ULTRA LOW NOISE, HIGH CURRENT

E-PHEMT Transistor

TAV-541+

THE BIG DEAL

- Low Noise Figure, 0.5 dB
- Gain, 17 dB at 2 GHz
- High Output IP3, +33 dBm
- Output Power at 1dB comp., +19 dBm
- High Current, 60mA
- Wide bandwidth
- External biasing and matching required

Generic photo used for illustration purposes only

CASE STYLE: FG873

+RoHS Compliant

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

APPLICATIONS

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

PRODUCT OVERVIEW

TAV-541+ is an ultra-low noise, high IP3 transistor device, manufactured using E-PHEMT* technology enabling it to work with a single positive supply voltage. It has outstanding Noise Figure, particularly below 2.5 GHz, and when combining this noise figure with high IP3 performance in a single device it makes it an ideal amplifier for demanding base station applications. We offer these units assembled into a complete module, 50Ω in/out, noise matched and fully specified. For more information please see our TAMP family of models on our web site.

KEY FEATURES

Feature	Advantages
Wideband, 0.045 to 6 GHz	Use in multiple applications: UHF, VHF, communication infrastructure
High Gain, Low noise figure	High Gain limits the effect of noise figure due to previous stages
Small size, 1.18 x 1.42 x 0.85 mm, MCLP package	Small foot print saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

* Enhancement mode Pseudomorphic High Electron Mobility Transistor.

REV. D
ECO-011337
TAV-541+
220111

E-PHEMT Transistor

TAV-541+

ELECTRICAL SPECIFICATIONS AT T_{AMB}=25°C, FREQUENCY 0.45 TO 6 GHZ

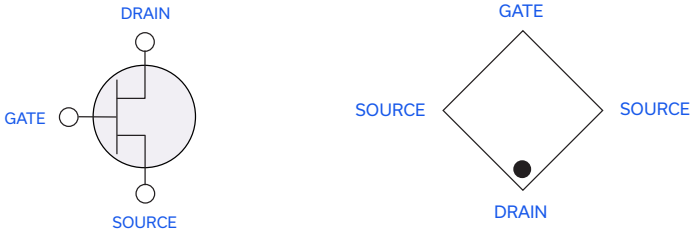
Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
DC Specifications						
V_{GS}	Operational Gate Voltage	V_{DS}=3V, I_{DS}=60 mA	0.37	0.48	0.69	V
V_{TH}	Threshold Voltage	V_{DS}=3V, I_{DS}=4 mA	0.18	0.26	0.38	V
I_{DSS}	Saturated Drain Current	V_{DS}=3V, V_{GS}=0 V	—	1.0	5.0	µA
G_M	Transconductance	V_{DS}=3V, Gm=Δ I_{DS}/ΔV_{GS} ΔV_{GS}=VG_{S1}-VG_{S2} V_{GS1}=V_{GS} at I_{DS}=60 mA V_{GS2}=VG_{S1}+0.05V	— — 230 — —	— — 392 — —	— — 560 — —	mS
I_{GSS}	Gate leakage Current	V_{GD}=V_{GS}=-3V			200	µA
RF Specifications, Z_0=50 Ohms (Figure 1)						
NF[1]	Noise Figure	V_{DS}=3V, I_{DS}=60 mA f=0.9 GHz		0.4	—	dB
		f=2.0 GHz		0.5	0.9	
		f=3.9 GHz		1.0	—	
		f=5.8 GHz		1.8	—	
		V_{DS}=4V, I_{DS}=60 mA f=2.0 GHz		0.4		
Gain	Gain	V_{DS}=3V, I_{DS}=60 mA f=0.9 GHz	—	23.8	—	dB
		f=2.0 GHz	15.5	17.9	18.9	
		f=3.9 GHz	—	12.7	—	
		f=5.8 GHz		9.5	—	
		V_{DS}=4V, I_{DS}=60 mA f=2.0 GHz	—	18.0		
OIP3	Output IP3	V_{DS}=3V, I_{DS}=60 mA f=0.9 GHz	—	32.1		dBm
		f=2.0 GHz	30.0	33.6		
		f=3.9 GHz	—	34.2		
		f=5.8 GHz	—	32.9		
		V_{DS}=4V, I_{DS}=60 mA f=2.0 GHz		35.9		
P1dB[2]	Power output at 1 dB Compression	V_{DS}=3V, I_{DS}=60 mA f=0.9 GHz		18.9		dBm
		f=2.0 GHz		19.1		
		f=3.9 GHz		19.4		
		f=5.8 GHz		19.6		
		V_{DS}=4V, I_{DS}=60 mA f=2.0 GHz		21.1		

MAXIMUM RATINGS(3)

Symbol	Parameter	Max.	Units
V_{DS}(4)	Drain-Source Voltage	5	V
V_{GS}(4)	Gate-Source Voltage	-5 to 0.7	V
V_{GD}(4)	Gate-Drain Voltage	-5 to 0.7	V
I_{DS}(4)	Drain Current	120	mA
I_{GS}	Gate Current	2	mA
P_{DISS}	Total Dissipated Power	550	mW
P_{IN}(5)	RF Input Power	17	dBm
T_{CH}	Channel Temperature	150	°C
T_{OP}	Operating Temperature	-40 to 85	°C
T_{STD}	Storage Temperature	-65 to 150	°C
Θ_{JC}	Thermal Resistance	112	°C/W

(1) Includes test board loss (measured in test board TB-154).
(2) Drain current bias allowed to increase during compression measurement.
(3) Operation of this device above any one of these parameters may cause permanent damage.
(4) Assumes DC quiescent conditions.
(5) IGS is limited to 2 mA during test.

SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION



Function	Pad Number	Description
Source	2 & 4	Source terminal, normally connected to ground
Gate	3	Gate used for RF input
Drain	1	Drain used for RF output

CHARACTERIZATION TEST CIRCUIT

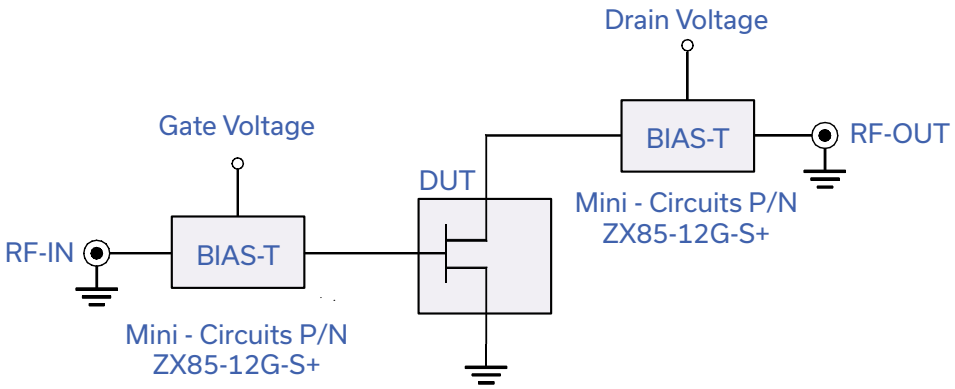


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Test Board TB-154)

Gain, Output power at 1dB compression (P1 dB) and output IP3 (OIP3) are measured using R&S Network Analyzer ZVA-24.
Noise Figure measured using Agilent Noise Figure meter N8975A and Noise Source N4000A.

Conditions:
1. Drain voltage (with reference to source, VDS)= 3 or 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.

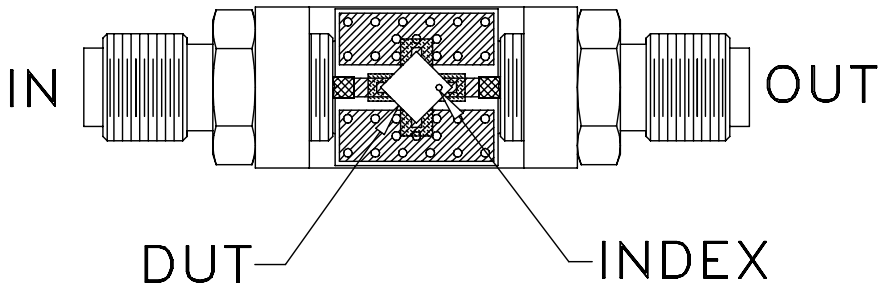


Fig 2. Test Board used for characterization, Mini-Circuits P/N TB-154 (Material: Rogers 4350, Thickness: 0.02")

E-PHEMT Transistor

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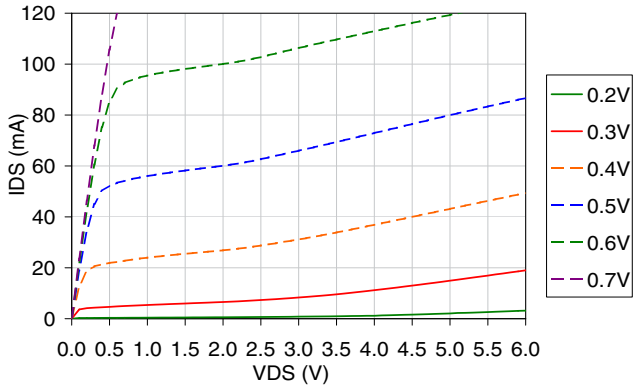
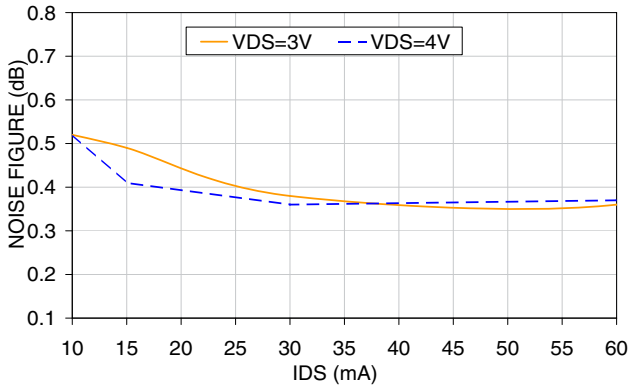
TYPICAL PERFORMANCE CURVES

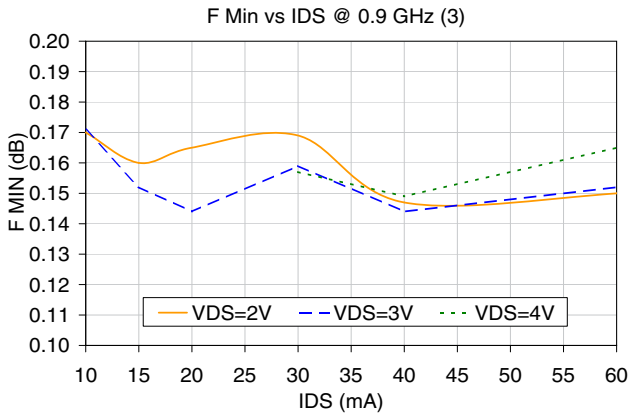
I-V (VGS=0.1V PER STEP) (2)



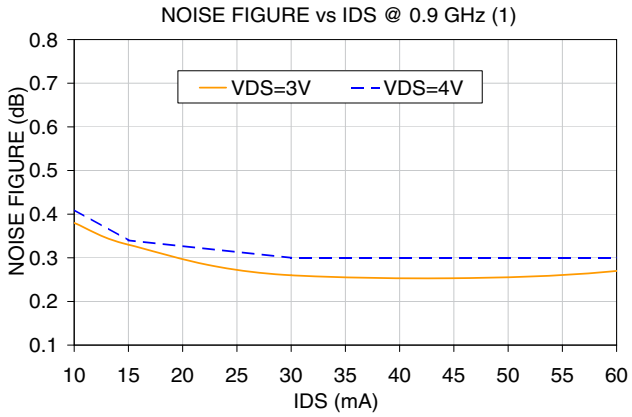
NOISE FIGURE vs IDS @ 2 GHz (1)



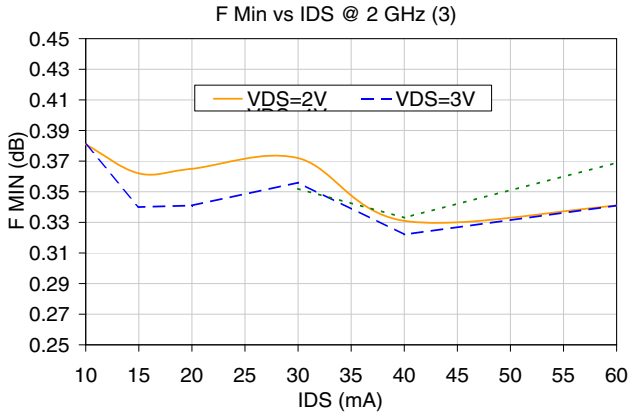
F Min vs IDS @ 0.9 GHz (3)



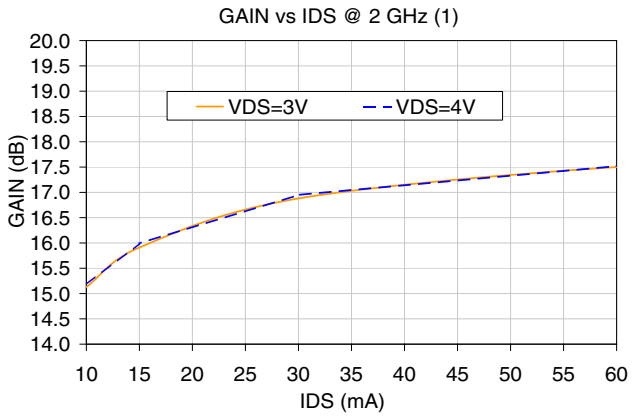
NOISE FIGURE vs IDS @ 0.9 GHz (1)



F Min vs IDS @ 2 GHz (3)



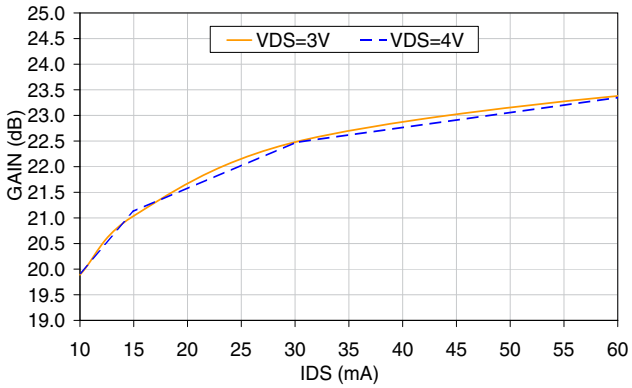
GAIN vs IDS @ 2 GHz (1)



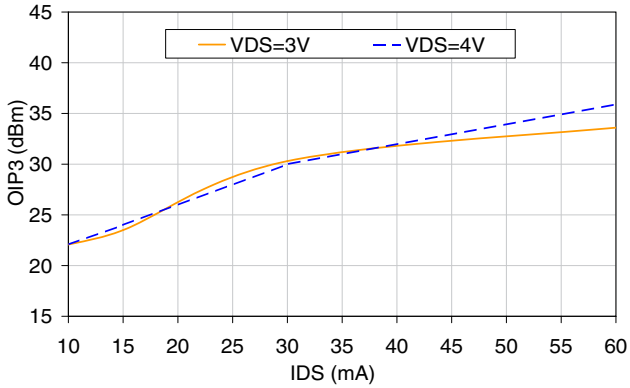
(1) Includes test board loss, set-up and conditions per Figure 1.
(2) Measured using HP4155B semiconductor parameter analyzer.
(3) F Min is minimum Noise Figure
(4) Draing current was allowed to increase during compression measurement.

TYPICAL PERFORMANCE CURVES

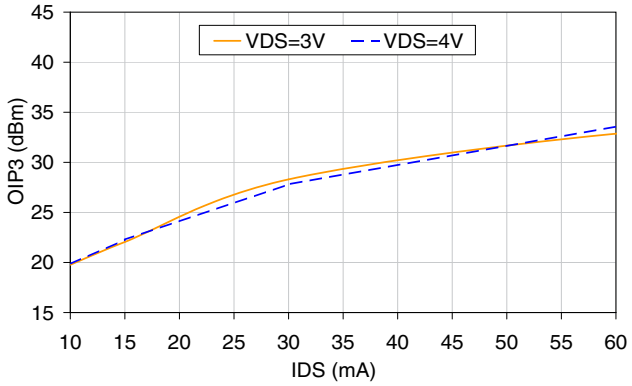
GAIN vs IDS @ 0.9 GHz (1)



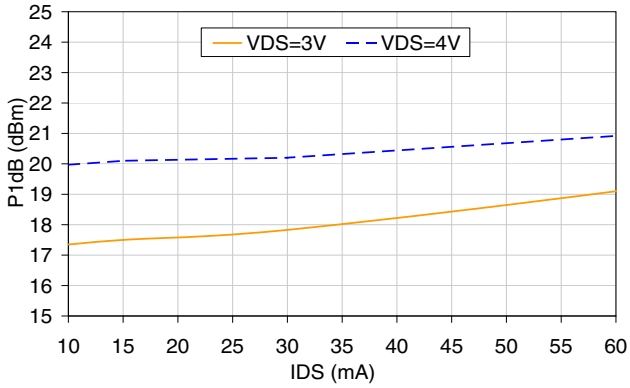
OIP3 vs IDS @ 2GHz (1)



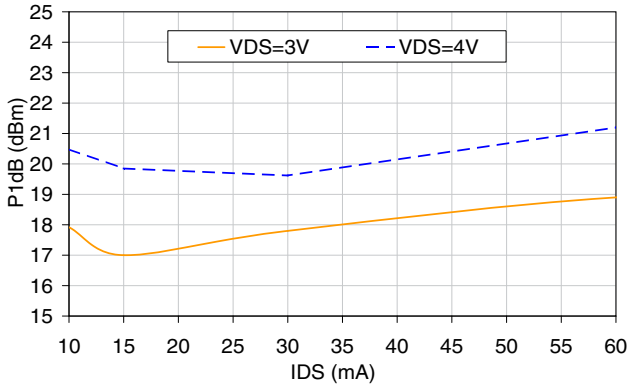
OIP3 vs IDS @ 0.9 GHz (1)



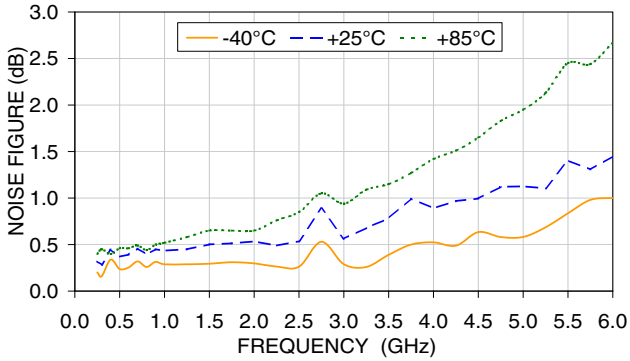
P1dB vs IDS @ 2 GHz (1,4)



P1dB vs IDS @ 0.9 GHz (1,4)



NF vs FREQUENCY & TEMPERATURE (1)
@ VDS=3V, IDS=60mA



(1) Includes test board loss, set-up and conditions per Figure 1.
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TYPICAL PERFORMANCE CURVES

GAIN vs FREQUENCY & TEMPERATURE (1)
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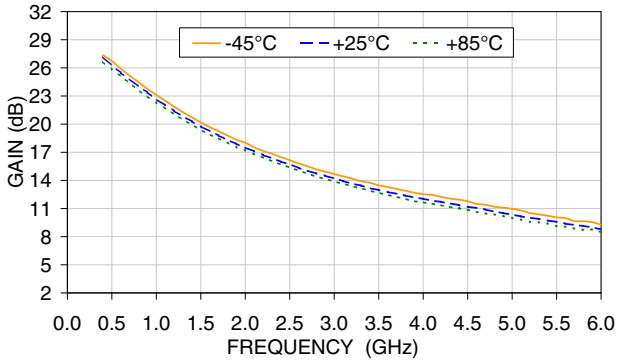
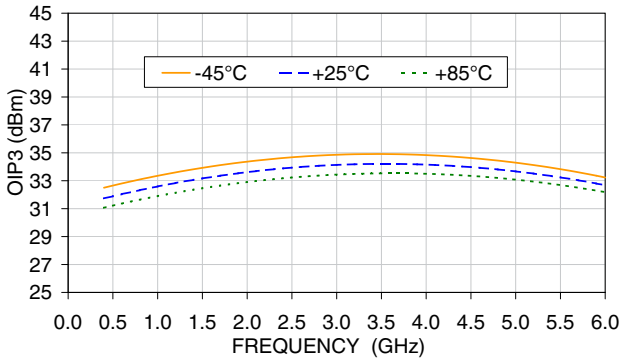


OIP3 vs FREQUENCY & TEMPERATURE (1)
@ VDS=3V, IDS=60mA



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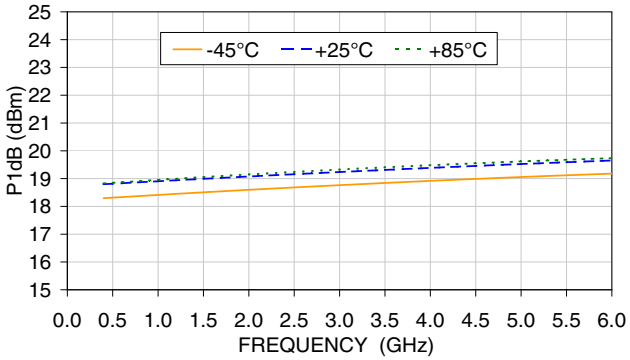
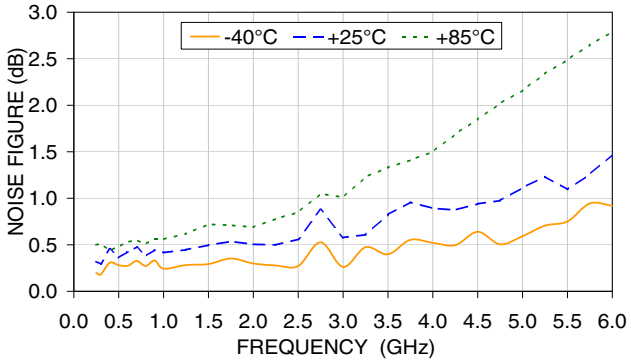
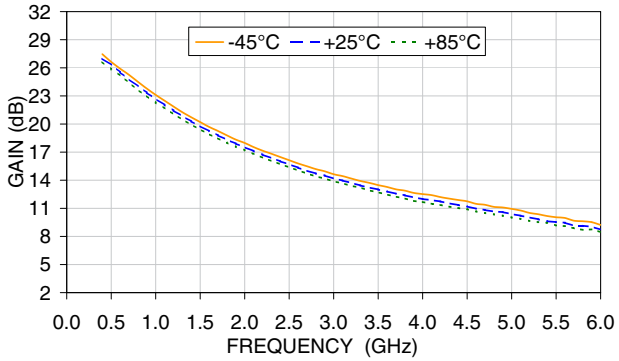


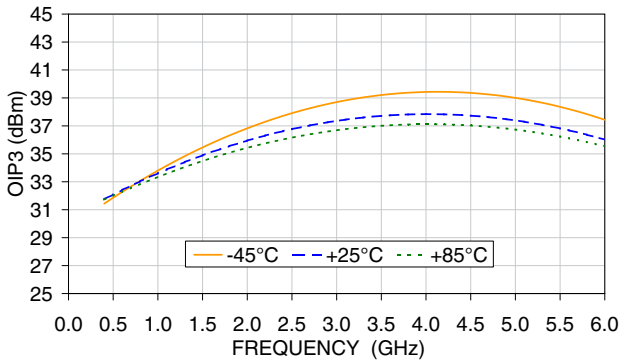
NF vs FREQUENCY & TEMPERATURE (1)
@ VDS=4V, IDS=60mA



GAIN vs FREQUENCY & TEMPERATURE (1)
@ VDS=4V, IDS=60mA



OIP3 vs FREQUENCY & TEMPERATURE (1)
@ VDS=4V, IDS=60mA



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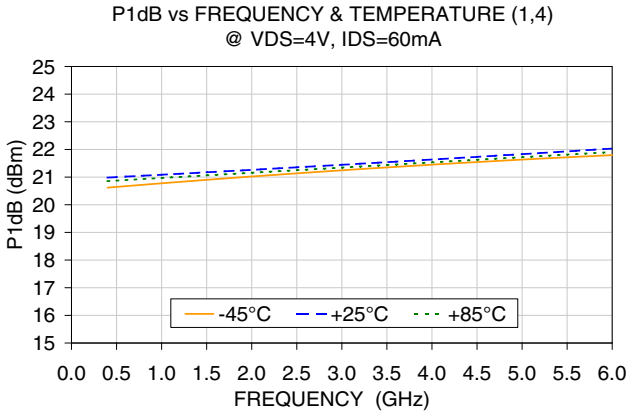
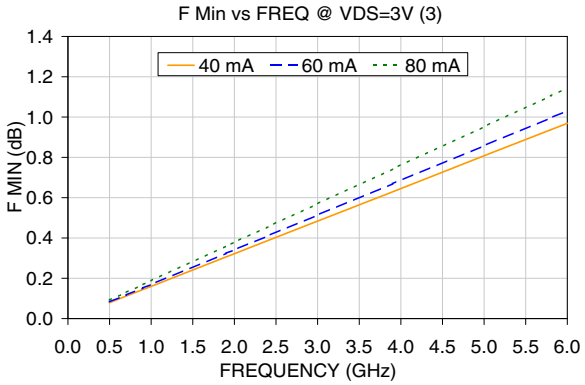
TYPICAL PERFORMANCE CURVES





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REFERENCE PLANE LOCATION FOR S AND NOISE PARAMETERS (SEE DATA IN PAGES 8-11)

(Refer to Application Note AN-60-040)

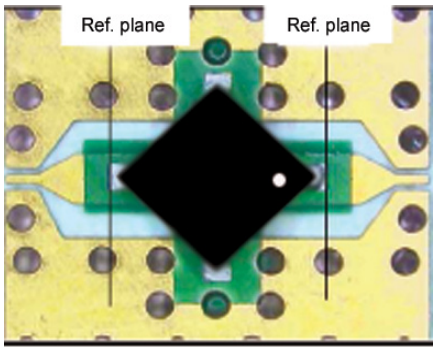


Fig 3. Reference Plane Location

Notes:
Noise parameters were measured over 0.5 to 6 GHz by Modelithics® using a solid state tuner-based NP noise parameter (NP) test system available from Maury Microwave. F Min, optimimum source reflection coefficient and noise resistance values are calculated values based on a set of measurements made at approximately 16 different impedances. Some data smoothing was applied to arrive at the presented data set.

S-parameters were measured by Modelithics® on an Anritsu Lightning vector network analyzer over 0.1 to 18GHz using 350um pitch RF probes from GGB industries combined with customized thru-reflect-line (TRL) calibration standards. The reference plane is at the device package leads, as shown in the picture.

E-PHEMT Transistor

TAV-541+

TYPICAL S-PARAMETERS, V_{DS}=3V AND I_{DS}=40 MA (FIG. 3)

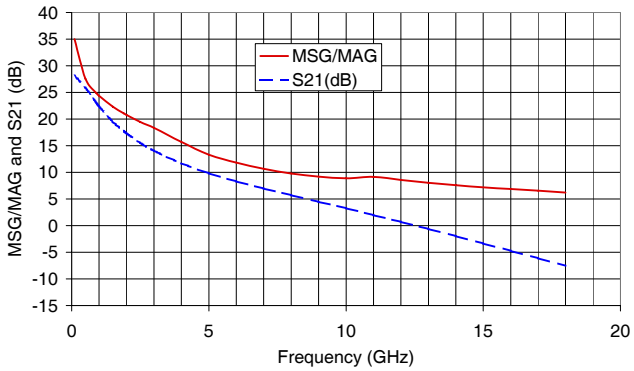
Freq. (GHz)	S11		S21			S12		S22		MSG/MAG (dB)
	Mag.	Ang.	Mag.	Mag (dB)	Ang.	Mag.	Ang.	Mag.	Ang.	
0.1	0.99	-17.2	25.43	28.11	168.9	0.008	88.2	0.56	-14.38	35.0
0.5	0.87	-76.8	19.58	25.84	130.6	0.035	53.0	0.43	-57.19	27.5
0.9	0.76	-115.5	14.13	23.01	106.5	0.046	37.7	0.32	-86.00	24.8
1.0	0.74	-123.3	13.11	22.35	101.9	0.048	34.5	0.30	-92.51	24.4
1.5	0.69	-152.7	9.47	19.53	83.1	0.055	26.3	0.23	-117.37	22.3
1.9	0.67	-170.0	7.69	17.72	71.2	0.06	22.0	0.19	-134.11	21.1
2.0	0.67	-173.7	7.34	17.32	68.5	0.061	21.0	0.19	-138.02	20.8
2.5	0.66	169.4	6.00	15.56	55.6	0.068	16.3	0.16	-156.68	19.5
3.0	0.66	154.6	5.06	14.08	43.7	0.074	11.9	0.15	-174.75	18.4
4.0	0.66	129.3	3.84	11.68	21.3	0.087	2.3	0.14	150.58	15.7
5.0	0.68	106.9	3.10	9.84	0.1	0.1	-8.8	0.15	119.45	13.3
6.0	0.70	86.2	2.60	8.30	-20.5	0.115	-20.9	0.18	92.56	11.8
7.0	0.72	66.4	2.22	6.94	-41.0	0.128	-34.2	0.22	69.55	10.7
8.0	0.75	47.4	1.93	5.70	-61.0	0.139	-48.1	0.27	49.63	9.8
9.0	0.79	28.5	1.68	4.48	-81.0	0.147	-63.3	0.34	31.29	9.2
10.0	0.83	9.5	1.46	3.26	-101.2	0.152	-78.5	0.41	13.77	8.9
11.0	0.86	-9.0	1.26	1.99	-121.1	0.153	-94.1	0.48	-2.86	9.2
12.0	0.89	-26.8	1.08	0.70	-140.7	0.151	-109.7	0.55	-18.99	8.6
13.0	0.91	-44.5	0.93	-0.61	-160.4	0.146	-125.6	0.60	-35.09	8.1
14.0	0.92	-61.1	0.80	-1.97	-179.5	0.139	-141.1	0.65	-50.57	7.6
15.0	0.94	-73.8	0.68	-3.33	164.7	0.13	-153.6	0.70	-62.75	7.2
16.0	0.96	-83.9	0.58	-4.74	151.0	0.119	-163.2	0.74	-73.16	6.9
17.0	0.96	-95.0	0.50	-6.11	136.0	0.11	-174.5	0.77	-85.02	6.5
18.0	0.96	-107.0	0.42	-7.54	120.2	0.101	175.2	0.79	-98.18	6.2

TYPICAL NOISE PARAMETERS, V_{DS}=3V AND I_{DS}=40 MA (FIG. 3)

Freq. (GHz)	F Min. (dB)	GOpt (Magnitude)	GOpt (Angle)	Rn/50	Ga Associated Gain (dB)
0.5	0.08	0.33	24.56	0.06	27.6
0.7	0.11	0.33	36.08	0.05	25.5
0.9	0.14	0.34	47.40	0.05	23.7
1.0	0.16	0.34	52.98	0.04	22.9
1.9	0.31	0.37	100.93	0.03	18.2
2.0	0.32	0.37	106.01	0.03	17.8
2.4	0.39	0.38	125.79	0.03	16.6
3.0	0.48	0.40	153.93	0.04	15.1
3.9	0.63	0.43	-167.30	0.06	13.5
5.0	0.81	0.46	-125.53	0.11	12.0
5.8	0.94	0.49	-99.03	0.16	11.1
6.0	0.97	0.50	-92.92	0.18	10.8

F Min.: Minimum Noise Figure
GOpt: Optimum Source Reflection Coefficient
Rn: Equivalent noise resistance

MAXIMUM STABLE GAIN (MSG)/MAXIMUM AVAILABLE GAIN (MAG) vs. FREQUENCY



E-PHEMT Transistor

TAV-541+

TYPICAL S-PARAMETERS, V_{DS}=3V AND I_{DS}=60 MA (FIG. 3)

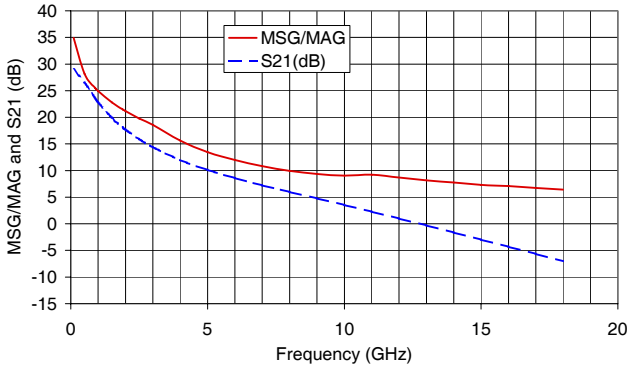
Freq. (GHz)	S11		S21			S12		S22		MSG/MAG (dB)
	Mag.	Ang.	Mag.	Mag (dB)	Ang.	Mag.	Ang.	Mag.	Ang.	
0.1	1.00	-18.3	28.21	29.01	168.3	0.009	85.7	0.51	-16.71	34.9
0.5	0.85	-80.2	21.11	26.49	128.7	0.032	52.1	0.39	-62.25	28.1
0.9	0.74	-119.0	14.94	23.49	104.9	0.043	38.1	0.29	-93.22	25.5
1.0	0.73	-126.7	13.82	22.81	100.3	0.044	35.5	0.27	-100.07	24.9
1.5	0.68	-155.5	9.90	19.91	82.0	0.052	28.6	0.21	-126.53	22.8
1.9	0.66	-172.3	8.01	18.07	70.4	0.057	25.0	0.18	-144.11	21.5
2.0	0.66	-176.0	7.64	17.67	67.7	0.058	24.3	0.18	-148.27	21.2
2.5	0.65	167.5	6.23	15.89	55.1	0.065	19.8	0.16	-167.22	19.8
3.0	0.65	153.1	5.25	14.40	43.3	0.072	15.3	0.15	174.65	18.6
4.0	0.65	128.2	3.98	12.00	21.3	0.087	5.4	0.15	141.50	15.6
5.0	0.67	106.1	3.21	10.14	0.3	0.102	-6.5	0.17	112.56	13.5
6.0	0.69	85.6	2.69	8.59	-20.1	0.117	-19.1	0.20	87.55	12.0
7.0	0.72	66.0	2.30	7.23	-40.4	0.13	-33.1	0.24	65.85	10.8
8.0	0.75	47.1	1.99	5.98	-60.3	0.142	-47.3	0.29	46.59	9.9
9.0	0.78	28.3	1.73	4.76	-80.1	0.15	-62.8	0.35	28.80	9.3
10.0	0.82	9.4	1.50	3.54	-100.0	0.154	-78.4	0.42	11.67	9.0
11.0	0.86	-9.1	1.30	2.26	-119.7	0.155	-94.2	0.49	-4.75	9.2
12.0	0.89	-26.9	1.12	0.99	-139.3	0.152	-109.8	0.56	-20.66	8.7
13.0	0.91	-44.5	0.97	-0.30	-158.8	0.147	-125.7	0.61	-36.60	8.2
14.0	0.92	-61.1	0.83	-1.63	-177.8	0.139	-141.3	0.66	-52.00	7.7
15.0	0.94	-73.9	0.71	-2.97	166.5	0.132	-154.0	0.71	-64.02	7.3
16.0	0.96	-84.1	0.61	-4.32	152.8	0.12	-163.5	0.74	-74.32	7.1
17.0	0.96	-95.3	0.52	-5.67	138.0	0.11	-174.6	0.77	-85.98	6.8
18.0	0.96	-107.3	0.45	-7.02	122.0	0.102	174.4	0.79	-99.18	6.4

TYPICAL NOISE PARAMETERS, V_{DS}=3V AND I_{DS}=60 MA (FIG. 3)

Freq. (GHz)	F Min. (dB)	GOpt (Magnitude)	GOpt (Angle)	Rn/50	Ga Associated Gain (dB)
0.5	0.08	0.30	28.07	0.05	28.1
0.7	0.12	0.31	40.04	0.05	26.0
0.9	0.15	0.31	51.78	0.04	24.3
1.0	0.17	0.32	57.56	0.04	23.5
1.9	0.32	0.34	106.85	0.03	18.7
2.0	0.34	0.35	112.03	0.03	18.3
2.4	0.41	0.36	132.12	0.03	17.1
3.0	0.51	0.38	160.46	0.04	15.6
3.9	0.67	0.41	-161.11	0.06	13.9
5.0	0.86	0.46	-120.77	0.12	12.3
5.8	1.00	0.50	-96.02	0.18	11.3
6.0	1.03	0.50	-90.44	0.20	11.1

F Min.: Minimum Noise Figure
GOpt: Optimum Source Reflection Coefficient
Rn: Equivalent noise resistance

MAXIMUM STABLE GAIN (MSG)/MAXIMUM AVAILABLE GAIN (MAG) vs. FREQUENCY



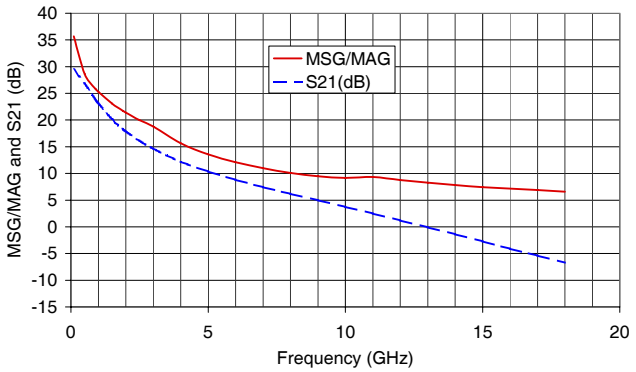
TYPICAL S-PARAMETERS, V_{DS}=3V AND I_{DS}=80 MA (FIG. 3)

Freq. (GHz)	S11		S21			S12		S22		MSG/MAG (dB)
	Mag.	Ang.	Mag.	Mag (dB)	Ang.	Mag.	Ang.	Mag.	Ang.	
0.1	0.99	-19.1	29.68	29.45	168.0	0.008	79.9	0.48	-15.91	35.7
0.5	0.84	-81.5	21.98	26.84	127.8	0.03	52.2	0.37	-64.82	28.6
0.9	0.74	-120.4	15.43	23.77	104.1	0.041	39.3	0.27	-96.45	25.8
1.0	0.72	-128.1	14.26	23.08	99.6	0.042	36.9	0.26	-103.52	25.3
1.5	0.67	-156.6	10.17	20.15	81.6	0.05	30.5	0.20	-130.54	23.1
1.9	0.65	-173.2	8.22	18.30	70.0	0.055	26.8	0.18	-148.39	21.7
2.0	0.65	-176.8	7.85	17.89	67.4	0.057	26.1	0.17	-152.41	21.4
2.5	0.65	166.8	6.39	16.12	54.9	0.064	21.9	0.16	-171.38	20.0
3.0	0.65	152.5	5.38	14.62	43.3	0.071	17.3	0.15	170.84	18.8
4.0	0.65	127.8	4.08	12.21	21.4	0.087	7.1	0.15	138.34	15.7
5.0	0.66	105.9	3.29	10.35	0.5	0.102	-5.0	0.17	110.24	13.5
6.0	0.69	85.5	2.75	8.79	-19.8	0.117	-18.3	0.20	85.89	12.1
7.0	0.71	66.0	2.35	7.43	-40.0	0.131	-32.5	0.24	64.54	11.0
8.0	0.74	47.1	2.04	6.19	-59.8	0.142	-46.7	0.30	45.55	10.1
9.0	0.78	28.3	1.77	4.96	-79.5	0.151	-62.4	0.36	27.96	9.5
10.0	0.82	9.4	1.54	3.74	-99.4	0.155	-78.0	0.43	10.98	9.2
11.0	0.85	-9.0	1.33	2.47	-119.0	0.155	-93.9	0.50	-5.36	9.3
12.0	0.88	-26.8	1.15	1.21	-138.5	0.153	-109.6	0.56	-21.19	8.8
13.0	0.91	-44.5	0.99	-0.07	-158.0	0.148	-125.5	0.61	-37.07	8.3
14.0	0.92	-61.1	0.85	-1.39	-176.9	0.14	-141.0	0.66	-52.42	7.8
15.0	0.94	-73.9	0.73	-2.72	167.5	0.132	-154.1	0.71	-64.45	7.4
16.0	0.96	-84.2	0.63	-4.08	153.8	0.12	-163.4	0.74	-74.71	7.2
17.0	0.96	-95.4	0.54	-5.38	138.8	0.11	-174.4	0.77	-86.39	6.9
18.0	0.96	-107.3	0.46	-6.72	122.8	0.102	174.9	0.79	-99.50	6.6

TYPICAL NOISE PARAMETERS, V_{DS}=3V AND I_{DS}=80 MA (FIG. 3)

Freq. (GHz)	F Min. (dB)	GOpt (Magni-tude)	GOpt (Angle)	Rn/50	Ga Associated Gain (dB)
0.5	0.09	0.33	26.31	0.06	28.3
0.7	0.13	0.33	39.10	0.05	26.2
0.9	0.17	0.33	51.61	0.04	24.5
1.0	0.19	0.33	57.75	0.04	23.7
1.9	0.36	0.33	109.77	0.03	19.0
2.0	0.38	0.33	115.19	0.03	18.6
2.4	0.46	0.34	136.14	0.03	17.4
3.0	0.57	0.36	165.40	0.04	15.9
3.9	0.74	0.39	-155.61	0.07	14.1
5.0	0.95	0.45	-115.93	0.14	12.5
5.8	1.11	0.51	-92.56	0.21	11.5
6.0	1.14	0.52	-87.45	0.23	11.3

MAXIMUM STABLE GAIN (MSG)/MAXIMUM AVAILABLE GAIN (MAG) vs. FREQUENCY



F Min.: Minimum Noise Figure
GOpt: Optimum Source Reflection Coefficient
Rn: Equivalent noise resistance

TYPICAL S-PARAMETERS, V_{DS}=4V AND I_{DS}=60 MA (FIG. 3)

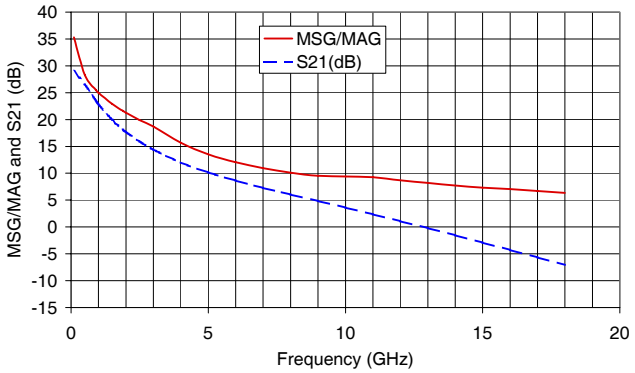
Freq. (GHz)	S11		S21			S12		S22		MSG/MAG (dB)
	Mag.	Ang.	Mag.	Mag (dB)	Ang.	Mag.	Ang.	Mag.	Ang.	
0.1	0.99	-18.6	28.21	29.01	168.0	0.008	81.4	0.53	-15.16	35.3
0.5	0.85	-80.1	21.15	26.51	128.6	0.032	50.7	0.41	-59.41	28.3
0.9	0.74	-118.9	14.97	23.51	104.8	0.042	38.3	0.29	-88.49	25.5
1.0	0.73	-126.7	13.85	22.83	100.2	0.044	36.0	0.27	-94.84	25.0
1.5	0.68	-155.5	9.92	19.93	81.9	0.051	28.6	0.21	-119.65	22.9
1.9	0.66	-172.3	8.03	18.10	70.3	0.056	24.9	0.18	-136.31	21.6
2.0	0.66	-176.0	7.67	17.69	67.6	0.057	24.2	0.17	-140.21	21.3
2.5	0.65	167.5	6.25	15.92	55.0	0.064	19.8	0.15	-158.90	19.9
3.0	0.65	153.1	5.26	14.42	43.3	0.071	15.5	0.14	-177.02	18.7
4.0	0.65	128.2	3.99	12.02	21.2	0.085	5.7	0.13	148.13	15.7
5.0	0.67	106.1	3.23	10.17	0.2	0.1	-5.8	0.14	117.31	13.5
6.0	0.69	85.6	2.70	8.63	-20.3	0.115	-18.2	0.17	90.98	12.1
7.0	0.72	66.0	2.31	7.28	-40.7	0.128	-32.0	0.21	68.42	11.0
8.0	0.75	47.1	2.01	6.05	-60.7	0.14	-46.1	0.27	48.79	10.1
9.0	0.78	28.3	1.74	4.83	-80.6	0.149	-61.5	0.33	30.75	9.6
10.0	0.82	9.4	1.52	3.62	-100.6	0.154	-76.9	0.40	13.54	9.4
11.0	0.86	-9.1	1.31	2.36	-120.5	0.155	-92.9	0.47	-3.07	9.3
12.0	0.89	-27.0	1.13	1.10	-140.2	0.153	-108.7	0.54	-19.05	8.7
13.0	0.91	-44.7	0.98	-0.20	-160.0	0.148	-124.7	0.60	-35.11	8.2
14.0	0.93	-61.4	0.84	-1.55	-179.2	0.141	-140.4	0.65	-50.62	7.7
15.0	0.94	-74.2	0.72	-2.90	165.0	0.132	-153.2	0.70	-62.85	7.3
16.0	0.96	-84.5	0.61	-4.30	151.1	0.12	-163.0	0.74	-73.26	7.1
17.0	0.96	-95.9	0.52	-5.64	135.9	0.111	-174.2	0.77	-85.15	6.7
18.0	0.96	-107.8	0.44	-7.06	119.8	0.103	174.4	0.79	-98.32	6.4

TYPICAL NOISE PARAMETERS, V_{DS}=4V AND I_{DS}=60 MA (FIG. 3)

Freq. (GHz)	F Min. (dB)	GOpt (Magni-tude)	GOpt (Angle)	Rn/50	Ga Associated Gain (dB)
0.5	0.09	0.34	30.05	0.06	28.3
0.7	0.13	0.35	41.82	0.05	26.1
0.9	0.17	0.35	53.36	0.04	24.3
1.0	0.18	0.35	59.05	0.04	23.5
1.9	0.35	0.36	107.61	0.03	18.7
2.0	0.37	0.36	112.72	0.03	18.3
2.4	0.44	0.37	132.57	0.03	17.1
3.0	0.56	0.38	160.61	0.04	15.6
3.9	0.72	0.41	-161.21	0.06	13.9
5.0	0.93	0.45	-120.91	0.12	12.3
5.8	1.08	0.49	-95.98	0.18	11.3
6.0	1.11	0.50	-90.33	0.20	11.1

F Min.: Minimum Noise Figure
GOpt: Optimum Source Reflection Coefficient
Rn: Equivalent noise resistance

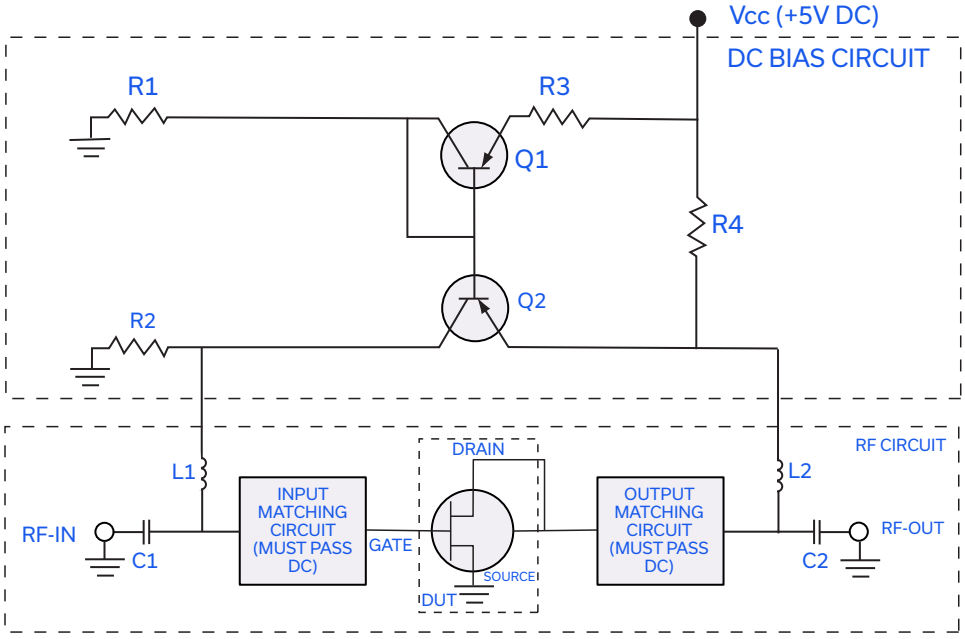
MAXIMUM STABLE GAIN (MSG)/MAXIMUM AVAILABLE GAIN (MAG) vs. FREQUENCY



E-PHEMT Transistor

TAV-541+

RECOMMENDED APPLICATION CIRCUIT



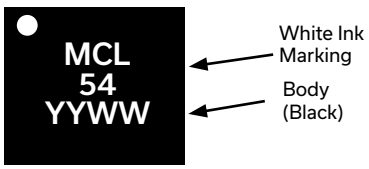
VDS, V (nom)	3	4
IDS, mA (nom)	60mA	60mA
R1	4320Ω	4320Ω
R2	4320Ω	4320Ω
R3	3570Ω	1210Ω
R4	33.2Ω	16.7Ω
Q1	MMBT3906*	MMBT3906*
Q2	MMBT3906*	MMBT3906*
C1	0.01µF	0.01µF
C2	0.01µF	0.01µF
L1**	840nH	840nH
L2**	840nH	840nH

* Fairchild Semiconductor™ part number
** Piconics™ part number CC45T47K240G5

OPTIMIZED AMPLIFIER CIRCUITS

For band specific, drop-in modules, and as an alternative to designing circuits, please refer to Mini-Circuits TAMP and RAMP series models which are based upon SAV/TAV E-PHEMT's and include all DC blocking, bias, matching and stabilization circuitry, without need for any external components.

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

E-PHEMT Transistor TAV-541+

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	FG873 Plastic low profile 3mm x 3mm, lead finish: tin/silver/nickel
Tape & Reel **Standard quantities available on reel**	F68 7" reels with 20, 50, 100, 200, 500,1K,2K or 3K devices
Suggested Layout for PCB Design	PL-301
Evaluation Board	TB-154+
Environmental Ratings	ENV08T2

ESD RATING

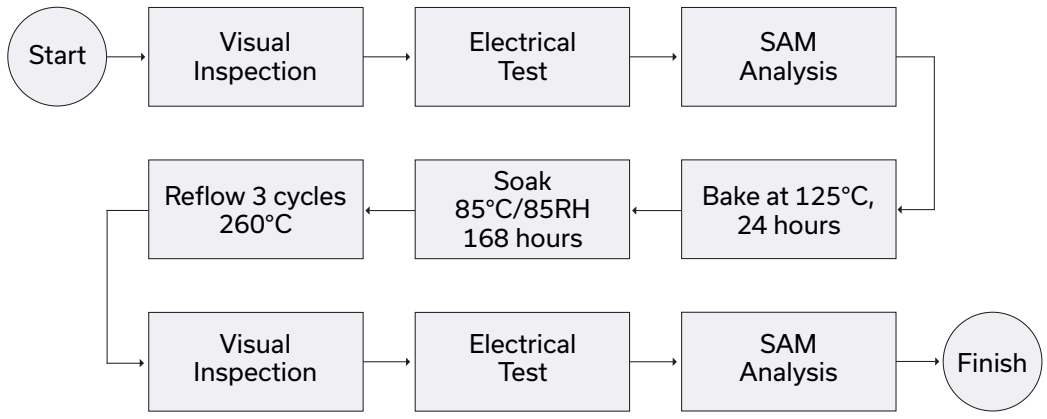
Human Body Model (HBM): Class 1A (250 V to < 500 V) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M1 (40 V) in accordance with ANSI/ESD STM 5.2 - 1999

MSL RATING

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

MSL TEST FLOW CHART



Typical Performance Data

VDS (V)	IDS (mA) @ VGS=					
	0.20V	0.30V	0.40V	0.50V	0.60V	0.70V
0.00	0.01	0.04	0.08	0.08	0.10	0.09
0.10	0.27	3.65	12.61	18.97	21.95	23.61
0.20	0.29	4.15	18.82	34.57	42.39	46.35
0.30	0.30	4.34	20.58	45.11	60.56	68.02
0.40	0.33	4.50	21.37	50.24	75.24	88.05
0.50	0.34	4.65	21.90	52.30	85.18	105.70
0.60	0.34	4.85	22.33	53.38	90.38	120.00
0.70	0.36	4.99	22.76	54.18	92.66	
0.80	0.38	5.13	23.24	54.89	93.88	
0.90	0.40	5.25	23.62	55.49	94.80	
1.00	0.42	5.38	23.97	56.03	95.53	
1.10	0.43	5.51	24.29	56.51	96.14	
1.20	0.45	5.63	24.61	56.97	96.68	
1.30	0.45	5.75	24.91	57.39	97.18	
1.40	0.47	5.86	25.22	57.82	97.65	
1.50	0.48	5.98	25.50	58.21	98.08	
1.60	0.52	6.10	25.77	58.60	98.49	
1.70	0.53	6.21	26.04	58.97	98.89	
1.80	0.55	6.32	26.32	59.33	99.30	
1.90	0.57	6.45	26.58	59.70	99.68	
2.00	0.55	6.55	26.87	60.08	100.07	
2.10	0.58	6.69	27.17	60.50	100.48	
2.20	0.60	6.82	27.51	60.97	100.97	
2.30	0.63	6.99	27.89	61.47	101.50	
2.40	0.64	7.17	28.29	62.05	102.12	
2.50	0.67	7.34	28.74	62.68	102.78	
2.60	0.70	7.52	29.19	63.32	103.50	
2.70	0.71	7.69	29.65	63.99	104.22	
2.80	0.73	7.90	30.15	64.64	104.94	
2.90	0.76	8.10	30.62	65.31	105.64	
3.00	0.82	8.34	31.13	65.99	106.33	
3.10	0.84	8.56	31.63	66.65	107.02	
3.20	0.87	8.79	32.17	67.32	107.70	
3.30	0.90	9.03	32.72	68.02	108.37	
3.40	0.92	9.30	33.28	68.69	109.02	
3.50	0.95	9.58	33.87	69.41	109.67	
3.60	1.01	9.89	34.46	70.12	110.34	
3.70	1.06	10.20	35.06	70.81	111.00	
3.80	1.10	10.53	35.67	71.53	111.64	
3.90	1.14	10.86	36.29	72.24	112.30	
4.00	1.14	11.21	36.89	72.93	112.96	
4.10	1.30	11.55	37.51	73.65	113.60	
4.20	1.37	11.90	38.13	74.35	114.25	
4.30	1.45	12.26	38.74	75.03	114.88	
4.40	1.54	12.63	39.36	75.76	115.53	
4.50	1.62	13.00	39.99	76.47	116.18	
4.60	1.69	13.38	40.62	77.15	116.80	
4.70	1.78	13.76	41.23	77.86	117.44	
4.80	1.90	14.14	41.86	78.56	118.06	
4.90	1.98	14.53	42.50	79.26	118.67	
5.00	2.07	14.94	43.13	79.96	119.30	

Typical Performance Data

IDS (mA)	GAIN (dB) [1]				OIP3 (dBm) [1]			
	VDS=+3V		VDS=+4V		VDS=+3V		VDS=+4V	
	0.9 GHz	2 GHz	0.9 GHz	2 GHz	0.9 GHz	2 GHz	0.9 GHz	2 GHz
10.00	19.89	15.13	19.92	15.18	19.77	22.07	19.85	22.07
15.00	21.04	15.91	21.13	15.99	22.05	23.50	22.28	24.00
30.00	22.48	16.88	22.47	16.95	28.30	30.30	27.81	30.00
60.00	23.38	17.50	23.35	17.52	32.86	33.60	33.57	35.90

IDS (mA)	Pout @ 1dB Compression [1,2] (dBm)				NOISE FIGURE [1] (dB)			
	VDS=+3V		VDS=+4V		VDS=+3V		VDS=+4V	
	0.9 GHz	2 GHz	0.9 GHz	2 GHz	0.9 GHz	2 GHz	0.9 GHz	2 GHz
10.00	17.92	17.35	20.48	19.97	0.38	0.52	0.41	0.52
15.00	17.00	17.50	19.85	20.10	0.33	0.49	0.34	0.41
30.00	17.80	17.83	19.62	20.20	0.26	0.38	0.30	0.36
60.00	18.90	19.10	21.20	20.92	0.27	0.36	0.30	0.37

FREQ (GHz)	NF vs FREQ & TEMPERATURE [1] @ VDS=3V, IDS=60mA			NF vs FREQ & TEMPERATURE [1] @ VDS=4V, IDS=60mA		
	-40°C	+25°C	+85°C	-40°C	+25°C	+85°C
0.25	0.20	0.32	0.40	0.20	0.32	0.50
0.30	0.16	0.28	0.45	0.18	0.29	0.51
0.40	0.34	0.45	0.40	0.31	0.46	0.44
0.50	0.24	0.37	0.46	0.28	0.36	0.48
0.60	0.25	0.39	0.46	0.27	0.43	0.53
0.70	0.32	0.46	0.49	0.33	0.48	0.55
0.80	0.26	0.40	0.44	0.27	0.38	0.51
0.90	0.31	0.45	0.50	0.33	0.45	0.56
1.00	0.29	0.44	0.52	0.24	0.42	0.56
1.25	0.29	0.45	0.58	0.28	0.45	0.62
1.50	0.29	0.50	0.65	0.29	0.50	0.72
1.75	0.31	0.51	0.65	0.35	0.54	0.71
2.00	0.30	0.53	0.65	0.30	0.51	0.69
2.25	0.26	0.49	0.76	0.28	0.50	0.78
2.50	0.26	0.54	0.85	0.27	0.56	0.85
2.75	0.53	0.89	1.05	0.53	0.88	1.05
3.00	0.29	0.56	0.94	0.26	0.58	1.01
3.25	0.26	0.68	1.09	0.47	0.61	1.23
3.50	0.39	0.78	1.15	0.40	0.82	1.33
3.75	0.50	1.00	1.27	0.55	0.96	1.41
4.00	0.52	0.89	1.42	0.52	0.89	1.50
4.25	0.49	0.97	1.51	0.50	0.87	1.69
4.50	0.63	1.00	1.65	0.64	0.94	1.85
4.75	0.58	1.12	1.83	0.51	0.98	2.02
5.00	0.58	1.13	1.95	0.59	1.11	2.16
5.25	0.69	1.11	2.13	0.71	1.23	2.34
5.50	0.84	1.40	2.45	0.75	1.09	2.49
5.75	0.98	1.31	2.44	0.95	1.26	2.65
6.00	1.00	1.45	2.67	0.92	1.47	2.79

(1) Includes test board loss

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

Typical Performance Data

FREQ (GHz)	GAIN vs FREQ & TEMPERATURE @ VDS=3V, IDS=60mA			OIP3 vs FREQ & TEMPERATURE [1] @ VDS=3V, IDS=60mA			P1dB vs FREQ & TEMPERATURE[1,2] @ VDS=3V, IDS=60mA		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
0.40	27.35	27.16	26.63	32.50	31.73	31.06	18.30	18.80	18.83
0.50	26.73	26.24	25.83	32.65	31.89	31.21	18.32	18.82	18.85
0.60	25.92	25.48	25.09	32.80	32.04	31.36	18.33	18.83	18.87
0.70	25.17	24.80	24.37	32.95	32.18	31.50	18.35	18.85	18.89
0.80	24.48	24.02	23.62	33.09	32.33	31.64	18.37	18.87	18.91
0.90	23.76	23.38	22.95	33.22	32.46	31.77	18.39	18.89	18.93
1.00	23.12	22.65	22.30	33.35	32.59	31.90	18.41	18.91	18.95
1.10	22.50	22.01	21.66	33.48	32.72	32.02	18.43	18.92	18.97
1.20	21.87	21.41	21.05	33.60	32.84	32.14	18.45	18.94	18.99
1.30	21.27	20.81	20.48	33.71	32.95	32.25	18.47	18.96	19.01
1.40	20.73	20.29	19.93	33.82	33.06	32.36	18.49	18.98	19.03
1.50	20.19	19.76	19.39	33.92	33.17	32.46	18.51	18.99	19.05
1.60	19.69	19.24	18.90	34.02	33.27	32.56	18.52	19.01	19.07
1.70	19.25	18.79	18.48	34.12	33.36	32.65	18.54	19.03	19.09
1.80	18.79	18.32	18.04	34.21	33.45	32.74	18.56	19.04	19.11
1.90	18.34	17.89	17.54	34.29	33.53	32.83	18.58	19.06	19.13
2.00	18.01	17.50	17.21	34.37	33.61	32.91	18.60	19.08	19.15
2.10	17.54	17.10	16.77	34.44	33.69	32.98	18.61	19.09	19.17
2.20	17.15	16.70	16.41	34.51	33.76	33.05	18.63	19.11	19.19
2.30	16.84	16.36	16.05	34.57	33.82	33.12	18.65	19.13	19.20
2.40	16.49	15.99	15.69	34.63	33.88	33.18	18.67	19.14	19.22
2.50	16.16	15.73	15.37	34.68	33.94	33.23	18.68	19.16	19.24
2.60	15.81	15.33	15.03	34.72	33.99	33.28	18.70	19.17	19.26
2.70	15.50	15.03	14.73	34.77	34.03	33.33	18.72	19.19	19.27
2.80	15.18	14.73	14.38	34.80	34.07	33.37	18.73	19.21	19.29
2.90	14.94	14.49	14.17	34.83	34.11	33.41	18.75	19.22	19.31
3.00	14.67	14.20	13.87	34.86	34.14	33.44	18.76	19.24	19.33
3.10	14.43	13.93	13.65	34.88	34.16	33.47	18.78	19.25	19.34
3.20	14.19	13.65	13.39	34.90	34.18	33.49	18.80	19.27	19.36
3.30	13.91	13.45	13.17	34.91	34.19	33.51	18.81	19.28	19.37
3.40	13.74	13.17	12.90	34.91	34.20	33.52	18.83	19.30	19.39
3.50	13.48	12.97	12.68	34.91	34.21	33.53	18.84	19.31	19.41
3.60	13.30	12.76	12.45	34.91	34.21	33.53	18.86	19.33	19.42
3.70	13.09	12.58	12.25	34.90	34.20	33.53	18.87	19.34	19.44
3.80	12.90	12.38	12.03	34.88	34.19	33.52	18.89	19.36	19.45
3.90	12.68	12.18	11.78	34.86	34.17	33.51	18.90	19.37	19.47
4.00	12.53	12.04	11.67	34.84	34.15	33.50	18.92	19.39	19.48
4.10	12.44	11.84	11.50	34.80	34.13	33.48	18.93	19.40	19.50
4.20	12.24	11.71	11.35	34.77	34.10	33.45	18.95	19.41	19.51
4.30	12.06	11.55	11.16	34.73	34.06	33.42	18.96	19.43	19.53
4.40	11.95	11.37	11.03	34.68	34.02	33.39	18.98	19.44	19.54
4.50	11.77	11.18	10.87	34.63	33.97	33.35	18.99	19.46	19.55
4.60	11.50	11.06	10.63	34.57	33.92	33.30	19.00	19.47	19.57
4.70	11.40	10.89	10.47	34.51	33.87	33.25	19.02	19.48	19.58
4.80	11.19	10.66	10.38	34.44	33.81	33.20	19.03	19.50	19.59
4.90	11.10	10.51	10.20	34.37	33.74	33.14	19.04	19.51	19.61
5.00	10.97	10.34	9.99	34.29	33.67	33.08	19.06	19.52	19.62
5.10	10.79	10.16	9.83	34.21	33.59	33.01	19.07	19.54	19.63
5.20	10.52	10.01	9.57	34.12	33.51	32.93	19.08	19.55	19.64
5.30	10.38	9.89	9.53	34.03	33.43	32.86	19.10	19.56	19.66
5.40	10.23	9.72	9.40	33.93	33.33	32.77	19.11	19.58	19.67
5.50	10.05	9.58	9.11	33.83	33.24	32.69	19.12	19.59	19.68
5.60	9.97	9.38	9.06	33.72	33.14	32.59	19.13	19.60	19.69
5.70	9.66	9.25	8.86	33.60	33.03	32.50	19.14	19.61	19.70
5.80	9.65	9.14	8.74	33.49	32.92	32.40	19.16	19.63	19.71
5.90	9.54	9.01	8.77	33.36	32.80	32.29	19.17	19.64	19.72
6.00	9.28	8.76	8.47	33.23	32.68	32.18	19.18	19.65	19.74

(1) Includes test board loss

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

Typical Performance Data

FREQ (GHz)	GAIN vs FREQ & TEMPERATURE @ VDS=4V, IDS=60mA			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	-45°C	+25°C	+85°C
0.40	27.46	26.98	26.62	31.43	31.75	31.71	20.62	20.98	20.85
0.50	26.63	26.32	25.86	31.86	32.09	32.00	20.64	21.00	20.87
0.60	25.91	25.53	25.16	32.27	32.41	32.29	20.67	21.02	20.89
0.70	25.25	24.78	24.41	32.67	32.72	32.57	20.70	21.03	20.91
0.80	24.51	24.04	23.64	33.06	33.03	32.84	20.72	21.05	20.93
0.90	23.79	23.35	22.99	33.43	33.32	33.10	20.75	21.07	20.95
1.00	23.11	22.69	22.29	33.80	33.61	33.35	20.78	21.09	20.97
1.10	22.49	22.04	21.66	34.15	33.88	33.59	20.80	21.10	20.99
1.20	21.87	21.44	21.05	34.50	34.15	33.83	20.83	21.12	21.00
1.30	21.26	20.84	20.48	34.83	34.40	34.06	20.85	21.14	21.02
1.40	20.72	20.28	19.93	35.15	34.65	34.28	20.88	21.16	21.04
1.50	20.21	19.77	19.42	35.46	34.89	34.49	20.90	21.17	21.06
1.60	19.69	19.24	18.91	35.75	35.12	34.69	20.93	21.19	21.08
1.70	19.26	18.79	18.47	36.04	35.34	34.89	20.95	21.21	21.10
1.80	18.79	18.32	18.01	36.31	35.55	35.08	20.97	21.23	21.12
1.90	18.34	17.91	17.58	36.57	35.75	35.26	21.00	21.24	21.14
2.00	17.98	17.52	17.20	36.83	35.95	35.43	21.02	21.26	21.15
2.10	17.54	17.11	16.79	37.06	36.13	35.59	21.04	21.28	21.17
2.20	17.16	16.73	16.40	37.29	36.30	35.74	21.07	21.30	21.19
2.30	16.83	16.36	16.05	37.51	36.47	35.89	21.09	21.32	21.21
2.40	16.48	16.02	15.71	37.71	36.62	36.03	21.11	21.33	21.23
2.50	16.14	15.70	15.38	37.91	36.77	36.16	21.14	21.35	21.25
2.60	15.79	15.34	15.04	38.09	36.90	36.28	21.16	21.37	21.27
2.70	15.49	15.02	14.72	38.26	37.03	36.39	21.18	21.39	21.29
2.80	15.19	14.71	14.41	38.42	37.15	36.50	21.20	21.41	21.31
2.90	14.95	14.50	14.18	38.56	37.26	36.59	21.22	21.43	21.32
3.00	14.64	14.17	13.88	38.70	37.36	36.68	21.25	21.45	21.34
3.10	14.44	13.97	13.67	38.83	37.45	36.76	21.27	21.46	21.36
3.20	14.18	13.71	13.40	38.94	37.53	36.84	21.29	21.48	21.38
3.30	13.92	13.44	13.21	39.04	37.60	36.90	21.31	21.50	21.40
3.40	13.72	13.22	12.91	39.13	37.66	36.96	21.33	21.52	21.42
3.50	13.48	13.01	12.71	39.21	37.71	37.00	21.35	21.54	21.44
3.60	13.28	12.80	12.47	39.27	37.76	37.04	21.37	21.56	21.46
3.70	13.03	12.56	12.24	39.33	37.79	37.07	21.39	21.58	21.47
3.80	12.89	12.39	12.06	39.37	37.82	37.10	21.41	21.60	21.49
3.90	12.65	12.16	11.79	39.41	37.83	37.11	21.43	21.62	21.51
4.00	12.52	11.99	11.68	39.43	37.84	37.12	21.45	21.63	21.53
4.10	12.41	11.88	11.50	39.44	37.84	37.12	21.47	21.65	21.55
4.20	12.20	11.73	11.36	39.43	37.82	37.11	21.49	21.67	21.57
4.30	12.04	11.53	11.18	39.42	37.80	37.09	21.51	21.69	21.59
4.40	11.89	11.35	11.03	39.40	37.77	37.06	21.53	21.71	21.61
4.50	11.75	11.20	10.91	39.36	37.73	37.03	21.54	21.73	21.63
4.60	11.48	10.96	10.67	39.31	37.68	36.99	21.56	21.75	21.64
4.70	11.38	10.82	10.50	39.25	37.62	36.94	21.58	21.77	21.66
4.80	11.16	10.65	10.36	39.18	37.56	36.88	21.60	21.79	21.68
4.90	11.09	10.60	10.21	39.10	37.48	36.81	21.62	21.81	21.70
5.00	10.94	10.39	10.02	39.01	37.39	36.74	21.63	21.83	21.72
5.10	10.77	10.21	9.87	38.90	37.30	36.65	21.65	21.85	21.74
5.20	10.51	10.03	9.65	38.78	37.19	36.56	21.67	21.87	21.76
5.30	10.37	9.83	9.52	38.65	37.08	36.46	21.68	21.89	21.78
5.40	10.18	9.62	9.45	38.51	36.95	36.35	21.70	21.91	21.79
5.50	10.05	9.53	9.16	38.36	36.82	36.24	21.72	21.93	21.81
5.60	9.97	9.46	9.10	38.20	36.68	36.11	21.73	21.95	21.83
5.70	9.68	9.14	8.86	38.03	36.52	35.98	21.75	21.97	21.85
5.80	9.62	9.14	8.70	37.84	36.36	35.84	21.76	21.99	21.87
5.90	9.52	9.04	8.75	37.64	36.19	35.69	21.78	22.01	21.89
6.00	9.23	8.72	8.46	37.43	36.01	35.53	21.79	22.03	21.91

(1) Includes test board loss

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

Typical Performance Data

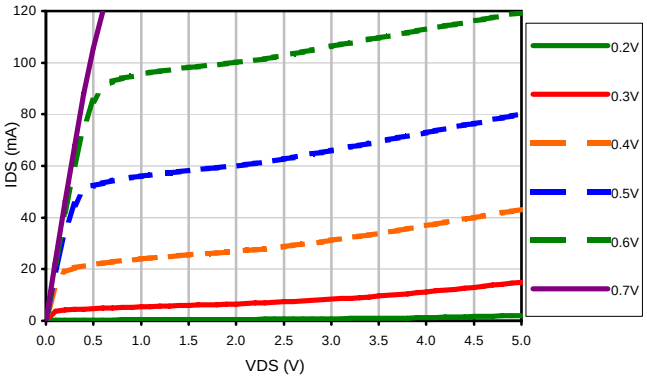
IDS (mA)	F_{MIN} (dB) (1)					
	VDS=+2V		VDS=+3V		VDS=+4V	
	0.9 GHz	2 GHz	0.9 GHz	2 GHz	0.9 GHz	2 GHz
10.00	0.170	0.381	0.171	0.381		
15.00	0.160	0.362	0.152	0.340	0.148	0.334
20.00	0.165	0.365	0.144	0.341		
30.00	0.169	0.372	0.159	0.356	0.157	0.352
40.00	0.147	0.331	0.144	0.322	0.149	0.333
60.00	0.150	0.341	0.152	0.341	0.165	0.369

FREQUENCY (GHz)	F_{MIN} (dB) (1)		
	VDS=3V		
	40 mA	60 mA	80 mA
0.50	0.08	0.08	0.09
0.70	0.11	0.12	0.13
0.90	0.14	0.15	0.17
1.00	0.16	0.17	0.19
1.90	0.31	0.32	0.36
2.00	0.32	0.34	0.38
2.40	0.39	0.41	0.46
3.00	0.48	0.51	0.57
3.90	0.63	0.67	0.74
5.00	0.81	0.86	0.95
5.80	0.94	1.00	1.11
6.00	0.97	1.03	1.14

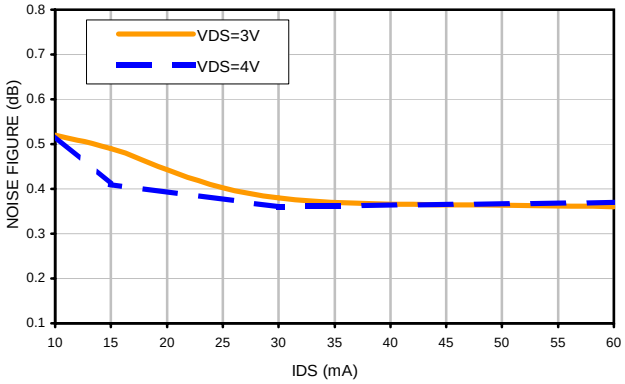
(1) F MIN is minimum Noise Figure

Typical Performance Curves

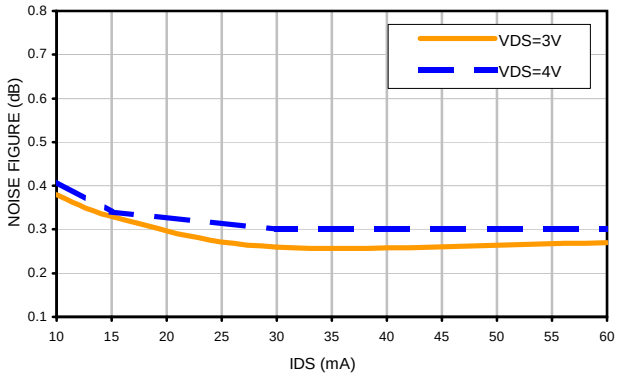
I-V (VGS=0.1V PER STEP) (2)



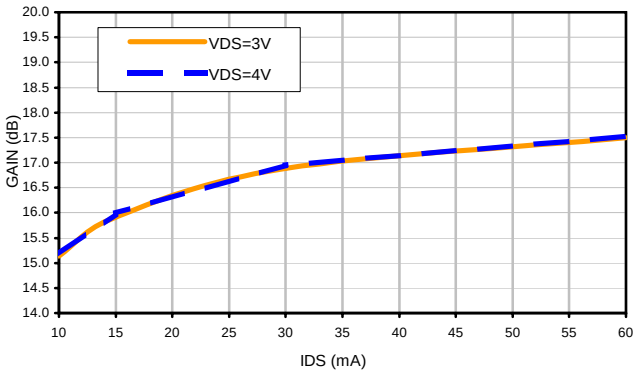
NOISE FIGURE vs IDS @ 2 GHz (1)



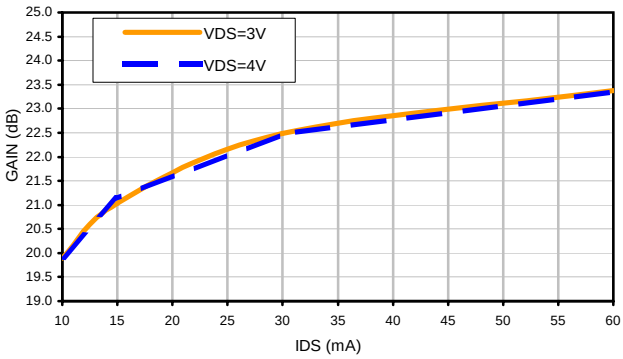
NOISE FIGURE vs IDS @ 0.9 GHz (1)



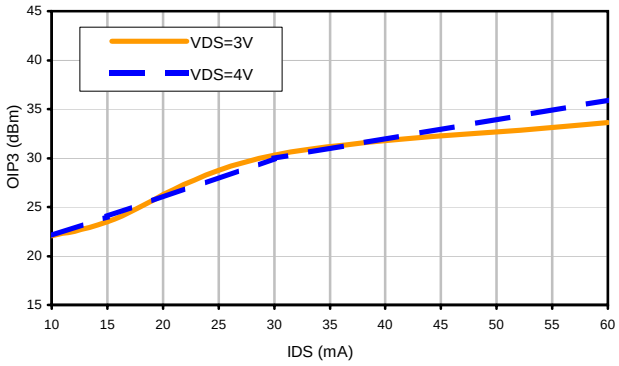
GAIN vs IDS @ 2 GHz (1)



GAIN vs IDS @ 0.9 GHz (1)



OIP3 vs IDS @ 2GHz (1)

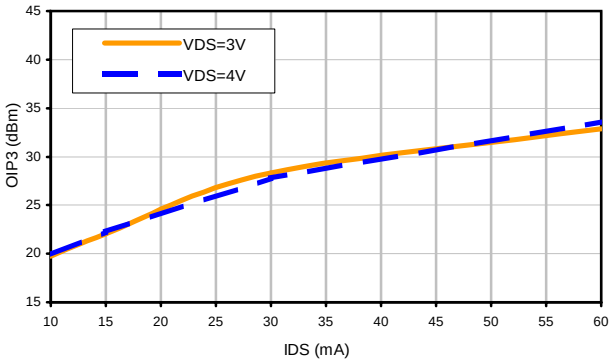


(1) Includes test board loss

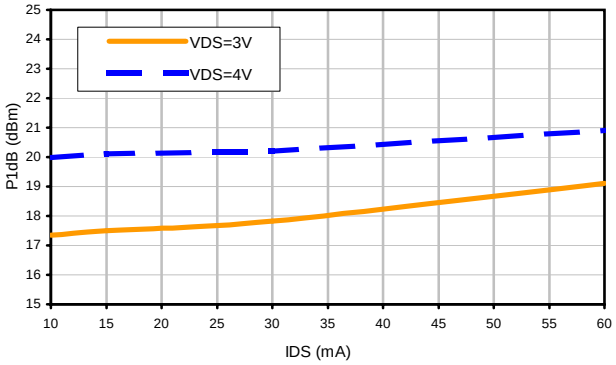
(2) Measured using HP4155B semiconductor parameter analyzer

Typical Performance Curves

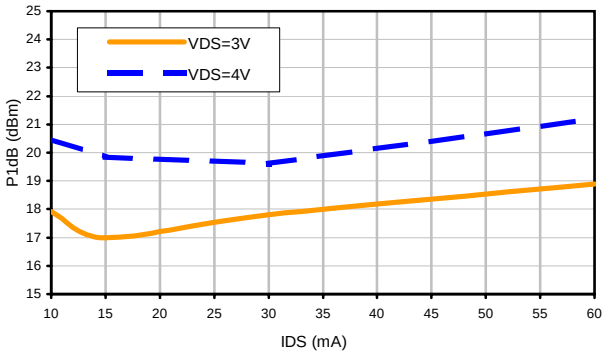
OIP3 vs IDS @ 0.9 GHz (1)



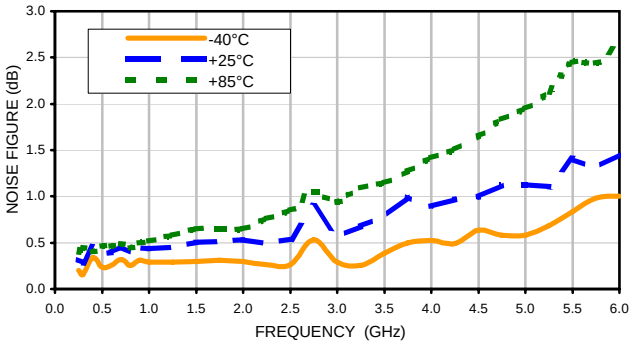
P1dB vs IDS @ 2 GHz (1,2)



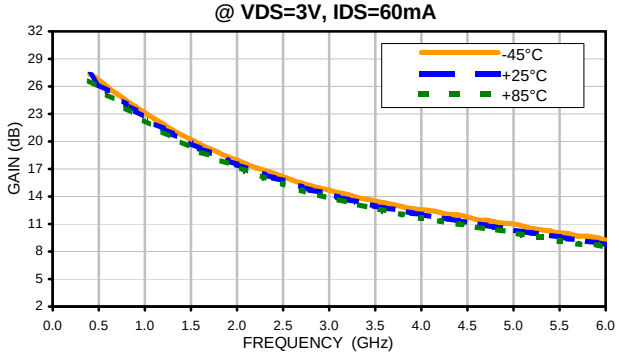
P1dB vs IDS @ 0.9 GHz (1,2)



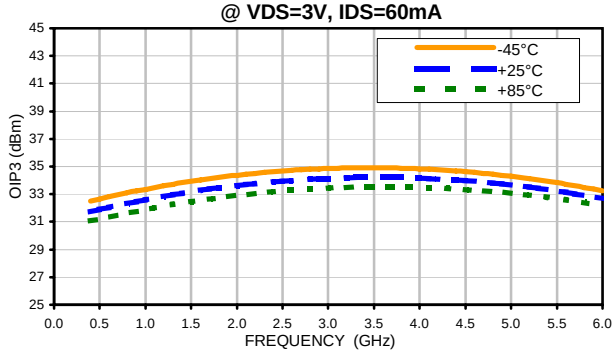
NF vs FREQUENCY & TEMPERATURE (1)
@ VDS=3V, IDS=60mA



GAIN vs FREQUENCY & TEMPERATURE (1)
@ VDS=3V, IDS=60mA



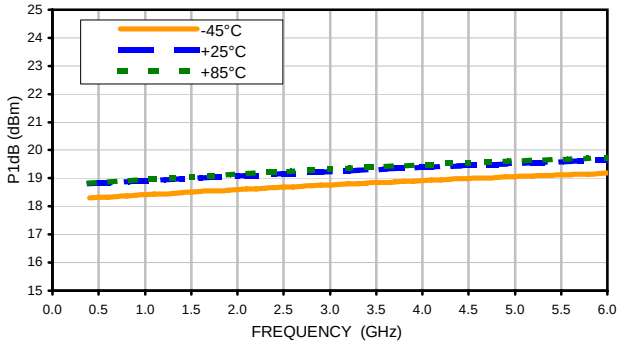
OIP3 vs FREQUENCY & TEMPERATURE (1)
@ VDS=3V, IDS=60mA



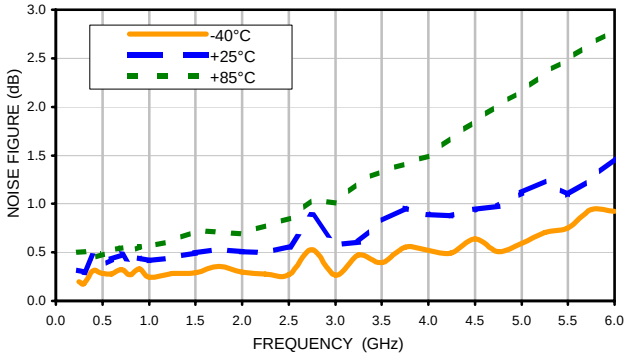
(1) Includes test board loss
(2) Drain current was allowed to increase during compression measurement

Typical Performance Curves

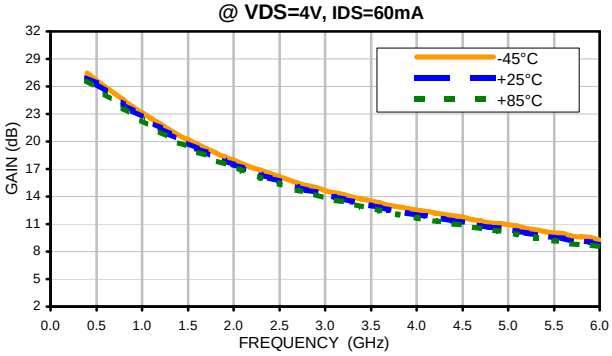
P1dB vs FREQUENCY & TEMPERATURE (1,2)
@ VDS=3V, IDS=60mA



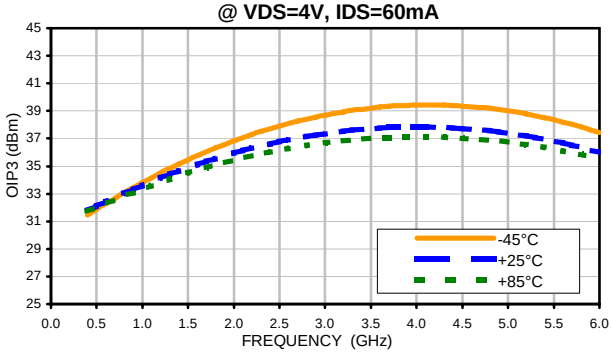
NF vs FREQUENCY & TEMPERATURE (1)
@ VDS=4V, IDS=60mA



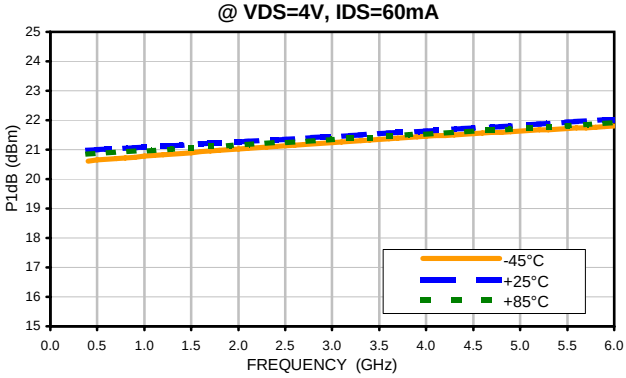
GAIN vs FREQUENCY & TEMPERATURE (1)
@ VDS=4V, IDS=60mA



OIP3 vs FREQUENCY & TEMPERATURE (1)
@ VDS=4V, IDS=60mA



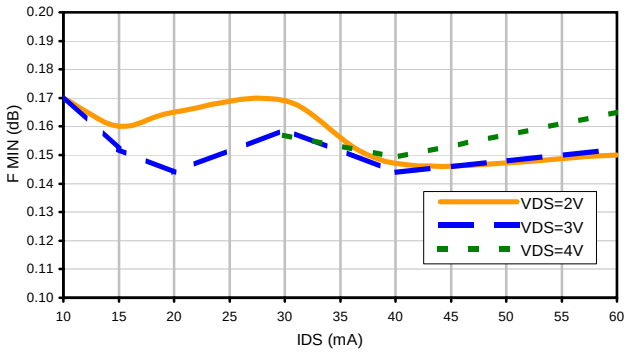
P1dB vs FREQUENCY & TEMPERATURE (1,2)
@ VDS=4V, IDS=60mA



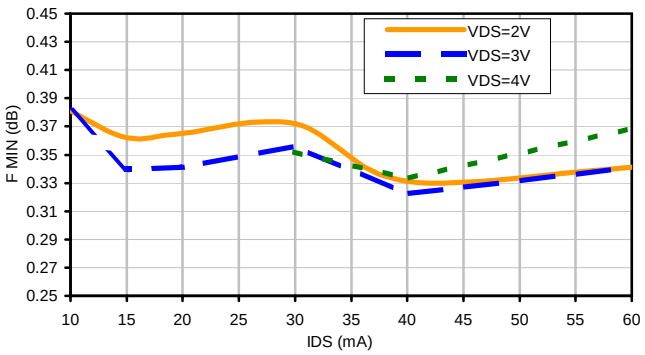
(1) Includes test board loss
(2) Drain current was allowed to increase during compression measurement

Typical Performance Curves

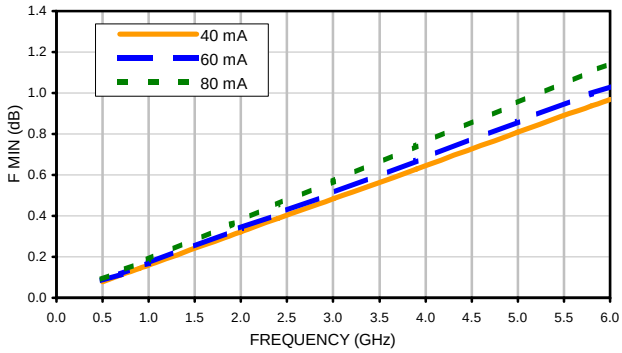
F_{MIN} vs IDS @ 0.9 GHz (1)



F_{MIN} vs IDS @ 2 GHz (1)



F_{MIN} vs FREQ @ VDS=3V (1)

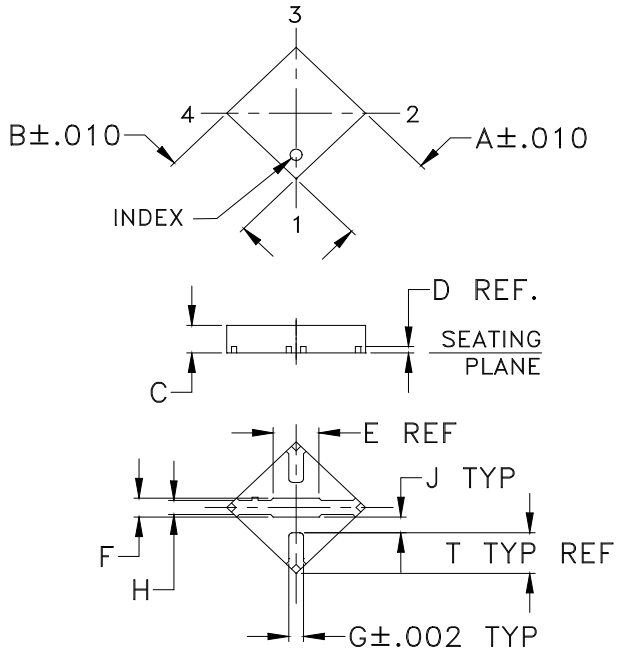


(1) F MIN is minimum Noise Figure

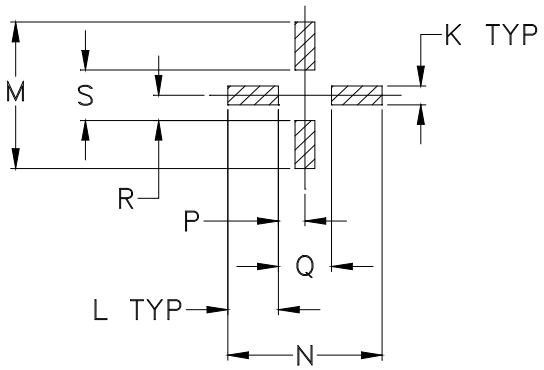
Case Style FG

FG873

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P
FG873	.118 (3.00)	.118 (3.00)	.035 (0.89)	.008 (0.20)	.07 (1.78)	.024 (0.60)	.017 (0.43)	.018 (0.46)	.021 (0.52)	.024 (0.61)	.061 (1.55)	.186 (4.72)	.186 (4.72)	.032 (0.81)

CASE #	Q	R	S	T	WT. GRAM
FG873	.064 (1.63)	.032 (0.81)	.064 (1.63)	.050 (1.27)	.02

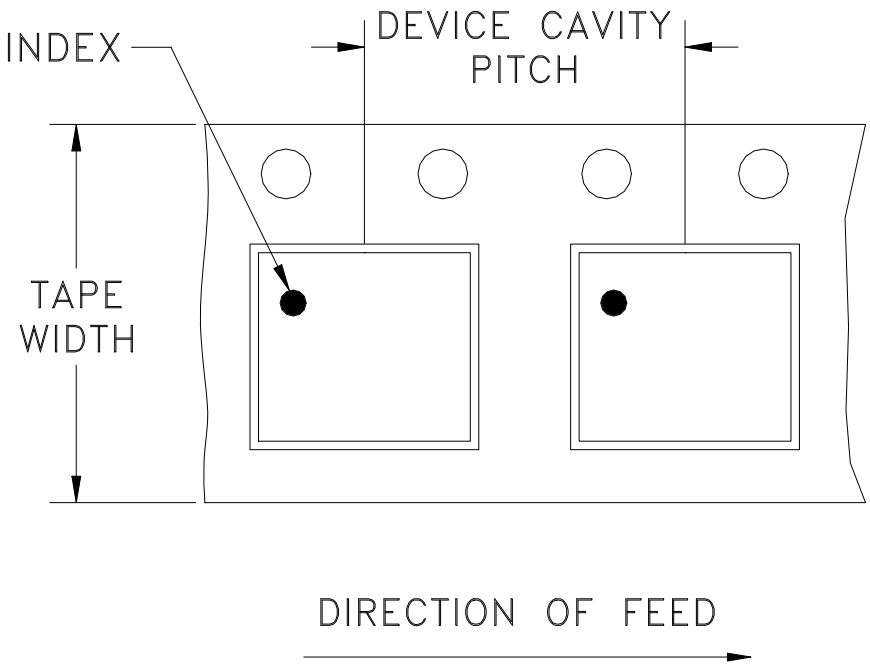
Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3Pl. ± .004

Notes:

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

Tape & Reel Packaging TR-F68

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
12	8	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000
		13	Standard	2000
				3000
				4000

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

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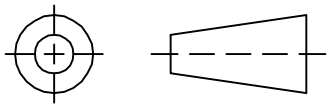
Mini-Circuits ISO 9001 & ISO 14001 Certified

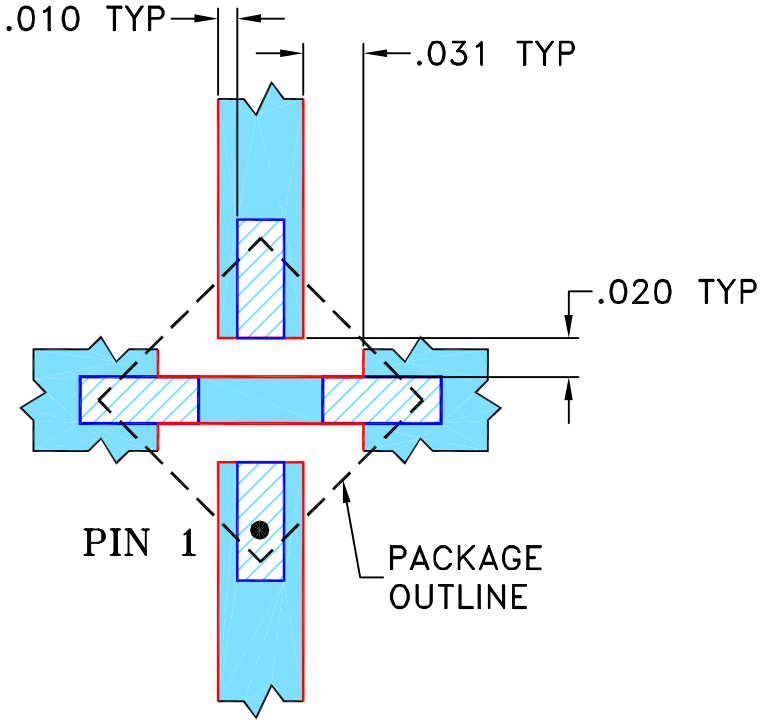
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M121883	NEW RELEASE	03/10/09	AV	TH

SUGGESTED MOUNTING CONFIGURATION FOR FG873 CASE STYLE, "04AM01" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR REFERENCE ONLY. ACTUAL LINE WIDTH IS A FUNCTION OF SPECIFIC MATCHING CIRCUIT.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. 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	AV	03/06/09
TOLERANCES ON:	CHECKED	IL	03/10/09
2 PL DECIMALS ±	APPROVED	TH	03/10/09
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

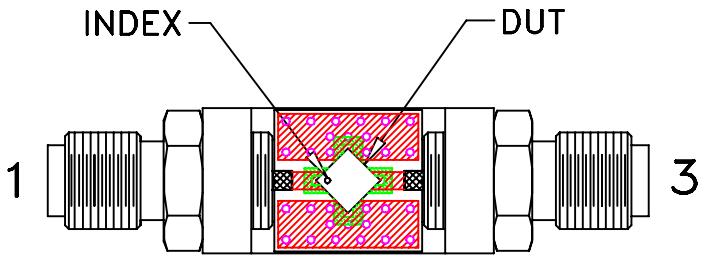
PL, 04AM01, FG873, TAV

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-301	OR

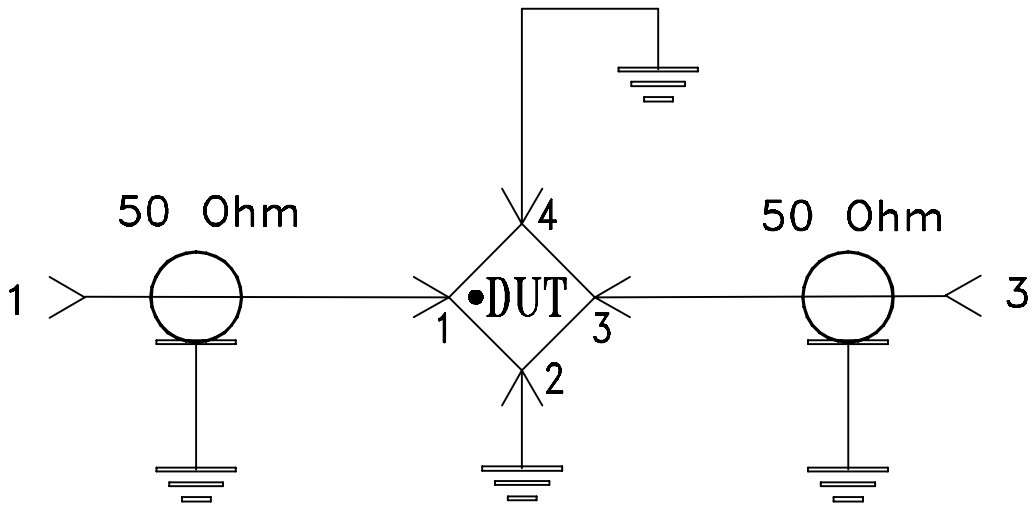
FILE:	SCALE:	SHEET:
98PL301	10:1	1 OF 1

Characterization Test Board

For Pins Connections refer to Data Sheet of the DUT



TB-154



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

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Environmental Specifications **ENV08T1**

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	-40° to 85° C or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
HTOL	1000 hours at 125°C	MIL-STD-883, Method 1005, Condition B
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

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
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