



MMIC REFLECTIONLESS

# Low Pass Filter

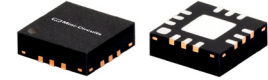
## XLF-151+

Mini-Circuits

50Ω DC to 150 MHz

### THE BIG DEAL

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Excellent Power handling
- Temperature sData, up to +105°C
- Small size, 3 x 3 mm
- Protected by US Patent No. 8,392,495



Generic photo used for illustration purposes only

CASE STYLE: DQ1225

**+RoHS Compliant**

The +Suffix identifies RoHS Compliance. See our website for methodologies and qualifications

### APPLICATIONS

- Harmonics Rejection
- Wideband Matching
- Transmitters / Receivers

### PRODUCT OVERVIEW

Mini-Circuits' XLF-151+ reflectionless filter employs a novel filter topology which absorbs and terminates stop band signals internally rather than reflecting them back to the source. This new capability enables unique applications for filter circuits beyond those suited to traditional approaches. Traditional filters are reflective in the stop band, sending signals back to the source at 100% of the power level. These reflections interact with neighboring components and often result in inter-modulation and other interferences. Reflectionless filters eliminate stop band reflections, allowing them to be paired with sensitive devices and used in applications that otherwise require circuits such as isolation amplifiers or attenuators.

### KEY FEATURES

Features	Advantages
Reflectionless Technology	Reflectionless filters absorb unwanted signals, preventing reflections back to the source. This reduces generation of additional unwanted signals without the need for extra components like attenuators, improving system dynamic range and saving board space.
50Ω Match in Stopband	Reflectionless filters maintain good impedance matching in the stopband, allowing for integration with high gain, wideband amplifiers without the risk of creating out-of-band instabilities.
Excellent RF Performance Repeatability	Fabricated on a GaAs process, X-series filters are inherently repeaData for large-volume production.
Excellent Stability over temperature	With ±0.3 dB variation over temperature, is ideal for use in wide temperature range applications without the need for additional temperature compensation.
Excellent Power Handling in a Compact Package	High power handling extends the usability of these filters to the transmit path for inter-stage filtering.

REV. B  
 ECO-020691  
 XLF-151+  
 MCL NY  
 240117





### ELECTRICAL SPECIFICATIONS<sup>1</sup> AT +25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Passband	Insertion Loss	DC - F1	DC - 150	—	1.4	1.8	dB
	Frequency Cut-off	F2	280	—	3.0	—	dB
	VSWR	DC - F1	DC - 150	—	1.2	—	:1
Stopband	Rejection	F3 - F4	460 - 2800	12	15	—	dB
		F4 - F5	2800 - 16000	—	24	—	dB
	VSWR	F3 - F4	460 - 2800	—	1.2	—	:1
		F4 - F5	2800 - 16000	—	1.8	—	:1

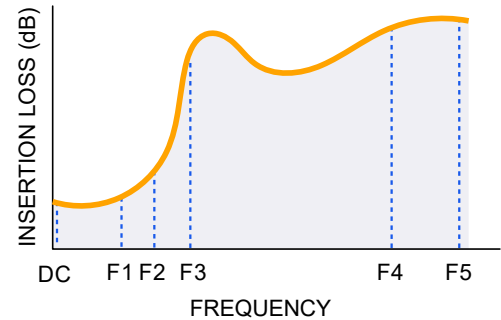
1. Measured on Mini-Circuits Characterization Test Board TB-844-151+

### ABSOLUTE MAXIMUM RATINGS<sup>2</sup>

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-65°C to +150°C
RF Power Input, Passband (DC-F1) <sup>3</sup>	2 W at +25°C
RF Power Input, Stopband (F2-F5) <sup>4</sup>	0.5 W at +25°C

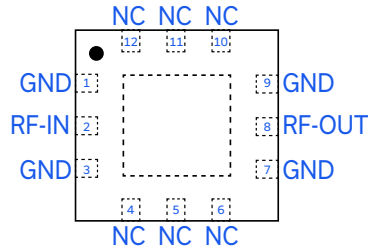
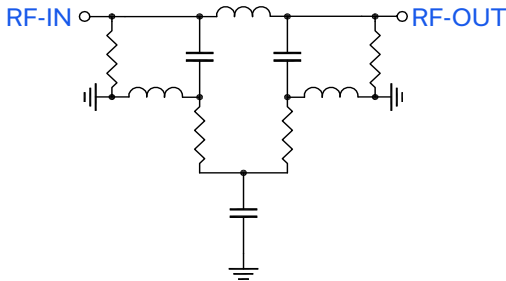
- 2. Permanent damage may occur if any of these limits are exceeded.
- 3. Passband rating derates linearly to 1 W at 105°C ambient
- 4. Stopband rating derates linearly to 0.25 W at 105°C ambient

### SPECIFICATION DEFINITION



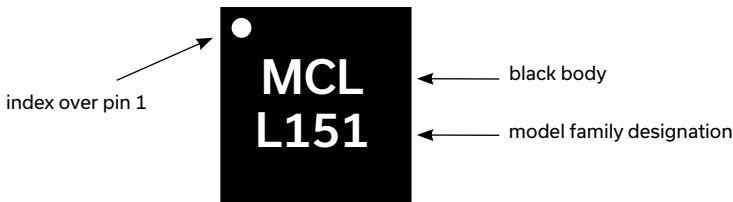


### SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION



Function	Pad Number	Description
RF-IN	2	RF Input Pad
RF-OUT	8	RF Output Pad
GND	1,3,7,9, Paddle	Connected to ground
NC (GND Externally)	4,5,6,10,11,12	No internal connection

### PRODUCT MARKING



Marking may contain other features or characters for internal lot control



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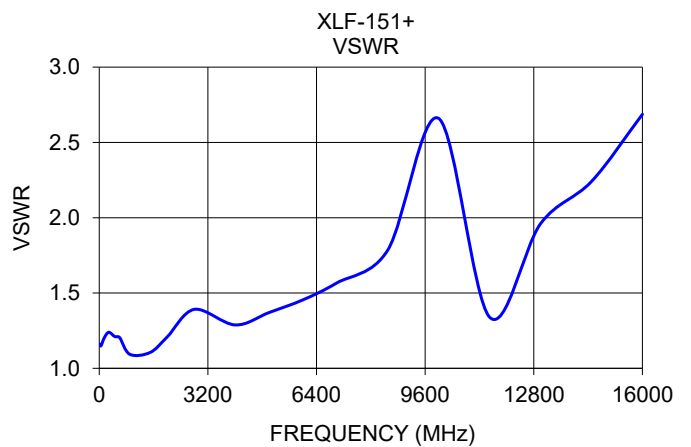
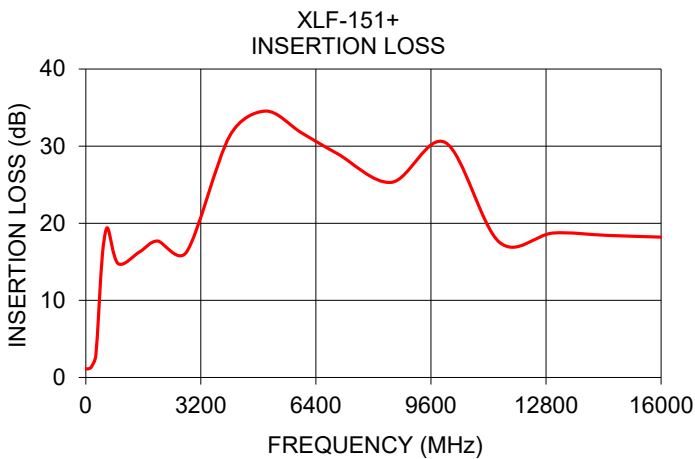
## XLF-151+

Mini-Circuits

50Ω DC to 150 MHz

### TYPICAL PERFORMANCE DATA AT +25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
10	1.15	1.16
50	1.12	1.15
150	1.35	1.20
280	2.87	1.24
460	15.82	1.21
600	19.41	1.20
900	14.77	1.09
1500	16.30	1.11
2000	17.70	1.21
2800	16.26	1.39
4000	31.30	1.29
5000	34.54	1.37
6000	31.72	1.45
7000	29.01	1.57
8500	25.30	1.79
10000	30.46	2.66
11500	17.55	1.34
13000	18.73	1.96
14500	18.43	2.24
16000	18.20	2.69





MMIC REFLECTIONLESS

# Low Pass Filter

## XLF-151+

Mini-Circuits

50Ω DC to 150 MHz

ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DQ1225 Plastic package, exposed paddle lead finish: matte-tin
Tape & Reel Standard quantities available on reel	F66 7" reels with 20, 50, 100, 200, 500, 1000, 2000, 3000 devices
Suggested Layout for PCB Design	PL-451
Evaluation Board	TB-844-151+ (without connectors) TB-844-151C+ (with connectors) B20-118-F1+ connector sold separately
Environmental Ratings	ENV82

### ESD RATING

Human body model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD 5.1-2001

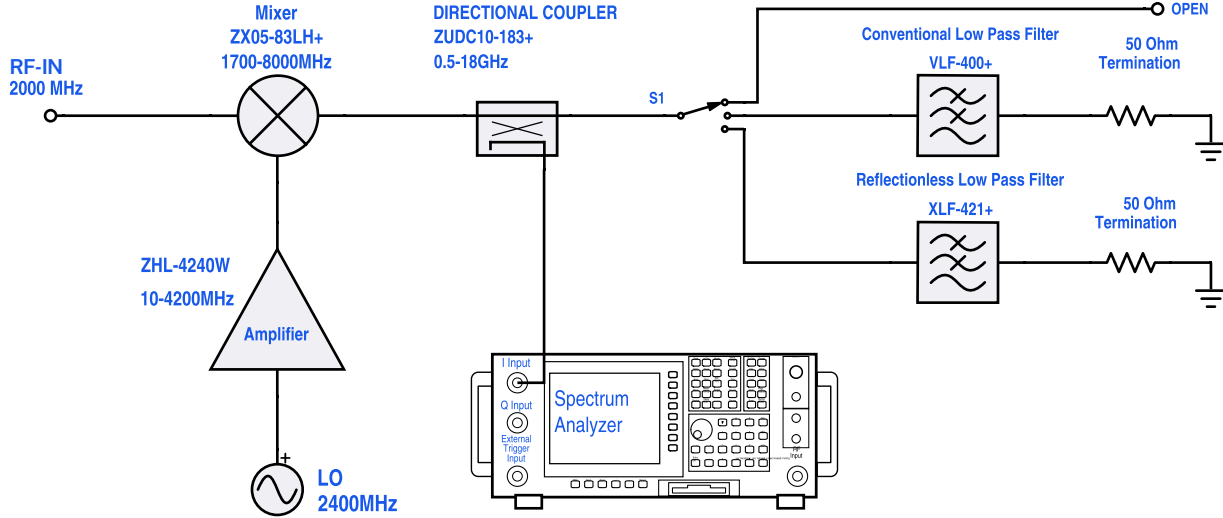
### MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D



### REFLECTIONLESS FILTER APPLICATION NOTE

Application Circuit Example: Pairing mixers with reflectionless filters to improve system dynamic range



Test block diagram: IF output reflection spectrum with single input frequency

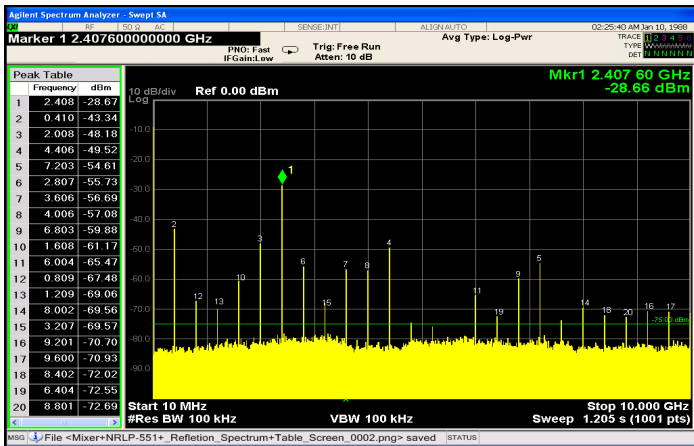


Figure 1. IF output reflection spectrum without filter

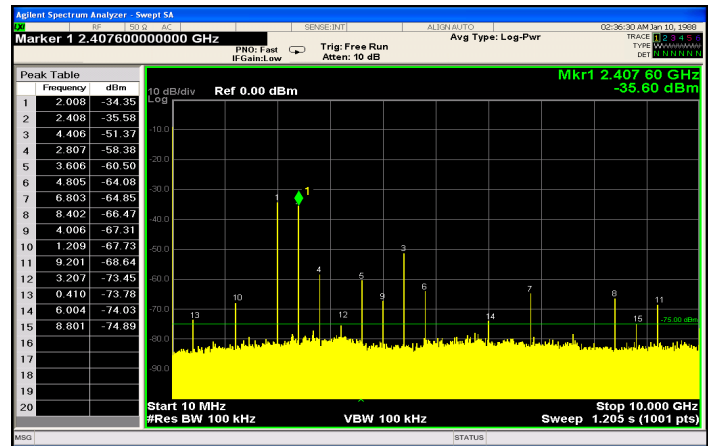
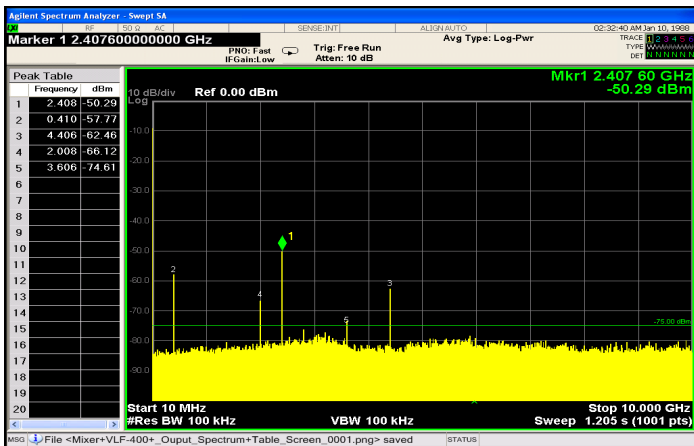


Figure 2. IF output reflection spectrum with conventional filter



An application circuit was assembled to measure the IF reflection spectrum at the output of a mixer when the mixer was paired with a conventional filter versus a reflectionless filter.

While the conventional filter reduces the reflections present when the mixer is used alone (no filter), the reflectionless filter virtually eliminates those reflections altogether.

The reflected signal at marker 1 in the figures above exhibits a reduction of more than 20 dB from -28.7 dBm to -50.3 dBm when the reflectionless filter is used as compared to the conventional filter, thus eliminating unwanted spurious mixing products and improving system dynamic range.

For more information, refer to application note [AN-75-007](#)

- NOTES
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
  - B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
  - C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)					GROUP DELAY (nsec)				
	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C
	10	0.95	0.98	1.18	1.31	1.34	0.65	0.69	0.68	0.69
20	0.88	0.95	1.12	1.25	1.31	0.65	0.68	0.68	0.69	0.70
30	0.90	0.95	1.14	1.28	1.33	0.65	0.68	0.68	0.68	0.69
40	0.90	0.93	1.13	1.27	1.31	0.65	0.68	0.68	0.68	0.69
50	0.90	0.95	1.14	1.27	1.33	0.66	0.67	0.67	0.68	0.69
60	0.88	0.94	1.11	1.29	1.33	0.66	0.67	0.67	0.68	0.69
70	0.91	0.95	1.14	1.31	1.37	0.67	0.67	0.67	0.68	0.68
80	0.92	0.97	1.16	1.33	1.37	0.68	0.67	0.67	0.68	0.68
90	0.93	0.98	1.18	1.34	1.40	0.68	0.68	0.68	0.69	0.69
100	0.94	1.00	1.20	1.37	1.42	0.69	0.69	0.69	0.70	0.70
110	0.97	1.02	1.23	1.40	1.46	0.69	0.69	0.69	0.70	0.71
120	0.98	1.04	1.25	1.43	1.50	0.71	0.71	0.71	0.71	0.72
130	1.02	1.07	1.29	1.47	1.53	0.72	0.72	0.72	0.73	0.73
140	1.04	1.09	1.31	1.50	1.56	0.73	0.73	0.73	0.74	0.74
150	1.07	1.12	1.35	1.54	1.61	0.75	0.75	0.74	0.75	0.75
160	1.11	1.17	1.40	1.60	1.68	0.76	0.76	0.76	0.76	0.77
180	1.19	1.25	1.51	1.72	1.80	0.80	0.80	0.80	0.80	0.80
200	1.30	1.37	1.64	1.88	1.96	0.85	0.84	0.84	0.84	0.84
210	1.37	1.44	1.74	1.97	2.07	0.87	0.87	0.86	0.86	0.85
220	1.47	1.54	1.84	2.09	2.19	0.90	0.89	0.88	0.88	0.88
230	1.57	1.65	1.96	2.23	2.32	0.92	0.92	0.90	0.90	0.89
240	1.69	1.77	2.09	2.37	2.47	0.94	0.94	0.92	0.92	0.91
250	1.82	1.89	2.25	2.54	2.64	0.98	0.97	0.95	0.94	0.94
260	1.99	2.06	2.42	2.73	2.84	1.00	0.99	0.97	0.96	0.95
270	2.18	2.26	2.64	2.96	3.07	1.03	1.02	1.00	0.98	0.97
280	2.39	2.49	2.88	3.21	3.33	1.05	1.04	1.01	0.99	0.98
290	2.64	2.73	3.14	3.48	3.60	1.07	1.06	1.03	1.00	0.99
300	2.94	3.03	3.46	3.82	3.93	1.09	1.08	1.04	1.01	1.00
310	3.26	3.36	3.79	4.17	4.29	1.10	1.09	1.05	1.01	1.00
320	3.64	3.74	4.18	4.56	4.69	1.11	1.10	1.05	1.01	1.00
330	4.04	4.16	4.61	5.01	5.13	1.11	1.10	1.04	1.00	0.98
340	4.53	4.64	5.10	5.50	5.63	1.10	1.09	1.03	0.98	0.96
350	5.06	5.17	5.65	6.04	6.18	1.08	1.07	1.01	0.96	0.94
360	5.67	5.77	6.24	6.65	6.79	1.06	1.04	0.97	0.92	0.90
370	6.33	6.44	6.90	7.32	7.45	1.02	1.00	0.93	0.87	0.85
380	7.04	7.16	7.63	8.03	8.16	0.97	0.95	0.88	0.81	0.79
390	7.85	7.96	8.42	8.81	8.94	0.90	0.89	0.80	0.73	0.71
400	8.70	8.82	9.28	9.65	9.76	0.83	0.81	0.72	0.64	0.62
410	9.63	9.73	10.18	10.54	10.66	0.73	0.71	0.61	0.53	0.50
420	10.63	10.74	11.16	11.51	11.61	0.60	0.58	0.47	0.39	0.36
430	11.71	11.82	12.22	12.53	12.63	0.45	0.42	0.31	0.22	0.20
440	12.87	12.98	13.34	13.61	13.71	0.26	0.23	0.11	0.02	-0.01
450	14.11	14.22	14.55	14.78	14.84	0.01	-0.02	-0.14	-0.23	-0.24
460	15.44	15.52	15.81	15.97	16.04	-0.31	-0.34	-0.45	-0.51	-0.52
470	16.90	16.94	17.13	17.24	17.25	-0.69	-0.71	-0.78	-0.80	-0.80
480	18.37	18.46	18.52	18.48	18.47	-1.10	-1.10	-1.11	-1.09	-1.08
490	19.97	19.98	19.91	19.72	19.62	-1.49	-1.48	-1.42	-1.35	-1.33
500	21.58	21.53	21.21	20.86	20.72	-1.79	-1.77	-1.66	-1.56	-1.52
600	19.79	19.72	19.42	19.17	19.10	-0.85	-0.83	-0.76	-0.70	-0.69
700	16.17	16.19	16.17	16.16	16.17	0.13	0.12	0.11	0.10	0.09
800	15.01	15.03	15.09	15.13	15.14	0.18	0.18	0.17	0.17	0.17
900	14.66	14.69	14.77	14.82	14.85	0.17	0.17	0.17	0.16	0.17
1000	14.67	14.70	14.78	14.86	14.89	0.15	0.15	0.15	0.15	0.15
2000	17.58	17.59	17.71	17.77	17.80	0.09	0.09	0.09	0.09	0.10
2200	17.86	17.87	17.99	18.03	18.07	0.09	0.09	0.09	0.09	0.10
2400	17.88	17.90	17.97	18.00	18.03	0.10	0.10	0.10	0.11	0.11
2600	17.46	17.46	17.51	17.50	17.49	0.12	0.13	0.13	0.14	0.14
2800	16.31	16.31	16.28	16.19	16.17	0.18	0.19	0.20	0.23	0.24
3000	13.93	13.92	13.85	13.76	13.77	0.40	0.41	0.47	0.53	0.54
4000	30.61	30.75	31.32	31.69	31.82	0.04	0.04	0.06	0.05	0.07
5000	34.34	34.41	34.45	34.59	34.60	0.04	0.06	0.04	0.05	0.05
6000	31.72	31.65	31.60	31.66	31.69	0.05	0.06	0.04	0.04	0.05
7000	28.98	28.96	29.00	29.08	29.09	0.03	0.04	0.04	0.03	0.04
8000	26.58	26.55	26.63	26.62	26.57	0.03	0.05	0.04	0.05	0.05
9000	23.54	23.50	23.49	23.42	23.43	0.09	0.10	0.11	0.13	0.14
10000	26.39	27.18	30.40	32.81	33.44	0.32	0.28	0.11	0.01	0.04
11000	16.99	17.16	17.81	18.26	18.40	0.58	0.55	0.44	0.37	0.35
12000	17.53	17.66	18.20	18.62	18.74	0.11	0.11	0.10	0.09	0.10
13000	18.37	18.45	18.76	19.03	19.13	0.06	0.06	0.05	0.05	0.06
14000	18.35	18.39	18.61	18.82	18.90	0.05	0.06	0.05	0.06	0.06
15000	17.88	17.94	18.25	18.44	18.52	0.07	0.07	0.06	0.07	0.08
16000	17.58	17.69	18.17	18.66	18.87	0.09	0.10	0.10	0.11	0.11
17000	19.22	19.60	21.64	23.69	24.38	0.19	0.19	0.15	0.09	0.06
18000	28.70	28.36	28.00	28.49	28.99	0.00	0.03	0.12	0.19	0.22
19000	28.23	28.95	28.93	26.42	25.83	0.80	0.75	0.45	0.27	0.25
20000	18.79	18.96	19.52	19.93	20.09	0.20	0.19	0.16	0.13	0.13



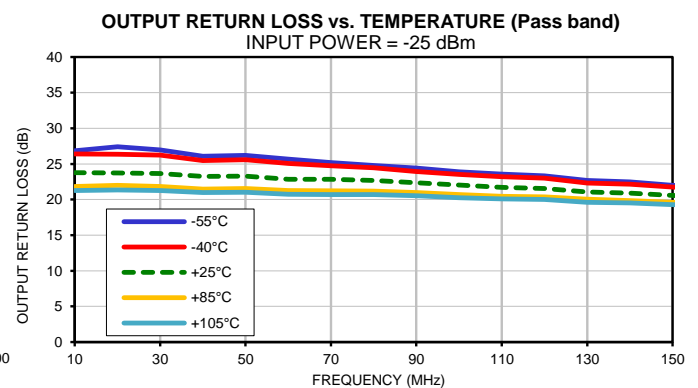
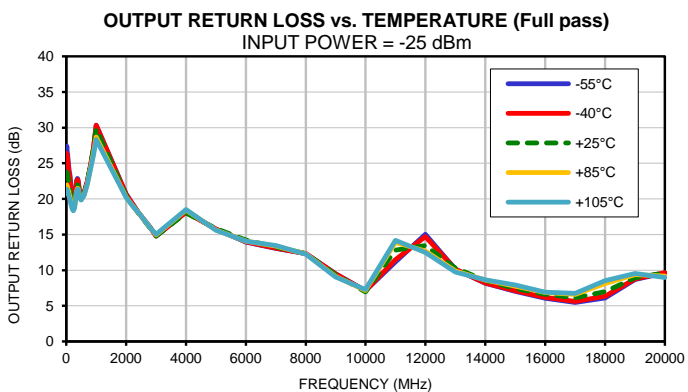
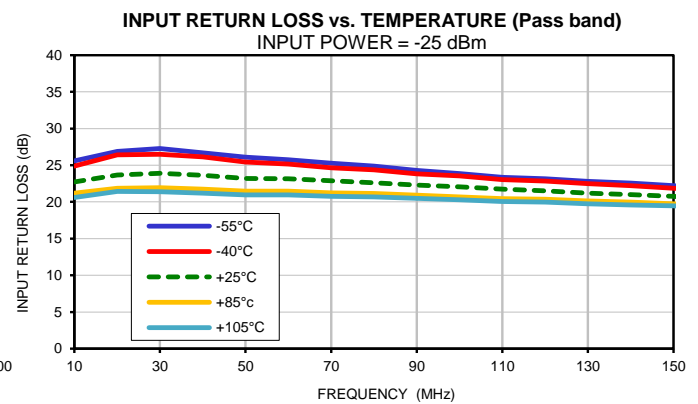
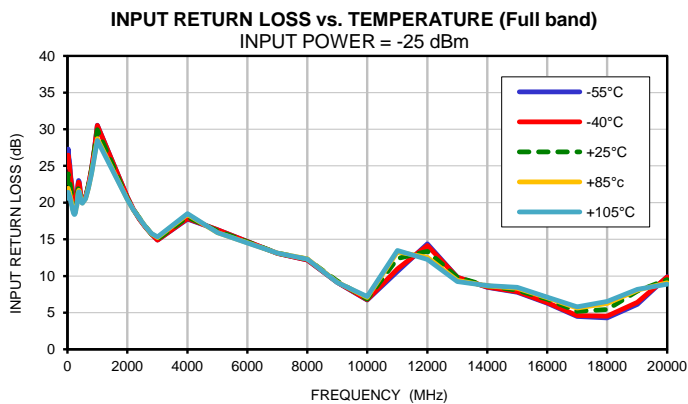
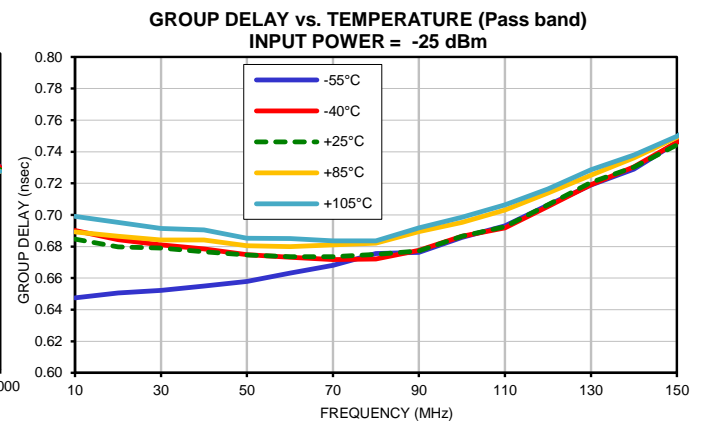
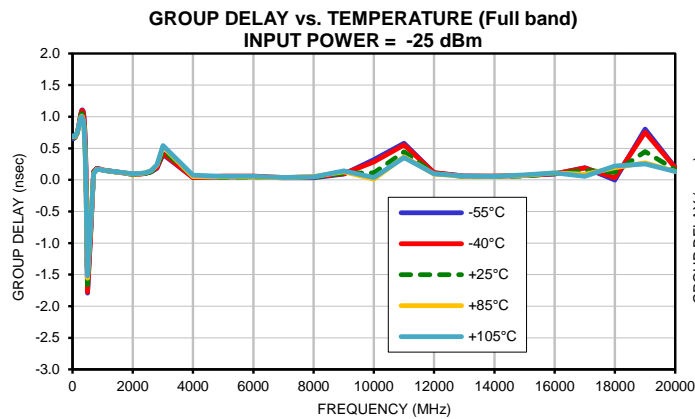
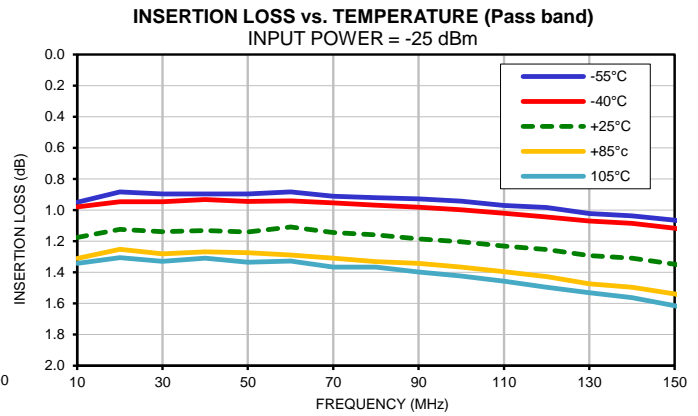
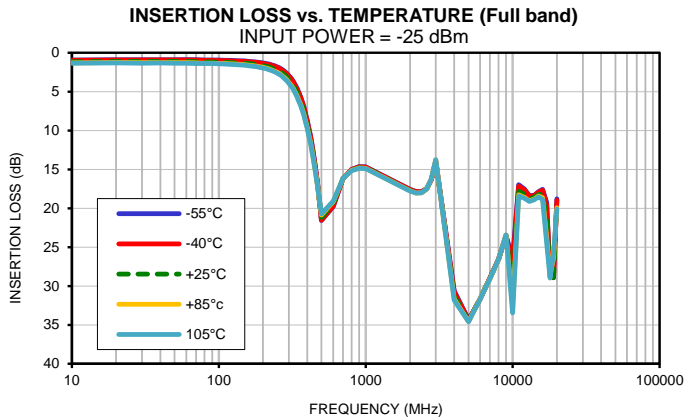
Typical Performance Data

FREQ.  (MHz)	INPUT RETURN LOSS					OUTPUT RETURN LOSS				
	(dB)					(dB)				
	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C
10	25.60	24.90	22.74	21.18	20.60	26.85	26.38	23.77	21.83	21.28
20	26.90	26.42	23.65	21.88	21.42	27.41	26.34	22.00	22.00	21.36
30	27.28	26.48	23.91	21.95	21.41	26.96	26.24	23.63	21.84	21.25
40	26.70	26.13	23.62	21.76	21.18	26.07	25.46	23.24	21.46	20.96
50	26.11	25.45	23.21	21.46	20.96	26.19	25.59	23.29	21.56	21.04
60	25.73	25.17	23.15	21.47	20.95	25.66	25.05	22.85	21.28	20.74
70	25.26	24.64	22.87	21.23	20.76	25.17	24.74	22.83	21.22	20.69
80	24.88	24.38	22.60	21.15	20.69	24.78	24.46	22.66	21.17	20.70
90	24.29	23.84	22.30	20.90	20.50	24.40	23.93	22.37	20.99	20.52
100	23.86	23.54	22.06	20.69	20.30	23.91	23.54	22.01	20.69	20.26
110	23.35	23.04	21.73	20.45	20.06	23.57	23.21	21.72	20.46	20.09
120	23.16	22.85	21.51	20.38	19.99	23.32	23.00	21.56	20.37	20.03
130	22.79	22.50	21.21	20.15	19.73	22.69	22.31	21.06	20.04	19.61
140	22.56	22.22	21.01	19.96	19.59	22.48	22.16	20.90	19.87	19.54
150	22.21	21.85	20.78	19.73	19.47	22.01	21.76	20.58	19.60	19.29
160	21.75	21.46	20.32	19.46	19.18	21.73	21.45	20.24	19.43	19.17
180	21.29	21.04	19.94	19.12	18.89	21.17	20.86	19.82	19.09	18.87
200	20.73	20.53	19.51	18.81	18.60	20.65	20.43	19.41	18.80	18.58
210	20.61	20.37	19.38	18.73	18.56	20.45	20.22	19.28	18.69	18.47
220	20.30	20.12	19.22	18.57	18.43	20.28	20.08	19.16	18.59	18.46
230	20.24	20.08	19.16	18.65	18.43	20.21	20.00	19.11	18.61	18.45
240	20.01	19.90	19.09	18.60	18.39	19.93	19.81	19.00	18.50	18.34
250	19.97	19.78	19.02	18.54	18.42	19.95	19.80	19.02	18.62	18.46
260	20.00	19.91	19.13	18.67	18.55	19.90	19.77	19.05	18.66	18.55
270	19.95	19.86	19.19	18.76	18.61	19.95	19.83	19.22	18.75	18.64
280	20.10	20.02	19.42	18.98	18.86	20.09	19.98	19.31	18.97	18.81
290	20.42	20.28	19.69	19.28	19.15	20.22	20.17	19.51	19.16	19.08
300	20.49	20.38	19.80	19.44	19.31	20.51	20.40	19.78	19.44	19.36
310	20.79	20.71	20.11	19.74	19.64	20.91	20.76	20.09	19.75	19.71
320	21.21	21.09	20.53	20.13	20.01	21.31	21.14	20.50	20.11	19.97
330	21.63	21.54	20.93	20.47	20.35	21.73	21.54	20.88	20.45	20.38
340	22.14	21.97	21.37	20.90	20.80	22.23	22.00	21.30	20.86	20.74
350	22.56	22.39	21.76	21.23	21.07	22.53	22.39	21.59	21.10	21.02
360	22.86	22.63	21.99	21.46	21.31	22.78	22.63	21.85	21.37	21.25
370	23.01	22.80	22.13	21.61	21.45	22.86	22.71	21.97	21.47	21.35
380	22.95	22.77	22.10	21.66	21.48	22.84	22.66	21.94	21.50	21.36
390	22.81	22.68	22.00	21.59	21.47	22.63	22.52	21.84	21.46	21.32
400	22.55	22.46	21.85	21.44	21.33	22.42	22.28	21.67	21.36	21.22
410	22.22	22.13	21.61	21.29	21.17	22.07	21.95	21.42	21.18	21.08
420	21.81	21.71	21.30	21.03	20.92	21.71	21.67	21.19	20.92	20.83
430	21.50	21.45	21.06	20.83	20.75	21.36	21.27	20.90	20.68	20.67
440	21.18	21.19	20.82	20.62	20.54	21.11	21.02	20.70	20.53	20.49
450	21.00	20.94	20.64	20.47	20.39	20.85	20.81	20.46	20.35	20.31
460	20.73	20.71	20.41	20.29	20.22	20.65	20.60	20.33	20.22	20.19
470	20.57	20.52	20.26	20.19	20.08	20.45	20.44	20.18	20.04	20.00
480	20.44	20.44	20.15	20.06	20.03	20.38	20.33	20.08	19.99	19.96
490	20.38	20.35	20.07	20.00	19.97	20.25	20.26	19.98	19.89	19.86
500	20.29	20.27	20.02	19.96	19.93	20.21	20.17	19.93	19.87	19.84
600	20.71	20.73	20.62	20.53	20.49	20.90	20.89	20.64	20.54	20.49
700	22.34	22.34	22.26	22.00	21.97	22.42	22.44	22.30	22.06	22.03
800	24.57	24.65	24.46	24.07	23.97	24.36	24.42	24.45	24.05	23.92
900	27.26	27.29	27.14	26.43	26.25	26.86	26.97	26.90	26.27	26.04
1000	30.55	30.52	29.94	28.72	28.48	30.35	30.33	29.81	28.69	28.32
2000	20.79	20.80	20.54	20.44	20.41	20.70	20.65	20.43	20.24	20.21
2200	19.11	19.11	19.08	19.00	19.00	19.41	19.37	19.20	19.11	19.09
2400	17.76	17.77	17.92	17.87	17.86	18.14	18.12	18.03	18.11	18.10
2600	16.64	16.66	16.75	16.73	16.73	17.10	17.09	17.03	17.11	17.09
2800	15.70	15.71	15.71	15.76	15.78	16.05	16.01	15.91	15.96	15.95
3000	14.87	14.91	15.00	15.25	15.32	14.79	14.78	14.77	14.97	15.04
4000	17.75	17.82	18.01	18.39	18.49	18.14	18.14	18.02	18.44	18.51
5000	16.30	16.30	16.14	15.92	15.91	15.78	15.78	15.83	15.63	15.59
6000	14.70	14.70	14.66	14.54	14.51	13.96	13.98	14.24	14.07	14.05
7000	13.09	13.10	13.13	13.10	13.14	13.05	13.08	13.24	13.39	13.45
8000	12.16	12.17	12.30	12.32	12.28	12.33	12.33	12.31	12.28	12.26
9000	9.12	9.15	9.30	9.15	9.12	9.49	9.49	9.37	9.15	9.06
10000	6.74	6.78	6.85	7.08	7.21	7.12	7.11	6.95	7.15	7.26
11000	10.61	10.94	12.36	13.28	13.49	11.17	11.48	12.81	13.89	14.20
12000	14.37	14.15	13.37	12.55	12.24	15.01	14.73	13.47	12.71	12.48
13000	9.82	9.83	9.82	9.39	9.24	10.14	10.12	10.32	9.90	9.74
14000	8.44	8.48	8.65	8.66	8.67	8.15	8.20	8.57	8.61	8.67
15000	7.79	7.86	8.07	8.33	8.45	7.03	7.10	7.43	7.77	7.92
16000	6.28	6.37	6.84	7.04	7.10	6.08	6.17	6.65	6.87	6.91
17000	4.46	4.61	5.18	5.63	5.79	5.47	5.62	6.13	6.60	6.75
18000	4.29	4.52	5.41	6.25	6.52	6.09	6.33	6.98	8.12	8.51
19000	6.12	6.41	7.92	8.07	8.18	8.71	8.78	8.94	9.38	9.55
20000	9.89	9.86	9.51	9.09	8.89	9.63	9.67	9.63	9.18	8.98

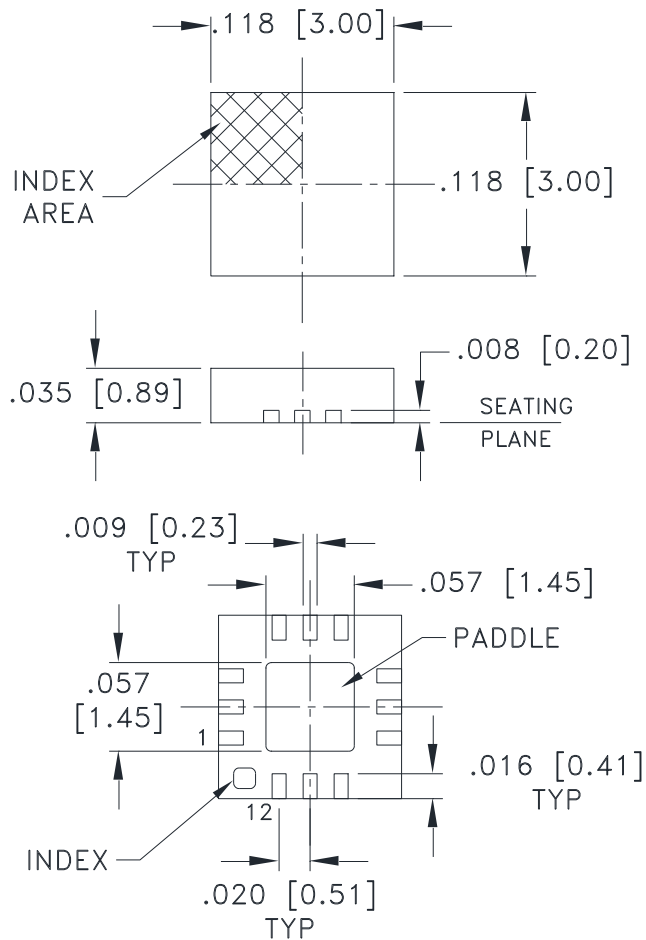




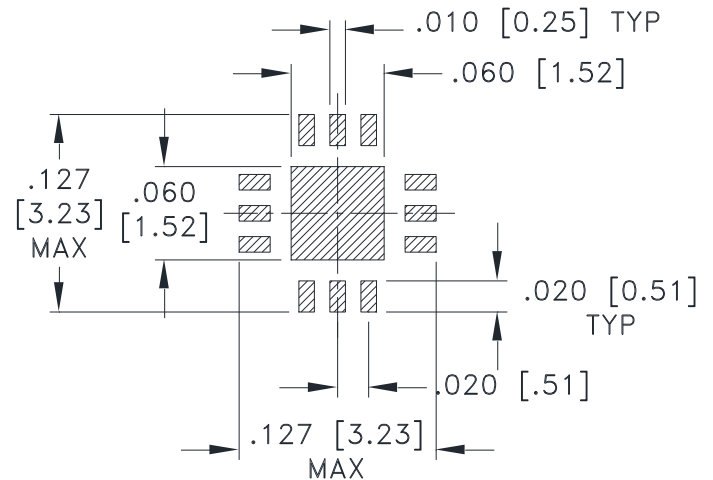
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



SUGGESTED LAYOUT,  
TOLERANCE TO BE WITHIN  $\pm .002$

**Weight: .02 Grams**

**Dimensions are in inches (mm). Tolerances: 2Pl.  $\pm .01$ ; 3 Pl.  $\pm .004$**

#### Notes:

1. Case material: Plastic.
2. Termination finish:
  - For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin. All models, (+) suffix. See Data sheet.
  - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



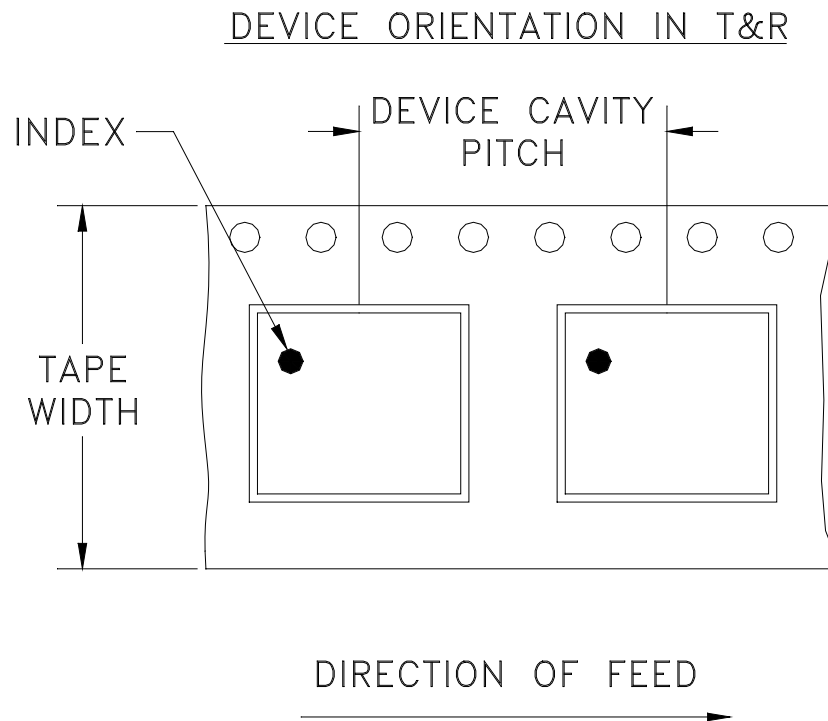
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# Tape & Reel Packaging TR-F66



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
8	4	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000, 2000, 3000

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)

**Mini-Circuits®**

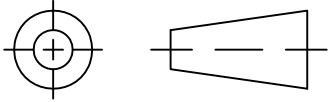
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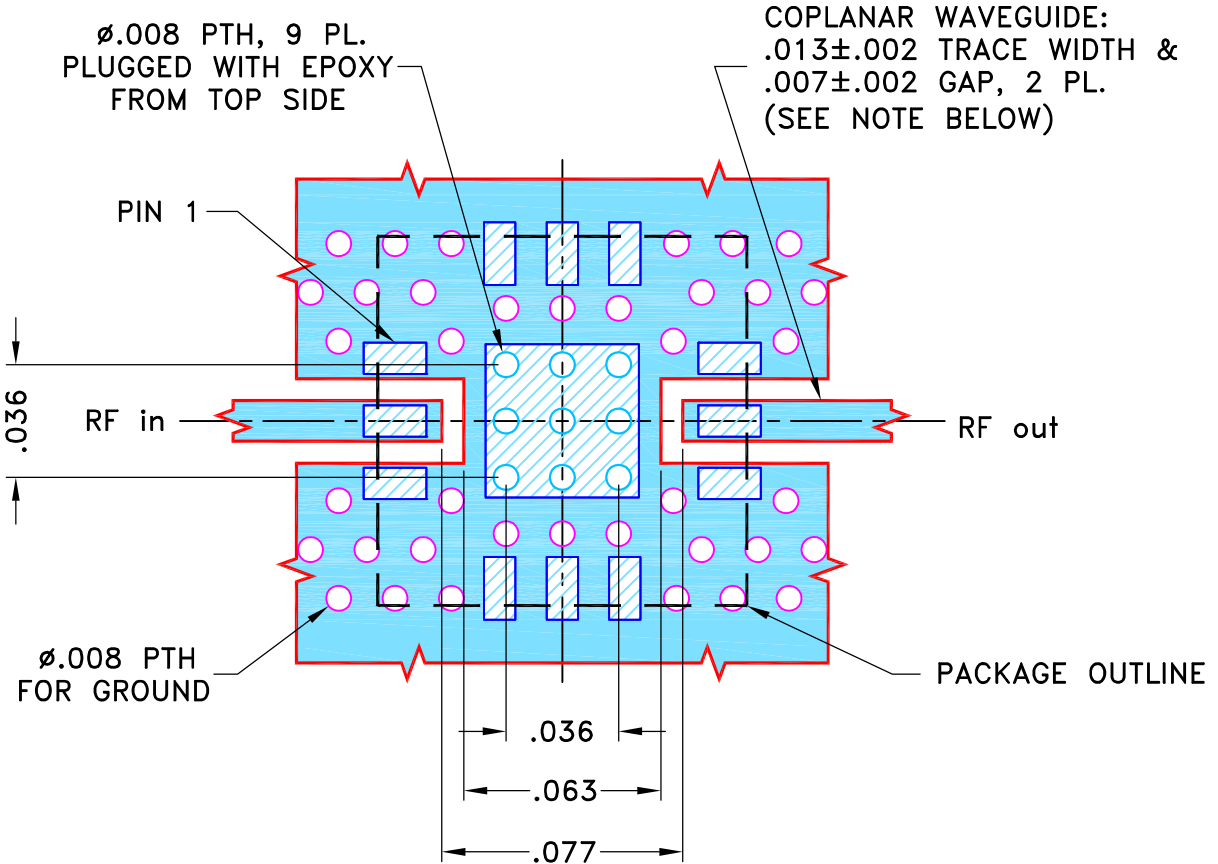
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M152656	NEW RELEASE	09/11/15	ITG	MY

SUGGESTED MOUNTING CONFIGURATION  
FOR DQ1225 CASE STYLE, "12FL02" PIN CODE



**NOTES:**

- TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.0066 \pm .0007$ ". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm .005$ ANGLES $\pm$ FRACTIONS $\pm$	DRAWN	ITG	09/10/15
	CHECKED	GF	09/11/15
	APPROVED	MY	09/11/15

**Mini-Circuits<sup>®</sup>** 13 Neptune Avenue  
 Brooklyn NY 11235

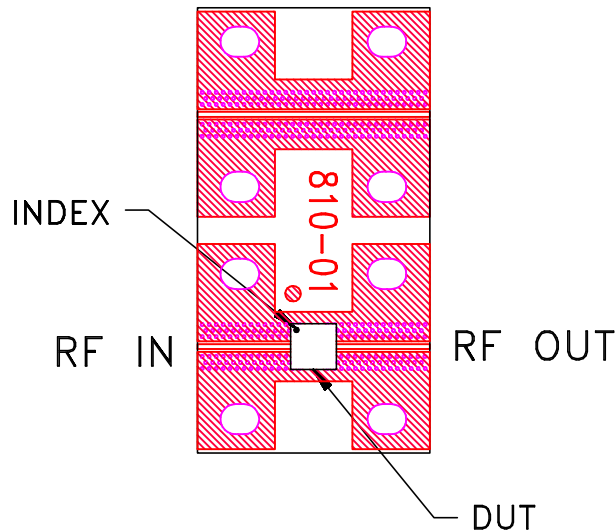
PL, 12FL02, DQ1225, TB-844+

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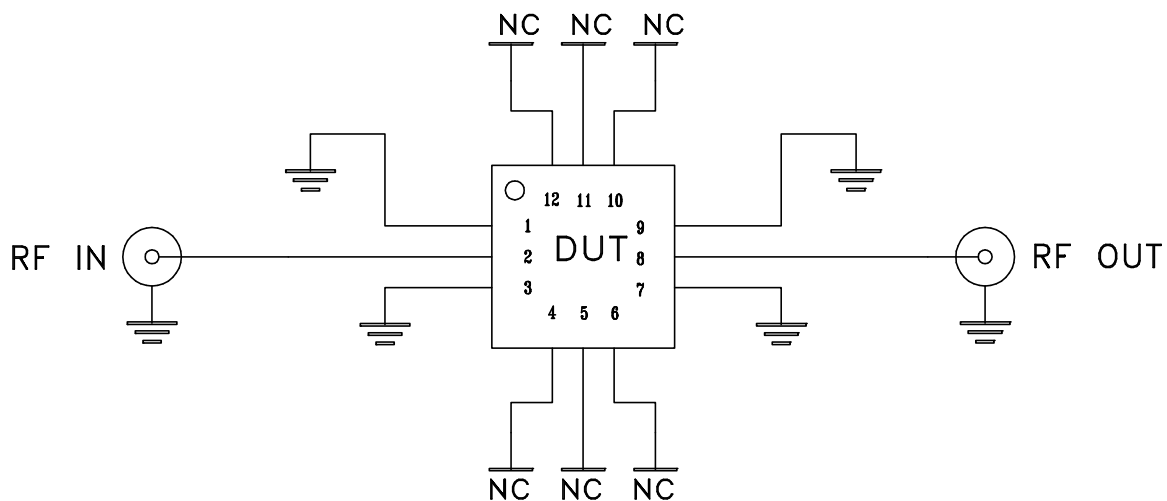
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-451	REV: OR
FILE: 98PL451	SCALE: 16:1	SHEET: 1 OF 1	

# Evaluation Board and Circuit

To be used with Mini-Circuits 50 Ohm 2.92 connectors B20-118-F1+.  
Connectors are sold separately.




TB-844-151+



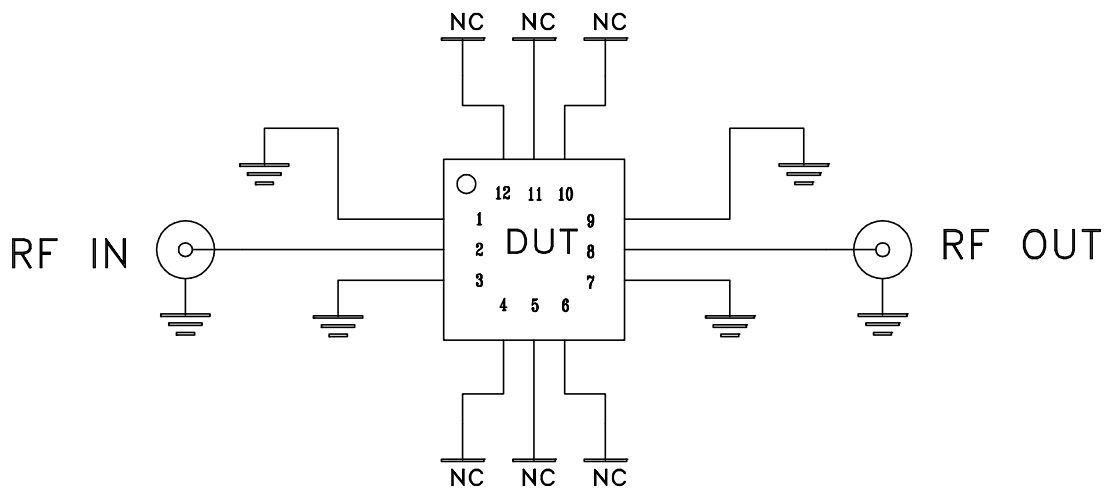
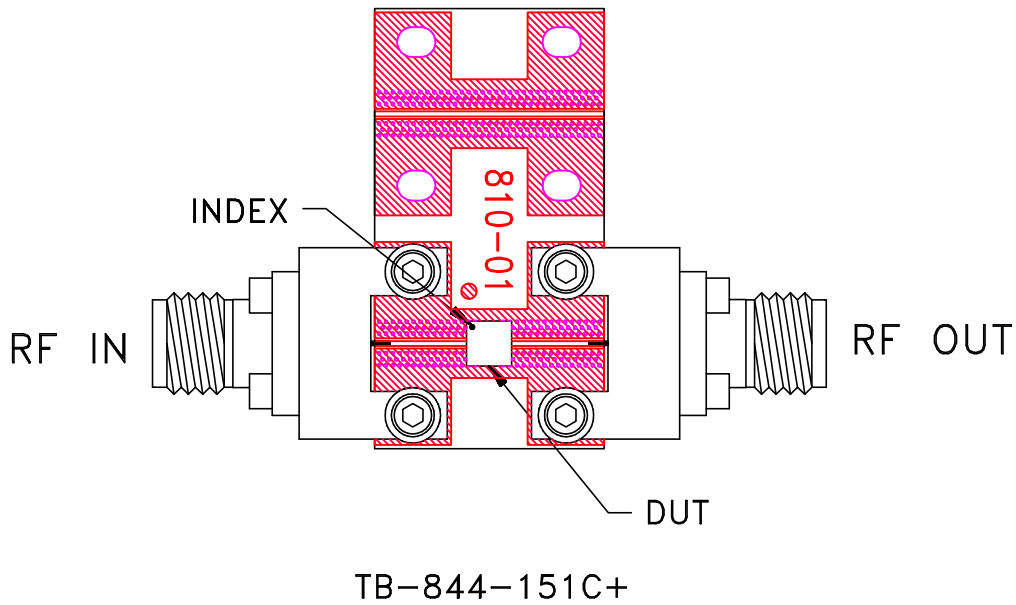
Schematic Diagram

## Note:

PCB Material: R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.0066 inch.

 **Mini-Circuits®**


# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. 50 Ohm 2.92 mm Female connectors.
2. PCB Material: R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.0066 inch.

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 105°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
Temperature Cycling	-65° to 150°C, 100 cycles	JESD22-A104
Temperature Humidity	85°C/ 85% RH, 168 hours	JESD22-113
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 240°C peak (Non-RoHS) or 260°C (RoHS)	J-STD-020C
Solderability	10X magnification, 95% coverage	JESD22-B102, Method 1: Dip and Look Test
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215