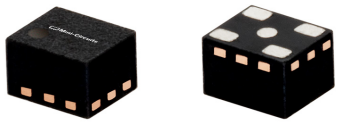
ULTRA LOW NOISE

D-PHEMT Transistor TAV1-331NM+

50Ω 10 to 4000 MHz Non-Magnetic Leadframe

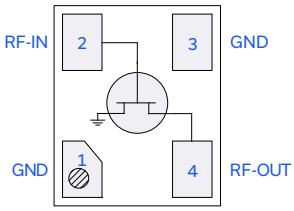
THE BIG DEAL

- No ferrous material in package leadframe
- Low Noise Figure, Typ. 0.5dB
- High Gain, Typ. 24.2dB
- High Output IP3, Typ. +31.7dBm
- Low Current, 60mA
- External biasing and matching required
- May be used as a replacement [a,b] for Broadcom ATF-331M4



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



APPLICATIONS

- MRI
- ISM
- 5G MIMO Radio Systems
- Wi-Fi 6
- Tactical Radio
- OFDM

PRODUCT OVERVIEW

Mini-Circuits' TAV1-331NM+ is a MMIC D-pHEMT* transistor with an operating frequency range from 10 to 4000MHz. This model combines high gain with extremely low noise figure, resulting in lower overall system noise. Low NF and high OIP3 performance make it an ideal choice for sensitive receivers in communications systems. Manufactured using highly repeatable D-pHEMT* technology, the unit comes housed in a tiny 1.4x1.2mm Non-Magnetic package. This model requires external biasing and matching.

KEY FEATURES

Features	Advantages
Non-Magnetic Package	Ideal for use in MRI and other magnetic sensitive applications.
Wideband, 10 to 4000MHz	A single device covers many wireless communications bands including cellular, ISM, GSM, WCDMA, WiMax, WLAN, and more.
High IP3 vs. DC power consumption • +31.7dBm at 300MHz • +36.5dBm at 4000MHz	The TAV1-331NM+ matches industry leading IP3 performance relative to device size and power consumption. Enhanced linearity over a broad frequency range makes the device ideal for use in: • Driver amplifiers for complex waveform up converter paths • Drivers in linearized transmit systems

* Depletion mode Pseudomorphic High Electron Mobility Transistor.

A Note: Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, and application, compatibility with other components and environmental conditions and stresses.

B. The Broadcom ATF-331M4 part number is used for identification and comparison purposes only.

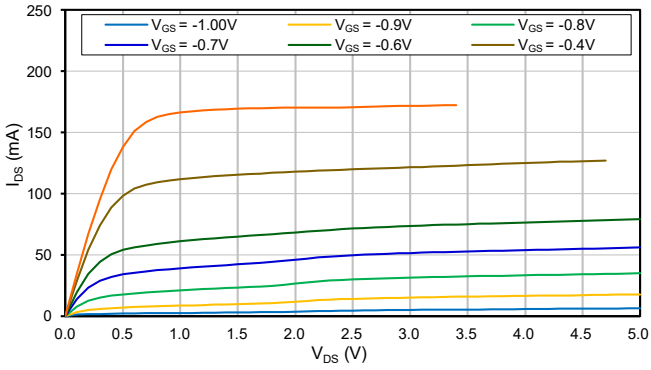
ELECTRICAL SPECIFICATIONS[1] AT +25°C, V_{DS}= +4V, I_{DS} = 60mA, UNLESS NOTED OTHERWISE

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		10		4000	MHz
Noise Figure	50 300 900 2000 4000		0.8 0.5 0.5 0.7 1.0		dB
Gain	50 300 900 2000 4000	24.2 23.8 21.3 16.7 11.5	24.7 24.2 21.8 17.3 12.3		dB
Output Power at 1dB Compression (P1dB)	50 300 900 2000 4000		+19.7 +19.8 +20.2 +20.9 +21.5		dBm
Output Third-Order Intercept P_{OUT} = 0dBm/Tone	50 300 900 2000 4000		+30.8 +31.7 +33.0 +34.6 +36.5		dBm
Isolation	50 300 900 2000 4000		50 35 27 25 22		dB
Output Return Loss	50 300 900 2000 4000		6.1 6.5 8.7 12.1 16.5		dB
Device Operating Gate Voltage (V_{GS})		-0.96	-0.69	-0.51	V
Pinch-off Voltage (V_P) @ V_{DS} = +1.5V, I_{DS} = 10% of I_{DSS}			-0.81		V
Saturated Drain Current (I_{DSS}) @ V_{DS} = +4V, V_{GS} = 0V			228		mA
Transconductance (G_M) @ V_{DS} = +4V, $G_M = \Delta I_{DS}/\Delta V_{GS}$			282		mS
Gate to Drain Leakage Current (I_{GDO}) @ V_{GD} = -5V				1000	µA
Gate leakage Current (I_{GSS}) @ V_{GD} = V_{GS} = -4V				600	µA

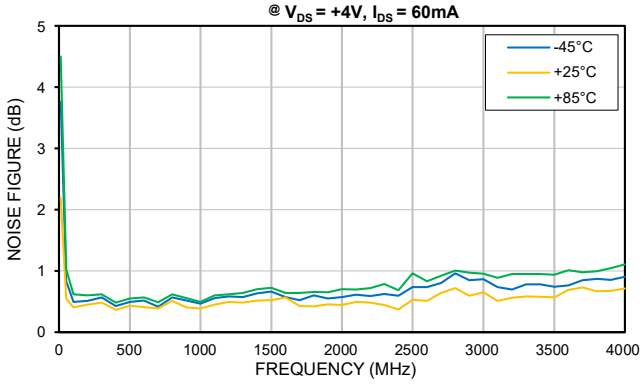
1. Tested on Mini-Circuits Characterization Test/Evaluation Board TB-TAV1-331NMC+. See Figure 2.

TYPICAL PERFORMANCE GRAPHS

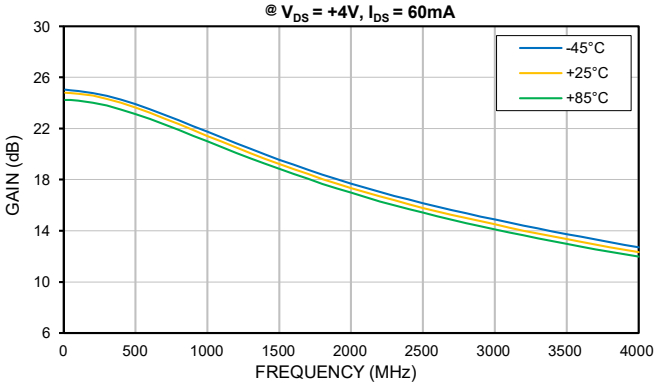
DRAIN CURRENT vs. GATE-SOURCE VOLTAGE(2)



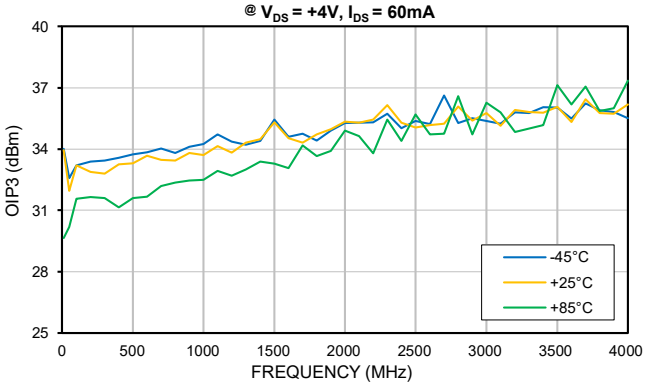
NOISE FIGURE vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



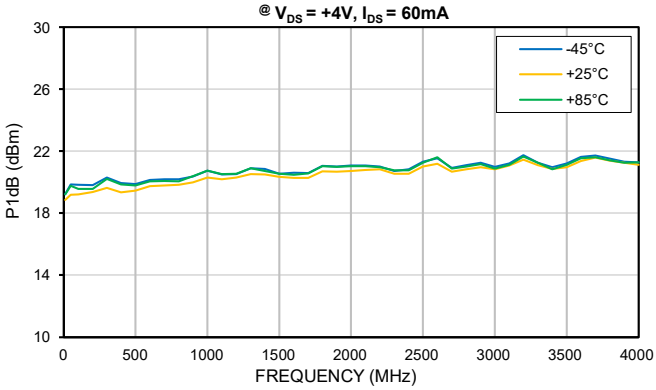
GAIN vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



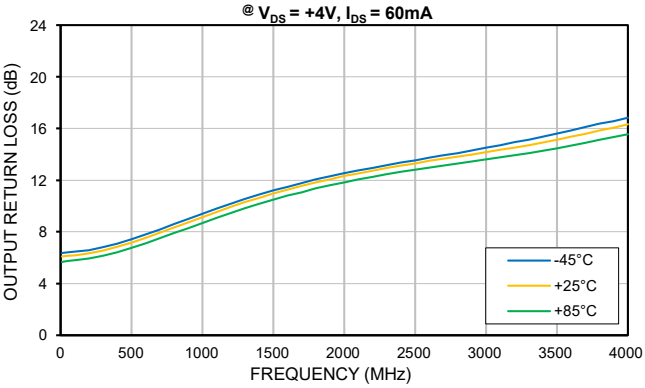
OUTPUT IP3 vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



P1dB vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



OUTPUT RETURN LOSS vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



(1). Includes test board loss
(2). Drain current was allowed to increase during compression measurement

ABSOLUTE MAXIMUM RATINGS[2]

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Junction Temperature[3]	+150°C
Total Power Dissipation	400mW
Input Power (CW)	+20dBm
Drain-Source Voltage[4]	+5V
Gate-Source Voltage[4]	-5V
Gate-Drain Voltage[4]	-5V
Drain Current[4]	149mA

2. Permanent damage may occur if any of these limits are exceeded. Maximum ratings are not intended for continuous normal operation.
3. Peak temperature on top of Die.
4. Assumes DC quiescent condition, V_{GS} = -0.51V, V_{DS} = +4V

THERMAL RESISTANCE

Parameter	Ratings
Thermal Resistance (Θ_{jc})[5]	106°C/W

5. Θ_{jc}= (Hot Spot Temperature on Die - Temperature at Ground Lead)/Dissipated Power

ESD RATING

	Class	Voltage Range	Reference Standard
HBM	0B	125V to <250V	ANSI/ESDA/JEDEC JS-001-2017

ESD HANDLING PRECAUTION: This device is designed to be Class 0B for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure Industry standard ESD handling precautions should be used at all times to protect the device from ESD damage.

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020E /JEDEC J-STD-033C

FUNCTIONAL DIAGRAM

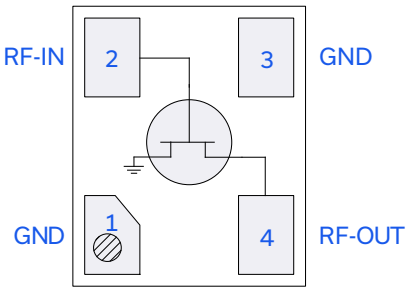


Figure 1. TAV1-331NM+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description (Refer to Figure 2)
RF-IN	2	RF-IN Pad connects to Gate
RF-OUT	4	RF-OUT Pad connects to Drain
GND	1, 3, and Paddle	Connects to ground

CHARACTERIZATION TEST BOARD

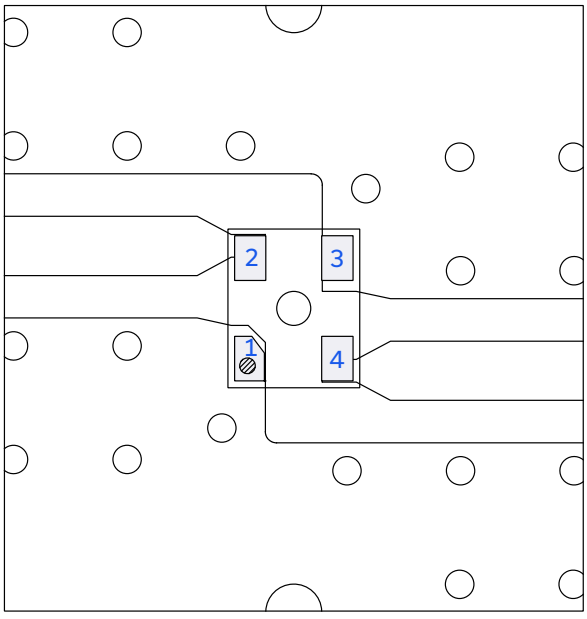


Figure 2. DUT soldered on Mini-Circuits Characterization Test Board: TB-TAV1-331NMC+

Electrical Parameters and Conditions
Gain, Output Power at 1dB Compression (P1dB), Output IP3 (OIP3), and Noise Figure measured using N5247B PNA-X microwave network analyzer.

Conditions:
1. Drain Voltage (with reference to source, V_{DS}) = +4V as shown.
2. Gate Voltage (with reference to source, V_{GS}) is set to obtain desired Drain-Source current (I_{DS}) as shown in Specification Table.
3. Gain: P_{IN} = -25dBm.
4. Output IP3 (OIP3): Two tones, spaced 1MHz apart, 0dBm/tone at output.
5. No External Matching Components Used.

Caution: Permanent damage to the device will occur if the Power ON and Power OFF Sequences are not followed.

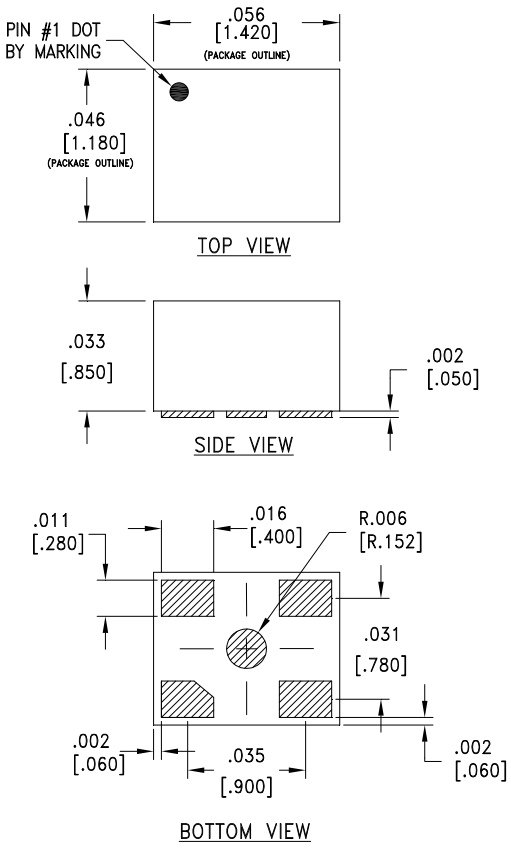
Power ON Sequence:
1) Set V_{GS} = -2V. Apply V_{GS}.
2) Set V_{DS} = +4V. Apply V_{DS}.
3) Increase V_{GS} to obtain desired I_{DS} as shown in specification table.
4) Apply RF Signal.

Power OFF Sequence:
1) Turn off RF Signal.
2) Adjust V_{GS} down to -2V.
3) Turn off V_{DS}.
4) Turn off V_{GS}.

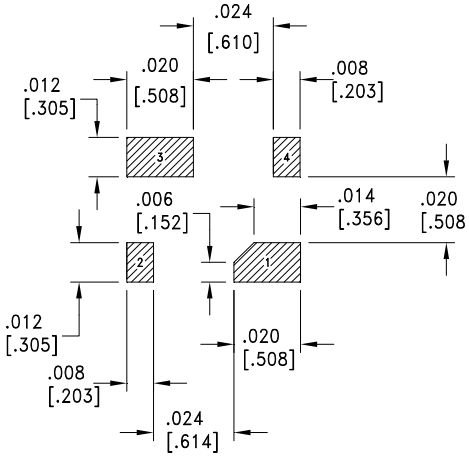
D-PHEMT Transistor TAV1-331NM+

50Ω 10 to 4000 MHz Non-Magnetic Leadframe

CASE STYLE DRAWING



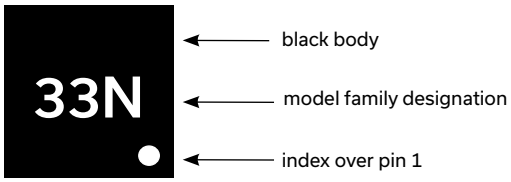
PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

Weight: .0047 grams
Dimensions are in inches (mm). Tolerances: 2 Pl. + .01; 3 Pl. + .005

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD CLICK HERE

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	TE2769 Plastic package, exposed paddle, Lead Finish: Matte-Tin
RoHS Status	Compliant
Tape & Reel **Standard quantities available on reel**	F90 7" reels with 20, 50, 100, 200, 500,1K, 2K or 3K devices
Suggested Layout for PCB Design	PL-758
Evaluation Board	TB-TAV1-331NMC+ Gerber File
Environmental Ratings	ENV08T2

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/terms/viewterm.html

Typical Performance Data

V_{DS} (V)	I_{DS} (mA)						
	V_{GS}= -1.00V	V_{GS}= -0.9V	V_{GS}= -0.8V	V_{GS}= -0.7V	V_{GS}= -0.6V	V_{GS}= -0.4V	V_{GS}= -0.2V
0.0	-0.01	-0.01	0.03	0.04	-0.01	-0.12	-0.14
0.1	1.32	3.19	8.04	14.00	19.61	28.89	34.79
0.2	1.67	4.87	12.63	23.34	34.52	54.04	67.14
0.3	1.85	5.85	15.15	28.87	44.46	74.08	95.60
0.4	1.98	6.53	16.73	32.10	50.52	88.67	120.14
0.5	2.11	7.05	17.86	34.12	54.08	98.28	138.30
0.6	2.22	7.46	18.72	35.53	56.26	104.20	150.94
0.7	2.32	7.79	19.41	36.62	57.79	107.32	158.60
0.8	2.43	8.09	20.01	37.56	59.04	109.22	162.68
0.9	2.52	8.37	20.56	38.39	60.11	110.60	164.94
1.0	2.62	8.63	21.08	39.15	61.07	111.72	166.36
1.1	2.71	8.88	21.56	39.86	61.95	112.68	167.34
1.2	2.80	9.12	22.02	40.53	62.78	113.52	168.08
1.3	2.89	9.36	22.45	41.16	63.55	114.24	168.62
1.4	2.98	9.59	22.87	41.77	64.27	114.88	169.04
1.5	3.06	9.82	23.30	42.35	64.97	115.48	169.34
1.6	3.15	10.07	23.75	42.95	65.64	116.02	169.62
1.7	3.25	10.36	24.27	43.58	66.30	116.52	169.84
1.8	3.37	10.73	24.89	44.31	66.96	117.02	170.00
1.9	3.52	11.20	25.67	45.16	67.66	117.48	170.18
2.0	3.69	11.79	26.61	46.04	68.36	117.92	170.30
2.1	3.88	12.50	27.60	46.97	69.08	118.32	170.26
2.2	4.10	13.07	28.39	47.86	69.78	118.72	170.18
2.3	4.29	13.50	29.01	48.62	70.41	119.12	170.18
2.4	4.45	13.85	29.51	49.24	71.02	119.50	170.26
2.5	4.58	14.15	29.93	49.77	71.57	119.84	170.46
2.6	4.70	14.40	30.28	50.22	72.06	120.24	170.70
2.7	4.81	14.63	30.62	50.62	72.51	120.56	171.12
2.8	4.90	14.82	30.90	50.98	72.92	120.90	171.26
2.9	4.98	15.01	31.17	51.30	73.30	121.20	171.42
3.0	5.07	15.19	31.42	51.61	73.65	121.50	171.60
3.1	5.15	15.35	31.65	51.88	73.98	121.82	171.80
3.2	5.22	15.50	31.86	52.16	74.28	122.16	171.98
3.3	5.30	15.65	32.08	52.41	74.57	122.46	172.14
3.4	5.37	15.80	32.27	52.65	74.85	122.84	172.28
3.5	5.44	15.93	32.47	52.88	75.12	123.20	--
3.6	5.51	16.06	32.65	53.11	75.39	123.58	--
3.7	5.57	16.19	32.83	53.33	75.65	123.96	--
3.8	5.64	16.32	33.00	53.53	75.90	124.32	--
3.9	5.70	16.44	33.17	53.74	76.17	124.68	--
4.0	5.77	16.56	33.34	53.95	76.42	125.04	--
4.1	5.83	16.68	33.50	54.16	76.69	125.36	--
4.2	5.90	16.80	33.68	54.36	76.96	125.68	--
4.3	5.97	16.92	33.84	54.56	77.23	125.96	--
4.4	6.03	17.04	34.00	54.77	77.52	126.28	--
4.5	6.10	17.16	34.17	54.98	77.80	126.54	--
4.6	6.16	17.28	34.33	55.19	78.10	126.74	--
4.7	6.23	17.39	34.50	55.41	78.41	127.00	--
4.8	6.30	17.51	34.67	55.63	78.71	--	--
4.9	6.37	17.64	34.84	55.86	79.03	--	--
5.0	6.44	17.76	35.01	56.09	79.35	--	--

Typical Performance Data

FREQ (MHz)	GAIN vs. FREQ & TEMPERATURE[1] @ V_{DS}=+4V, I_{DS}=60mA			NOISE FIGURE vs. FREQ & TEMPERATURE [1] @ V_{DS}=+4V, I_{DS}=60mA			OUTPUT RETURN LOSS vs. FREQ & TEMPERATURE [1] @ V_{DS}=+4V, I_{DS}=60mA		
	dB			dB			dB		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
10	25.0	24.8	24.2	3.8	2.2	4.5	6.4	6.1	5.7
50	25.0	24.8	24.2	0.8	0.5	1.0	6.4	6.1	5.7
100	24.9	24.7	24.2	0.5	0.4	0.6	6.5	6.2	5.8
200	24.8	24.6	24.0	0.5	0.4	0.6	6.6	6.3	5.9
300	24.6	24.3	23.8	0.6	0.5	0.6	6.8	6.6	6.2
400	24.3	24.0	23.5	0.4	0.4	0.5	7.1	6.8	6.4
500	23.9	23.6	23.1	0.5	0.4	0.6	7.4	7.2	6.8
600	23.5	23.2	22.8	0.5	0.4	0.6	7.8	7.5	7.1
700	23.1	22.8	22.3	0.4	0.4	0.5	8.2	7.9	7.5
800	22.6	22.3	21.9	0.6	0.5	0.6	8.6	8.3	7.9
900	22.2	21.9	21.4	0.5	0.4	0.6	9.0	8.7	8.3
1000	21.7	21.4	21.0	0.5	0.4	0.5	9.4	9.1	8.7
1100	21.3	21.0	20.5	0.6	0.4	0.6	9.8	9.5	9.1
1200	20.9	20.5	20.1	0.6	0.5	0.6	10.2	9.9	9.5
1300	20.4	20.1	19.7	0.6	0.5	0.6	10.5	10.3	9.8
1400	20.0	19.6	19.2	0.6	0.5	0.7	10.9	10.6	10.2
1500	19.6	19.2	18.8	0.7	0.5	0.7	11.2	11.0	10.5
1600	19.2	18.8	18.4	0.6	0.6	0.6	11.5	11.3	10.8
1700	18.8	18.4	18.1	0.5	0.4	0.6	11.8	11.6	11.1
1800	18.4	18.1	17.7	0.6	0.4	0.7	12.1	11.8	11.4
1900	18.0	17.7	17.3	0.6	0.5	0.6	12.3	12.1	11.6
2000	17.7	17.4	17.0	0.6	0.4	0.7	12.5	12.3	11.8
2100	17.4	17.0	16.6	0.6	0.5	0.7	12.8	12.5	12.1
2200	17.0	16.7	16.3	0.6	0.5	0.7	13.0	12.7	12.3
2300	16.7	16.4	16.0	0.6	0.4	0.8	13.2	12.9	12.5
2400	16.4	16.1	15.7	0.6	0.4	0.7	13.4	13.1	12.7
2500	16.2	15.8	15.4	0.7	0.5	1.0	13.5	13.3	12.8
2600	15.9	15.5	15.1	0.7	0.5	0.8	13.7	13.5	13.0
2700	15.6	15.2	14.9	0.8	0.6	0.9	13.9	13.6	13.1
2800	15.4	15.0	14.6	1.0	0.7	1.0	14.1	13.8	13.3
2900	15.1	14.7	14.4	0.8	0.6	1.0	14.3	14.0	13.5
3000	14.9	14.5	14.1	0.9	0.7	1.0	14.5	14.2	13.6
3100	14.6	14.2	13.9	0.7	0.5	0.9	14.7	14.3	13.8
3200	14.4	14.0	13.6	0.7	0.6	0.9	14.9	14.5	13.9
3300	14.2	13.8	13.4	0.8	0.6	1.0	15.1	14.7	14.1
3400	14.0	13.6	13.2	0.8	0.6	0.9	15.4	14.9	14.3
3500	13.7	13.3	13.0	0.7	0.6	0.9	15.6	15.1	14.5
3600	13.5	13.1	12.8	0.8	0.7	1.0	15.8	15.4	14.7
3700	13.3	12.9	12.6	0.8	0.7	1.0	16.1	15.6	14.9
3800	13.1	12.7	12.3	0.9	0.7	1.0	16.4	15.8	15.1
3900	12.9	12.5	12.2	0.9	0.7	1.0	16.6	16.1	15.3
4000	12.7	12.3	12.0	0.9	0.7	1.1	16.8	16.3	15.6

[1] Includes test board loss

Typical Performance Data

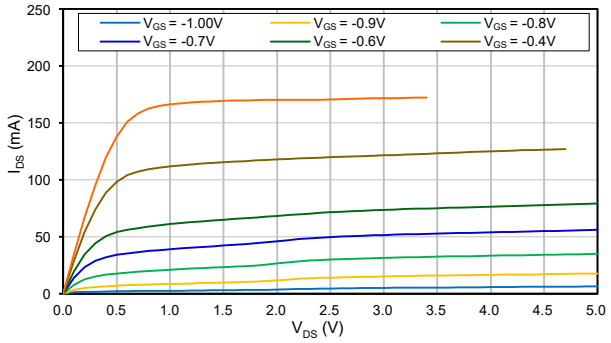
FREQ (MHz)	OIP3 vs FREQ & TEMPERATURE [1] @ V_{DS}=+4V, I_{DS}=60mA			P1dB vs FREQ & TEMPERATURE[1,2] @ V_{DS}=+4V, I_{DS}=60mA		
	dBm			dBm		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
10	34.0	33.9	29.7	19.2	18.9	19.2
50	32.6	32.0	30.2	19.8	19.2	19.8
100	33.2	33.2	31.6	19.8	19.2	19.6
200	33.4	32.9	31.7	19.8	19.4	19.6
300	33.4	32.8	31.6	20.3	19.6	20.2
400	33.6	33.3	31.1	20.0	19.4	19.9
500	33.7	33.3	31.6	19.9	19.5	19.8
600	33.9	33.7	31.7	20.2	19.8	20.0
700	34.0	33.5	32.2	20.2	19.8	20.1
800	33.8	33.4	32.4	20.2	19.8	20.1
900	34.1	33.8	32.5	20.4	20.0	20.4
1000	34.2	33.7	32.5	20.7	20.3	20.7
1100	34.7	34.1	32.9	20.5	20.2	20.5
1200	34.4	33.8	32.7	20.5	20.3	20.5
1300	34.2	34.3	33.0	20.9	20.5	20.9
1400	34.4	34.5	33.4	20.9	20.5	20.7
1500	35.4	35.3	33.3	20.5	20.4	20.5
1600	34.6	34.5	33.1	20.6	20.3	20.5
1700	34.8	34.3	34.2	20.6	20.3	20.6
1800	34.4	34.7	33.7	21.1	20.7	21.0
1900	34.9	35.0	33.9	21.0	20.7	21.0
2000	35.3	35.3	34.9	21.1	20.7	21.0
2100	35.3	35.3	34.6	21.1	20.8	21.0
2200	35.3	35.4	33.8	21.0	20.8	21.0
2300	35.7	36.2	35.4	20.7	20.5	20.8
2400	35.0	35.3	34.4	20.8	20.6	20.8
2500	35.4	35.1	35.7	21.3	21.0	21.3
2600	35.2	35.2	34.7	21.6	21.2	21.6
2700	36.6	35.2	34.8	20.9	20.7	20.9
2800	35.3	36.1	36.6	21.1	20.8	21.0
2900	35.5	35.4	34.7	21.3	21.0	21.2
3000	35.4	35.8	36.3	21.0	20.8	20.9
3100	35.2	35.1	35.8	21.2	21.1	21.1
3200	35.8	35.9	34.8	21.8	21.5	21.7
3300	35.8	35.8	35.0	21.2	21.1	21.3
3400	36.1	35.8	35.2	21.0	20.9	20.8
3500	36.0	36.1	37.1	21.2	21.0	21.1
3600	35.5	35.3	36.2	21.6	21.4	21.5
3700	36.2	36.4	37.1	21.7	21.6	21.6
3800	35.9	35.8	35.9	21.5	21.4	21.4
3900	35.8	35.7	36.0	21.3	21.2	21.3
4000	35.5	36.2	37.4	21.3	21.1	21.3

[1] Includes test board loss

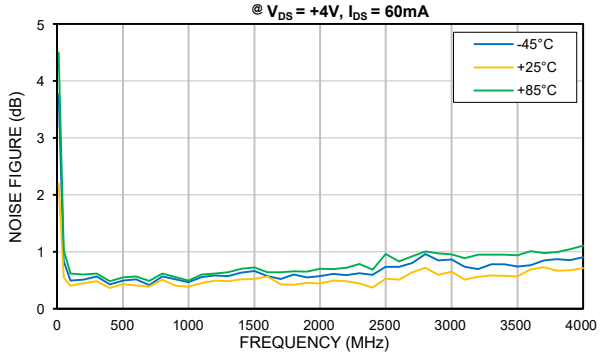
[2] Drain current was allowed to increase during compression measurement

Typical Performance Curves

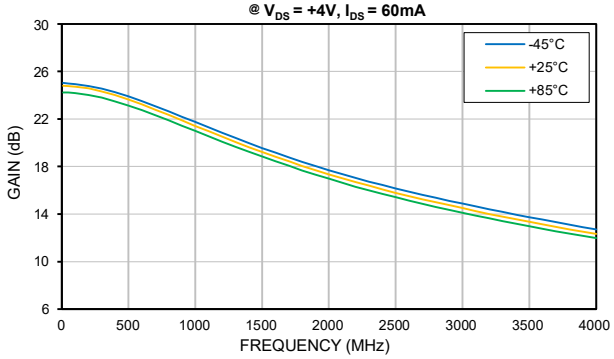
DRAIN CURRENT vs. GATE-SOURCE VOLTAGE(2)



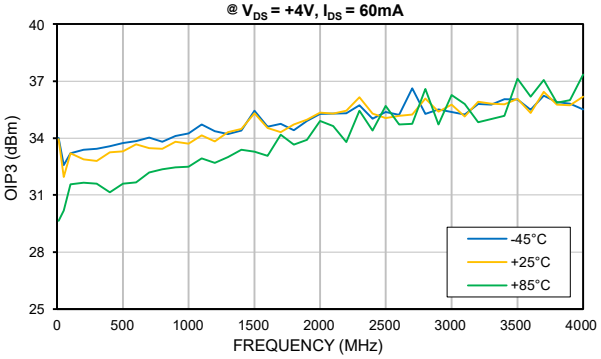
NOISE FIGURE vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



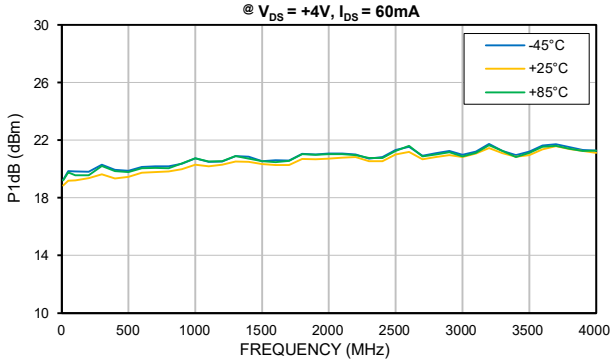
GAIN vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



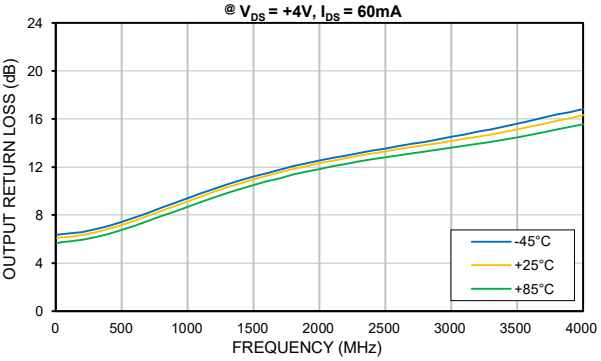
OUTPUT IP3 vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



P1dB vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA



OUTPUT RETURN LOSS vs. TEMPERATURE(1)
@ V_{DS} = +4V, I_{DS} = 60mA

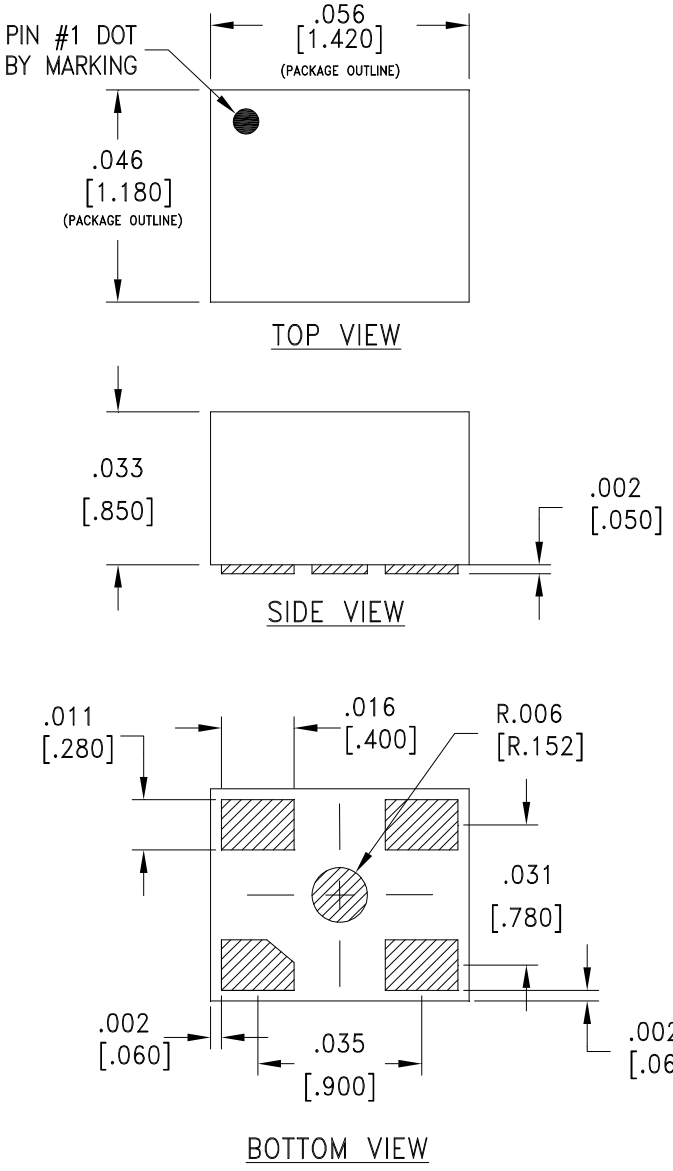


(1). Includes test board loss
(2). Drain current was allowed to increase during compression measurement

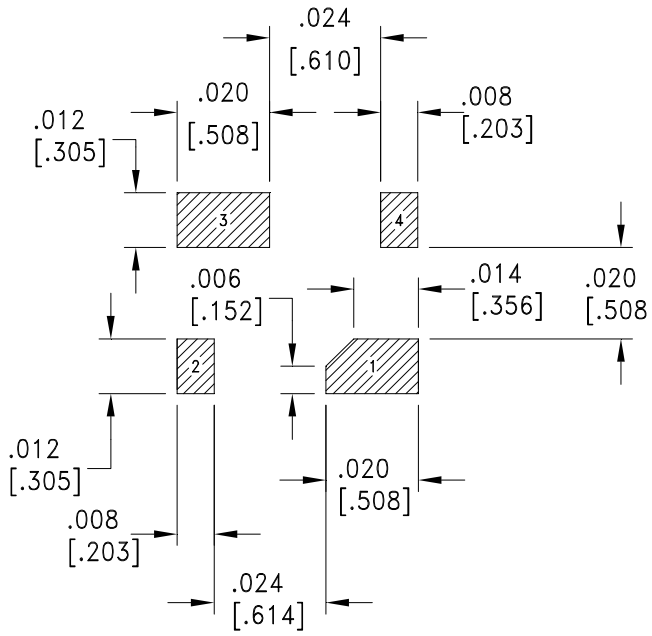
Case Style TE

Outline Dimensions

TE2769



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

Weight: .0047 grams

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3 Pl. ± .005

Notes:

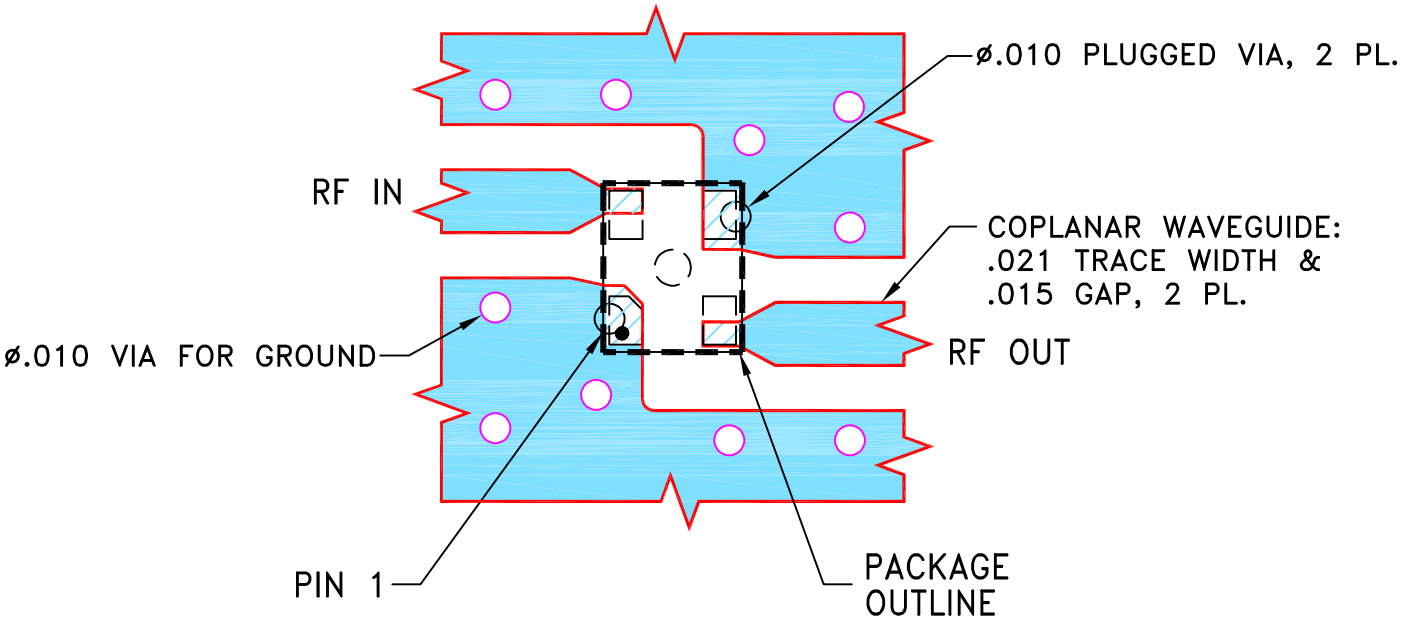
1. Case material: Plastic.
2. Termination finish:

   For RoHS Case Styles: Matte-Tin plate.

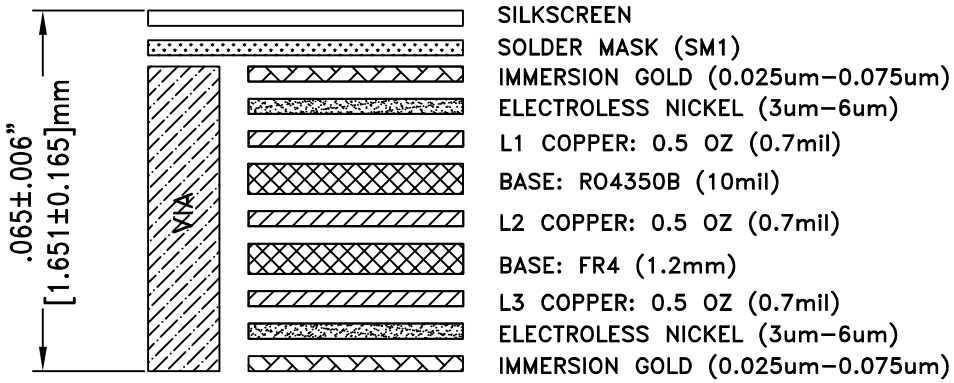
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-018788	NEW RELEASE	08/07/23	ITG	IL

SUGGESTED MOUNTING CONFIGURATION FOR TE2769 CASE STYLE



3 LAYER STACK-UP DIAGRAM



NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"; COPPER: 1/2 OZ EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
3. COPPER LAYERS L2 & L3 OF THE PCB ARE CONTINUOUS GROUND PLANES.

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	08/07/23
TOLERANCES ON:	CHECKED	GF	08/07/23
2 PL DECIMALS ±	APPROVED	IL	08/07/23
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

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

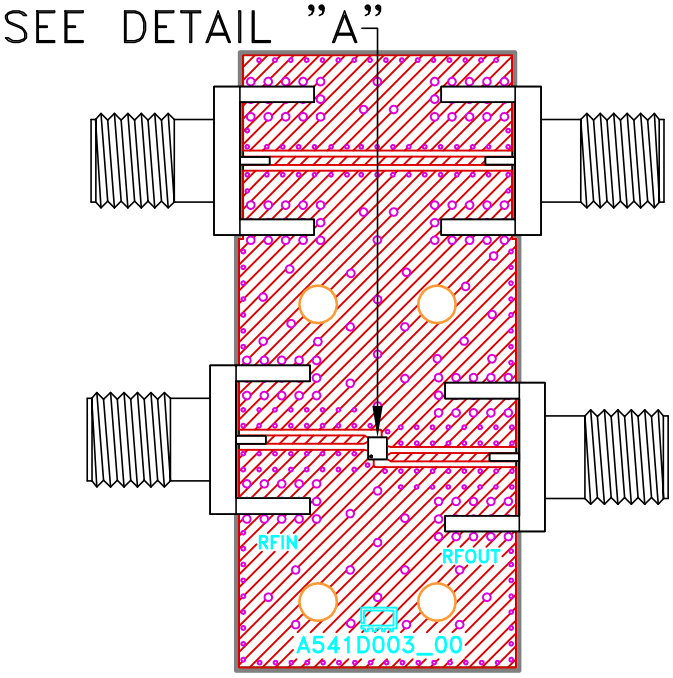
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

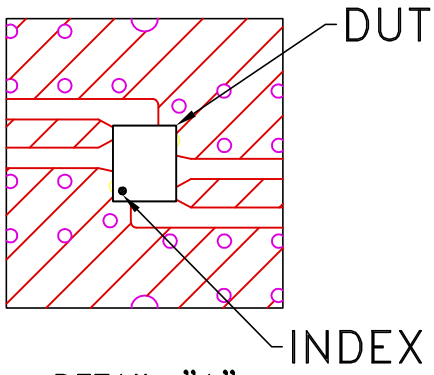
PL,TE2769,TB-TAV1-331NM+/541NM+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-758	OR

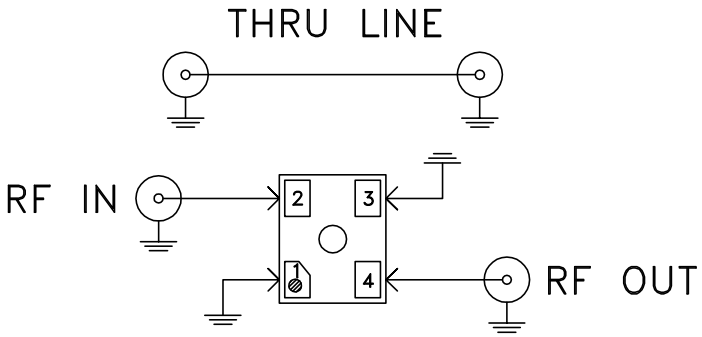
FILE:	SCALE:	SHEET:
98PL758	15:1	1 OF 1

Evaluation Board and Circuit





DETAIL "A"
(SCALE 5:1)



SCHEMATIC DIAGRAM

Function	Pad
RF IN	2
RF OUT	4
GND	1,3

Notes:

1. 50 Ohm SMA Female Connectors.
2. PCB Material: Roger RO4350B or equivalent, Dielectric constant=3.5, Thickness=0.01 inch

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Environmental Specifications **ENV08T2**

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	-45° to 85°C or -40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
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 260°C peak	J-STD-020
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether +	MIL-STD-202, Method 215

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
	monoethanolamine at 63°C to 70°C	