

TOSHIBA

MICROWAVE SEMICONDUCTOR TECHNICAL DATA

MICROWAVE POWER GaAs FET

TIM4450-45SL

FEATURES

- LOW INTERMODULATION DISTORTION
IM3=-45dBc at Po=35.5dBm
Single Carrier Level
- HIGH POWER
P1dB=46.5 at 4.4GHz to 5.0GHz
- HIGH GAIN
G1dB=9.5dB at 4.4GHz to 5.0GHz
- BROAD BAND INTERNALLY MATCHED
- HERMETICALLY SEALED PACKAGE

RF PERFORMANCE SPECIFICATIONS (Ta=25°C)

CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Output Power at 1dB Gain Compression Point	P1dB	VDD=10V F = 4.4-5.0GHz	dBm	46.0	46.5	—
Power Gain at 1dB Gain Compression Point	G1dB		dB	8.5	9.5	—
Drain Current	Ids1		A	—	9.6	10.8
Power Added Efficiency	η_{add}		%	—	41	—
3 rd Order Intermodulation Distortion	IM3	Note 1	dBc	-42	-45	—
Channel Temperature Rise	ΔT_{ch}	VDS×IDS×Rth(c-c)	°C/W	—	—	100

ELECTRICAL CHARACTERISTICS (Ta=25°C)

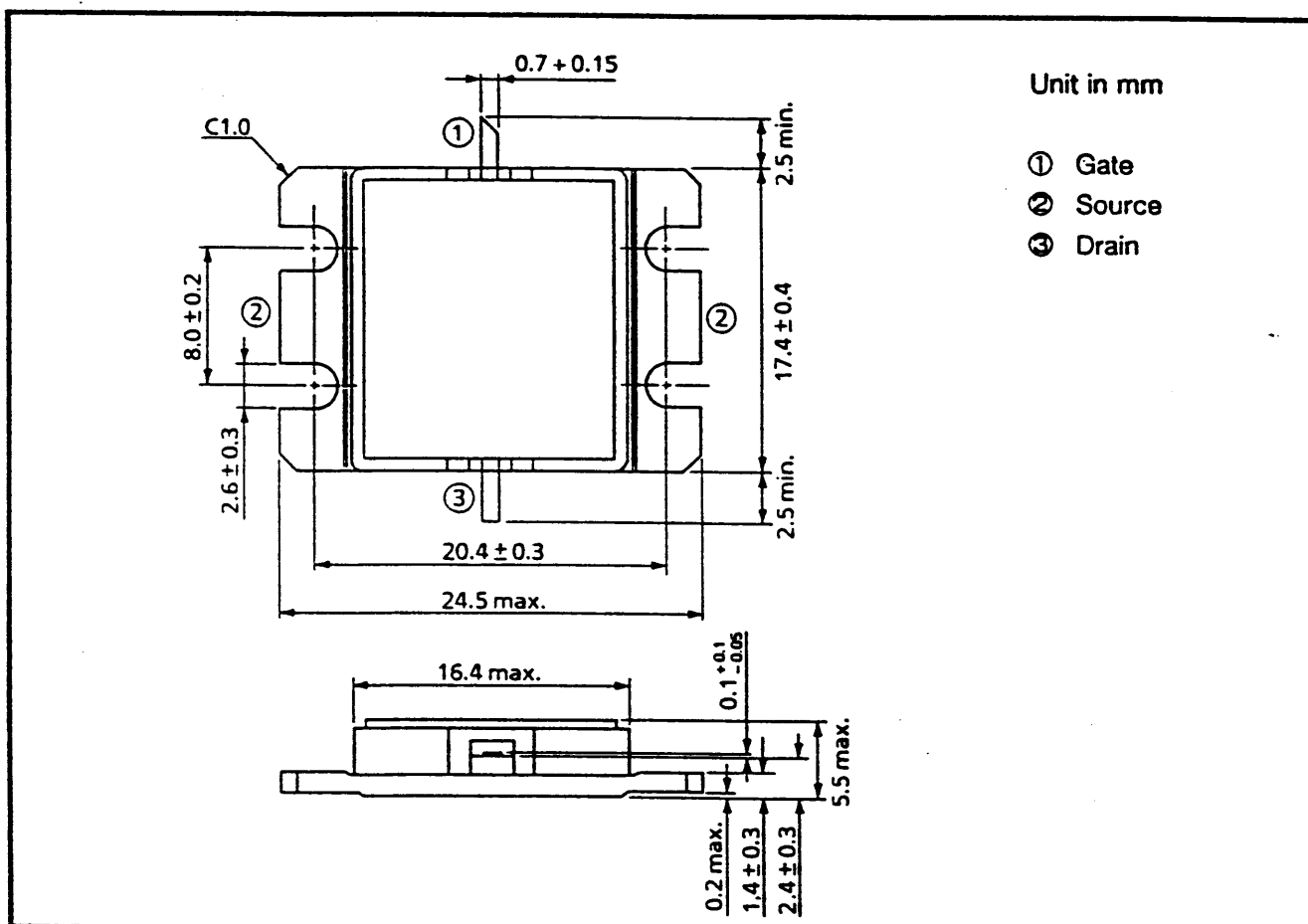
CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Transconductance	gm	Vds=3V Ids=11.0A	mS	—	8000	—
Pinch-off Voltage	Vgsoff	Vds=3V Ids=170mA	V	-1.0	-2.5	-4.0
Saturated Drain Current	Idss	Vds=3V Vgs=0V	A	—	24	31
Gate – Source Breakdown Voltage	Vgso	IGS= -500μA	V	-5	—	—
Terminal Resistance	Rth (c-c)	Channel to case	°C/W	—	0.8	1.2

Note 1: 2 tone test Pout=35.5dBm Single Carrier Level

Recommended Gate Resistance (Rg): Rg=Rg1(10Ω) + Rg2(18Ω)=28Ω (MAX).

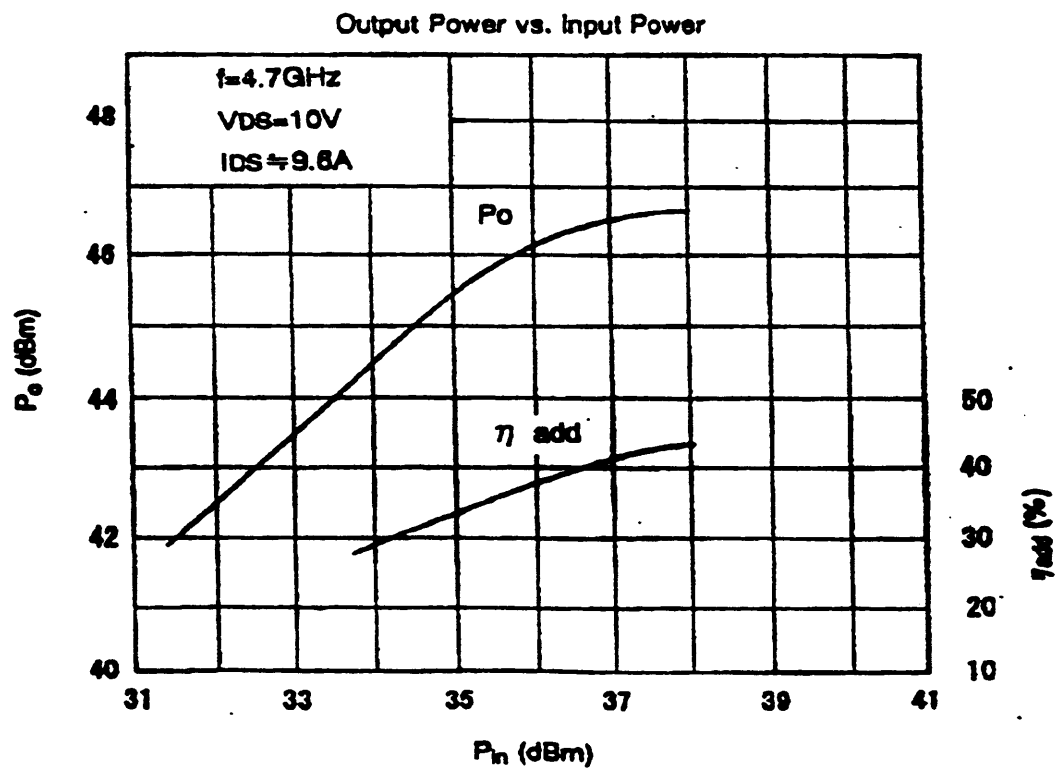
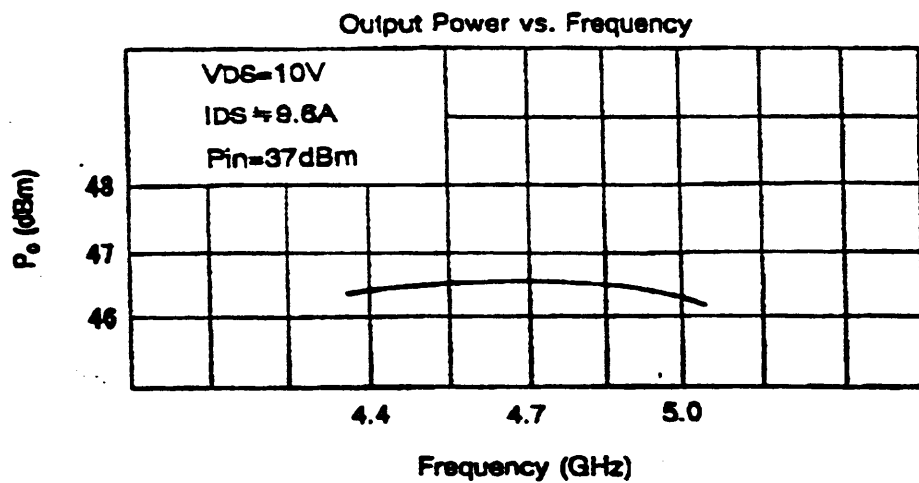
ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTICS	SYMBOL	UNIT	RATING
Drain-Source Voltage	V_{DS}	V	15
Gate-Source Voltage	V_{GS}	V	-5
Drain Current	I_{DS}	A	31
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_T	W	125
Channel Temperature	T_{ch}	$^\circ\text{C}$	175
Storage Temperature	T_{stg}	$^\circ\text{C}$	-65 ~ 175

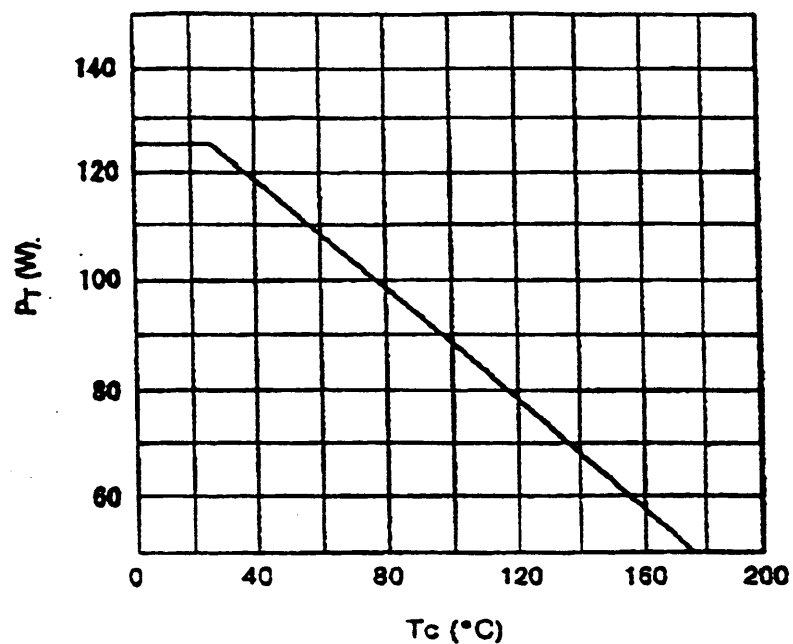
PACKAGE OUTLINE (2-16G1B)**HANDLING PRECAUTIONS FOR PACKAGED TYPE**

Soldering iron should be grounded and the operating time should not exceed 10 seconds at 260°C .

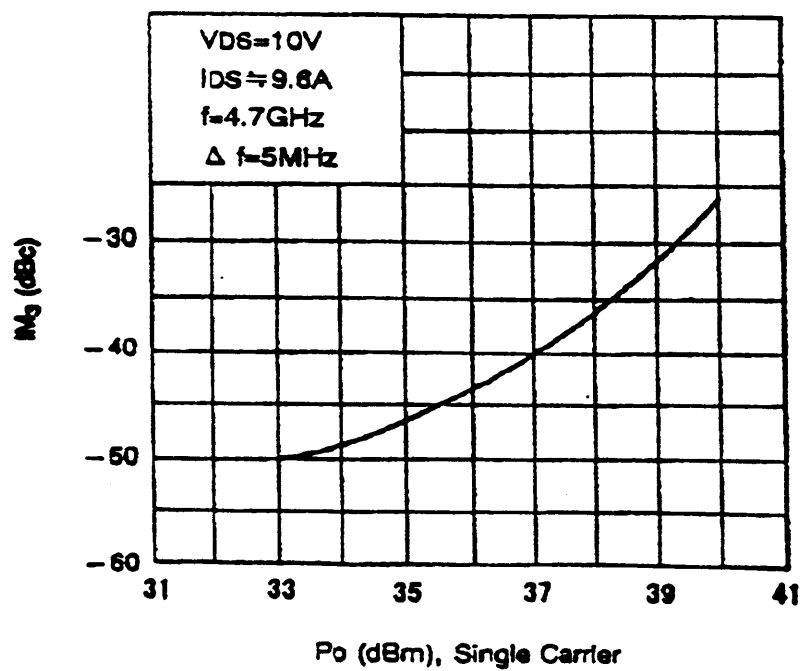
RF Performance



POWER DISSIPATION VS. CASE TEMPERATURE



IM3 VS. OUTPUT POWER CHARACTERISTICS

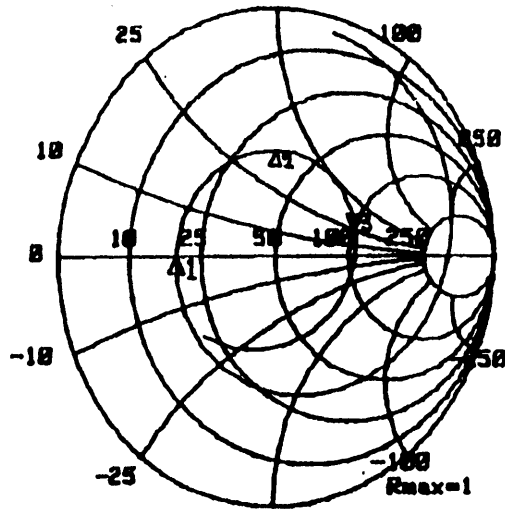


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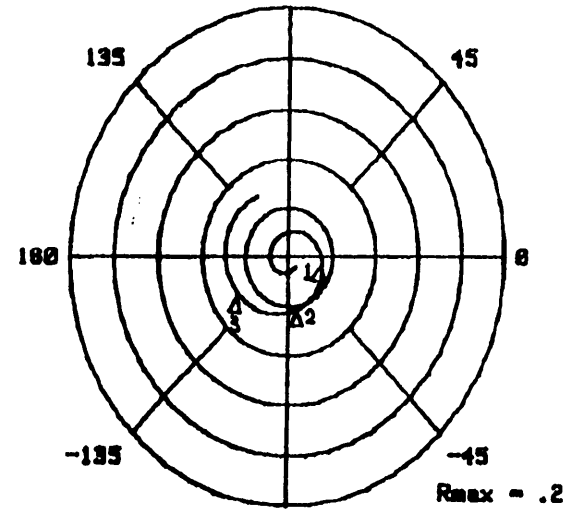
Bias condition : VDS=10V, IDS=9600mA, VGS=-1V

FREQ (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2900.0	.943	74.3	.583	-97.1	.010	-53.9	.855	85.4
2950.0	.939	71.1	.616	-101.6	.010	-58.3	.851	83.0
3000.0	.934	67.8	.650	-106.3	.010	-62.9	.838	80.3
3050.0	.931	64.3	.687	-111.3	.011	-67.4	.836	77.5
3100.0	.923	60.9	.728	-116.0	.011	-72.3	.829	74.7
3150.0	.917	57.1	.773	-121.1	.011	-77.6	.821	71.8
3200.0	.911	53.2	.822	-126.4	.012	-82.7	.813	68.8
3250.0	.903	49.1	.876	-131.7	.012	-87.8	.806	65.9
3300.0	.895	44.8	.936	-137.3	.012	-93.7	.797	62.7
3350.0	.886	40.3	1.004	-143.1	.013	-100.1	.788	59.5
3400.0	.876	35.5	1.076	-149.0	.013	-107.0	.780	56.2
3450.0	.865	30.4	1.159	-155.3	.014	-114.1	.769	52.8
3500.0	.852	24.9	1.249	-161.6	.014	-121.6	.759	49.2
3550.0	.838	19.2	1.347	-168.4	.015	-129.4	.749	45.5
3600.0	.823	12.9	1.460	-175.4	.015	-138.1	.737	41.7
3650.0	.804	6.2	1.579	177.2	.015	-148.4	.724	37.6
3700.0	.784	-1.0	1.709	169.4	.016	-157.9	.713	33.3
3750.0	.761	-8.6	1.852	161.5	.016	-169.2	.698	28.8
3800.0	.736	-17.1	2.003	153.0	.017	179.4	.683	23.8
3850.0	.710	-26.2	2.167	144.2	.017	166.1	.668	18.7
3900.0	.681	-36.1	2.339	135.1	.018	152.6	.650	13.2
3950.0	.650	-47.0	2.519	125.3	.018	137.5	.629	7.2
4000.0	.618	-58.9	2.696	115.3	.019	122.7	.608	.7
4050.0	.584	-71.8	2.878	104.9	.020	106.6	.585	-5.9
4100.0	.551	-85.9	3.050	94.1	.021	89.7	.557	-13.3
4150.0	.522	-100.9	3.206	83.0	.022	73.2	.528	-21.3
4200.0	.494	-116.9	3.350	71.8	.024	56.3	.497	-29.4
4250.0	.473	-133.8	3.470	60.5	.026	40.0	.463	-38.2
4300.0	.458	-150.8	3.564	49.0	.028	24.1	.429	-47.6
4350.0	.447	-167.9	3.635	37.7	.030	8.9	.395	-57.1
4400.0	.443	175.4	3.685	26.5	.032	-6.0	.361	-67.4
4450.0	.443	159.5	3.717	15.4	.034	-19.8	.331	-78.3
4500.0	.444	144.3	3.730	4.4	.036	-33.2	.302	-89.5
4550.0	.446	129.8	3.734	-6.4	.038	-46.1	.276	-101.3
4600.0	.448	116.2	3.726	-17.0	.040	-59.0	.256	-113.6
4650.0	.447	103.1	3.713	-27.6	.041	-70.5	.237	-125.7
4700.0	.445	90.4	3.695	-37.9	.043	-82.4	.221	-138.2
4750.0	.441	78.2	3.675	-48.2	.045	-93.7	.210	-150.5
4800.0	.433	65.9	3.661	-58.5	.047	-104.7	.199	-162.1
4850.0	.424	53.4	3.643	-68.8	.049	-115.6	.188	-173.7
4900.0	.411	40.9	3.627	-79.0	.050	-126.5	.178	175.3
4950.0	.397	27.5	3.613	-89.4	.052	-137.2	.165	164.8
5000.0	.382	13.3	3.598	-100.0	.054	-147.9	.150	153.7
5050.0	.367	-1.8	3.578	-110.7	.055	-158.8	.133	142.9
5100.0	.353	-18.6	3.558	-121.7	.057	-169.8	.110	131.5
5150.0	.345	-36.7	3.521	-132.8	.058	178.9	.082	116.5
5200.0	.342	-55.9	3.477	-144.3	.059	167.5	.053	94.8
5250.0	.350	-76.6	3.414	-155.9	.060	155.9	.028	38.7
5300.0	.371	-96.8	3.331	-167.9	.060	144.0	.051	-34.0
5350.0	.400	-118.3	3.226	-180.0	.059	132.0	.095	-60.0
5400.0	.440	-134.8	3.095	167.9	.058	119.9	.147	-76.4

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S11



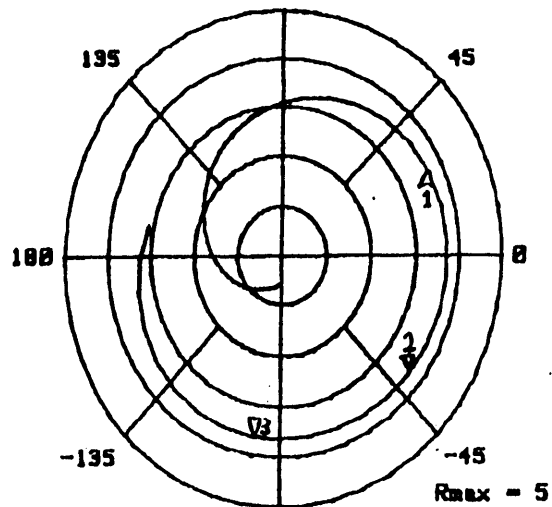
S12

Bias condition : $V_{DS}=10V$, $I_{DS}=9600mA$, $V_{GS}=-1V$

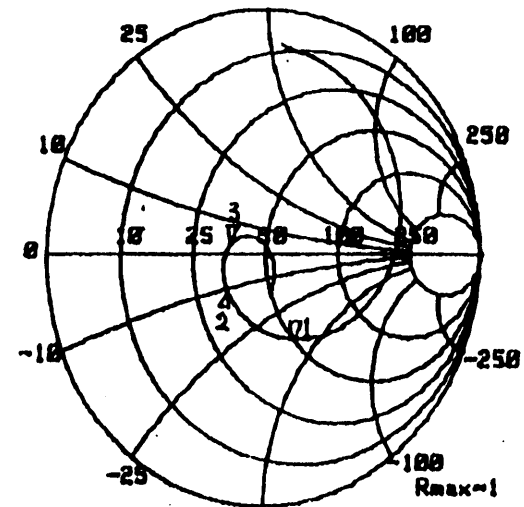
marker : $V1 \dots f=4.4GHz$

$V2 \dots f=4.7GHz$

$V3 \dots f=5.0GHz$



S21



S22

START 2.9 GHz

STOP 5.4 GHz