



ULTRA LOW NOISE, MEDIUM CURRENT

D-PHEMT Transistor

TAV1-331+

50Ω 10 to 4000 MHz

THE BIG DEAL

- Low Noise Figure, 0.6 dB typ. at 300 MHz
- High Gain, 24.1 dB typ. at 300 MHz
- High Output IP3, +31.8 dBm typ. at 300 MHz
- Output Power at 1dB comp., +20.1 dBm typ. at 300 MHz
- 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

CASE STYLE: TE2769

+RoHS Compliant

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

APPLICATIONS

- Cellular
- ISM
- GSM
- WCDMA
- WiMax
- WLAN
- UNII and HIPERLAN

PRODUCT OVERVIEW

Mini-Circuits' TAV1-331+ is a MMIC D-PHEMT* transistor with an operating frequency range from 10 to 4000 MHz. This model combines high gain with extremely low noise figure, resulting in lower overall system noise. Low NF and IP3 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 MCLP package. This model requires external biasing and matching.

KEY FEATURES

| Feature | Advantages |
|---|--|
| Wideband, 10 to 4000 MHz | A single device covers many wireless communications bands including cellular, ISM, GSM, WCDMA, WiMax, WLAN, and more. |
| High IP3 vs. DC power consumption <ul style="list-style-type: none"> • +31.8 dBm at 300 MHz • +37.3 dBm at 4000 MHz | The TAV1-331+ 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: <ul style="list-style-type: none"> • Driver amplifiers for complex waveform up converter paths • Drivers in linearized transmit systems |
| Combines high gain (24.1 dB) with very low Noise Figure (0.6 dB) | The unique combination of high gain and low Noise Figure results in lower overall system noise. |

* Depletion mode Pseudomorphic High Electron Mobility Transistor.





ULTRA LOW NOISE, MEDIUM CURRENT

D-PHEMT Transistor

TAV1-331+

Mini-Circuits

ELECTRICAL SPECIFICATIONS AT $T_{AMB}=25^{\circ}\text{C}$, FREQUENCY 10 TO 4000 MHZ

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|--|----------------------------------|---|------------|-------|-------|-------|
| DC Specifications | | | | | | |
| V_{GS} | Operational Gate Voltage | $V_{DS}=4\text{V}, I_{DS}=60\text{ mA}$ | -0.96 | -0.69 | -0.51 | V |
| V_p | Pinch-off Voltage | $V_{DS}=1.5\text{V}, I_{DS}=10\% \text{ of } I_{DSS}$ | | -0.81 | | V |
| I_{DSS} | Saturated Drain Current | $V_{DS}=4\text{V}, V_{GS}=0\text{ V}$ | | 228 | | mA |
| G_M | Transconductance | $V_{DS}=4\text{V}, G_m = \Delta I_{DS} / \Delta V_{GS}$ | | 282 | | mS |
| I_{GDO} | Gate to Drain Leakage Current | $V_{GD}=-5\text{V}$ | | | 1000 | uA |
| I_{GSS} | Gate leakage Current | $V_{GD}=V_{GS}=-4\text{V}$ | | | 600 | μA |
| Specifications, $Z_0=50\text{ Ohms}$ (Figure 1)* | | | | | | |
| NF | Noise Figure | $V_{DS}=4\text{V}, I_{DS}=60\text{ mA}$ | f=50 MHz | 0.9 | 0.8 | dB |
| | | | f=300 MHz | 0.6 | | |
| | | | f=900 MHz | 0.5 | | |
| | | | f=2000 MHz | 0.6 | | |
| | | | f=4000 MHz | 1.0 | | |
| Gain | Gain | $V_{DS}=4\text{V}, I_{DS}=60\text{ mA}$ | f=10 MHz | 24.6 | 18.3 | dB |
| | | | f=300 MHz | 24.1 | | |
| | | | f=900 MHz | 21.6 | | |
| | | | f=2000 MHz | 17.0 | | |
| | | | f=4000 MHz | 12.0 | | |
| OIP3 | Output IP3 | $V_{DS}=4\text{V}, I_{DS}=60\text{ mA}$ | f=10 MHz | 31.7 | | dBm |
| | | | f=300 MHz | 31.8 | | |
| | | | f=900 MHz | 32.9 | | |
| | | | f=2000 MHz | 34.6 | | |
| | | | f=4000 MHz | 37.3 | | |
| P1dB | Power output at 1 dB Compression | $V_{DS}=4\text{V}, I_{DS}=60\text{ mA}$ | f=10 MHz | 19.6 | 18.0 | dBm |
| | | | f=300 MHz | 20.1 | | |
| | | | f=900 MHz | 20.4 | | |
| | | | f=2000 MHz | 21.3 | | |
| | | | f=4000 MHz | 21.3 | | |
| Θ_{JC} | Thermal Resistance | | | 106 | | °C/W |

*Tested on Mini-Circuits test board TB-TAV1-331+



D-PHEMT Transistor

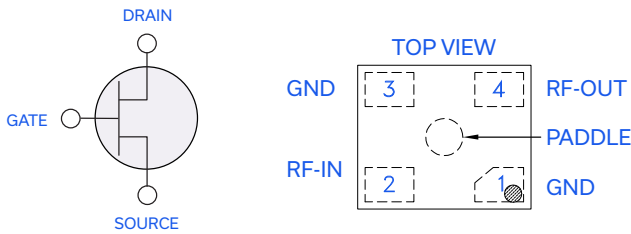
TAV1-331+

MAXIMUM RATINGS⁽¹⁾

| Symbol | Parameter | Max. | Units |
|------------|-----------------------------------|------------|-------|
| V_{DS} | Drain-Source Voltage ² | 5 | V |
| V_{GS} | Gate-Source Voltage ² | -5 | V |
| V_{GD} | Gate-Drain Voltage ² | -5 | V |
| I_{DS} | Drain Current ² | 149 | mA |
| P_{DISS} | Total Dissipated Power | 400 | mW |
| P_{IN} | RF Input Power | 20 | dBm |
| T_{CH} | Channel Temperature | 150 | °C |
| T_{OP} | Operating Temperature | -40 to 85 | °C |
| T_{STD} | Storage Temperature | -65 to 150 | °C |

(1) Operation of this device above any one of these parameters may cause permanent damage.
 (2) Assumes DC quiescent conditions, $V_{GS} = -0.51\text{ V}$, $V_{DS} = 4\text{ V}$.

SIMPLIFIED SCHEMATIC AND PIN DESCRIPTION



| Function | Pin Number | Description |
|----------|----------------|---|
| RF-IN | 2 | Gate used for RF input |
| RF-OUT | 4 | Drain used for RF output |
| GND | 1,3 and Paddle | Source terminal and Paddle, normally connected to ground. |

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.



CHARACTERIZATION TEST CIRCUIT

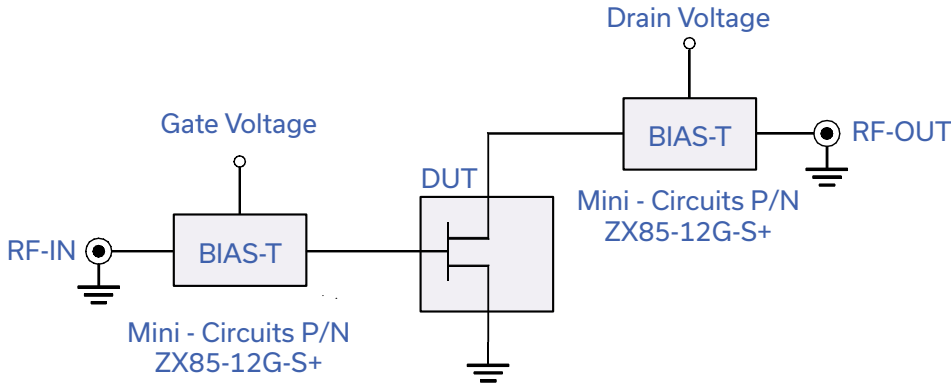


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Test Board TB-TAV1-331+)

Gain, Output power at 1dB compression (P1 dB), Noise Figure and output IP3 (OIP3) are measured using Keysight PNA-X.

Conditions:

1. Drain voltage (with reference to source, VDS)= 4V as shown.
2. Gate Voltage (with reference to source, VGS) is set to obtain desired Drain-Source current (IDS) as shown in graphs or specification table.
3. Gain: Pin= -25dBm
4. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.
5. No external matching components used.

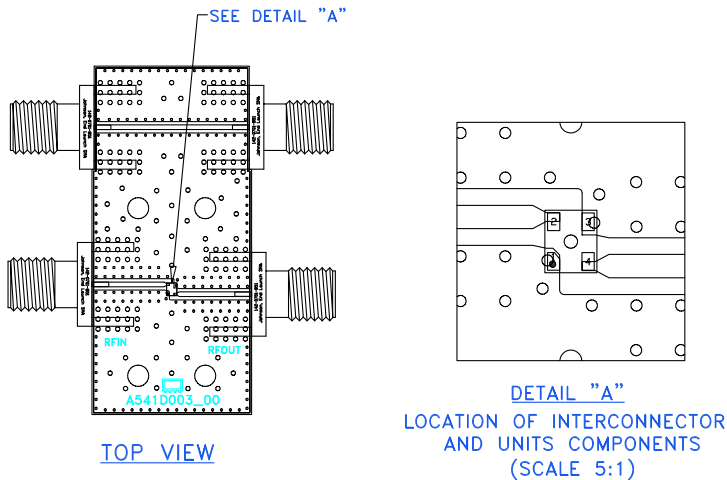
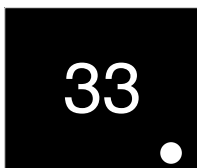


Fig 2. Test Board used for characterization, Mini-Circuits P/N TB-TAV1-331+ (Material: Rogers R04350B, Thickness: 0.01")

PRODUCT MARKING



- ← Black body
- ← Model family designation
- ← Index over pin

Marking may contain other features or characters for internal lot control



ULTRA LOW NOISE, MEDIUM CURRENT

D-PHEMT Transistor

TAV1-331+

Mini-Circuits

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

| | |
|--|--|
| Performance Data | Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file) |
| Case Style | TE2769 Plastic package, exposed paddle, lead finish: Matte-Tin plated |
| 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-627 |
| Evaluation Board | TB-TAV1-331+ |
| Environmental Ratings | ENV08T2 |

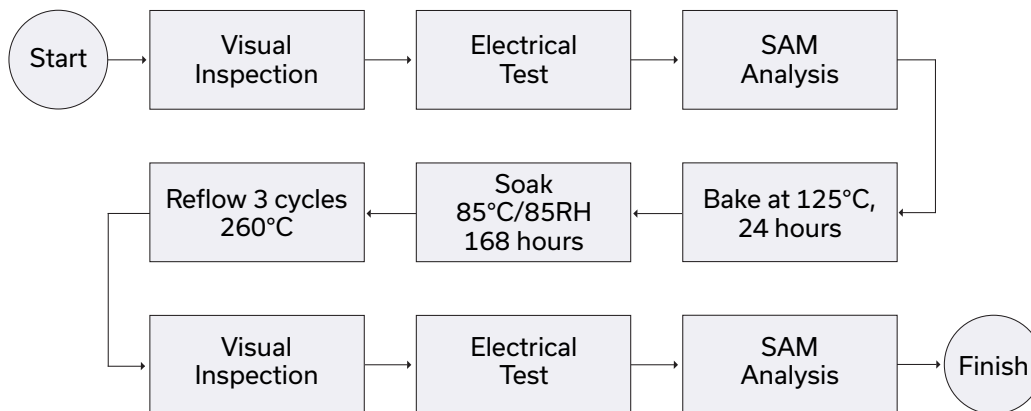
ESD RATING

Human Body Model (HBM): Class 0 (<250V) in accordance with ANSI/ESD STM 5.1 - 2001

MSL RATING

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

MSL TEST FLOW CHART



- 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

| VDS (V) | IDS (mA) | | | | | | |
|---------|----------|--------|-------|-------|-------|--------|--------|
| | @ VGS= | | | | | | |
| | -1.00V | -0.90V | -0.8V | -0.7V | -0.6V | -0.4V | -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 | -- | -- |



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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IF/RF MICROWAVE COMPONENTS

Typical Performance Data

| FREQ (GHz) | GAIN vs FREQ & TEMPERATURE ⁽¹⁾ @ VDS=4V, IDS=60mA | | | NOISE FIGURE vs FREQ & TEMPERATURE ⁽¹⁾ @ VDS=4V, IDS=60mA | | |
|---------------|---|-------|-------|---|-------|-------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| 0.01 | 25.03 | 24.80 | 24.25 | 3.77 | 2.19 | 4.50 |
| 0.05 | 25.00 | 24.77 | 24.23 | 0.83 | 0.55 | 1.03 |
| 0.10 | 24.94 | 24.72 | 24.18 | 0.50 | 0.40 | 0.62 |
| 0.20 | 24.78 | 24.57 | 24.03 | 0.51 | 0.45 | 0.60 |
| 0.30 | 24.55 | 24.33 | 23.80 | 0.56 | 0.48 | 0.62 |
| 0.40 | 24.26 | 24.01 | 23.49 | 0.43 | 0.36 | 0.48 |
| 0.50 | 23.91 | 23.65 | 23.14 | 0.49 | 0.43 | 0.55 |
| 0.60 | 23.51 | 23.24 | 22.75 | 0.52 | 0.41 | 0.57 |
| 0.70 | 23.08 | 22.80 | 22.33 | 0.41 | 0.39 | 0.49 |
| 0.80 | 22.65 | 22.35 | 21.89 | 0.57 | 0.51 | 0.62 |
| 0.90 | 22.20 | 21.88 | 21.44 | 0.52 | 0.40 | 0.56 |
| 1.00 | 21.74 | 21.42 | 20.98 | 0.47 | 0.39 | 0.49 |
| 1.10 | 21.30 | 20.97 | 20.54 | 0.56 | 0.45 | 0.60 |
| 1.20 | 20.85 | 20.52 | 20.10 | 0.58 | 0.49 | 0.62 |
| 1.30 | 20.41 | 20.08 | 19.66 | 0.57 | 0.48 | 0.64 |
| 1.40 | 19.98 | 19.64 | 19.24 | 0.63 | 0.52 | 0.70 |
| 1.50 | 19.56 | 19.22 | 18.83 | 0.66 | 0.52 | 0.73 |
| 1.60 | 19.16 | 18.82 | 18.44 | 0.57 | 0.57 | 0.64 |
| 1.70 | 18.78 | 18.44 | 18.05 | 0.52 | 0.42 | 0.64 |
| 1.80 | 18.39 | 18.05 | 17.67 | 0.60 | 0.42 | 0.66 |
| 1.90 | 18.04 | 17.70 | 17.31 | 0.55 | 0.45 | 0.65 |
| 2.00 | 17.70 | 17.35 | 16.97 | 0.57 | 0.44 | 0.70 |
| 2.10 | 17.37 | 17.02 | 16.63 | 0.61 | 0.49 | 0.70 |
| 2.20 | 17.05 | 16.69 | 16.31 | 0.59 | 0.48 | 0.72 |
| 2.30 | 16.74 | 16.38 | 16.00 | 0.63 | 0.44 | 0.79 |
| 2.40 | 16.44 | 16.08 | 15.70 | 0.59 | 0.37 | 0.68 |
| 2.50 | 16.16 | 15.79 | 15.42 | 0.73 | 0.53 | 0.96 |
| 2.60 | 15.87 | 15.50 | 15.13 | 0.73 | 0.52 | 0.83 |
| 2.70 | 15.61 | 15.24 | 14.86 | 0.80 | 0.64 | 0.92 |
| 2.80 | 15.36 | 14.98 | 14.60 | 0.96 | 0.72 | 1.00 |
| 2.90 | 15.12 | 14.73 | 14.35 | 0.85 | 0.59 | 0.97 |
| 3.00 | 14.88 | 14.49 | 14.11 | 0.87 | 0.65 | 0.96 |
| 3.10 | 14.64 | 14.25 | 13.87 | 0.74 | 0.51 | 0.89 |
| 3.20 | 14.40 | 14.01 | 13.64 | 0.70 | 0.56 | 0.95 |
| 3.30 | 14.18 | 13.79 | 13.41 | 0.78 | 0.59 | 0.95 |
| 3.40 | 13.95 | 13.56 | 13.18 | 0.78 | 0.58 | 0.95 |
| 3.50 | 13.74 | 13.35 | 12.97 | 0.74 | 0.57 | 0.94 |
| 3.60 | 13.53 | 13.14 | 12.76 | 0.76 | 0.69 | 1.01 |
| 3.70 | 13.31 | 12.92 | 12.55 | 0.85 | 0.73 | 0.97 |
| 3.80 | 13.10 | 12.71 | 12.35 | 0.87 | 0.67 | 1.00 |
| 3.90 | 12.90 | 12.52 | 12.16 | 0.85 | 0.67 | 1.04 |
| 4.00 | 12.70 | 12.33 | 11.97 | 0.90 | 0.72 | 1.11 |

⁽¹⁾ Includes test board loss

⁽²⁾ Drain current was allowed to increase during compression measurement

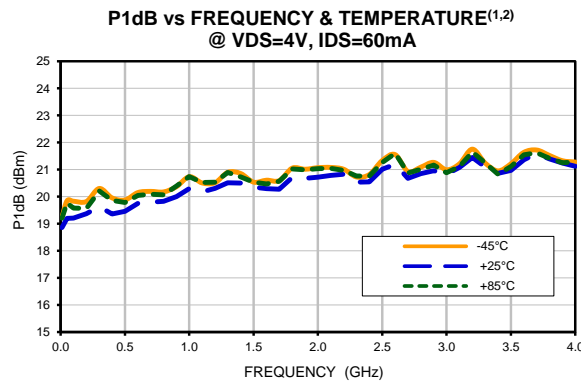
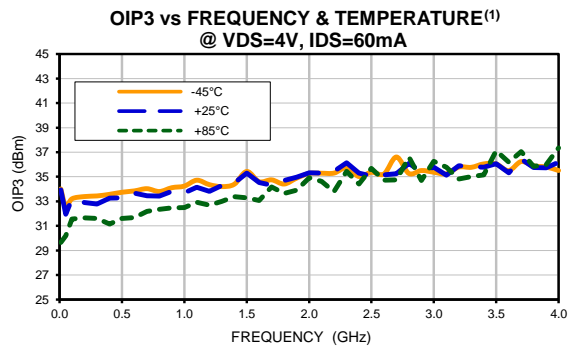
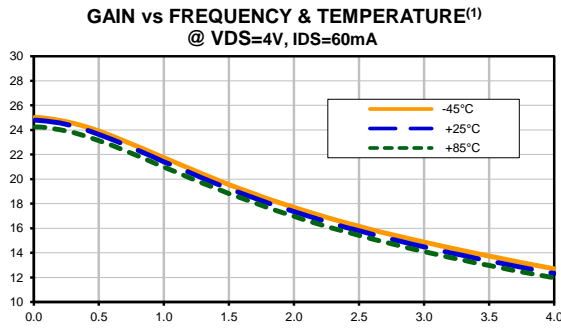
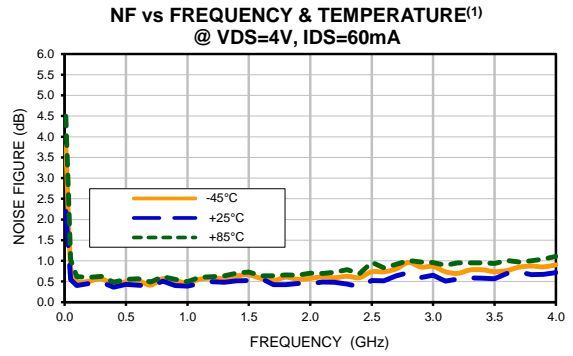
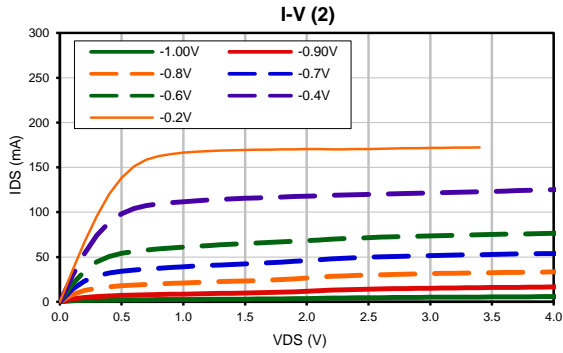
Typical Performance Data

| FREQ (GHz) | OIP3 vs FREQ & TEMPERATURE ⁽¹⁾ @ VDS=4V, IDS=60mA | | | P1dB vs FREQ & TEMPERATURE ^(1,2) @ VDS=4V, IDS=60mA | | |
|---------------|---|-------|-------|---|-------|-------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| 0.01 | 34.01 | 33.94 | 29.65 | 19.24 | 18.86 | 19.20 |
| 0.05 | 32.57 | 31.95 | 30.18 | 19.85 | 19.19 | 19.76 |
| 0.10 | 33.21 | 33.19 | 31.56 | 19.83 | 19.20 | 19.58 |
| 0.20 | 33.39 | 32.89 | 31.65 | 19.82 | 19.37 | 19.57 |
| 0.30 | 33.44 | 32.79 | 31.61 | 20.30 | 19.64 | 20.21 |
| 0.40 | 33.57 | 33.25 | 31.14 | 19.95 | 19.36 | 19.86 |
| 0.50 | 33.74 | 33.29 | 31.61 | 19.88 | 19.46 | 19.79 |
| 0.60 | 33.85 | 33.67 | 31.67 | 20.15 | 19.75 | 20.05 |
| 0.70 | 34.03 | 33.46 | 32.18 | 20.20 | 19.79 | 20.09 |
| 0.80 | 33.80 | 33.43 | 32.36 | 20.18 | 19.83 | 20.07 |
| 0.90 | 34.11 | 33.81 | 32.46 | 20.37 | 20.00 | 20.39 |
| 1.00 | 34.24 | 33.70 | 32.49 | 20.74 | 20.30 | 20.74 |
| 1.10 | 34.72 | 34.14 | 32.92 | 20.51 | 20.18 | 20.53 |
| 1.20 | 34.36 | 33.82 | 32.69 | 20.51 | 20.31 | 20.53 |
| 1.30 | 34.20 | 34.30 | 33.00 | 20.90 | 20.52 | 20.89 |
| 1.40 | 34.39 | 34.48 | 33.39 | 20.85 | 20.50 | 20.73 |
| 1.50 | 35.43 | 35.30 | 33.28 | 20.54 | 20.36 | 20.54 |
| 1.60 | 34.60 | 34.54 | 33.06 | 20.61 | 20.29 | 20.47 |
| 1.70 | 34.75 | 34.32 | 34.18 | 20.59 | 20.27 | 20.57 |
| 1.80 | 34.41 | 34.71 | 33.65 | 21.05 | 20.71 | 21.02 |
| 1.90 | 34.89 | 34.97 | 33.91 | 21.01 | 20.67 | 20.99 |
| 2.00 | 35.27 | 35.33 | 34.91 | 21.07 | 20.72 | 21.03 |
| 2.10 | 35.29 | 35.29 | 34.63 | 21.08 | 20.79 | 21.05 |
| 2.20 | 35.30 | 35.44 | 33.79 | 21.01 | 20.83 | 20.97 |
| 2.30 | 35.73 | 36.15 | 35.44 | 20.73 | 20.54 | 20.76 |
| 2.40 | 35.02 | 35.29 | 34.40 | 20.82 | 20.55 | 20.77 |
| 2.50 | 35.37 | 35.05 | 35.69 | 21.34 | 21.01 | 21.26 |
| 2.60 | 35.23 | 35.16 | 34.72 | 21.55 | 21.19 | 21.60 |
| 2.70 | 36.61 | 35.24 | 34.75 | 20.93 | 20.67 | 20.87 |
| 2.80 | 35.27 | 36.08 | 36.59 | 21.09 | 20.84 | 21.01 |
| 2.90 | 35.51 | 35.40 | 34.71 | 21.27 | 20.96 | 21.16 |
| 3.00 | 35.37 | 35.77 | 36.26 | 20.99 | 20.83 | 20.88 |
| 3.10 | 35.24 | 35.14 | 35.79 | 21.21 | 21.08 | 21.11 |
| 3.20 | 35.79 | 35.91 | 34.83 | 21.75 | 21.45 | 21.65 |
| 3.30 | 35.77 | 35.82 | 35.00 | 21.24 | 21.10 | 21.25 |
| 3.40 | 36.05 | 35.78 | 35.16 | 20.95 | 20.86 | 20.83 |
| 3.50 | 36.04 | 36.06 | 37.12 | 21.21 | 20.97 | 21.11 |
| 3.60 | 35.50 | 35.32 | 36.18 | 21.64 | 21.36 | 21.55 |
| 3.70 | 36.24 | 36.44 | 37.06 | 21.72 | 21.59 | 21.62 |
| 3.80 | 35.89 | 35.76 | 35.85 | 21.52 | 21.39 | 21.42 |
| 3.90 | 35.80 | 35.73 | 35.99 | 21.33 | 21.24 | 21.25 |
| 4.00 | 35.51 | 36.19 | 37.35 | 21.28 | 21.13 | 21.28 |

⁽¹⁾ Includes test board loss

⁽²⁾ Drain current was allowed to increase during compression measurement

Typical Performance Curves

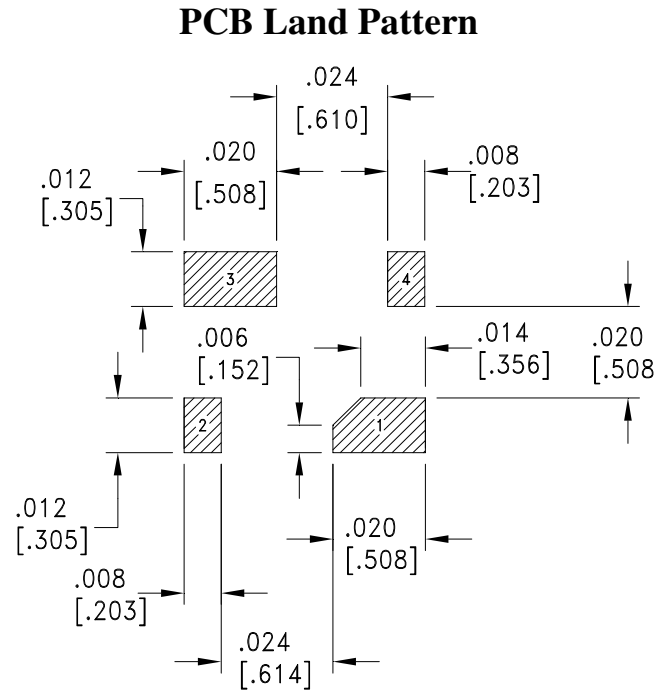
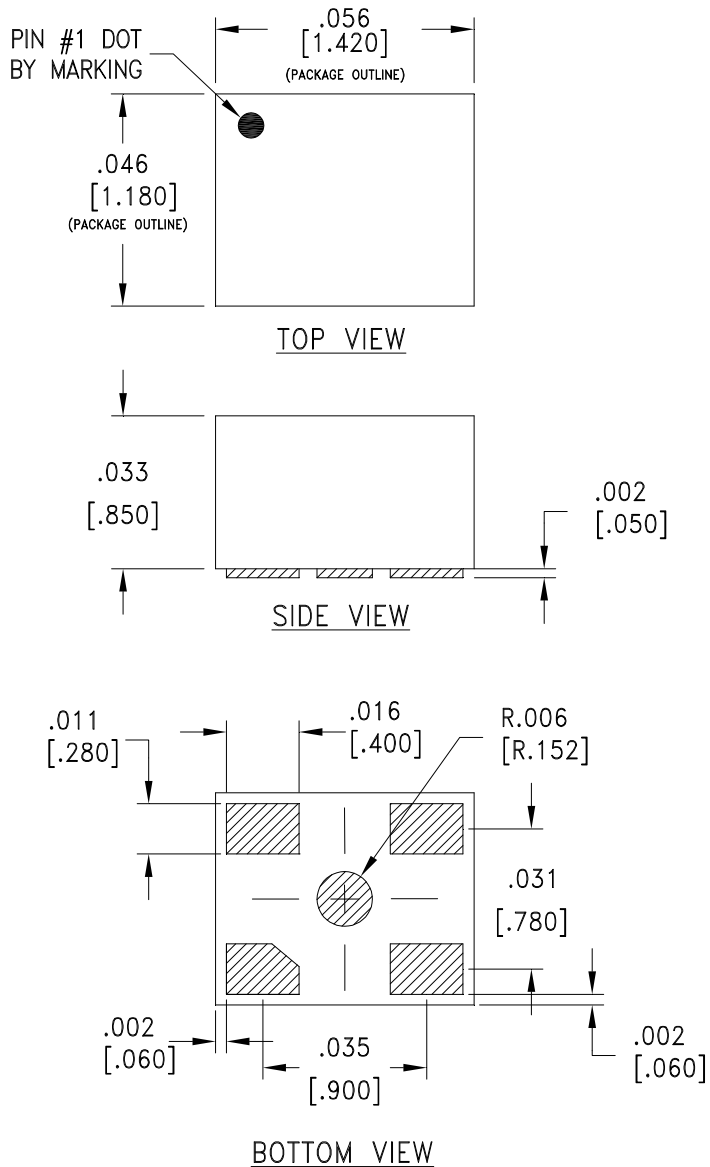


⁽¹⁾ Includes test board loss

⁽²⁾ Drain current was allowed to increase during compression measurement

Outline Dimensions

TE2769



Suggested Layout,
 Tolerance to be within $\pm .002$

Weight: .0047 grams

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

Notes:

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

For RoHS Case Styles: Matte-Tin plate.



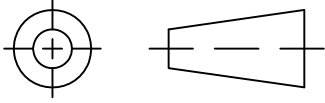
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

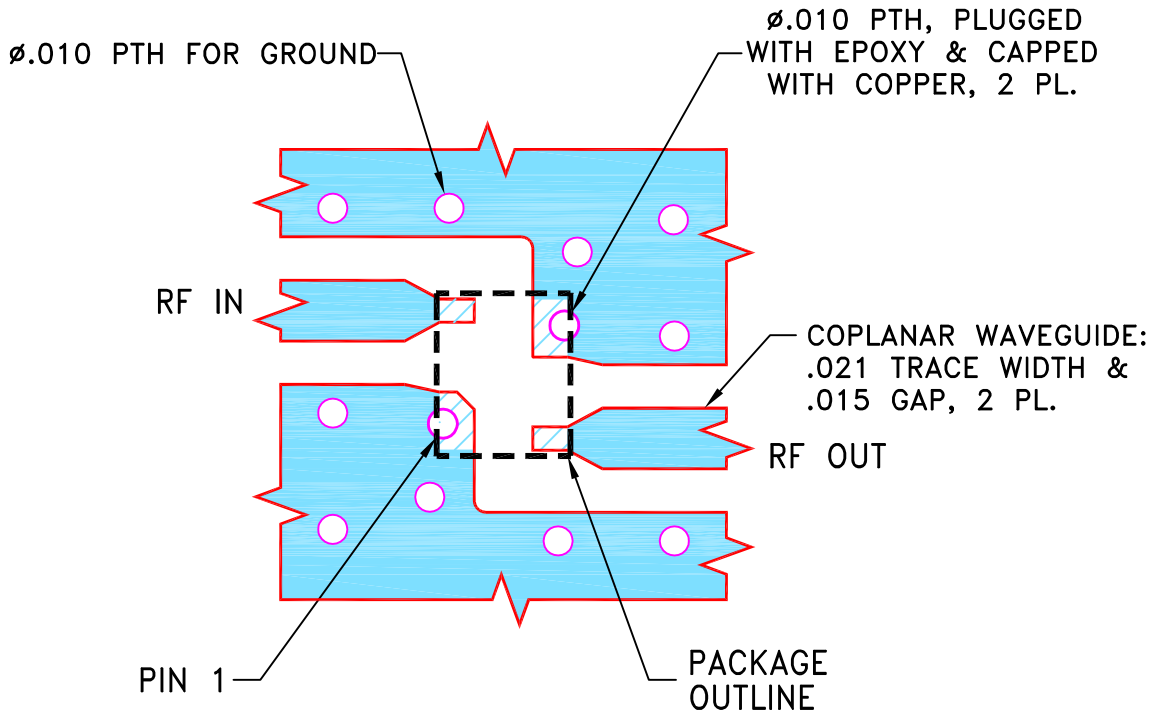
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|-------------|----------|-----|--------|
| OR | M172675 | NEW RELEASE | 02/18/19 | ITG | WIL. P |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION
FOR TE2769 CASE STYLE, "04AM06" PIN CODE

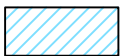


NOTES:

- TRACE WIDTH & GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/2 OZ. EACH SIDE.
 FOR OTHER MATERIALS TRACE WIDTH & 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 ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ± | DRAWN | ITG | 02/15/19 |
| | CHECKED | GF | 02/18/19 |
| | APPROVED | WILSON P | 02/18/19 |



Mini-Circuits®

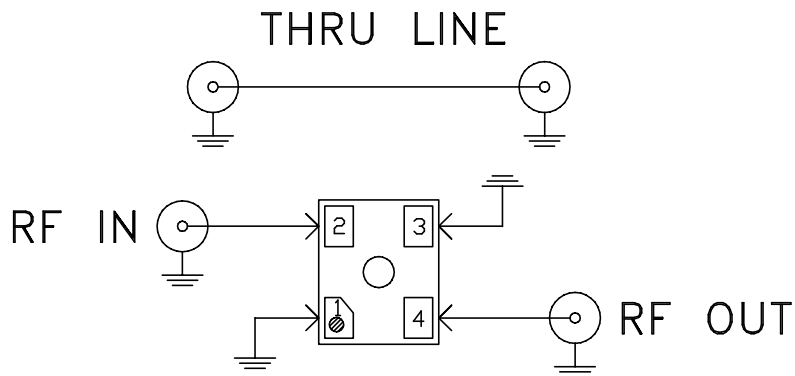
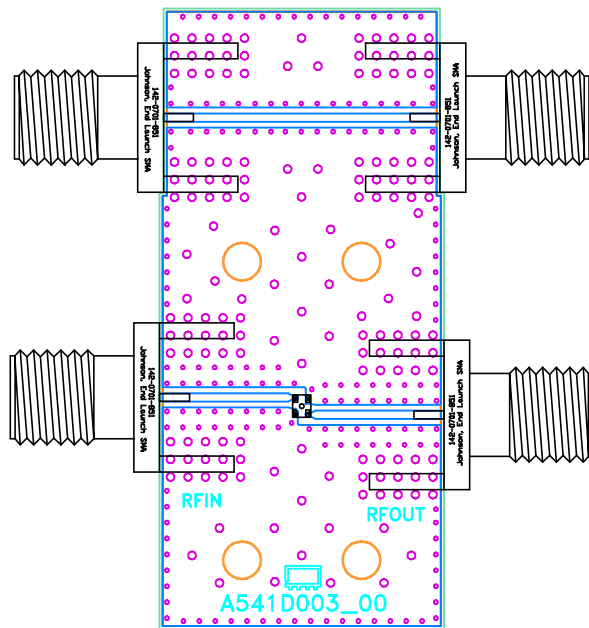
13 Neptune Avenue
 Brooklyn NY 11235

PL, 04AM06, TE2769, TB-TAV1-331+

| | | | |
|------------------|---------------------|--------------------------|------------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-627 | REV: OR |
| FILE: 98PL627 | SCALE: 15:1 | SHEET: 1 OF 1 | |

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Evaluation Board and Circuit

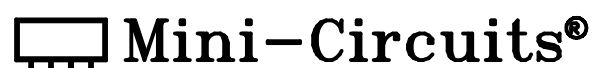


| Function | Pad |
|----------|-----|
| RF IN | 2 |
| RF OUT | 4 |
| GND | 1,3 |

Schematic Diagram

NOTES:

1. 50 Ohm SMA Female Connectors.
2. PCB Material: Roger R04350B or equivalent, Dielectric constant=3.5, Thickness=0.010 inch



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 |



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| Specification | Test/Inspection Condition | Reference/Spec |
|---------------|----------------------------------|----------------|
| | monoethanolamine at 63°C to 70°C | |