.750	16	0.80	0.32	10	5	-30 to +80	0.25 x 0.50	991-109127-091	D22	
11.000-13.300	20	0.40	1.22	10	20	-30 to +70	0.350 x 0.475	991-110133-901	D21	
11.400-11.800	19	0.50	1.25	3	5	-20 to +70	0.25 x 0.50	991-114118-091	D22	
11.700-12.700	20	0.40	1.22	5	5	-30 to +70	0.350 x 0.475	991-117127-903	D21	
12.200-13.800	19	0.50	1.25	3	5	-40 to +85	0.25 x 0.50	991-122138-091	D22	
12.700-13.250	21	0.40	1.20	3	5	-30 to +70	0.25 x 0.50	991-127132-091	D22	
12.700-13.300	20	0.40	1.22	30	30	-30 to +70	0.350 x 0.475	991-127133-903	D21	
13.500-16.400	18	0.50	1.29	3	5	0 to +65	0.350 x 0.475	991-135164-901	D21	
13.700-14.500	20	0.40	1.20	3	5	-30 to +70	0.25 x 0.50	991-137145-091	D22	
13.750-14.500	22	0.40	1.18	10	10	-30 to +70	0.350 x 0.475	994-039066-002	D21	
13.750-14.500	19	0.30	1.20	30	30	-40 to +85	0.350 x 0.475	991-137145-903	D21	
13.800-14.600	20	0.40	1.20	3	5	-30 to +70	0.25 x 0.50	991-138146-091	D22	
14.000-14.500	20	0.50	1.25	10	10	-40 to +75	0.50 x 0.50	994-039066-005	D18	
14.000-14.500	21	0.45	1.20	3	5	-40 to +70	0.350 x 0.475	991-140145-901	D21	
14.000-14.500	20	0.50	1.25	3	5	-40 to +80	0.25 x 0.50	991-140145-091	D22	
14.000-15.500	20	0.50	1.22	3	3	-20 to +70	0.25 x 0.50	991-140155-091	D22	
14.000-15.500	20	0.40	1.25	3	5	-45 to +85	0.350 x 0.475	991-140155-901	D21	
14.400-15.600	20	0.40	1.25	3	5	-20 to +95	0.350 x 0.475	991-144156-901	D21	
14.500-15.500	20	0.50	1.25	3	5	-20 to +70	0.25 x 0.50	991-145155-091	D22	
15.000-18.000	18	0.60	1.35	10	5	0 to +65	0.350 x 0.475	991-150180-901	D21	
17.300-18.400	20	0.55	1.22	1	15	0 to +65	0.350 x 0.475	991-173184-901	D21	
17.800-19.300	20	0.55	1.22	1	10	-30 to +80	0.350 x 0.475	991-178193-901	D21	
19.200-19.600	19	0.45	1.25	1	3	0 to +65	0.350 x 0.475	991-192196-901	D21	



# Drop-in Isolators - High Power

## Electrical Specifications

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
0.318-0.328	20	0.30	1.22	150	200	-10 to +85	1.50 x 1.80	991-318328-951	D24	
0.380-0.430	20	0.40	1.25	100	200	-20 to +80	1.50 x 1.80	991-380430-951	D24	
0.405-0.420	20	0.30	1.22	150	200	-10 to +85	1.50 x 1.80	991-405420-951	D24	
0.450-0.480	20	0.30	1.22	150	200	-10 to +85	1.50 x 1.80	991-450480-951	D24	
0.869-0.894	22	0.25	1.18	150	200	-10 to +70	1.00 x 1.25	891-869894-651	D11	
0.869-0.894	20	0.30	1.22	100	150	-10 to +85	1.00 x 1.25	991-869894-651	D25	14
0.890-0.910	20	0.30	1.22	150	200	-20 to +85	1.00 x 1.25	991-890910-651	D25	
0.920-0.960	20	0.35	1.22	70	70	-20 to +85	1.00 x 1.25	994-039050-011	D15	1
0.925-0.960	20	0.30	1.22	100	150	-10 to +85	1.00 x 1.25	991-925960-651	D25	14
0.960-1.230	15	0.60	1.44	50	50	-40 to +85	1.00 x 1.25	991-960123-651	D25	
1.020-1.040	20	0.30	1.22	100	150	-40 to +85	1.00 x 1.25	991-102104-655	D25	12
1.030-1.090	20	0.30	1.25	100	200	-10 to +65	1.00 x 1.25	991-103109-601	D11	1
1.080-1.100	20	0.30	1.22	100	150	-30 to +65	1.00 x 1.25	991-108110-653	D25	
1.200-1.400	20	0.40	1.22	100	150	-10 to +75	1.00 x 1.25	891-120140-601	D11	1
1.550-1.600	22	0.25	1.17	150	200	-20 to +70	1.00 x 1.25	891-155160-651	D11	
1.626-1.666	20	0.25	1.25	70	70	-40 to +70	0.75 x 1.00	094-039038-008	D16	1
1.670-1.675	22	0.30	1.18	100	150	-20 to +70	0.75 x 1.00	891-167167-401	D13	1
1.710-2.170	18	0.45	1.28	100	150	-20 to +85	1.00 x 1.25	991-171217-651	D25	
1.750-1.850	20	0.32	1.22	70	70	-20 to +70	0.75 x 1.00	891-175185-401	D13	1
1.800-1.880	22	0.25	1.15	30	30	-40 to +100	0.75 x 1.00	094-039038-015	D16	1
1.800-2.000	20	0.40	1.25	30	30	-40 to +100	0.75 x 1.00	094-039038-025	D16	1
1.805-1.880	20	0.25	1.20	100	150	-20 to +70	0.75 x 1.00	891-180188-451	D13	
1.805-1.880	21	0.28	1.20	100	100	-20 to +70	1.00 x 1.25	891-180188-651	D11	
1.805-1.880	20	0.30	1.22	100	150	-0 to +80	0.75 x 1.00	991-180188-451	D27	14
1.900-2.020	20	0.40	1.20	30	30	-40 to +100	0.75 x 1.00	994-039038-060	D16	1
1.930-1.990	24	0.30	1.19	70	70	-30 to +65	0.75 x 1.00	094-039038-028	D16	1
1.930-1.990	20	0.30	1.25	30	30	-40 to +100	0.75 x 1.00	094-039038-001	D16	1
1.930-1.990	22	0.30	1.18	70	70	-10 to +85	1.00 x 1.25	994-039065-004	D15	
1.930-1.990	20	0.30	1.22	100	150	-0 to +80	0.75 x 1.00	991-193199-451	D27	14

# Drop-in Isolators - High Power

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

Available in BeO and Non-BeO

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
1.930-1.990	21	0.28	1.20	100	150	-20 to +70	1.00 x 1.25	891-193199-651	D11	
2.000-2.400	17	0.50	1.30	100	150	0 to +80	0.75 x 1.00	891-200240-401	D13	1
2.090-2.190	21	0.27	1.22	30	30	-20 to +85	0.75 x 1.00	994-039038-044	D16	
2.100-2.200	20	0.25	1.25	30	30	-40 to +100	0.75 x 1.00	094-039038-022	D16	1
2.100-2.200	21	0.28	1.20	150	150	-20 to +70	0.75 x 1.00	891-210220-451	D13	
2.110-2.170	22	0.28	1.17	150	150	-20 to +70	0.75 x 1.00	891-211217-451	D13	
2.110-2.170	20	0.30	1.22	100	150	-0 to +80	0.75 x 1.00	991-211217-451	D27	14
2.200-2.500	20	0.30	1.22	75	75	-20 to +85	0.75 x 1.00	991-220250-451	D27	
2.300-2.700	19	0.40	1.25	150	150	-20 to +70	0.75 x 1.00	891-230270-451	D13	
2.320-2.330	22	0.23	1.17	150	150	-40 to +100	0.75 x 1.00	891-232233-451	D13	
2.370-2.400	20	0.25	1.20	30	30	-40 to +100	0.75 x 1.00	094-039038-005	D16	1
2.400-2.500	20	0.25	1.22	100	150	-20 to +70	0.75 x 1.00	891-240250-451	D13	
2.400-2.600	20	0.38	1.22	100	100	-20 to +70	0.75 x 1.00	891-240260-401	D13	1
2.500-2.700	20	0.27	1.20	100	150	-20 to +70	0.75 x 1.00	891-250270-401	D13	1
2.600-2.700	21	0.27	1.20	100	150	-20 to +70	0.75 x 1.00	891-260270-451	D13	
2.700-2.900	20	0.35	1.22	30	30	-30 to +85	0.75 x 1.00	994-039038-058	D16	1
3.400-3.700	20	0.35	1.25	20	20	0 to +70	0.75 x 1.00	991-340370-451	D27	1
4.200-4.400	20	0.50	1.25	30	10	-55 to +95	0.375 x 0.620	991-420440-901	D23	1
5.800-6.500	20	0.40	1.25	20	20	-40 to +85	0.50 x 0.95	094-039043-001	D19	1
5.800-6.700	20	0.40	1.25	20	20	-40 to +85	0.50 x 0.95	094-039043-002	D19	1
7.100-7.300	20	0.30	1.22	50	50	-20 to +65	0.50 x 0.50	991-710730-201	D06	
9.900-10.100	20	0.30	1.22	50	50	-30 to +70	0.50 x 0.50	991-990101-201	D06	
12.700-13.300	20	0.40	1.22	30	30	-30 to +70	0.350 x 0.475	991-127133-903	D21	
13.700-14.500	19	0.30	1.20	30	30	-40 to +85	0.350 x 0.475	991-137145-903	D21	



# Drop-in Isolator-Attenuators: 20 or 30 dB tabs

## Electrical Specifications

\* Case Temperature Not To Exceed Operating Temperature

All part numbers have clockwise rotation. Counter clockwise rotation is available.

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Monitor tab Attenuation (-dB)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes See Page 15
0.850-0.960	21	0.25	1.20	100	150	20	-20 to +85	1.00 x 1.25	992-850960-651	D37	
0.869-0.894	20	0.28	1.22	100	150	20	-20 to +85	1.00 x 1.25	992-869894-651	D37	13
0.869-0.894	22	0.25	1.18	100	200	30	-10 to +70	1.00 x 1.25	892-869894-653	D31	
0.910-0.970	21	0.25	1.20	100	150	20	0 to +65	1.00 x 1.25	992-910970-653	D37	13
0.925-0.960	20	0.28	1.22	100	150	20	-20 to +85	1.00 x 1.25	992-925960-651	D37	13
0.925-0.960	22	0.25	1.18	100	200	30	-10 to +70	1.00 x 1.25	892-925960-653	D31	
1.200-1.400	20	0.25	1.22	75	100	20	-40 to +85	1.00 x 1.25	992-120140-651	D37	
1.626-1.666	20	0.30	1.25	75	75	20	-40 to +70	0.75 x 1.00	994-039038-059	D34L	1, 10
1.805-1.880	20	0.30	1.22	100	100	20	-20 to +85	1.00 x 1.25	992-180188-651	D37	14
1.805-1.880	20	0.30	1.25	30	50	20	-40 to +80	0.75 x 1.00	994-039038-061	D34	1
1.805-1.880	21	0.28	1.20	50	70	20	-20 to +70	1.00 x 1.25	892-180188-651	D31	
1.805-1.880	20	0.25	1.20	100	150	30	-20 to +70	0.75 x 1.00	892-180188-453	D32	
1.900-2.020	20	0.25	1.22	100	200	30	-10 to +85	1.00 x 1.50	994-039067-004	D33	
1.922-1.988	23	0.15	1.15	100	150	30	-10 to +80	0.75 x 1.00	892-192199-453	D32	
1.930-1.990	20	0.25	1.25	30	30	20	-40 to +100	0.75 x 1.00	994-039038-062	D34L	1, 10
1.930-1.990	20	0.25	1.20	100	150	20	-20 to +70	0.75 x 1.00	892-193199-451	D32	
1.930-1.990	20	0.30	1.22	100	75	20	-20 to +85	1.00 x 1.25	992-193199-651	D37	14
2.000-2.150	20	0.25	1.25	30	30	30	-30 to +90	0.75 x 1.00	094-039038-024	D34	1
2.090-2.190	21	0.27	1.22	50	50	20	-20 to +85	0.75 x 1.00	994-039038-046	D34	
2.100-2.200	21	0.25	1.20	100	150	20	-20 to +70	0.75 x 1.00	892-210220-451	D32	
2.110-2.170	22	0.25	1.18	100	75	20	-30 to +80	0.75 x 1.00	992-211217-451	D38	14
2.190-2.390	23	0.28	1.15	100	150	20	-20 to +70	0.75 x 1.00	892-219239-451	D32	
2.993-3.007	21	0.26	1.16	100	150	20	-20 to +70	0.75 x 1.00	892-299300-451	D32	
2.300-2.400	21	0.26	1.20	100	150	30	-20 to +70	0.75 x 1.00	892-230240-453	D32	
2.300-2.700	20	0.40	1.25	30	30	20	-40 to +100	0.75 x 1.00	994-039038-063	D34L	1, 10
2.370-2.400	20	0.25	1.25	30	30	20	-40 to +100	0.75 x 1.00	094-039038-021	D34	1
2.400-2.500	20	0.25	1.22	100	150	20	-20 to +70	0.75 x 1.00	892-240250-451	D32	
2.500-2.700	20	0.30	1.25	30	30	20	-30 to +70	0.75 x 1.00	094-039038-027	D34	1
2.600-2.700	21	0.25	1.20	100	150	20	-20 to +70	0.75 x 1.00	892-260270-451	D32	
3.500-3.600	20	0.30	1.22	20	20	20	-20 to +85	0.75 x 1.00	992-350360-451	D38	13

## 20 or 30 dB monitor tabs available on all Drop-in Isolator-Attenuators

Low IMD designs - see notes 13 and 14

# Drop-in Circulators & Isolators - Single Junction Mechanical Outlines and Notes

All catalog part numbers are for devices with clockwise rotation, however counter clockwise rotation is available by request. Consult the factory for special performance and unique mechanical configurations. We have many other designs not listed in the catalog, and develop new designs almost on a daily basis.

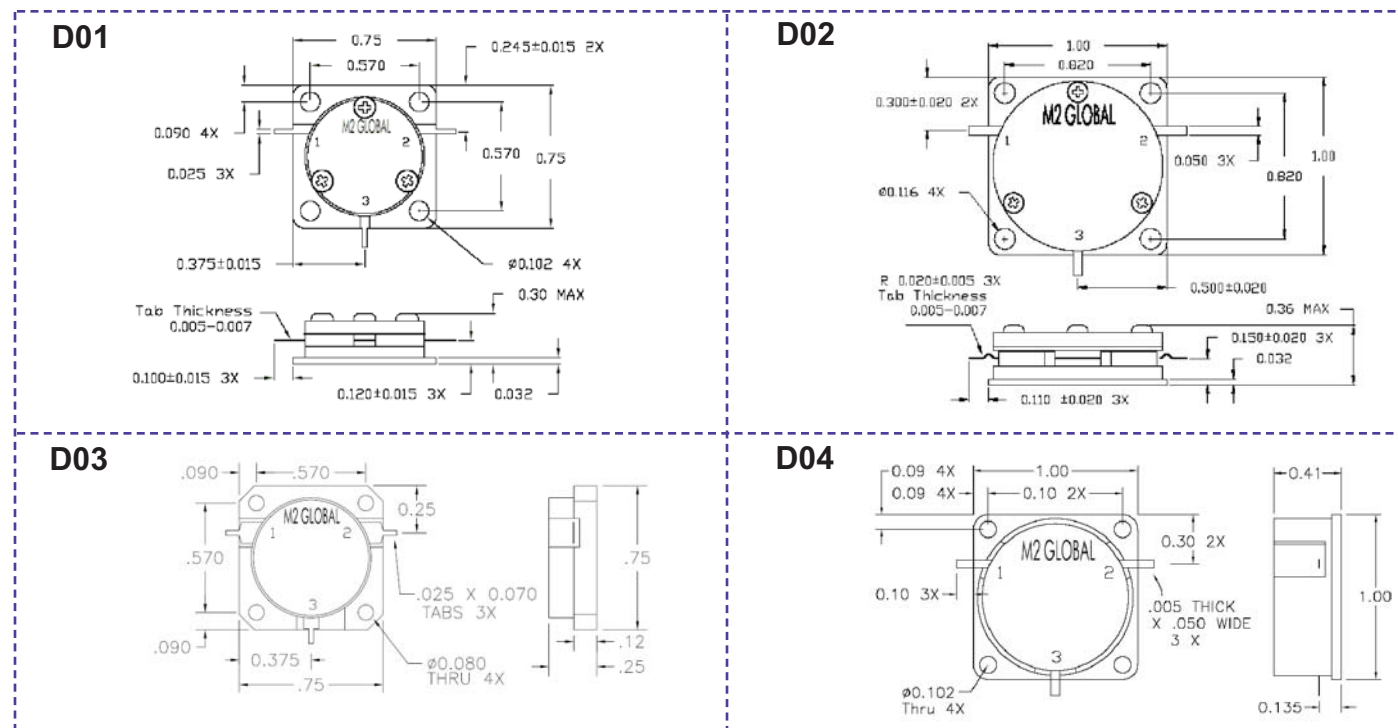
**Encapsulation is available on some designs for high peak power & high altitude capability.**

### Mechanical Specifications

### NOTES

- Note 1: BeO termination
- Note 3: four mounting holes are 0.110 in. diameter
- Note 5: four mounting holes are 0.094 in. diameter
- Note 7: tab height is 0.080 in.
- Note 9: tab height is 0.120 in.
- Note 12: encapsulated for high peak power
- Note 14: -80 dBc IMD with 2 tones at 20W

- Note 2: four mounting holes are 0.116 in. diameter
- Note 4: four mounting holes are 0.102 in. diameter
- Note 6: tab height is 0.075 in.
- Note 8: tab height is 0.150 in.
- Note 10: monitor tab is on left of termination, available on right
- Note 13: -70 dBc IMD with 2 tones at 20W

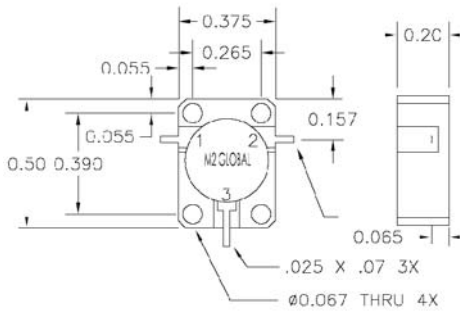




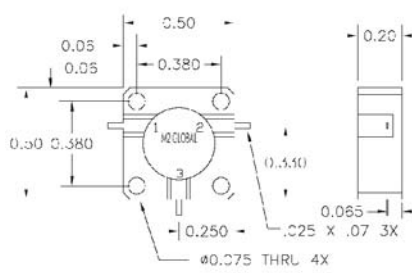
# Drop-in Circulators & Isolators

## Mechanical Specifications continued

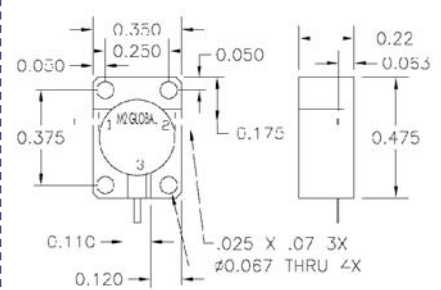
**D05**



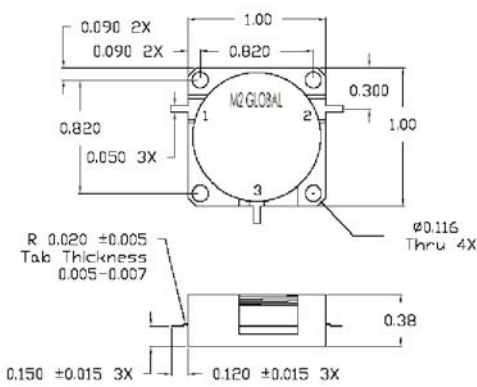
**D06**



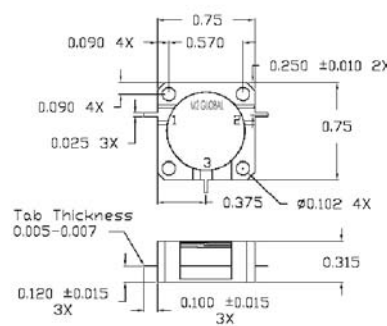
**D07**



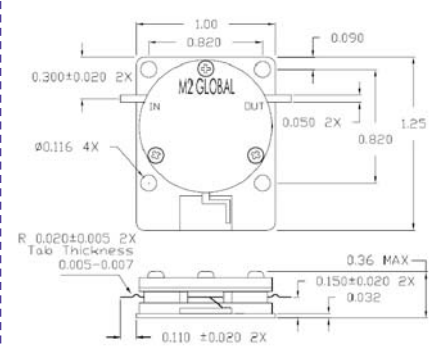
**D08**



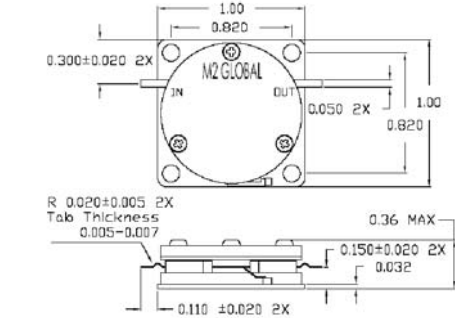
**D09**



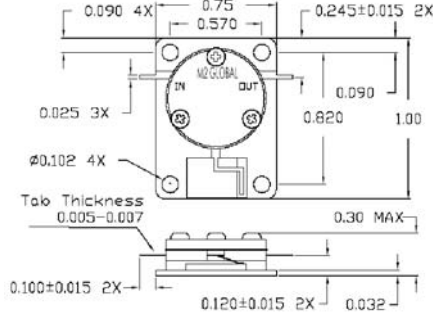
**D11**



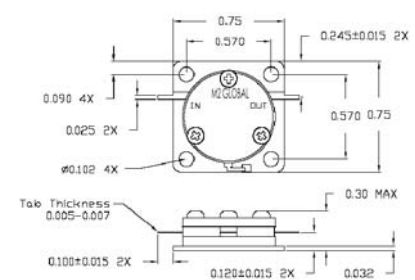
**D12**



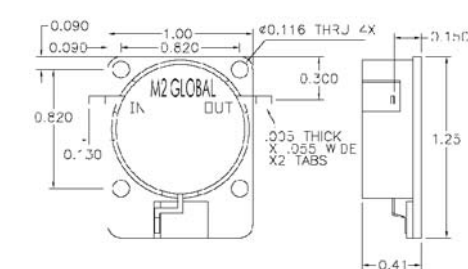
**D13**



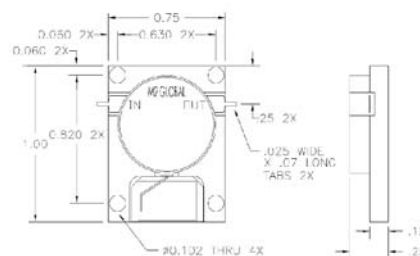
**D14**



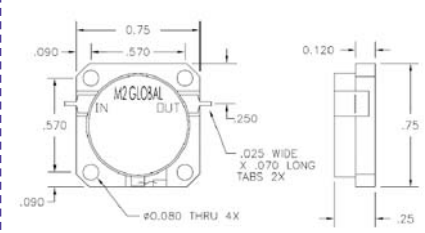
**D15**



**D16**



**D17**

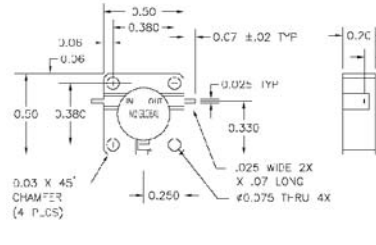




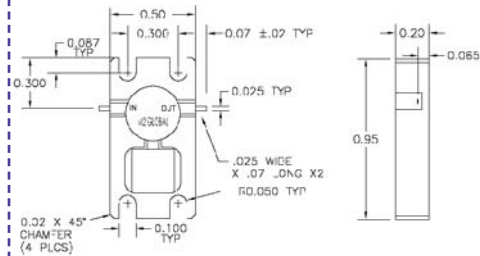
# Drop-in Circulators & Isolators

## Mechanical Specifications continued

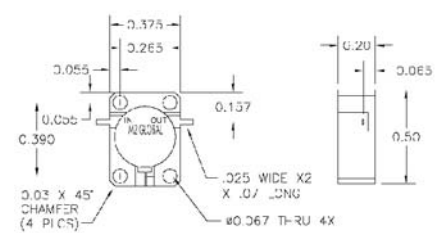
**D18**



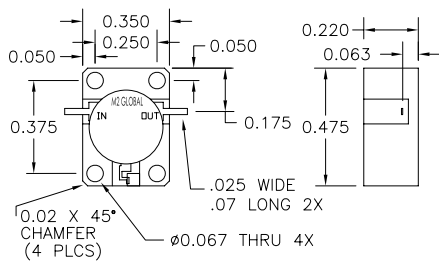
**D19**



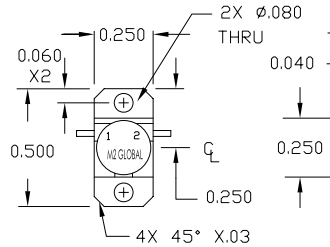
**D20**



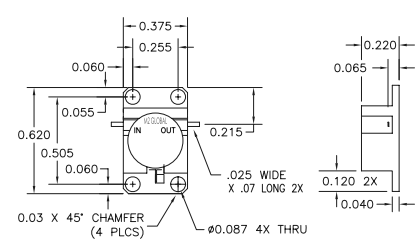
**D21**



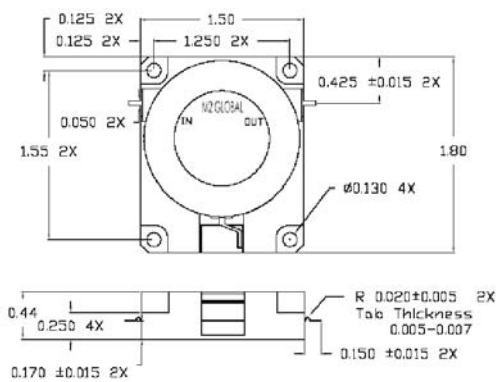
**D22**



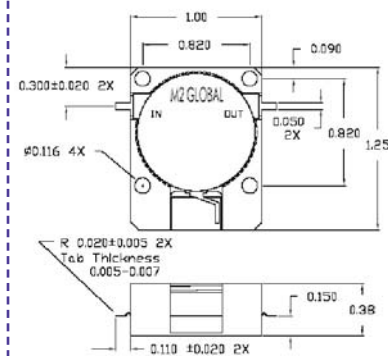
**D23**



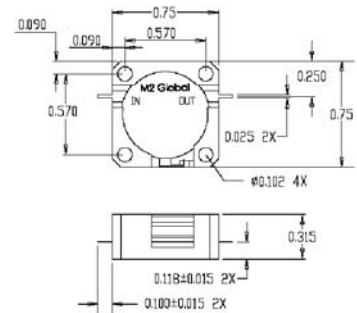
**D24**



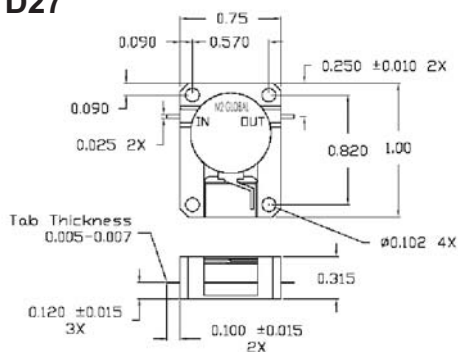
**D25**



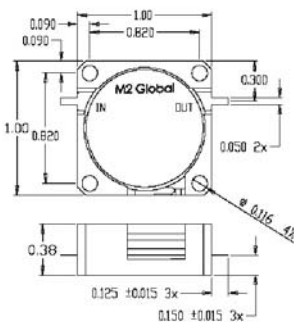
**D26**



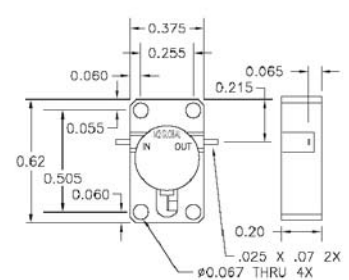
**D27**



**D28**



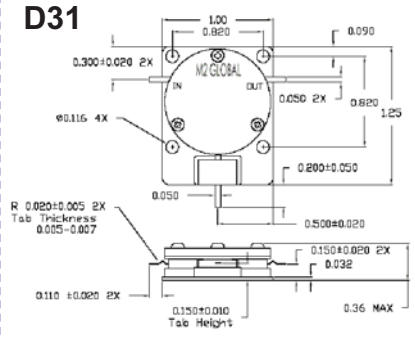
**D29**



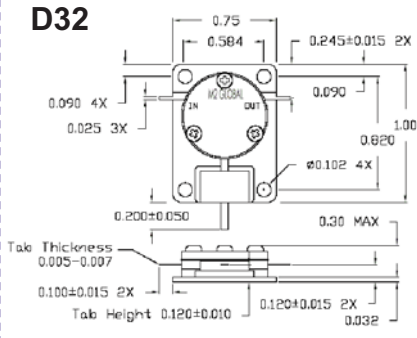
# Drop-in Circulators & Isolators

## Mechanical Specifications continued

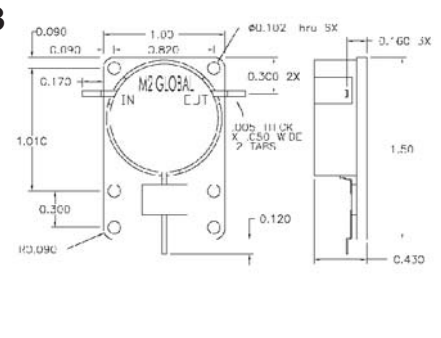
**D31**



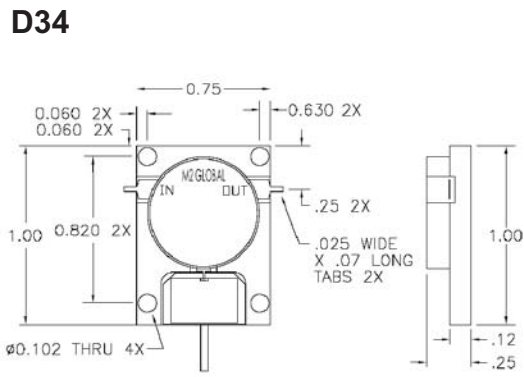
**D32**



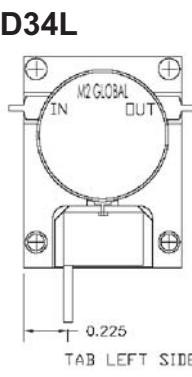
**D33**



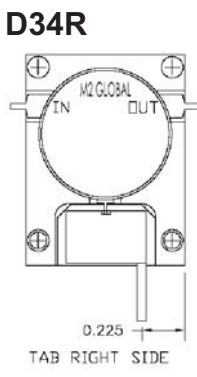
**D34**



**D34L**

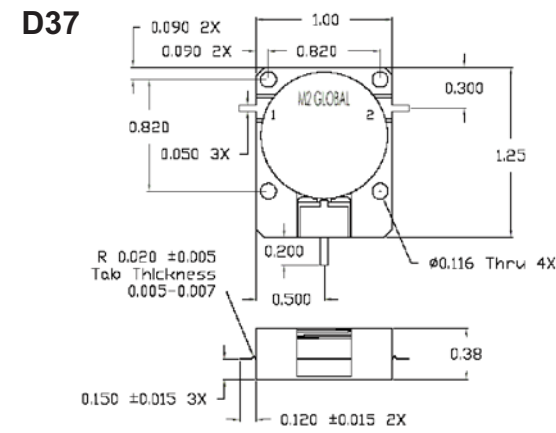


**D34R**

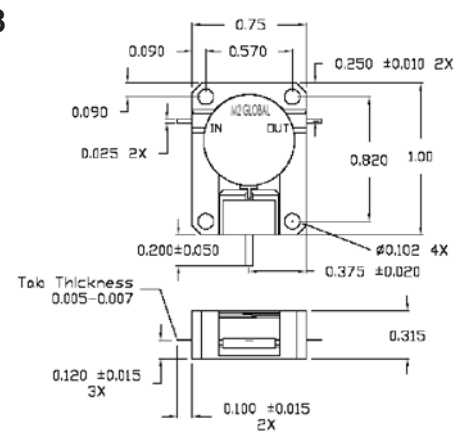


Monitor tabs are shown in center position on outline drawings, but may be requested for left or right hand side, as shown in diagrams to left.

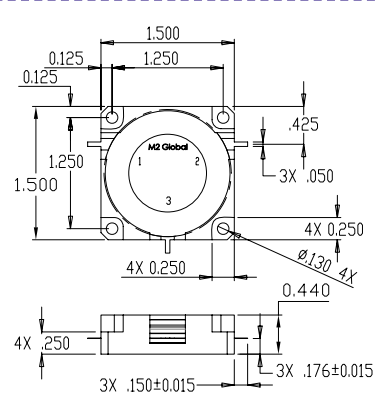
**D37**



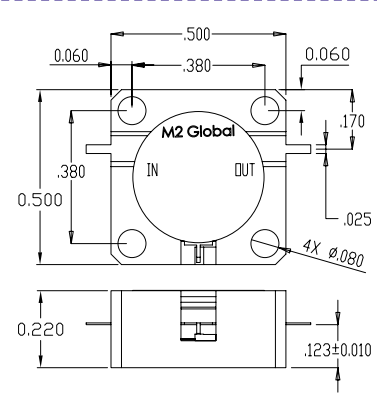
**D38**



**D39**



**D40A**



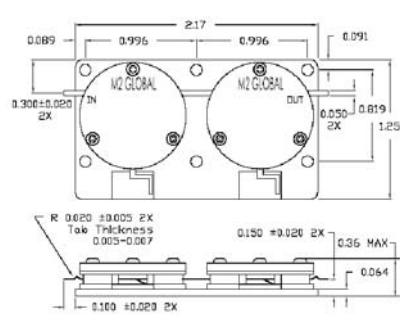
# Dual Junction Drop-in Isolators

## Electrical Specifications

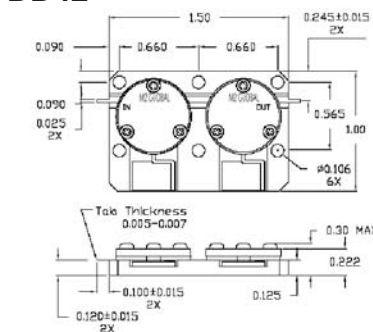
Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Operating * Temperature °C	Footprint (in x in)	Part Number	Outline Drawing	Notes
0.380-0.400	50	0.60	1.25	110	150	0 to +60	3.10 x 1.80	991-390400-851	DD45	
0.824-0.960	40	0.70	1.22	100	150	-20 to +85	2.17 x 1.25	891-824960-851	DD43	
0.921-0.961	50	0.50	1.18	100	150	0 to +85	2.17 x 1.25	891-921960-853	DD40	
1.020-1.040	20	0.25	1.22	100	150	-40 to +100	1.25 x 2.00	991-102104-851	DD46	
1.710-1785	45	0.60	1.18	150	150	-20 to +75	1.50 x 1.00	891-171178-851	DD42	
1.710-1.990	40	0.70	1.22	100	75	-20 to +85	1.50 x 1.00	991-171199-851	DD44	
1.805-1.880	45	0.60	1.18	150	150	-20 to +75	1.50 x 1.00	891-180188-855	DD42	
1.805-1.880	45	0.60	1.18	100	150	-20 to +75	2.17 x 1.25	891-180188-853	DD40	
1.850-1.910	45	0.60	1.18	150	150	-20 to +75	1.50 x 1.00	891-185191-851	DD42	
1.920-2.170	40	0.70	1.22	100	75	-20 to +85	1.50 x 1.00	991-192217-851	DD44	
1.930-1.990	45	0.60	1.18	150	150	-20 to +75	1.50 x 1.00	891-193199-855	DD42	
1.930-1.990	50	0.50	1.19	100	150	0 to +85	2.17 x 1.25	891-193199-865	DD40	
2.100-2.500	35	0.60	1.28	100	25	-40 to +85	1.50 x 1.00	991-210250-851	DD44	
2.110-2.170	45	0.55	1.17	100	150	-20 to +70	1.50 x 1.00	891-200217-851	DD42	
10.600-11.800	38	0.90	1.25	10	4	0 to +85	0.700 x 0.475	991-106118-803	DD47	
12.700-13.300	38	0.80	1.25	10	4	0 to +85	0.700 x 0.475	991-127133-803	DD47	
14.400-15.400	38	0.80	1.25	10	4	0 to +85	0.700 x 0.475	991-144154-803	DD47	

## Mechanical Specifications

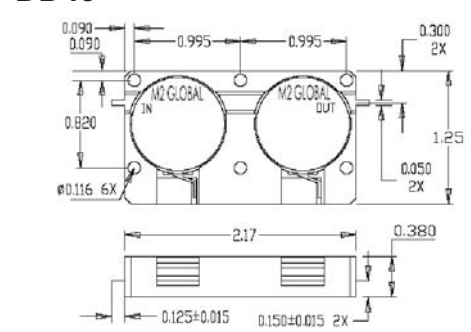
**DD40**



**DD42**

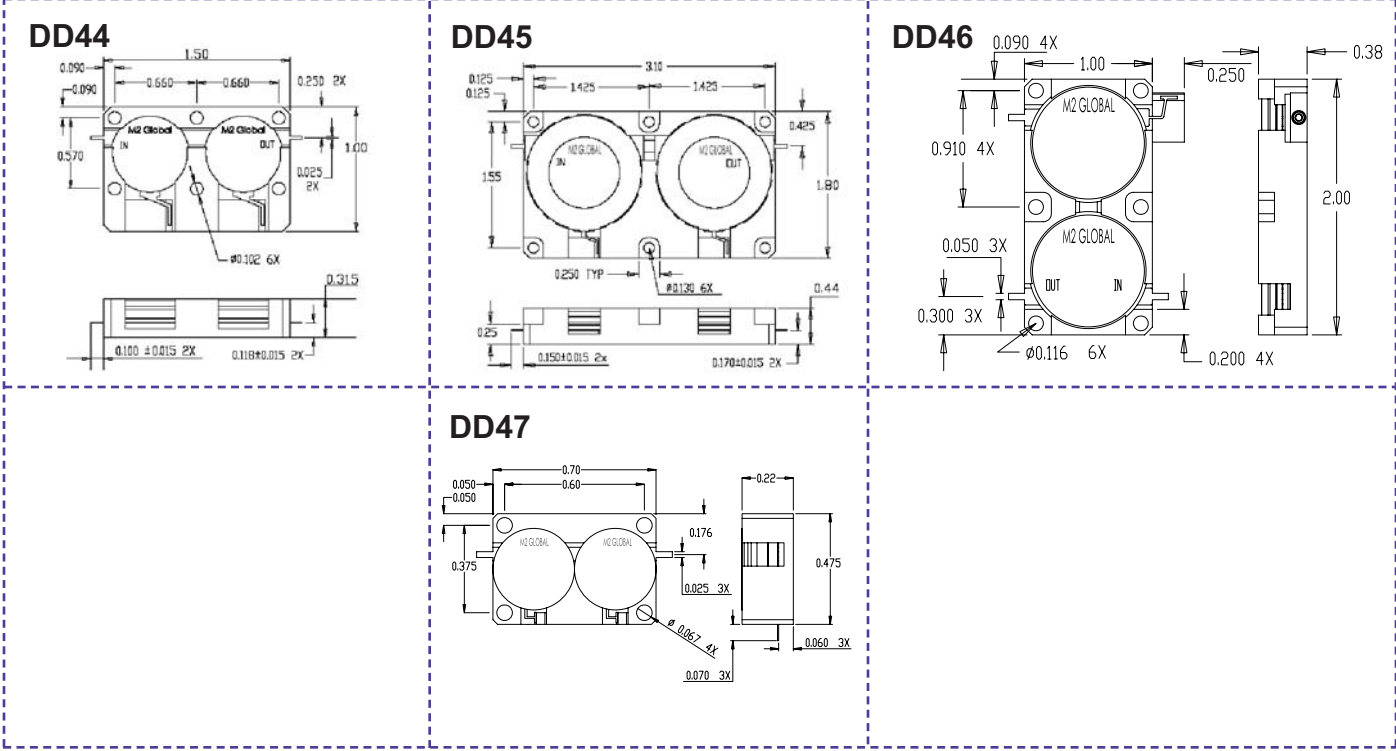


**DD43**





**Mechanical Specifications continued**



# Coax Circulators & Isolators

Broadcast Bands Circulators	Page 21
Modular Coax Circulators and Isolators	Page 22
Octave and Broadband Circulators and Isolators	Page 24
Standard Coax Circulators	Page 25
Standard Coax Isolators	Page 27
Outlines and Notes for Standard Coax Circulators & Isolators	Page 32

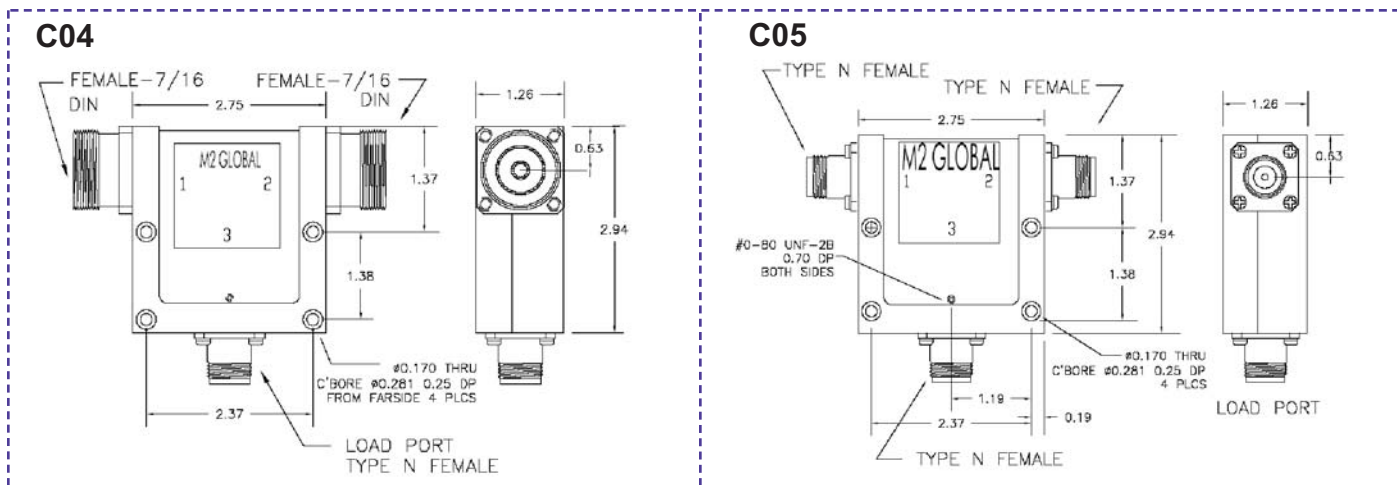
## Broadcast Bands

All part numbers have clockwise rotation.  
 Counter clockwise rotation is available.

Electrical Specifications		# F = Female Connector M = Male Connector		* Case Temperature Not To Exceed Operating Temperature						
Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Connector # Configuration		Power Rating (Watts)	Dimensions (in x in x in)	Part Number	Outline Drawing	Notes
0.470-0.518	0.30	1.20	0 to +65	DIN	FFF	700	2.75 x 2.94 x 1.26	994-038072-021	C04	
0.470-0.548	0.30	1.20	0 to +65	N-Type	FFF	700	2.75 x 2.94 x 1.26	994-038072-025	C05	
0.518-0.596	0.30	1.20	0 to +65	DIN	FFF	700	2.75 x 2.94 x 1.26	994-038072-022	C04	
0.542-0.656	0.30	1.20	0 to +65	N-Type	FFF	700	2.75 x 2.94 x 1.26	994-038072-026	C05	
0.596-0.704	0.30	1.20	0 to +65	DIN	FFF	700	2.75 x 2.94 x 1.26	994-038072-023	C04	
0.650-0.806	0.30	1.20	0 to +65	N-Type	FFF	700	2.75 x 2.94 x 1.26	994-038072-027	C05	
0.701-0.806	0.30	1.20	0 to +65	DIN	FFF	700	2.75 x 2.94 x 1.26	994-038072-024	C04	
0.806-0.860	0.30	1.20	0 to +65	N-Type	FFF	700	2.75 x 2.94 x 1.26	994-038072-028	C05	

## Mechanical Specifications

Isolator versions are available.



# Coax Isolators & Circulators (modular design) High Power ratings with optional encapsulation

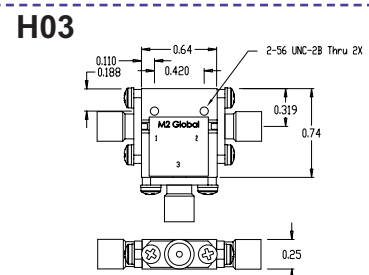
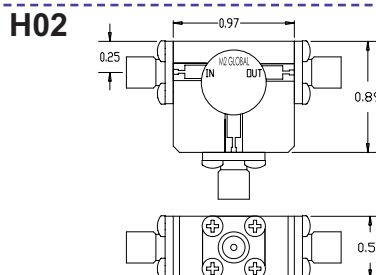
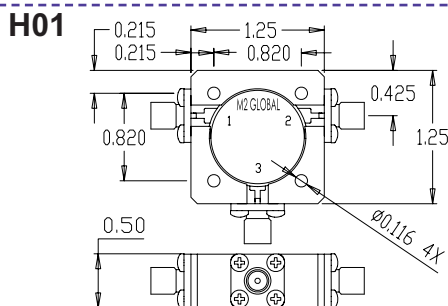
## Electrical Specifications

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Reverse Power (Watts)	Forward Power (Watts)	Monitor Tab Attenuation (-dBc)	Operating * Temperature °C	Footprint (in x in)	SMA or N-Type	Part Number	Outline Drawing	Notes
<b>Single Junction Circulators</b>												
1.010-1.100	-	0.45	1.25	100	100	-	-40 to +85	1.25 x 1.25	SMA	995-101110-501	H01	1, 2
1.030-1.090	-	0.40	1.22	150	150	-	-40 to +85	1.25 x 1.25	N-Type	995-103109-501	H10	1
1.400-1.500	-	0.40	1.22	80	80	-	-40 to +85	0.97 x 0.89	SMA	995-140150-401	H02	
2.200-2.300	-	0.35	1.22	10	75	-	-20 to +85	0.97 x 0.89	SMA	995-220230-401	H02	
5.400-5.900	-	0.40	1.22	20	20	-	-10 to +85	0.64 x 0.74	SMA	995-540590-101	H03	
<b>Single Junction Isolators</b>												
1.020-1.040	19	0.45	1.25	10	100	-	-40 to +85	1.25 x 1.25	SMA	996-102104-505	H04	2
1.020-1.040	19	0.45	1.25	10	100	-	-40 to +85	1.25 x 1.25	SMA	996-102104-503	H08	
2.100-2.200	20	0.50	1.20	50	50	20	-20 to +85	0.97 x 1.07	SMA	996-210220-901	H07	
2.200-2.300	20	0.35	1.22	10	75	-	-20 to +85	0.97 x 0.89	SMA	996-220230-405	H05	
2.200-2.300	20	0.35	1.22	10	75	-	-20 to +85	0.97 x 0.89	SMA	996-220230-403	H09	
2.400-2.700	20	0.40	1.25	10	75	-	-20 to +85	0.97 x 0.89	SMA	996-240270-401	H09	
5.400-5.900	20	0.4	1.22	10	85	-	-10 to +85	0.64 x 0.74	SMA	996-540590-101	H06	
<b>Dual Junction Isolators</b>												
0.440-0.460	40	0.80	1.15	150	200	-	0 to +70	3.40 x 1.80	N-Type	996-440660-801	H21	
0.824-0.849	50	0.60	1.22	100	100	-	-40 to +85	2.50 x 1.25	SMA	996-824849-891	H20	
1.850-1.910	50	0.60	1.22	100	100	-	-40 to +85	2.50 x 1.25	SMA	996-185191-891	H20	

These modular design isolators and circulators provide coax units with the inherent advantages of drop-in devices, including good heat sinking, high power terminations, and 20/30 dB tabs for reverse power monitoring. Models H01, H02, and H03 can be equipped with terminations, up to 75W, while model H04 can have terminations up to 200W. The smaller H03 models can be used at frequencies up to 14 GHz. Optional mounting hole patterns are provided, see page 23.

## Mechanical Specifications

Note 1. Devices are encapsulated for high peak power and high altitude.  
Note 2. IMD performance is -75 dBc with 2 tones at 20W.





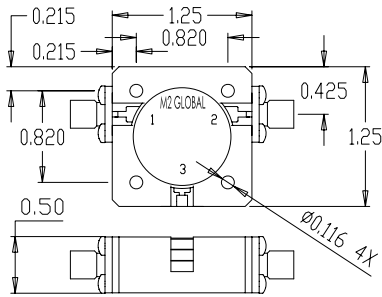
A Service Disabled  
Veteran-Owned Business



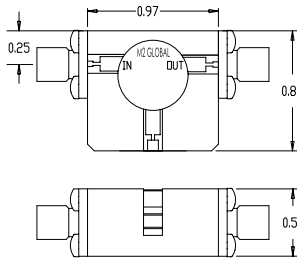
# Coax Isolators & Circulators (modular design) High Power rating with optional encapsulation

## Mechanical Specifications continued

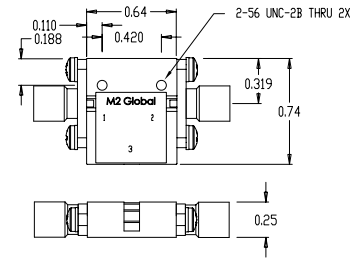
**H04**



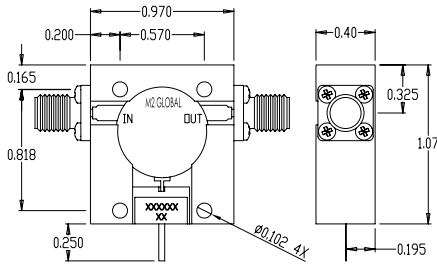
**H05**



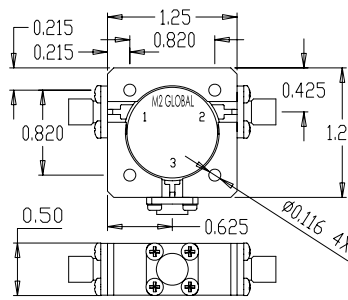
**H06**



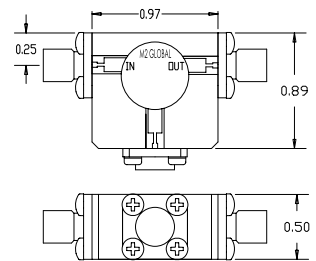
**H07**



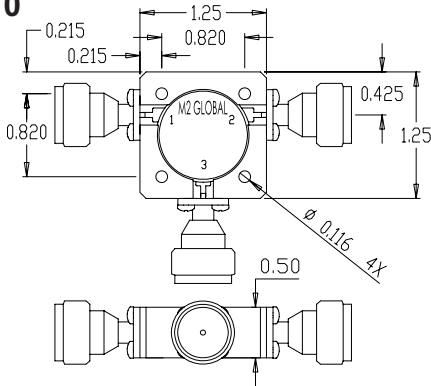
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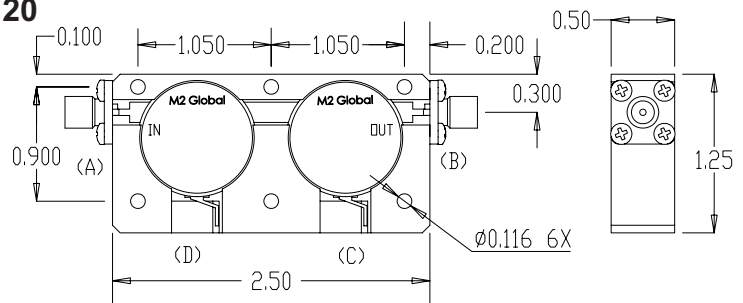
**H09**



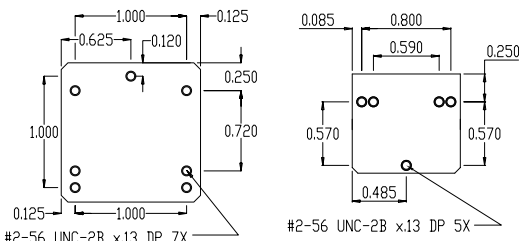
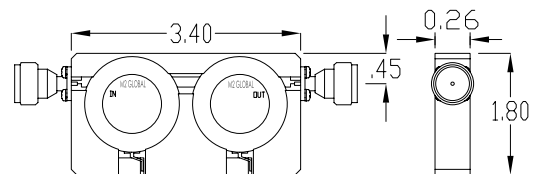
**H10**



**H20**

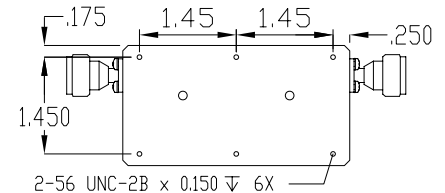


**H21**



**H01 H04 Mounting holes H02 H05**

**H21**  
Mounting holes







# Octave and Wide Bandwidth (>50%) Coax Isolators and Circulators

The isolator part numbers listed below all have FFT configuration (female-female-termination) with clockwise rotation. The other standard configurations (FMT, MFT, MMT) and counter-clockwise rotation are available for any of these part numbers by request.

In addition many designs are available in non-standard configurations such as FTF, MTF, TFF etc, and also with mixed SMA and N-type connectors. Please consult the factory for non-standard configurations.

Electrical Specifications		# F = Female M = Male T = Termination	N = N-Type S = SMA	* Case Temperature Not To Exceed Operating Temperature							
Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Dimensions (in x in x in)	Part Number	# Connector & Termination Configuration		Outline Drawing	Notes See Page 32
1.000-1.525	20	0.50	1.25	0 to +65	15	3.00x3.00x1.03	996-100152-901	S	FFT	C35	
1.0-2.0	17	0.50	1.35	0 to +50	10	3.00x3.00x1.03	996-100200-903	N	FFT	C35	
2.0-4.0	-	0.50	1.25	0 to +50	-	1.75x1.76x0.75	094-037114-001	S	FFF	C14	
2.0-4.0	20	0.50	1.25	0 to +50	10	1.75x1.76x0.75	094-037115-001	S	FFT	C14	
2.0-4.0	-	0.50	1.25	0 to +50	-	1.75x1.76x0.75	994-037117-003	N	FFF	C14	
2.0-4.0	20	0.50	1.25	0 to +50	10	1.75x1.76x0.75	994-037115-004	N	FFT	C14	
2.0-5.0	15	0.80	1.67	-40 to +55	10	1.75x1.76x0.75	996-200500-801	S	FFT	C14	
3.0-6.0	20	0.40	1.25	-20 to +65	10	1.00x1.00x0.60	996-300600-401	S	FFT	C17	
3.40-6.75	18	0.50	1.30	-20 to +65	10	1.00x1.10x0.70	996-340675-401	N	FFT	C31	
4.0-8.0	-	0.40	1.25	0 to +50	-	1.00x1.10x0.58	094-037170-001	S	FFF	C18	
4.0-8.0	20	0.40	1.25	0 to +50	10	1.00x1.10x0.58	094-037168-001	S	FFT	C18	
7.0-12.4	-	0.50	1.25	-20 to +65	-	0.74x0.90x0.50	094-037201-001	S	FFF	C23	
7.0-12.4	20	0.50	1.25	-20 to +65	10	0.74x0.90x0.50	094-037202-001	S	FFT	C23	
7.0-17.0	15	0.80	1.50	-40 to +55	10	0.62x0.75x0.50	996-700170-101	S	FFF	C25	2
8.0-12.0	18	0.40	1.20	0 to +50	10	0.74x0.90x0.50	994-037855-003	S	FFT	C23	
8.0-12.4	23	0.40	1.25	+20 to +50	10	1.00x1.00x0.56	996-800124-401	S	FFT	C42	
8.20-16.2	16	0.60	1.38	0 to +65	10	0.62x0.75x0.50	996-820162-101	S	FFT	C25	
10.0-15.0	-	0.50	1.30	-20 to +65	-	0.62x0.75x0.50	094-037510-004	S	FFF	C25	2
10.0-15.0	20	0.50	1.30	-20 to +65	1	0.62x0.75x0.50	094-037510-003	S	FFT	C25	
11.0-18.0	-	0.50	1.35	-20 to +65	-	0.62x0.75x0.50	994-037423-003	S	FFF	C25	
10.0-22.0	15	0.90	1.44	-10 to +75	10	0.62x0.75x0.50	996-100220-001	S	FFT	C25	
11.0-18.0	18	0.50	1.35	-20 to +65	1	0.62x0.75x0.50	994-037423-001	S	FFT	C25	
12.4-18.0	-	0.50	1.25	-20 to +65	-	0.62x0.75x0.50	094-037298-001	S	FFF	C25	
12.4-18.0	20	0.50	1.25	-20 to +65	10	0.62x0.75x0.50	094-037296-001	S	FFT	C25	

# Coax Circulators

The circulator part numbers listed below all have FFF configuration (female-female-female) with clockwise rotation. The other standard configurations (FFM, FMF, MFF, MMF, MFM, FMM, and MMM) and counter-clockwise rotation are available for any of these part numbers by request.

In addition many designs are available in non-standard configurations with mixed SMA and N-type connectors. Please consult the factory for non-standard configurations.

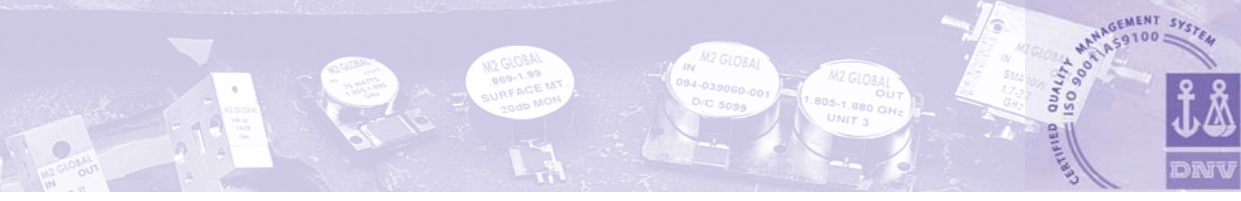
## Electrical Specifications

# F = Female  
M = Male

N = N-Type  
S = SMA

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Dimensions (in x in x in)	Part Number	# Connector Configuration	Outline Drawing	Notes See Page 32
0.750-0.960	0.40	1.20	-10 to +65	1.68x2.05x1.27	094-037054-002	N FFF	C06	
0.750-0.960	0.40	1.20	-10 to +65	1.25x1.25x0.87	094-037055-003	S FFF	C07	
0.800-0.900	0.40	1.15	-10 to +65	1.25x1.25x0.87	094-037065-001	S FFF	C07	
0.850-0.960	0.40	1.25	-20 to +65	1.68x2.05x1.27	994-037054-006	N FFF	C06	
0.850-0.960	0.40	1.20	0 to +50	1.25x1.25x0.87	995-850960-501	S FFF	C07	
0.850-1.100	0.40	1.20	0 to +50	1.25x1.25x0.87	995-850110-501	S FFF	C07	
0.902-0.928	0.35	1.20	-20 to +65	1.25x1.25x0.87	995-902928-501	S FFF	C07	
0.950-1.225	0.40	1.25	-20 to +60	1.25x1.25x0.55	094-037071-002	S FFF	C08	
0.960-1.220	0.40	1.20	0 to +60	1.25x1.25x0.55	994-037526-003	S FFF	C08	
1.020-1.100	0.40	1.20	0 to +60	1.25x1.25x0.55	994-037526-002	S FFF	C08	
1.200-1.500	0.40	1.20	-20 to +65	1.25x1.25x0.87	994-037075-005	S FFF	C09	
1.500-2.000	0.40	1.25	-10 to +85	1.56x1.94x1.00	995-150200-601	S FFF	C11	3
1.700-2.000	0.40	1.20	-20 to +60	1.00x1.00x0.50	094-037086-001	S FFF	C10	
1.700-2.100	0.30	1.15	-20 to +65	1.56x1.94x1.00	094-037092-001	S FFF	C11	3
1.700-2.100	0.30	1.15	-20 to +65	1.56x1.94x1.00	094-037096-004	N FFF	C11	
1.700-2.300	0.40	1.30	-20 to +65	1.56x1.94x1.00	094-037095-001	S FFF	C11	
1.700-2.300	0.40	1.30	-20 to +65	1.56x1.94x1.00	994-037097-002	N FFF	C11	3
1.700-2.300	0.30	1.29	-20 to +60	2.00x2.00x0.75	995-170230-942	S FFF	C39	
1.800-2.100	0.40	1.15	-20 to +60	1.00x1.00x0.50	094-037100-001	S FFF	C10	
1.800-2.800	0.40	1.30	-20 to +65	1.63x1.63x0.76	995-180280-701	S FFF	C13	
1.900-2.300	0.30	1.15	-20 to +65	1.56x1.94x1.00	994-037596-007	S FFF	C11	
1.900-2.300	0.30	1.15	-20 to +65	1.56x1.94x1.00	994-037717-002	N FFF	C11	3
1.900-2.350	0.35	1.22	0 to +60	1.63x1.63x0.76	994-037107-007	S FFF	C13	
1.900-2.500	0.40	1.25	-20 to +65	1.63x1.63x0.76	094-037107-002	S FFF	C13	1
2.000-2.300	0.40	1.20	-20 to +60	1.00x1.00x0.50	994-037108-006	S FFF	C10	2
2.000-2.500	0.40	1.30	-20 to +80	1.56x1.94x1.00	995-200250-601	N FFF	C11	3
2.200-2.700	0.40	1.25	-20 to +65	1.56x1.94x1.00	994-037127-002	S FFF	C11	



# Coax Circulators

## Electrical Specifications continued

# F = Female  
M = Male

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Dimensions (in x in x in)	Part Number	# Connector Configuration		Outline Drawing	Notes See Page 32
2.200-2.700	0.40	1.25	-20 to +65	1.56x1.94x1.00	094-037121-001	N	FFF	C11	3
2.400-2.700	0.40	1.25	-20 to +65	1.00x1.00x0.50	994-037133-006	S	FFF	C10	
3.400-4.200	0.40	1.20	-20 to +65	1.00x1.36x1.00	994-037146-007	N	FFF	C15	
3.400-4.200	0.40	1.25	-20 to +65	0.75x0.89x0.50	994-037139-004	S	FFF	C16	
3.600-4.200	0.30	1.15	-20 to +65	1.00x1.36x1.00	994-037763-003	N	FFF	C15	
3.600-4.200	0.20	1.10	-20 to +65	0.75x0.89x0.50	994-037162-006	S	FFF	C16	
3.700-6.500	0.40	1.25	-20 to +65	1.00x1.00x0.60	094-037164-002	S	FFF	C17	
4.400-5.100	0.20	1.10	-20 to +65	0.75x0.86x0.49	094-037806-005	S	FFF	C19	2
4.400-5.100	0.40	1.20	-20 to +65	0.75x0.86x0.49	094-037806-009	N	FFF	C19	
4.400-5.900	0.40	1.30	-40 to +70	1.00x1.00x0.60	994-037164-007	S	FFF	C17	
5.000-6.000	0.45	1.18	-20 to +65	1.00x1.00x0.60	995-500600-401	S	FFF	C17	
5.400-5.900	0.40	1.25	-20 to +65	0.50x0.67x0.50	094-037180-001	S	FFF	C20	
5.700-5.900	0.20	1.13	-30 to +85	0.88x0.88x0.73	094-037189-015	S	FFF	C21	
5.900-8.500	0.40	1.25	-20 to +65	0.87x0.87x0.74	094-037188-003	S	FFF	C21	
5.925-7.125	0.20	1.22	-30 to +65	1.00x1.10x0.50	995-592712-401	S	FFF	C36	
6.400-7.100	0.20	1.15	-10 to +70	1.00x1.10x0.50	995-640710-403	S	FFF	C36	
7.100-8.500	0.20	1.15	-10 to +70	1.00x1.10x0.50	995-710850-423	S	FFF	C36	
7.900-8.400	0.30	1.20	-20 to +65	0.50x0.67x0.50	995-790840-001	S	FFF	C20	
8.500-9.600	0.40	1.15	-20 to +65	0.87x0.87x0.74	094-037219-003	S	FFF	C21	
9.200-10.200	0.40	1.15	-20 to +65	0.62x0.69x0.69	094-037221-002	S	FFF	C24	1
10.700-13.300	0.40	1.20	-20 to +65	0.62x0.69x0.63	094-037272-004	S	FFF	C27	
12.300-13.600	0.50	1.25	-20 to +65	0.50x0.63x0.50	994-037503-015	S	FFF	C38	5
12.600-13.300	0.30	1.15	-20 to +65	0.62x0.69x0.69	994-037305-002	S	FFF	C24	
13.000-16.000	0.40	1.25	-20 to +65	0.62x0.69x0.63	094-037306-004	S	FFF	C27	2
13.900-14.600	0.40	1.15	-20 to +65	0.62x0.69x0.63	994-037918-008	S	FFF	C27	
14.000-15.500	0.50	1.20	-30 to +70	0.50x0.67x0.50	995-140155-101	S	FFF	C20	2
14.400-14.500	0.30	1.08	-20 to +65	0.62x0.69x0.63	995-144145-101	S	FFF	C27	
15.000-18.000	0.50	1.25	-20 to +65	0.62x0.75x0.50	094-037461-001	S	FFF	C25	2
17.700-19.700	0.50	1.25	-20 to +65	0.50x0.67x0.50	994-037245-003	S	FFF	C20	

# Coax Isolators

The isolator part numbers listed below all have FFT configuration (female-female-termination) with clockwise rotation. The other standard configurations (FMT, MFT, MMT) and counter-clockwise rotation are available for any of these part numbers by request.

In addition many designs are available with non-standard configurations such as FTF, MTF, TFF etc, and also with mixed SMA and N-type connectors. Please consult the factory for non-standard configurations.

## Electrical Specifications

# F = Female      N = N-Type      \* Case Temperature Not To Exceed Operating Temperature  
M = Male        S = SMA  
T = Termination    K = 2.92mm

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Dimensions (in x in x in)	Part Number	# Connector & Termination Configuration		Outline Drawing	Notes See Page 32
0.410-0.470	20	0.40	1.22	0 to +85	150	2.50x2.50x1.10	996-410470-902	S	FFT	C41	
0.750-0.960	20	0.40	1.20	-10 to +65	15	1.68x2.05x1.26	094-037054-003	N	FFT	C06	
0.750-0.960	20	0.40	1.20	-10 to +65	10	1.25x1.25x0.87	094-037055-002	S	FFT	C07	
0.800-0.900	23	0.40	1.15	-10 to +65	10	1.25x1.25x0.87	094-037438-001	S	FFT	C07	
0.800-1.000	19	0.50	1.25	0 to +50	10	1.25x1.25x0.87	094-037064-009	S	FFT	C07	
0.850-1.100	20	0.40	1.20	0 to +50	10	1.25x1.25x.87	996-850110-501	S	FFT	C07	
0.890-0.960	20	0.40	1.20	-10 to +65	15	1.68x2.05x1.26	994-037069-003	S	FFT	C06	
0.910-1.010	20	0.40	1.20	-10 to +65	10	1.25x1.25x0.87	994-037774-005	S	FFT	C07	
0.950-1.225	20	0.40	1.25	-10 to +65	10	1.25x1.25x0.55	094-037071-001	S	FFT	C08	
0.960-1.220	20	0.40	1.20	0 to +60	10	1.25x1.25x0.55	994-037541-003	S	FFT	C08	
1.045-1.155	23	0.30	1.15	-20 to +65	10	1.25x1.25x0.63	094-037638-001	S	FFT	C33	
1.200-1.300	20	0.50	1.15	0 to +65	10	1.25x1.25x0.75	994-037664-022	S	FFT	C34	
1.200-1.400	20	0.40	1.15	0 to +50	10	1.25x1.25x0.87	994-037076-009	S	FFT	C09	
1.200-1.500	19	0.45	1.25	-20 to +65	10	1.25x1.25x0.87	094-037076-001	S	FFT	C09	
1.200-1.500	19	0.45	1.25	-20 to +65	30	1.25x1.25x0.87	094-037076-002	S	FFT	C09	
1.300-1.400	20	0.50	1.15	0 to +65	10	1.25x1.25x0.75	994-037664-023	S	FFT	C34	
1.400-1.540	20	0.40	1.20	-20 to +65	10	1.25x1.25x0.87	094-037079-001	S	FFT	C09	
1.500-1.600	22	0.25	1.15	-20 to +65	10	1.25x1.25x0.87	994-037082-006	S	FFT	C09	
1.500-1.700	20	0.40	1.25	-20 to +65	10	1.25x1.25x0.87	094-037082-003	S	FFT	C09	
1.620-1.660	23	0.30	1.15	-20 to +65	10	1.25x1.25x0.87	994-037082-005	S	FFT	C07	
1.700-2.000	20	0.40	1.20	-20 to +60	10	1.00x1.00x0.50	094-037087-001	S	FFT	C10	
1.700-2.100	20	0.30	1.15	-20 to +65	15	1.56x1.94x1.00	094-037093-002	S	FFT	C11	
1.700-2.100	20	0.30	1.15	-20 to +65	15	1.56x1.94x1.00	094-037096-001	N	FFT	C11	
1.700-2.300	20	0.40	1.30	-20 to +65	15	1.56x1.94x1.00	094-037095-002	S	FFT	C11	



# Coax Isolators

## Electrical Specifications continued

# F = Female  
M = Male  
T = Termination

N = N-Type  
S = SMA  
K = 2.92mm

\* Case Temperature Not To Exceed  
Operating Temperature

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Dimensions (in x in x in)	Part Number	# Connector & Termination Configuration		Outline Drawing	Notes See Page 32
1.700-2.300	20	0.40	1.30	-20 to +65	15	1.56x1.94x1.00	994-037099-003	N	FFT	C11	
1.800-2.100	23	0.40	1.15	-20 to +65	10	1.00x1.00x0.50	094-037537-004	S	FFT	C10	
1.800-2.800	18	0.40	1.30	-20 to +65	10	1.63x1.63x0.76	094-037444-002	S	FFT	C13	
1.900-2.000	23	0.40	1.15	-20 to +65	10	1.00x1.00x0.50	996-190200-401	S	FFT	C10	
1.900-2.300	20	0.30	1.15	-20 to +65	15	1.56x1.94x1.00	994-037103-002	S	FFT	C11	
1.900-2.300	20	0.30	1.15	-20 to +65	15	1.56x1.94x1.00	994-037596-003	N	FFT	C11	
1.900-2.350	20	0.35	1.22	0 to +65	10	1.63x1.63x0.76	994-037107-006	S	FFT	C13	
1.980-2.280	20	0.40	1.20	-20 to +65	10	1.00x1.00x0.50	094-037109-003	S	FFT	C10	
1.990-2.500	20	0.30	1.22	0 to +65	10	1.25x1.36x0.50	996-199250-501	S	FFT	C40	
2.000-2.300	20	0.40	1.20	-20 to +65	10	1.00x1.00x0.50	994-037110-003	S	FFT	C10	
2.000-2.700	20	0.40	1.20	-20 to +65	10	1.75x1.76x0.75	094-037487-001	S	FFT	C14	
2.200-2.300	20	0.40	1.20	-20 to +65	10	1.00x1.00x0.50	994-037113-003	S	FFT	C10	
2.200-2.400	14	0.50	1.50	-20 to +60	30	1.00x1.00x0.50	996-220240-403	S	FFT	C10	
2.200-2.400	20	0.40	1.20	-20 to +65	15	1.56x1.94x1.00	094-037120-002	S	FFT	C11	
2.200-2.700	20	0.40	1.25	-20 to +65	15	1.56x1.94x1.00	994-037124-003	S	FFT	C11	
2.200-2.700	20	0.40	1.25	-20 to +65	15	1.56x1.94x1.00	994-037121-006	N	FFT	C11	
2.320-2.350	26	0.30	1.10	-10 to +65	10	1.00x1.00x0.50	094-037087-006	S	FFT	C10	
2.400-2.500	20	0.40	1.20	-20 to +65	10	1.00x1.00x0.50	994-037133-010	S	FFT	C10	
2.450-2.700	20	0.40	1.20	-20 to +65	10	1.00x1.00x0.50	994-037133-011	S	FFT	C10	
2.450-2.700	20	0.40	1.25	-20 to +65	10	1.00x1.00x0.50	094-037132-001	S	FFT	C10	
2.700-3.100	20	0.30	1.22	-20 to +65	10	1.25x1.25x0.76	996-270310-501	S	FFT	C12	
2.500-3.200	23	0.40	1.15	-20 to +65	10	1.75x1.75x0.75	994-037739-005	S	FFT	C14	
3.000-4.200	20	0.40	1.20	-20 to +65	10	1.25x1.25x0.76	094-037911-001	S	FFT	C12	
3.100-3.600	20	0.40	1.20	-20 to +65	10	0.75x0.89x0.50	994-037866-005	S	FFT	C16	
3.400-4.200	20	0.40	1.25	-20 to +65	10	1.00x1.10x0.70	996-340420-401	N	FFT	C31	
3.400-4.200	20	0.40	1.20	-20 to +65	15	1.00x1.36x1.00	994-037146-009	N	FFT	C15	
3.400-4.200	20	0.40	1.25	-20 to +65	10	0.75x0.89x0.50	094-037139-001	S	FFT	C16	
3.400-4.800	20	0.50	1.20	0 to +50	10	1.25x1.25x0.76	094-037143-003	S	FFT	C12	
3.400-6.750	20	0.40	1.25	-20 to +65	10	1.00x1.10x0.70	994-037168-015	N	FFT	C31	

# Coax Isolators

## Electrical Specifications continued

# F = Female      N = N-Type      \* Case Temperature Not To Exceed Operating Temperature  
 M = Male      S = SMA  
 T = Termination      K = 2.92mm

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Dimensions (in x in x in)	Part Number	# Connector & Termination Configuration		Outline Drawing	Notes See Page 32
3.600-4.200	20	0.30	1.15	-20 to +65	15	1.00x1.36x1.00	994-037711-007	N	FFT	C15	
3.600-4.200	27	0.20	1.10	-20 to +65	10	0.75x0.89x0.50	094-037162-002	S	FFT	C16	
3.600-5.300	20	0.40	1.25	0 to +50	10	1.25x1.25x0.76	094-037143-006	S	FFT	C12	
3.700-4.200	27	0.20	1.10	-20 to +65	10	0.74x0.90x0.50	094-037162-001	S	FFT	C23	
3.700-6.500	20	0.40	1.25	-20 to +65	10	1.00x1.00x0.60	094-037164-001	S	FFT	C17	
4.400-5.000	20	0.20	1.20	-20 to +55	10	0.75x0.86x0.49	994-037168-009	S	FFT	C19	2
4.400-5.100	26	0.20	1.10	-20 to +65	10	0.75x0.86x0.49	094-037806-010	S	FFT	C19	2
4.500-6.800	20	0.40	1.22	0 to +65	10	1.00x1.10x0.58	994-037168-013	S	FFT	C18	
4.600-5.550	20	0.40	1.20	0 to +65	10	1.00x1.10x0.58	994-038065-003	S	FFT	C18	
4.800-5.400	20	0.40	1.25	-20 to +65	10	1.00x1.10x0.58	994-037612-002	S	FFT	C18	
5.300-5.900	20	0.40	1.25	-20 to +65	10	1.00x1.10x0.70	996-530590-405	N	FFT	C31	
5.400-5.900	20	0.40	1.25	-20 to +65	10	0.50x0.67x0.50	994-037182-003	S	FFT	C20	
5.670-6.425	26	0.35	1.10	-20 to +55	10	0.87x0.87x0.74	994-037196-017	S	FFT	C21	2
5.700-6.600	20	0.40	1.20	-20 to +70	10	0.50x0.67x0.50	994-037192-009	S	FFT	C20	5
5.800-6.500	23	0.30	1.15	-20 to +65	10	0.88x0.88x0.73	094-037189-002	S	FFT	C21	
5.800-6.750	20	0.40	1.25	-20 to +65	10	1.00x1.10x0.70	996-580675-401	N	FFT	C31	
5.800-7.100	20	0.40	1.20	-10 to +60	10	0.88x0.88x0.73	094-037189-013	S	FFT	C21	
5.800-7.300	20	0.40	1.20	-20 to +55	10	0.88x0.88x0.73	994-037188-016	S	FFT	C21	
5.850-6.425	20	0.40	1.15	-20 to +55	10	0.88x0.88x0.73	994-095326-005	S	FFT	C21	
5.850-6.425	20	0.50	1.15	0 to +50	10	0.87x1.10x1.00	994-037854-004	N	FFT	C30	
5.850-6.725	20	0.40	1.22	-20 to +55	10	0.88x0.88x0.73	994-037614-009	S	FFT	C21	2
5.850-8.400	20	0.40	1.20	-20 to +65	10	0.88x0.88x0.73	994-037188-009	S	FFT	C21	
5.900-6.500	20	0.40	1.25	-20 to +65	10	0.50x0.67x0.50	994-037192-010	S	FFT	C20	5
5.900-6.500	23	0.30	1.15	-20 to +65	10	0.88x0.88x0.73	094-037189-001	S	FFT	C21	
5.900-6.500	23	0.30	1.15	-20 to +65	10	0.87x1.10x1.00	994-037186-011	N	FFT	C30	
5.900-8.500	20	0.40	1.20	-20 to +65	10	0.88x0.88x0.73	994-037519-007	S	FFT	C21	
6.000-7.250	23	0.20	1.15	0 to +65	10	0.88x0.88x0.73	994-037538-009	S	FFT	C21	
6.400-7.200	23	0.30	1.15	-20 to +65	10	0.88x0.88x0.73	094-037196-002	S	FFT	C21	
6.425-7.125	26	0.35	1.10	-20 to +55	10	0.88x0.88x0.73	994-037196-018	S	FFT	C21	



# Coax Isolators

## Electrical Specifications continued

# F = Female  
M = Male  
T = Termination

N = N-Type  
S = SMA  
K = 2.92mm

\* Case Temperature Not To Exceed  
Operating Temperature

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Dimensions (in x in x in)	Part Number	# Connector & Termination Configuration	Outline Drawing	Notes See Page 32
6.500-7.800	20	0.40	1.20	-20 to +55	10	0.88x0.88x0.73	994-037196-026	S FFT	C21	
7.000-8.570	20	0.40	1.20	-20 to +55	10	0.88x0.88x0.73	994-037196-012	S FFT	C21	
7.100-7.900	26	0.35	1.10	-20 to +55	10	0.88x0.88x0.73	994-037196-019	S FFT	C21	2
7.100-7.900	20	0.30	1.22	-10 to +70	10	0.50x0.67x0.50	996-710790-001	S FFT	C20	
7.100-8.400	20	0.30	1.25	-20 to +55	10	0.62x0.75x0.50	994-038052-002	S FFT	C25	4
7.100-8.500	23	0.30	1.15	-20 to +65	10	0.88x0.88x0.73	094-037538-001	S FFT	C21	
7.100-8.500	20	0.40	1.15	-20 to +55	10	0.74x0.90x0.50	994-037856-001	S FFT	C23	
7.100-8.500	20	0.40	1.20	-20 to +65	10	0.50x0.67x0.50	994-037956-005	S FFT	C20	5
7.125-8.500	23	0.30	1.15	-20 to +65	10	0.88x0.88x0.73	994-037206-005	S FFT	C21	
7.200-7.800	23	0.20	1.15	0 to +65	10	0.88x0.88x0.73	994-037599-003	S FFT	C21	2
7.250-7.750	20	0.35	1.22	-30 to +55	10	0.87x0.96x0.74	996-725775-303	N FFT	C37	
7.700-8.500	20	0.40	1.20	-20 to +55	10	0.88x0.88x0.73	994-037599-006	S FFT	C21	2
7.850-8.450	23	0.20	1.15	0 to +65	10	0.88x0.88x0.73	994-037599-004	S FFT	C21	
8.000-10.500	20	0.35	1.22	0 to +65	10	0.74x0.90x0.50	994-037202-013	S FFT	C23	
8.450-10.550	23	0.35	1.15	0 to +65	10	0.74x0.90x0.50	994-037202-012	S FFT	C23	
8.500-9.600	23	0.40	1.15	-20 to +65	10	0.88x0.88x0.73	094-037219-002	S FFT	C21	
9.200-10.200	23	0.40	1.15	-20 to +65	10	0.62x0.69x0.69	094-037221-001	S FFT	C24	1
10.200-10.800	23	0.30	1.15	-20 to +65	10	0.62x0.69x0.69	994-037498-006	S FFT	C24	1
10.400-11.800	20	0.35	1.22	-10 to +85	10	0.50x0.63x0.50	996-104118-001	S FFT	C38	
10.500-11.700	26	0.40	1.10	-20 to +55	10	0.88x0.88x0.73	994-037219-007	S FFT	C21	2
10.600-11.800	20	0.25	1.20	-20 to +55	10	0.62x0.69x0.63	994-037405-006	S FFT	C27	
10.700-12.750	22	0.30	1.30	-20 to +65	10	0.62x0.69x0.63	994-037405-002	S FFT	C27	
10.700-12.800	20	0.50	1.25	-20 to +65	10	0.62x0.85x0.70	994-037405-008	N FFT	C29	
10.700-13.250	20	0.40	1.20	-20 to +65	10	0.62x0.69x0.63	094-037825-001	S FFT	C27	
10.700-13.300	20	0.40	1.20	-20 to +65	10	0.62x0.69x0.63	094-037272-003	S FFT	C27	
10.900-12.800	20	0.40	1.20	-30 to +65	10	0.62x0.69x0.63	994-037280-010	S FFT	C27	
10.950-13.350	20	0.40	1.30	0 to +50	10	0.50x0.63x0.50	994-037466-004	S FFT	C28	
11.700-12.200	23	0.30	1.15	-20 to +65	10	0.62x0.69x0.69	994-037285-005	S FFT	C24	1
11.700-14.500	20	0.40	1.20	0 to +50	10	0.62x0.75x0.50	994-037510-011	S FFT	C25	2

# Coax Isolators

## Electrical Specifications continued

# F = Female  
M = Male  
T = Termination

N = N-Type  
S = SMA  
K = 2.92mm

\* Case Temperature Not To Exceed  
Operating Temperature

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Dimensions (in x in x in)	Part Number	# Connector & Termination Configuration		Outline Drawing	Notes See Page 32
12.000-13.250	20	0.40	1.20	-40 to +85	10	0.62x0.69x0.63	994-037405-007	S	FFT	C27	
12.300-13.600	20	0.50	1.25	-20 to +65	10	0.50x0.63x0.50	994-037503-011	S	FFT	C28	
12.700-15.400	20	0.40	1.20	-40 to +70	10	0.62x0.75x0.50	994-099307-005	S	FFT	C25	
13.000-16.000	20	0.40	1.25	-20 to +65	1	0.62x0.69x0.63	094-037306-001	S	FFT	C27	
13.750-14.500	20	0.40	1.20	-20 to +65	10	0.87x0.96x0.74	994-038069-005	N	FFT	C37	
13.750-14.500	20	0.50	1.15	-20 to +65	10	0.50x0.67x0.50	094-037471-003	S	FFT	C20	
13.750-14.800	20	0.50	1.15	-20 to +65	10	0.50x0.67x0.50	994-037471-004	S	FFT	C20	
13.900-14.600	23	0.40	1.15	-20 to +65	10	0.62x0.69x0.63	094-037918-003	S	FFT	C27	
14.000-14.500	23	0.40	1.15	-20 to +65	10	0.62x0.69x0.63	994-037231-005	S	FFT	C27	
14.000-15.500	20	0.50	1.20	-30 to +70	10	0.62x0.69x0.63	994-037918-009	S	FFT	C27	
14.400-14.500	28	0.30	1.08	-20 to +65	10	0.62x0.69x0.63	996-144145-101	S	FFT	C27	
14.400-15.350	21	0.30	1.20	-20 to +65	10	0.50x0.67x0.50	996-144153-001	S	FFT	C20	
15.000-15.500	20	0.40	1.25	-40 to +85	10	0.62x0.75x0.50	996-150155-133	S	FFT	C25	
15.000-18.000	20	0.50	1.25	-20 to +65	10	0.62x0.75x0.50	094-037461-003	S	FFT	C25	
16.000-18.000	20	0.50	1.25	-20 to +65	1	0.50x0.67x0.50	996-160180-001	S	FFT	C20	2
16.500-22.000	20	0.50	1.25	-20 to +65	1	0.50x0.67x0.50	994-037419-008	S	FFT	C20	
17.000-19.000	20	0.50	1.25	-20 to +60	1	0.50x0.67x0.50	094-037419-002	S	FFT	C20	2
17.300-18.400	20	0.50	1.20	-10 to +60	1	0.50x0.67x0.50	094-037419-006	S	FFT	C20	2
17.700-19.700	20	0.50	1.25	-20 to +65	10	0.50x0.67x0.50	094-037245-001	S	FFT	C20	2
17.700-21.300	20	0.50	1.25	-20 to +65	10	0.50x0.67x0.50	996-177213-001	S	FFT	C20	2
18.100-18.600	23	0.50	1.15	-20 to +65	10	0.50x0.67x0.50	094-038074-008	S	FFT	C28	2
19.200-20.200	20	0.40	1.20	-20 to +65	10	0.50x0.67x0.50	994-038034-002	S	FFT	C20	2
20.200-21.200	20	0.50	1.25	-20 to +65	10	0.50x0.63x0.50	996-202212-003	S	FFT	C28	2
21.200-23.600	20	0.50	1.25	-20 to +65	10	0.50x0.63x0.50	094-037250-002	S	FFT	C28	2
27.000-31.000	16	1.00	1.40	-40 to +85	1	0.50x0.63x0.50	996-270310-001	K	FFT	C28	



# Coax Circulators and Isolators

## Mechanical Specifications

The following outlines illustrate circulators with non-specific connectors. The outlines are valid for any male and female connector configuration, and for isolators where the appropriate connector is replaced with a termination. Termination outlines and dimensions are shown below.

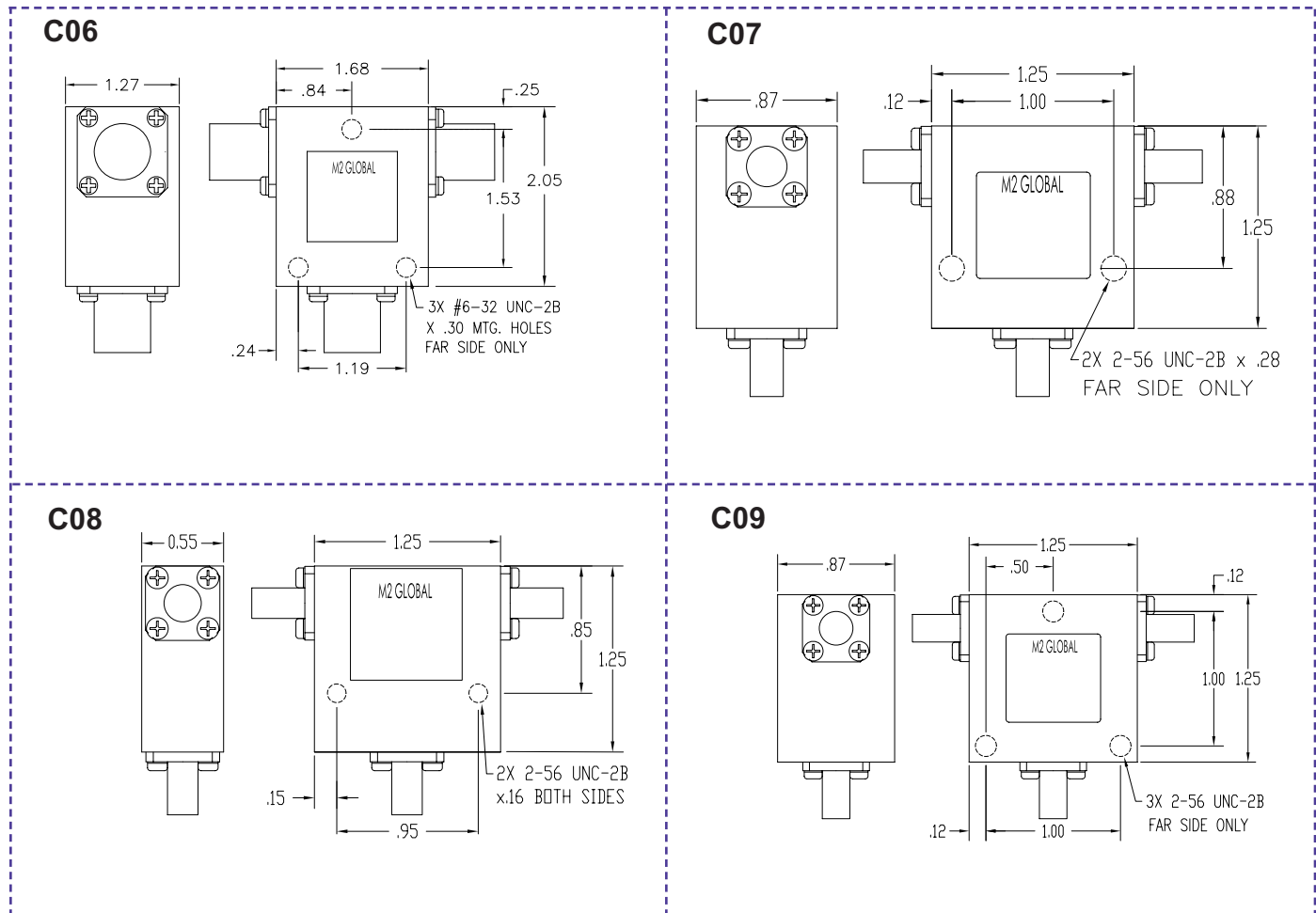
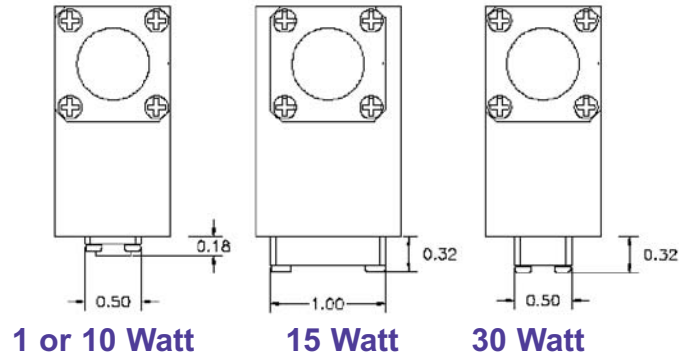
Note 1: No mounting holes.

Note 2: Removable connectors.

Note 3: CW power rating is 200 W

Note 4: Dimension between mounting holes is 0.50 in.

Note 5: Dimension between mounting holes is 0.35 in.





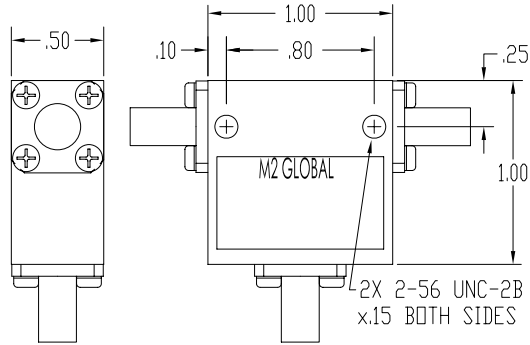
A Service Disabled  
Veteran-Owned Business



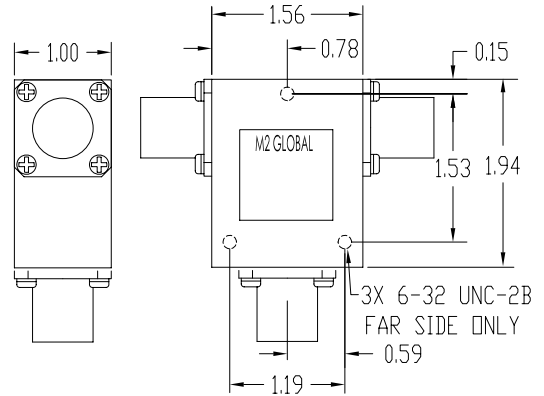
# Coax Circulators and Isolators

## Mechanical Specifications continued

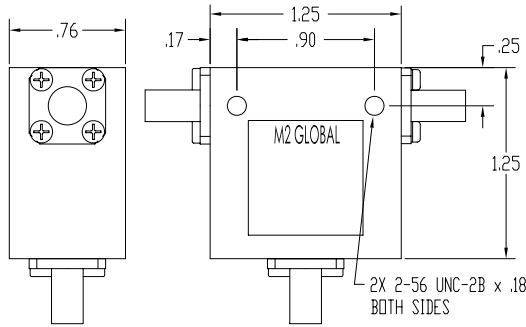
**C10**



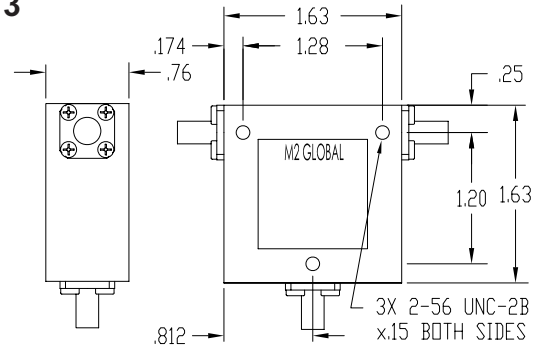
**C11**



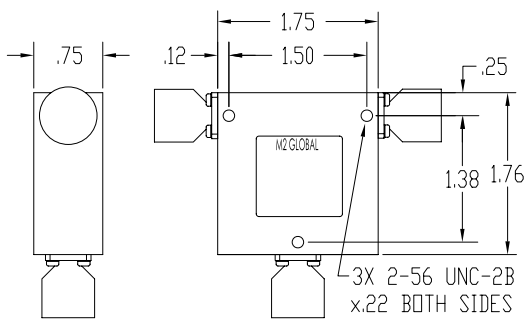
**C12**



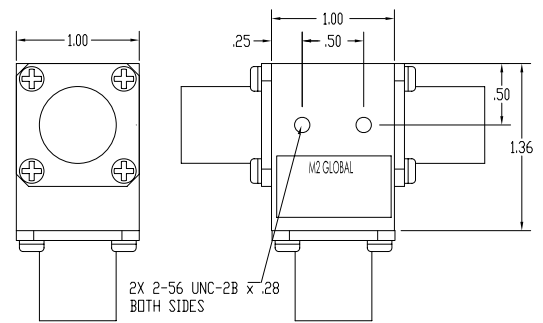
**C13**



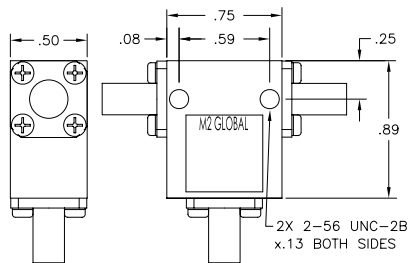
**C14**



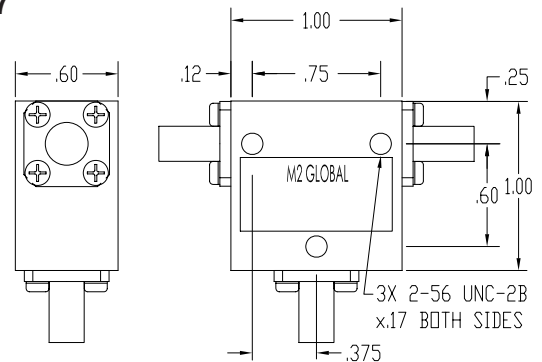
**C15**



**C16**



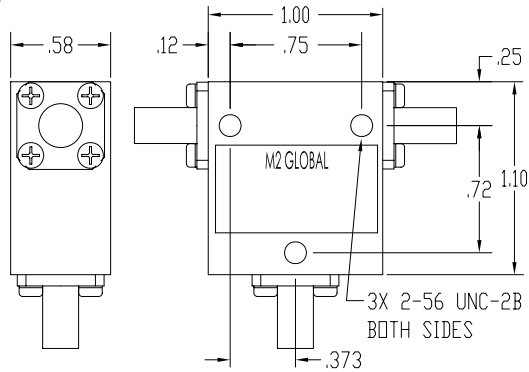
**C17**



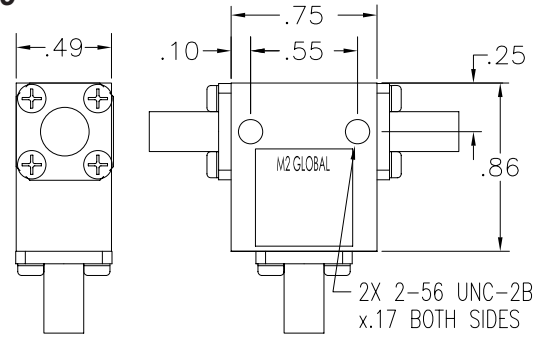
# Coax Circulators and Isolators

## Mechanical Specifications continued

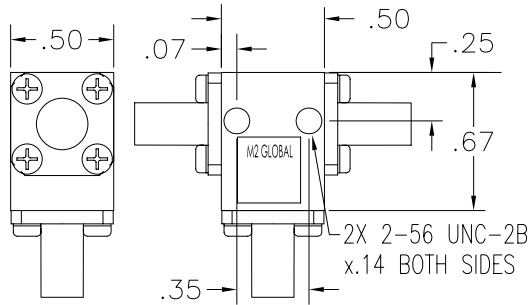
**C18**



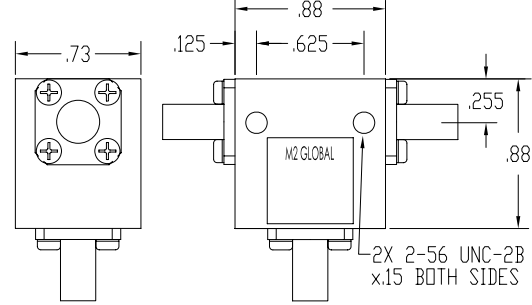
**C19**



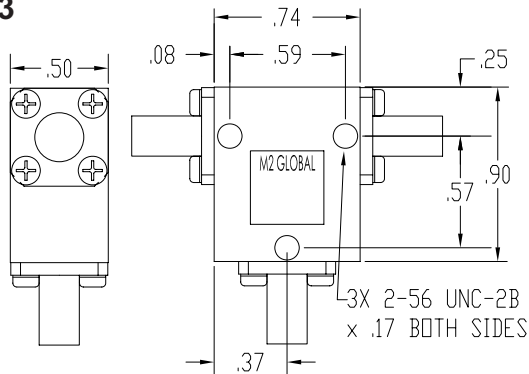
**C20**



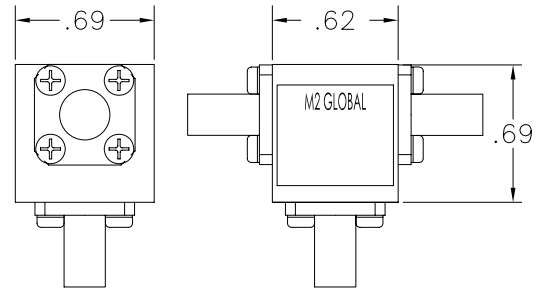
**C21**



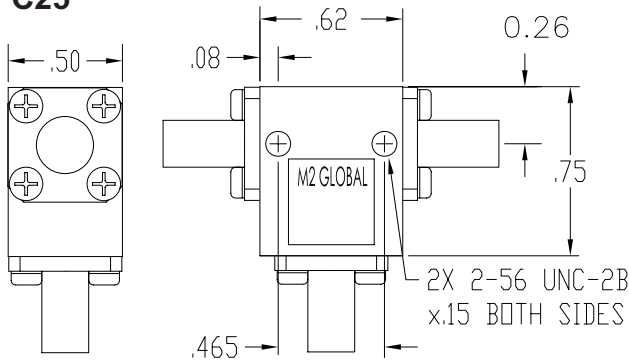
**C23**



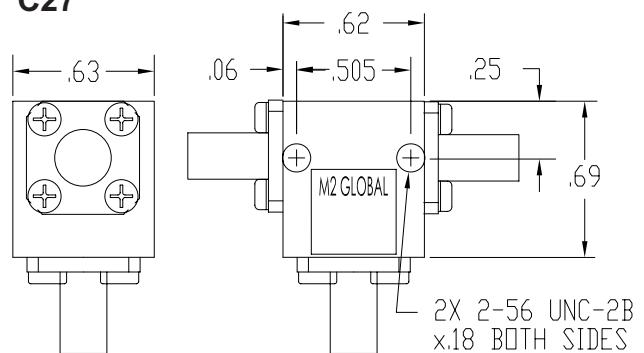
**C24**



**C25**



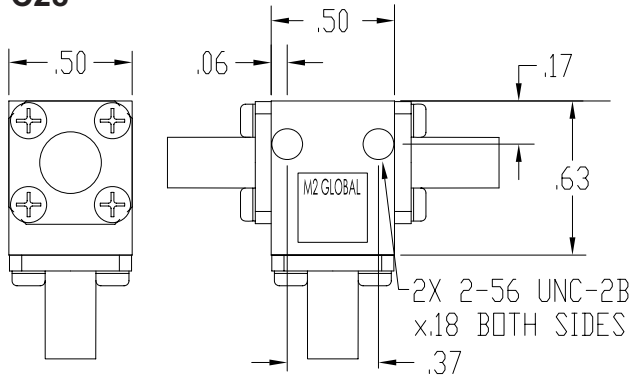
**C27**



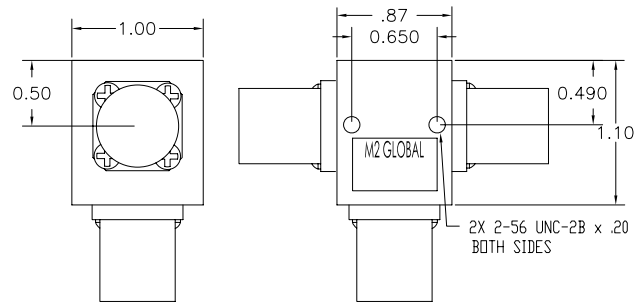
# Coax Circulators and Isolators

## Mechanical Specifications continued

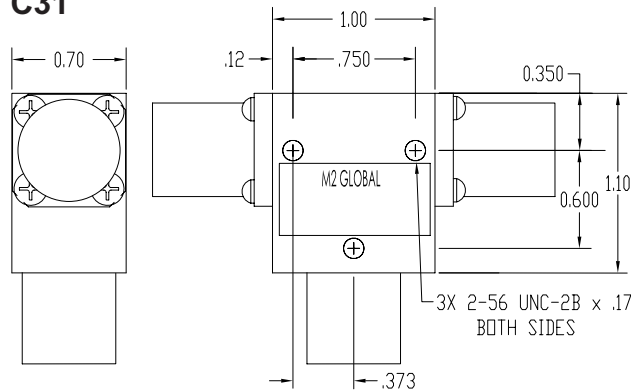
**C28**



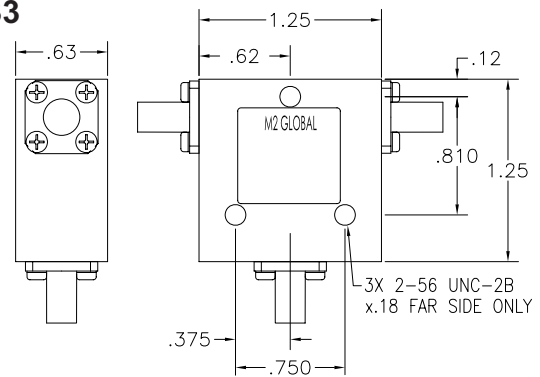
**C30**



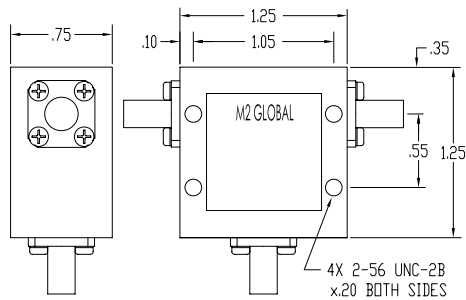
**C31**



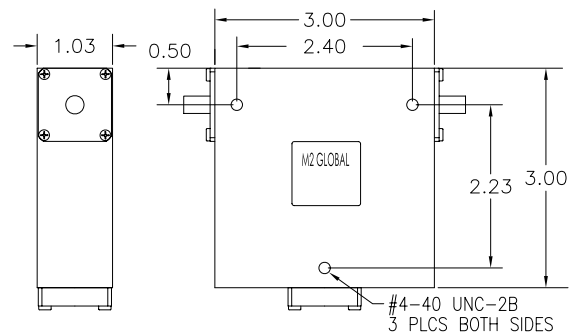
**C33**



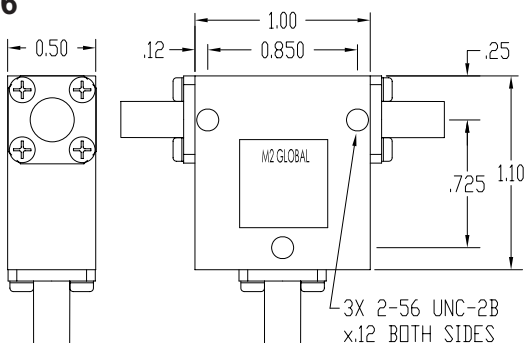
**C34**



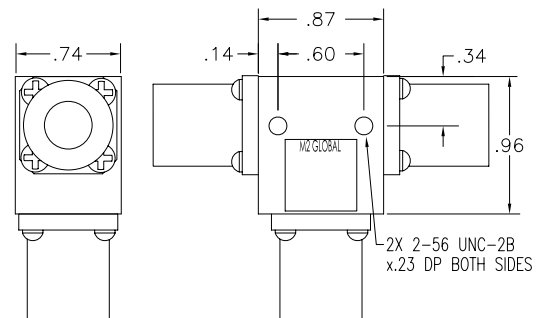
**C35**



**C36**



**C37**

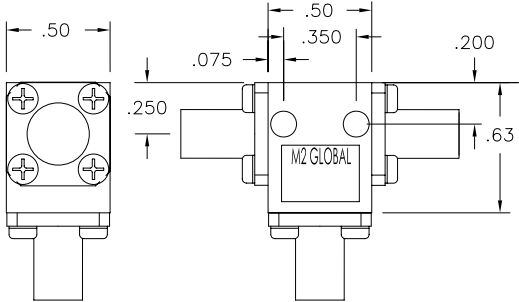




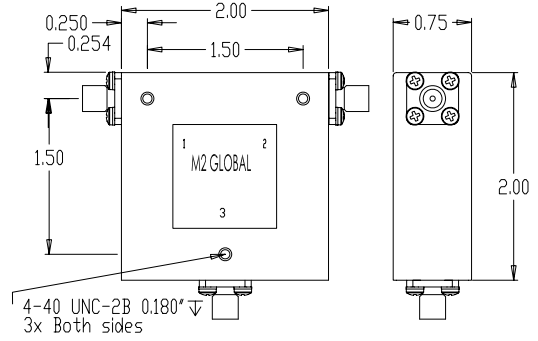
# Coax Circulators and Isolators

## Mechanical Specifications continued

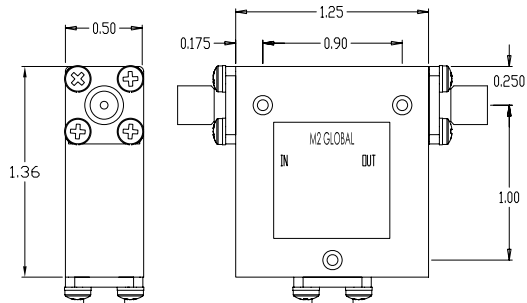
**C38**



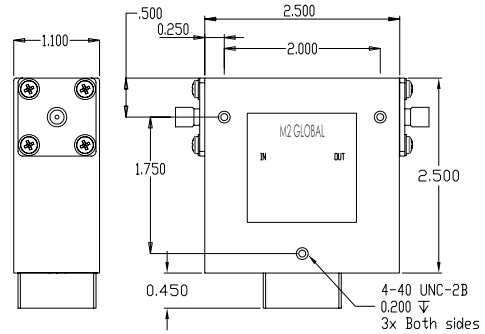
**C39**



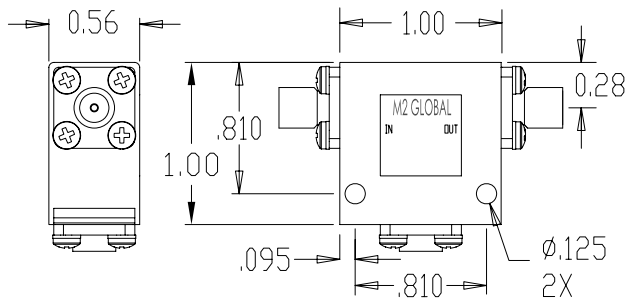
**C40**



**C41**



**C42**



# Waveguide Circulators

All part numbers have clockwise rotation.  
Counter clockwise rotation is available.

## Electrical Specifications

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Mating Flange	Dimensions (in x in x in)	Part Number	Outline Drawing	Notes
<b>WR137</b>								
5.8-6.5	0.10	1.10	-20 to +65	CMR-137	3.25x2.76x1.53	994-037002-016	W01	
5.800-7.125	0.10	1.10	+10 to +40	CMR-137	3.25x2.76x1.53	994-037002-017	W01	
5.85-7.10	0.10	1.10	-20 to +65	CMR-137	3.25x2.76x1.53	994-037002-018	W01	
5.9-7.2	0.15	1.10	-35 to +70	CMR-137	3.25x3.00x1.53	994-037900-002	W02	
5.925-7.125	0.10	1.10	-20 to +65	CMR-137	3.25x2.76x1.53	094-037002-001	W01	
<b>WR112</b>								
7.100-8.770	0.10	1.15	-10 to +75	CMR-112	2.62x2.31x1.38	997-710877-201	W03	
7.125-8.500	0.10	1.10	-20 to +65	CMR-112	2.62x2.31x1.38	094-037010-001	W03	
7.9-8.4	0.10	1.12	0 to +65	UG138/U	2.62x2.50x1.88	997-710850-203	WC10	
<b>WR90</b>								
8.2-12.4	0.30	1.25	-20 to +65	UG135/U	2.25x2.25x1.62	094-037006-001	W04	
9.1-9.2	0.20	1.15	-20 to +65	UG135/U	1.63x2.00x1.69	997-900920-402	W09	
10.4-10.8	0.20	1.10	-20 to +65	UG135/U	2.25x2.25x1.62	994-037017-003	W04	
10.5-11.8	0.20	1.10	-20 to +65	UG135/U	2.25x2.25x1.62	994-037017-004	W04	
10.7-11.7	0.20	1.10	-20 to +65	UG135/U	2.25x2.25x1.62	094-037017-001	W04	
<b>WR75</b>								
10.0-15.0	0.30	1.25	-20 to +65	WR75	1.75x1.75x1.50	994-037014-004	W05	
10.7-11.7	0.10	1.08	-20 to +65	WR75	1.75x1.75x1.50	994-037018-003	W05	
10.7-12.8	0.15	1.10	-20 to +65	WR75	1.75x1.75x1.50	994-037020-008	W05	
10.70-12.95	0.10	1.08	-20 to +65	WR75	1.75x1.75x1.50	994-037640-005	W05	
10.70-13.25	0.20	1.10	-20 to +65	WR75	1.75x1.75x1.50	094-037011-001	W05	
10.95-12.75	0.20	1.08	-20 to +65	WR75	1.75x1.75x1.50	094-037025-002	W05	
11.7-12.2	0.10	1.08	-20 to +65	WR75	1.75x1.75x1.50	994-037027-004	W05	
11.70-12.75	0.15	1.10	-40 to +70	WR75	1.75x1.75x1.50	994-037946-004	W05	
12.0-13.0	0.10	1.08	-30 to +60	WR75	1.75x1.75x1.50	994-037490-002	W05	
12.0-13.7	0.15	1.20	-20 to +65	WR75	1.75x1.75x1.50	994-037014-005	W05	
12.2-12.8	0.20	1.10	-20 to +65	WR75	1.75x1.75x1.50	994-037028-005	W05	
12.7-15.4	0.20	1.15	-40 to +70	WR75	1.75x1.75x1.50	994-037306-004	W05	
13.8-14.7	0.20	1.10	-20 to +65	WR75	1.75x1.75x1.50	094-037030-002	W05	
14.0-14.5	0.15	1.10	-40 to +70	WR75	1.75x1.75x1.50	994-037032-006	W05	

# Waveguide Circulators

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

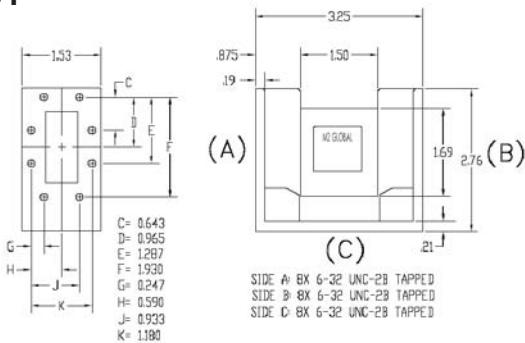
Frequency Range (GHz)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Mating Flange	Dimensions (in x in x in)	Part Number	Outline Drawing	Notes
<b>WR62</b>								
13.5-14.5	0.35	1.20	-20 to +85	UG1665	1.50x1.50x1.31	997-135145-601	W06	
14.0-15.3	0.20	1.10	-20 to +65	UG1665	1.50x1.50x1.31	094-037033-001	W06	
14.0-16.0	0.30	1.15	-30 to +65	UG1665	1.50x1.50x1.31	994-037033-005	W06	
14.2-15.6	0.30	1.20	-20 to +65	UG1665	1.50x1.50x1.31	094-037033-002	W06	
15.9-17.0	0.40	1.15	-20 to +65	UG1665	1.50x1.50x1.31	094-038019-001	W06	
<b>WR42</b>								
17.6-19.8	0.20	1.22	-20 to +70	UG597	1.25x1.25x1.00	994-037034-004	W07	
17.7-19.7	0.30	1.20	-20 to +70	UG597	1.25x1.25x1.00	094-037034-001	W07	
18.25-19.50	0.20	1.15	-30 to +85	UG597	1.25x1.25x1.00	994-037042-004	W07	
18.3-20.2	0.40	1.25	-30 to +85	UG597	1.25x1.25x1.00	994-037042-003	W07	
19.3-20.3	0.30	1.15	-20 to +70	UG597	1.25x1.25x1.00	994-037042-005	W07	
21.2-23.6	0.20	1.20	-30 to +85	UG597	1.25x1.25x1.00	094-037042-001	W07	
21.2-23.6	0.30	1.20	-30 to +60	UG597	1.00x1.15x0.88	994-038045-003	W08	

## Mechanical Specifications

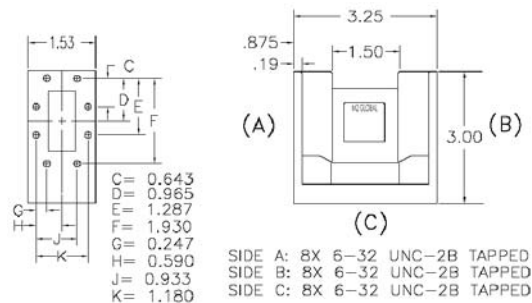
Pressure sealing and RFI sealing is available for most models.

Flanges are available with any combination of tapped and clear holes. Catalog part numbers are for all holes tapped. CPR grooved flanges are available for some models.

W01



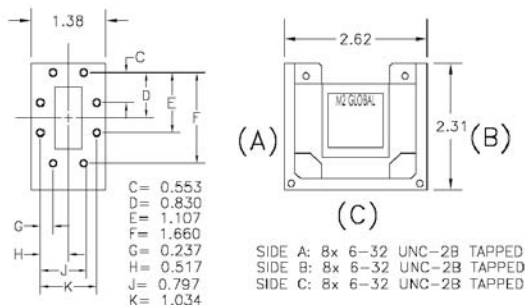
W02



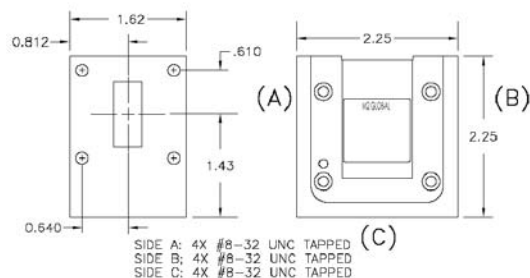
# Waveguide Circulators

## Mechanical Specifications continued

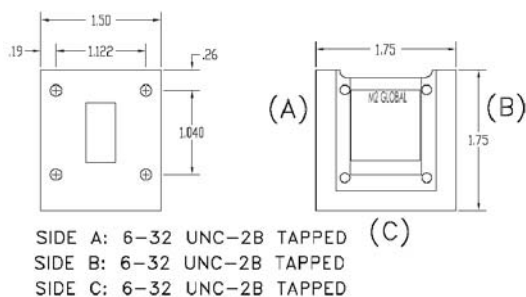
### W03



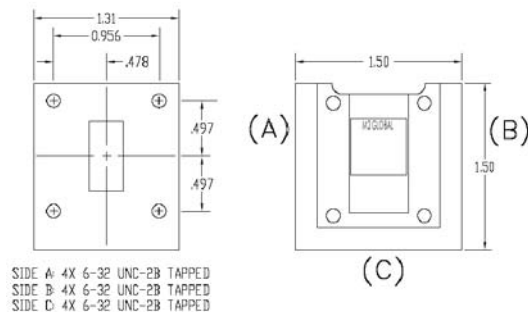
### W04



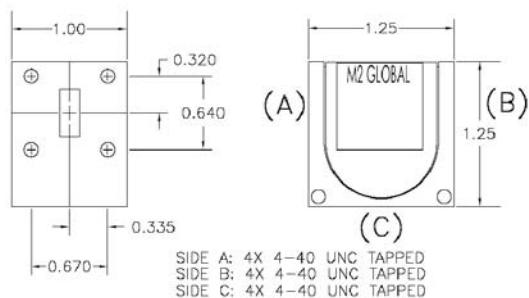
### W05



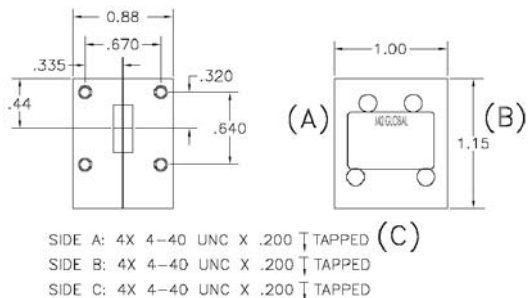
### W06



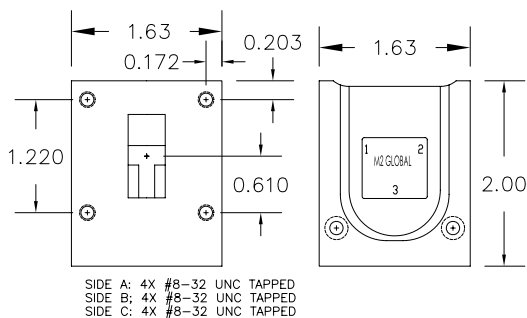
### W07



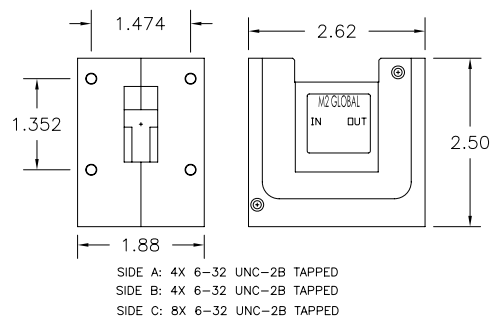
### W08



### W09



### WC10







# Waveguide Isolators

All part numbers have clockwise rotation.  
Counter clockwise rotation is available.

## Electrical Specifications

\* Case Temperature Not To Exceed Operating Temperature

Frequency Range (GHz)	Isolation (Max) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Mating Flanges	Dimensions (in x in x in)	Part Number	Outline Drawing	Notes
<b>WR137</b>										
5.8-6.5	26	0.10	1.10	-20 to +65	10	CMR-137	3.25x2.76x1.53	994-037003-006	W10	
5.800-7.125	26	0.10	1.10	+20 to +65	10	CMR-137	3.25x2.76x1.53	994-037003-007	W10	
5.85-7.10	26	0.10	1.10	-20 to +65	10	CMR-137	3.25x2.76x1.53	994-037003-008	W10	
5.925-7.125	26	0.10	1.10	-20 to +65	10	CMR-137	3.25x2.76x1.53	994-037003-005	W10	
7.250-7.750	23	0.15	1.15	-20 to +65	10	CPR/CPRG-137	3.00x3.00x1.94	998-725775-102	W17	
<b>WR112</b>										
7.100-7.750	26	0.10	1.10	-20 to +65	10	CPRG/CPRG-112	2.62x2.56x1.75	998-710775-201	W18	
7.125-8.500	26	0.10	1.10	-20 to +65	10	CMR-112	2.62x2.31x1.38	094-037010-002	W11	
<b>WR90</b>										
8.2-12.4	20	0.30	1.25	-20 to +65	5	UG135/U	2.25x2.25x1.62	994-037007-002	W12	
9.0-9.2	20	0.15	1.25	-20 to +65	5	UG135/U	2.25x2.25x1.62	994-037006-002	W12	
10.4-10.8	26	0.20	1.10	-20 to +65	5	UG135/U	2.25x2.25x1.62	994-037017-005	W12	
10.5-11.8	26	0.20	1.10	-20 to +65	5	UG135/U	2.25x2.25x1.62	994-037017-006	W12	
10.7-11.7	26	0.20	1.10	-20 to +65	5	UG135/U	2.25x2.25x1.62	994-037017-007	W12	
<b>WR75</b>										
10.0-15.0	20	0.30	1.25	-20 to +65	3	WR75	1.75x1.75x1.50	094-037014-001	W13	
10.7-11.7	26	0.10	1.08	-20 to +65	3	WR75	1.75x1.75x1.50	994-037018-004	W13	
10.7-12.8	26	0.15	1.10	-20 to +65	3	WR75	1.75x1.75x1.50	094-037020-001	W13	
10.70-12.95	26	0.10	1.08	-20 to +65	3	WR75	1.75x1.75x1.50	994-037020-007	W13	
10.70-13.25	26	0.20	1.10	-20 to +65	3	WR75	1.75x1.75x1.50	094-037012-001	W13	
10.95-12.75	26	0.20	1.08	-20 to +65	3	WR75	1.75x1.75x1.50	094-037025-001	W13	
11.7-12.2	26	0.10	1.08	-20 to +65	3	WR75	1.75x1.75x1.50	994-037027-003	W13	
11.70-12.75	23	0.15	1.10	-40 to +70	3	WR75	1.75x1.75x1.50	994-037946-005	W13	
12.0-13.0	26	0.10	1.08	-20 to +65	3	WR75	1.75x1.75x1.50	994-037490-003	W13	
12.0-13.7	26	0.15	1.20	-20 to +65	3	WR75	1.75x1.75x1.50	994-037014-003	W13	
12.2-12.8	26	0.20	1.10	-20 to +65	3	WR75	1.75x1.75x1.50	094-037028-001	W13	
12.7-15.4	20	0.20	1.15	-40 to +70	3	WR75	1.75x1.75x1.50	994-037306-005	W13	
13.7-14.5	26	0.20	1.10	-20 to +65	50	WR75	1.75x1.75x1.50	998-137145-510	W14	
13.7-14.5	26	0.10	1.10	-20 to +65	3	WR75	1.75x1.75x1.50	998-137145-501	W13	
13.8-14.7	26	0.20	1.10	-20 to +65	3	WR75	1.75x1.75x1.50	094-037030-001	W13	
14.0-14.5	23	0.15	1.10	-40 to +70	50	WR75	1.75x1.75x1.50	994-037635-007	W14	
14.0-14.5	26	0.20	1.10	-20 to +65	3	WR75	1.75x1.75x1.50	094-037032-002	W13	

# Waveguide Isolators

## Electrical Specifications continued

\* Case Temperature Not To Exceed Operating Temperature

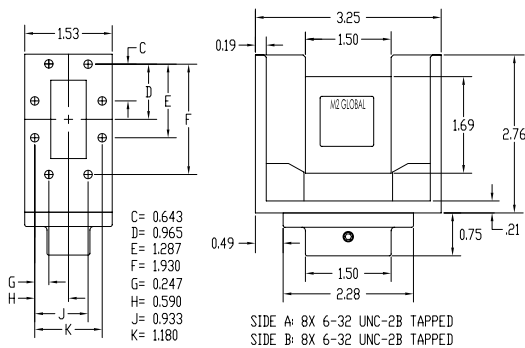
Frequency Range (GHz)	Isolation (Max) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Rating (Watts)	Mating Flanges	Dimensions (in x in x in)	Part Number	Outline Drawing	Notes
<b>WR62</b>										
13.5-14.5	20	0.35	1.20	-20 to +85	3	UG1665/U	1.50x1.50x1.31	998-135145-601	W15	
13.7-15.4	24	0.40	1.15	-20 to +65	20	UG1665/U	1.50x1.50x1.31	998-137154-601	W19	
14.0-15.3	26	0.20	1.10	-20 to +65	3	UG1665/U	1.50x1.50x1.31	094-037694-001	W15	
14.0-17.0	20	0.40	1.15	-20 to +65	3	UG1665/U	1.50x1.50x1.31	998-140170-601	W15	
14.2-15.6	25	0.30	1.20	-20 to +65	3	UG1665/U	1.50x1.50x1.31	994-037033-006	W15	
14.0-16.0	23	0.30	1.15	-20 to +65	3	UG1665/U	1.50x1.50x1.31	994-037033-007	W15	
14.4-15.4	26	0.20	1.10	-20 to +65	40	UG1665/U	1.50x1.50x1.31	998-144154-601	W20	
15.9-17.0	24	0.40	1.15	-20 to +65	3	UG1665/U	1.50x1.50x1.31	994-038019-004	W15	
<b>WR42</b>										
17.2-21.2	23	0.35	1.20	0 to +60	1	WR42	1.27x1.32x1.00	998-172212-701	W16	
17.7-19.7	21	0.30	1.20	-20 to +65	1	WR42	1.27x1.32x1.00	994-037034-005	W16	
18.25-19.50	21	0.20	1.15	-30 to +85	1	WR42	1.27x1.32x1.00	994-037034-006	W16	
18.3-20.2	21	0.40	1.25	-30 to +85	1	WR42	1.27x1.32x1.00	994-037042-003	W16	
19.3-20.3	23	0.30	1.15	-20 to +65	1	WR42	1.27x1.32x1.00	994-037034-007	W16	
20.2-21.2	21	0.30	1.25	-30 to +85	1	WR42	1.27x1.32x1.00	998-202212-701	W16	
21.2-23.6	21	0.20	1.20	-30 to +85	1	WR42	1.27x1.32x1.00	094-037042-002	W16	

Pressure sealing and RFI sealing is available for most models.

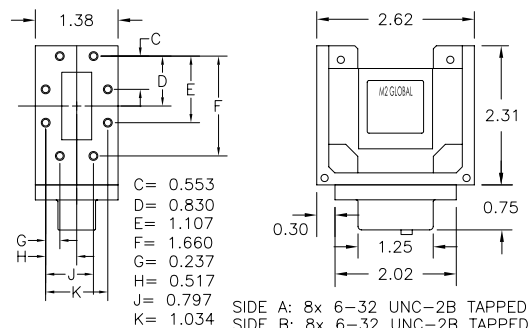
Flanges are available with any combination of tapped and clear holes. Metric threads are also available. Catalog part numbers have all holes tapped, unless noted otherwise. CPR grooved flanges are available for some models.

## Mechanical Specifications

### W10



### W11

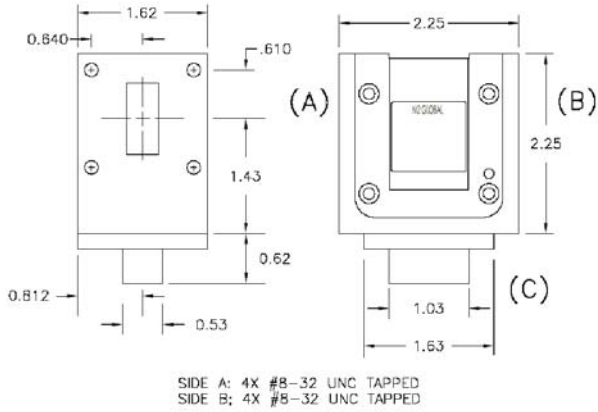




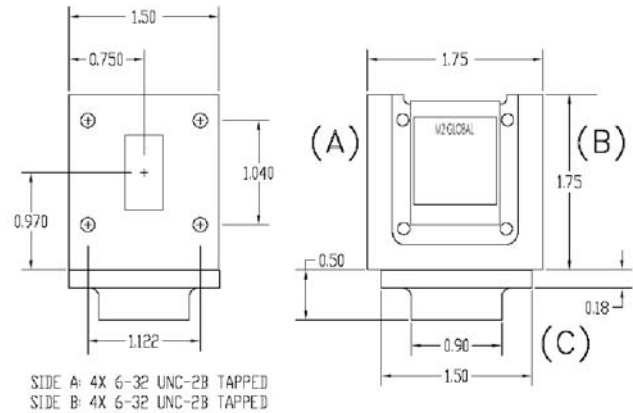
# Waveguide Isolators

## Mechanical Specifications continued

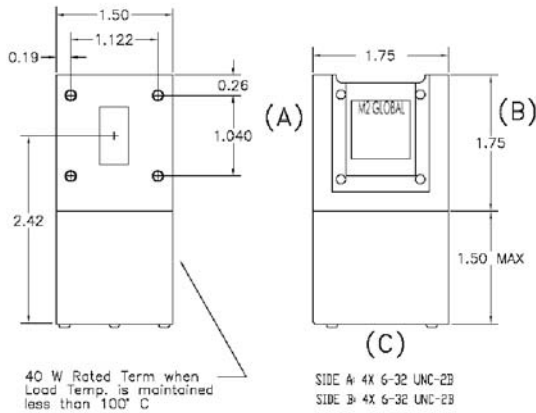
**W12**



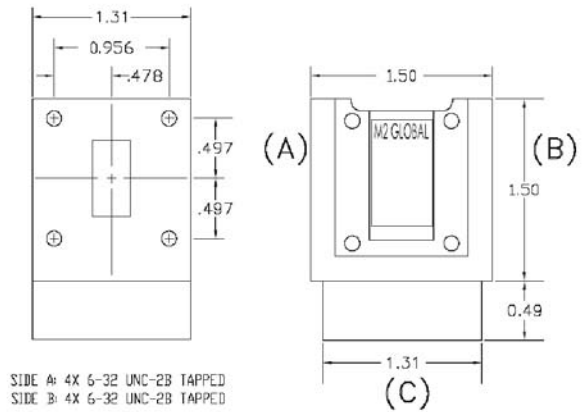
**W13**



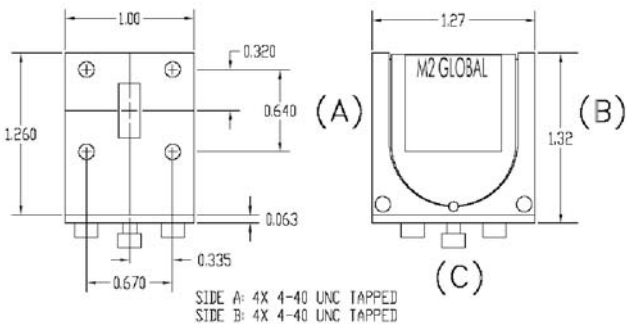
**W14**



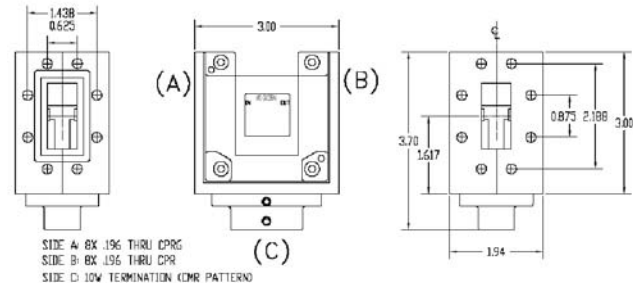
**W15**



**W16**



**W17**





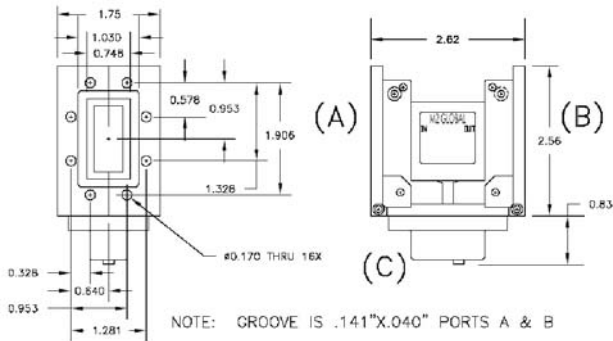
A Service Disabled  
Veteran-Owned Business



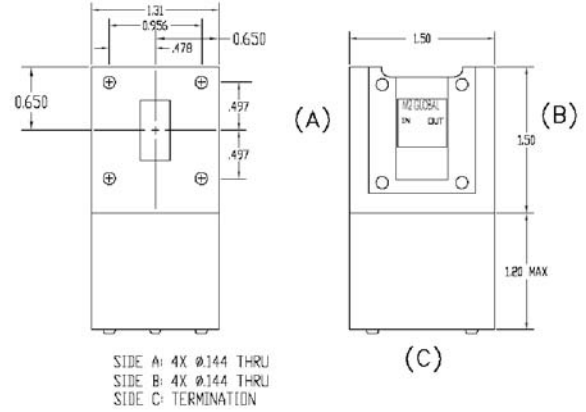
# Waveguide Isolators

## Mechanical Specifications continued

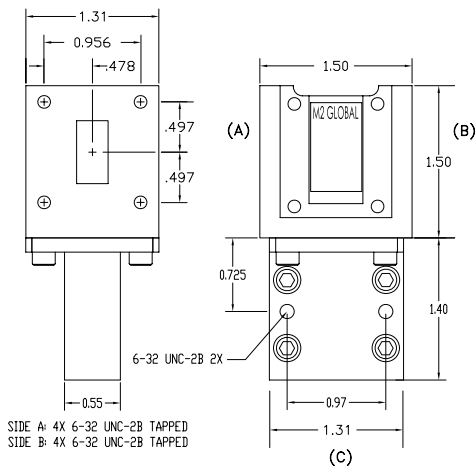
**W18**



**W19**



**W20**



# Waveguide Flange Isolators

All part numbers have clockwise rotation.  
Counter clockwise rotation is available.

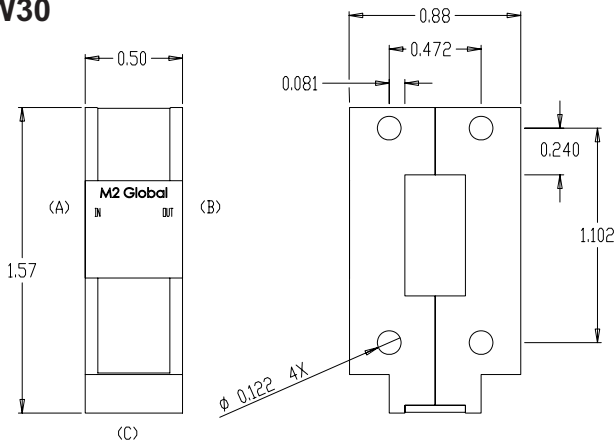
## Electrical Specifications

Case Temperature Not To Exceed Operating Temperature

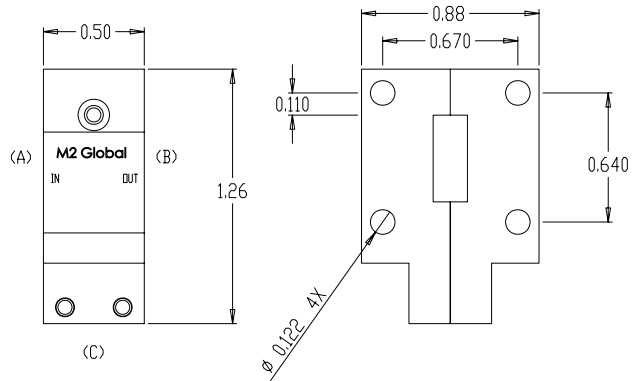
Frequency Range (GHz)	Isolation (Max) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating * Temperature °C	Termination Power (Watts)	Forward Power (Watts)	Mating Flange	Dimensions (in x in x in)	Part Number	Outline Drawing	Notes
<b>WR62</b>											
12.700-13250	20	0.40	1.22	-30 to +75	1	1	WR62	0.50x1.57x0.88	998-127132-611	W30	
14.400-15.000	20	0.40	1.22	-30 to +75	1	1	WR62	0.50x1.57x0.88	998-144150-611	W30	
14.800-15.350	20	0.40	1.22	-30 to +75	1	1	WR62	0.50x1.57x0.88	998-148153-611	W30	
<b>WR42</b>											
17.700-19.700	20	0.30	1.22	-30 to +75	1	1	WR42	0.50x1.26x0.88	998-177197-711	W31	
21.200-23.600	20	0.30	1.22	-30 to +75	1	1	WR42	0.50x1.26x0.88	998-212236-711	W31	
<b>WR34</b>											
30.000-31.000	20	0.35	1.22	-40 to +85	1	1	WR34	0.50x1.26x0.88	998-300310-813	W33	
<b>WR28</b>											
37.000-40.500	18	0.30	1.28	-30 to +75	1	1	WR28	0.50x1.25x0.73	998-370405-911	W32	

## Mechanical Specifications

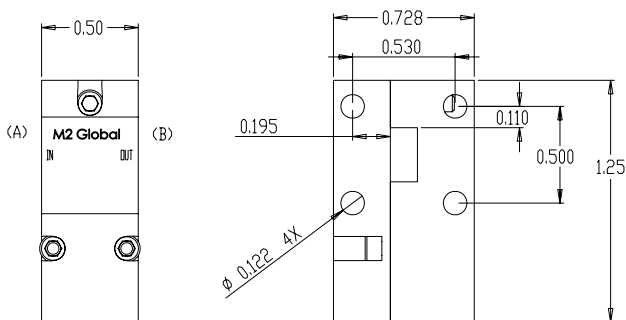
**W30**



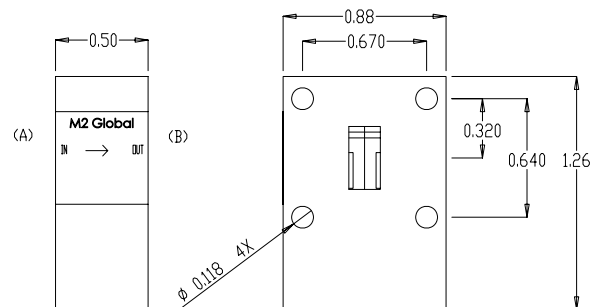
**W31**



**W32**



**W33**





# Isoadaptors

## Electrical Specifications

# SF = Female SMA \* Case Temperature Not To Exceed Operating Temperature  
WG = Waveguide Port  
T = Termination

Frequency Range (GHz)	Isolation (Min) (-dB)	Insertion Loss (Max) (-dB)	VSWR (Max)	Operating Temperature °C	Port Configuration and rotation	Mating Flange	Dimensions (in x in x in)	Part Number	Outline Drawing	Notes
<b>WR137</b>										
5.800-7.125	N/A	0.30	1.15	-20 to +55	WG-SF-SF	CMR-137	2.28x1.53x2.27	994-109045-004	I01	
5.800-7.125	23	0.30	1.15	-20 to +55	WG-SF-T	CMR-137	2.28x1.53x2.27	994-109045-005	I01	
<b>WR90</b>										
10.0-11.0	N/A	0.30	1.22/1.15	-30 to +55	SF-WG-SF	UG39/U	1.62x1.62x1.88	994-106323-003	I02	1
10.0-11.0	20	0.30	1.22/1.15	-30 to +55	WG-SF-T	UG39/U	1.62x1.62x1.88	994-106323-004	I02	2
<b>WR62</b>										
12.7-15.0	20	0.50	1.25	-20 to +65	SF-WG-T	UG419/U	1.32x1.32x1.50	994-037414-011	I03	
12.75-13.25	20	0.50	1.15	-20 to +65	SF-WG-T	UG419/U	1.32x1.32x1.50	994-037414-010	I03	
13.7-14.8	20	0.50	1.15	-20 to +65	SF-WG-T	UG419/U	1.32x1.32x1.50	994-037414-012	I03	
13.7-14.8	20	0.50	1.15	-20 to +65	WG-SF-T	UG419/U	1.32x1.32x1.50	094-037414-008	I03	
14.0-14.5	20	0.50	1.15	-20 to +65	SF-WG-T	UG419/U	1.32x1.32x1.50	994-037628-003	I03	
17.25-18.45	20	0.50	1.22	0 to +50	WG-SF-T	UG419/U	1.32x1.32x1.09	994-037982-010	I04	
17.3-18.1	20	0.50	1.17	-20 to +65	WG-SF-T	UG419/U	1.32x1.32x1.50	994-037982-008	I04	
17.3-18.1	20	0.50	1.17	-20 to +65	SF-WG-T	UG419/U	1.32x1.32x1.50	994-037982-009	I04	

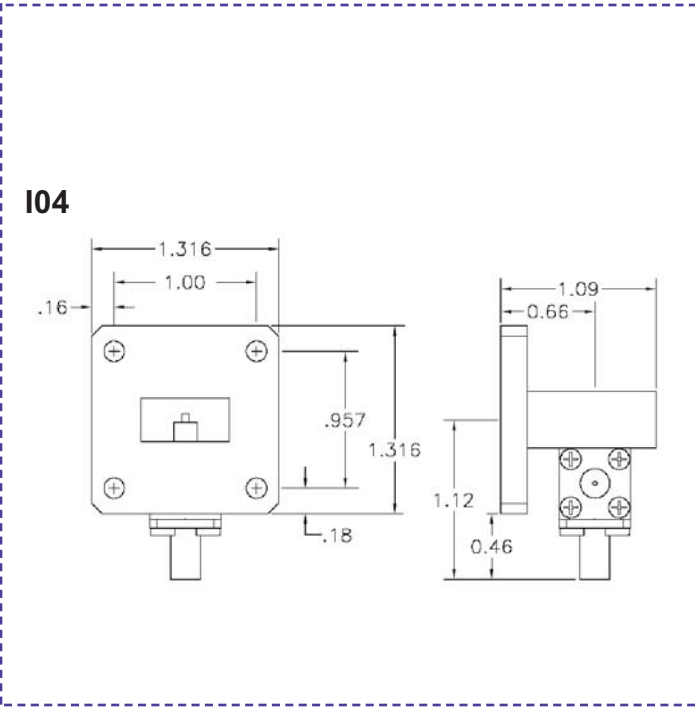
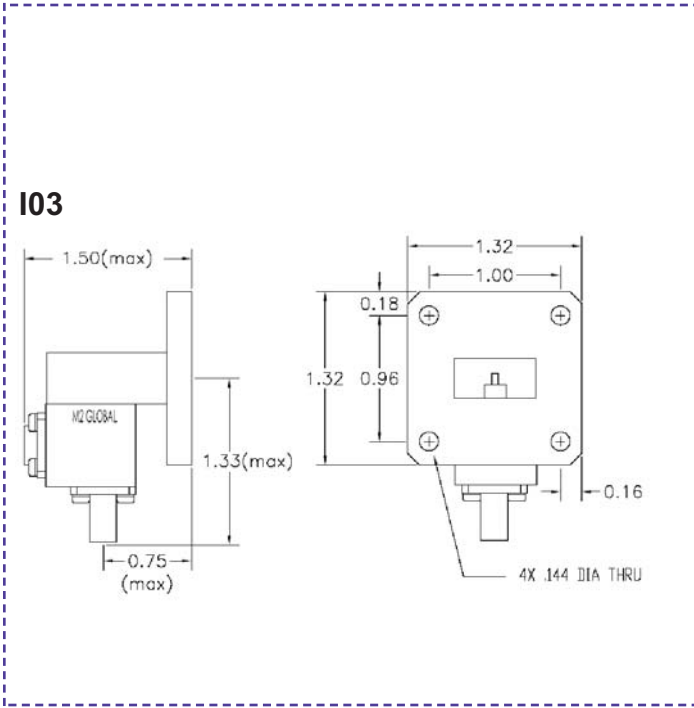
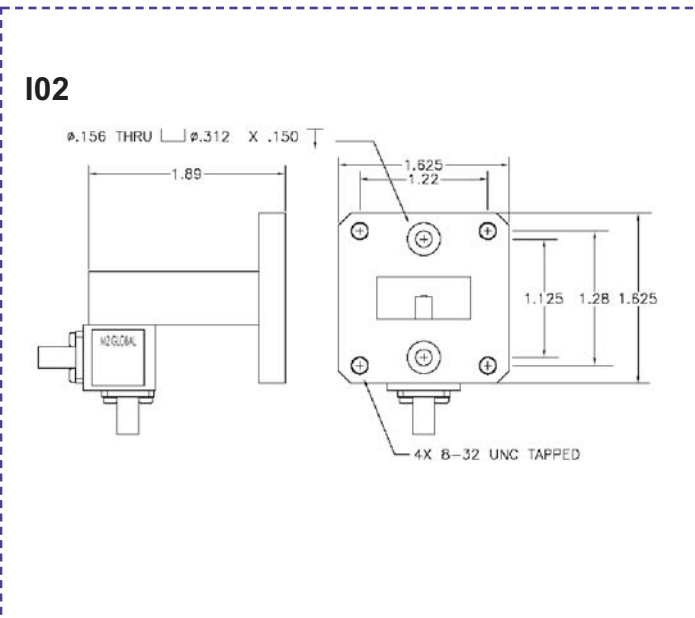
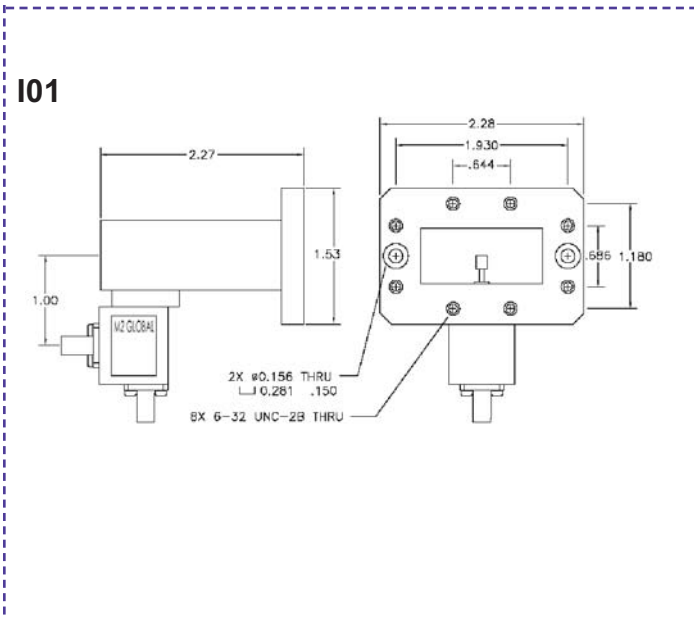
Note 1: VSWR on Port 2 is 1.15:1, and on Ports 1 and 3 is 1.22:1  
Note 2: VSWR on Input Port is 1.15:1, and on Output Port is 1.22:1

M2 Global's Isoadaptors combine a coaxial isolator with a coax to waveguide adapter. One advantage of this arrangement is that the reflection coefficient of the interface is tuned out during the tuning process of the isolator, reducing overall loss. Other advantages are that they may occupy smaller physical space and simplify inventory.

Other waveguide sizes are available upon request.

# Isoadaptors

## Mechanical Specifications



# ISOLATOR/CIRCULATOR REQUEST FOR QUOTE

## CUSTOMER INFORMATION

Your Name:

Company:

Address:

City:  State:

Country:

Phone:  Fax:

Email:

Delivery Date:  Today's Date:

Please contact our sales department for other passive microwave devices or for additional specifications such as phase matching, rf shielding, and environmental requirements:

sales@m2global.com  
or 210-561-4800.

## PRODUCT INFORMATION

M2 Global Part Number(s):

Quantity(s):

Isolator     Dual Junction     Drop-in     Isoadaptor

Circulator     Coax     Waveguide

Frequency Range (GHz):  to     Average Power (W):

Isolation (dB min.):     Peak Power (W):

VSWR (max):     Termination Rating(W):

Insertion loss (dB max):     Other:

Temperature Range (°C):  to

### CONNECTOR TYPE

N-type, SMA, or other

### WG FLANGE TYPE

Male or Female

CPR, CMR, choke, cover, or other

### DROP-IN TAB DIMENSIONS

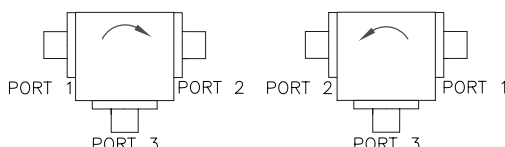
Length x Width x Height (in.)

### EXTERNAL DIMENSIONS

Length x Width x Height (in.)

Port 1:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Port 2:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Maximum <input type="checkbox"/>
Port 3:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	or Exact <input type="checkbox"/>

Clockwise     Counter-clockwise



This form is also available on our website: [www.M2Global.com](http://www.M2Global.com)





# SECTION 2

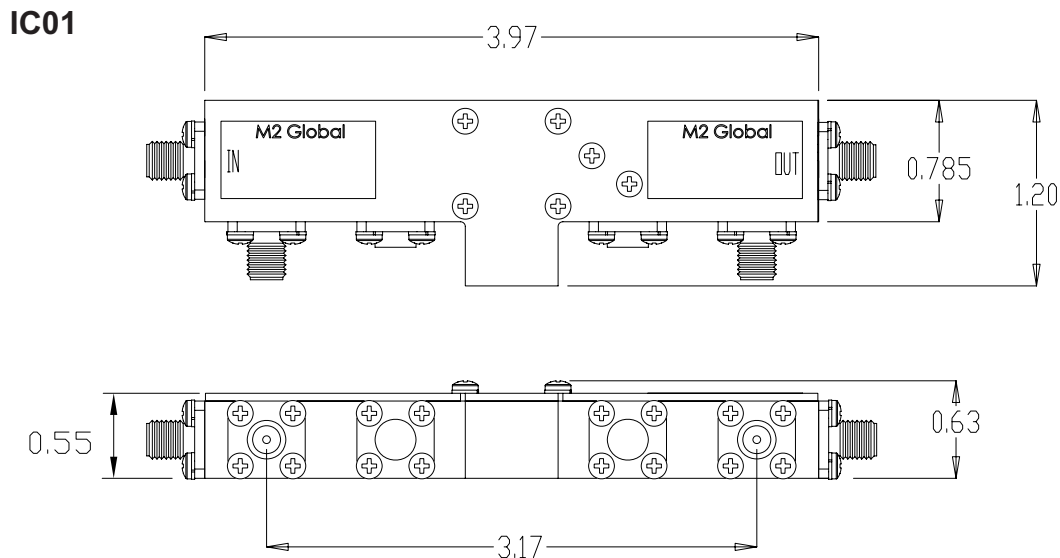
## COAX DIRECTIONAL COUPLERS & POWER DIVIDERS

Integrated Iso-couplers	Page 48
Narrow and Wide Band Coax Couplers	Page 49
Microwave Radio Receiver Couplers and Splitters	Page 51
Coax Power Dividers	Page 52

### Integrated Iso-couplers

M2 Global has developed a line of integrated ferrite components that includes iso-adaptors, iso-filters, and iso-couplers. Such integrated devices provide superior electrical performance, smaller sizes, and reduced inventories. Even when the isolator is a separate item, tuning the two components together after assembly results in improved performance.

The outline drawing below is an example of a 2.45 GHz iso-coupler in which the return signal is attenuated more than 20 dB by the internal isolator.



**We will gladly quote your requirements for an existing integrated isolator component, or for a new design.**

# Narrow and Wide Band Coax Couplers - SMA

## Electrical Specifications

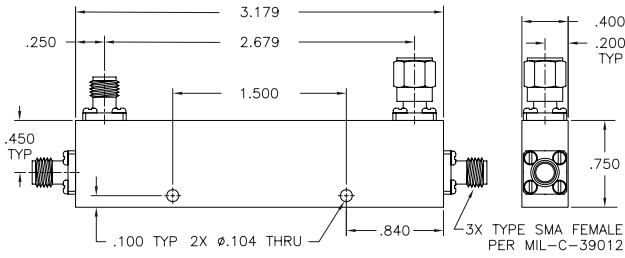
Maximum input power: 50W

Frequency Range (GHz)	Coupling (-dB)	VSWR Mainline (Max)	Insertion Loss (true) (dB)	Reflected Power (Max Watts)	Coupling Accuracy (dB)	Frequency sensitivity (dB)	Directivity (min) (dB)	Part Number Base	SMA Part Number Extension	Outline Drawing	Notes
0.50-1.00	10	1.15	0.80	5	±1.25	±0.75	25	685-050100	-010	CC11	
	20	1.15	0.20	50	±1.25	±0.75	25		-020		
	30	1.20	0.20	50	±1.25	±0.75	25		-030		
0.80-2.30	10	1.25	1.00	50	±1.25	±0.50	20	685-080230	-010	CC16	
	20	1.25	0.45	50	±1.25	±0.50	20		-020		
0.80-3.00	10	1.25	1.00	50	±1.25	±0.50	16	685-080300	-010	CC17	
	20	1.25	0.45	50	±1.25	±0.50	16		-020		
1.00-2.00	10	1.10	0.90	5	±1.25	±0.75	25	685-100200	-010	CC12	
	20	1.10	0.20	50	±1.25	±0.75	25		-020		
	30	1.10	0.20	50	±1.25	±0.75	25		-030		
1.85-3.65	10	1.25	0.70	50	±1.25	±0.75	20	685-185365	-010	CC13	
	20	1.25	0.20	50	±1.25	±0.75	20		-020		
	30	1.25	0.20	50	±1.25	±0.75	20		-030		
2.00-4.00	10	1.15	0.70	5	±1.25	±0.75	22	685-200400	-010	CC13	
	20	1.15	0.20	50	±1.25	±0.75	22		-020		
	30	1.15	0.20	50	±1.25	±0.75	22		-030		
2.10-2.70	10	1.15	0.70	50	±1.25	±0.75	22	685-360420	-010	CC13	
	20	1.15	0.20	50	±1.25	±0.75	22		-020		
	30	1.15	0.20	50	±1.25	±0.75	22		-030		
2.60-5.20	10	1.25	0.80	5	±1.25	±0.75	20	685-260520	-010	CC14	
	20	1.25	0.25	50	±1.25	±0.75	20		-020		
	30	1.25	0.25	50	±1.25	±0.75	20		-030		
3.60-4.20	10	1.40	1.00	50	±1.00	±0.30	15	685-360420	-010	CC14	
	20	1.40	0.55	50	±1.00	±0.30	15		-020		
	30	1.40	0.55	50	±1.00	±0.30	15		-030		
4.00-8.00	10	1.25	1.00	5	±1.25	±0.75	20	685-400800	-010	CC14	
	20	1.25	0.30	50	±1.25	±0.75	20		-020		
	30	1.25	0.25	50	±1.25	±0.75	20		-030		
5.70-10.20	10	1.40	1.00	50	±1.25	±0.75	15	685-570102	-010	CC14	
	20	1.40	0.45	50	±1.25	±0.75	15		-020		
	30	1.40	0.45	50	±1.25	±0.75	15		-030		
5.80-6.40	10	1.35	1.10	50	±1.00	±0.30	15	685-580640	-010	CC14	
	20	1.30	0.55	50	±1.00	±0.30	15		-020		
	30	1.30	0.55	50	±1.00	±0.30	15		-030		
7.00-12.40	10	1.30	1.00	5	±1.25	±0.50	17	685-700124	-010	CC14	
	20	1.30	0.35	50	±1.00	±0.50	17		-020		
	30	1.30	0.30	50	±1.00	±0.50	17		-030		
10.90-12.75	10	1.35	1.50	50	±1.25	±0.75	15	685-140145	-010	CC14	
	20	1.35	0.55	50	±1.25	±0.75	15		-020		
	30	1.35	0.55	50	±1.25	±0.75	15		-030		
12.40-18.00	10	1.30	1.10	5	±1.00	±0.55	15	685-124180	-010	CC14	
	20	1.30	0.55	50	±1.00	±0.50	15		-020		
	30	1.30	0.55	50	±1.00	±0.50	15		-030		
14.00-14.50	10	1.35	1.10	50	±1.00	±0.30	15	685-140145	-010	CC14	
	20	1.30	0.55	50	±1.00	±0.30	15		-020		
	30	1.30	0.55	50	±1.00	±0.30	15		-030		
18.00-26.50	10	1.60	1.50	5	±1.20	±0.70	11	685-180265	-010	CC15 CC15 CC14	
	20	1.60	0.80	50	±1.20	±0.70	11		-020		
	30	1.60	0.80	50	±1.20	±0.70	11		-030		
18.50-19.50	10	1.70	1.60	50	±1.25	±0.80	10	685-185195	-010	CC14	
	20	1.70	0.85	50	±1.25	±0.80	10		-020		
	30	1.70	0.85	50	±1.25	±0.80	10		-030		

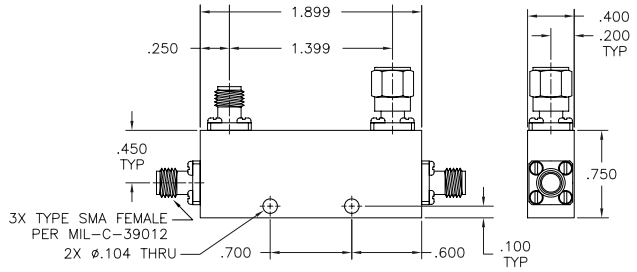
# Coax Couplers

## Mechanical Specifications

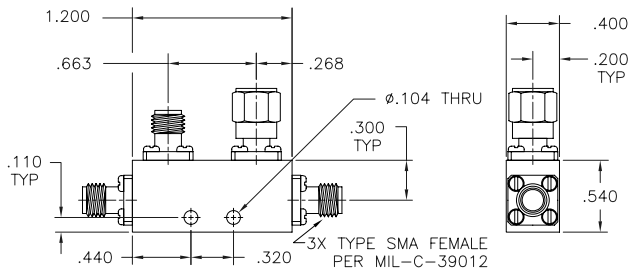
**CC11**



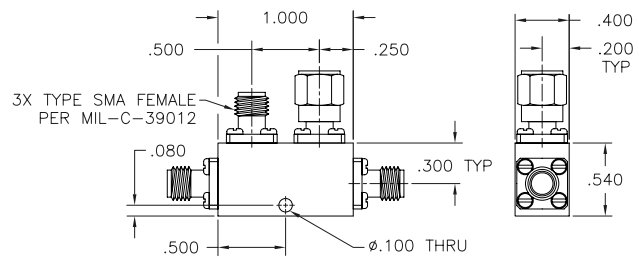
**CC12**



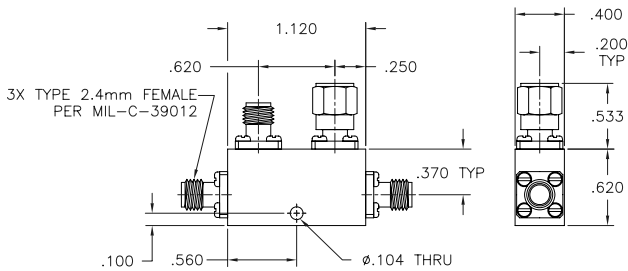
**CC13**



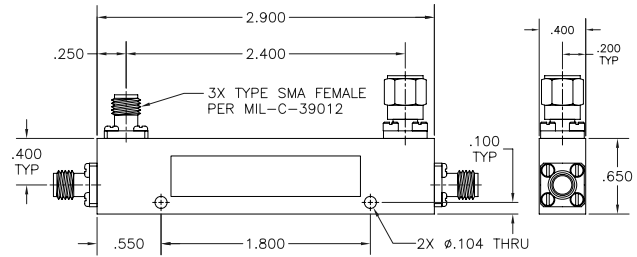
**CC14**



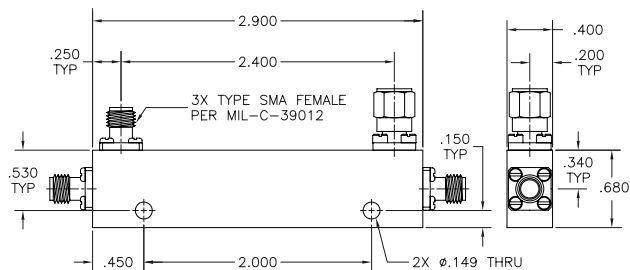
**CC15**



**CC16**



**CC17**



# Microwave Radio Receiver Couplers & Splitters

## Electrical Specifications

Connectors: SMA

Operating Temperature Range: -40°C to +80°C

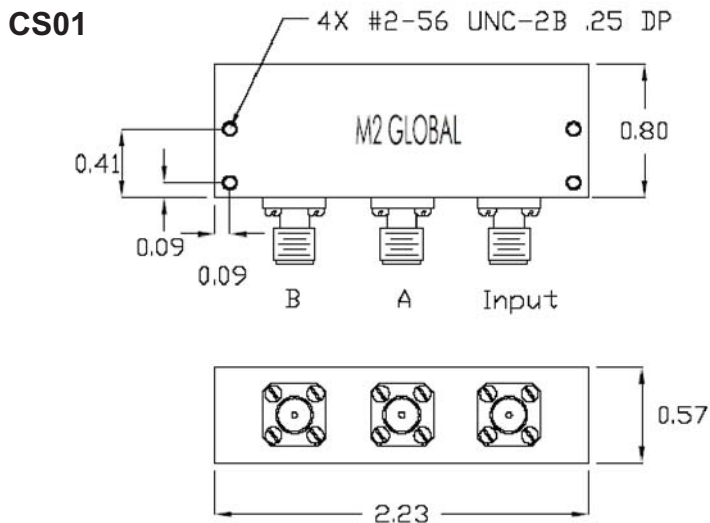
### 10 dB Coupler

Frequency Range (GHz)	Insertion Loss (-dB max)	Accuracy (-dB max)	Isolation A - B (-dB min)	Return Loss, I/P (dB min)	Return Loss, A (dB min)	Return Loss, B (dB min)	Part Number	Outline Drawing
5.60-8.80	1.0	+0.5/-1.0	20	18	16	12	692-560880-001	CS01
10.0-12.0	1.0	+0.5/-1.0	20	18	16	12	692-100120-001	CS01
12.7-15.4	1.0	+0.5/-1.0	20	18	16	12	692-127154-001	CS01
17.7-19.7	1.4	+0.5/-1.0	20	18	16	12	692-177197-001	CS01
21.2-23.6	1.4	+0.5/-1.0	20	18	16	12	692-212236-001	CS01

### 3 dB Splitter

Frequency Range (GHz)	Insertion Loss A (-dB max)	Insertion Loss B (-dB max)	Isolation A - B (-dB min)	Return Loss, I/P (dB min)	Return Loss, A (dB min)	Return Loss, B (dB min)	Part Number	Outline Drawing
5.60-8.80	3.7	3.7	20	18	16	16	592-560880-001	CS01
10.0-12.0	3.7	3.7	20	18	16	16	592-100120-001	CS01
12.7-15.4	3.7	3.7	20	18	16	16	592-127154-001	CS01

## Mechanical Specifications



# Coax Power Dividers

## Electrical Specifications

## 2-WAY DIVIDERS

Frequency Range (GHz)	Insertion Loss (max) (dB)		Isolation (min) (dB)		VSWR In/Out (max)		Match Amp./Phase (dB)/(O)		Part Number Base	Part Number Extension		Outline Drawing		Notes
	SMA	N	SMA	N	SMA	N	SMA	N		SMA	N	SMA	N	
0.50-1.00	0.40	0.40	22	22	1.23/1.15	1.25/1.25	0.2/2	0.2/4	592-050100	-020	-120	CD21	CD31	
0.50-2.50	0.80	0.50	18	18	1.35/1.11	1.40/1.30	0.2/2	0.2/4	592-050250	-020	-120	CD22	CD32	
1.00-2.00	0.35	0.35	20	20	1.25/1.15	1.25/1.20	0.2/2	0.2/3	592-100200	-020	-120	CD23	CD33	
2.00-4.00	0.40	0.40	20	18	1.30/1.20	1.30/1.20	0.2/2	0.3/4	592-200400	-020	-120	CD24	CD33	
4.00-8.00	0.60	0.70	20	17	1.35/1.25	1.50/1.45	0.2/2	0.2/8	592-400800	-020	-120	CD24	CD33	
8.00-12.40	0.50	0.90	20	12	1.35/1.30	1.75/1.60	0.2/3	0.2/9	592-800124	-020	-120	CD25	CD33	
12.00-18.00	0.70		19		1.40/1.35		0.3/6		592-120180	-020	N/A	CD25	N/A	
18.00-26.50	1.60		15		2.00/2.00		0.5/12		592-180265	-020	N/A	CD25	N/A	

## 4-WAY DIVIDERS

Frequency Range (GHz)	Insertion Loss (max) (dB)		Isolation (min) (dB)		VSWR In/Out (max)		Match Amp./Phase (dB)/(O)		Part Number Base	Part Number Extension		Outline Drawing		Notes
	SMA	N	SMA	N	SMA	N	SMA	N		SMA	N	SMA	N	
0.50-1.00	0.9	0.9	22	20	1.45/1.30	1.45/1.30	0.3/5	0.3/5	592-050100	-020	-120	CD41	CD51	
0.50-2.50	0.7	0.9	20	18	1.45/1.30	1.60/1.15	0.3/5	0.5/8	592-050250	-020	-120	CD42	CD52	
1.00-2.00	0.8	0.8	20	18	1.40/1.15	1.40/1.25	0.3/5	0.3/4	592-100200	-020	-120	CD43	CD53	
2.00-4.00	0.6	0.6	20	18	1.35/1.35	1.45/1.40	0.3/6	0.4/8	592-200400	-020	-120	CD43	CD54	
4.00-8.00	0.8	0.7	20	19	1.45/1.35	1.50/1.40	0.3/8	0.4/8	592-400800	-020	-120	CD44	CD54	
8.00-12.40	0.8	1.4	18	15	1.45/1.35	1.60/1.50	0.4/6	0.4/10	592-800124	-020	-120	CD45	CD55	
12.00-18.00	1.5		18		1.50/1.40		0.5/6		592-120180	-020	N/A	CD45	N/A	
18.00-26.50	2.6		15		1.65/1.60		0.8/12		592-180265	-020	N/A	CD46	N/A	

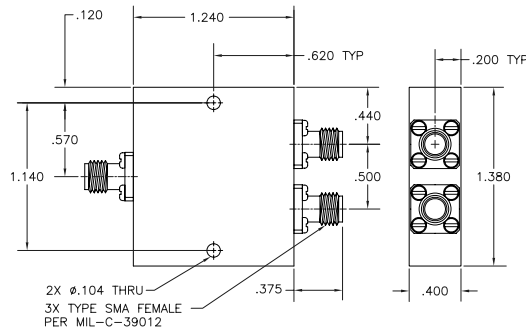
**Average input power rating:**

<b>Watts</b>	<b>Load VSWR</b>
<b>30</b>	<b>1.2</b>
<b>10</b>	<b>2.0</b>
<b>1</b>	<b>Inf.</b>

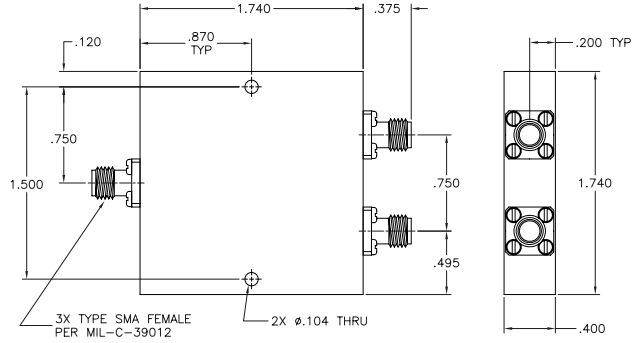
# Coax Power Dividers

## Mechanical Specifications

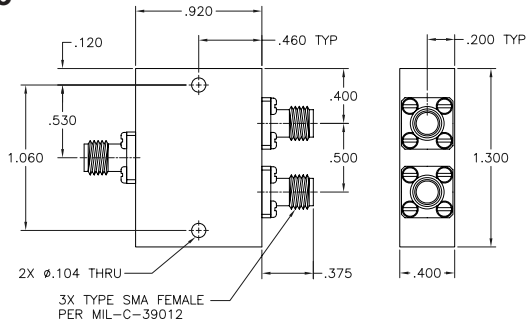
**CD21**



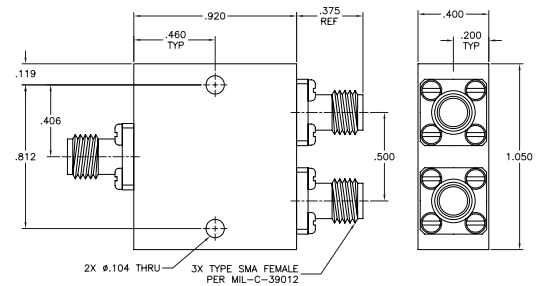
**CD22**



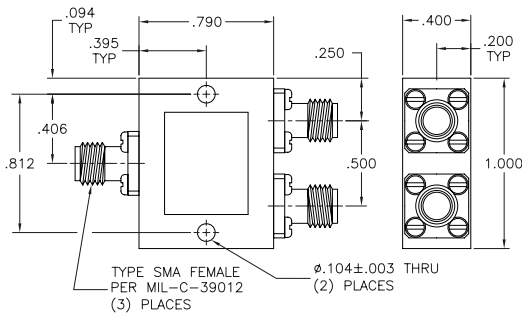
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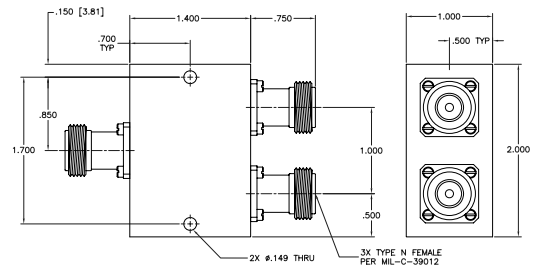
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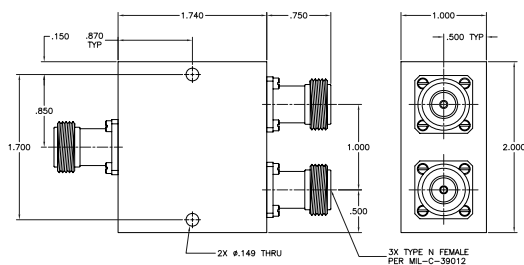
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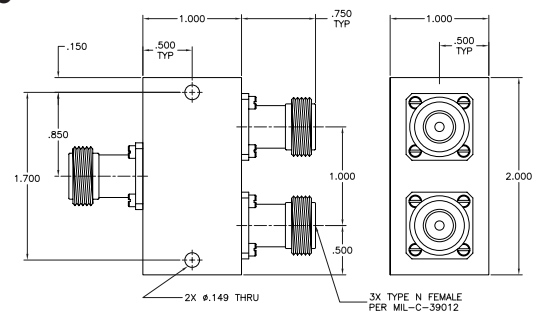
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**CD32**



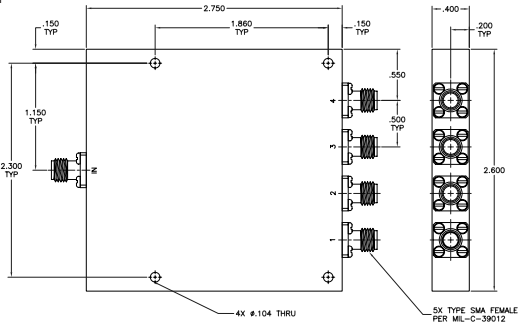
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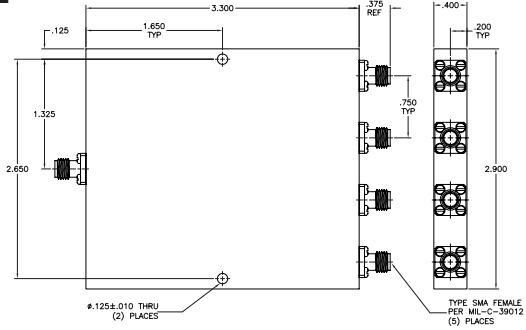
# Coax Power Dividers

## Mechanical Specifications continued

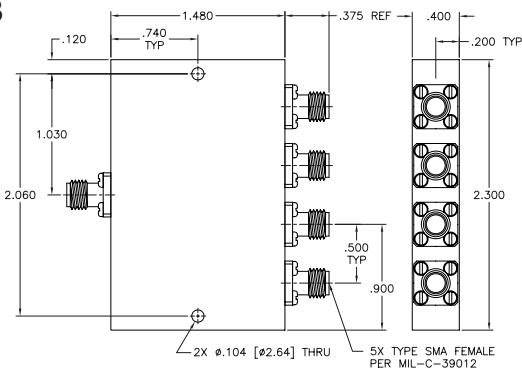
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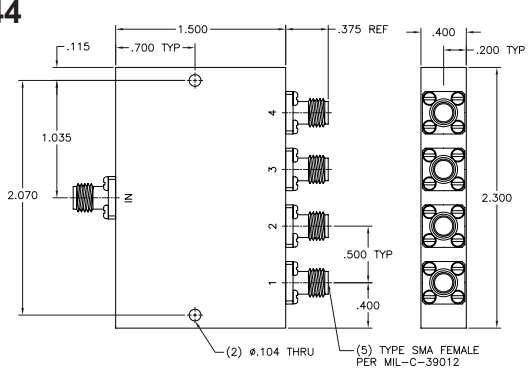
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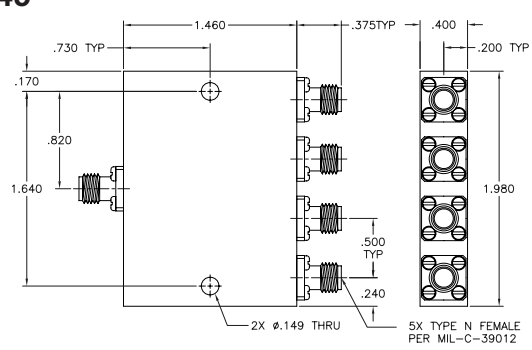
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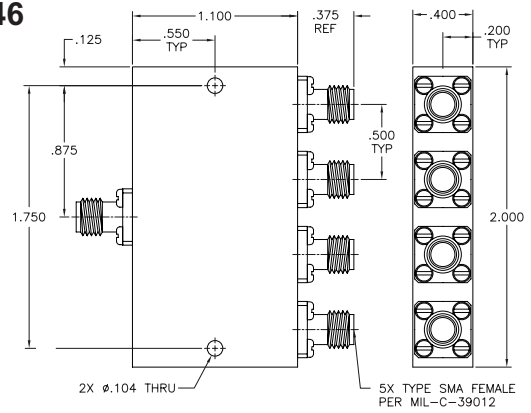
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**CD45**



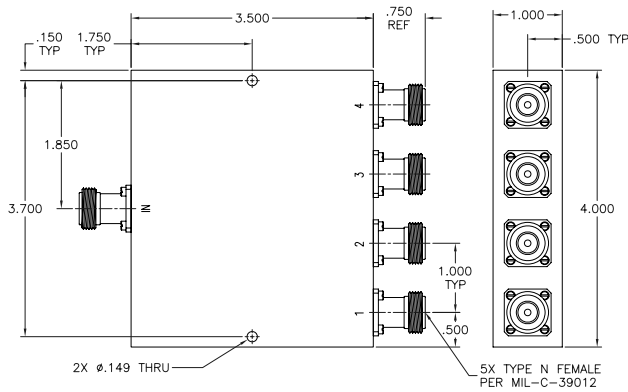
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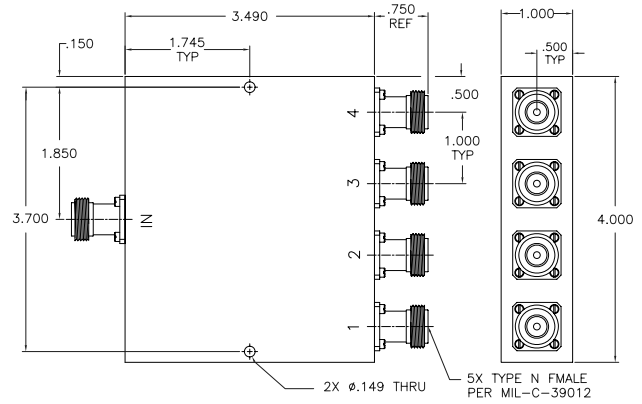
# Coax Power Dividers

## Mechanical Specifications continued

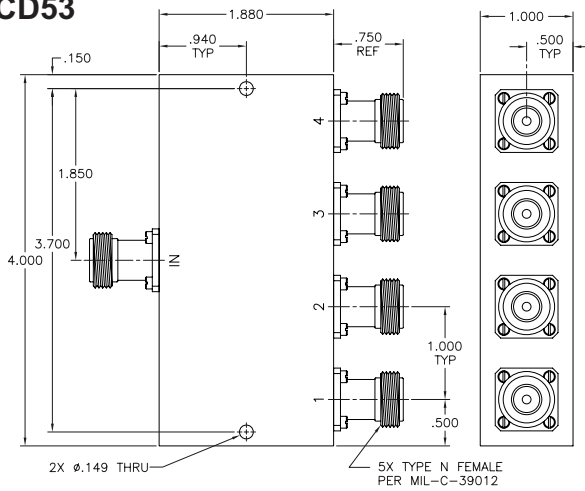
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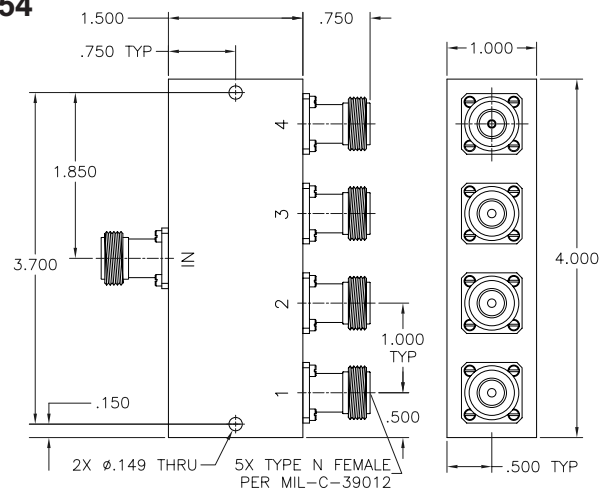
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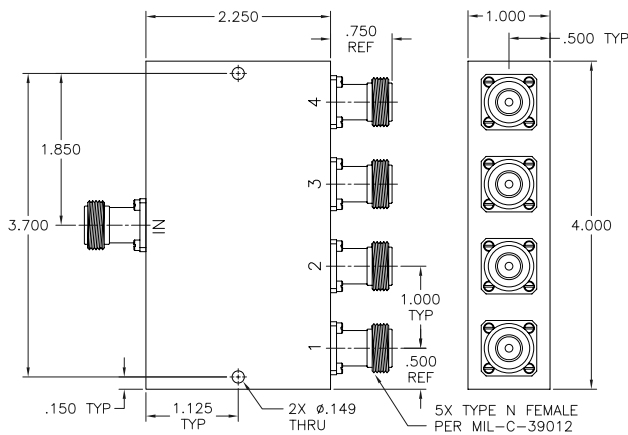
**CD53**



**CD54**



**CD55**





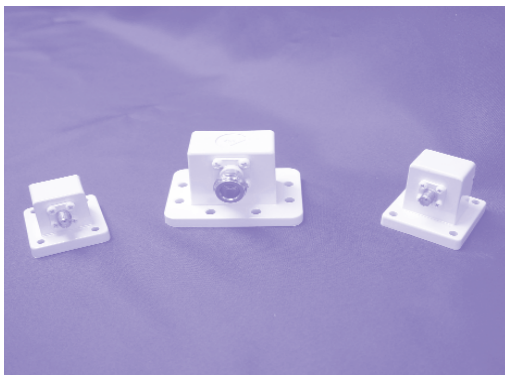
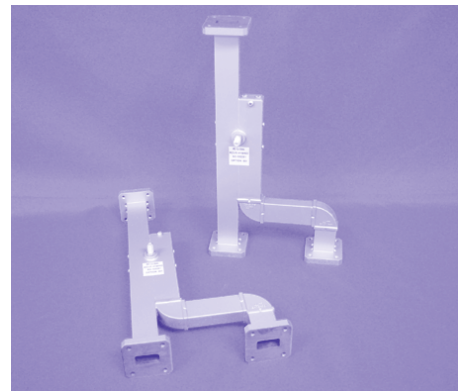
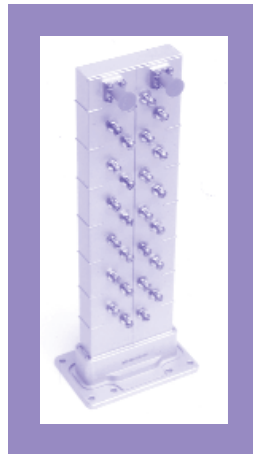


## SECTION 3

# WAVEGUIDE PRODUCTS

This section highlights a small sample of the waveguide components and assemblies that M2 Global is able to supply. Please contact our factory sales personnel to obtain price and delivery for standard or custom configured products

We design custom filters and diplexers, and supply waveguide assemblies to your specifications. Our waveguide products include switches, couplers, adapters, terminations, waveguide to coax adapters, sections, and windows. Waveguide sections include bends, straight and twisted rigid sections, and flex or twistable flex sections. In addition we provide installation kits, and stock a full line of flanges, cast E/H-Bends, and waveguide tubing.





# Waveguide Switches

## Electrical Specifications

Waveguide Size	Frequency Range (GHz)	Insertion Loss (typ) (dB)	Isolation (max) (dB)	Return Loss (typ) (dB)	Switching Time (max) (msec)	CW Power Rating (kW)	Part Number	Outline	Notes
WR229	3.5-4.2	0.05	70	32	120	5.0	390-350420-190	S01	
WR187	3.95-5.85	0.05	80	30	100	5.0	390-395585-190	S02	
WR159	4.90-7.05	0.05	70	30	100	5.0	390-490705-190	S03	
WR137	5.85-8.20	0.05	70	30	80	5.0	390-585820-110	S04	
WR112	7.0-10.0	0.05	70	28	80	5.0	390-700100-120	S05	
WR90	8.2-12.4	0.05	70	30	80	3.5	390-820124-140	S06	
WR75	10.0-15.0	0.05	70	28	80	3.5	390-100150-150	S07	
WR62	12.4-18.0	0.05	70	26	80	2.5	390-124180-160	S08	
WR42	18.0-26.5	0.15	60	23	70	1.0	390-180265-170	S09	
WR34	22.0-33.0	0.15	55	23	70	0.5	390-220330-180	S10	
WR28	26.5-40.0	0.15	55	23	70	0.4	390-265400-190	S11	

Our line of waveguide switches are designed for reliability in outdoor environments including freezing rain, sand and dust. A mating connector is supplied with each switch. Standard options are available as follows:

- \* Flanges can be selected from most common North American or metric types. Specify flange type with order.
- \* Driver voltages include 12V, 24V, or 48V DC and 115V or 220V AC. Specify driver voltage with order.
- \* Weather cap for manual override control (required for outdoor environments).
- \* Drive head includes Form C contacts, some of which may be replaced with inhibit contacts.

Power connectors: for WR229 through WR62 - ITT KPTO2614-19P  
for WR42 through WR28 - ITT KPTO2614-10P

Operating temperature: -40 to +75 °C

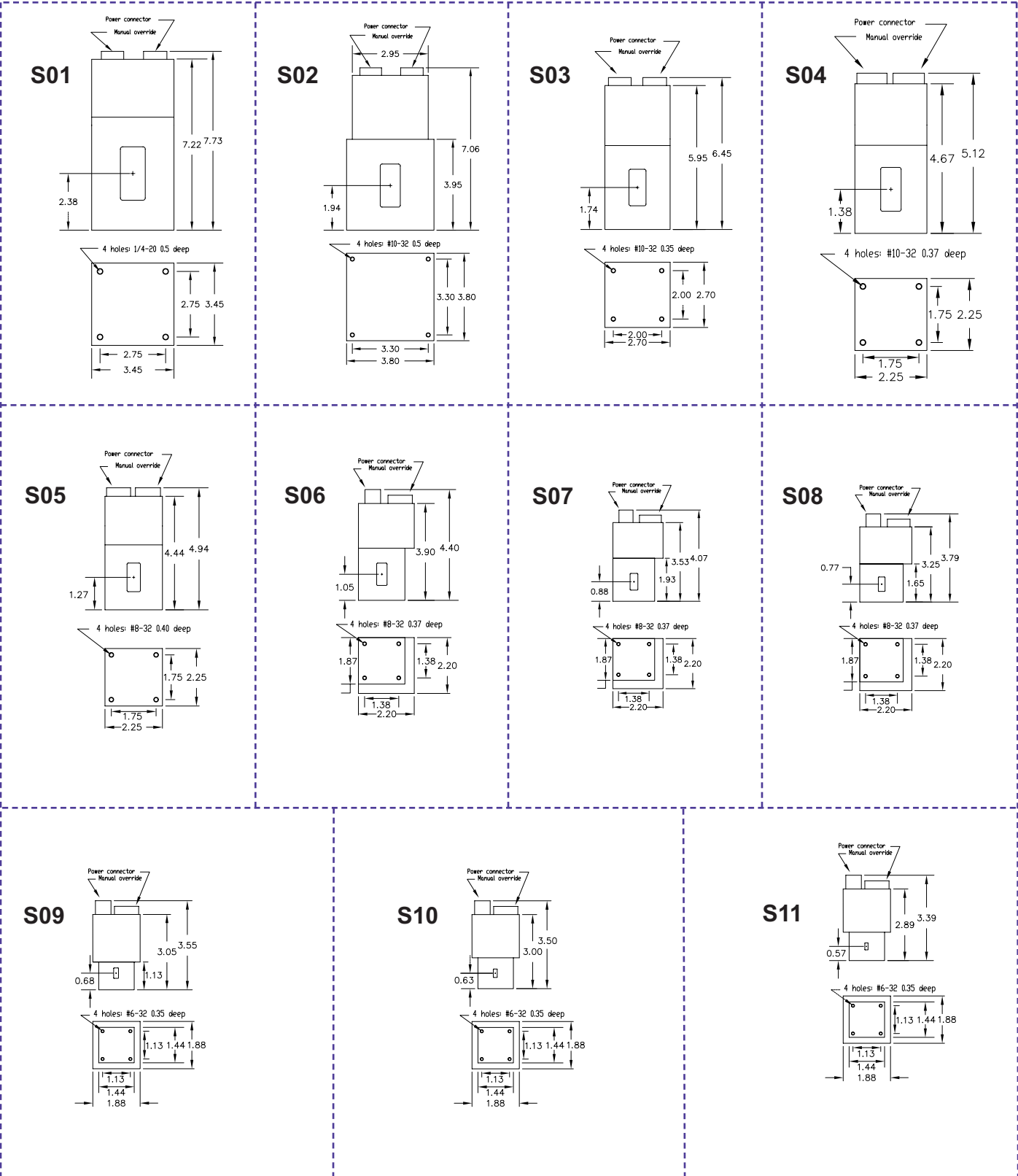
Humidity: 100%

Pressure rating: 20 psig, including driving head



# Waveguide Switches

## Mechanical Specifications

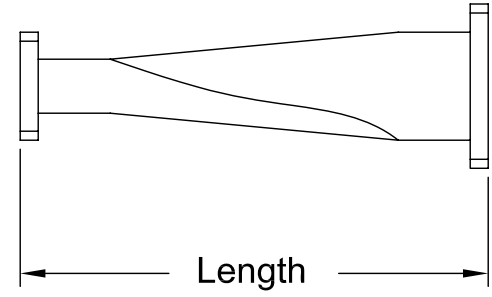
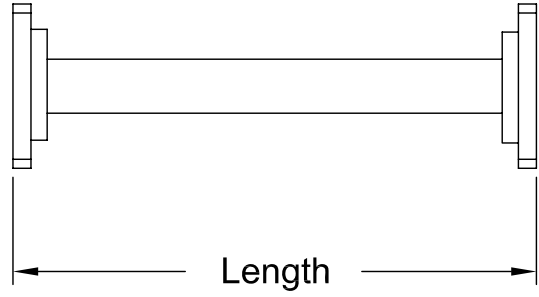




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# Straight and Twisted Rigid Waveguide Sections



Waveguide Size	Frequency Range (GHz)
WR 284	2.60-3.95
WR 229	3.30-4.90
WR 187	3.95-5.85
WR 159	4.90-7.05
WR 137	5.85-8.20
WR 112	7.05-10.0
WR 102	7.00-11.0
WR 90	8.20-12.4
WR 75	10.0-15.0
WR 62	12.4-18.0
WR 51	15.0-22.0
WR 42	18.0-26.5
WR 34	22.0-33.0
WR 28	26.5-40.0

Rigid Waveguide Sections are manufactured in lengths up to 12 feet from copper, aluminum or brass waveguide in waveguide sizes from WR28 through WR284.

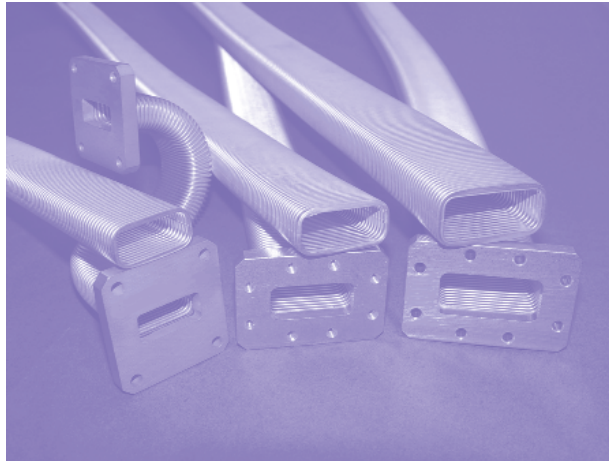
Lengths with 90° twists are available.

Painting, chemical finishing and/or plating are available per requirements.

Flange options include: CPR, CMR, Choke, Cover or foreign flange standards.



# Flex and Twistable Flex Waveguide Sections



Waveguide Size	Frequency Range (GHz)
WR 284	2.60-3.95
WR 229	3.30-4.90
WR 187	3.95-5.85
WR 159	4.90-7.05
WR 137	5.85-8.20
WR 112	7.05-10.0
WR 102	7.00-11.0
WR 90	8.20-12.4
WR 75	10.0-15.0
WR 62	12.4-18.0
WR 51	15.0-22.0
WR 42	18.0-26.5
WR 34	22.0-33.0
WR 28	26.5-40.0

Flex waveguide is manufactured in lengths up to 4 feet in seamless brass in waveguide sizes WR28 through WR284.

Twistable flex is manufactured in lengths up to 10 feet in waveguide sizes WR28 through WR284. Neoprene jacketing is available.

Painting, chemical finishing and/or plating are available per requirements.

Flange options include: CPR, CMR, Choke, Cover or foreign flange standards.

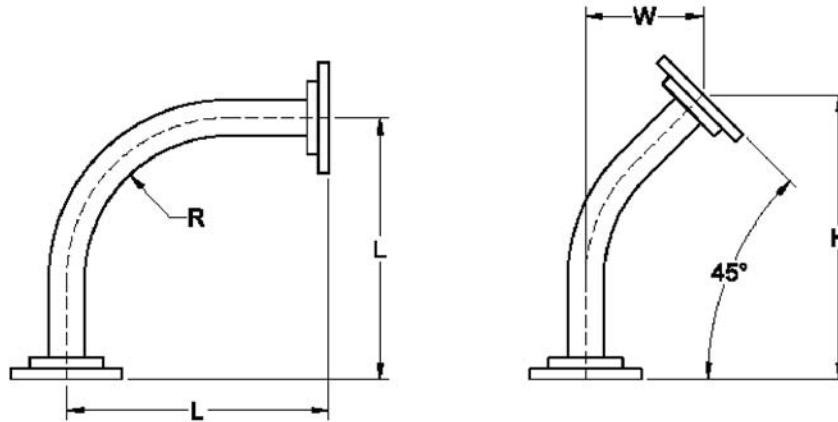
Flex waveguide is also available without flanges.



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# Waveguide Bends

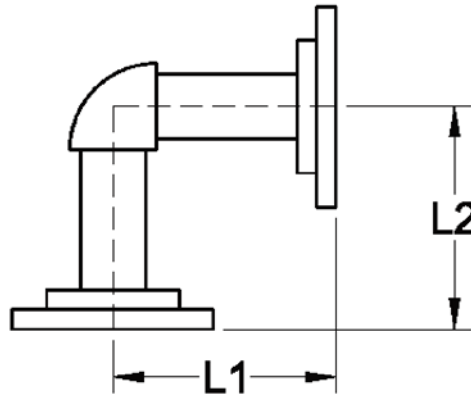


M2 Global offers formed E or H-bend assemblies in copper or aluminum covering the range WR-19 to WR-284. Other sizes are available on a special order basis. Flange options include: CPR, CMR, CPRF, Choke, or Cover.

Minimum Dimensions		90 Deg. "E" Bend		90 Deg. "H" Bend		45 Deg. "E" Bend		45 Deg. "H" Bend	
Waveguide Size	Frequency Range(GHz)	L (in.)	R (in.)	L (in.)	R (in.)	W (in.)	H (in.)	W (in.)	H (in.)
WR-284	2.60-3.95	7.75	6.0	7.250	4.00	1.875	4.500	2.093	5.031
WR-229	3.30-4.90	3.625	2.0	4.250	2.00	1.062	2.328	1.312	3.062
WR-187	3.95-5.85	5.062	4.0	5.625	4.00	1.437	3.468	1.593	3.812
WR-159	4.90-7.05	2.500	1.0	2.875	1.00	1.250	3.000	1.218	2.906
WR-137	5.85-8.20	2.375	1.0	2.750	1.00	1.125	2.687	1.218	2.937
WR-112	7.05-10.0	2.062	0.8	2.375	0.75	1.093	2.625	1.187	2.875
WR-102	7.00-11.0	2.000	0.5	2.000	0.50	1.093	2.625	1.187	2.875
WR-90	8.20-12.4	1.437	0.5	1.687	0.50	0.968	2.312	1.031	2.500
WR-75	10.0-15.0	1.437	0.5	1.687	0.50	0.687	1.687	0.687	1.687
WR-62	12.4-18.0	1.656	0.5	1.687	0.50	0.687	1.687	0.687	1.687
WR-51	15.0-22.0	1.656	0.5	1.687	0.50	0.687	1.687	0.687	1.687
WR-42	18.0-26.5	1.25	0.5	1.375	0.50	0.687	1.687	0.687	1.687
WR-28	26.5-40.0	1.234	0.5	1.312	0.50	0.687	1.687	0.687	1.687
WR-22	33.0-50.0	1.234	0.5	1.312	0.50	0.687	1.687	0.687	1.687
WR-19	40.0-60.0	1.234	0.5	1.312	0.50	0.687	1.687	0.687	1.687



# Waveguide Mitered Bends



M2 GLOBAL TECHNOLOGY offers a line of mitered waveguide bends for waveguide systems. Give us your dimensions for a custom E-bend and H-bend combination, and we will build them to your specifications, either in copper or aluminum.

Typical VSWR for standard mitered bends is 1.05:1 over the full frequency range.

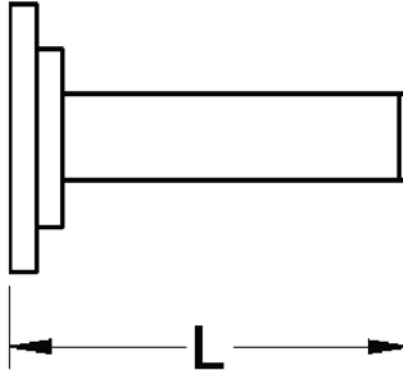
L1 and L2 (up to 12 inches) to be specified by the customer. Mitered Bends can be manufactured with 30°, 45° or 90° elbows. Please call the factory for bend lengths in excess of 12 inches or for special configurations.

Flange options include: CPR, CMR, Choke, or Cover.

Waveguide Size	Frequency Range (GHz)
WR 284	2.60-3.95
WR 229	3.30-4.90
WR 187	3.95-5.85
WR 159	4.90-7.05
WR 137	5.85-8.20
WR 112	7.05-10.0
WR 102	7.00-11.0
WR 90	8.20-12.4
WR 75	10.0-15.0
WR 62	12.4-18.0
WR 51	15.0-22.0
WR 42	18.0-26.5
WR 28	26.5-40.0



# Waveguide Terminations - Low & Medium Power



M2 Global's precision fixed terminations are used to terminate waveguide runs with low VSWR.

## LOW POWER TERMINATIONS

Waveguide Size	Frequency Range (GHz)	Ave. Power (Watts)	VSWR (typ.)	"L" (in.)
WR 284	2.50-3.95	10	1.02	11.00
WR 229	3.30-4.90	10	1.02	8.00
WR 187	3.95-5.85	8	1.02	6.50
WR 159	4.90-7.05	5	1.02	5.75
WR 137	5.85-8.20	6	1.02	6.25
WR 112	7.05-10.0	5	1.02	4.75
WR 102	7.00-11.0	5	1.02	3.75
WR 90	8.20-12.4	4	1.02	3.50
WR 75	10.0-15.0	2.5	1.02	3.75
WR 62	12.4-18.0	1.5	1.02	3.38
WR 51	15.0-22.0	1	1.02	3.13
WR 42	18.0-26.5	1	1.02	3.00
WR 34	22.0-33.0	1	1.02	3.00
WR 28	26.5-40.0	0.5	1.02	2.38
WR 22	33.0-50.0	0.25	1.02	2.38
WR 19	40.0-60.0	0.25	1.02	2.00
WR 15	50.0-75.0	0.125	1.02	2.00
WR 12	60.0-90.0	0.125	1.02	2.00

## MEDIUM POWER TERMINATIONS

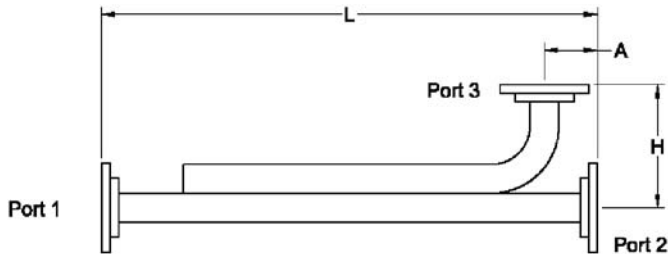
Waveguide Size	Frequency Range (GHz)	Ave. Power (Watts)	VSWR (typ.)	"L" (in.)
WR 187	3.95-5.85	30	1.04	6.50
WR 137	5.85-8.20	30	1.03	6.25
WR 112	7.05-10.0	50	1.03	6.25
WR 90	8.20-12.4	50	1.03	3.50
WR 75	10.0-15.0	60	1.04	3.75
WR 62	12.4-18.0	60	1.03	3.38
WR 51	15.0-22.0	50	1.04	3.75
WR 42	18.0-26.5	25	1.04	3.38
WR 34	22.0-33.0	25	1.04	3.38

Flange options include: CPR, CMR, Choke, or Cover.





# Directional Couplers



Coupled ports may be equipped with waveguide flanges or N-type connectors.

Coupling values of 3, 6, 10 and 20 dB are available with an accuracy of +/- 0.4 dB.

Coupling values of 30 and 40 dB are available with an accuracy of +/- 1.0 dB.  
(Except for models in WR-28, WR-34, and WR-42 the accuracy is +/- .6 dB, for WR-51 the accuracy is +/- 1.2 dB)

Custom Specifications are available upon request.

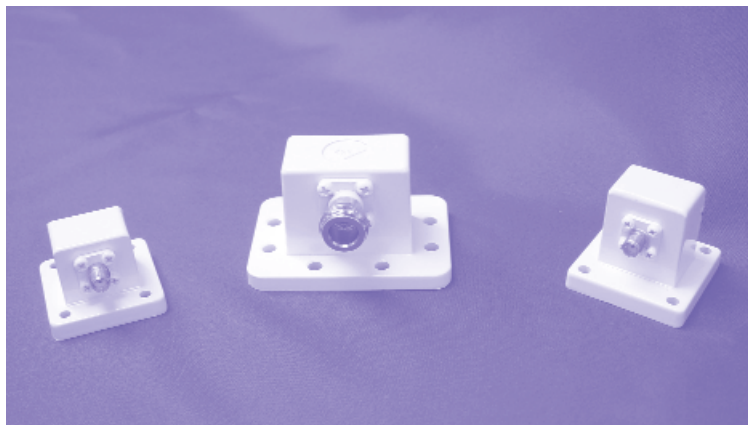
Couplers are available in Aluminum, Brass or Copper.

Flange options: CPR, CMR, Choke, and Cover

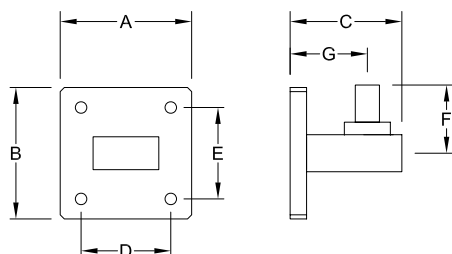
Waveguide Size	Frequency Range (GHz)	L (in.)	A (in.)	H (in.)
WR-650	1.12-1.70	on request	on request	on request
WR-430	1.70-2.60	on request	on request	on request
WR-284	2.60-3.95	50.25	2.656	9.187
WR-229	3.30-4.90	42	1	6.812
WR-187	3.95-5.85	34.625	1.812	6.437
WR-159	4.90-7.05	32.5	0.875	5.25
WR-137	5.85-8.20	26.5	1.562	3.062
WR-112	7.05-10.0	18.625	0.937	3.062
WR-102	7.00-11.0	18	0.875	2.25
WR-90	8.20-12.4	16.687	0.812	1.937
WR-75	10.00-15.0	15	0.75	2.5
WR-62	12.4-18.0	13.75	0.656	2.187
WR-51	15.0-22.0	12	0.656	2.125
WR-42	18.0-26.5	9.5	0.437	1.25
WR-34	22.0-33.0	9	0.437	1.25
WR-28	26.5-40.0	6.5	0.375	1.125

# Waveguide to Coax Adapters

## Electrical & Mechanical Specifications



M2 Global offers waveguide to coax adapters for all common waveguide bands. Coax connector options are N-type, SMA, and K-type, depending on frequency.

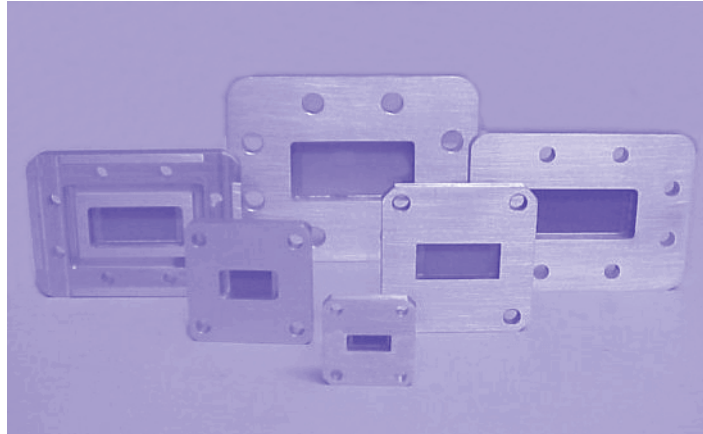


**Low VSWR**  
**N-type, SMA and K connectors**  
**C to Ka bands**

Cover flanges are shown. Most flange options and custom designs are available.

Waveguide Size	Frequency Range (GHz)	VSWR (Max)	Connector Style	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	Part Number
WR284	2.60-3.95	1.2	SMA Female	4.50	3.00	2.91	3.83	2.33	1.12	1.90	490-260395-002
WR229	3.30-4.90	1.2	N-Type Female	3.88	2.75	2.40	3.24	2.10	1.46	1.38	490-330490-102
WR229	3.30-4.90	1.2	SMA Female	3.88	2.75	2.40	3.24	2.10	1.09	1.38	490-330490-002
WR137	5.85-8.20	1.2	N-Type Female	2.70	1.95	1.55	2.19	1.44	1.22	1.07	490-585820-102
WR137	5.85-8.20	1.2	SMA Female	2.70	1.95	1.55	2.19	1.44	0.85	1.07	490-585820-002
WR112	7.05-10.0	1.2	N-Type Female	1.88	1.88	1.57	1.35	1.47	1.20	1.00	490-705100-102
WR112	7.05-10.0	1.2	SMA Female	1.88	1.88	1.57	1.35	1.47	0.85	1.00	490-705100-002
WR90	8.20-12.40	1.2	SMA Female	1.63	1.63	1.50	1.22	1.28	0.77	0.89	490-820124-002
WR75	10.0-15.0	1.2	SMA Female	1.48	1.48	1.12	1.04	1.122	0.78	0.70	490-100150-002
WR62	12.0-18.0	1.2	SMA Female	1.31	1.31	1.31	0.99	0.96	0.73	0.93	490-120180-002
WR42	18.0-25.0	1.2	SMA Female	0.88	0.88	1.02	0.64	0.67	0.67	0.61	490-176255-001
WR42	18.0-26.0	1.2	K-Type Female	0.88	0.88	1.02	0.64	0.67	0.67	0.61	490-176255-201
WR28	26.0-40.0	1.2	K-Type Female	0.75	0.75	1.06	0.5	0.53	0.66	0.72	490-260400-201

# Waveguide Pressure Windows



## Low VSWR Pressure Windows

Typical construction with Teflon fiberglass.  
 Special configurations available upon request.  
 Flanges are cover, choke, groove, or CPR.

Waveguide Size	Frequency Range (GHz)	Thickness (in)	Pressure Max (psig)
WR 284	2.60-3.95	0.25	15
WR 229	3.30-4.90	0.25	20
WR 187	3.95-5.85	0.25	25
WR 159	4.90-7.05	0.25	30
WR 137	5.85-8.20	0.25	35
WR 112	7.05-10.0	0.25	40
WR 102	7.00-11.0	0.25	40
WR 90	8.20-12.4	0.16	40
WR 75	10.0-15.0	0.20	40
WR 62	12.4-18.0	0.19	40
WR 42	18.0-26.5	0.15	40
WR 28	26.5-40.0	0.10	40

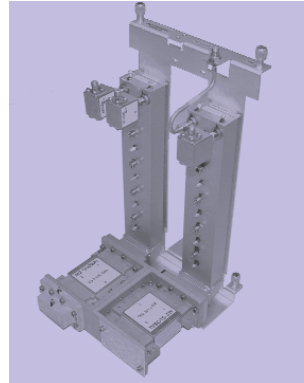
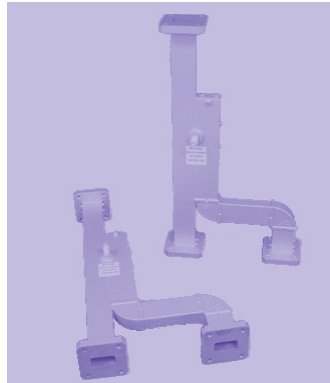


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# Custom Waveguide Assemblies

## Designed to Your Specifications



### *Features & Benefits:*

- Highly accurate designs and precision tuning to optimize customer's system performance and to reduce development costs.
- Design facility is based on full 3D electromagnetic modelling and optimization using proprietary and commercial software for accuracy and reduced prototype costs.
- Manufacturing is supported by Virtual Gibbs, Master Cam, and CAD/CAM, enabling designs to go straight from AutoCAD and SolidWorks to CNC program resulting in superior performance and exceptional reliability.
- Vertically integrated processes allow for high-quality, quick response.
- Frequency Ranges covering 500 MHz to 40 GHz.
- Painting and Chemical finishing done in house.
- Tuning to required specifications.



## Custom Field Installation Kits



CustomField installation Kits can be configured to match the customer's EF&I requirements with the following:

- Flex Waveguide Sections
- Rigid Waveguide Sections
- Twisted Waveguide Sections
- E/H Bends
- Waveguide Hangers
- Spacers
- Gasket Sets
- Pressure Windows
- Hardware
- O-Rings

M2 Global fabricates Build-to-print Installation Kits from an extensive stock of waveguide components. We drop ship to customer sites.



A Service Disabled  
Veteran-Owned Business



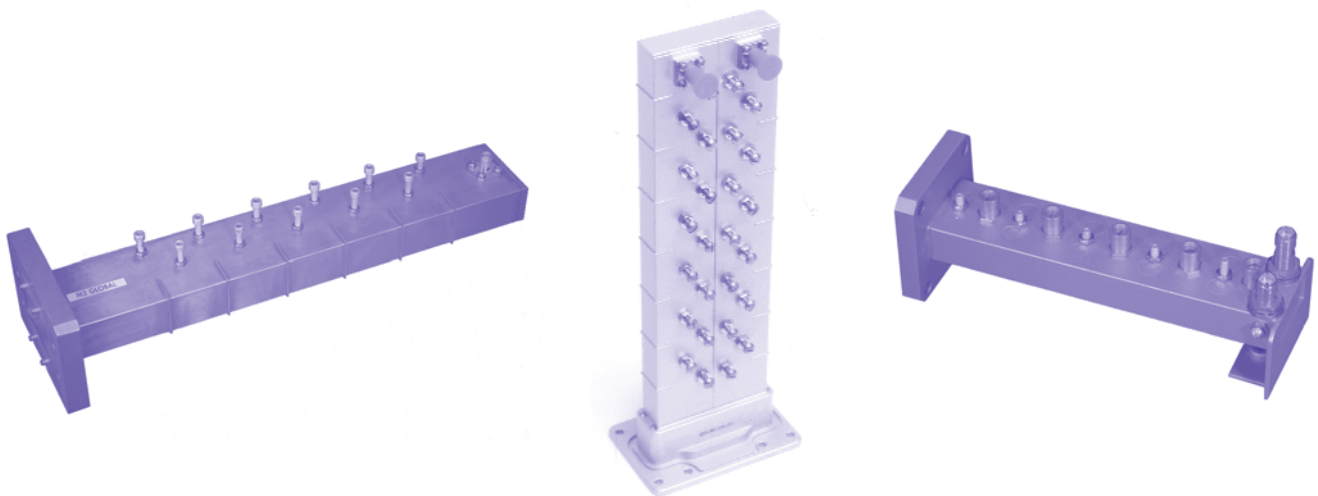
## SECTION 4

# CUSTOM DIPLEXERS AND FILTERS

M2 Global designs and manufactures the following types of custom rf and microwave filters and diplexers to your specifications.

- Bandpass Filters (compline, interdigital, waveguide cavity and coax cavity)
- Bandstop Filters
- Highpass Filters
- Lowpass Filters (Propagating and Evanescent Modes)
- Diplexers
- Integrated Isofilters

Optimum structures are selected for customer's application.



# Custom Waveguide Band Pass Filters

M2 Global designs and manufactures waveguide bandpass filters to customer specifications in WR137, WR159, WR112, WR75, WR62, and WR51. Most flange options are available.

Examples of WR112 bandpass filters are given below.

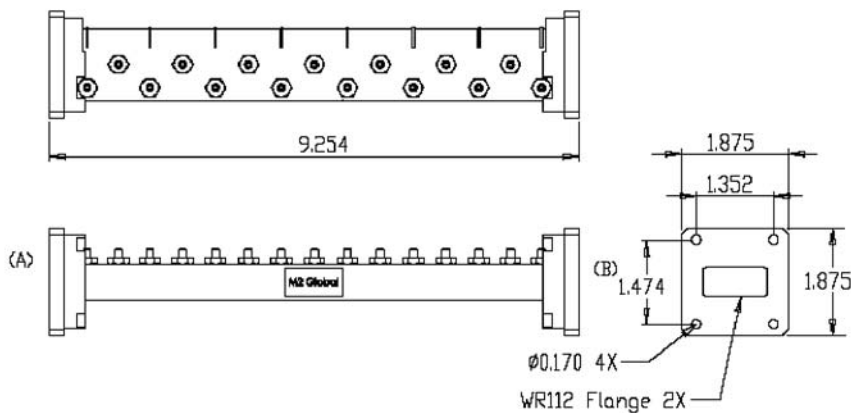
## Electrical Specifications

Frequency Range (GHz)	Return Loss (-dB) max	Insertion Loss (-dB) max	Part Number	Pass Band			Pass Band Ripple (+/-dB) max	Stop Band Attenuation (-dB) min	Outline	Notes
				(MHz) min	(MHz)	(MHz) max				
7.10-7.30	24	1.0	928-710730-001	36	42	46	0.10	30	F01	
7.30-7.50	24	1.0	928-730750-001	36	42	46	0.10	30	F01	
7.50-7.70	24	1.0	928-750770-001	36	42	46	0.10	30	F01	
7.70-7.90	24	1.0	928-770790-001	36	42	46	0.10	30	F01	
7.90-8.10	24	1.0	928-790810-001	36	42	46	0.10	30	F01	
8.10-8.30	24	1.0	928-810830-001	36	42 </td <td>46</td> <td>0.10</td> <td>30</td> <td>F01</td> <td></td>	46	0.10	30	F01	
8.30-8.50	24	1.0	928-830850-001	36	42	46	0.10	30	F01	

Pass Band ripple: +/- 0.1 dB max for  $F_0$  +/- 15 MHz  
 Stop Band attenuation: 30 dB min for  $F_0$  +/- 43 MHz  
 60 dB min for  $F_0$  +/- 80 MHz  
 Operating temperature: -30 °C to +70 °C

## Mechanical Specifications

F01



# Integrated Isofilters

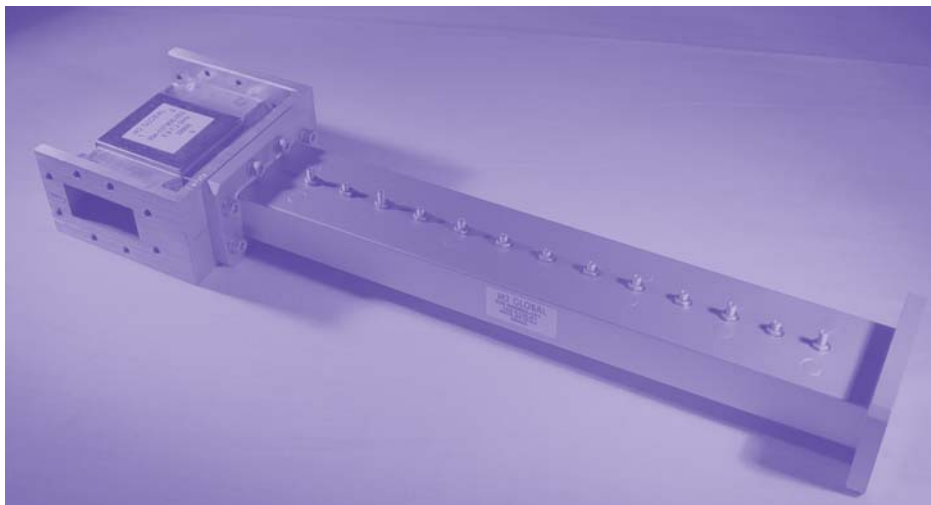
M2Global designs and manufactures integrated isofilters. These components consist of a filter or diplexer matched to an isolator or circulator.

Isolators and circulators are usually standalone components. However, in an actual system, most of M2Global's filter customers combine isolators with filters and other passive components. M2Global approaches the integration of filters and isolators (or circulators) in a way that minimizes size mismatch and interconnect losses. Parts for the isolator/circulator and the filter/diplexer are machined to meet customer specifications, and assembled and tuned for optimum performance.

Filters are designed with our precise EM modelling software that provides fast and efficient designs. We have existing isofilter designs for WR137, WR112, WR75, WR62.

The following types of filters can be integrated in M2Global's isofilters:

1. Waveguide filters for high-power and low-loss applications
2. Stripline/Suspended/Microstrip filters for low power and moderate-loss applications.
3. Cavity filters for high-Q and high selectivity applications.





Our M2 Global web site includes a “Technical Info” page with links to several technical papers. These include:

Understanding Coaxial and Drop-in Isolators and Circulators

Glossary of Technical Terms

Common Frequency Bands

Waveguide Band Designators

Microwave Circulators Using Ceramic and NdFeB Magnets

Ferrite Circulator Switches and their Applications

Intermodulation Distortion (IMD) in Medium-Power Drop-in Ferrite Isolators and Circulators

The “Technical Info” page is located at:  
<http://www.m2global.com/techtools.html>

Our RoHS Compliance Statement is located at:  
<http://www.m2global.com/documents/M2RoHS.pdf>

Basic Facts about Circulators and Isolators can be found on our FAQ page:  
<http://www.m2global.com/faq.html>