

TECH+PLUS

MICROWAVE Inc.



About TechPlus Microwave

FOUNDED IN 2012 BY EXPERTS IN FILTER DESIGN AND MANUFACTURING, TECHPLUS MICROWAVE, INC. IS A STATE-OF-THE-ART, INNOVATIVE, MICROWAVE RF FILTER PROVIDER SPECIALIZING IN COST-EFFECTIVE, HIGH QUALITY FILTERS AND ASSEMBLIES.

WE PROUDLY SPECIALIZE IN UNIQUE AND CHALLENGING DESIGNS TO MEET OUR CUSTOMERS NEEDS. OUR CAPABILITIES INCLUDE SMALL AND LARGE PRODUCTION RUNS UTILIZING STATE-OF-THE-ART TEST EQUIPMENT.

TECHPLUS MICROWAVE MANUFACTURES FOR A WIDE RANGE OF WIRELESS PROTOCOLS, AS WELL AS SPREAD SPECTRUM FILTERS AND DUPLEXERS FOR POINT TO POINT, POINT TO MULTIPOINT AND LMDS TO 40 GHZ.

FAST DESIGN TIMES TO MEET YOUR QUICK-RESPONSE NEEDS.

TECHPLUS MICROWAVE IS PREPARED TO PROVIDE A TIMELY RESPONSE TO REQUESTS AND SPECIFICATIONS.

STATE-OF-THE-ART CAD/CAM SOFTWARE CAPABILITIES.

OUR WIDE RANGE OF PRODUCTS INCLUDE BOTH CUSTOM AND CATALOG DESIGNS.

OUR EXPERIENCED ENGINEERING TEAM WILL ENSURE YOUR CUSTOM DESIGNED PRODUCT WILL MEET YOUR SPECIFIC PROGRAM REQUIREMENTS.

TECHPLUS MICROWAVE HAS PROVEN MANUFACTURING TECHNIQUES AND STRONG COMMITMENT TO CUSTOMER SATISFACTION,

YOUR NEEDS ARE ALWAYS OUR #1 PRIORITY. WE WELCOME THE OPPORTUNITY TO ADDRESS YOUR SPECIFIC REQUIREMENT.

Quality Assurance

◇ **"In terms of importance, quality must be rated above schedule and price."**

TechPlus Microwave has implemented a Quality Management system in line with ISO 9001:2015. It is our policy to supply products that conform to all established requirements and expectations of our customers. We are committed to continuous quality improvement. Everyone shares the responsibility for ensuring the quality of TechPlus Microwave's products, and to help assure the success of this policy, the following functions are assigned;

◇ **Warranty**

Each product is warranted to be free from defects for a period of 3 years

◇ **Quality Assurance - Quality Standards.**

The Quality organization's first responsibility is to protect against the consequences of shipping product that fails to meet the customers' requirements. Quality department assists all departments and individuals in the accomplishment of this policy by providing, as required, Quality education, Quality performance measurements and Quality improvement directions.

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BAND REJECT (NOTCH) FILTERS

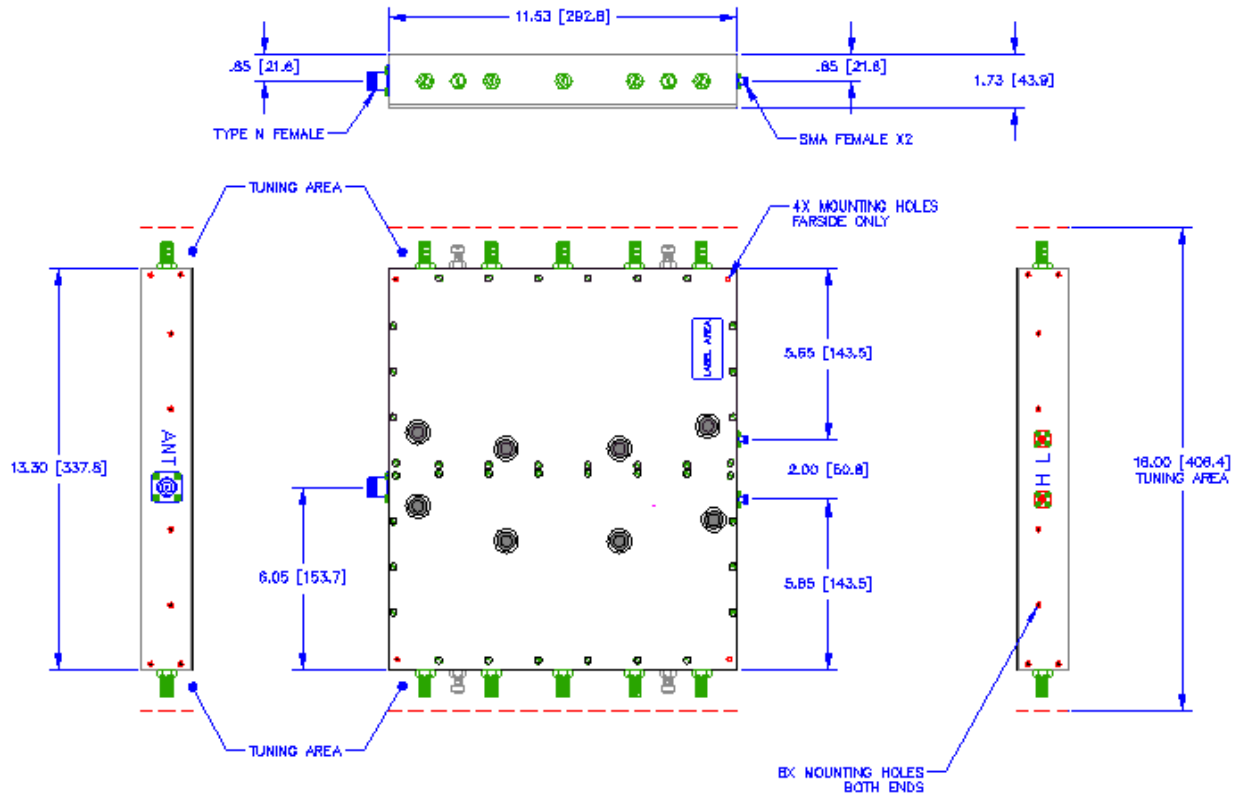
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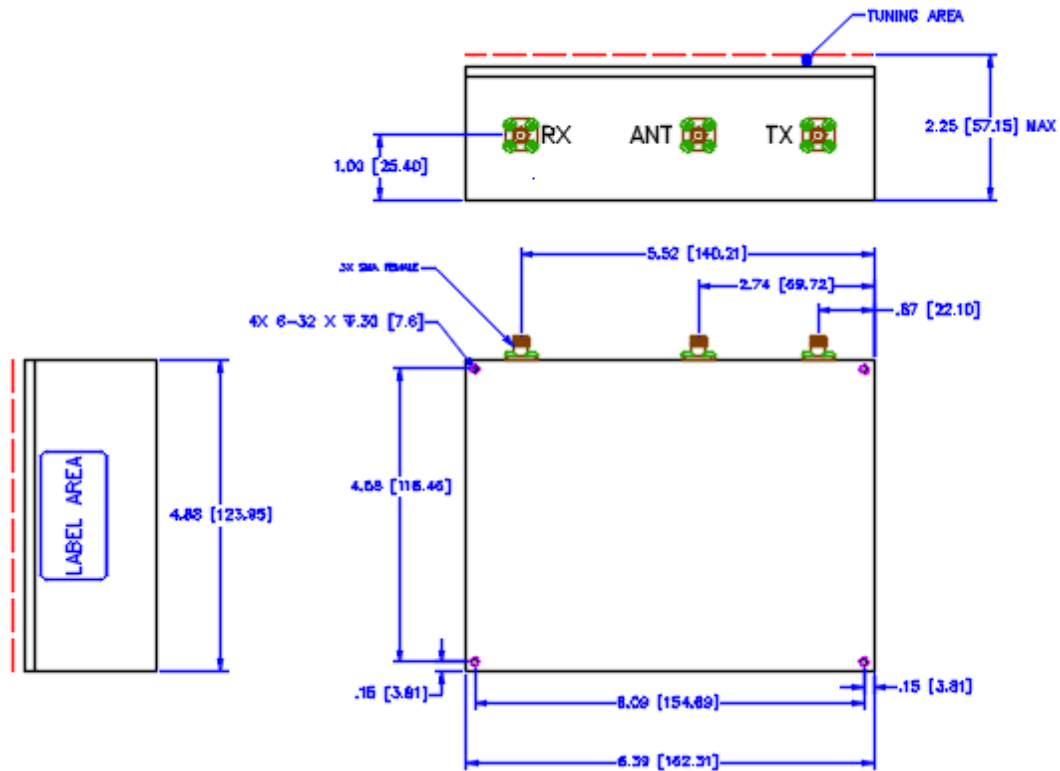
VHF DUPLEXER - TM1003



PARAMETER	SPECIFICATION	
PASSBAND RANGE	135 – 172 MHz (RX)	140—175 MHz (TX)
BANDWIDTH @ Fc	500 KHz	500 KHz
T/R SPACING	4.5 MHz min. - 15 MHz max.	
INSERTION LOSS	3.5 dB max.	3.5 dB max.
RETURN LOSS	20 dB min.	20 dB min.
REJECTION	80 dB min. @ Fc ± 140 MHz	80 dB min. @ Fc ± 140 MHz
	50 dB min. @ Fc ± 20 MHz	50 dB min. @ Fc ± 20 MHz
ISOLATION	80 dB min.	
POWER	20W PIP	
OPERATING TEMPERATURE	-10° to +70°C	
CONNECTORS	Type N female - SMA female	

AMPS FULLBAND DUPLEXER - TM1066

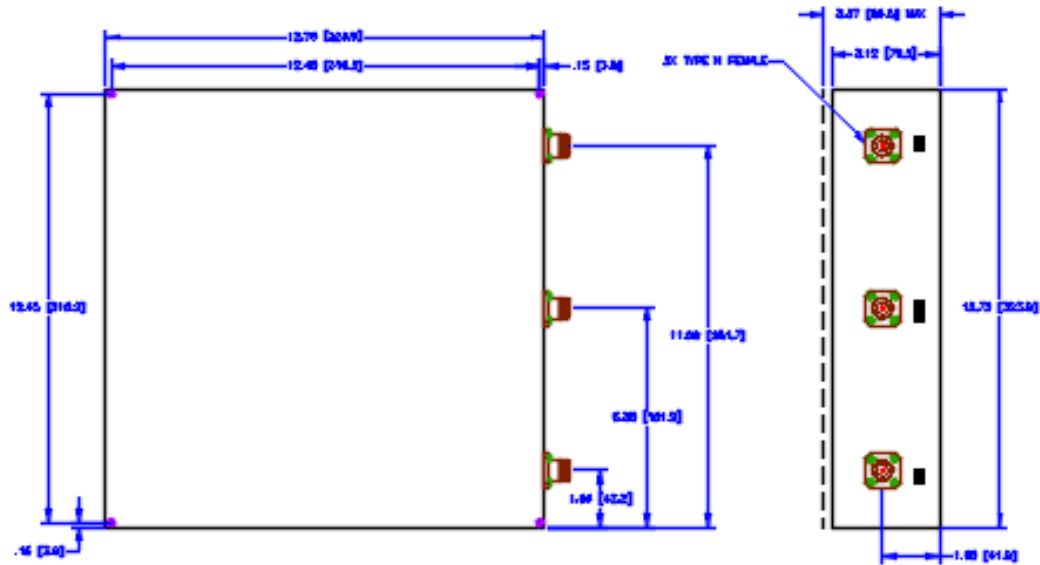
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	824 – 849 MHz (RX)	869–894 MHz (TX)
INSERTION LOSS	1.0 dB max.	1.0 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	75 dB min. DC — 794 MHz	75 dB min. DC — 849 MHz
	75 dB min. 869— 3000 MHz	75 dB min. 924— 3000 MHz
ISOLATION	75 dB min.	
POWER	150W CW, 1500W PIP	
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	SMA, female	

AMPS A BAND DUPLEXER - TM1004

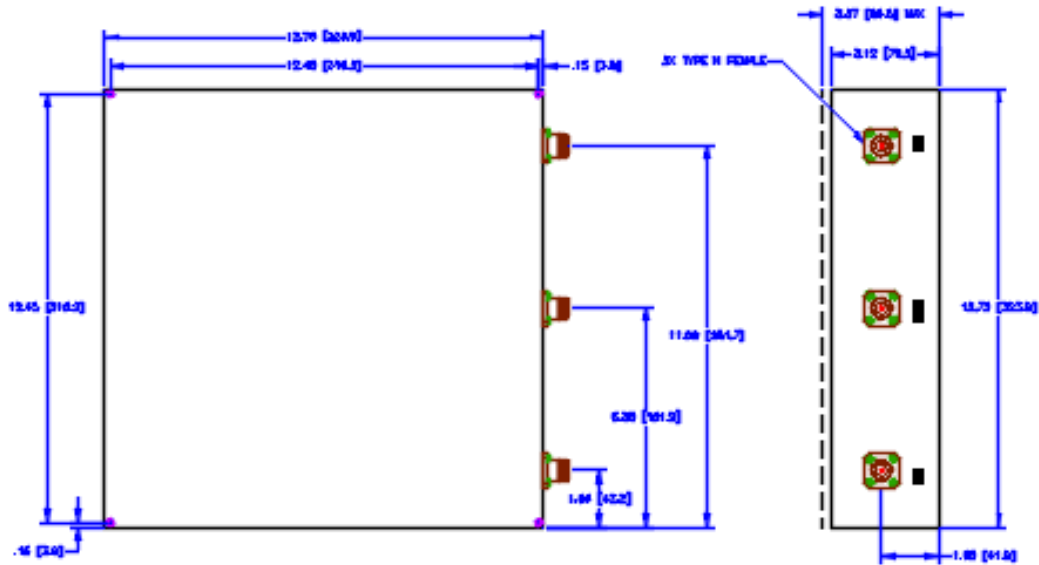
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	824 – 846.5 MHz (RX)	869—891.5 MHz (TX)
INSERTION LOSS	1.5 dB max.	0.5 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	90 dB min. DC — 800 MHz	90 dB min. DC — 849 MHz
	30 dB min. 800— 820 MHz	30 dB min. 898— 925 MHz
	30 dB min. 854— 869 MHz	70 dB min. 925— 2000 MHz
	90 dB min. 869— 2000 MHz	
ISOLATION	90 dB min.	90 dB min.
POWER		750W CW, 12.5 kW PIP
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	Type N, female	

AMPS B BAND DUPLEXER - TM1059

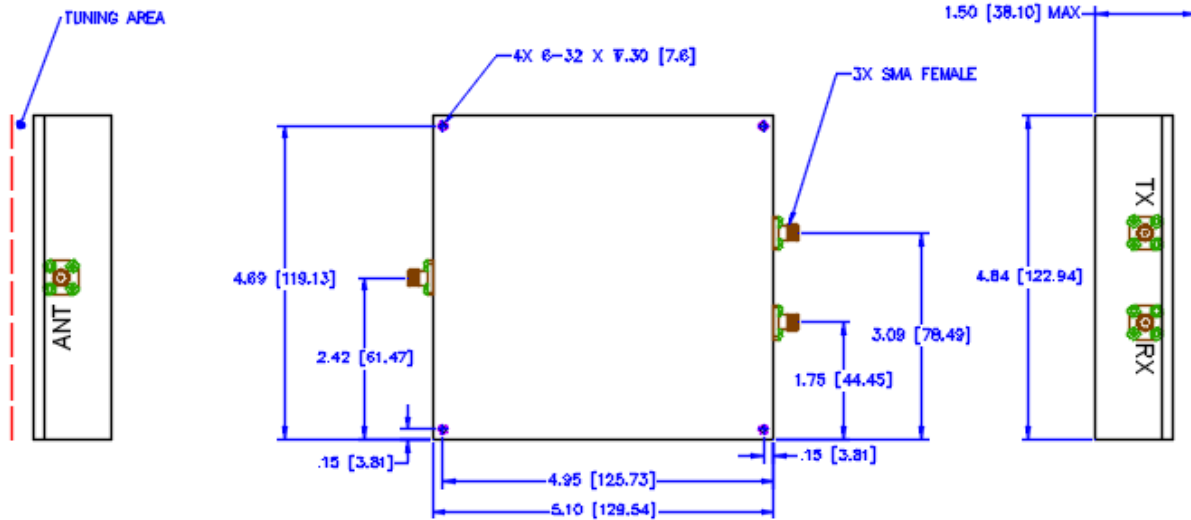
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	835 – 849 MHz (RX)	880—894 MHz (TX)
INSERTION LOSS	1.7 dB max.	0.7 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	90 dB min. DC — 804 MHz 40 dB min. 804— 830 MHz 40 dB min. 854— 880 MHz 90 dB min. 880— 2000 MHz	90 dB min. DC — 849 MHz 70 dB min. 925— 2000 MHz
ISOLATION	90 dB min.	90 dB min.
POWER		750W CW, 12.5 kW PIP
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	Type N, female	

MMDS DUPLEXER - TM1057

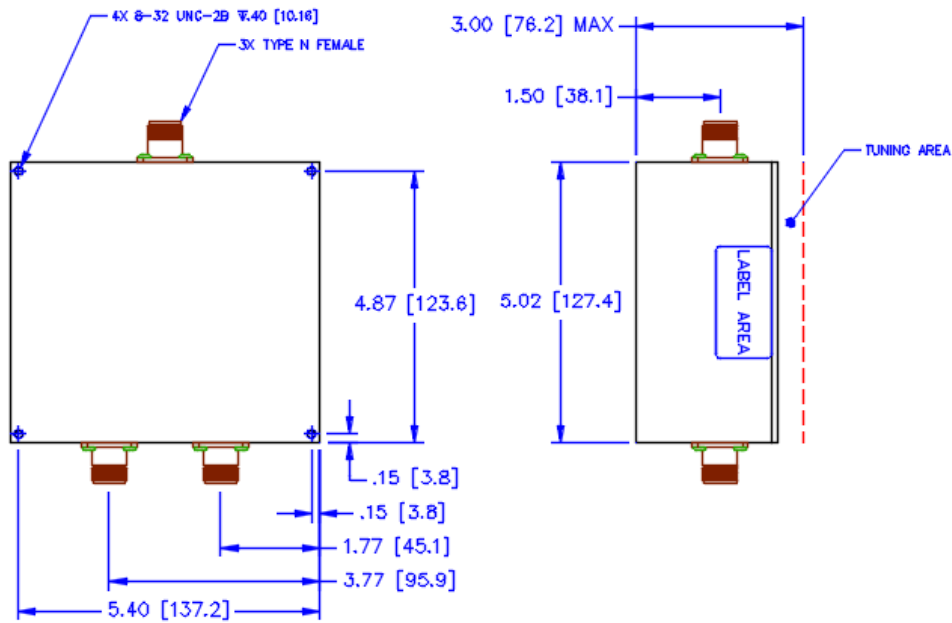
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	2500 – 2548 MHz (RX)	2596—2644 MHz (TX)
INSERTION LOSS	0.7 dB max.	0.7 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	70 dB min. DC — 2450 MHz 75 dB min. 2596 — 5500 MHz	75 dB min. DC — 2548 MHz 70 dB min. 2692 — 2645 MHz
ISOLATION	75 dB min.	75 dB min.
POWER		25W CW, 800W PIP
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	SMA, female	

EGSM DUPLEXER - TM1081

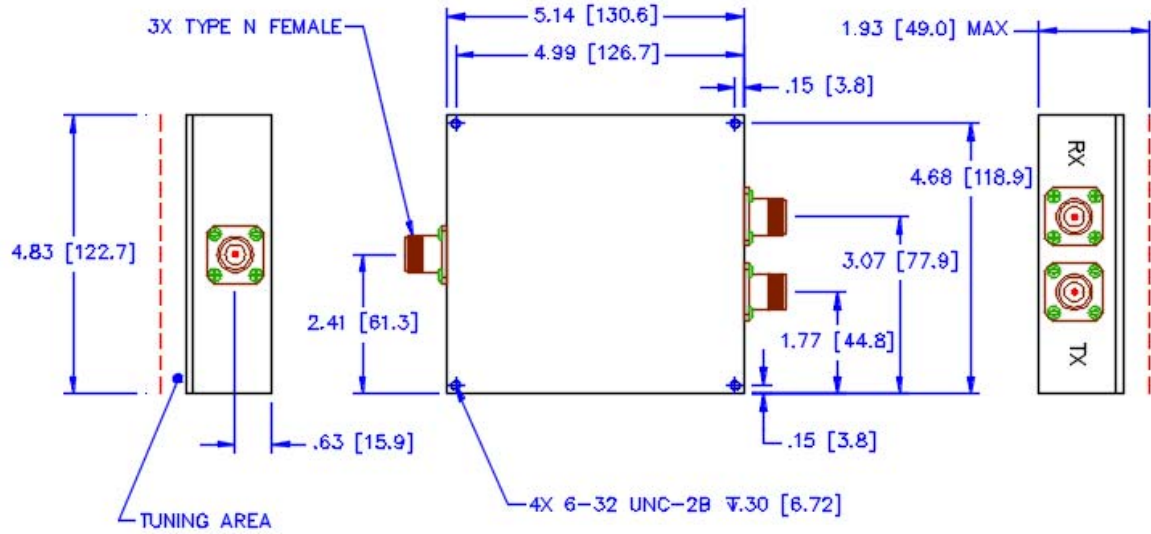
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	880 – 915 MHz (RX)	925 – 960 MHz (TX)
INSERTION LOSS	1.2 dB max.	1.2 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	40 dB min. DC – 845 MHz	40 dB min. DC – 915 MHz
	40 dB min. 925 – 2000 MHz	40 dB min. 995 – 2000 MHz
ISOLATION	40 dB min.	75 dB min.
POWER		25W CW, 800W PIP
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	SMA, female	

MMDS DUPLEXER - TM1023

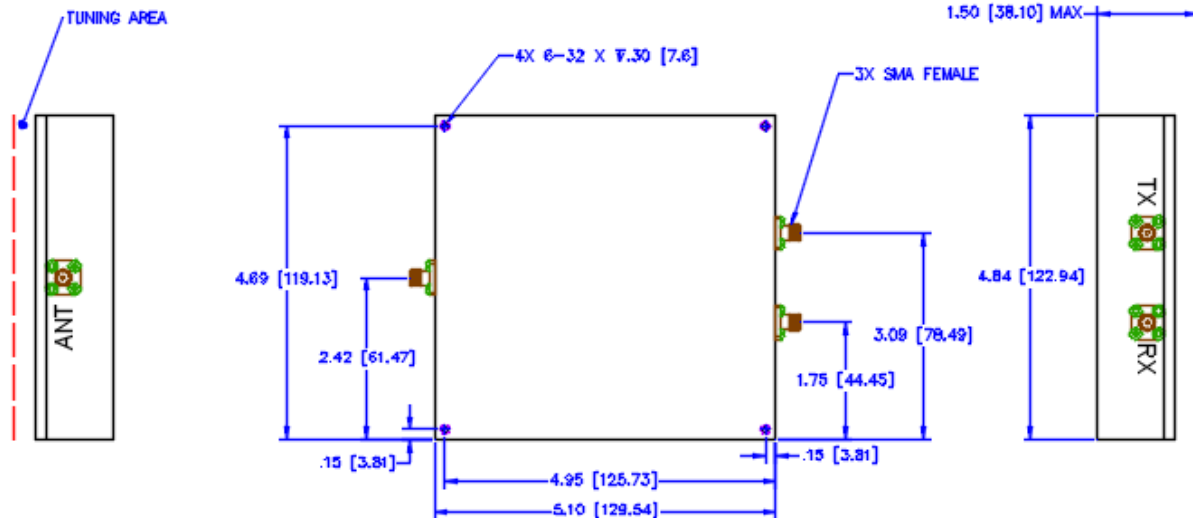
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	1710 – 1785 MHz (RX)	1805 – 1880 MHz (TX)
INSERTION LOSS	1.0 dB max.	1.0 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	50 dB min. DC – 1575 MHz	50 dB min. DC – 1785 MHz
	50 dB min. 1805 – 4000 MHz	50 dB min. 2030 – 4000 MHz
ISOLATION	50 dB min.	50 dB min.
POWER		25W CW, 800W PIP
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	SMA, female	

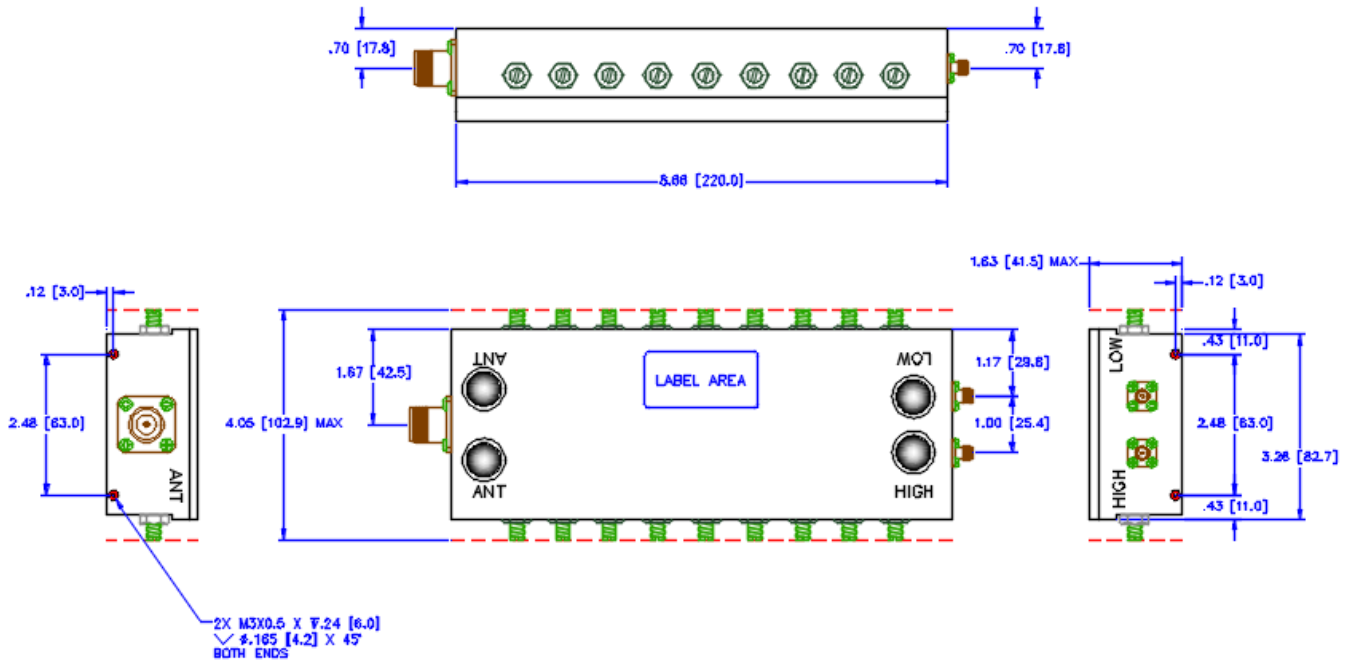
PCS FULLBAND DUPLEXER - TM1001

OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	2500 – 2548 MHz (RX)	2596 – 2644 MHz (TX)
INSERTION LOSS	0.7 dB max.	0.7 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	70 dB min. DC – 2450 MHz	75 dB min. DC – 2548 MHz
	75 dB min. 2596 – 5500 MHz	70 dB min. 2692 – 2645 MHz
ISOLATION	75 dB min.	75 dB min.
POWER		25W CW, 800W PIP
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	SMA, female	

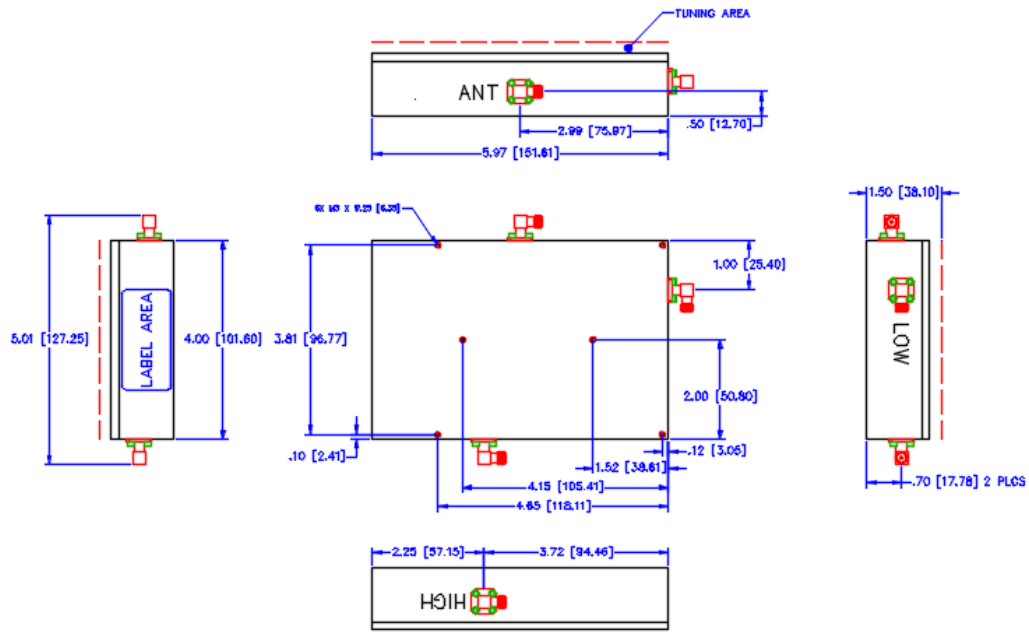
700 MHz DUPLEXER - TM1074



PARAMETER	SPECIFICATION	
PASSBAND RANGE	698 – 806 MHz (RX)	698—806 MHz (TX)
BANDWIDTH @ Fc	3.50 MHz	3.50 MHz
T/R SPACING	45 MHz min.	
INSERTION LOSS	1.5 dB max.	1.5 dB max.
RETURN LOSS	20 dB min.	20 dB min.
REJECTION	80 dB min. @ Fc ± 140 MHz	80 dB min. @ Fc ± 140 MHz
	50 dB min. @ Fc ± 200 MHz	50 dB min. @ Fc ± 200 MHz
ISOLATION	80 dB min.	
POWER		20W PIP
OPERATING TEMPERATURE	-10° to +70°C	
CONNECTORS	Type N female - SMA female	

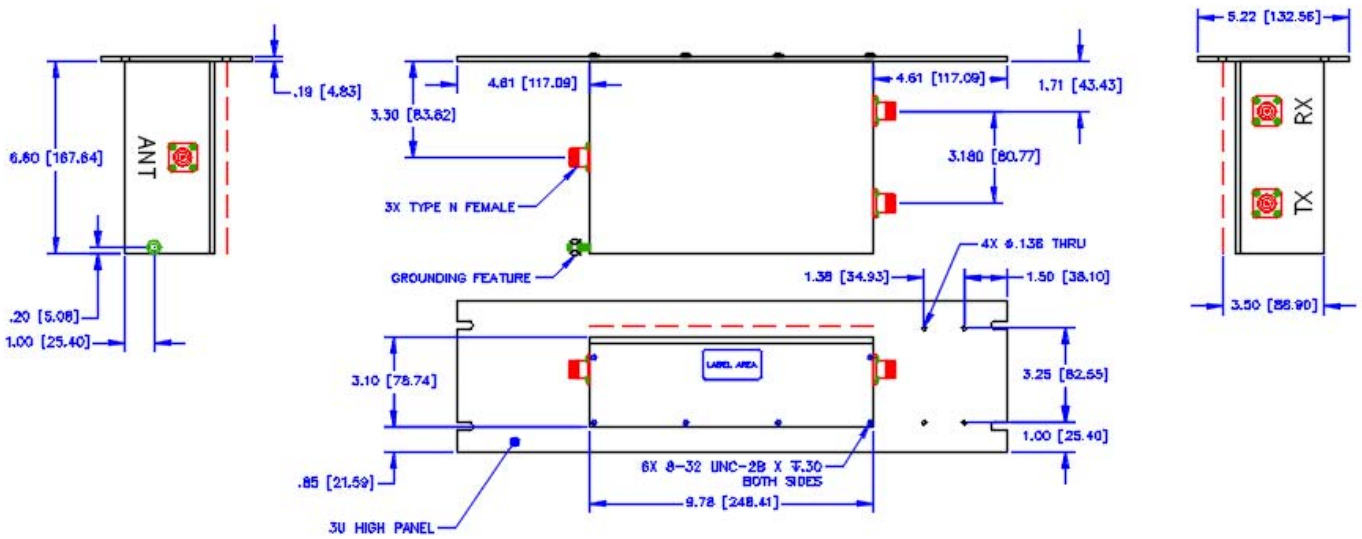
800 MHz DUPLEXER - TM1015

OUTLINE



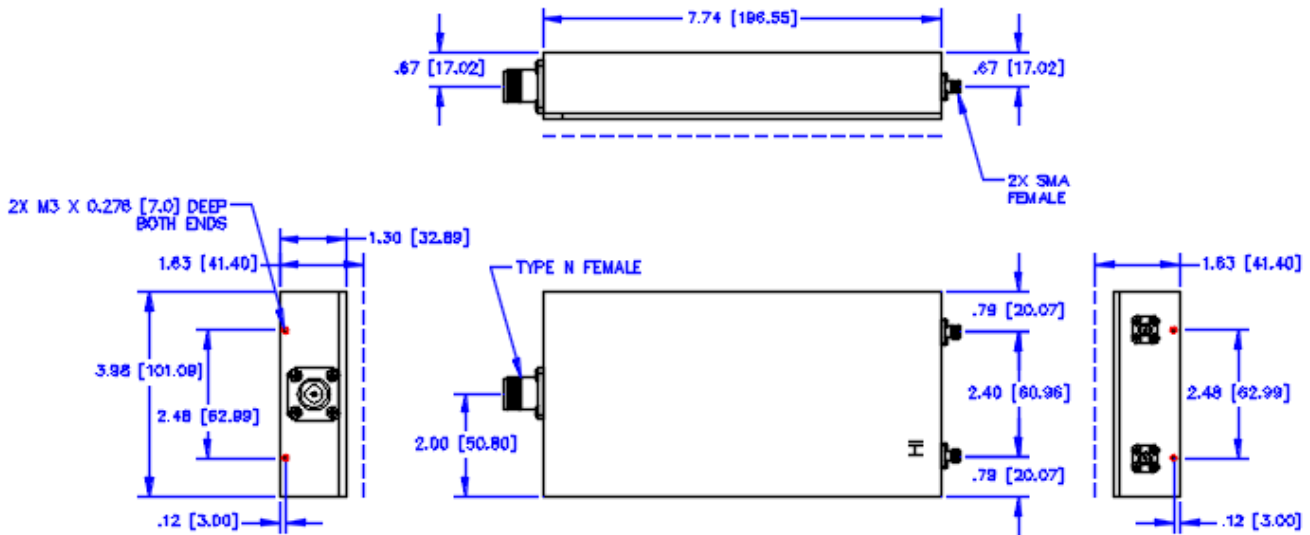
PARAMETER	SPECIFICATION	
PASSBAND	814.2 – 814.4 MHz (RX)	859.2 – 859.4 MHz (TX)
INSERTION LOSS	3.1 dB max.	3.1 dB max.
FLATNESS	1.0 dB max.	1.0 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	40 dB min. 806 – 812 MHz	40 dB min. 851 – 857 MHz
ISOLATION	80 dB min.	80 dB min.
POWER		10W CW, 40W PIP
OPERATING TEMPERATURE	0° to +65°C	
CONNECTORS	SMA, female	

900 MHz DUPLEXER - TM1064



PARAMETER	SPECIFICATION	
PASSBAND RANGE	896 – 933 MHz (RX)	935 — 960 MHz (TX)
BANDWIDTH @ 3 dB	4.0 MHz max.	4.0 MHz max.
BANDWIDTH @ 20 dB	8.0 MHz max.	8.0 MHz max.
BANDWIDTH @ 40 dB	15.0 MHz max.	15.0 MHz max.
INSERTION LOSS	1.5 dB max.	1.5 dB max.
RETURN LOSS	20 dB min.	20 dB min.
T/R SPACING	9— 49 MHz	
ISOLATION	90 dB min.	
POWER		
OPERATING TEMPERATURE	-30° to +70°C	
CONNECTORS	Type N female	
MOUNTING	3U 19" Panel	

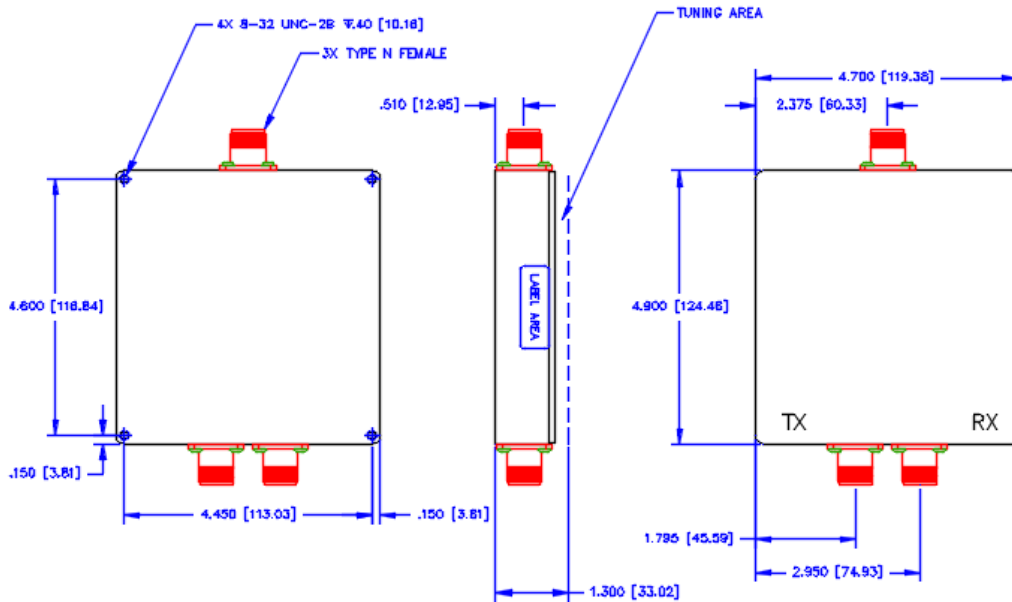
1400 MHz DUPLEXER - TM1053



PARAMETER	SPECIFICATION	
PASSBAND RANGE	1350 – 1530 MHz (RX)	1370 – 1550 MHz (TX)
BANDWIDTH @ Fc	± 3.5 MHz	± 3.5 MHz
T/R SPACING	23 MHz min.	
INSERTION LOSS	1.5 dB max.	1.5 dB max.
RETURN LOSS	20 dB min.	20 dB min.
GROUP DELAY	100 nS max.	
REJECTION	80 dB min. @ Fc ± 140 MHz	80 dB min. @ Fc ± 140 MHz
	50 dB min. @ Fc ± 200 MHz	50 dB min. @ Fc ± 200 MHz
ISOLATION	80 dB min.	
POWER		10W PIP
OPERATING TEMPERATURE	-10° to +70°C	
CONNECTORS	Type N female - SMA female	

L/S DUPLEXER - TM1104

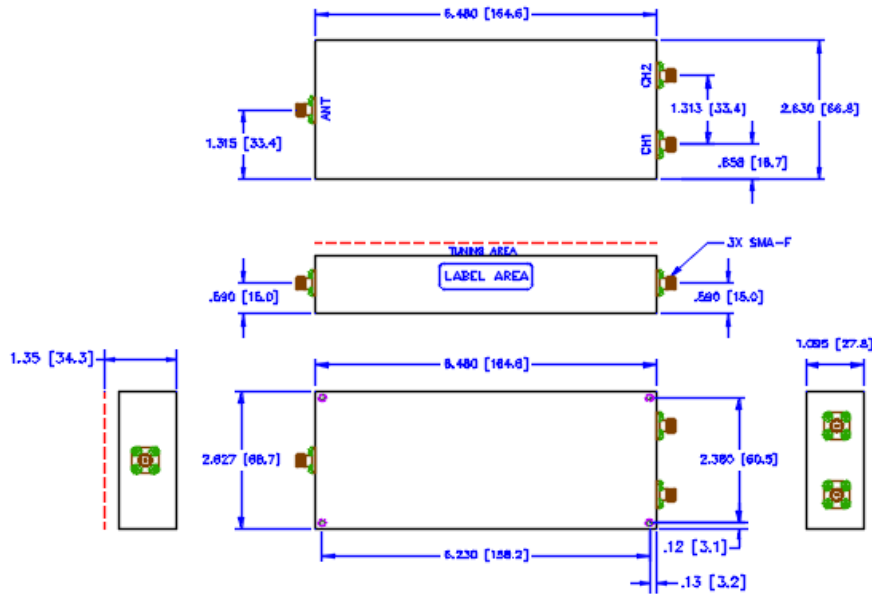
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	1700.0 – 1850.0 MHz (RX)	2200.0 – 2500.0 MHz (TX)
INSERTION LOSS	1.0 dB max.	1.0 dB max.
FLATNESS	0.6 dB max.	0.6 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	70 dB min. @ 1615.0 MHz	70 dB min. @ 2125.0 MHz
	70 dB min. @ 1925.0 MHz	70 dB min. @ 2590.0 MHz
ISOLATION	90 dB min.	90 dB min.
POWER		170W CW max.
OPERATING TEMPERATURE	-30° to +65°C	
CONNECTORS	TYPE N, Female	

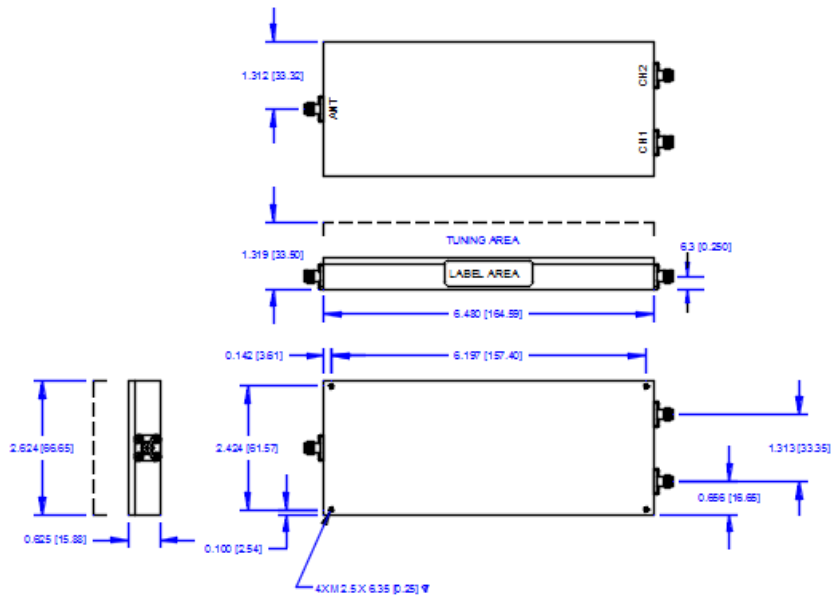
S Band DUPLEXER - TM1054

OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	2400.0 – 2436.0 MHz (RX)	2448.0 – 2484.0 MHz (TX)
INSERTION LOSS	2.5 dB max.	2.5 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	80 dB min. @ 2448 – 2484 MHz	80 dB min. @ 2400 – 2436 MHz
ISOLATION	80 dB min.	80 dB min.
POWER		10W CW max.
OPERATING TEMPERATURE	-30° to +65°C	
CONNECTORS	SMA, Female	

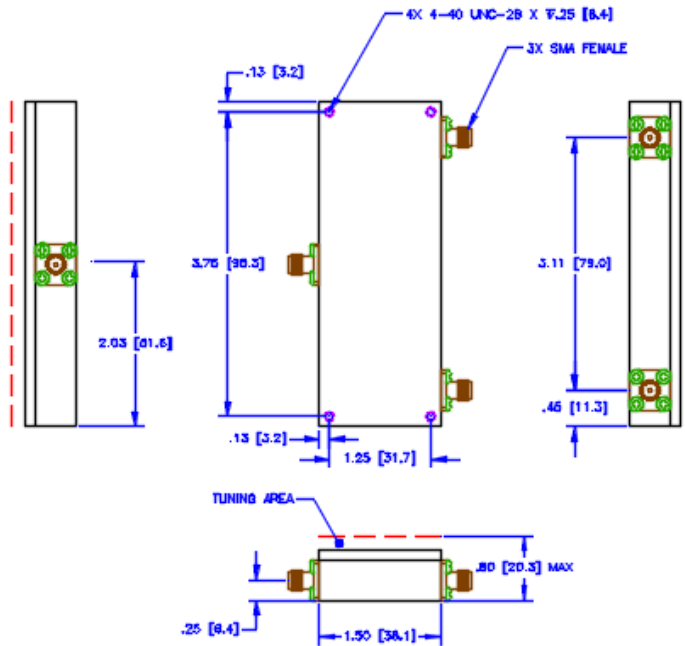
C Band DUPLEXER - TM1058



PARAMETER	SPECIFICATION	
PASSBAND	5725.0 – 5775.0 MHz (RX)	5800.0 – 5850.0 MHz (TX)
INSERTION LOSS	2.5 dB max.	2.5 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	85 dB min. @ 5796.0 - 5850.0 MHz	85 dB min. @ 5725 - 5779.0 MHz
ISOLATION	80 dB min.	80 dB min.
POWER		
OPERATING TEMPERATURE	-30° to +65°C	
CONNECTORS	SMA Female	

X Band DUPLEXER - TM1114

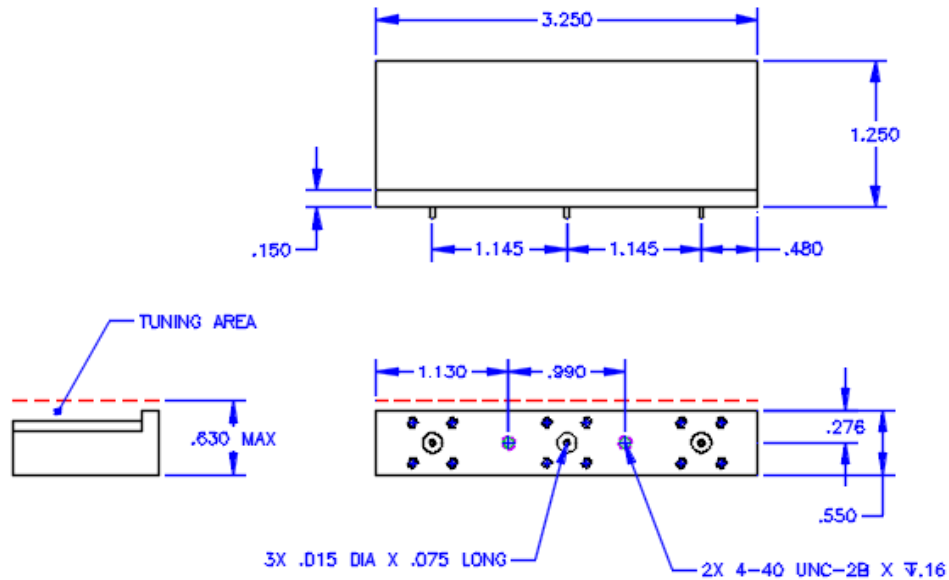
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	8.321 – 8.377 GHz (RX)	8.440 — 8.496 GHz (TX)
INSERTION LOSS	1.2 dB max.	1.2 dB max.
FLATNESS	0.2 dB max.	0.2 dB max.
RETURN LOSS	18 dB min.	18 dB min.
REJECTION	70 dB min. @ 8.440 - 8.496 GHz	70 dB min. @ 8.321 - 8.377 GHz
ISOLATION	70 dB min.	70 dB min.
POWER		
OPERATING TEMPERATURE	-30° to +65°C	
CONNECTORS	SMA Female	

Ku Band DUPLEXER - TM1099

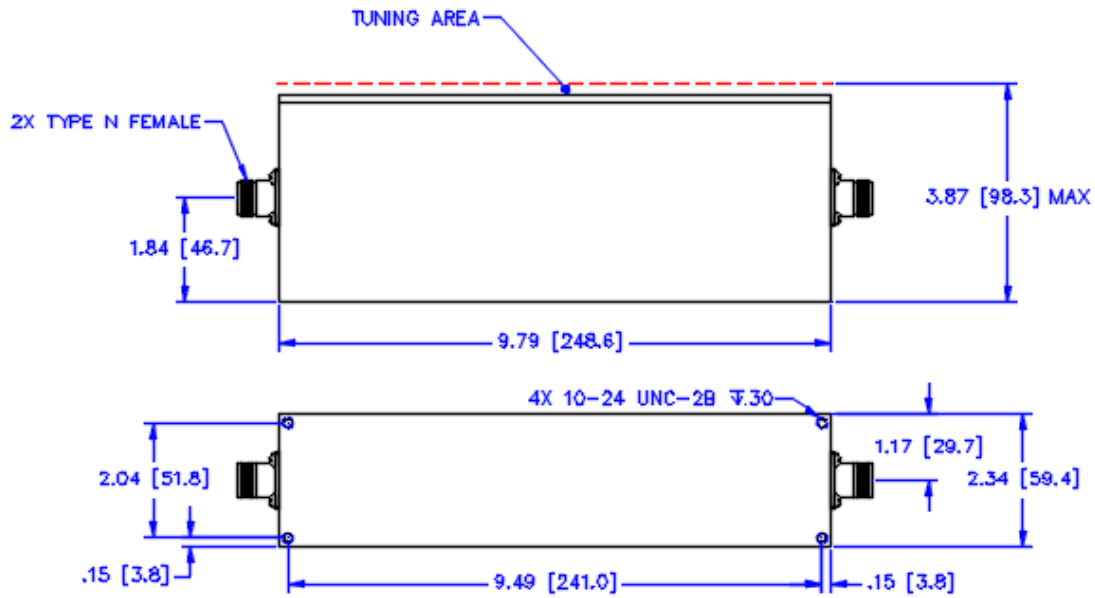
OUTLINE



PARAMETER	SPECIFICATION	
PASSBAND	12.825 – 12.915 GHz (RX)	13.091 – 13.181 GHz (TX)
INSERTION LOSS	1.5 dB max.	1.5 dB max.
FLATNESS	0.2 dB max.	0.2 dB max.
RETURN LOSS	20 dB min.	20 dB min.
REJECTION	65 dB min. @ 13.091 - 13.181 GHz	65 dB min. @ 12.825 - 12.915 GHz
ISOLATION	65 dB min.	65 dB min.
POWER		
OPERATING TEMPERATURE	-30° to +65°C	
CONNECTORS	.015 Pin Out	

400 MHz BANDPASS - TM1002

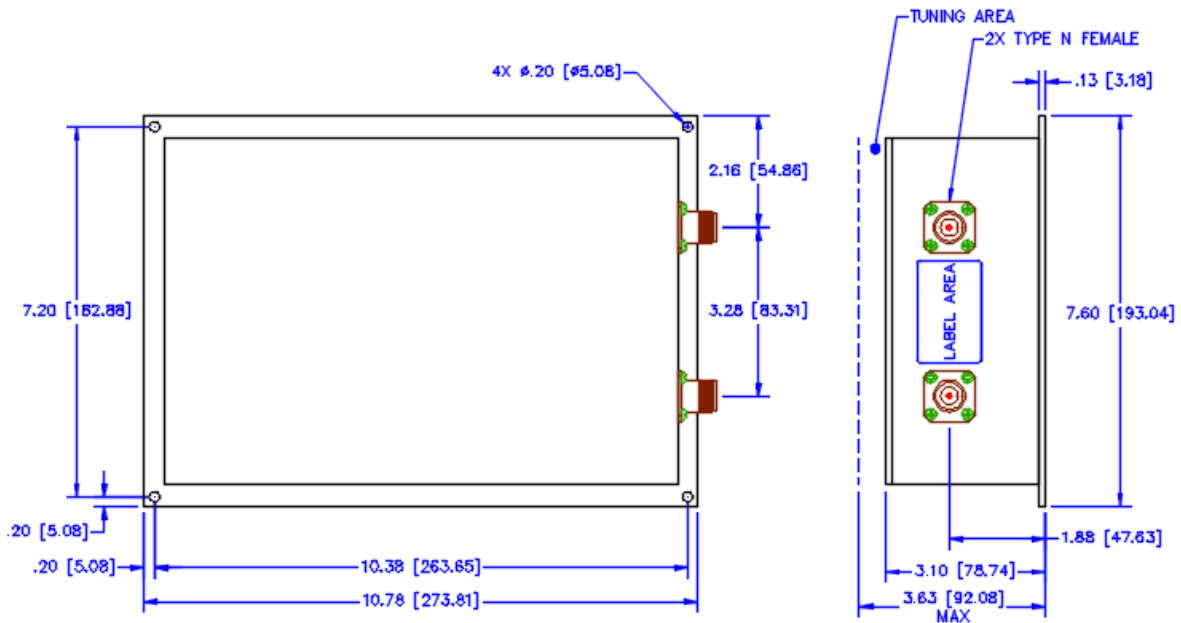
OUTLINE



PARAMETER	SPECIFICATION
PASSBAND	430.0 – 500.0 MHz
INSERTION LOSS	0.8 dB max.
RETURN LOSS	16 dB min.
REJECTION	40 dB min. DC — 325.0 MHz
	15 dB min. 411.0 MHz
	15 dB min. 522.0 MHz
	40 dB min. 605.0 — 700.0 MHz
POWER	
OPERATING TEMPERATURE	-30° to +65°C
CONNECTORS	TYPE N, female

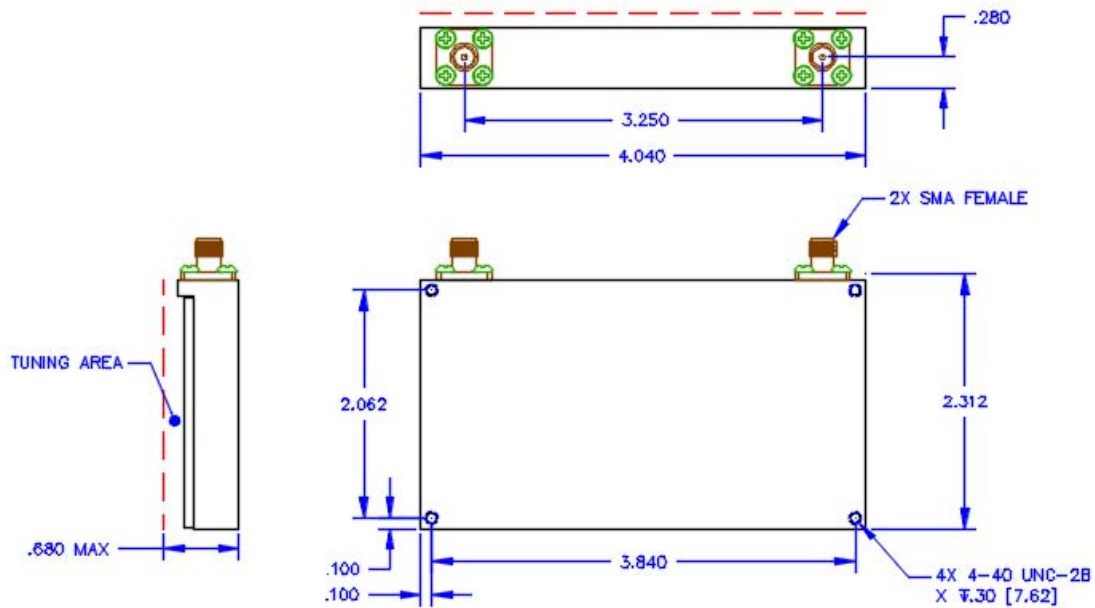
900 MHz BANDPASS - TM1085

OUTLINE



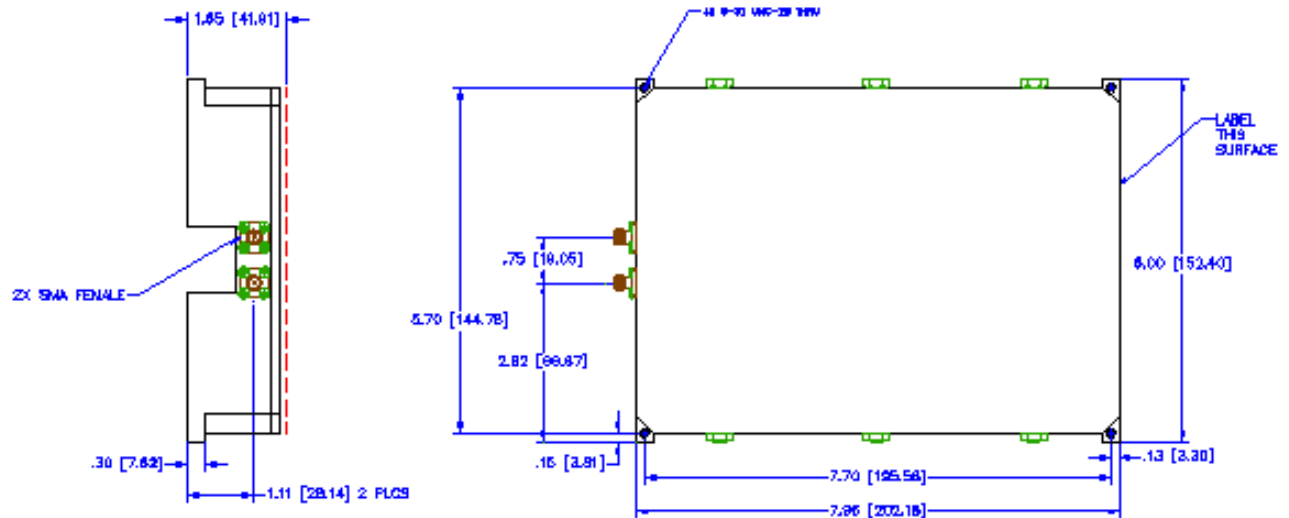
PARAMETER	SPECIFICATION
PASSBAND	902.0 – 927.05 MHz
INSERTION LOSS	1.5 dB max.
RETURN LOSS	18 dB min.
REJECTION	65 dB min. DC — 894.00 MHz 20 dB min. 929.50 — 931.75 MHz 40 dB min. 931.75 — 936.00 MHz 65 dB min. 936.00 — 1000.0 MHz
POWER	
OPERATING TEMPERATURE	0° to +65°C
CONNECTORS	TYPE N, female

X BAND BANDPASS - TM3012



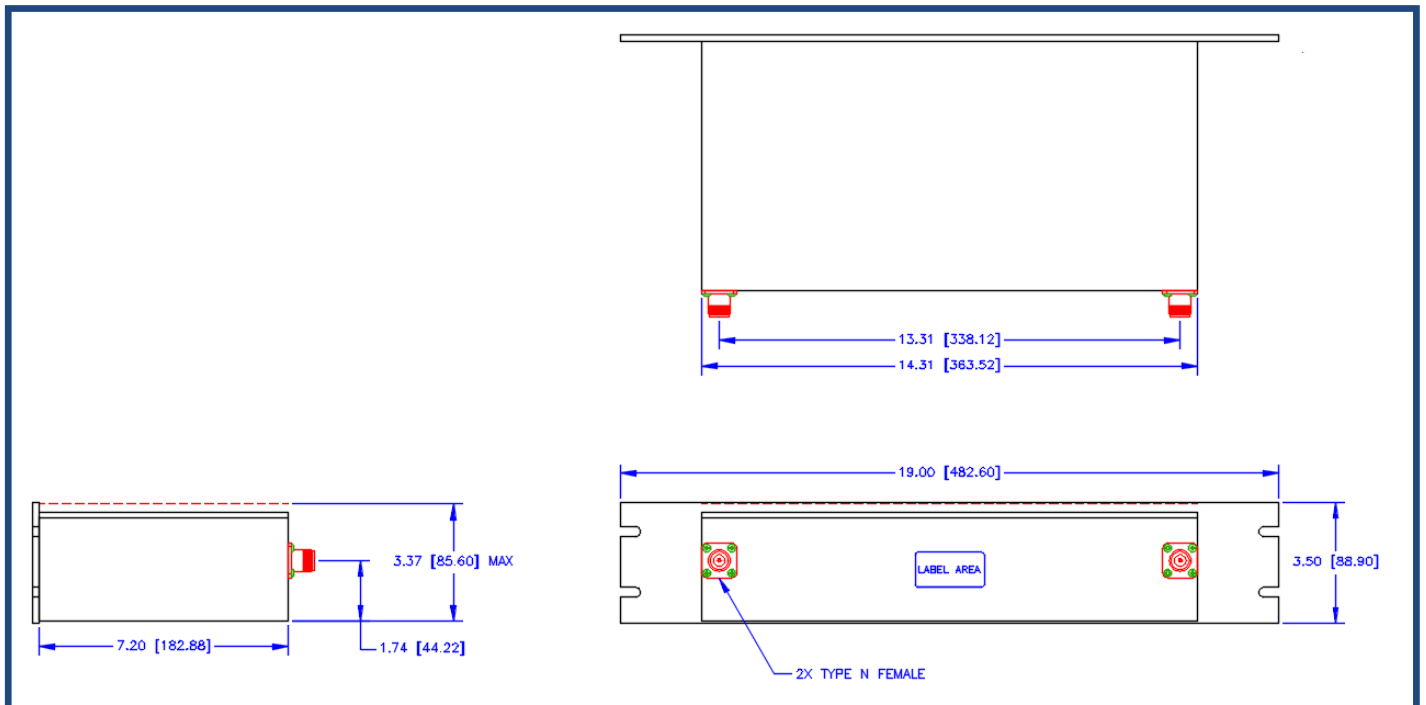
PARAMETER	SPECIFICATION
PASSBAND	9.410 – 9.590 GHz
BANDWIDTH	180 MHz
INSERTION LOSS	1.8 dB max.
RETURN LOSS	18 dB min.
REJECTION	20 dB min. @ $F_c \pm 100$ MHz
POWER	10 W
OPERATING TEMPERATURE	-30° to +60°C
CONNECTORS	SMA, female

700/800 MHz DUAL NOTCH - TM1006



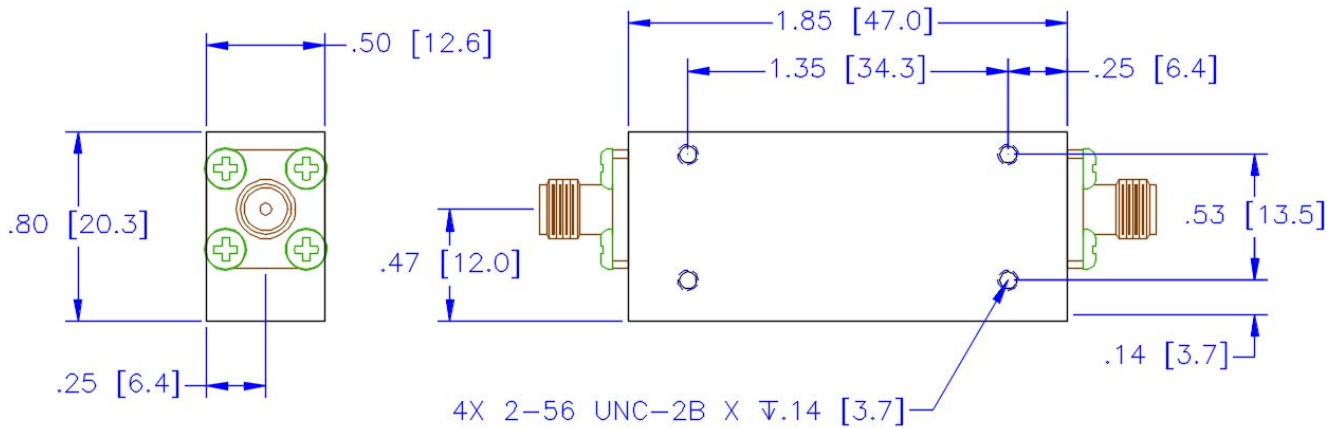
PARAMETER	SPECIFICATION	
PASSBAND	773.8 – 775.0 MHz	803.8 - 869 MHz
INSERTION LOSS	1.2 dB max.	1.2 dB max.
RETURN LOSS	16 dB min.	16 dB min.
REJECTION	40 dB min. 769.8 – 770.8 MHz	40 dB min. 779.8 – 800.8 MHz
OPERATING TEMPERATURE	-30° to +60°C	
CONNECTORS	SMA, female	

AWS NOTCH FILTER - TM1008



PARAMETER	SPECIFICATION
PASSBAND	2030 – 2109.5 MHz
INSERTION LOSS	1.5 dB max.
RETURN LOSS	18 dB min.
REJECTION	60 dB min. @ 2110.5 - 2122 MHz
POWER	10 W
OPERATING TEMPERATURE	-30° to +60°C
CONNECTORS	SMA, female

X BAND NOTCH FILTER - TM1062



PARAMETER	SPECIFICATION	
PASSBAND	5.850 – 8.400 GHz	13.750 – 14.500 GHz
INSERTION LOSS	1.2 dB max.	1.2 dB max.
RETURN LOSS	16 dB min.	16 dB min.
RF SUSCEPTABILITY	70 dBc max.	
REJECTION	20 dB min. @ 5.000 - 5.750 GHz	
	20 dB min. @ 8.500 - 10.000 GHz	
	30 dB min. @ 10.000 - 12.850 GHz	
	20 dB min. @ 15.800 - 29.000 GHz	
POWER	10 W	
OPERATING TEMPERATURE	-30° to +65°C	
CONNECTORS	SMA, female	

SUSPENDED SUBSTRATE FILTERS

Suspended Substrate Microwave Integrated Circuit (SSMIC) is a mechanical fabrication technique used to realize microwave transmission lines. TechPlus Microwave is developing its microwave components and integrated assemblies using SSMIC printed circuit techniques because of the following:

- ★ Electrical performance approaches that of coaxial air line.
- ★ Temperature stability.
- ★ Cost effective production.
- ★ Mechanical integrity.
- ★ Reliability.
- ★ Integrate-ability.

The SSMIC microwave component realization technique used by TechPlus Microwave has evolved over several decades. SSMIC was first used to fabricate broadband multiplexers and filter networks. SSMIC has proven to be a high performance temperature stable, exceptionally reliable, reproducible, microwave transmission medium.

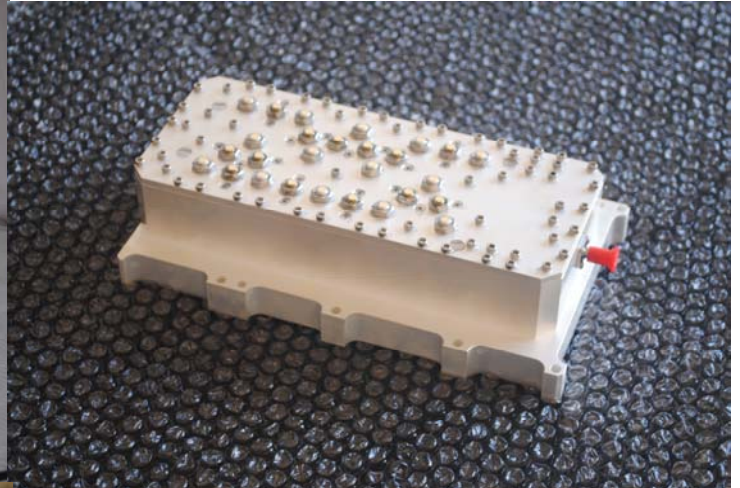
The microwave transmission line circuit is photo etched on both sides of a thin reinforced Teflon (RT/Duroid) dielectric board and clamped between machined metal housings. Front-to-back circuit board interconnections are accomplished with plated through holes. Excellent tolerances are maintained on the circuit board and housings through the use of modern photo-etching and numerically controlled milling techniques.

SSMIC suspended stripline approaches the optimum loss configuration for a dielectric support strip transmission line. It behaves essentially as an airline; most geometries having an effective dielectric constant of 1:25 or less, and offers performance approaching machined coaxial components with reproducibility and cost effectiveness of etched stripline and microstrip. The clamped circuit board mechanical construction technique results in a gasket tight EMI and moisture seal and eliminates the tolerance and fabrication problems associated with edge clamping of “nested” circuit boards. Grounding, shielding and higher order mode suppression and isolation are effectively accomplished with plated through holes. Isolation of greater than 80 dB is realized with proper design using the EMI shielding achieved by the plated through holes. The clamped circuit board eliminates the majority of the leakage paths found in many “modular” microwave integrated assemblies. Plated through holes also result in accurately located short circuit reference planes which improve the reproducibility of short circuited transmission line elements. The use of plated through holes and the “clamped board” construction have enabled excellent large scale production reproducibility with high yields.

SSMIC allows the realization of most any transmission line network on a single circuit board. Very high impedance (>200 ohms) and very low impedances (<10 ohms) lines can be easily fabricated together in very small (high frequency) TEM geometries. The SSMIC fabrication technique also lends itself to the integration of many different transmission line media in a single package. Microstrip, Fin-line, coplanar waveguide, etc., can be realized as well as suspended stripline using the same construction techniques. Using a bit of imagination, it is possible to conceive of an RF assembly that combines waveguide, suspended stripline, microstrip, fin-line, slot-line, coplanar waveguide and lumped constant techniques on a single SSMIC circuit board clamped within one set of housings.

A large number of microwave components have been adapted to SSMIC fabrication. These include filters, multiplexers, PIN control devices (switches, attenuators, limiters, etc.).

- ★ Products can be designed with any Connector configuration
- ★ Product can be designed for Hermetic sealing (Laser Weld)
- ★ Products can be designed for Outdoor Configuration — IP67



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