REFLECTIONLESS

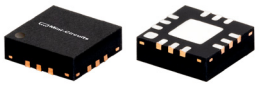
High Pass Filter

XHF-392+

50Ω 3940 to 11500 MHz

THE BIG DEAL

- Match to 50Ω in the stop band, eliminates undesired reflections
- Cascadable
- Excellent Power handling
- Temperature stable, 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

- Sub-harmonic rejection
- Wideband Matching
- Transmitters / Receivers

GENERAL DESCRIPTION

Mini-Circuits' XHF-392+ 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

Feature	Advantages
Easy integration with sensitive reflective components, e.g. mixers, multipliers	Reflectionless filters absorb unwanted signals falling in filter stopband, 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.
High stopband rejection, up to 50 dB	Ideal for applications where suppression of strong spurious signals and intermod- ulation products is needed.
Enables stable integration of wideband amplifiers	Because reflectionless filters maintain good impedance in the stopband; they can be integrated with high gain, wideband amplifiers without the risk of creating instabilities in these out of band regions.
Cascadable	Reflectionless filters can be cascaded in multiple sections to provide sharper and higher attenuation, while also preventing any standing waves that could affect passband signals. Low & highpass filters can be cascaded to realize bandpass filters.
Excellent power handling in a tiny surface mount device up to 7W in passband	High power handling extends the usability of these filters to the transmit path for inter-stage filtering.
Small size, 3x3mm QFN	Allows replacement of filter/attenuator pairs with a single reflectionless filter, saving board space.
Excellent repeatability of RF performance	Through semiconductor IPD process, X-series filters are inherently repeatable for large volume production.
Operating temperature up to 105˚C	Suitable for operation close to high power components.

IPD – Integrated Passive Device, is a GaAs semiconductor process

REFLECTIONLESS

High Pass Filter

XHF-392+

50Ω 3940 to 11500 MHz

ELECTRICAL SPECIFICATIONS[1] AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Stop Band	Rejection	DC-F1	DC-2450	12	14	—	dB
	Frequency Cut-off	F2	3220	—	3.0	—	dB
	VSWR	DC - F1	DC-2450	—	1.4	—	:1
Pass Band	Insertion Loss	F3-F5	3940 -11500	—	1.3	1.6	dB
	VSWR	F3-F4	3940 - 8000	—	1.4	—	:1
		F4-F5	8000 - 11500	—	1.7	—	:1

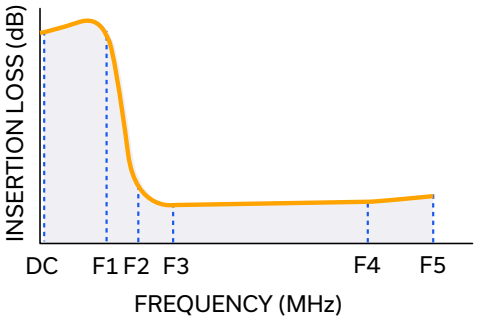
1. Measured on Mini-Circuits Characterization Test Board TB-844-392H+

ABOLUTE MAXIMUM RATINGS[2]

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-65°C to +150°C
RF Power Input, Passband (F3-F5)[3]	2 W at +25°C
RF Power Input, Stopband (DC-F3)[4]	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

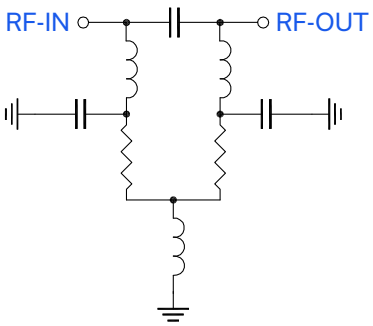


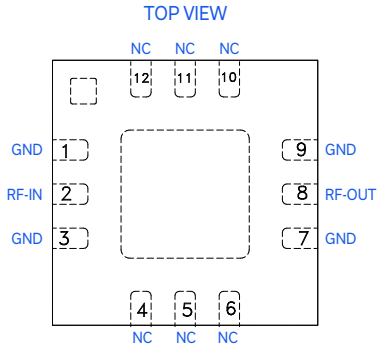
High Pass Filter

XHF-392+

50Ω 3940 to 11500 MHz

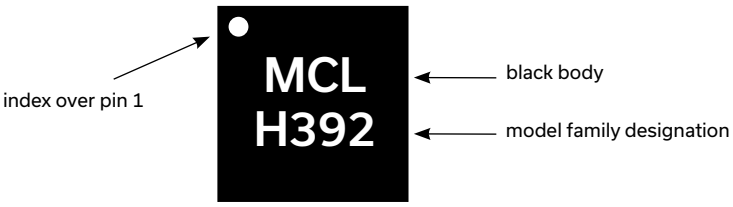
SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION





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

REFLECTIONLESS

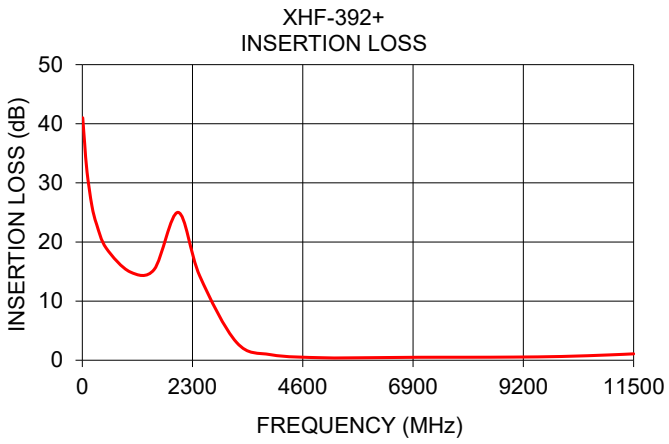
High Pass Filter

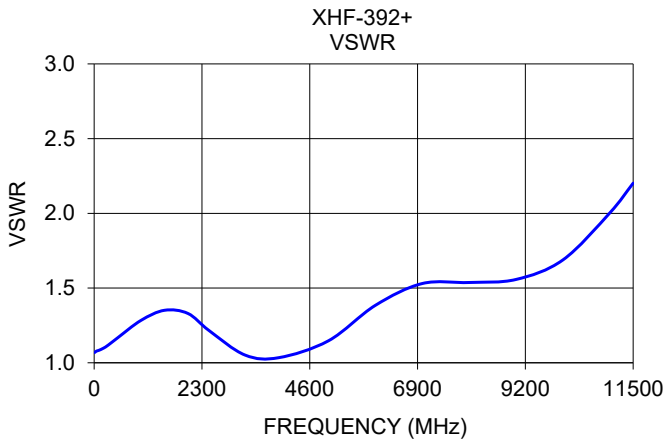
XHF-392+

50Ω 3940 to 11500 MHz

TYPICAL PERFORMANCE DATA AT +25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
10	41.01	1.07
50	36.66	1.08
100	31.80	1.08
200	26.17	1.10
300	22.97	1.12
500	18.96	1.17
1000	14.93	1.28
1500	15.36	1.35
2000	25.01	1.33
2450	14.26	1.22
3220	3.00	1.05
3940	0.93	1.03
5000	0.43	1.15
6000	0.44	1.38
7000	0.51	1.53
8000	0.51	1.54
9000	0.54	1.56
10000	0.64	1.69
11000	0.91	2.00
11500	1.09	2.20





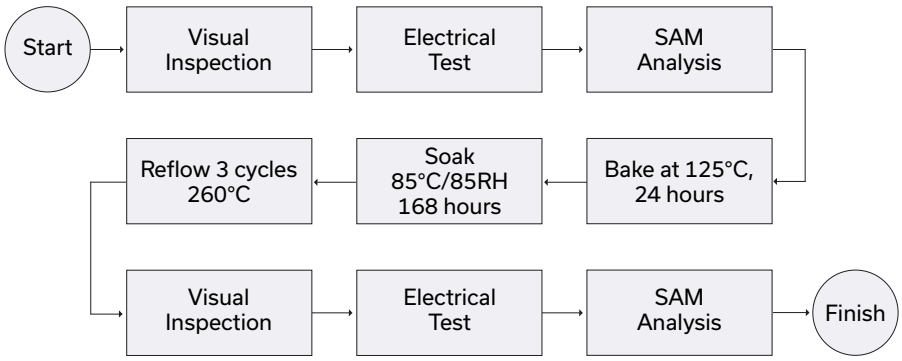
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE

Performance Data & Graphs	Table 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-844-392H+ (without connectors) TB-844-392HC+ (with connectors) B20-118-F1+ Connector sold separately
Environmental Ratings	ENV82

ESD RATING
Human body model (HBM): Class 2 (2000 to < 4000 V) in accordance with ANSI/ESD 5.1-2001

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

MSL TEST FLOW CHART



REFLECTIONLESS

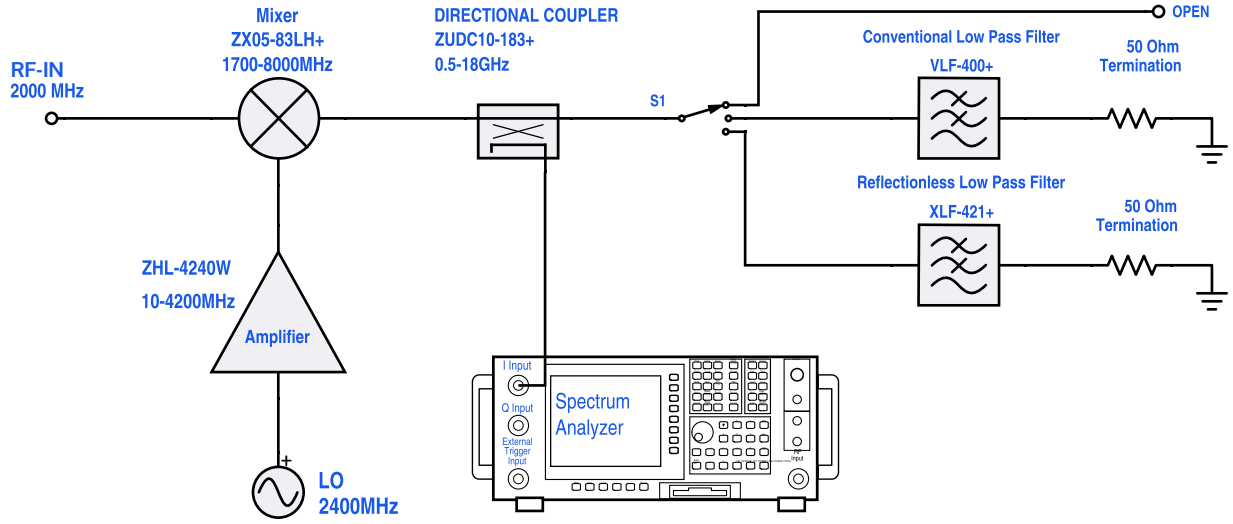
High Pass Filter

XHF-392+

50Ω 3940 to 11500 MHz

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

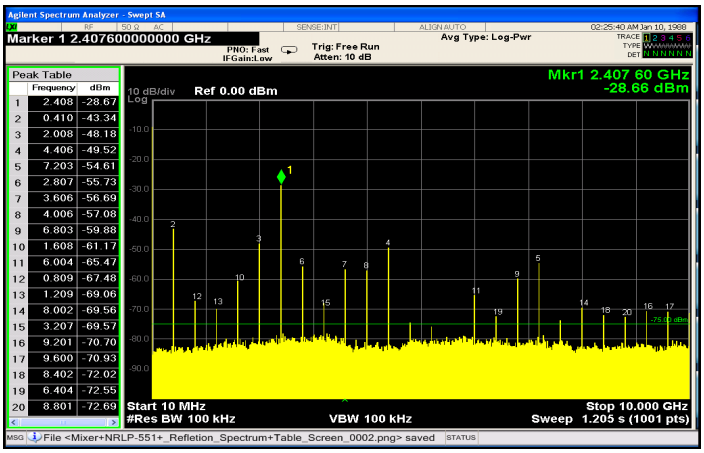


Figure 1. IF output reflection spectrum without filter

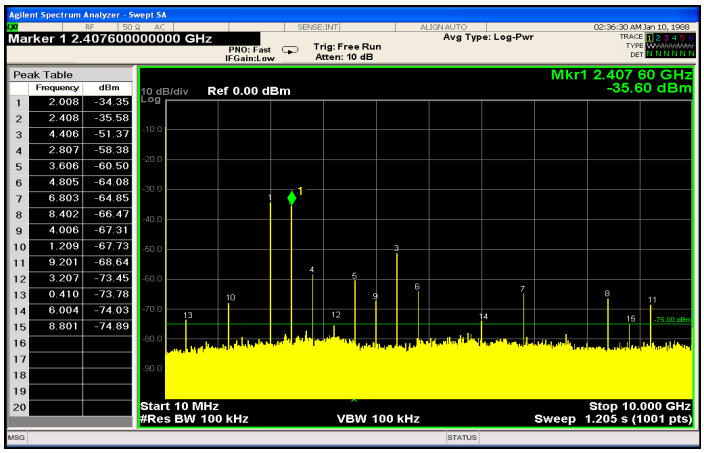


Figure 2. IF output reflection spectrum with conventional filter

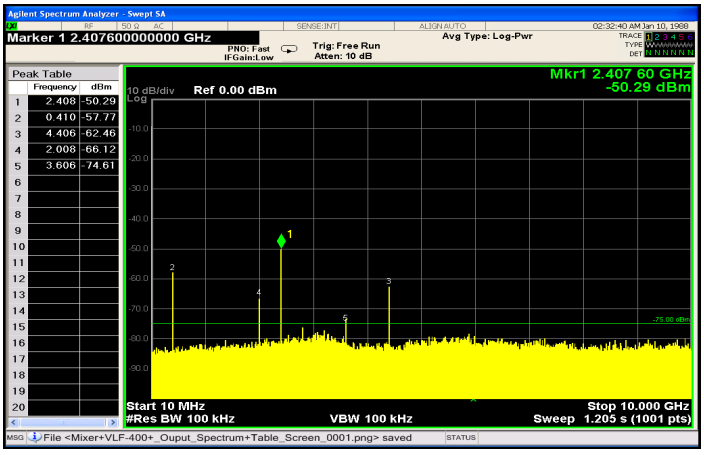


Figure 3. IF output reflection spectrum with reflectionless filter

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 improvingsystem 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

Typical Performance Data

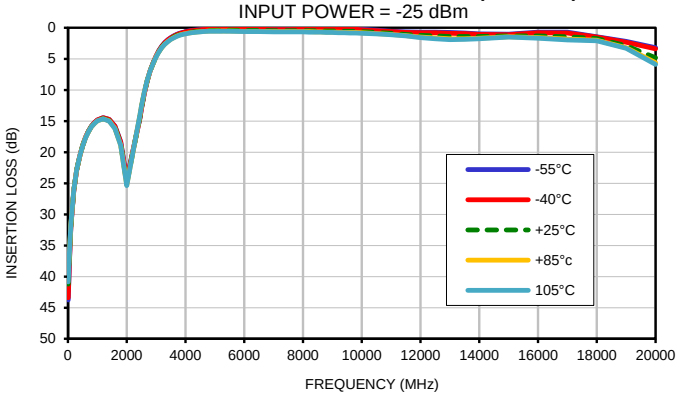
FREQ.	INSERTION LOSS					GROUP DELAY				
(MHz)	(dB)					(nsec)				
	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C
10	43.76	43.40	41.21	39.33	40.86	-2.06	-1.32	-4.05	-3.24	-3.56
50	37.66	37.44	36.43	36.48	36.12	-1.47	-1.17	-2.23	-2.00	-2.18
100	32.01	31.98	31.92	31.69	31.54	-0.47	-0.51	-0.42	-0.59	-0.52
200	26.31	26.28	26.14	26.18	26.11	0.04	0.05	0.02	-0.03	-0.03
300	22.90	22.94	22.90	22.88	22.90	0.11	0.09	0.09	0.08	0.07
400	20.64	20.62	20.59	20.67	20.64	0.12	0.12	0.11	0.10	0.10
500	18.90	18.93	18.96	18.96	18.98	0.13	0.12	0.12	0.11	0.12
600	17.62	17.62	17.66	17.67	17.69	0.13	0.13	0.12	0.12	0.11
700	16.62	16.63	16.69	16.71	16.71	0.13	0.13	0.12	0.12	0.12
800	15.85	15.85	15.91	15.93	15.95	0.13	0.13	0.12	0.12	0.12
900	15.26	15.26	15.33	15.38	15.38	0.13	0.13	0.12	0.12	0.12
1000	14.83	14.84	14.93	14.95	14.98	0.13	0.13	0.12	0.12	0.12
1200	14.45	14.48	14.58	14.64	14.66	0.13	0.13	0.12	0.12	0.12
1400	14.72	14.75	14.90	14.98	15.00	0.12	0.12	0.11	0.11	0.11
1600	15.82	15.86	16.06	16.16	16.20	0.12	0.11	0.11	0.10	0.10
1800	18.31	18.38	18.66	18.84	18.91	0.09	0.08	0.06	0.05	0.04
2000	24.42	24.52	25.00	25.28	25.37	-0.23	-0.27	-0.41	-0.52	-0.54
2450	14.52	14.47	14.26	14.03	13.96	0.13	0.12	0.11	0.11	0.10
2500	13.05	13.01	12.85	12.66	12.61	0.15	0.15	0.14	0.13	0.13
2600	10.57	10.55	10.47	10.35	10.32	0.18	0.18	0.17	0.17	0.16
2700	8.57	8.57	8.54	8.48	8.46	0.20	0.20	0.19	0.18	0.18
2800	6.95	6.95	6.97	6.94	6.94	0.21	0.21	0.20	0.19	0.19
2900	5.61	5.63	5.70	5.69	5.69	0.21	0.21	0.20	0.20	0.19
3000	4.53	4.55	4.64	4.67	4.67	0.21	0.21	0.20	0.19	0.19
3100	3.65	3.68	3.79	3.83	3.85	0.20	0.20	0.19	0.19	0.19
3200	2.95	2.98	3.11	3.16	3.18	0.19	0.19	0.18	0.18	0.18
3220	2.82	2.86	2.99	3.05	3.06	0.19	0.19	0.18	0.18	0.18
3300	2.39	2.42	2.57	2.63	2.65	0.18	0.18	0.17	0.17	0.17
3400	1.93	1.97	2.13	2.20	2.22	0.17	0.17	0.16	0.16	0.16
3500	1.58	1.62	1.78	1.86	1.89	0.16	0.16	0.15	0.15	0.15
3600	1.30	1.34	1.50	1.58	1.61	0.15	0.15	0.14	0.14	0.14
3700	1.06	1.11	1.28	1.37	1.40	0.14	0.14	0.13	0.13	0.13
3800	0.89	0.93	1.10	1.19	1.22	0.13	0.13	0.12	0.12	0.12
3900	0.74	0.79	0.97	1.06	1.09	0.12	0.12	0.12	0.11	0.11
3940	0.69	0.74	0.92	1.01	1.04	0.12	0.12	0.11	0.11	0.11
4000	0.62	0.67	0.85	0.94	0.98	0.12	0.11	0.11	0.11	0.11
4100	0.53	0.57	0.76	0.84	0.88	0.11	0.11	0.10	0.10	0.10
4200	0.45	0.50	0.69	0.78	0.82	0.10	0.10	0.10	0.10	0.10
4400	0.33	0.38	0.57	0.67	0.70	0.09	0.09	0.09	0.08	0.08
4600	0.26	0.30	0.50	0.60	0.63	0.09	0.09	0.08	0.08	0.08
4800	0.20	0.25	0.44	0.55	0.59	0.08	0.08	0.07	0.07	0.07
5000	0.16	0.22	0.41	0.52	0.57	0.07	0.07	0.07	0.07	0.07
5100	0.14	0.20	0.40	0.51	0.56	0.07	0.07	0.06	0.07	0.06
5200	0.14	0.19	0.40	0.52	0.56	0.07	0.07	0.06	0.06	0.06
5300	0.13	0.19	0.39	0.51	0.56	0.07	0.07	0.06	0.06	0.06
5400	0.12	0.17	0.39	0.52	0.56	0.07	0.07	0.06	0.06	0.06
5500	0.12	0.18	0.40	0.52	0.57	0.06	0.06	0.06	0.06	0.06
6000	0.14	0.19	0.42	0.56	0.61	0.06	0.06	0.05	0.05	0.05
6500	0.17	0.23	0.45	0.59	0.64	0.05	0.05	0.04	0.04	0.04
7000	0.21	0.27	0.48	0.61	0.65	0.05	0.05	0.04	0.04	0.04
7500	0.21	0.27	0.49	0.62	0.66	0.05	0.04	0.04	0.04	0.04
8000	0.17	0.24	0.48	0.63	0.68	0.04	0.04	0.04	0.04	0.04
8200	0.16	0.22	0.48	0.64	0.69	0.04	0.05	0.04	0.04	0.04
8400	0.14	0.21	0.49	0.65	0.71	0.05	0.05	0.04	0.04	0.04
8600	0.13	0.20	0.49	0.67	0.73	0.04	0.04	0.04	0.04	0.04
8800	0.12	0.19	0.51	0.69	0.76	0.05	0.05	0.04	0.04	0.04
9000	0.12	0.19	0.51	0.70	0.78	0.05	0.05	0.04	0.04	0.04
9200	0.13	0.20	0.53	0.73	0.80	0.04	0.04	0.04	0.03	0.03
9400	0.14	0.21	0.55	0.73	0.81	0.04	0.04	0.04	0.04	0.04
9600	0.17	0.23	0.56	0.76	0.83	0.05	0.05	0.04	0.04	0.04
9800	0.19	0.27	0.58	0.78	0.86	0.04	0.04	0.04	0.04	0.04
10000	0.24	0.32	0.62	0.81	0.89	0.04	0.04	0.04	0.04	0.03
10500	0.40	0.46	0.74	0.92	0.98	0.04	0.04	0.03	0.03	0.03
11000	0.56	0.63	0.88	1.06	1.12	0.04	0.04	0.03	0.03	0.03
11500	0.65	0.75	1.06	1.26	1.33	0.04	0.03	0.03	0.03	0.03
12000	0.70	0.80	1.22	1.48	1.57	0.04	0.03	0.03	0.03	0.03
12500	0.71	0.82	1.33	1.65	1.76	0.04	0.04	0.03	0.03	0.03
13000	0.77	0.88	1.42	1.78	1.91	0.04	0.04	0.03	0.02	0.02
13500	0.85	0.95	1.42	1.76	1.88	0.04	0.04	0.03	0.03	0.02
14000	0.99	1.06	1.38	1.66	1.76	0.03	0.03	0.03	0.03	0.03
15000	1.03	1.11	1.29	1.46	1.51	0.03	0.03	0.03	0.04	0.04
16000	0.70	0.81	1.32	1.57	1.66	0.05	0.05	0.04	0.04	0.04
17000	0.71	0.83	1.44	1.82	1.97	0.05	0.05	0.04	0.04	0.04
18000	1.43	1.51	1.74	2.01	2.12	0.04	0.04	0.05	0.05	0.05
19000	2.19	2.34	2.88	3.22	3.30	0.05	0.05	0.05	0.05	0.05
20000	3.19	3.42	4.84	5.63	5.91	0.06	0.05	0.02	0.01	0.01

Typical Performance Data

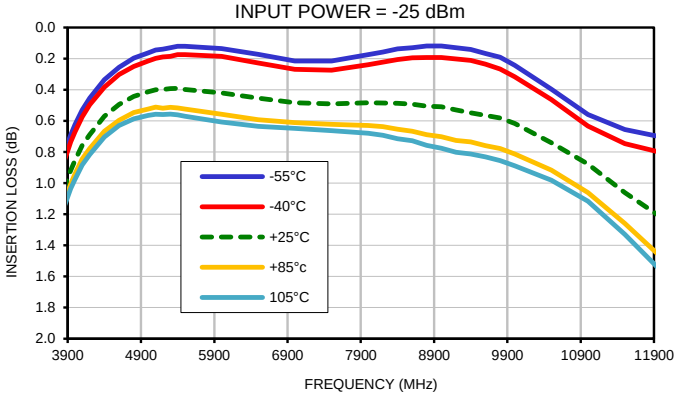
FREQ.	INPUT RETURN LOSS					OUTPUT RETURN LOSS				
(MHz)	(dB)					(dB)				
	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C	@-55°C	@-40°C	@+25°C	@+85°C	@+105°C
10	29.85	29.78	29.20	28.81	28.40	29.33	29.19	28.24	27.73	27.71
50	28.99	28.85	28.39	28.00	27.81	28.13	28.25	28.38	27.83	27.75
100	27.83	27.91	27.93	27.49	27.44	27.41	27.34	28.05	28.31	28.47
200	26.67	26.59	26.66	26.39	26.32	26.71	26.72	26.50	26.33	26.17
300	25.31	25.32	25.03	24.84	24.81	25.02	24.99	25.14	24.86	24.86
400	23.66	23.59	23.51	23.47	23.38	23.70	23.66	23.43	23.34	23.32
500	22.38	22.37	22.23	22.26	22.24	22.15	22.12	22.11	21.86	21.69
600	21.32	21.31	21.14	21.10	21.11	21.16	21.12	20.99	20.92	20.87
700	20.28	20.28	20.16	20.16	20.17	20.28	20.25	19.99	19.87	19.81
800	19.47	19.50	19.39	19.38	19.38	19.20	19.17	19.07	18.89	18.80
900	18.80	18.80	18.74	18.73	18.74	18.48	18.49	18.39	18.29	18.27
1000	18.17	18.16	18.11	18.10	18.13	17.92	17.91	17.83	17.75	17.72
1200	17.21	17.23	17.21	17.22	17.21	16.94	16.96	16.93	16.89	16.90
1400	16.58	16.60	16.66	16.65	16.63	16.24	16.27	16.34	16.35	16.29
1600	16.27	16.32	16.44	16.44	16.42	15.89	15.94	16.12	16.16	16.15
1800	16.27	16.33	16.53	16.54	16.53	15.81	15.90	16.14	16.24	16.27
2000	16.69	16.74	16.96	17.03	17.04	16.00	16.10	16.47	16.63	16.65
2450	19.97	20.01	20.22	20.45	20.49	18.72	18.83	19.33	19.56	19.67
2500	20.74	20.76	20.92	21.20	21.25	19.35	19.43	19.97	20.24	20.33
2600	22.34	22.38	22.52	22.81	22.84	20.80	20.89	21.33	21.57	21.69
2700	24.22	24.26	24.39	24.62	24.65	22.38	22.48	22.91	23.08	23.08
2800	26.40	26.41	26.52	26.55	26.56	24.35	24.43	24.72	24.78	24.89
2900	28.82	28.77	28.67	28.52	28.45	26.40	26.44	26.53	26.48	26.55
3000	31.04	30.96	30.67	30.14	29.85	28.17	28.06	28.09	27.81	27.64
3100	32.45	32.30	31.37	30.70	30.27	29.03	28.89	28.72	28.22	28.13
3200	33.30	32.96	31.91	30.84	30.33	29.14	29.04	28.97	28.29	28.22
3220	33.22	32.95	31.97	30.75	30.24	28.94	28.95	28.86	28.23	28.18
3300	33.84	33.51	32.28	30.98	30.40	28.86	28.79	28.82	27.99	27.66
3400	34.75	34.50	32.70	31.22	30.58	28.70	28.54	28.55	27.77	27.57
3500	35.25	34.85	32.85	31.10	30.36	28.57	28.61	28.43	27.64	27.45
3600	35.99	35.58	33.63	31.58	30.91	28.87	28.72	28.60	27.83	27.55
3700	37.28	36.80	34.14	32.01	31.20	28.88	28.83	28.52	27.76	27.64
3800	38.61	38.23	34.93	32.31	31.42	29.32	29.21	28.61	28.04	27.85
3900	38.50	37.64	35.12	32.72	31.99	29.57	29.43	28.62	27.77	27.56
3940	38.50	37.96	35.58	33.26	32.54	29.99	29.71	28.82	27.95	27.66
4000	38.32	37.72	36.09	33.80	33.08	30.09	29.80	28.64	27.84	27.67
4100	37.88	37.31	35.98	34.07	33.48	30.47	30.17	28.70	27.94	27.84
4200	36.86	36.34	35.64	34.56	34.11	30.45	30.10	28.71	27.80	27.50
4400	33.64	33.18	32.09	31.31	31.13	30.72	30.12	27.81	27.04	26.89
4600	30.44	29.94	28.49	27.65	27.43	29.13	28.45	26.07	25.38	25.18
4800	27.92	27.48	25.80	24.81	24.55	27.40	26.80	24.27	23.20	22.94
5000	25.75	25.28	23.38	22.28	21.98	25.33	24.74	22.36	21.24	20.92
5100	24.82	24.40	22.44	21.31	20.99	24.28	23.72	21.55	20.38	20.07
5200	23.53	23.13	21.28	20.16	19.91	23.04	22.62	20.53	19.47	19.17
5300	22.51	22.20	20.42	19.37	19.09	22.02	21.60	19.68	18.68	18.36
5400	21.73	21.42	19.60	18.53	18.23	21.14	20.79	18.91	17.83	17.53
5500	20.93	20.65	18.90	17.80	17.50	20.49	20.18	18.38	17.35	17.03
6000	16.95	16.80	15.84	15.09	14.87	16.39	16.29	15.56	14.86	14.66
6500	14.59	14.54	14.24	13.93	13.91	13.88	13.90	13.96	13.77	13.79
7000	13.10	13.13	13.55	13.66	13.80	12.52	12.60	13.30	13.55	13.74
7500	12.68	12.72	13.29	13.55	13.72	12.26	12.33	13.10	13.48	13.67
8000	13.05	13.07	13.47	13.59	13.69	12.83	12.87	13.31	13.46	13.60
8200	13.31	13.31	13.53	13.53	13.52	13.21	13.25	13.42	13.46	13.43
8400	13.63	13.60	13.53	13.39	13.32	13.56	13.55	13.45	13.30	13.19
8600	13.76	13.72	13.46	13.25	13.13	13.57	13.53	13.28	13.06	12.93
8800	13.94	13.86	13.34	12.96	12.76	13.93	13.88	13.29	12.89	12.65
9000	13.93	13.85	13.22	12.79	12.58	13.69	13.66	13.07	12.65	12.39
9200	13.75	13.68	13.02	12.60	12.40	13.43	13.44	12.88	12.45	12.21
9400	13.60	13.55	12.88	12.53	12.34	13.22	13.25	12.77	12.46	12.23
9600	13.07	13.06	12.58	12.29	12.10	12.56	12.65	12.44	12.19	11.98
9800	12.40	12.45	12.24	12.05	11.89	11.92	12.04	12.12	11.98	11.79
10000	11.67	11.75	11.83	11.70	11.58	11.23	11.39	11.81	11.78	11.65
10500	10.10	10.20	10.67	10.82	10.82	9.60	9.76	10.62	10.94	10.94
11000	8.80	8.88	9.48	9.69	9.77	8.45	8.56	9.53	9.91	10.03
11500	8.24	8.27	8.47	8.56	8.62	7.95	7.97	8.43	8.62	8.71
12000	7.99	7.96	7.71	7.56	7.52	7.78	7.74	7.64	7.56	7.53
12500	7.99	7.93	7.35	7.02	6.91	7.73	7.69	7.24	6.97	6.87
13000	7.63	7.62	7.04	6.62	6.50	7.24	7.25	6.90	6.55	6.43
13500	7.29	7.36	7.14	6.86	6.77	6.71	6.81	6.96	6.78	6.68
14000	6.77	6.93	7.45	7.44	7.44	6.08	6.25	7.23	7.39	7.41
15000	6.89	7.06	8.26	8.91	9.25	6.33	6.51	8.24	9.31	9.84
16000	8.73	8.74	8.54	8.78	8.90	8.65	8.68	8.58	8.87	8.98
17000	8.81	8.84	8.37	8.18	8.04	8.51	8.67	8.42	8.09	7.82
18000	6.01	6.16	7.28	7.57	7.59	5.42	5.64	7.54	8.28	8.44
19000	4.33	4.35	4.67	4.77	4.86	4.15	4.22	4.80	5.28	5.53
20000	3.12	3.11	2.73	2.66	2.65	2.86	2.90	2.58	2.53	2.49

Typical Performance Curves

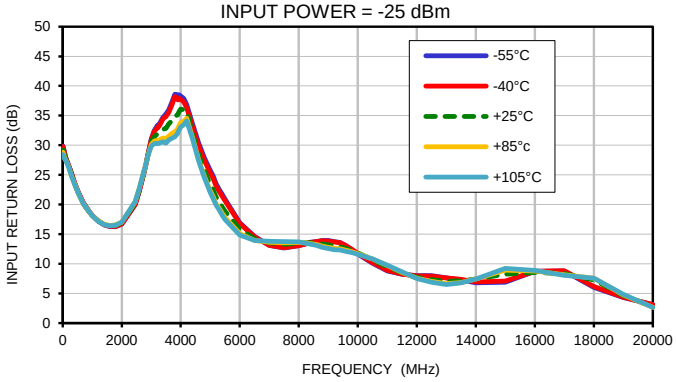
INSERTION LOSS vs. TEMPERATURE (Full Band)
INPUT POWER = -25 dBm



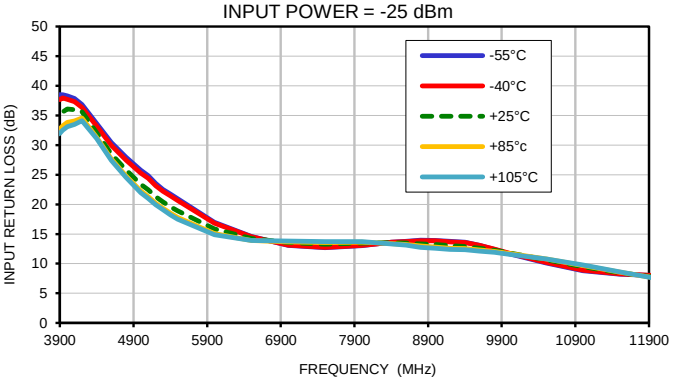
INSERTION LOSS vs. TEMPERATURE (Pass band)
INPUT POWER = -25 dBm



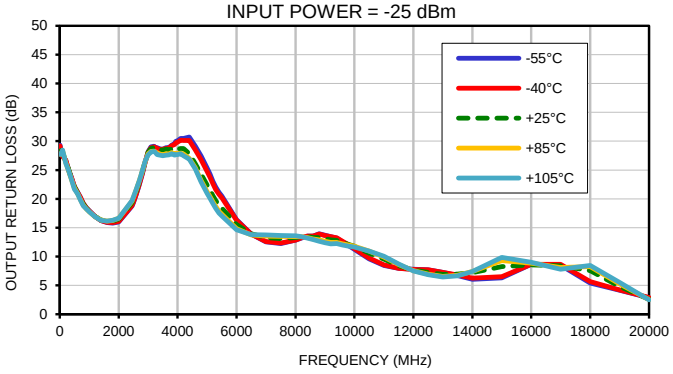
INPUT RETURN LOSS vs. TEMPERATURE (Full band)
INPUT POWER = -25 dBm



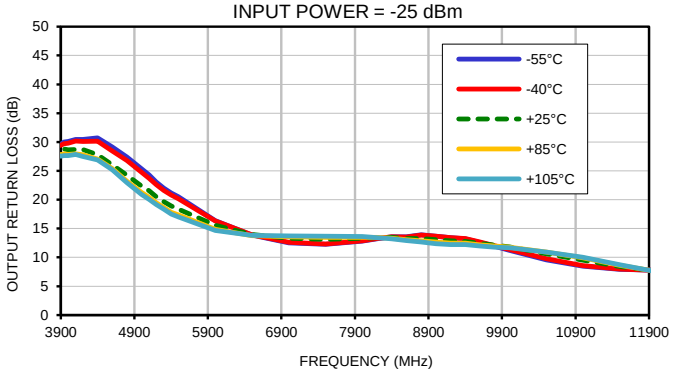
INPUT RETURN LOSS vs. TEMPERATURE (Pass band)
INPUT POWER = -25 dBm



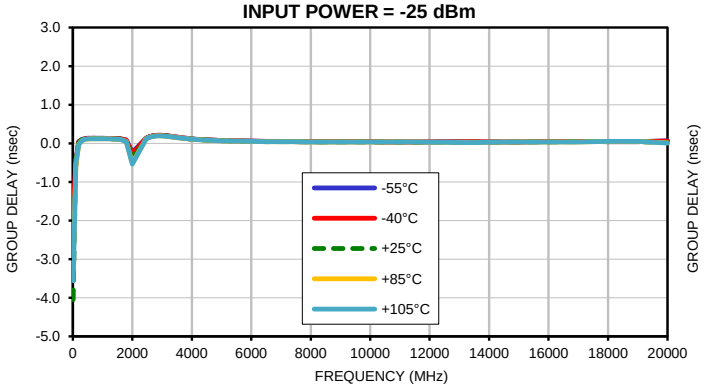
OUTPUT RETURN LOSS vs. TEMPERATURE (Full band)
INPUT POWER = -25 dBm



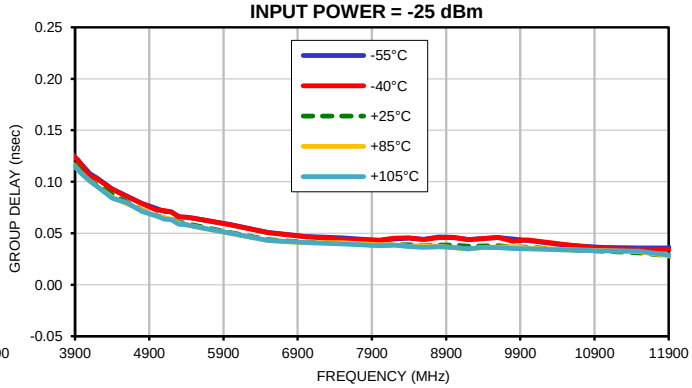
OUTPUT RETURN LOSS vs. TEMPERATURE (Pass band)
INPUT POWER = -25 dBm



GROUP DELAY vs. TEMPERATURE (Full band)
INPUT POWER = -25 dBm



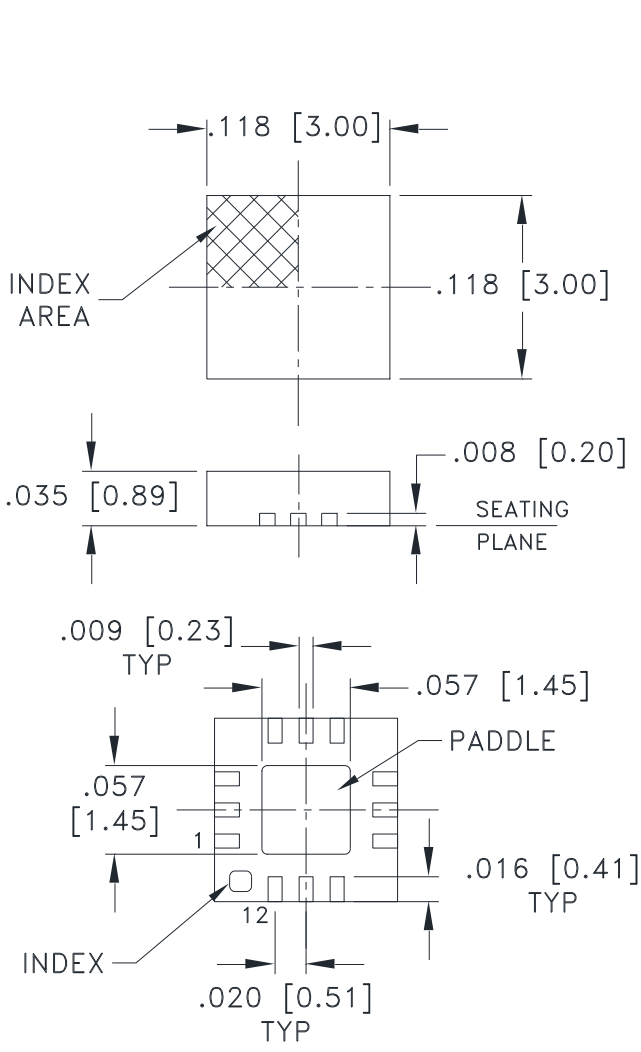
GROUP DELAY vs. TEMPERATURE (Pass band)
INPUT POWER = -25 dBm



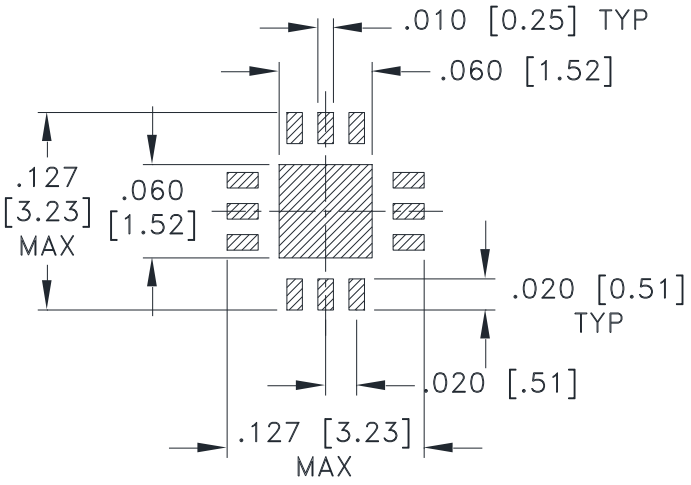
Case Style DQ

DQ1225

Outline Dimensions



PCB Land Pattern



SUGGESTED LAYOUT,
TOLERANCE TO BE WITHIN ±.002

Weight: .02 Grams

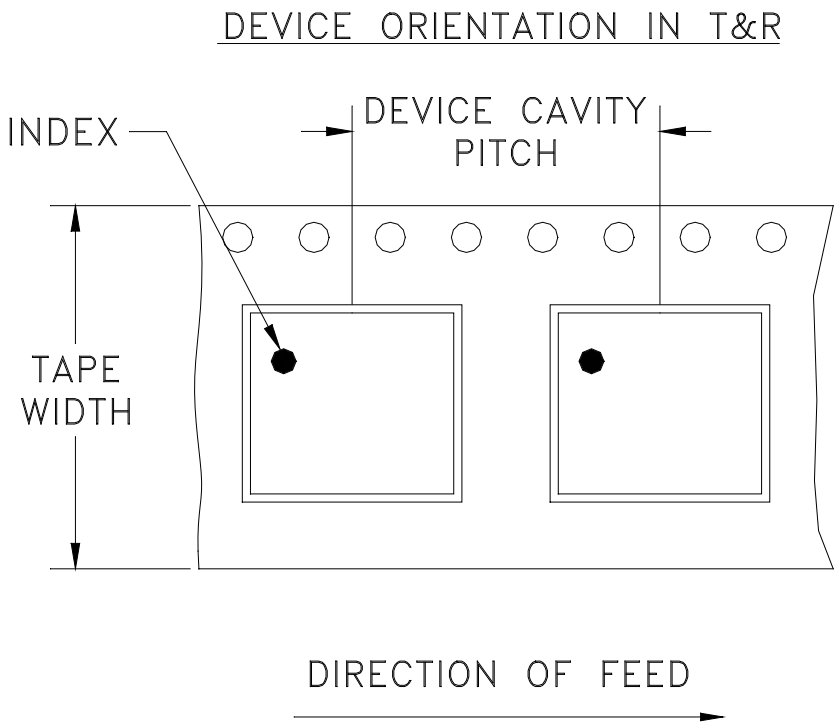
Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .004

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.

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

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.

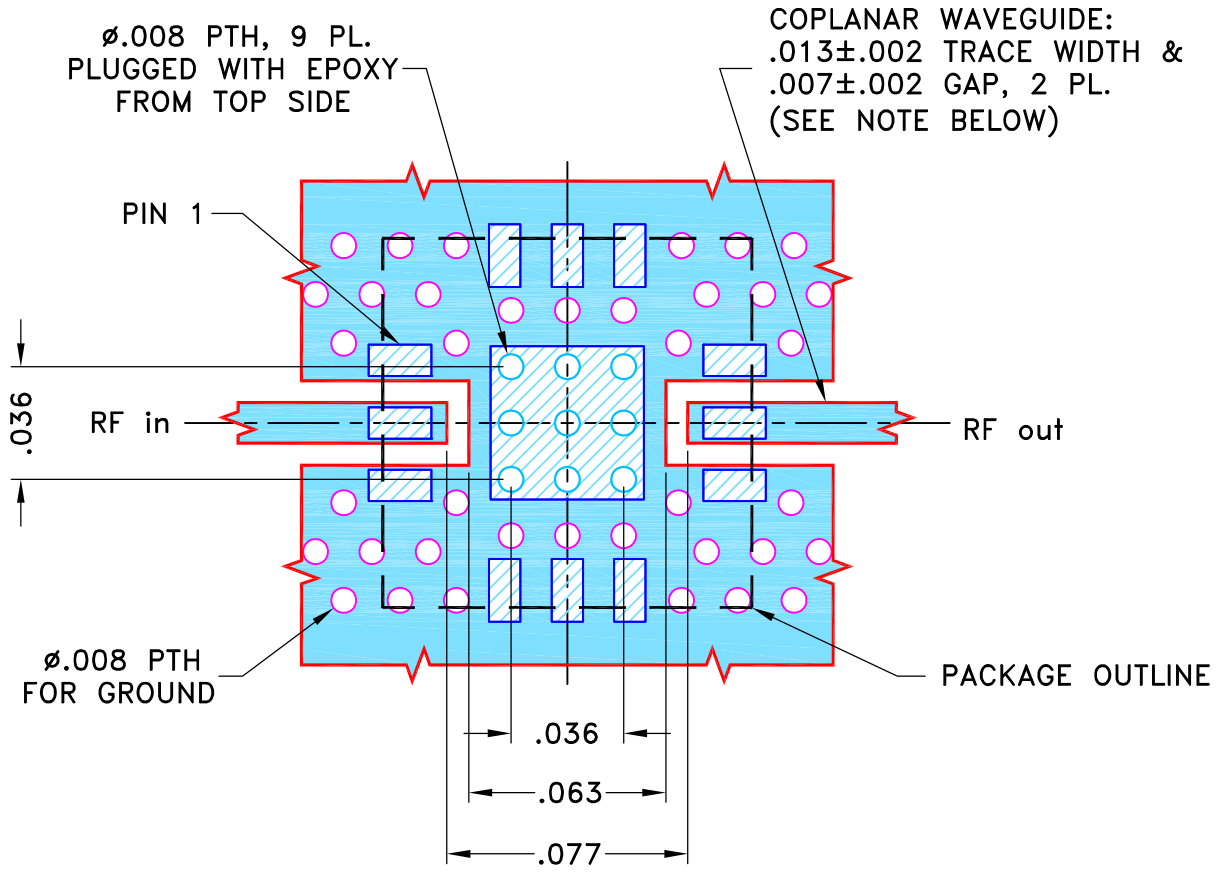
Go to: www.minicircuits.com/pages/pdfs/tape.pdf

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

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:

1. TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .0066"±.0007". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. 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	DRAWN	ITG	09/10/15
TOLERANCES ON:	CHECKED	GF	09/11/15
2 PL DECIMALS ±	APPROVED	MY	09/11/15
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

ASHEETA1.DWG REV:A DATE:01/12/95

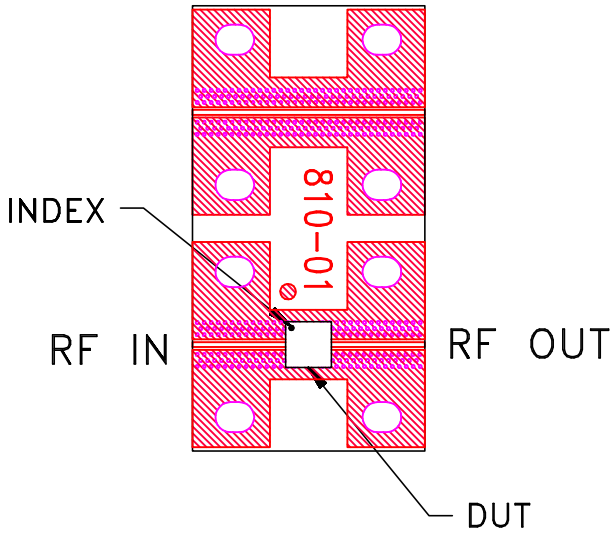
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 12FL02, DQ1225, TB-844+

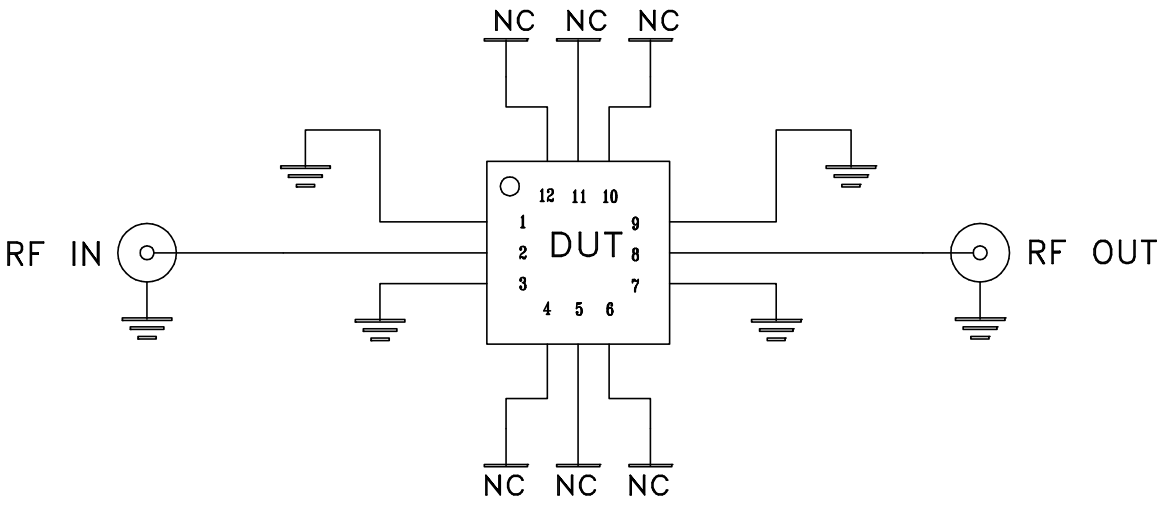
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-451	OR
FILE: 98PL451	SCALE: 16:1	SHEET: 1 OF 1	

Evaluation Board and Circuit

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



TB-844-392H+



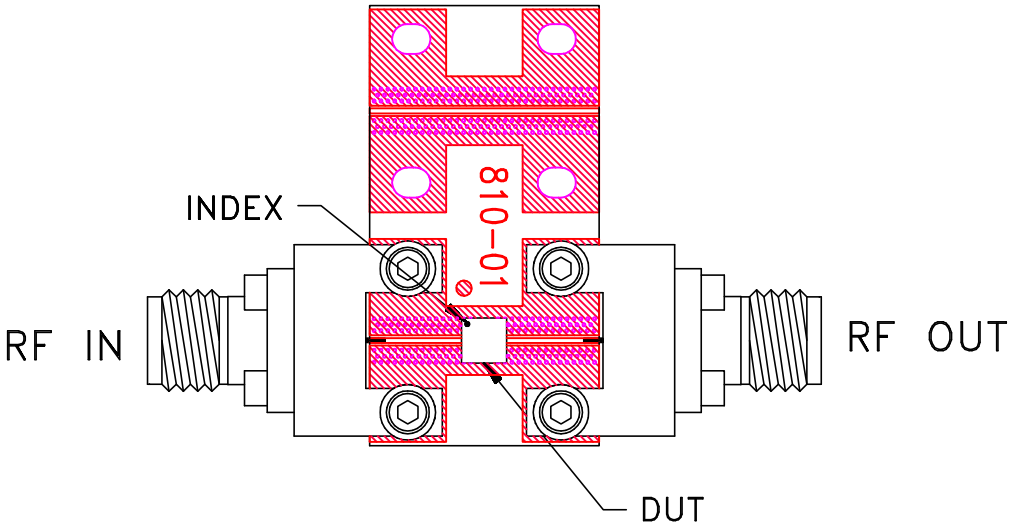
Schematic Diagram

Note:

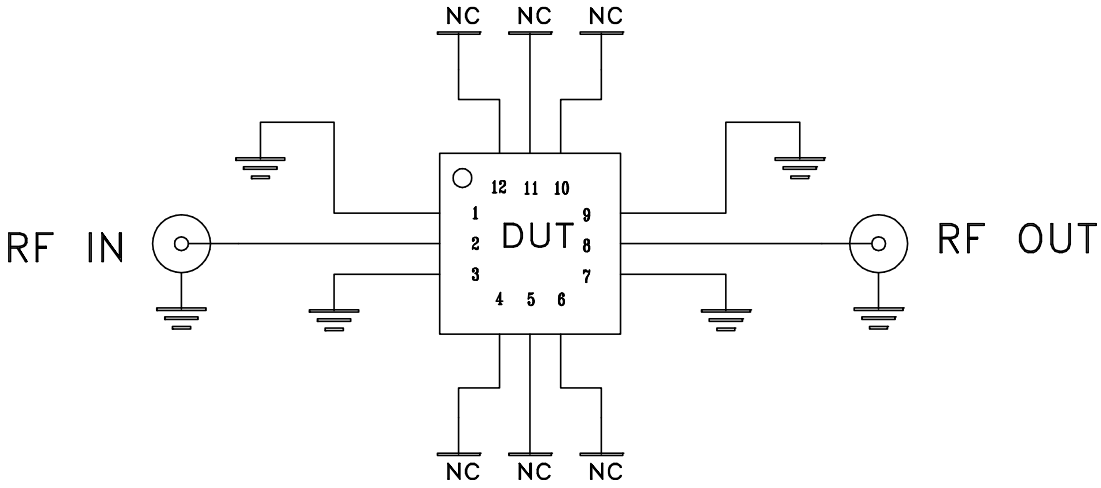
PCB Material: RO4350 or equivalent,
Dielectric Constant=3.5, Thickness=.0066 inch.

Mini-Circuits®

Evaluation Board and Circuit



TB-844-392HC+



Schematic Diagram

Notes:

1. 50 Ohm 2.92 mm Female connectors.
2. PCB Material: RO4350 or equivalent,
   Dielectric Constant=3.5, Thickness=.0066 inch.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV82

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