

**Electronics Group**  
**Microwave Systems Solutions**  
Components Catalog



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**Overview** Microwave Systems Solutions is a part of the Electronics Group of Crane Aerospace and Electronics, which is a segment of Crane Co. (NYSE-CR). Microwave Systems Solutions is the "doing business as" name for what was once Signal Technology Corporation (STC) prior to STC being acquired by Crane Co. in May 2003. Microwave Systems Solutions specializes in the design and manufacture of high performance Millimeterwave, Microwave, RF and IF components, subsystems, and systems for government, industrial and military end-use customers. We are a total solution enterprise, offering our customers solution sets including electronic manufacturing services, engineering support services, product development and production in world class manufacturing operations.

Our products span a wide range of components:

- ferrite isolators and circulators
- detectors
- limiters
- mixers
- switches
- power dividers
- attenuators
- voltage controlled, dielectric and coaxial resonator oscillators

Microwave Systems Solutions also offers higher value added products including:

- detector log video amplifiers (DLVA)
- successive detection log amplifiers
- frequency discriminators
- phase detectors
- comb generators
- phase and frequency locked and digitally tuned oscillators
- solid state amplifiers
- frequency synthesizers

We build on these core competencies to integrate the technologies in products that result in extremely complex integrated microwave assemblies including transceivers, up and down converters and other high performance assemblies.

**Heritage** Microwave Systems Solutions consists of two operations located in Beverly, Massachusetts and Chandler, Arizona. Signal developed a rich heritage based on the acquisition and integration of many familiar names including MicroSonics, Varian RF Subsystems, Omni Spectra, M/A-Com Active Assemblies, Addington Labs, FEI Microwave, Systron Donner, Innwave, Yig Tek, Omega, and Western Microwave. This legacy has enabled us to support countless critical defense and industrial applications dating back to the 1960s.

**Technical Competency** At the heart of our operations is our dedicated engineering team. We take pride in this team of engineers who continue to focus their efforts to be consistent with our customer's mission. Our team consists of experts ranging from our component architectures through full system engineering. Our engineers excel as the requirement complexity increases and the environment becomes severe. We have instilled a "customer focused solutions" philosophy within the team and they seek to quickly deliver outstanding solutions at attractive prices. Our team stands ready to meet your most stringent requirements so we can become a valuable partner in your complex system design task.

**Manufacturing Experience** World class production facilities with a breadth of experience is in place at all our operations. Our manufacturing experts have the capability to address requirements in both small lot and high volume manufacturing. Close contact and communication with our customers is maintained, to consistently meet the manufacturing needs of their programs. Lean manufacturing techniques to optimize manufacturing efficiency and accuracy are employed on all product lines. These processes vary from complete work-cell type manufacturing arrangements with minimal lot sizes, to flow reduction and lot size optimization. Automated screening and test is incorporated throughout our facilities. We have extensive environmental test capability throughout our manufacturing sites. Most importantly, care is taken to insure that the customer's requirements are always met. While others shy away from the space market, Microwave Systems Solutions is there, participating in several space based platforms and have full support functions in place both in engineering and manufacturing to satisfy our customers in this unique market application.

## **Microwave Systems Solutions Offerings**

***Electronic Manufacturing Services (EMS)*** We have been listening to the market. Many of our customers have products that need to be developed internally yet need to outsource the production. These are typically complex subsystems requiring assembly, tune, and test in the IF, RF, microwave and millimeterwave spectrum. These products do not lend themselves to typical contract manufacturing companies who lack the technology background. This is the arena where Microwave Systems Solutions excels. We have manufactured products including LRUs, receivers, transmitters and other complex assemblies. We have also initiated discussions with customers where engineering staffing is an issue and have become an extension of their development team.

***Ferrite Based Components*** Microwave Systems Solutions offer isolators and circulators emphasizing miniature, broadband drop-in units. These products are used for defense, space and commercial applications. Special features that make this line of isolators and circulators unique to the industry are their typical compact configurations, extreme performance requirements, and power handling capability which includes medium and high power requirements. Package types include stripline, drop-in, coaxial, and microstrip configurations.

***Control Components*** Passive devices are yet another example of the breadth of our product offerings. Microwave Systems Solutions has a complete line of power dividers, directional couplers, hybrids, modulators, phase shifters, filters (fixed and tunable) and other control devices. Toriod transformer technology enables our lower frequency designs (up to 2 GHz). Distributed transmission line technology (stripline and microstrip) is incorporated in our higher frequency products.

Pin diode switches have been incorporated in our integrated assemblies for years. Microwave Systems Solutions has answered industry's call and now offers standalone PIN diode switch components for use in a variety of applications. Our new high power switches are being widely accepted in radar and EW applications where selection between transmit and receive functions is desirable. Power levels as high as a few hundred watts CW and Kilowatts peak are handled with no damage or degradation of performance. We took this technology a step further and now offer a variety of

microwave switch matrix assemblies including switched filter banks, switched amplifier assemblies and other complex subsystems.

**Mixer Products** We have over 20 years experience in mixer and mixer-based subsystem design, development and production. We offer a broad line of double balanced and triple balanced mixers with RF/LO frequencies from 0.5 MHz to 26.5 GHz. The mixers are fabricated on soft-board and ceramic substrates, or with discrete toroid technology. Monolithic beam lead Schottky diodes are used to reduce the parasitics between the circuits and semiconductors. Outstanding repeatability and reliability is achieved through printed or thin film circuit construction techniques. We utilize standard mixer technology in the design and production of correlators, polar frequency discriminators, IFM's, translators, image reject mixers, converters, IQ mixers, modulators, mixer pre-amplifiers and other custom products.

**Detectors, Limiters and Comb Generators** Our detectors, limiters, and comb generators offer the broadest spectrum of frequencies and packages available on the market. Careful selection and microwave integrated circuit module packaging provide small, reliable semiconductor products. Applications include RF detection, protection, frequency generation in receiver applications, instrumentation and monitoring circuitry. Package types are hermetic and include coaxial, tubular or flat-pack with pins.

### **Electronics Group**

The Electronics Group of Crane Aerospace & Electronics designs and manufactures high-density, high-reliability electronics for aerospace, space, military, medical, industrial, and commercial applications. Our brand names are ELDEC, General Technology, Interpoint, Keltec, Oelektron and Signal Technology. For more information on the Electronics Group of Crane Aerospace & Electronics, please visit [www.craneae.com/electronics](http://www.craneae.com/electronics).

### **Crane Aerospace & Electronics**

Crane Aerospace & Electronics is a segment of Crane Co. and a major supplier of critical aircraft and electronic systems and components. In addition to the brands named above, the segment includes the Hydro-Aire, Lear Romec, and P.L. Porter brands. For more information on Crane Aerospace & Electronics, please visit [www.craneae.com](http://www.craneae.com).

### **Crane Co.**

Crane Co. is a diversified manufacturer of engineered industrial products. Founded in 1855, Crane provides products and solutions to customers in the aerospace, electronics, hydrocarbon processing, petrochemical, chemical, power generation, automated merchandising, transportation and other markets. The Company has five business segments: Aerospace & Electronics, Fluid Handling, Engineered Materials, Merchandising Systems and Controls. Crane has 10,500 employees in North America, South America, Europe, Asia and Australia. Crane Co. is traded on the New York Stock Exchange (NYSE:CR). For more information, please visit [www.craneco.com](http://www.craneco.com).

# Drop-In Isolators & Circulators

The following listed Flange Mount isolators and circulators are specifically designed to be mounted with standard hardware within your chassis. The connector tabs are suitable for soldering to the mating circuit boards. The specifications and frequency bands listed can be modified or unique interfaces such as wire bondable pads, can be accommodated by special order. Our Flange Mounts utilize the latest technology in miniaturization to assure a fit into the most compact assemblies. The actual performance for many of the models will far exceed those listed. If improved performance is required, we recommend the evaluation of our standard product first, for your applications, prior to any special ordering. Surface Mount equivalent models are also available on special order.

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB)	Typ./Min. Insertion Loss (dB)	Typ./Max. VSWR Max.	Operating Temp. (°C)	Fwd/Pr Pk (KW) / Avg (W)	Rev/Pwr Term. (W)	Weight (Gms)	O'Line (Fig.)
0.300 - 0.325	IF01	CF01	20 / 18	0.45 / 0.6	1.35:1	0 to 60	1 / 100	2	300	1A
0.325 - 0.400	IF02	CF02	20 / 18	0.45 / 0.6	1.35:1	0 to 60	1 / 100	2	300	1A
0.400 - 0.450	IF03	CF03	22 / 20	0.35 / 0.5	1.25:1	0 to 60	1 / 100	2	175	1B
0.450 - 0.500	IF04	CF04	22 / 20	0.40 / 0.5	1.25:1	0 to 60	1 / 100	2	70	1C
0.500 - 0.625	IF05	CF05	22 / 20	0.40 / 0.5	1.25:1	0 to 60	.5 / 75	2	70	1C
0.625 - 0.750	IF06	CF06	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.5 / 75	2	70	1C
0.750 - 0.800	IF07	CF07	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.5 / 75	2	35	1E
0.800 - 0.900	IF08	CF08	20 / 18	0.40 / 0.5	1.30:1	-20 to 70	.5 / 75	2	35	1E
0.860 - 0.890	IF09	CF09	23 / 21	0.40 / 0.5	1.25:1	-20 to 70	.5 / 75	65	22	1D
0.900 - 1.000	IF10	CF10	20 / 18	0.40 / 0.5	1.30:1	-20 to 70	.25 / 25	2	35	1E
0.960 - 1.215	IF11	CF11	20 / 17	0.40 / 0.5	1.35:1	-20 to 70	.25 / 25	2	35	1E
1.000 - 1.100	IF12	CF12	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.15 / 15	2	25	1F
1.030 - 1.090	IF13	CF13	23 / 20	0.35 / 0.4	1.25:1	-20 to 70	.15 / 15	2	25	1F
1.100 - 1.200	IF14	CF14	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.15 / 15	2	15	1G
1.200 - 1.350	IF15	CF15	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
1.200 - 1.400	IF16	CF16	21 / 18	0.40 / 0.5	1.35:1	-20 to 70	.1 / 10	2	15	1G
1.200 - 1.600	IF17	CF17	19 / 17	0.50 / 0.6	1.35:1	-20 to 70	.25 / 25	2	35	1E
1.300 - 1.500	IF18	CF18	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
1.400 - 1.600	IF19	CF19	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
1.500 - 1.700	IF20	CF20	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
1.600 - 1.800	IF21	CF21	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
1.700 - 1.900	IF22	CF22	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
1.800 - 2.000	IF23	CF23	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
1.900 - 2.100	IF24	CF24	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
2.000 - 2.300	IF25	CF25	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G

\* See outline drawings on page 3

# Drop-In Isolators & Circulators

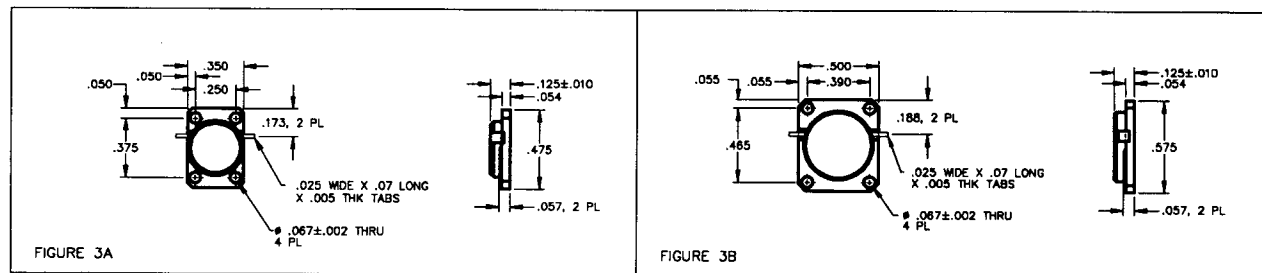
Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB)	Typ./Min. Insertion Loss (dB)	Typ./Max. VSWR Max.	Operating Temp. (°C)	Fwd/Pr Pk (KW) / Avg (W)	Rev/Pwr Term. (W)	Weight (Gms)	O'Line (Fig.)
2.000 - 2.500	IF26	CF26	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	25	1F
2.100 - 2.400	IF27	CF27	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
2.200 - 2.500	IF28	CF28	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
2.300 - 2.600	IF29	CF29	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
2.400 - 2.700	IF30	CF30	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
2.600 - 2.900	IF31	CF31	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.1 / 10	2	15	1G
2.800 - 3.500	IF32	CF32	20 / 18	0.50 / 0.6	1.35:1	-20 to 70	.01 / 2	2	15	1G
2.800 - 3.000	IF33	CF33	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.1 / 10	2	15	1G
2.900 - 3.100	IF34	CF34	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.01 / 2	2	15	1G
3.000 - 3.300	IF35	CF35	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.01 / 2	2	15	1G
3.100 - 3.500	IF36	CF36	22 / 20	0.50 / 0.6	1.30:1	-20 to 70	.01 / 2	2	15	1G
3.300 - 3.700	IF37	CF37	22 / 20	0.50 / 0.6	1.30:1	-20 to 70	.01 / 2	2	15	1G
3.500 - 3.900	IF38	CF38	22 / 20	0.50 / 0.6	1.30:1	-20 to 70	.01 / 2	2	15	1G
3.600 - 4.200	IF39	CF39	22 / 20	0.30 / 0.4	1.25:1	-20 to 70	.01 / 2	2	10	1H
4.100 - 4.400	IF40	CF40	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.01 / 2	2	10	1H
4.400 - 5.000	IF41	CF41	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.01 / 2	2	10	1H
4.500 - 5.300	IF42	CF42	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.01 / 2	2	10	1H
5.000 - 6.500	IF43	CF43	20 / 17	0.40 / 0.5	1.35:1	-20 to 70	.01 / 2	2	10	1H
5.700 - 5.900	IF44	CF44	22 / 20	0.40 / 0.5	1.30:1	-20 to 70	.01 / 2	2	10	1H
5.800 - 6.500	IF45	CF45	22 / 20	0.35 / 0.4	1.25:1	-20 to 70	.01 / 2	2	4.5	1I
6.400 - 7.500	IF46	CF46	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.01 / 2	2	4.5	1I
6.500 - 8.500	IF47	CF47	20 / 18	0.40 / 0.5	1.30:1	-20 to 70	.01 / 2	2	4.5	1I
7.000 - 7.800	IF48	CF48	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.01 / 2	2	4.5	1I
7.900 - 8.400	IF49	CF49	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.01 / 2	2	4.5	1I
7.500 - 9.000	IF50	CF50	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.01 / 2	2	4.5	1I
8.500 - 9.600	IF51	CF51	22 / 20	0.40 / 0.5	1.25:1	-20 to 70	.01 / 2	2	3.5	1J
8.500 - 11.500	IF52	CF52	20 / 18	0.40 / 0.5	1.35:1	-20 to 70	.01 / 2	2	3.5	1J
10.700 - 11.700	IF53	CF53	20 / 18	0.50 / 0.6	1.35:1	-20 to 70	.01 / 2	2	3.5	1J
10.000 - 15.000	IF54	CF54	18 / 15	0.70 / 0.9	1.45:1	-20 to 70	.01 / 2	2	4.5	1I
10.950 - 12.750	IF55	CF55	20 / 18	0.50 / 0.6	1.35:1	-20 to 70	.01 / 2	2	2.5 / 3.5	*IK, 1L
11.500 - 17.500	IF56	CF56	17 / 15	0.70 / 0.8	1.50:1	-20 to 70	.01 / 2	2	2.5 / 3.5	*IK, 1L
11.700 - 12.750	IF57	CF57	20 / 18	0.50 / 0.6	1.35:1	-20 to 70	.01 / 2	2	2.5 / 3.5	*IK, 1L
13.600 - 14.900	IF58	CF58	22 / 20	0.50 / 0.6	1.35:1	-20 to 70	.01 / 2	2	2.5 / 3.5	*IK, 1L
14.000 - 18.000	IF59	CF59	22 / 20	0.50 / 0.6	1.35:1	-20 to 70	.01 / 2	2	2.5 / 3.5	*IK, 1L

\* Circulator for these models will be in package outline 1L

\*\* See outline drawings on page 3

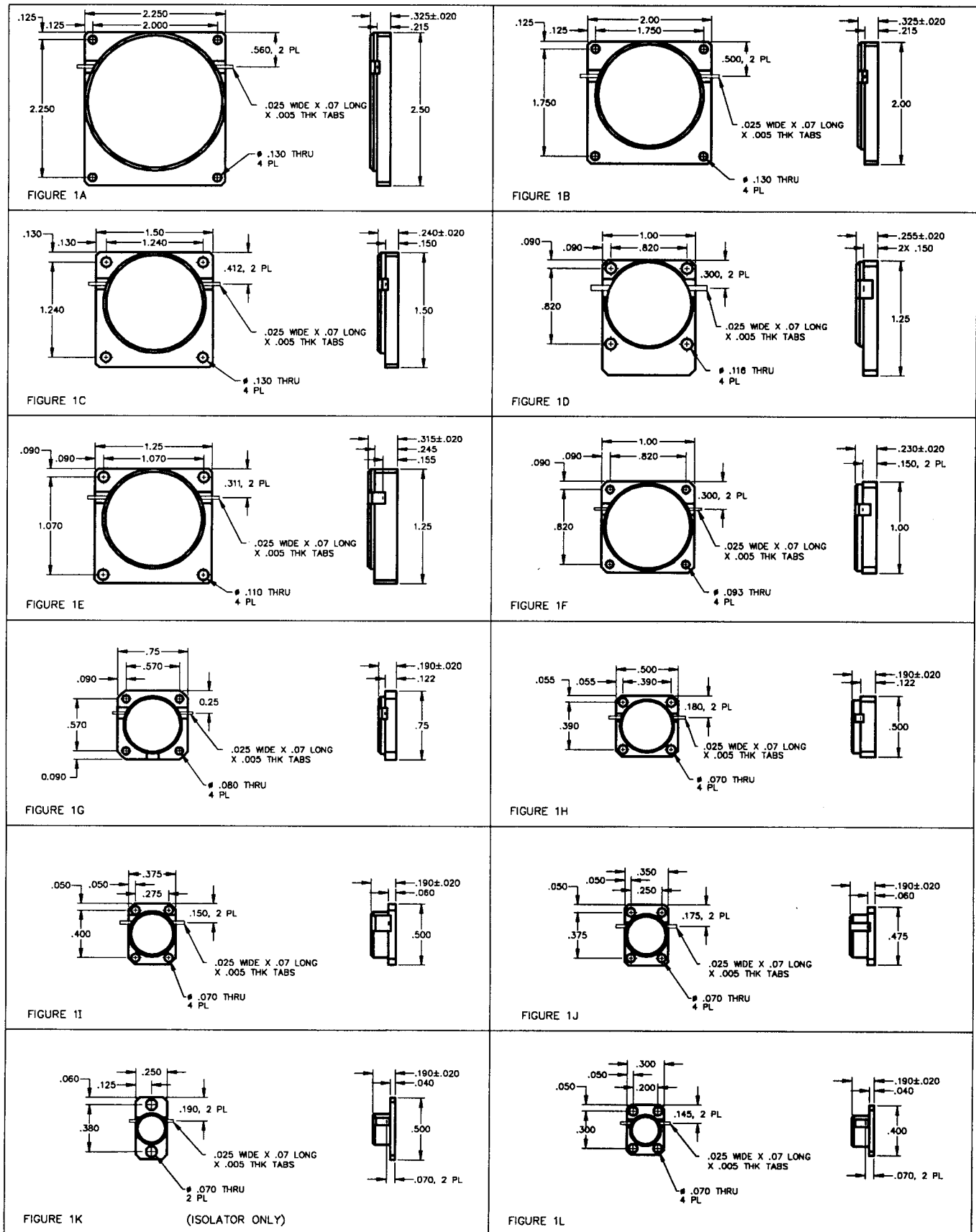
## THIN-PAK Flange Mount Isolators

Frequency Range (GHz)	Isolator Model	Isolation (dB)	Typ./Min. Insertion Loss (dB)	Typ./Max. VSWR Max.	Operating Temp. (°C)	Fwd/Pr Pk (KW) / Avg (W)	Rev/Pwr Term. (W)	Weight (Gms)	O'Line (Fig.)
4.400 - 5.000	2750D0100-01	20 / 17	0.40 / 0.5	1.25:1	-54 to 85	.01 / 1	1	3	3B
4.500 - 5.300	2750D0150-01	20 / 17	0.50 / 0.6	1.25:1	-54 to 85	.01 / 1	1	3	3B
5.000 - 6.500	2750D0020-01	20 / 17	0.50 / 0.6	1.30:1	-54 to 85	.01 / 1	1	3	3B
6.500 - 8.500	2750D0010-01	20 / 17	0.50 / 0.6	1.30:1	-54 to 85	.01 / 1	1	3	3B
8.500 - 11.500	2735D0040-01	20 / 17	0.50 / 0.6	1.30:1	-54 to 85	.01 / 1	1	3	3A
11.500 - 16.000	2735D0080-01	20 / 17	0.50 / 0.6	1.30:1	-54 to 85	.01 / 1	1	3	3A
19.700 - 21.700	2735D0180-01	20 / 17	0.80 / 0.9	1.30:1	-54 to 85	.01 / 1	1	3	3A



UNLESS OTHERWISE SPECIFIED:  
3 PLACE .XXX±.010  
2 PLACE .XX±.02

# Outline Figures



UNLESS OTHERWISE SPECIFIED:  
3 PLACE .XXX±.010  
2 PLACE .XX±.02

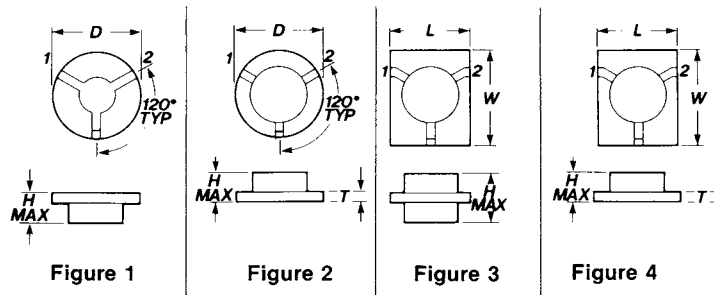


# Microstrip Isolators & Circulators

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches)				See Figure
							D or L	W	T	H	
1.70 - 1.80	I018B	C018B	22/20	0.35/0.40	1.25/1.30	0 to +55	1.150	---	0.090	0.30	1
1.80 - 2.00	I019B	C019B	22/20	0.35/0.40	1.25/1.30	0 to +55	1.150	---	0.090	0.30	1
2.00 - 2.20	I021B	C021B	22/20	0.35/0.40	1.25/1.30	0 to +55	0.997	---	0.080	0.33	1
2.15 - 2.55	I024T	C024T	20/18	0.40/0.50	1.25/1.30	0 to +55	0.997	---	0.080	0.33	2
2.20 - 2.30	I023T	C023T	23/20	0.30/0.40	1.20/1.25	0 to +55	0.997	---	0.080	0.33	2
2.30 - 2.50	I025T	C025T	23/20	0.30/0.40	1.20/1.25	0 to +55	0.997	---	0.080	0.33	2
2.60 - 2.90	I028B	C028B	22/20	0.35/0.40	1.20/1.25	0 to +55	0.810	---	0.060	0.30	1
2.90 - 3.10	I030B	C030B	22/20	0.35/0.40	1.20/1.25	0 to +55	0.810	---	0.060	0.30	1
3.10 - 3.50	I033T	C033T	23/20	0.30/0.40	1.20/1.25	0 to +55	0.748	---	0.045	0.25	2
3.40 - 3.70	I036T	C036T	23/20	0.30/0.40	1.20/1.25	0 to +55	0.748	---	0.045	0.25	2
3.70 - 4.20	I040T	C040T	23/20	0.30/0.40	1.20/1.25	0 to +55	0.748	---	0.045	0.25	2
4.20 - 4.60	I044	C1044	23/20	0.30/0.40	1.20/1.25	-30 to +71	0.623	---	0.040	0.25	3
4.40 - 5.00	I047B	C047B	23/20	0.30/0.40	1.20/1.25	-30 to +71	0.623	---	0.040	0.25	1
5.00 - 5.40	I052B	C052B	23/20	0.30/0.40	1.20/1.25	-30 to +71	0.623	---	0.040	0.25	1
5.40 - 5.90	I057B	C057B	23/20	0.30/0.40	1.20/1.25	-30 to +71	0.623	---	0.040	0.25	1
5.90 - 6.40	I063B	C063B	23/20	0.30/0.40	1.20/1.25	-30 to +71	0.623	---	0.040	0.25	1
6.40 - 7.10	I068B	C068B	23/20	0.30/0.40	1.20/1.25	-30 to +71	0.623	---	0.040	0.25	1
7.10 - 7.90	I075B	C075B	23/20	0.30/0.40	1.20/1.25	-30 to +71	0.623	---	0.040	0.25	1
7.90 - 8.40	I082	C082	23/20	0.40/0.50	1.20/1.25	-30 to +71	0.450	---	0.030	0.30	3
8.40 - 10.0	I092	C092	22/20	0.35/0.40	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
8.50 - 9.60	I091	C091	23/20	0.40/0.50	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
9.00 - 10.0	I095	C095	22/20	0.35/0.40	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
9.50 - 10.5	I100	C100	23/20	0.40/0.50	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
10.0 - 11.0	I105	C105	23/20	0.40/0.50	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
10.5 - 11.7	I111	C111	23/20	0.40/0.50	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
11.7 - 12.2	I120	C120	23/20	0.40/0.50	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
12.2 - 12.7	I125	C125	23/20	0.40/0.50	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
12.7 - 13.7	I132	C132	23/20	0.40/0.50	1.25/1.30	-54 to +95	0.350	0.400	0.025	0.25	3
13.7 - 14.3	I140	C140	23/20	0.50/0.60	1.30/1.35	-54 to +95	0.250	0.300	0.040	0.25	4
14.0 - 14.5	I143	C143	23/20	0.50/0.60	1.30/1.35	-54 to +95	0.250	0.300	0.040	0.25	4
14.5 - 15.5	I150	C150	23/20	0.50/0.60	1.30/1.35	-54 to +95	0.250	0.300	0.040	0.25	4
16.0 - 16.4	I162	C162	20/18	0.50/0.60	1.30/1.35	-54 to +95	0.250	0.300	0.040	0.25	4

\*Typical performance at +23°C

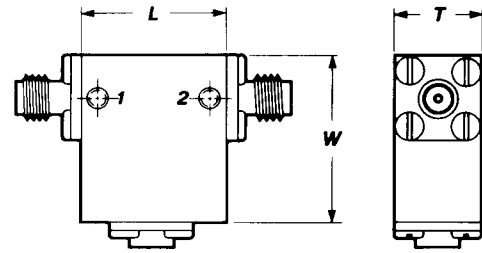
1) Thickness includes a 0.025 thick carrier plate



## 3-Port Coaxial Isolators & Circulators

Our standard coaxial isolators and circulators are designed for each frequency band to be a compromise among size, electrical performance and cost. Individual parameters can be optimized to provide a special order isolator or circulator to meet a specific customer requirement.

All standard devices are supplied with SMA female connectors. SMA male, female removable and right angle connectors can be supplied upon special order. Type N, TNC, TM, and SC connectors can also be supplied on units where size permits. Some electrical degradation may occur depending on the actual frequency band.



All isolators and circulators are provided with mounting holes and are finished using blue vinyl paint. Other finishes and colors are available upon special request

### Narrow Bandwidth

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T	Approx. Weight (Gms)
.100 - .125	1M11IV	1M11CV	20 / 18	0.5 / 0.7	1.25 / 1.30	0 to +55	5.50 x 5.50 x 1.50	3000
.125 - .150	1M14IV	1M14CV	20 / 18	0.5 / 0.7	1.25 / 1.30	0 to +55	4.75 x 4.75 x 1.50	2500
.147 - .174	1M16IV	1M16CV	20 / 18	0.5 / 0.7	1.25 / 1.30	0 to +55	4.50 x 4.50 x 1.50	2200
.174 - .216	1M20IV	1M20CV	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	4.00 x 4.00 x 1.50	1800
.220 - .300	1M26IZ	1M26CZ	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	4.25 x 4.25 x 1.50	2000
.225 - .275	1M25IV	1M25CV	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	3.50 x 3.50 x 1.25	1200
.225 - .400	1M31IZ	1M31CZ	19 / 17	0.6 / 0.7	1.25 / 1.35	-10 to +60	2.00 x 2.00 x 1.00	350
.270 - .330	1M30IV	1M30CV	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	3.00 x 3.00 x 1.25	800
.300 - .400	1M35IZ	1M35CZ	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	3.25 x 3.25 x 1.50	1200
.330 - .400	1M37IV	1M37CV	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	2.25 x 2.25 x 1.00	400
.380 - .470	1M43IV	1M43CV	22 / 20	0.3 / 0.4	1.20 / 1.25	0 to +55	2.25 x 2.25 x 1.00	450
.400 - .500	1M45IV	1M45CV	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	2.25 x 2.25 x 1.00	450
.400 - .550	1M48IZ	1M48CZ	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	3.25 x 3.25 x 1.50	1000
.500 - .600	1M55IV	1M55CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-30 to +71	2.00 x 2.00 x 1.00	350
.550 - .700	1M63IZ	1M63CV	23 / 20	0.3 / 0.4	1.15 / 1.25	-30 to +71	2.25 x 2.25 x 1.00	450
.600 - .750	1M68IV	1M68CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-30 to +71	1.75 x 1.75 x 1.00	300
.650 - .850	1M75IZ	1M75CZ	23 / 20	0.3 / 0.4	1.15 / 1.25	-30 to +71	2.00 x 2.00 x 1.00	350
.700 - .830	1M77IV	1M77CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-30 to +71	1.50 x 1.50 x 0.75	200
.700 - .100	1M85IZ	1M85CZ	18 / 17	0.4 / 0.5	1.30 / 1.35	0 to +55	2.00 x 2.00 x 1.00	400
.790 - .960	1M88IV	1M88CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-30 to +71	1.50 x 1.50 x 0.75	200
.900 - 1.10	1M99IV	1M99CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.25 x 1.25 x 0.75	100
.960 - 1.215	1010IV	1010CV	21 / 18	0.4 / 0.5	1.20 / 1.30	-54 to +95	1.25 x 1.25 x 0.75	100
.960 - 1.215	1011IV	1011CV	21 / 18	0.4 / 0.5	1.20 / 1.30	-54 to +95	1.25 x 1.25 x 0.50	100
.960 - 1.215	1011IZ	1011CZ	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.50 x 1.50 x 1.00	250
1.00 - 1.40	1012IZ	1012CZ	18 / 17	0.4 / 0.5	1.30 / 1.35	-54 to +95	1.50 x 1.50 x 1.00	250
1.10 - 1.30	1012IV	1012CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.25 x 1.25 x 0.75	100
1.20 - 1.40	1013IV	1013CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.25 x 1.25 x 0.75	100
1.20 - 1.60	1014IZ	1014CZ	19 / 17	0.5 / 0.6	1.30 / 1.35	-54 to +95	1.25 x 1.25 x 0.75	100
1.40 - 1.60	1015IV	1015CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.25 x 1.25 x 0.75	100
1.50 - 1.80	1016IV	1016CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.00 x 1.00 x 0.50	50
1.70 - 2.10	1019IT	1019CT	30 / 26	0.2 / 0.3	1.10 / 1.15	0 to +55	2.00 x 2.00 x 1.00	300
1.70 - 2.40	1021IT	1021CT	21 / 20	0.4 / 0.5	1.20 / 1.25	0 to +55	1.50 x 1.75 x 0.75	150
1.80 - 2.10	1020IV	1020CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.00 x 1.00 x 0.50	50
1.90 - 2.30	1020IT	1020CT	30 / 26	0.2 / 0.3	1.10 / 1.15	0 to +55	2.00 x 2.00 x 1.00	300
2.00 - 2.30	1022IV	1022CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.00 x 1.00 x 0.50	50
2.10 - 2.40	1023IV	1023CV	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.00 x 1.00 x 0.50	50
2.10 - 2.90	1025IS	1025CS	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	1.50 x 1.50 x 0.75	125
2.40 - 2.80	1026IX	1026CX	22 / 18	0.4 / 0.5	1.20 / 1.30	-30 to +71	1.00 x 1.00 x 0.50	50
2.40 - 3.30	1029IS	1029CS	20 / 18	0.4 / 0.5	1.25 / 1.30	0 to +55	1.50 x 1.50 x 0.75	125
2.70 - 3.10	1029IX	1029CX	22 / 18	0.4 / 0.5	1.20 / 1.30	-30 to +71	1.00 x 1.00 x 0.50	50
2.80 - 3.30	1031IX	1031CX	22 / 18	0.4 / 0.5	1.20 / 1.30	-54 to +95	1.00 x 1.00 x 0.50	50
3.00 - 4.00	1035IS	1035CS	20 / 18	0.4 / 0.5	1.20 / 1.30	-30 to +71	1.25 x 1.25 x 0.75	100
3.10 - 3.60	1033IX	1033CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
3.30 - 3.90	1036IX	1036CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
3.30 - 4.50	1038IS	1038CS	21 / 19	0.4 / 0.5	1.20 / 1.30	-30 to +71	1.25 x 1.25 x 0.75	100
3.70 - 4.20	1039IX	1039CX	23 / 20	0.3 / 0.4	1.15 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
3.70 - 4.20	1039IT	1039CT	30 / 26	0.15 / 0.20	1.05 / 1.10	-30 to +71	1.00 x 1.00 x 0.50	50
3.90 - 4.60	1043IX	1043CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30

\*Typical performance at +23°C

# 3-Port Coaxial Isolators & Circulators

## Narrow Bandwidth

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T	Approx. Weight (Gms)
4.00 - 5.30	1047IS	1047CS	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.00 x 1.00 x 0.50	50
4.20 - 5.00	1046IX	1046CX	22 / 20	3.0 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
4.40 - 5.00	1047IT	1047CT	30 / 26	0.15 / 0.25	1.05 / 1.10	-30 to +71	1.00 x 1.00 x 0.50	50
4.50 - 6.00	1053IS	1053CS	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	1.00 x 1.00 x 0.50	50
4.60 - 5.40	1050IX	1050CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
5.00 - 6.00	1055IX	1055CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
5.30 - 7.00	1062IS	1062CS	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
5.40 - 5.90	1057IX	1057CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.50 x 0.67 x 0.50	20
5.70 - 6.80	1063IX	1063CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.50 x 0.67 x 0.50	20
5.90 - 6.40	1062IT	1062CT	30 / 26	0.15 / 0.25	1.05 / 1.10	-30 to +71	0.75 x 0.81 x 0.50	30
6.00 - 8.00	1070IS	1070CS	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.75 x 0.81 x 0.50	30
6.40 - 7.20	1068IT	1068CT	30 / 26	0.15 / 0.25	1.05 / 1.10	-30 to +71	0.75 x 0.81 x 0.50	30
6.80 - 8.00	1074IX	1074CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.50 x 0.67 x 0.50	20
7.20 - 7.80	1075IT	1075CT	30 / 26	0.20 / 0.25	1.05 / 1.10	-30 to +71	0.63 x 0.75 x 0.50	25
7.80 - 8.40	1081IT	1081CT	30 / 26	0.20 / 0.25	1.05 / 1.10	-30 to +71	0.63 x 0.75 x 0.50	25
7.50 - 9.00	1083IX	1083CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.50 x 0.67 x 0.50	20
8.00 - 11.00	1095IS	1095CS	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.63 x 0.75 x 0.50	25
8.40 - 10.00	1092IX	1092CX	22 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.50 x 0.67 x 0.50	20
11.50 - 15.00	1133IS	1133DS	22 / 20	0.4 / 0.5	1.25 / 1.35	-54 to +95	0.50 x 0.67 x 0.50	20
11.70 - 12.20	1120IT	1120CT	26 / 23	0.20 / 0.25	1.10 / 1.15	-54 to +95	0.50 x 0.67 x 0.50	20
12.20 - 12.70	1125IT	1125CT	26 / 23	0.20 / 0.25	1.10 / 1.15	-54 to +95	0.50 x 0.67 x 0.50	20
13.00 - 16.00	1144IS	1144CS	23 / 20	0.3 / 0.4	1.20 / 1.25	-54 to +95	0.50 x 0.67 x 0.50	20
14.00 - 14.50	1143IS	1143CS	26 / 23	0.30 / 0.35	1.15 / 1.20	-54 to +95	0.50 x 0.67 x 0.50	20
15.00 - 18.00	1154IS	1165CS	22 / 20	0.4 / 0.5	1.20 / 1.30	-54 to +95	0.50 x 0.67 x 0.50	20
17.00 - 20.00	1185IS	1185CS	22 / 20	0.5 / 0.6	1.25 / 1.35	-54 to +95	0.50 x 0.67 x 0.50	20
17.70 - 20.20	1190IS	1190CS	22 / 20	0.5 / 0.6	1.25 / 1.35	-54 to +95	0.50 x 0.67 x 0.50	20

\*Typical performance at +23°C

## Broad Bandwidth

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T	Approx. Weight (Gms)
1.00 - 2.00	1015IQ	1015ICQ	20 / 17	0.4 / 0.5	1.20 / 1.35	0 to +55	3.00 x 3.00 x 1.00	475
1.25 - 2.50	1019IQ	1019CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	0 to +55	3.00 x 3.00 x 1.00	475
1.50 - 3.00	1023IQ	1023ICQ	20 / 17	0.4 / 0.5	1.20 / 1.35	0 to +55	2.25 x 2.25 x 0.75	300
2.00 - 3.00	1030IQ	1030CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-30 to +71	1.75 x 1.75 x 0.75	135
2.10 - 4.20	1032IQ	1032CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-30 to +71	1.75 x 1.75 x 0.75	135
2.50 - 5.00	1038IQ	1038CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-54 to +95	1.50 x 1.50 x 0.75	120
2.60 - 5.20	1039IQ	1039CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-54 to +95	1.25 x 1.25 x 0.70	100
3.00 - 6.00	1045IQ	1045CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-54 to +95	1.25 x 1.25 x 0.70	100
3.20 - 6.40	1048IQ	1048CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-54 to +95	1.25 x 1.25 x 0.70	100
3.50 - 7.00	1053IQ	1053CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-54 to +95	1.25 x 1.25 x 0.70	100
4.00 - 8.00	1060IQ	1060CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-54 to +95	1.00 x 1.10 x 0.58	75
4.50 - 9.00	1068IQ	1068CQ	20 / 17	0.4 / 0.5	1.20 / 1.35	-54 to +95	0.90 x 1.00 x 0.58	75
5.00 - 10.00	1075IQ	1075CQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.90 x 1.00 x 0.58	60
5.20 - 10.40	1078IQ	1078ICQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.90 x 1.00 x 0.58	60
5.50 - 11.00	1083IQ	1083CQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.75 x 0.90 x 0.50	60
6.00 - 12.00	1090IQ	1090CQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.75 x 0.90 x 0.50	40
6.50 - 13.00	1098IQ	1098CQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.75 x 0.90 x 0.50	40
7.00 - 11.00	1090IS	1090CS	23 / 20	0.4 / 0.5	1.15 / 1.25	-54 to +95	0.75 x 0.90 x 0.50	40
7.00 - 14.00	1051IQ	1051ICQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.75 x 0.90 x 0.50	40
7.50 - 15.00	1125IQ	1125CQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.75 x 0.90 x 0.50	40
8.00 - 12.40	1102IS	1102CS	23 / 20	0.4 / 0.5	1.15 / 1.25	-54 to +95	0.75 x 0.90 x 0.50	40
8.00 - 16.00	1120IQ	1120ICQ	20 / 17	0.4 / 0.6	1.20 / 1.35	-54 to +95	0.63 x 0.75 x 0.50	25
9.00 - 18.00	1135IQ	1135CQ	20 / 17	0.4 / 0.7	1.20 / 1.35	-54 to +95	0.63 x 0.75 x 0.50	25
10.00 - 20.00	1150IQ	1150ICQ	18 / 16	0.6 / 0.7	1.35 / 1.40	-54 to +95	0.63 x 0.75 x 0.50	25
11.00 - 18.00	1145IS	1145CS	22 / 20	0.4 / 0.6	1.25 / 1.35	-54 to +95	0.63 x 0.75 x 0.50	25
18.00 - 26.50	1223IS	1223CS	18 / 16	0.8 / 1.0	1.40 / 1.50	-54 to +95	0.50 x 0.63 x 0.50	20

\*Typical performance at +23°C

# 3-Port Coaxial Isolators & Circulators

## Octave Plus

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T	Approx. Weight (Gms)
1.70 - 4.20	1030IR	1030CR	16 / 15	0.6 / 0.7	1.50 / 1.60	0 to +55	1.75 x 1.75 x 0.75	135
2.50 - 5.50	1040IIR	1040CIR	18 / 16	0.5 / 0.6	1.30 / 1.40	-30 to +71	1.50 x 1.50 x 0.75	120
3.70 - 8.30	1060IR	1060CR	16 / 15	0.6 / 0.7	1.40 / 1.50	-54 to +95	1.00 x 1.10 x 0.58	75
4.00 - 9.00	1065IR	1065CR	16 / 15	0.6 / 0.7	1.40 / 1.50	-54 to +95	1.00 x 1.10 x 0.58	75
6.00 - 18.00	1120IR	1120CR	15 / 12	0.9 / 1.2	1.45 / 1.65	-54 to +95	0.50 x 0.55 x 0.38	20
6.50 - 16.50	1115IR	1115CR	14 / 13	1.0 / 1.1	1.55 / 1.60	-54 to +95	0.75 x 0.90 x 0.50	40
7.00 - 15.00	1110IR	1110CR	18 / 16	0.5 / 0.6	1.30 / 1.40	-54 to +95	0.75 x 0.90 x 0.50	40
7.00 - 17.00	1119IR	1119CR	16 / 15	0.8 / 0.9	1.50 / 1.60	-54 to +95	0.63 x 0.75 x 0.50	25
7.50 - 16.00	1118IR	1118CR	18 / 16	0.5 / 0.6	1.30 / 1.40	-54 to +95	0.63 x 0.75 x 0.50	25
7.50 - 18.00	1127IR	1127CR	16 / 15	0.8 / 0.9	1.50 / 1.60	-54 to +95	0.63 x 0.75 x 0.50	25
8.00 - 18.00	1130IR	1130CR	16 / 15	0.7 / 0.8	1.45 / 1.50	-54 to +95	0.63 x 0.75 x 0.50	25

\*Typical performance at +23°C

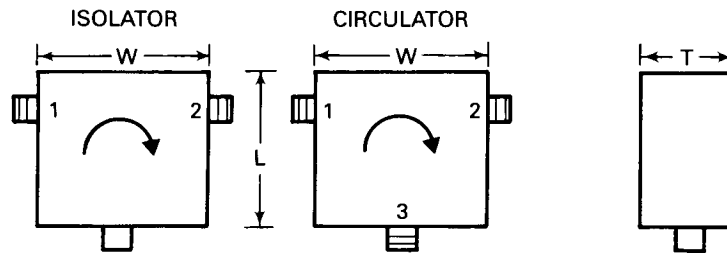
# Isolators & Circulators

## Miniature, Narrow Band, High Performance

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T
.95 - 1.225	AMI9525	AMC9525	22 / 20	.35 / .4	1.18 / 1.25	-20 to +65	1.25 x 1.25 x .75
1.2 - 1.4	AMI0114	AMC0114	23 / 20	.3 / .4	1.15 / 1.25	-20 to +65	1.25 x 1.25 x .75
1.4 - 1.6	AMI0116	AMC0116	23 / 20	.3 / .4	1.15 / 1.25	-20 to +65	1.0 x 1.0 x .5
1.6 - 1.8	AMI0118	AMC0118	23 / 20	.3 / .4	1.15 / 1.25	-20 to +65	1.0 x 1.0 x .5
1.7 - 2.0	AMI0120	AMC0120	23 / 20	.3 / .4	1.15 / 1.25	-20 to +65	1.0 x 1.0 x .5
2.0 - 2.3	AMI0223	AMC0223	23 / 20	.3 / .4	1.15 / 1.25	-20 to +65	1.0 x 1.0 x .5
3.7 - 4.2	AMI3742	AMC3742	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.75 x .75 x .5
5.4 - 5.9	AMI5459	AMC5459	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.63 x .63 x .5
5.9 - 6.5	AMI5965	AMC5965	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.63 x .63 x .5
7.5 - 10.0	AMI7510	AMC7510	23 / 20	.3 / .5	1.15 / 1.25	-30 to +60	.5 x .63 x .5
7.9 - 8.4	AMI7984	AMC7984	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.5 x .63 x .5
8.4 - 8.8	AMI8488	AMC8488	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.5 x .63 x .5
8.8 - 9.5	AMI8895	AMC8895	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.5 x .63 x .5
9.95 - 10.35	AMI1010	AMC1010	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.5 x .63 x .5
11.0 - 11.4	AMI1114	AMC1114	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.5 x .63 x .5
11.5 - 12.2	AMI1112	AMC1112	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.5 x .63 x .5
12.25 - 12.65	AMI1213	AMC1213	26 / 23	.1 / .15	1.10 / 1.15	-30 to +60	.5 x .63 x .5

\*Typical performance at +23°C

### Single Junction (Standard Configuration)



## Broadband

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T
2.0 - 4.0	101101910	-----	19	.6	1.35	0 to +60	1.63 x 1.63 x .75
2.0 - 4.0	ASI2040	ASC2040	20	.4	1.25	+10 to +50	1.58 x 1.65 x .75
2.6 - 5.2	ASI2652	ASC2652	20	.4	1.25	0 to +50	1.60 x 1.85 x 1.0
3.0 - 6.0	ASI3060	ASC3060	20	.4	1.25	0 to +50	1.25 x 1.25 x .7
3.5 - 7.0	ASI3570	ASC3570	20	.4	1.25	0 to +50	1.0 x 1.03 x .64
4.0 - 8.0	ASI4080	ASC4080	20	.4	1.25	0 to +50	1.0 x 1.03 x .64
7.0 - 11.0	ASI7011	ASC7011	20	.4	1.25	-30 to +85	.88 x 1.01 x .63
8.0 - 12.4	ASI8012	ASC8012	20	.4	1.25	-30 to +85	.88 x 1.01 x .63
8.0 - 16.0	ASI8016	ASC8016	17	.6	1.35	-10 to +65	1.35 x .63 x .55
11.0 - 18.0	ASI1118	ASC1118	20	.5	1.25	-20 to +65	.61 x .83 x .61
18.0 - 26.5	ASI1826	-----	15	.8	1.5	-20 to +65	.5 x .63 x .5

\*Typical performance at +23°C

## Surface Mode™ Isolators & Circulators

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T
2.0 - 6.0	SMI2060	SMC2060	15	.8	1.5	0 to +60	1.58 x 1.61 x .73
2.6 - 5.3	SMI2653	SMC2653	15	1.0	1.5	-30 to +70	1.00 x 1.00 x .50
6.0 - 12.0	SMI6012	SMC6012	17	.6	1.35	-40 to +85	.75 x .75 x .38
6.5 - 18.0	SMMI6518	SMMC6518	15	.9*	1.50	-54 to +85	.50 x .58 x .38
7.0 - 18.0	SMMI7018	SMMC7018	16	.8	1.45	-54 to +85	.50 x .58 x .38
8.0 - 18.0	SMMI8018	SMMC8018	17	.8	1.40	-54 to +85	.50 x .58 x .38

\*Typical performance at +23°C

# 4-Port Circulators & Hi-Ratio Isolators

Two 3-port isolators are combined into a single package to obtain a high ratio isolator, or 4-port circulator. These packages use less volume than individual 3-port isolators or circulators connected together, to obtain the necessary electrical characteristics. For example, some VCO's require higher than single junction isolation, thus requiring the use of a high ratio isolator to minimize frequency pulling of the oscillator, or the 4-port circulator can provide the duplexing function for a transceiver.

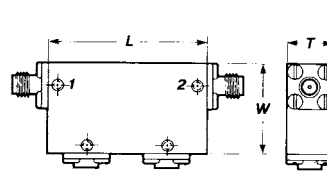


Figure 1 HI-RATIO

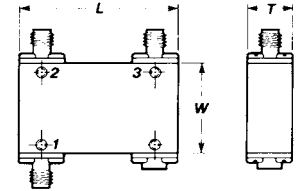


Figure 2 4-PORT

Frequency Range (GHz)	Hi Ratio Model	*Op. Temp (°C)	Isol. (dB)	Ins. Loss (dB)	VSWR All Ports	Dimensions (Inches) L x W x T	4 Port Model	Isol. (dB) 2-1 3-2	Ins. Loss 1-2 3-2	VSWR All Ports	Dimensions (Inches) L x W x T
.790 - .960	1M88HV	+23 -30 to +71	44 40	0.6 0.8	1.20 1.25	3.00 x 1.50 x 0.75	1M99FV	20 40 18 40	0.3 0.6 0.4 0.8	1.20 1.25	3.00 x 1.50 x 0.75
.960 - 1.215	1011HV	+23 -54 to +95	42 36	0.8 1.0	1.20 1.30	2.50 x 1.25 x 0.50	1011FV	20 42 16 36	0.3 0.6 0.4 0.8	1.20 1.30	2.50 x 1.25 x 0.50
1.70 - 2.10	1019HT	+23 0 to +55	55 50	0.4 0.6	1.10 1.15	4.00 x 2.00 x 1.00	1019FT	27 55 23 50	0.2 0.4 0.3 0.6	1.10 1.15	4.00 x 2.00 x 1.00
1.90 - 2.30	1020HT	+23 0 to +55	55 50	0.4 0.6	1.10 1.15	4.00 x 2.00 x 1.00	1020FT	27 55 23 50	0.2 0.4 0.3 0.6	1.10 1.15	4.00 x 2.00 x 1.00
2.00 - 2.30	1022HV	+23 -54 to +95	44 40	0.6 0.8	1.20 1.25	2.00 x 1.00 x 0.50	1022FV	20 44 18 40	0.3 0.6 0.4 0.8	1.20 1.25	2.00 x 1.00 x 0.50
2.0 - 2.40	1023HV	+23 -54 to +95	44 40	0.6 0.8	1.20 1.25	2.00 x 1.00 x .050	1023FV	20 44 18 40	0.3 0.6 0.4 0.8	1.20 1.25	2.00 x 1.00 x 0.50
2.70 - 3.10	1029HX	+23 -30 to +71	44 36	0.8 1.0	1.20 1.30	2.00 x 1.00 x 0.50	1029FX	20 44 17 36	0.4 0.8 0.5 1.0	1.20 1.30	2.00 x 1.00 x 0.50
3.30 - 4.50	1038HS	+23 -30 to +71	42 38	0.8 1.0	1.20 1.30	2.50 x 1.25 x 0.75	1038FS	18 42 16 38	0.4 0.8 0.5 1.0	1.20 1.30	2.50 x 1.25 x 0.75
3.70 - 4.20	1039HT	+23 -30 to +71	55 50	0.3 0.4	1.05 1.10	2.00 x 1.00 x 0.50	1039FT	27 55 23 50	0.15 0.3 0.20 0.4	1.05 1.10	2.00 x 1.00 x 0.50
4.20 - 5.00	1046HX	+23 -54 to +95	44 40	0.6 0.8	1.20 1.25	1.50 x 0.81 x 0.50	1046FX	20 44 18 40	0.3 0.6 0.4 0.8	1.20 1.25	1.62 x 0.75 x 0.50
5.40 - 5.90	1057HX	+23 -54 to +95	44 40	0.6 0.8	1.20 1.25	1.00 x 0.67 x 0.50	1057FX	20 44 18 40	0.3 0.6 0.4 0.8	1.20 1.25	1.34 x 0.50 x 0.50
5.90 - 6.40	1062HT	+23 -30 to +71	55 50	0.3 0.5	1.05 1.10	1.50 x 0.81 x 0.50	1062FT	27 55 23 50	0.15 0.3 0.25 0.5	1.05 1.10	1.62 x 0.75 x 0.50
7.20 - 7.80	1075HT	+23 -30 to +71	55 50	0.4 0.5	1.05 1.10	1.25 x 0.75 x 0.50	1075FT	27 55 23 50	0.20 0.4 0.25 0.5	1.05 1.10	1.50 x 0.63 x 0.50
11.70 - 12.20	1120HT	+23 -54 to +95	50 46	0.4 0.5	1.10 1.15	1.00 x 0.67 x 0.50	1120FT	25 50 23 46	0.20 0.4 0.25 0.5	1.10 1.15	1.34 x 0.50 x 0.50
12.20 - 12.70	1125HT	+23 -54 to +95	50 46	0.4 0.5	1.10 1.15	1.00 x 0.67 x 0.50	1125FT	25 50 23 46	0.20 0.4 0.25 0.5	1.10 1.15	1.34 x 0.50 x 0.50
14.00 - 14.50	1143HS	+23 -54 to +95	50 46	0.6 0.7	1.15 1.20	1.00 x 0.67 x 0.50	1143FS	25 50 23 46	0.30 0.6 0.35 0.7	1.15 1.20	1.34 x 0.50 x 0.50
17.70 - 20.20	1190HS	+23 -54 to +95	44 40	1.0 1.2	1.25 1.35	1.00 x 0.67 x 0.50	1190FS	21 44 19 40	0.5 1.0 0.6 1.2	1.25 1.35	1.34 x 0.50 x 0.50
1.00 - 2.00	1015HQ	+23 0 to +55	40 34	0.8 1.0	1.20 1.35	6.00 x 3.00 x 1.00	1015FQ	19 40 16 34	0.4 0.8 0.5 1.0	1.20 1.35	6.00 x 3.00 x 1.00
2.00 - 4.00	1030HQ	+23 -30 to +71	40 34	0.8 1.0	1.20 1.35	3.50 x 1.75 x 0.75	1030FQ	19 40 16 34	0.4 0.8 0.5 1.0	1.20 1.35	3.50 x 1.75 x 0.75
3.00 - 6.00	1045HQ	+23 -54 to +95	40 34	0.8 1.0	1.20 1.35	2.50 x 1.25 x 0.70	1045FQ	19 40 16 34	0.4 0.8 0.5 1.0	1.20 1.35	2.50 x 1.25 x 0.70
4.00 - 8.00	1060HQ	+23 -54 to +95	40 34	0.8 1.0	1.20 1.35	2.00 x 1.10 x 0.58	1060FQ	19 40 16 34	0.4 0.8 0.5 1.0	1.20 1.35	2.20 x 1.00 x 0.58
5.00 - 10.00	1075HQ	+23 -54 to +95	40 34	0.8 1.2	1.20 1.35	1.80 x 1.00 x 0.58	1075FQ	19 40 16 34	0.4 0.8 0.6 1.2	1.20 1.35	2.20 x 0.90 x 0.58
6.00 - 12.00	1090HQ	+23 -54 to +95	40 34	0.8 1.2	1.20 1.35	1.50 x 0.90 x 0.50	1090FQ	19 40 16 34	0.4 0.8 0.6 1.2	1.20 1.35	1.80 x 0.75 x 0.50
7.00 - 11.00	1090HS	+23 -54 to +95	45 40	0.8 1.0	1.15 1.25	1.50 x 0.90 x 0.50	1090FS	22 45 19 40	0.4 0.8 0.5 1.0	1.15 1.25	1.80 x 0.75 x 0.50
8.00 - 12.40	1102HS	+23 -54 to +95	45 40	0.8 1.0	1.15 1.25	1.50 x 0.90 x 0.50	1102FS	22 45 19 40	0.4 0.8 0.5 1.0	1.15 1.25	1.80 x 0.75 x 0.50
8.00 - 16.00	1120HQ	+23 -54 to +95	40 34	0.8 1.2	1.20 1.35	1.25 x 0.75 x 0.50	1120FQ	19 40 16 34	0.4 0.8 0.6 1.2	1.20 1.35	1.50 x 0.63 x 0.50
9.00 - 18.00	1135HQ	+23 -54 to +95	40 34	0.8 1.4	1.20 1.35	1.25 x 0.75 x 0.50	1135FQ	19 40 16 34	0.4 0.8 0.7 1.04	1.20 1.35	1.50 x 0.63 x 0.50
11.00 - 18.00	1145HS	+23 -54 to +95	44 40	0.8 1.2	1.25 1.35	1.25 x 0.75 x 0.50	1145FS	20 44 18 40	0.4 0.8 0.6 1.2	1.25 1.35	1.50 x 0.63 x 0.50

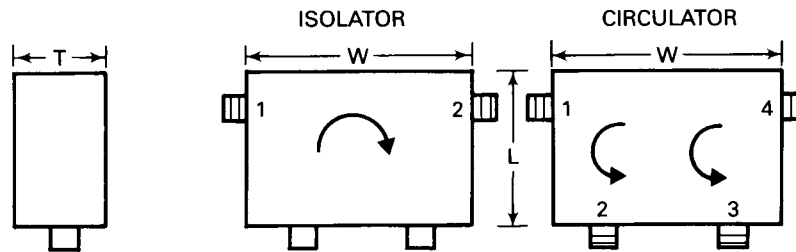
\*Typical performance at +23°C

# High Isolation, Broadband Isolators

## Miniature, Narrow Band, High Performance

Frequency Range (GHz)	Isolator Model	Isolation (dB) Min.	Insertion Loss (dB) Max.	VSWR Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T
2.0 - 4.0	A4H2040	40	.8	1.25	+10 to +50	3.16 x 1.65 x .75
2.6 - 5.2	A4H2652	40	.8	1.25	0 to +50	3.20 x 1.85 x 1.0
3.0 - 6.0	A4H3060	40	.8	1.25	0 to +50	2.50 x 1.25 x .70
4.0 - 8.0	A4H4080	40	.8	1.25	0 to +50	2.00 x 1.03 x .64
7.0 - 11.0	A4H7011	40	.8	1.25	-30 to +85	1.76 x 1.01 x .63
8.0 - 12.4	A4H8012	40	.8	1.25	-30 to +85	1.76 x 1.01 x .63
8.0 - 16.0	A4H8016	34	1.2	1.25	-10 to +85	1.26 x .80 x .55
11.0 - 18.0	A4H1118	40	1.0	1.25	-20 to +65	1.36 x .83 x .61

### Dual Junction (Standard Configuration)



## Broadband 4-Port Circulators

Frequency Range (GHz)	Isolator Model	Isolation (dB) Min.		Insertion Loss (dB) Max.		VSWR Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T
		2-1	1-4	1-2	2-3			
2.0 - 4.0	A4C2040	17	40	.4	.8	1.25	0 to +50	3.16 x 1.65 x .75
4.0 - 8.0	A4C4080	17	40	.4	.8	1.25	0 to +50	2.0 x 1.03 x .64
7.0 - 11.0	A4C7011	17	40	.4	.8	1.25	-30 to +85	1.76 x 1.01 x .63
8.0 - 12.4	A4C8012	17	40	.4	.8	1.25	-30 to +85	1.76 x 1.01 x .63
11.0 - 18.0	A4C1118	17	35	.5	1.0	1.25	-20 to +65	1.36 x .83 x .61

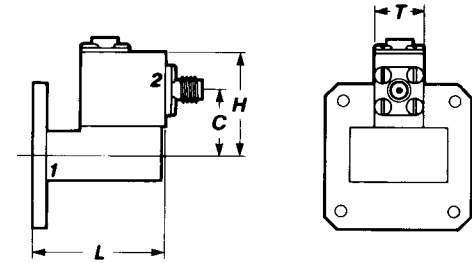
Note: By special order, any of the coaxial isolators and circulators listed in this catalog can be configured as a high-ratio isolator or 4-port circulator.



# High Isolation, Broadband Isolators

The INNOGUIDE consists of an isolator or circulator integrally mounted to a waveguide transition. The resulting size is generally not much larger than a waveguide to coaxial adapter, while providing isolation between input and output ports.

Although this catalog lists our standard models, other waveguide flanges, coaxial connectors, and configurations can be provided on a special order.



Frequency Range (GHz)	Model No. WG-IN SMA-OUT	Model No. SMA-IN WG-OUT	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T	C	Flange Type
3.10 - 3.60	1034IW	1034IWR	25 / 23	0.15 / 0.20	1.10 / 1.15	0 to +55	4.00 x 2.70 x 0.82	1.80	UG1725/U
3.70 - 4.20	1039IW	1039IWR	30 / 26	0.12 / 0.15	1.10 / 1.15	0 to +55	2.50 x 2.64 x 0.85	1.79	CPR229G
5.90 - 6.40	1062IW	1062IWR	26 / 23	0.25 / 0.30	1.10 / 1.15	-30 to +71	1.75 x 1.25 x 0.50	0.88	CMR137
6.40 - 7.10	1068IW	1068IWR	26 / 23	0.25 / 0.30	1.10 / 1.15	-30 to +71	1.75 x 1.25 x 0.50	0.88	CMR137
7.20 - 8.40	1078IW	1078IWR	26 / 23	0.25 / 0.30	1.10 / 1.15	-30 to +71	1.75 x 1.25 x 0.50	0.90	CPR112
9.60 - 10.0	1098IW	1098IWR	26 / 23	0.25 / 0.30	1.10 / 1.15	-30 to +71	1.50 x 1.25 x 0.50	0.90	UG135/U
11.7 - 12.2	1120IW	1120IWR	26 / 23	0.25 / 0.30	1.10 / 1.15	-30 to +71	1.25 x 0.88 x 0.50	0.63	WR75
11.7 - 12.7	1121IW	1121IWR	23 / 20	0.25 / 0.30	1.15 / 1.25	-30 to +71	1.25 x 0.88 x 0.50	0.63	WR75
12.2 - 12.7	1122IW	1122IWR	26 / 23	0.25 / 0.30	1.10 / 1.15	-30 to +71	1.25 x 0.88 x 0.50	0.63	WR75
12.0 - 18.0	1150IW	1150IWR	20 / 17	0.50 / 0.60	1.25 / 1.35	-54 to +95	1.15 x 0.95 x 0.50	0.63	UG1665/U
14.0 - 14.5	1143IW	1143IWR	26 / 23	0.35 / 0.40	1.10 / 1.15	-54 to +95	1.00 x 0.84 x 0.50	0.59	UG1665/U
17.0 - 18.0	1175IW	1175IWR	26 / 23	0.50 / 0.60	1.15 / 1.25	-54 to +95	1.00 x 0.84 x 0.50	0.59	UG1665/U

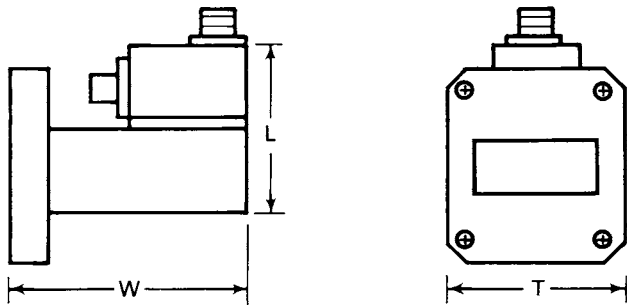
\*Typical performance at +23°C

## Co-isoguide Isolators & Circulators

Frequency Range (GHz)	Isolator Model	Circulator Model	Isolation (dB) *Typ./Min.	Insertion Loss (dB) *Typ./Max.	VSWR *Typ./Max.	Operating Temp. (°C)	Dimensions (Inches) L x W x T
7.0 - 11.0	AWI7011	AWC7011	20	.5	1.25	-20 to +65	1.75 x 1.56 x 1.63
8.0 - 12.4	AWI8012	AWC8012	20	.5	1.25	-20 to +65	1.75 x 1.56 x 1.63
11.0 - 18.0	AWI1118	AWC1118	20	.6	1.35	-20 to +65	1.59 x 1.19 x 1.31

\*Typical performance at +23°C

### Co-isoguide Isolator/Circulator (Standard Configuration)



Notes:

1. When ordering an isolator, add "01" for W/G input; "-2" for W/G output.
2. When ordering a circulator, add "01" for clockwise rotation; "-2" for counterclockwise rotation.



# Power Dividers

Guaranteed Specifications -54°C to +85°C

Model Number	Frequency Range (MHz)	Isolation dB Min.	Insertion Loss dB Max.	VSWR Max.	Phase Balance ± °Max	Amp Balance ±° dB Max	Case Style
<b>Two Way Power Dividers in Phase</b>							
HJ-12001	0.01 - 10	30	0.5	1.3:1	1	0.1	C-1 (BNC)
HJ-12002	0.01 - 10	30	0.5	1.3:1	1	0.1	R-1
HJ-12003	0.10 - 10	30	0.5	1.3:1	1	0.1	TO-5-1
HJ-22001	1 - 100	30	0.5	1.3:1	1	0.1	C-1 (BNC)
HJ-22004	1 - 100	30	0.5	1.3:1	1	0.1	FP-1
HJ-22006	1 - 100	30	0.5	1.3:1	1	0.1	C-2 (SMA)
HJ-22002	1 - 100	30	0.5	1.3:1	1	0.2	R-1
HJ-22005	1 - 100	30	0.5	1.3:1	1	0.1	SM-1
HJ-22003	1 - 100	30	0.5	1.3:1	1	0.1	TO-5-1
HJ-22007	2 - 100	35	0.5	1.2:1	1	0.1	C-1 (BNC)
HJ-22008	2 - 100	35	0.5	1.3:1	1	0.1	FP-1
HJ-22010	2 - 100	35	0.5	1.2:1	1	0.1	C-2 (SMA)
HJ-22009	2 - 100	35	0.5	1.3:1	1	0.1	TO-5-1
HJ-42001	10 - 500	30	0.65	1.3:1	2	0.1	C-1(BNC)
HJ-42003	10 - 500	30	0.65	1.3:1	2	0.1	FP-1
HJ-42005	10 - 500	30	0.65	1.3:1	2	0.1	C-2 (SMA)
HJ-42004	10 - 500	30	0.65	1.3:1	2	0.1	SM-1
HJ-42002	10 - 500	30	0.65	1.3:1	2	0.1	TO-5-1
HJ-42010	200 - 450	25	0.5	1.3:1	5	0.3	Packageless
HJ-52004	20 - 1000	30	1.0	1.4:1	4	0.2	C-2 (SMA)
HJ-52002	20 - 1000	20	1.0	1.3:1	4	0.2	FP-1
HJ-52003	20 - 1000	20	1.0	1.3:1	4	0.2	SM-1
HJ-52001	20 - 1000	20	1.0	1.3:1	4	0.2	TO-5-1
HJ-52005	50 - 1000	20	1.0	1.4:1	2	0.1	FP-5
HJ-62001	50 - 2000	20	1.5	1.4:1	4	0.3	FP-1
HJ-62002	50 - 2000	20	1.5	1.4:1	4	0.2	C-2(SMA)
<b>Two way Power Dividers 180 Degrees</b>							
NJ-10001	0.01 - 10	30	0.75	1.3:1	2	0.2	C-1 (BNC)
NJ-10002	0.01 - 10	30	0.75	1.3:1	2	0.2	R-1
NJ-10003	0.01 - 10	30	0.75	1.3:1	2	0.2	TO-5-1
NJ-20001	1 - 100	30	0.75	1.3:1	2	0.2	C-1 (BNC)
NJ-20002	1 - 100	30	0.75	1.3:1	2	0.2	FP-1
NJ-20004	1 - 100	30	0.75	1.3:1	2	0.2	C-2 (SMA)
NJ-20003	1 - 100	30	0.75	1.3:1	2	0.2	SM-1
NJ-20005	1 - 100	30	0.75	1.3:1	2	0.2	TO-5-1
NJ-40001	50 - 500	30	1.0	1.3:1	3	0.3	C-1 (BNC)
NJ-40002	50 - 500	25	1.0	1.3:1	2	0.3	FP-1
NJ-40003	50 - 500	30	1.0	1.3:1	3	0.3	C-2 (SMA)
NJ-40004	50 - 500	20	1.0	1.3:1	3	0.3	SM-1
NJ-40005	50 - 500	20	1.0	1.3:1	3	0.3	TO-5-1
<b>Three Way Power Dividers in Phase</b>							
HJ-23001	1 - 100	30	0.65	1.3:1	2	0.2	C-3 (BNC)
HJ-23002	1 - 100	30	0.65	1.3:1	2	0.2	FP-1
HJ-23003	1 - 100	30	0.65	1.3:1	2	0.2	C-4 (SMA)
HJ-23004	1 - 100	30	0.65	1.3:1	2	0.2	TO-5-2
HJ-43001	10 - 500	30	0.65	1.3:1	3	0.2	C-3 (BNC)
HJ-43002	10 - 500	25	0.65	1.3:1	2	0.2	FP-2
HJ-43003	10 - 500	30	0.65	1.3:1	3	0.2	C-5 (SMA)
HJ-53001	20 - 1000	25	0.75	1.4:1	4	0.3	C-5 (SMA)
HJ-53002	30 - 1000	25	0.75	1.3:1	3	0.2	FP-3
<b>Four Way Power Dividers in Phase</b>							
HJ-44001	10 - 500	25	0.75	1.3:1	3	0.2	FP-4
HJ-44002	10 - 500	30	1.0	1.3:1	3	0.2	C-6 (BNC)
HJ-44003	10 - 500	30	1.0	1.3:1	3	0.2	C-7 (SMA)
HJ-44010	200 - 450	25	0.6	1.3:1	5	0.3	Packageless
HJ-54002	20 - 1000	25	1.5	1.3:1	3	0.2	C-7 (SMA)
HJ-54001	30 - 1000	25	1.75	1.3:1	3	0.3	FP-5

# Power Dividers

Guaranteed Specifications -54°C to +85°C

Six Way Power Dividers in Phase							
HJ-26001	1 - 100	30	1.0	1.3:1	2	0.2	C-8 (BNC)
HJ-26002	1 - 100	30	1.0	1.3:1	2	0.2	C-9 (SMA)
HJ-46001	10 - 500	30	1.25	1.3:1	3	0.2	C-8 (BNC)
HJ-46002	10 - 500	30	1.25	1.3:1	3	0.2	C-9 (SMA)
HJ-56001	20 - 1000	20	1.75	1.5:1	4	0.4	C-9 (SMA)
Eight Way Power Dividers in Phase							
HJ-27001	1 - 100	30	1.3	1.4:1	2	0.2	C-10 (BNC)
HJ-27002	1 - 1000	30	1.3	1.4:1	2	0.2	C-11 (SMA)
HJ-47001	10 - 500	30	1.25	1.3:1	3	0.2	C-10 (BNC)
HJ-47002	10 - 500	30	1.25	1.3:1	3	0.2	C-11 (SMA)
HJ-57001	20 - 1000	20	2.5	1.5:1	4	0.5	C-11 (SMA)
Twelve Way Power Dividers in Phase							
HJ-28001	1 - 100	30	1.25	1.3:1	2	0.2	C-12 (BNC)
HJ-28002	10 - 100	30	1.25	1.3:1	2	0.2	C-13 (SMA)
HJ-48001	10 - 500	20	2.0	1.5:1	3	0.2	C-12 (BNC)
HJ-48002	10 - 500	20	2.0	1.5:1	3	0.2	C-13 (SMA)
HJ-58001	20 - 1000	20	2.25	1.6:1	5	0.3	C-13 (SMA)
Sixteen Way Power Dividers in Phase							
HJ-29001	1 - 100	30	1.75	1.4:1	3	0.2	C-17 (BNC)
HJ-29002	1 - 100	30	1.75	1.4:1	3	0.2	C-15 (SMA)
HJ-49001	10 - 500	30	2.0	1.4:1	3	0.2	C-17 (BNC)
HJ-49002	10 - 500	30	2.0	1.4:1	3	0.2	C-14 (SMA)
HJ-59001	20 - 1000	25	2.5	1.5:1	5	0.4	C-16 (SMA)

# Directional Couplers

Guaranteed Specifications -54°C to +85°C

Model Number	Frequency Range (MHz)	Coupling dB	Coupling Flatness $\pm$ dB	Loss dB	Directivity dB	VSWR Max.	Po Watts	Case Style
10 dB Directional Couplers								
D3-20005	0.075 - 75	10 + 0.1	0.10	0.35	30	1.15:1	3	R-1
D3-20006	0.075 - 75	10 + 0.1	0.10	0.35	30	1.15:1	3	C-20 (BNC)
D3-40009	10 - 500	10 + 0.25	0.25	0.65	30	1.25:1	3	FP-1
D3-40010	10 - 500	10 + 0.25	0.25	0.65	25	1.25:1	3	SM-1
D3-40011	10 - 500	10 + 0.25	0.35	0.65	25	1.25:1	3	C-20 (BNC)
D3-40012	10 - 500	10 + 0.25	0.35	0.65	25	1.25:1	3	C-21 (SMA)
D3-40013	10 - 500	10 + 0.3	0.30	0.8	20	1.3:1	3	TO-5-1
D3-50004	75 - 1000	10 + 0.5	0.50	1.0	20	1.4:1	3	C-21 (SMA)
15 dB Directional Couplers								
D3-40006	10 - 400	15.0 + 0.2	0.20	0.35	25	1.2:1	3	TO-5-21
D3-40007	10 - 500	15.0 + 0.2	0.20	0.35	25	1.2:1	3	C-20 (BNC)
D3-40008	10 - 500	15.0 + 0.2	0.20	0.35	25	1.2:1	3	C-21 (SMA)
D3-50003	10 - 1000	15.0 + 0.35	0.35	0.65	20	1.4:1	3	C-21 (SMA)
D3-50002	20 - 1000	15.0 + 0.35	0.35	0.75	20	1.5:1	3	FP-1
20 dB Directional Couplers								
D3-20001	1 - 100	20.25 + 0.15	0.15	0.3	25	1.15:1	3	TO-5-2
D3-20002	1 - 100	20.25 + 0.15	0.15	0.3	25	1.15:1	3	FP-1
D3-20003	1 - 100	20.25 + 0.1	0.10	0.25	20	1.15:1	3	C-20 (BNC)
D3-20004	1 - 100	20.25 + 0.1	0.10	0.25	20	1.2:1	3	C-21 (SMA)
D3-40001	10 - 500	20.25 + 0.25	0.25	0.5	20	1.2:1	3	FP-1
D3-40002	10 - 500	20.25 + 0.25	0.25	0.5	20	1.2:1	3	SM-1
D3-40003	10 - 500	20.25 + 0.25	0.25	0.5	20	1.2:1	3	TO-5-1
D3-40004	10 - 500	20.25 + 0.25	0.20	0.5	20	1.2:1	3	C-20 (BNC)
D3-40005	10 - 500	20.25 + 0.35	0.25	0.5	20	1.2:1	3	C-21 (SMA)
D3-50001	10 - 1000	20.25 + 0.35	0.35	0.5	20	1.2:1	3	C-21 (SMA))

# Directional Couplers

Guaranteed Specifications -54°C to +85°C

10 dB Bi-Directional Couplers								
D4-20005	0.075 - 75	10 +0.2	0.20	0.35	25	1.15:1	3	R-1
D4-20006	0.075 - 75	10 +0.2	0.20	0.35	25	1.15:1	3	C-18 (BNC)
D4-40006	10 - 500	10 +0.3	0.30	0.5	20	1.2:1	3	FP-1
D4-40007	10 - 500	10 +0.3	0.30	0.5	20	1.2:1	3	TO-5-3
D4-40008	10 - 500	10 +0.3	0.30	0.5	20	1.2:1	3	SM-1
D4-40009	10 - 500	10 +0.3	0.30	0.65	20	1.25:1	3	C-18 (BNC)
D4-40010	10 - 500	10 +0.3	0.30	0.65	20	1.25:1	3	C-19 (SMA)
D4-50002	10 - 1000	10 +0.3	0.50	0.65	20	1.4:1	3	C-19 (SMA)
20 dB Bi-Directional Couplers								
D3-20001	1 - 100	20.25 + 0.2	0.35	0.3	20	1.15:1	3	TO-5-2
D3-20002	1 - 100	20.25 + 0.2	0.35	0.3	20	1.15:1	3	FP-1
D3-20003	1 - 100	20.25 + 0.25	0.35	0.3	20	1.15:1	3	C-18 (BNC)
D3-20004	1 - 100	20.25 + 0.25	0.35	0.3	20	1.15:1	3	C-19 (SMA)
D3-40001	10 - 500	20.25 + 0.35	0.35	0.5	20	1.2:1	3	FP-1
D3-40002	10 - 500	20.25 + 0.35	0.5	0.35	20	1.2:1	3	SM01
D3-40003	10 - 500	20.25 + 0.35	0.5	0.35	20	1.3:1	3	TO-5-3
D3-40004	10 - 500	20.25 + 0.35	0.35	0.5	20	1.3:1	3	C-18 (BNC)
D3-40005	10 - 500	20.25 + 0.35	0.35	0.5	20	1.3:1	3	C-19 (SMA)
D3-50001	10 - 1000	20.25 + 0.5	0.50	0.75	20	1.3:1	3	C-19 (SMA)

# Hybrids

Guaranteed Specifications -54°C to +85°C

Model Number	Frequency Range (MHz)	Isolation dB Min.	Insertion Loss dB Max.	VSWR Max.	Phase Balance ± °Max	Amp Balance ±° dB Max	Case Style
Quadrature Hybrids							
J4-10002	7 - 14	25	0.5	1.2:1	3	0.75	TO-5-3
J4-10003	7 - 14	25	0.5	1.2:1	3	0.75	FP-6
J4-20010	14 - 28	25	0.5	1.2:1	3	0.75	TO-5-3
J4-20011	14 - 28	25	0.5	1.2:1	3	0.75	FP-6
J4-20001	20 - 40	25	0.5	1.2:1	3	0.75	C-23 (SMA)
J4-20002	20 - 40	25	0.5	1.2:1	3	0.75	TO-5-3
J4-20003	20 - 40	25	0.5	1.2:1	3	0.75	FP-6
J4-20004	20 - 40	25	0.5	1.2:1	3	0.75	SM-2
J4-20005	40 - 80	25	0.5	1.2:1	3	0.75	C-23 (SMA)
J4-20006	40 - 80	25	0.5	1.2:1	3	0.75	TO-5-3
J4-20007	40 - 80	25	0.5	1.2:1	3	0.75	FP-6
J4-20008	40 - 80	25	0.5	1.2:1	3	0.75	SM-2
J4-30001	80 - 160	25	0.5	1.3:1	4	0.75	C-23 (SMA)
J4-30002	80 - 160	25	0.75	1.3:1	4	0.75	TO-5-3
J4-30003	80 - 160	25	0.75	1.3:1	4	0.75	FP-6
J4-30004	80 - 160	25	0.75	1.2:1	3	0.75	SM-2
J4-30005	100 - 200	20	0.75	1.3:1	4	0.75	C-23 (SMA)
J4-30006	100 - 200	20	0.75	1.3:1	4	0.75	TO-5-3
J4-30007	100 - 200	20	0.75	1.3:1	4	0.75	FP-6
J4-30008	100 - 200	20	0.75	1.3:1	4	0.75	SM-1
J4-40001	160 - 320	20	0.75	1.3:1	4	0.75	C-23 (SMA)
J4-40002	160 - 320	20	0.75	1.3:1	4	0.75	TO-5-3
J4-40003	160 - 320	20	0.75	1.3:1	4	0.75	FP-6
J4-40004	160 - 320	20	0.75	1.3:1	4	0.75	SM-1
J4-40005	225 - 400	20	0.75	1.3:1	4	0.75	C-23 (SMA)
J4-40006	225 - 400	20	0.75	1.3:1	4	0.75	TO-5-3
J4-40007	225 - 400	20	0.75	1.3:1	4	0.75	FP-6
J4-40008	225 - 400	20	0.75	1.3:1	4	0.75	SM-1
J4-50001	300 - 500	20	0.75	1.3:1	4	0.75	C-23 (SMA)
J4-50002	300 - 500	20	0.75	1.3:1	4	0.75	TO-5-3
J4-50003	300 - 500	20	0.75	1.3:1	4	0.75	FP-6
J4-50004	300 - 500	20	0.75	1.3:1	4	0.75	SM-1
J4-50005	400 - 600	20	1.0	1.3:1	4	0.75	C-23 (SMA)
J4-50006	400 - 600	20	1.0	1.3:1	4	0.75	TO-5-3
J4-50007	400 - 600	20	1.0	1.3:1	4	0.75	FP-6
J4-50008	400 - 600	20	1.0	1.3:1	4	0.75	SM-1

# Hybrids

Guaranteed Specifications -54°C to +85°C

Broadband 3 Port Quadrature Hybrids							
J3-20001	10 - 100	25	1.2	1.3:1	3	0.5	P-1
J3-20001	10 - 100	25	1.2	1.3:1	3	0.5	C-22 (SMA)
J3-20001	20 - 200	20	1.2	1.4:1	3	0.5	P-1
J3-20001	20 - 200	20	1.2	1.4:1	3	0.5	C-22 (SMA)
J3-20001	50 - 500	20	1.5	1.4:1	3	0.5	P-1
J3-20001	50 - 500	20	1.5	1.4:1	3	0.5	C-22 (SMA)
Sum/Difference (0/180°) Hybrids							
FH-30001	2 - 200	30	0.75	1.3:1	2.0	0.2	C-23 (SMA)
FH-30002	2 - 200	30	0.75	1.3:1	2.0	0.2	FP-6
FH-30003	2 - 200	30	0.75	1.3:1	2.0	0.2	SM-2
FH-30004	2 - 200	30	0.75	1.3:1	2.0	0.2	TO-5-4
FH-40001	10 - 400	25	1.25	1.3:1	3.0	0.3	C-23 (SMA)
FH-40002	10 - 400	25	1.25	1.3:1	3.0	0.3	FP-6
FH-40003	10 - 400	25	1.25	1.3:1	3.0	0.3	SM-2

# Mixer Selection Guide

Guaranteed Specifications -54°C to +85°C

Model Number	RF/LO Frequency MHz	IF Frequency MHz	Conversion Loss dB Max.	LO/RF Isolation dB Min.	LO/IF Isolation dB Min.	RF/IF Isolation dB Min.	Compression Point dB Min.	LO Drive dBm nom.	Case Style	IF Output
CDB-9005	1 - 500	DC-500	7.5	25	20	20	1	10	FP	Dual
CDB-9006	5 - 1000	DC-800	9.0	20	15	15	2	10	FP	Dual
CDB-9007	5 - 1350	DC-800	9.0	20	15	15	2	10	FP	Single
CDB-9008	10 - 2000	DC-1800	10.0	15	15	15	1	10	FP	Dual
CDB-9009	10 - 2000	DC-2000	10.0	20	20	15	6	13	FP	Single
CDB-9010	5 - 1000	DC-800	8.5	30	20	15	11	17	FP	Single
CDB-9011	20 - 2000	DC-1800	10.0	25	15	15	20	27	FP	Single

# Active IF - Log IF Amplifiers

Guaranteed Specifications -54°C to +85°C

Model Number	Frequency Range MHz	Dynamic Range dB	Constant Phase Yes/No	Package Size/Style Inches
Log IF Amplifiers				
HCL-3-9001	55 - 65	70	No	2.5 x 1.0 x 0.25
HCL-3-9002	55 - 65	70	No	3.5 x 1.5 x 0.46
MCWL-3-9027	20 - 100	70	No	1.5 x 1.0 x 0.28
HCL-3-9003	40 - 140	70	No	2.5 x 1.0 x 0.25
HCL-3-9004	40 - 140	70	No	3.5 x 1.5 x 0.46
HCL-4-9005	140 - 180	70	No	2.5 x 1.0 x 0.25
HCL-4-9006	140 - 180	70	No	3.5 x 1.5 x 0.46
HCL-4-9007	120 - 480	70	No	2.5 x 1.0 x 0.25
HCL-4-9008	120 - 480	70	No	3.5 x 1.5 x 0.46
HCL-5-9036	300 - 800	60	No	2.5 x 1.0 x 0.25
HCL-5-9011	750 - 1250	60	No	2.5 x 1.0 x 0.25
Constant Transmission Phase Limiting Amplifiers				
HCLM-4-9019	145 - 175	70	Yes	2.5 x 1.0 x 0.25
Frequency Discriminators				
HCF-4-9021	140 - 180			2.5 x 1.0 x 0.25
HCF-5-9023	750 - 1250			2.5 x 1.0 x 0.25

# Control Devices

Guaranteed Specifications -54°C to +85°C

Frequency (MHz)	Model Number
Phase Comparator (PC Series)	
7 - 14	PC-10
10 - 20	PC-15
14 - 28	PC-20
20 - 40	PC-30
30 - 60	PC-45
40 - 80	PC-60
55 - 90	PC-70
70 - 140	PC-100
80 - 160	PC-120
100 - 200	PC-150
150 - 300	PC-200
160 - 320	PC-240
225 - 400	PC-300
360 - 390	PC-375
GaAs Bi-Phase Modulators (BPM-1047 Series)	
100 - 1000	FP-BPM-1047
100 - 1000	TO8-BPM-1047
100 - 1000	SM-BPM-1047
Complex Phase Modulators (CPM-4 Series)	
10 - 20	P-CPM-15-4
20 - 40	P-CPM-30-4
30 - 60	P-CPM-45-4
40 - 80	P-CPM-60-4
55 - 90	P-CPM-70-4
70 - 140	P-CPM-100-4
80 - 160	P-CPM-120-4
100 - 200	P-CPM-150-4
140 - 280	P-CPM-200-4
160 - 320	P-CPM-240-4
225 - 400	P-CPM-300-4
300 - 500	P-CPM-400-4
375 - 525	P-CPM-450-4
400 - 650	P-CPM-550-4
Wideband Complex Phase Modulator (CPM-9100 Series)	
50 - 500	CPM-9100
Quadriphase Modulators (JPM Series)	
14 - 18	JPM-20
17 - 33	JPM-25
20 - 40	JPM-30
30 - 60	JPM-45
50 - 90	JPM-70
55 - 100	JPM-75
70 - 140	JPM-100
80 - 160	JPM-120
100 - 200	JPM-150
160 - 320	JPM-240
225 - 350	JPM-300
320 - 450	JPM-385
350 - 450	JPM-400

Frequency (MHz)	Model Number	Description
Attenuators		
10 - 500	ATT-9700	Pin Diode Bridge Atten
30 ±5%	ATT-9801	Matched IF Attenuator
60 ±5%	ATT-9802	Matched IF Attenuator
120 ±5%	ATT-9803	Matched IF Attenuator
200 ±5%	ATT-9804	Matched IF Attenuator
100 - 200	ATT-9116	Digital Attenuator
Switches Balanced Pin Diode Switch with Integral Drivers		
2 - 100	ISD-9901	(SPST)
20 - 400	ISD-9902	(SPST)
0.05 - 200	ISD-9110	(SPST)
2 - 100	ISD-9111	(SPST)
20 - 400	ISD-9112	(SPST)
2 - 100	ISD-9200	(SPST)
20 - 400	ISD-9201	(SPST)
0.05 - 200	ISD-9210	(SPST)
2 - 100	ISD-9211	(SPST)
20 - 400	ISD-9212	(SPST)

# Broadband Double Balanced Mixers

## FEATURES

- Broad Frequency Coverage
- Low Conversion Loss
- High Isolation
- Drop-In or Connectorized Hermetic Packages



## Performance / Specifications @ +25°C

RF/LO Frequency (GHz)	Model Number	IF Frequency (GHz)	Conversion Loss (dB) (Typ./Max.)	Isolation (Typ./Min.)		Conditions Frequency (GHz)	Package Style
				L-R	L-I		
4.0 - 20.0	STDB-2005	DC - 4.0	5.5 / 7.0 6.0 / 7.5	45 / 30 40 / 25	30 / 20 30 / 20	RF / LO 6.0 - 18.0 RF / LO 4.0 - 20.0	I, H, M, L
2.0 - 8.0	STDB-2006	DC - 2.0	5.5 / 7.0 6.0 / 7.5	40 / 30 40 / 30	30 / 20 30 / 20	RF / LO 3.0 - 7.0 RF / LO 2.0 - 8.0	I, H, R
2.0 - 12.0	STDB-2007	DC - 2.0	6.0 / 7.5 6.5 / 8.0	35 / 25 35 / 25	30 / 20 30 / 20	RF / LO 4.0 - 10.0 RF / LO 2.0 - 12.0	I, H, R
6.0 - 18.0	STDB-2008	DC - 4.0	5.0 / 6.5 5.5 / 7.0	40 / 30 40 / 30	35 / 25 35 / 25	RF / LO 8.0 - 16.0 RF / LO 6.0 - 18.0	I, H, O, S, M
8.0 - 14.0	STDB-2009	DC - 4.0	4.5 / 6.0 5.0 / 6.5	45 / 35 45 / 30	35 / 25 35 / 25	RF / LO 9.0 - 13.0 RF / LO 8.0 - 14.0	I, H, O, S, M
10.0 - 26.5	STDB-2010	DC - 4.0	6.0 / 7.5 6.5 / 8.0	35 / 25 35 / 25	30 / 20 30 / 20	RF / LO 12.0 - 24.0 RF / LO 10.0 - 26.5	I, H, O, S, M

## Model Number Designation

Model STDB-2005 - I L C — C for SMA Female Connectors  
 — L Local Oscillator Power  
 — I Package Style  
 — STDB Double Balanced Design

### Local Oscillator Power Options

L Version +7 dBm (Typ 1 dB Input Compression Point +1 dBm)  
 M Version +10 dBm (Typ 1 dB Input Compression Point +4 dBm)  
 H Version +13 dBm (Typ 1 dB Input Compression Point +7 dBm)

## General Information

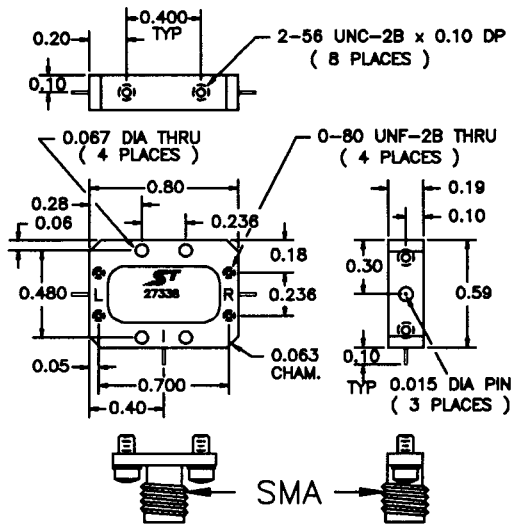
Storage Temp - 65°C to +125°C  
 Operating Temp -54°C to +100°C

Custom frequency bands, packages, and higher power levels are available.

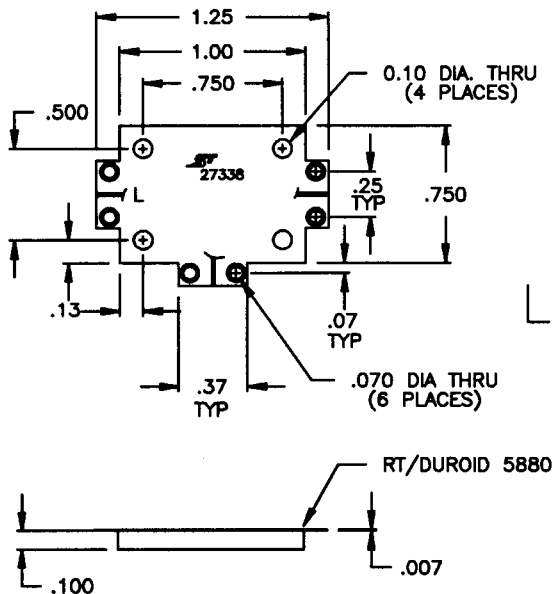
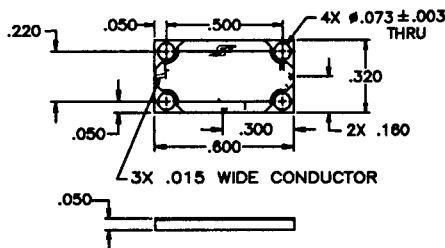
# Broadband Double Balanced Mixers

## Standard Outlines

NOTE: Other Outlines can be provided

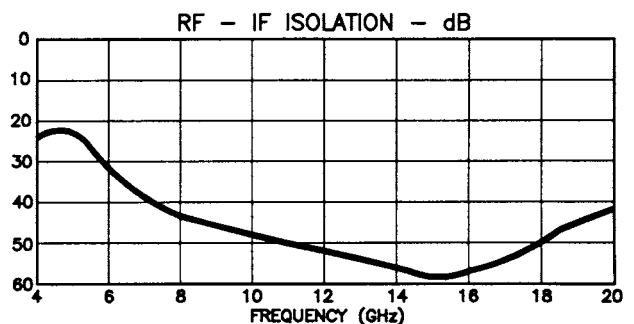
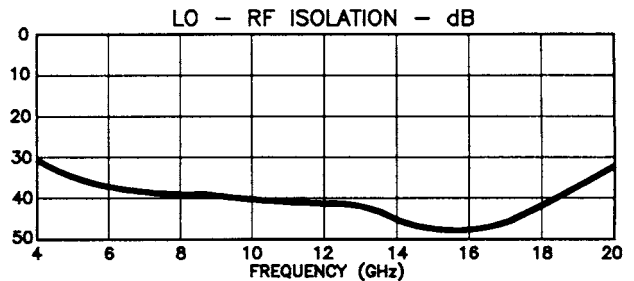
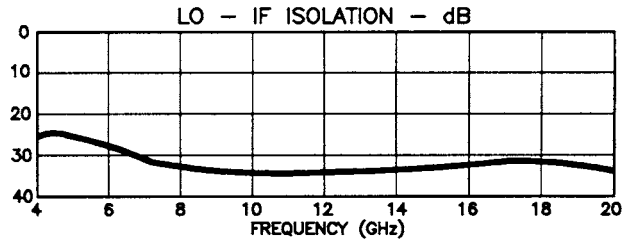
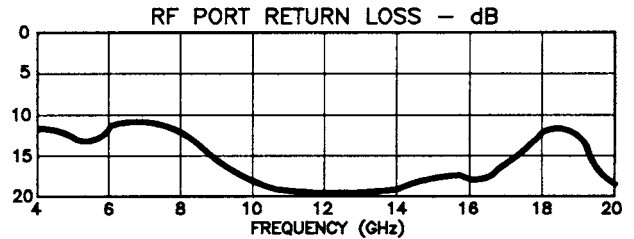
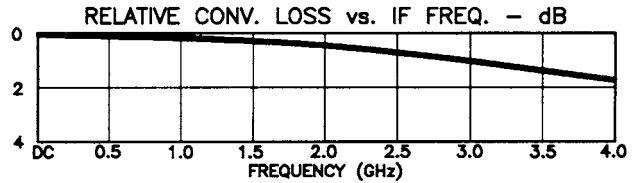
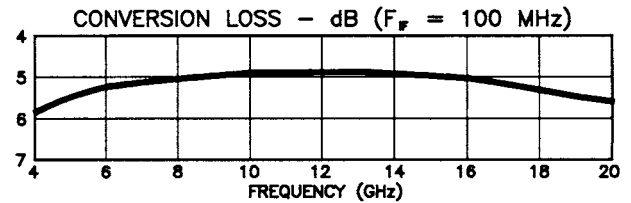


SCRIBE SERIAL  
NUMBER AND  
DATE CODE



## Typical Performance, +25°C

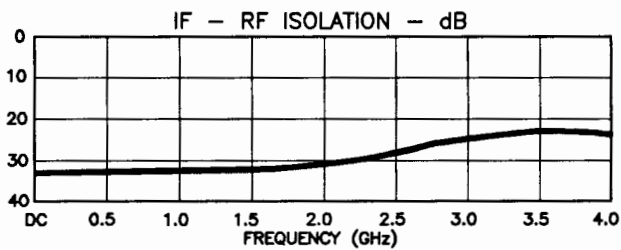
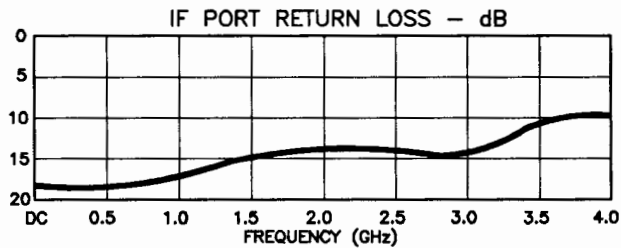
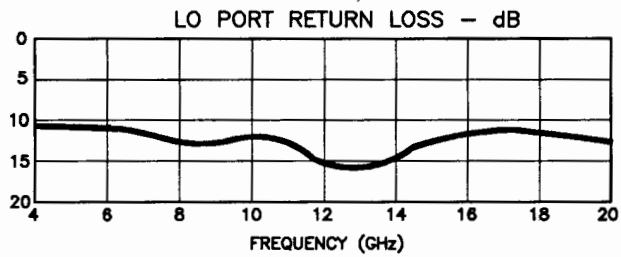
### MODEL STDB-2005



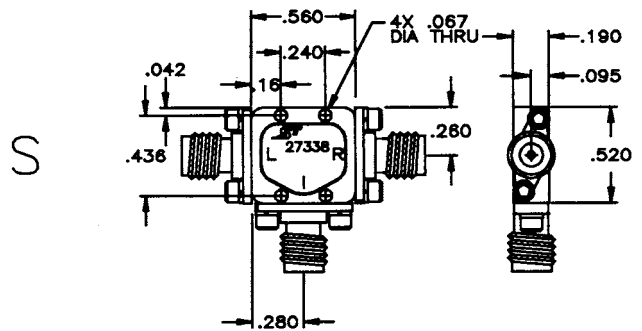
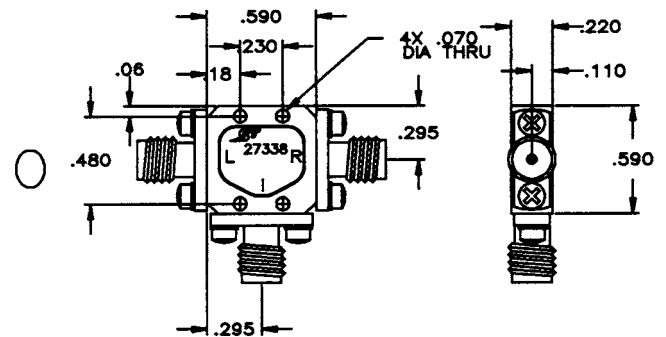
# Broadband Double Balanced Mixers

## Typical Performance +25°C

### MODEL STDB-2005



## Standard Outlines



## Typical Performance - Single Tone Intermodulation Products

TEST CONDITIONS	IM PRODUCT	IM LEVEL, DBC
RF = 6 - 10 GHz @ -10 dBm LO = 6 GHz @ -10 dBm IF = DC - 4 GHz	2L-R	32
	2R-2L	48
	3L-2R	49
	3R-3L	54
	2R-3L	51
	4L-2R	53
RF = 9.6 - 13 GHz @ -10 dBm LO = 13.5 GHz @ +10 dBm IF = 0.5 - 4 GHz	4R-4L	>70
	2L-2R	54
	3R-2L	58
	3L-3R	56
	3L-4R	>70
	4L-4R	>70
IF IN = 1.5 - 4 GHz @ -10 dBm LO = 11 GHz @ = 10 dBm RF OUT = 7 - 9 GHz	L-2I	55
	L-3I	60
	2I	50
	3I	>70
	4I	>70
	2L-4I	>70

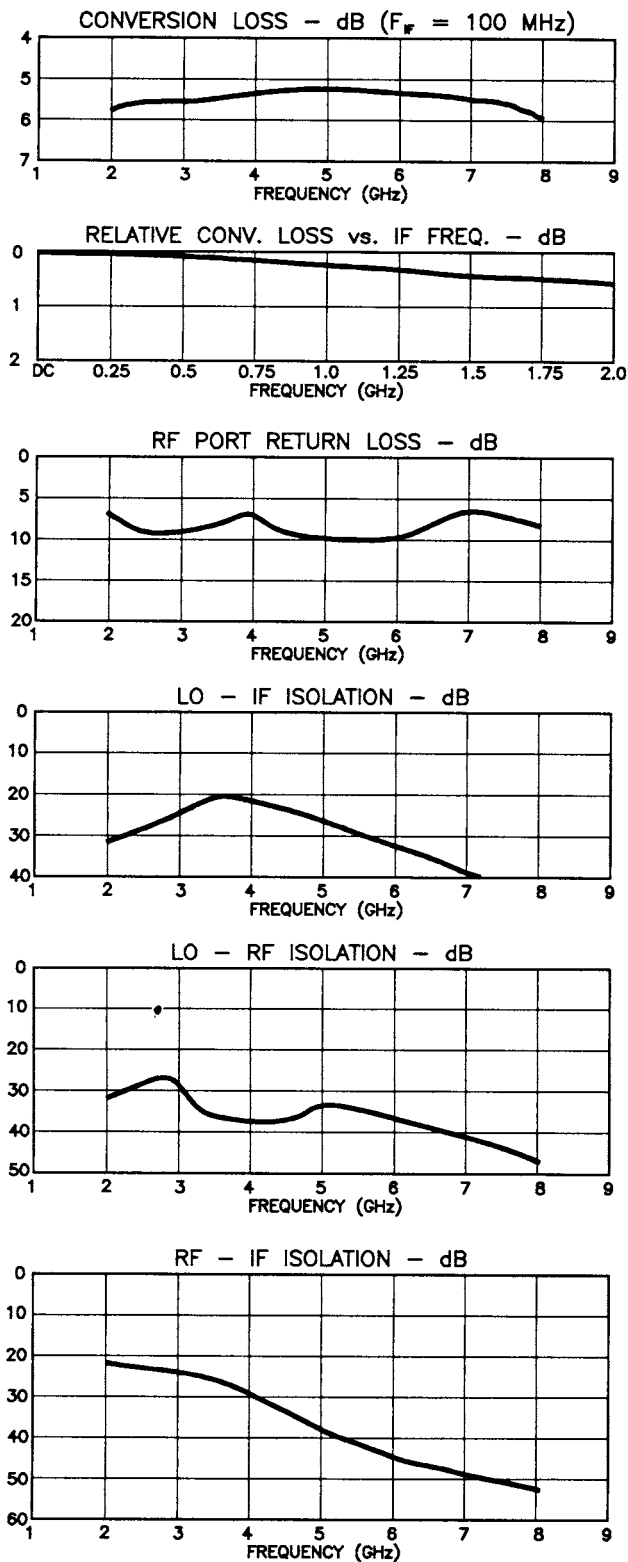
dBc = dB BELOW DESIRED OUTPUT SIGNAL LEVEL



# Broadband Double Balanced Mixers

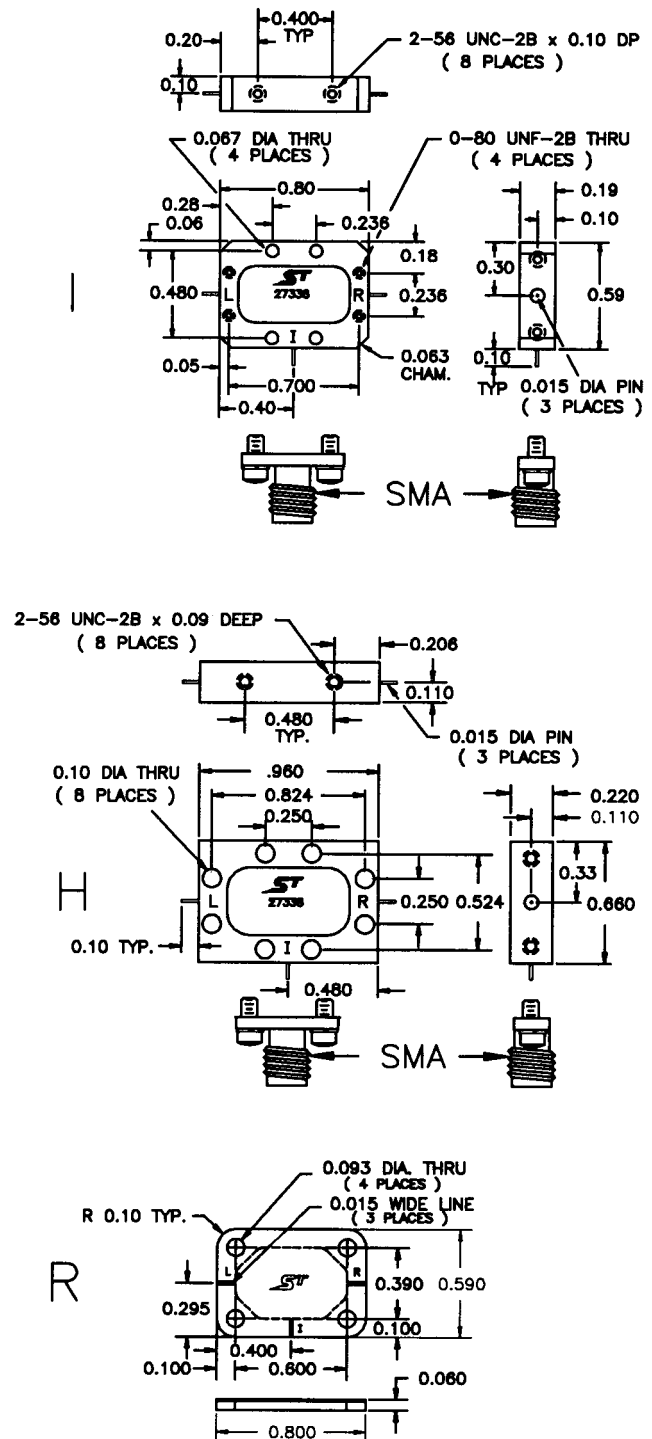
## Typical Performance, +25°C

### MODEL STDB-2006



## Standard Outlines

NOTE: Other Outlines can be provided



# Double Balanced Telecommunications Band Mixers

## FEATURES

- Low Conversion Loss
- High Isolation
- Low Cost
- Drop-In or Connectorized Hermetic Packages

## Performance / Specifications @ +25°C

RF Frequency (GHz)	Model Number	IF Frequency (GHz)	Conversion Loss (dB) (Typ./Max.)	Isolation (Typ./Min.)		Conditions LO Frequency (GHz)	Package Style
1.7 - 1.9	STDB-2101	DC - 200	6.0 / 6.5	L-R 35 / 30	L-I 30 / 25	1.7 - 1.9	R
3.7 - 4.2	STDB-2102	DC - 500	5.5 / 6.0	35 / 30	25 / 20	3.2 - 4.7	I, R
5.9 - 6.4	STDB-2103	DC - 1100	5.5 / 6.0	40 / 30	25 / 20	4.8 - 7.5	I, R, M
11.7 - 12.2	STDB-2104	DC - 2000	5.0 / 6.0	40 / 30	35 / 25	9.7 - 14.2	I, M
14.4 - 15.9	STDB-2105	DC - 2000	5.0 / 6.0	45 / 35	33 / 25	12.4 - 17.5	I, M
19.5 - 21.8	STDB-2106	DC - 2000	6.0 / 7.0	35 / 30	30 / 20	17.6 - 23.8	I, M

## Model Number Designation

Model STDB-2101 - I L C — C for SMA Female Connectors  
 — Local Oscillator Power  
 — Package Style  
 — Double Balanced Design

## General Information

Storage Temp - 65°C to +125°C  
 Operating Temp -54°C to +100°C

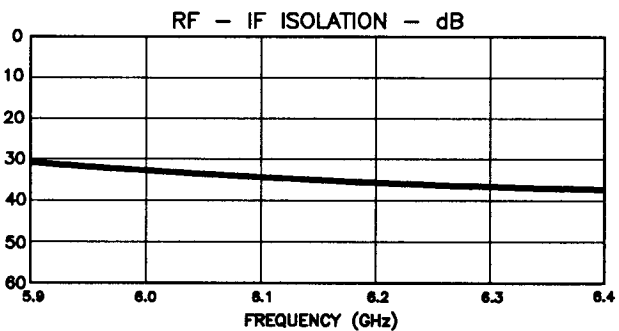
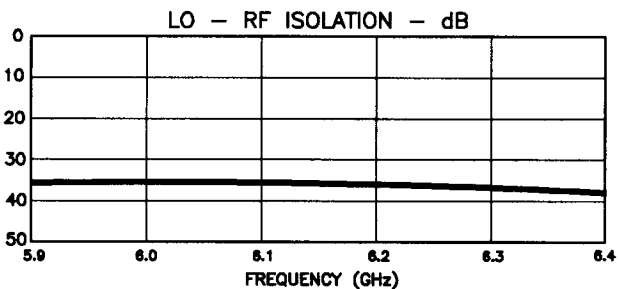
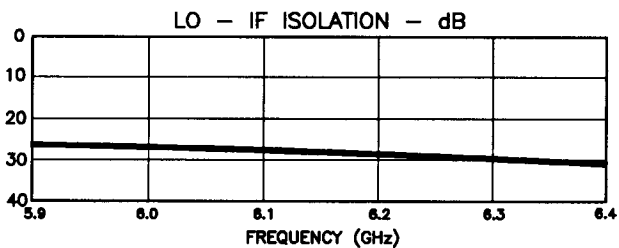
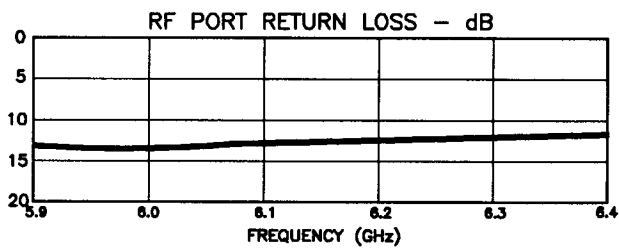
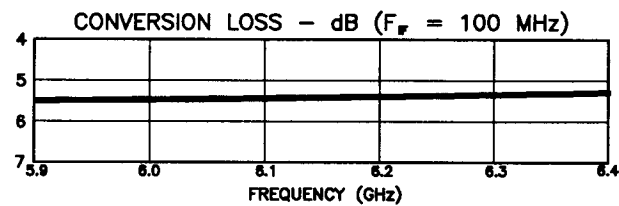
### Local Oscillator Power Options

L Version	+7 dBm	(Typ 1 dB Input Compression Point +1 dBm)
M Version	+10 dBm	(Typ 1 dB Input Compression Point +4 dBm)
H Version	+13 dBm	(Typ 1 dB Input Compression Point +7 dBm)

# Double Balanced Telecommunications Band Mixers

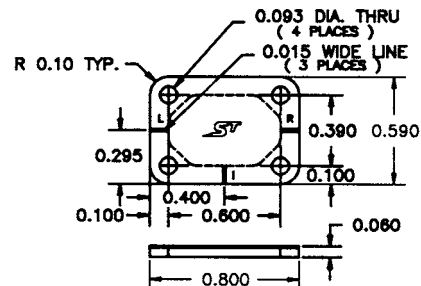
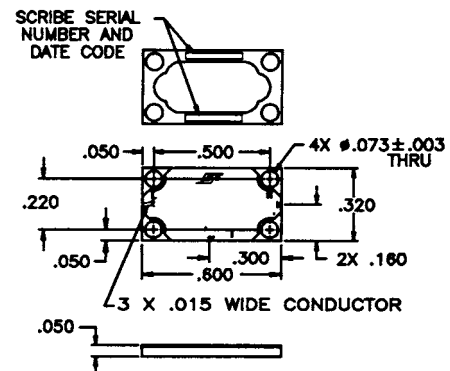
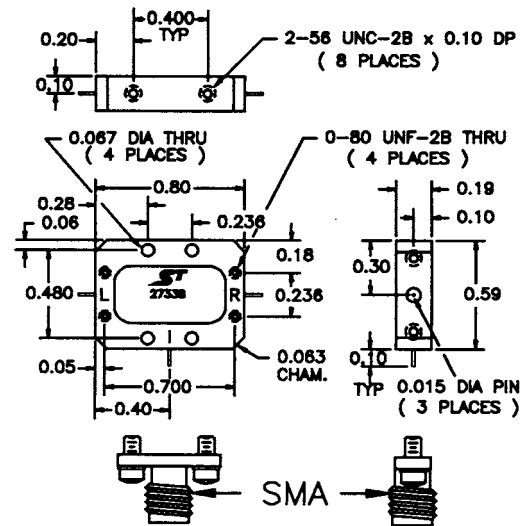
## Typical Performance, +25°C

### MODEL STDB-2103



## Standard Outlines

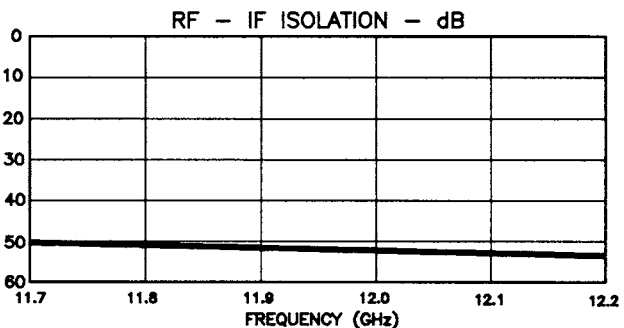
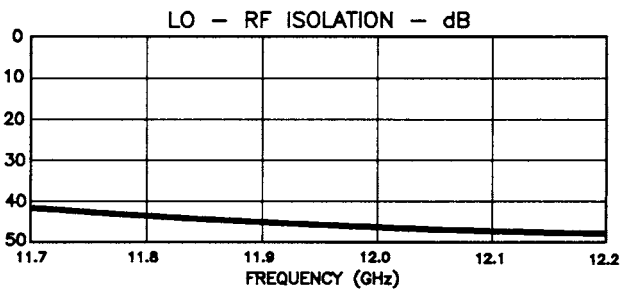
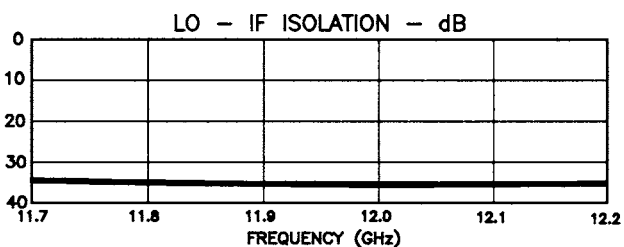
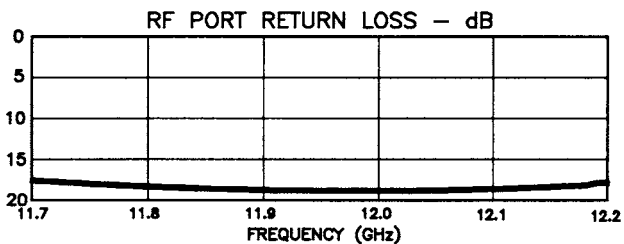
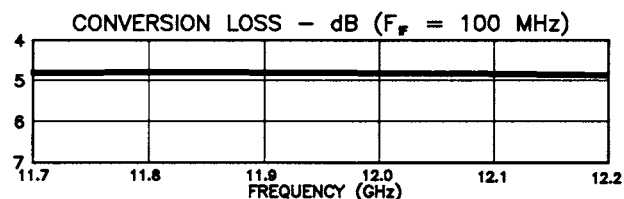
NOTE: Other Outlines can be provided



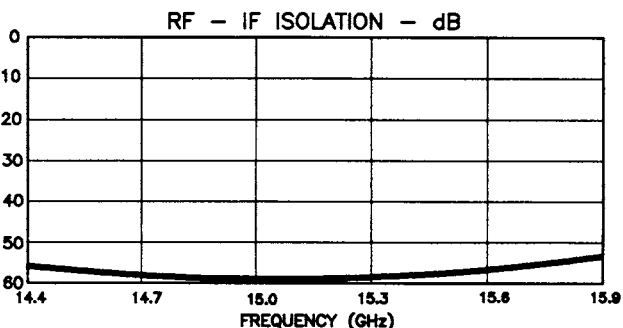
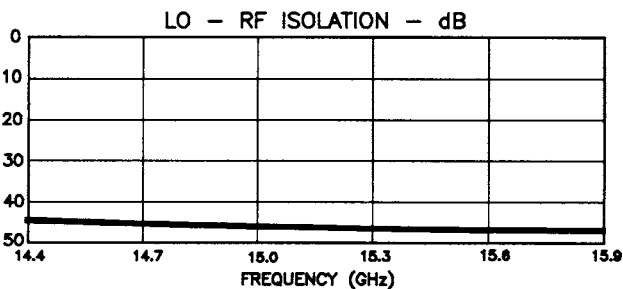
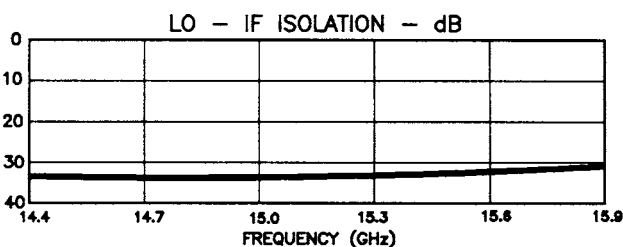
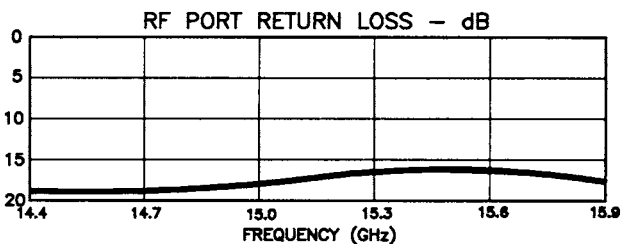
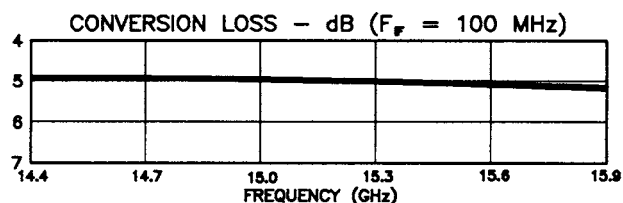
# Double Balanced Telecommunications Band Mixers

Typical Performance, +25°C

*MODEL STDB-2104*



*MODEL STDB-2105*



# Broadband Triple Balanced Mixers

## FEATURES

- Broadband Frequency Coverage
- Low Conversion Loss
- High Isolation
- Drop-In or Connectorized Hermetic Packages

## Performance / Specifications @ +25°C

RF/LO Frequency (GHz)	Model Number	IF Frequency (GHz)	Conversion Loss (dB) (Typ./Max.)	L-R	Isolation L-I (Typ./Min.)	R-I	Package Style
2.0 - 20.0	STTB-4001	1.0 - 8.0	7.5 / 9.0	25 / 20	25 / 20	25 / 20	I, H, M
6.0 - 18.0	STTB-4002	2.0 - 8.0	6.5 / 8.5	27 / 23	25 / 20	30 / 25	I, H, M, O, S
1.0 - 10.0	STTB-4003	0.005 - 4.0	6.5 / 8.0	23 / 18	25 / 20	25 / 20	I, H, M
2.0 - 20.0	STTB-4008	0.005 - 8.0	7.5 / 9.0	25 / 20	25 / 20	25 / 20	I, H, M
6.0 - 26.5	STTB-4106	4.0 - 12.0	8.0 / 11.0	25 / 20	22 / 17	22 / 17	I, O, S, M
8.0 - 32.0	STTB-4108	4.0 - 15.0	8.5 / 12.0	23 / 18	23 / 18	23 / 18	I, O, S, M

## Model Number Designation

Model STTB-4001 - I L C

- C for SMA Female Connectors
- L Local Oscillator Power
- C Package Style
- I Double Balanced Design

### Local Oscillator Power Options

L Version	+10 dBm	(Typ 1 dB Input Compression Point +5 dBm)
M Version	+15 dBm	(Typ 1 dB Input Compression Point +10 dBm)
H Version	+20 dBm	(Typ 1 dB Input Compression Point +15 dBm)

## General Information

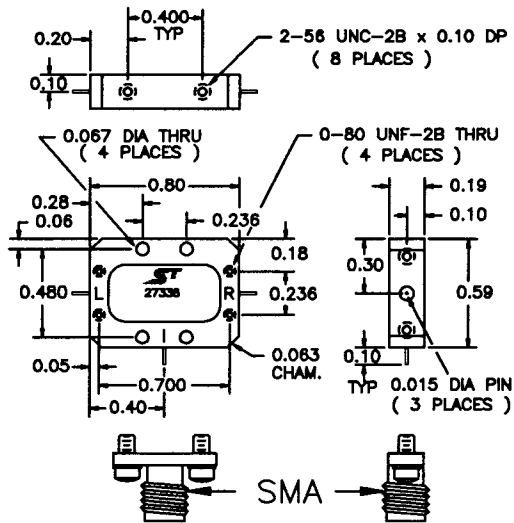
Storage Temp - 65°C to +125°C  
Operating Temp -54°C to +100°C

Custom frequency bands, packages, and higher power levels are available.

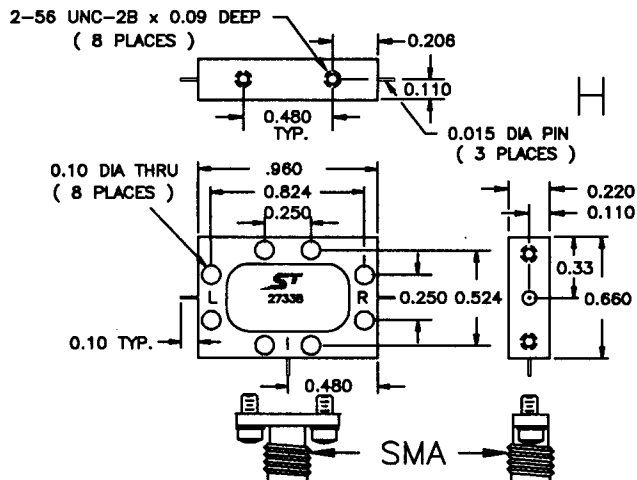
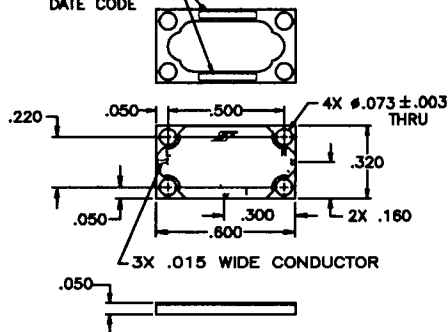
# Broadband Triple Balanced Mixers

## Standard Outlines

NOTE: Other Outlines can be provided

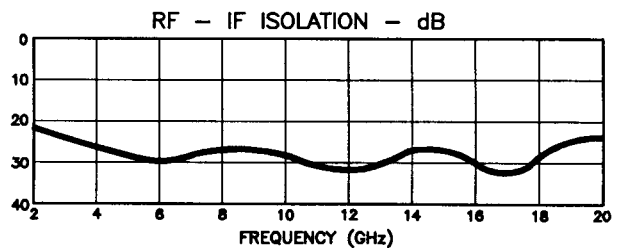
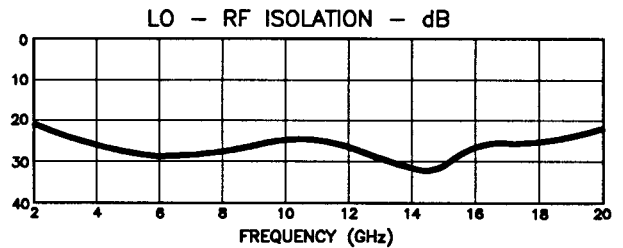
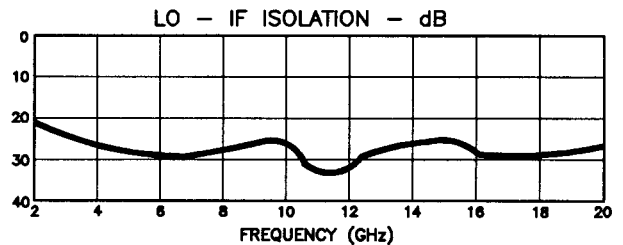
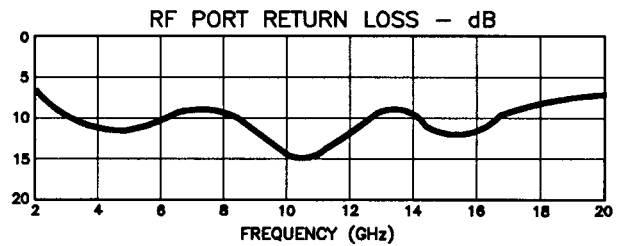
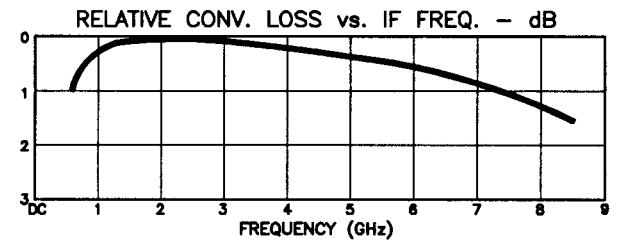
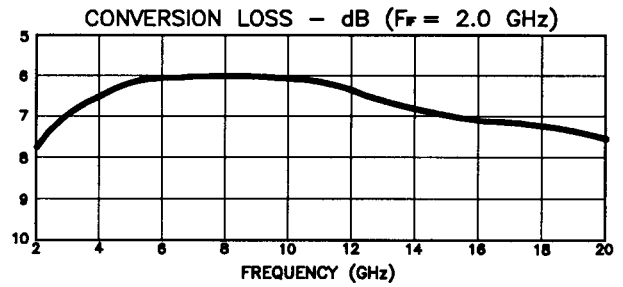


SCRIBE SERIAL NUMBER AND DATE CODE



## Typical Performance, +25°C

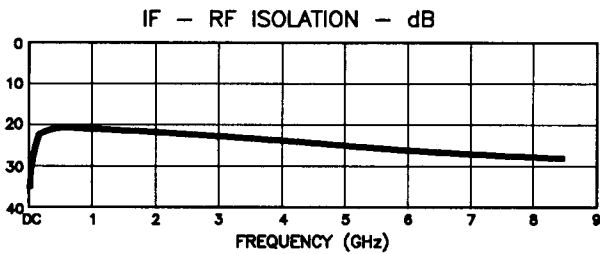
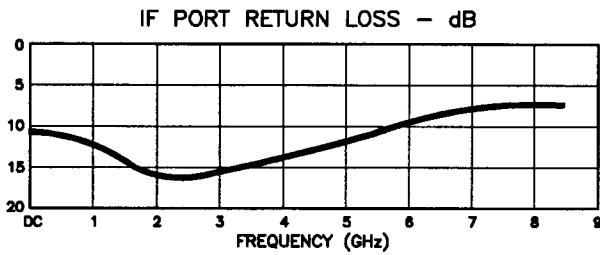
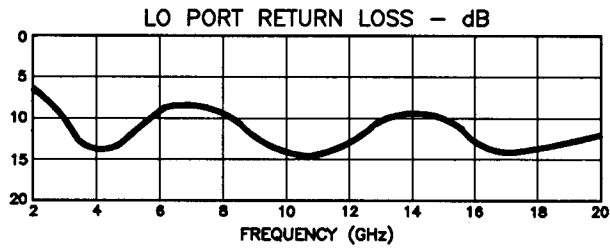
### MODEL STTB-4001



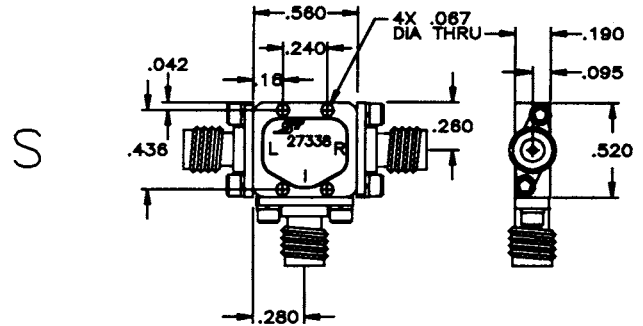
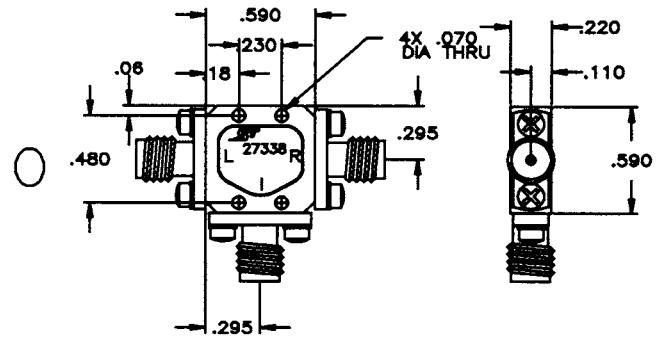
# Broadband Triple Balanced Mixers

## Typical Performance +25°C

### MODEL STTB-4001



## Standard Outlines



## Typical Performance - Single Tone Intermodulation Products

TEST CONDITIONS	IM PRODUCT	IM LEVEL, DBC
RF INPUT = 5.8 - 10.2 GHz @ +5 dBm LO INPUT = 12.0 GHz @ +20 dBm IF OUTPUT = 1.8 - 6.2 GHz	1R	32
	2R-L	48
	L-2R	49
	2L-2R	54
	3R-2L	51
	2R-3L	53
	3R-L	>70
RF INPUT = 9.8 - 14.2 GHz @ +5 dBm LO INPUT = 16.0 GHz @ +20 dBm IF OUTPUT = 1.8 - 6.2 GHz	3L-3R	>70
	2R-L	54
	2L-2R	58
	3R-2L	56
	2L-3R	>70
RF INPUT = 13.8 - 18.2 GHz @ +5 dBm LO INPUT = 12.0 GHz @ +20 dBm IF OUTPUT = 1.8 - 6.2 GHz	3L-3R	>70
	2L-R	28
	2R-2L	44
	3L-2R	40
	3R-3L	40

dBc = dB BELOW DESIRED OUTPUT SIGNAL LEVEL

# Double Balanced Very Broadband Mixers

## FEATURES

- RF/LO Frequency Range 1.0 - 40.0 GHz
- Fundamental and 3rd Harmonic Capability
- Low Conversion Loss
- High Isolation

## Performance / Specifications @ +25°C

RF/LO Frequency (GHz)	Model Number	IF Frequency (GHz)	Conversion Loss (dB) (Typ./Max.)	Isolation L-R (Typ./Min.)	L-I	Conditions Frequency (GHz)	Package Style
1.0 - 26.5	STDB-1001	DC - 700	8.0 / 10.5 7.0 / 9.0 8.0 / 10.0	30 / 20	35 / 20	1.0 - 3.0 3.0 - 20.0 20.0 - 26.5	A, B, C
3.7 - 4.2	STDB-2102	DC - 500	7.5 / 9.0 8.0 / 10.0 16.0 / 18.0 18.0 / 22.0	30 / 20	35 / 20	2.0 - 18.0 18.0 - 26.5 2.0 - 6.0 6.0 - 9.0	A, B, C
2.0 - 40.0	STDB-3002	DC - 700	8.0 / 10.0 10.0 / 12.0 17.0 / 22.0 21.0 / 26.0	30 / 20 25 / 18 30 / 20 30 / 20	35 / 20 30 / 18 35 / 20 35 / 20	2.0 - 26.5 26.5 - 40.0 2.0 - 9.0 9.0 - 13.4	A, B, C

## Model Number Designation

Model STDB-1001 - A L C — C for SMA Female Connectors  
 — L Local Oscillator Power  
 — A Package Style  
 — Double Balanced Design

## General Information

Storage Temp - 65°C to +125°C  
 Operating Temp -54°C to +100°C

### Local Oscillator Power Options

L Version +10 dBm (Typ 1 dB Input Compression Point +5 dBm)  
 M Version +15 dBm (Typ 1 dB Input Compression Point +9 dBm)  
 H Version +18 dBm (Typ 1 dB Input Compression Point +12 dBm)

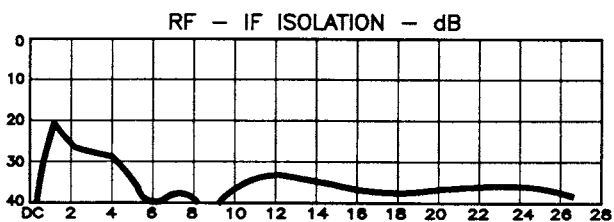
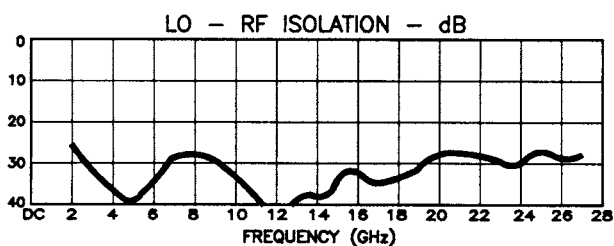
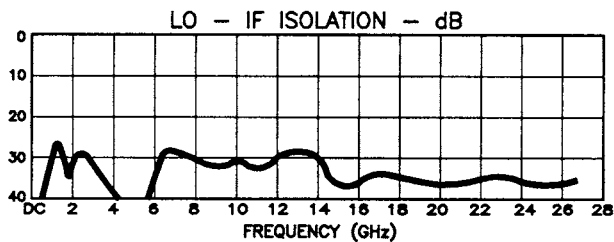
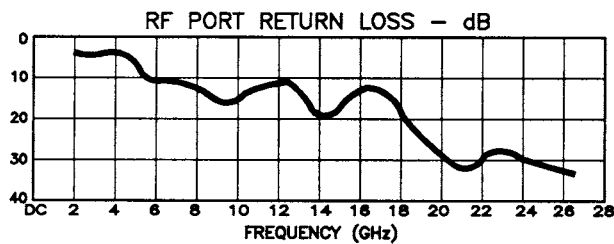
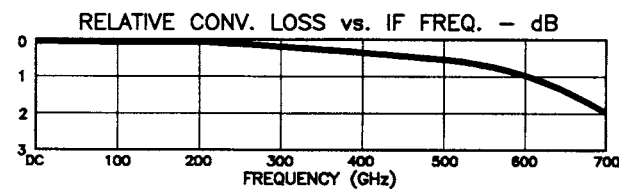
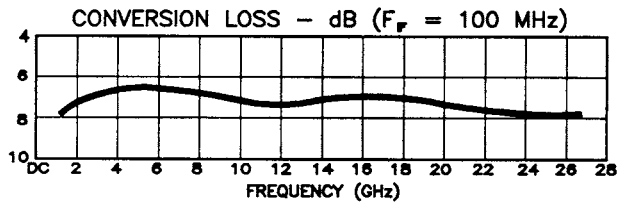
Custom frequency bands, packages, and higher power levels are available.



# Double Balanced Very Broadband Mixers

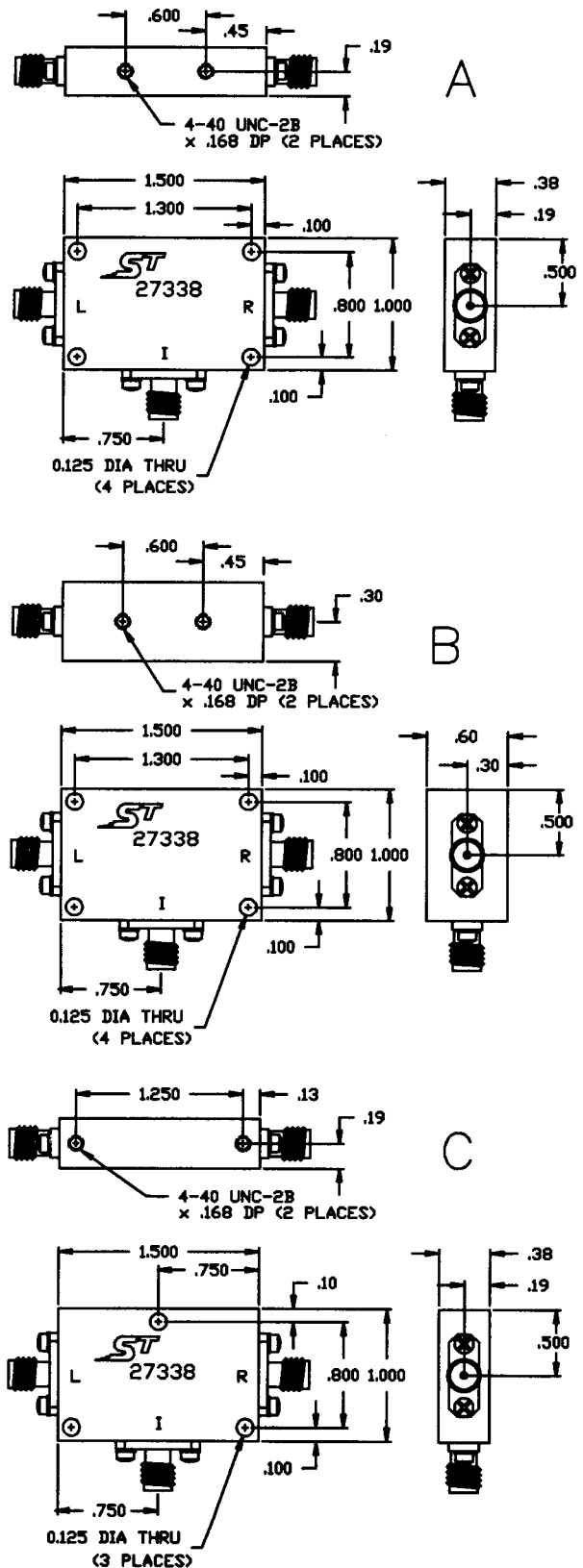
## Typical Performance, +25°C

### MODEL STDB-1001



## Standard Outlines

NOTE: Other Outlines can be provided



# Broadband Frequency Doublers

## FEATURES

- Broadband Frequency Coverage
- Low Conversion Loss
- High Fundamental and 3rd Harmonic Suppression
- Drop-In or Connectorized Hermetic Packages

## Performance / Specifications @ +25°C

RF Input Frequency (GHz)	Model Number	RF Output Frequency (GHz)	Conversion Loss (dB) (Typ./Max.)	Fundamental Isolation (Typ./Min.)	3rd Harmonic Suppression (Typ./Min.)	Package Style
3.0 - 10.0	STDD-0120	6.0 - 20.0	10.0/12.0	25 / 20	25 / 20	I, M, O
2.5 - 6.0	STDD-0122	5.0 - 12.0	11.0 / 13.0	25 / 20	30 / 25	R
9.0 - 13.0	STDD-0126	18.0 - 26.0	10.0 / 12.0	25 / 20	25 / 20	I, M
10.0 - 15.0	STDD-0128	20.0 - 30.0	12.0 / 14.0	25 / 20	25 / 20	S, O
15.0 - 20.0	STDD-0129	30.0 - 40.0	13.0 / 15.0	25 / 20	25 / 20	S, O
1.5 - 5.0	STDD-0131	3.0 - 10.0	8.5 / 10.0	25 / 20	35 / 30	R

## Model Number Designation

Model STDD-0120 - M L

Local Oscillator Power  
Package Style  
Double Balanced Design

## General Information

Storage Temp - 65°C to +125°C  
Operating Temp -54°C to +100°C

### Local Oscillator Power Options

L Version +10 to +13 dBm  
M Version +16 to +19 dBm  
H Version +21 to +24 dBm

Custom frequency bands, packages, and higher power levels are available.

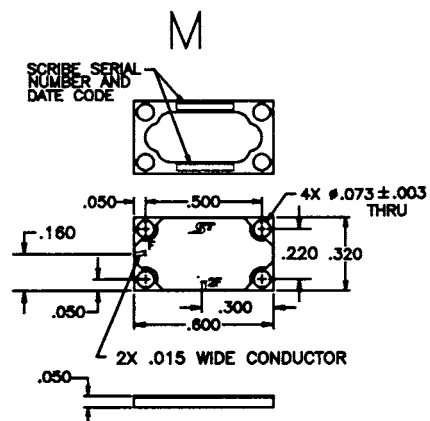
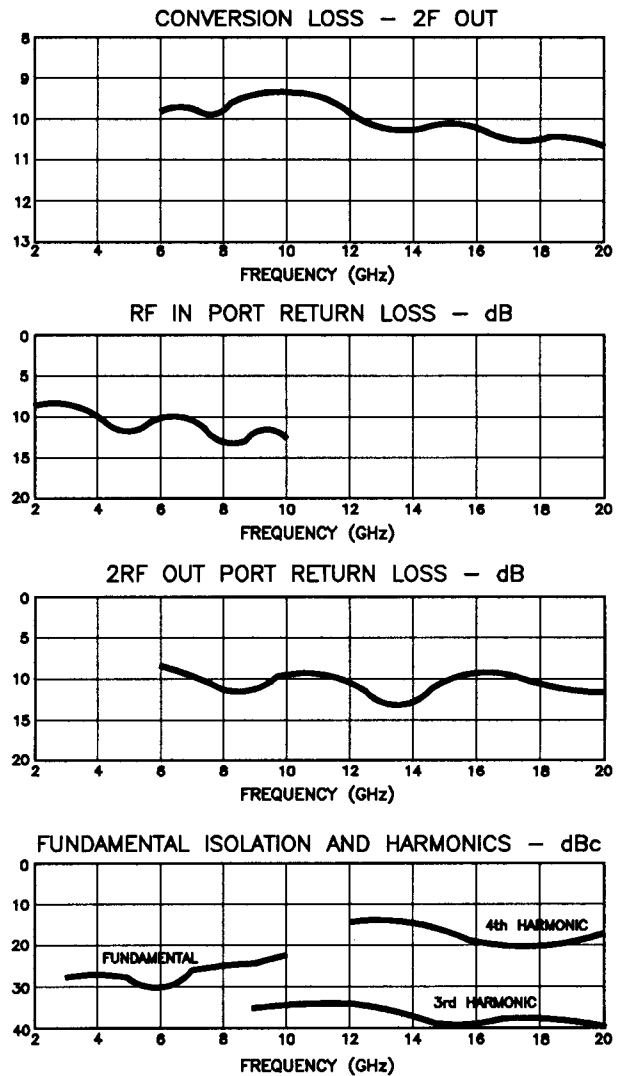
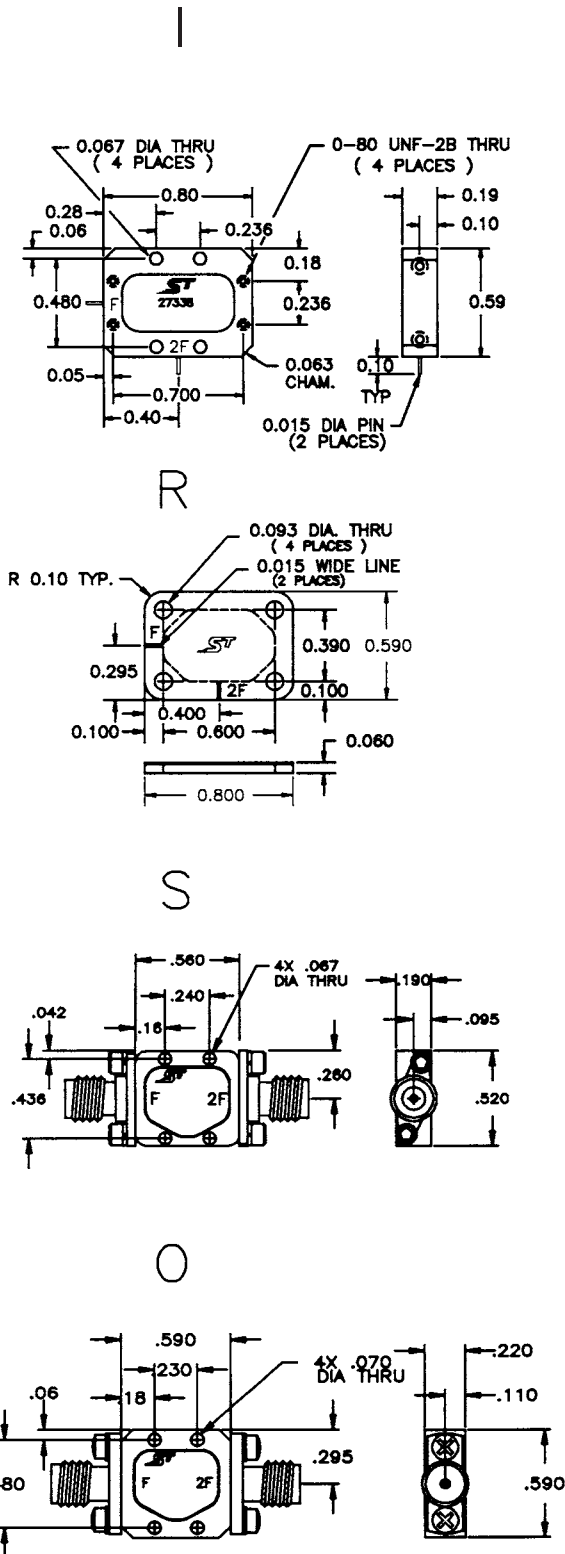
Note: "In-line" port configurations available on special order.

# Broadband Frequency Doublers

## Standard Outlines

## Typical Performance +25°C

### MODEL STDD-0120



# Planar Tunnel Diode Detectors

## Electrical Specifications

	Frequency (GHz)	ST Microwave Models	Reference Model No's. (Inactive)		Cap. (C <sub>V</sub> ) (pF) Typ.	K <sup>3</sup> (mV/mW) Min.	M Typ.	Flatness (dB) Typ.	T <sub>ss</sub> <sup>4</sup> (dBm) Typ.	VSWR <sup>3</sup> (Max.)	Outlines* Available
			Aertech, TRW, FEI Microwave Model	Innowave Model							
Standard Octave	0.5 - 1.0	STT510	DOM510D	VTN0510	100	1000	100	±0.2	-52	2.5	B2, A4, F
	1.0 - 2.0	STT102	DOM102B	VTN1020	50	1000	100	±0.2	-52	2.5	B2, A4, F
	2.0 - 4.0	STT204	DOM204B	VTN2040	20	1000	100	±0.2	-52	2.0	B2, A4, F
	4.0 - 8.0	STT408	DOM408B	VTN4080	20	700	70	±0.4	-50	2.5	B2, A4
	8.0 - 12.0	STT812	DOM812B	VTN8012	20	700	70	±0.4	-50	2.5	B2, A4
	8.0 - 16.0	STT816	DOM816B	VTN8016	20	450	35	±0.6	-48	3.0	B2, A4
	12.0 - 18.0	STT128	DOM208F	VTN1218	20	400	30	±0.5	-47	2.5	B2, A4
Multi-Octave	0.1 - 1.0	STT110	DOM110D	N/A	500	700	70	±0.5	-52	3.0	B2, A4, F
	0.5 - 2.0	STT520	DOM520D	VTN0520	100	800	80	±0.5	-52	2.0	B2, A4, F
	1.0 - 4.0	STT104	DOM104B	N/A	50	800	80	±0.5	-52	2.5	B2, A4, F
	2.0 - 6.0	STT206	N/A	VTN2060	20	800	80	±0.6	-50	3.0	B2, A4, F
	2.0 - 8.0	STT208	DOM208B	VTN2080	20	700	70	±0.7	-50	3.5	B2, A4
	6.0 - 18.0	STT618	N/A	VTN6018	20	500	35	±1.0	-48	3.5	B2, A4
	1.0 - 18.0	STT118	DOM118B	VTN1018	20	400	30	±1.25	-48	4.0	B2, A4

\* See outline drawings on pages 37 and 38

### Technical Notes on Specifications

1. The 1 dB non-square law point varies with the value of the video load. Typical values are -23 dBm for open circuit.

2. RF power input must be limited to 50 mW, CW or 3 ergs spike. On models specified above 12 GHz, power ratings are 20 mW, CW or 1 erg spike. The video input must be limited to 0.5 volt forward voltage and 10 mA reverse current. Forward voltage is defined as a negative voltage at the video connector for a forward (-) output detector. Voltage and power levels higher than those specified may result in permanent damage to the detector.

3. VSWR, K and flatness ratings are given for input powers from tangential sensitivity to -23 dBm.

4. BW = 2 MHz, NF = 2 dB @ ambient temperature.

### 5. Environmental

All specifications are at room ambient temperature.

Maximum temperature range:

Storage -55°C to +125°C

Operating -55°C to +115°C

### 6. Options Available

A. Matching — For matched requirements, consult ST Microwave.

B. Connectors — Other connectors are available. Consult your ST Microwave representative for details.

C. Output Polarity — Normal video polarity is negative; for positive polarity, add P to the end of the model number, i.e., STT510P

# Schottky Diode Detectors

## Electrical Specifications

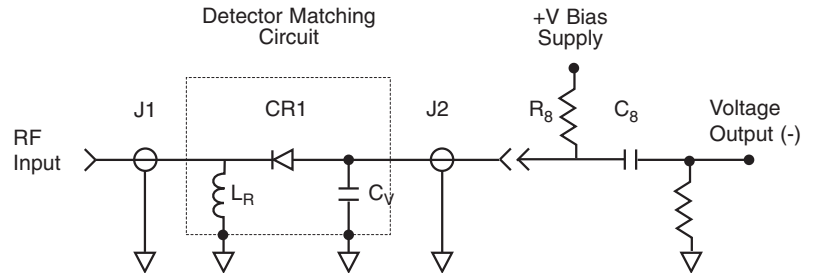
	Frequency (GHz)	ST Microwave Models	Reference Model No's. (Inactive)		Cap. (C <sub>v</sub> ) (pF) Typ.	K <sup>1.5</sup> (mV/mW) Min.	Flatness (dB) Typ.	T <sub>ss</sub> <sup>2</sup> (dBm) Typ.	Nominal Bias <sup>3</sup> (μ A)	Outlines* Available
			Aertech, TRW, FEI Microwave Model	Innowave Model						
Standard Octave	0.5 - 1.0	STS510	DOM510DS	VSN0510	100	1800	±0.75	-52	50	B2, A4, F
	1.0 - 2.0	STS102	DOM102BS	VSN1020	50	2000	±0.75	-52	100	B2, A4, F
	2.0 - 4.0	STS204	DOM204BS	VSN2040	20	2000	±0.75	-52	100	B2, A4, F
	4.0 - 8.0	STS408	DOM408BS	VSN4080	20	2000	±0.75	-52	100	B2, A4
	8.0 - 12.0	STS812	DOM812BS	VSN8012	20	1800	±0.75	-52	100	B2, A4
	8.0 - 16.0	STS816	DOM816BS	VSN8016	20	1600	±1.0	-51	100	B2, A4
	12.0 - 18.0	STS128	DOM208FS	VSN1218	20	1200	±0.75	100	100	B2, A4
Multi-Octave	0.1 - 1.0	STS110	DOM110DS	N/A	500	2000	±1.0	-52	50	B2, A4, F
	0.5 - 2.0	STS520	DOM520DS	VSN0520	100	2000	±0.75	-52	100	B2, A4, F
	1.0 - 4.0	STS104	DOM104BS	N/A	50	2000	±0.75	-52	100	B2, A4, F
	2.0 - 6.0	STS206	N/A	VSN2060	20	2000	±1.0	-51	100	B2, A4, F
	2.0 - 8.0	STS208	N/A	VSN2080	20	1800	±1.0	-51	100	B2, A4
	6.0 - 18.0	STS618	N/A	VSN6018	20	1000	±1.5	-50	100	B2, A4
	1.0 - 18.0	STS118	DOM118BS	VSN1018	20	1000	±1.5	-50	100	B2, A4

\* See outline drawings on pages 37 and 38

### Technical Notes on Specifications

1. "K" is defined as the small signal open circuit voltage sensitivity,  $V_{out} / P_{in}$ .
2. BW = 2 MHz (+25°C ambient temperature).  
Noise Figure = 3 dB.
3. May be adjusted to obtain increased sensitivity (lower bias) or reduced VSWR (higher bias). Figure 2, page 12 shows typical detector performance as a function of bias. Specifications apply for stated bias.
4. Normal video polarity is negative; for positive polarity, add P to the end of the model number, i.e., STS510P.
5. K ratings are given for input powers from tangential sensitivity to -20 dBm.

### Bias Circuit (Positive Bias, Negative Output)



# Zero Bias Schottky Detectors

## Model STZ 265, 0.01 to 26.5 GHz

### FEATURES

- Broadband, 0.01 to 26.5 GHz
- Flat Frequency Response
- Low VSWR, <2.0:1 to 26.5 GHz
- Excellent Sensitivity, 500 mV/mW
- Usable to 40 GHz

### Description / Applications

STMicrowave STZ265 low barrier Schottky diode detectors are designed for use in laboratory measurements, microwave instrumentation, and broadband EW systems. They can be used with common oscilloscopes since they do not require D.C. bias current.

Their ease of use and broadband performance make ST Microwave Zero Biased Schottky Diode Detectors very useful measurement accessories.

### Zero Bias Schottky Detector Performance Specifications @ 25°C

Specifications	Typ.	Min.	Max.
Frequency Range (GHz)		0.01 - 26.5	
Flatness (dB) <sup>1</sup> 0.01 - 18.0 GHz 18.0 - 25.4 GHz	±0.3		±0.5 ±0.75
VSWR <sup>1</sup> 0.01 - 18.0 GHz 18.0 - 26.5 GHz	1.4:1		1.5:1 2.0:1
Low Level Sensitivity (mV/mW)	500	400	

\* See outline drawings on pages 37 and 38

NOTES: 1. Measured with  $P_{in} = -20$  dBm,  $R_L = 1$  MegOhm.  
2. Output Polarity: STZ265 - Negative; STZ265P - Positive.

### FEATURES

- No Bias Required
- Metallurgically Bonded Diode
- Miniature Size
- Usable to 20 GHz and Above

### Typical Performance @ Room Ambient

Voltage Sensitivity	1500 mV/mW Min.
Flatness	±1.0 dB Max.
$T_{SS}$ (2 MHz BW)	-48 dBm Min.
Output Capacitance (Typical)	20 pF
Video Resistance	3000 ohms, Nominal
Maximum RF Power (CW)	+20 dBm
Temperature Sensitivity	±2.5 dB, -50°C to +125°C, Typ.
Output Polarity — STZ118	Negative
— STZ118P	Positive
Weight	7 grams
Outline Drawing	B2

### Environmental Ratings

Storage Temperature	-55°C to +125°C
Operating Temperature	-55°C to +125°C
Temperature Cycling	-55°C to +125°C
Shock	1500g, 0.5 msec 50g, 11 msec
Vibration	20g, 100 - 2000 Hz
Acceleration	2000g
Maximum Power	
CW	200 mW
Pulsed 1µsec / 1 KHz	1 W
Weight	7 grams

# Power Monitor Model STZ 200

## FEATURES

- Low Barrier Schottky Diode
- Low VSWR, <1.5:1 to 18 GHz
- Flat Frequency Response, .01 to 26.5 GHz
- -20 to +20 dBm Dynamic Range

## Description / Applications

The STZ200 Power Monitor is designed to operate with 0 dBm RF input and no d.c. bias. These devices provide a flat output of 150 mV nominal at +25°C, and vary by less than  $\pm 1.5$  dB over MIL-Spec temperature ranges.

Commonly used in transmitters for EW, radar, or communications, power monitors are a key element in automatic leveling (ALC) loops and in BITE circuitry which indicates system performance status. These power monitors mate directly with SMA, or with APC-3.5 connectors.

## Power Monitor Performance

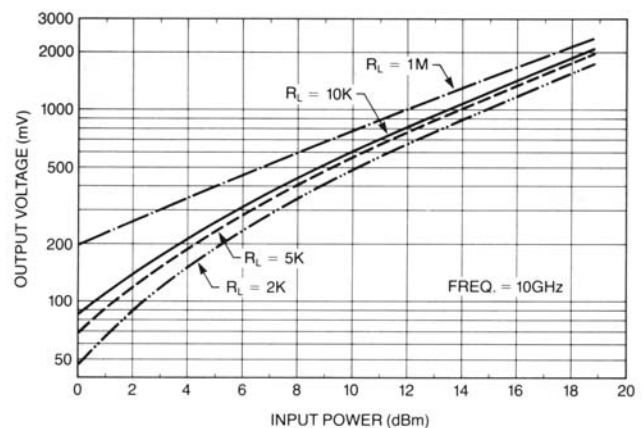
### Specifications @ 25°C, $P_{in} = 0$ dBm

Specifications	Typ.	Min.	Max.
Frequency Range (GHz)		0.01 - 26.5	
VSWR <sup>1,2</sup> 0.01 - 26.5 GHz			2.0:1
Output Voltage 1,3 (mV) 0.01 - 18.0 GHz	200	100	
Output Polarity STZ200 – Negative STZ200P – Positive			

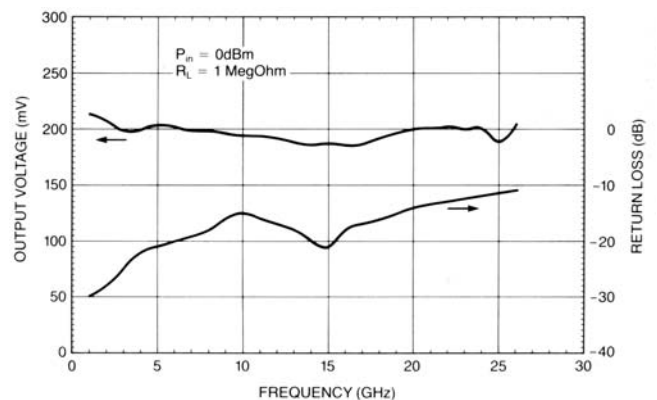
\* See outline drawings on pages 37 and 38

- NOTES: 1. Measured with  $P_{in} = 0$  dBm,  $R_L = 1$  MegOhm.  
 2. Typical VSWR is 1.5:1 from 10 MHz to 20 GHz.  
 2. Minimum guaranteed output from -55°C to +125°C.

## Typical Transfer Curve



## Output Voltage & Return Loss vs. Frequency



## PIN-PIN Limiter STL 140

### FEATURES

- 1 Watt CW Capability
- Wide Bandwidth, 2 to 18 GHz
- Low VSWR < 2.0:1
- Internal D.C. Return
- Low Insertion Loss, < 2.2 dB

### Description / Applications

The STL140 limiter is a passive, broadband integrated assembly designed for receiver protection and power leveling applications. This is a PIN-PIN design with internal D.C. return. Metallurgical bonds are used to provide the reliability required by the most severe environments.

Systems applications include protection of transistor and FET amplifiers, mixers, and detectors in ECM, telecommunications and radar systems.

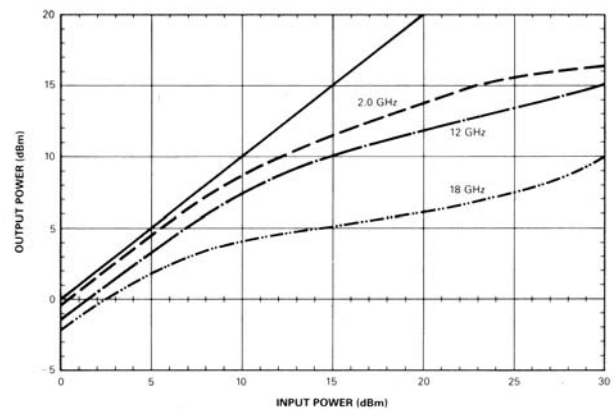
### STL140 Performance Specifications @ 25°C

	Typ.	Min.
Frequency Range (GHz)	2.0 - 18.0	
Insertion Loss (dB) <sup>1</sup>		
2.0 - 10.0 GHz	0.8	1.2
10.0 - 18.0 GHz	1.6	2.2
VSWR <sup>1</sup>		
2.0 - 18.0 GHz	1.8:1	2.0:1
RF Leakage (dBm) <sup>2</sup>	+15	+19
Limiting Threshold (dBm)	+8	—
Recovery Time <sup>3</sup> (nSec)	60	—
Power Handling <sup>4</sup>		
1W, CW		
50 W, 1μSec, 1 kHz PRF		

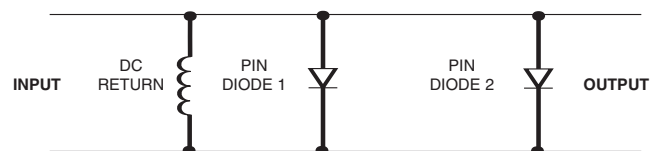
\* See outline drawings on pages 37 and 38

- NOTES: 1. Measured at 0 dBm input.  
 2. Leakage measured with 1 W, CW input.  
 3. Measured with 50 W, 1μSec, 1 kHz pulses.  
 4. Derate from +25°C to 20% at +125°C.

### Typical Transfer Curve



### Circuit Diagram of PIN-PIN Limiter





## PIN-Schottky Limiter STL 301

### FEATURES

- 1 Watt CW Capability
- Wide Bandwidth, 0.5 to 18 GHz
- Low VSWR < 2.2:1
- Internal D.C. Blocks

### Description / Applications

The STL301 limiter is a passive, broadband integrated assembly designed for receiver protection and power leveling applications. This is a PIN-Schottky design with built-in D.C. blocking capacitors. Metallurgical bonds are used to provide the reliability required by the most severe environments.

Systems applications include protection of transistor and FET amplifiers, mixers, and detectors in ECM, telecommunications and radar systems.



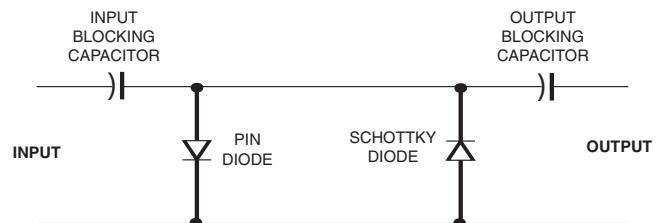
### STL301 Performance Specifications @ 25°C

	Typ.	Min.
Frequency Range (GHz)	0.5 - 18.0	
Insertion Loss (dB) <sup>1</sup>		
0.5 - 8.0 GHz	1.25	1.50
8.0 - 18.0 GHz	1.50	2.30
VSWR <sup>1</sup>		
0.5 - 1.0 GHz	2.0:1	2.2:1
1.0 - 18.0 GHz	1.8:1	2.0:1
RF Leakage (dBm) <sup>2</sup>	+14	+16.5
Limiting Threshold (dBm)	+5	—
Recovery Time <sup>3</sup> (μSec)	3.5	—
Power Handling <sup>4</sup>		
1W, CW		
50 W, 1μSec, 1 kHz PRF		

\* See outline drawings on pages 37 and 38

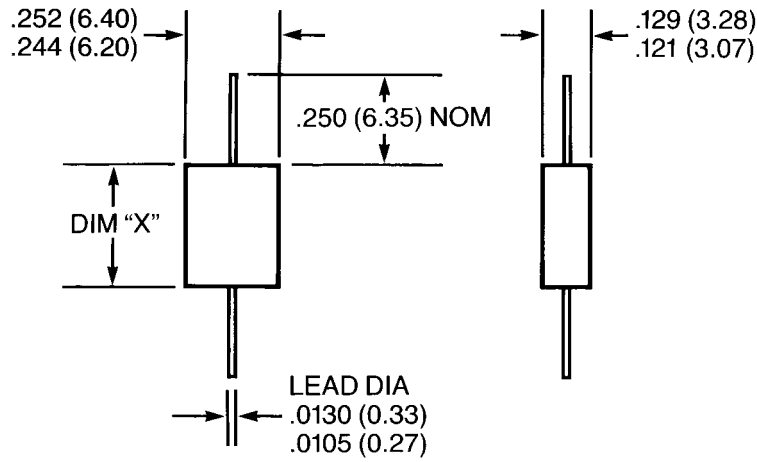
- NOTES: 1. Measured at -10 dBm input.  
 2. Leakage measured with 1 W, CW input.  
 3. Measured with 50 W, 1μSec, 1 kHz pulses.  
 4. Derate from +25°C to 20% at +125°C.

### Circuit Diagram of PIN-PIN Limiter



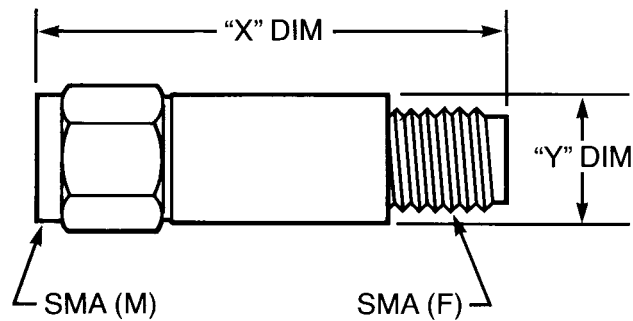
# Outline Drawings

## Case Style “A”



DASH NO.	DIM “X” – INCHES / MILLIMETER			
	MINIMUM		MAXIMUM	
	IN	MM	IN	MM
A4	.327	8.31	.333	8.46
A5	.526	13.39	.533	13.54

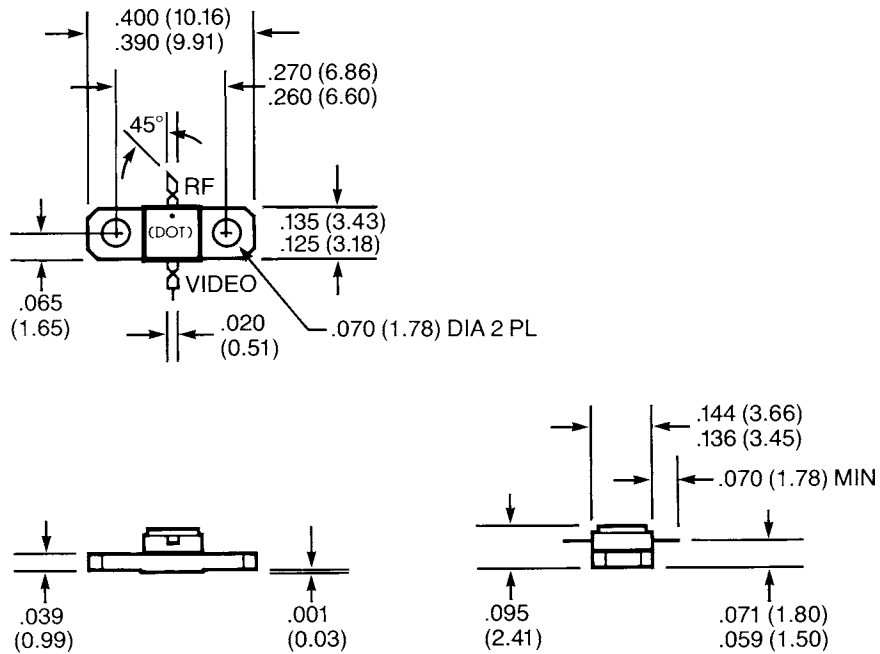
## Case Style “B”



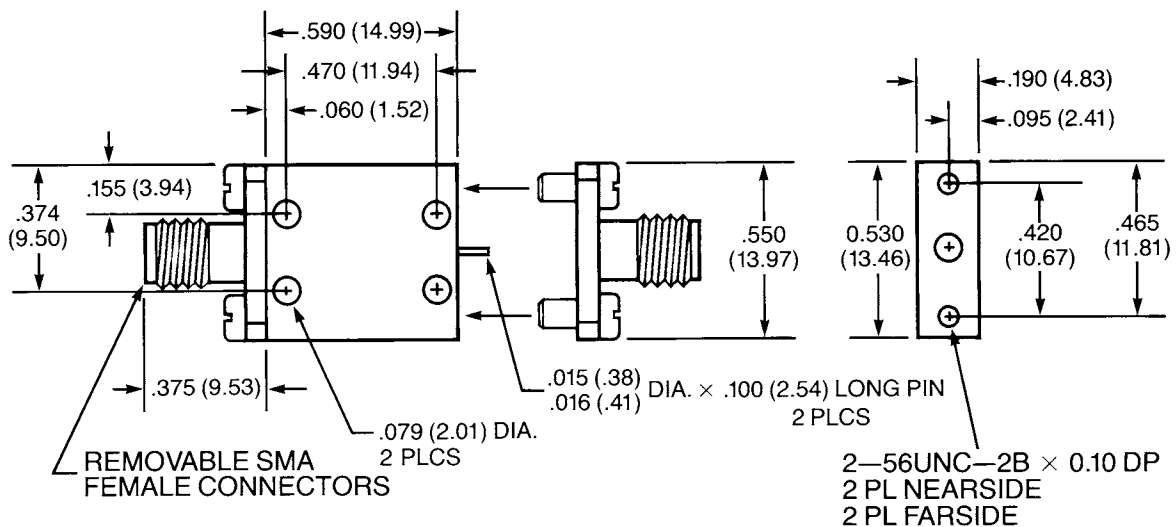
DASH NO.	DIM “X” – INCHES / MILLIMETER				DIM “Y” – INCHES / MILLIMETER			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	IN	MM	IN	MM	IN	MM	IN	MM
B1	1.01	25.65	1.05	26.67	1.01	25.65	1.05	26.67
B2	1.14	28.96	1.18	29.97	1.14	28.96	1.18	29.97
B3	1.29	32.77	1.33	33.78	1.29	32.77	1.33	33.78

# Outline Drawings

## Case Style "F"



## Case Style "R"



### NOTE:

1. OPTIONAL SPACER FOR CONNECTOR GROUND CLEARANCE CAN BE PROVIDED UPON REQUEST.

DIMENSIONS = INCHES  
( ) = MILLIMETERS

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