

# TOSHIBA

## MICROWAVE SEMICONDUCTOR

### TECHNICAL DATA

MICROWAVE POWER GaAs FET

TIM1112-4

#### FEATURES:

- HIGH POWER  
P<sub>1dB</sub> = 36.5 dBm at 11.7 GHz to 12.7 GHz
- BROAD BAND INTERNALLY MATCHED
- HIGH GAIN  
G<sub>1dB</sub> = 7.5 dB at 11.7 GHz to 12.7 GHz
- HERMETICALLY SEALED PACKAGE

#### RF PERFORMANCE SPECIFICATIONS (T<sub>a</sub> = 25°C)

CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Output Power at 1 dB Compression Point	P <sub>1dB</sub>	V <sub>DS</sub> = 9 V  f = 11.7 - 12.7 GHz	dBm	35.5	36.5	-
Power Gain at 1 dB Compression Point	G <sub>1dB</sub>		dB	6.5	7.5	-
Drain Current	I <sub>DS</sub>		A	-	1.7	2.2
Power Added Efficiency	η <sub>add</sub>		%	-	24	-
Channel-Temperature Rise	ΔT <sub>ch</sub>	V <sub>DS</sub> × I <sub>DS</sub> × R <sub>th(c-c)</sub>	°C	-	-	70

#### ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25°C)

CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Trans-conductance	gm	V <sub>DS</sub> = 3 V I <sub>DS</sub> = 2.0 A	mS	-	1200	-
Pinch-off Voltage	V <sub>GSoff</sub>	V <sub>DS</sub> = 3 V I <sub>DS</sub> = 60 mA	V	-2	-3.5	-5
Saturated Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 3 V V <sub>GS</sub> = 0 V	A	-	4.0	5.2
Gate-Source Breakdown Voltage	V <sub>GS0</sub>	I <sub>GS</sub> = -60 μA	V	-5	-	-
Thermal Resistance	R <sub>th(c-c)</sub>	Channel to Case	°C/W	-	2.9	3.5

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- \* The information contained herein may be changed without prior notice. It is therefore advisable to contact TOSHIBA before proceeding with the design of equipment incorporating this product.

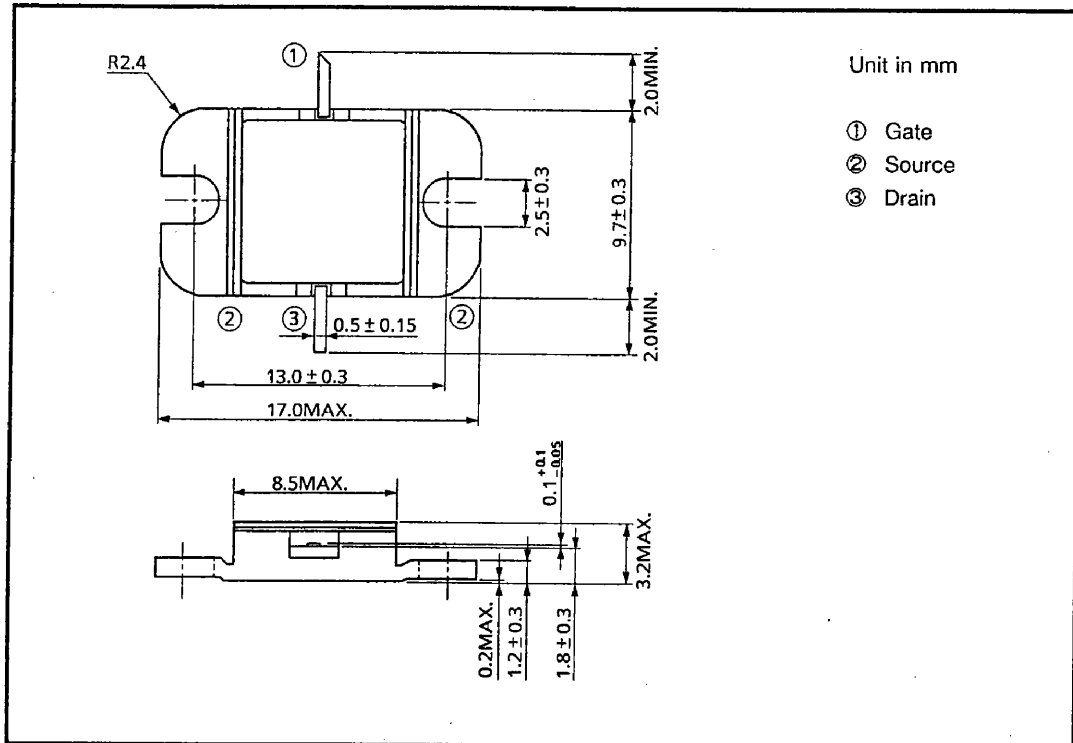


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## ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	UNIT	RATING
Drain-Source Voltage	$V_{DS}$	V	15
Gate-Source Voltage	$V_{GS}$	V	-5
Drain Current	$I_{DS}$	A	5.2
Total Power Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_T$	W	30
Channel Temperature	$T_{ch}$	$^\circ\text{C}$	175
Storage Temperature	$T_{stg}$	$^\circ\text{C}$	-65-175

## PACKAGE OUTLINE (2-9D1B)

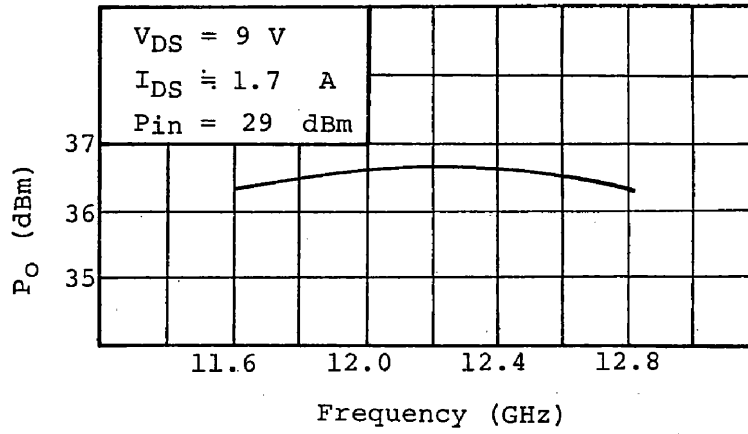


### HANDLING PRECAUTIONS FOR PACKAGED TYPE

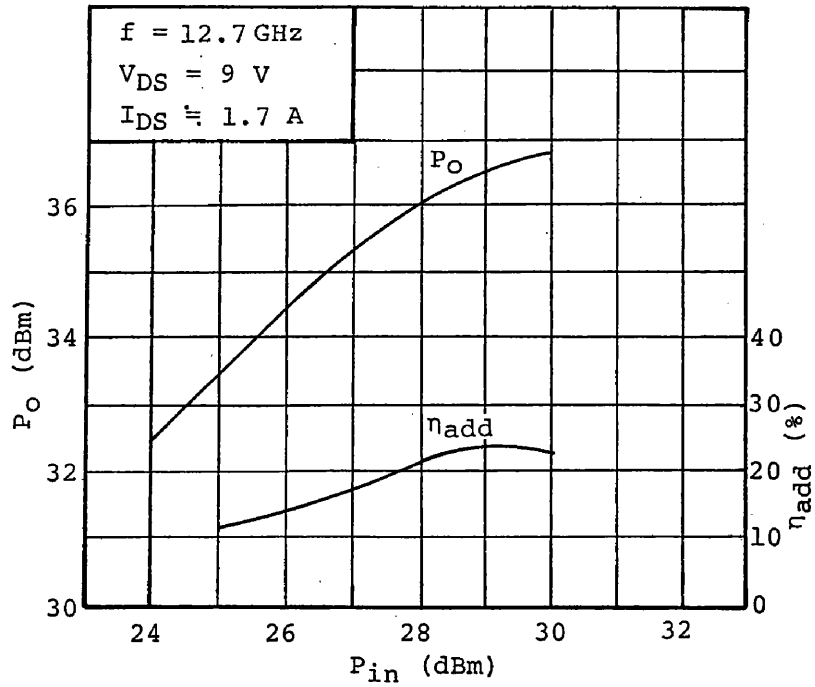
Soldering iron should be grounded and the operating time should not exceed 10 seconds at  $260^\circ\text{C}$ .

RF PERFORMANCES

Output Power vs. Frequency

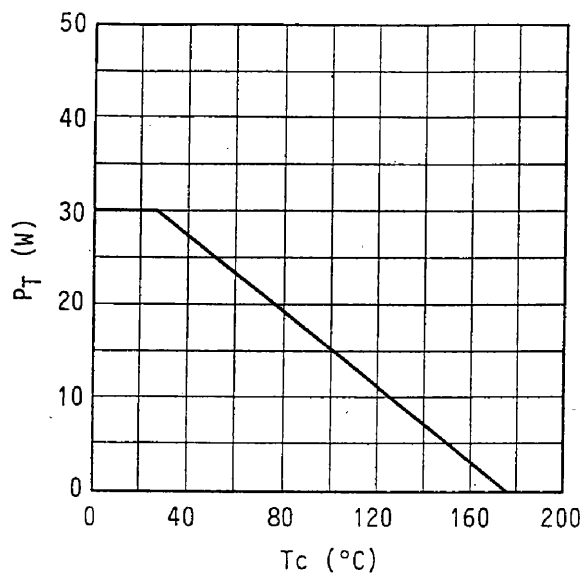


Output Power vs. Input Power



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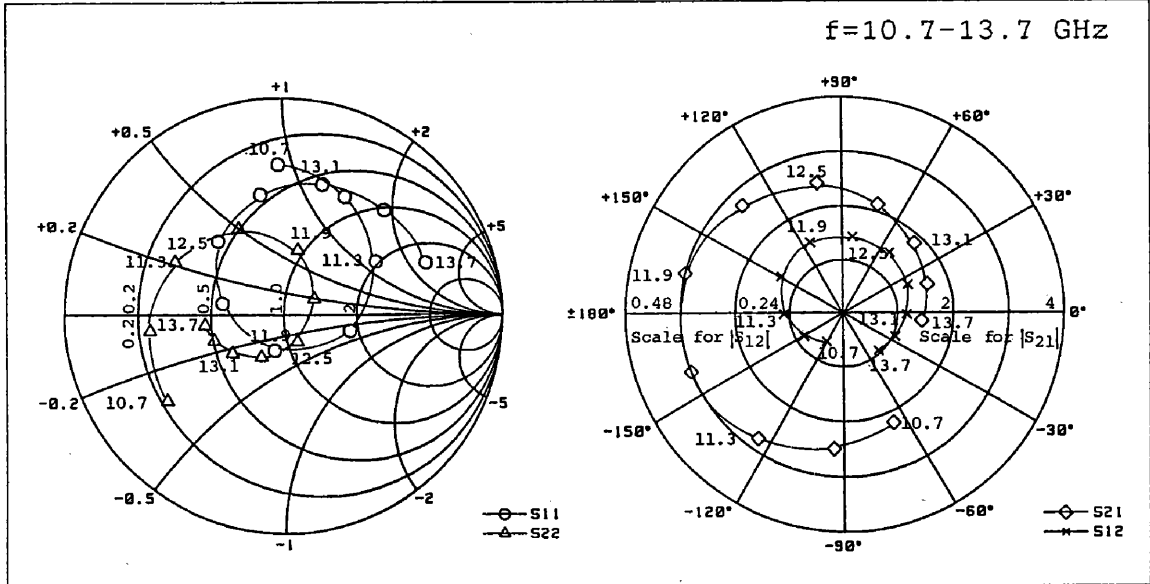
## POWER DISSIPATION VS. CASE TEMPERATURE



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## TIM1112-4 S-PARAMETERS (MAGN. and ANGLES)

$V_{DS}=9V, I_{DS}=2A$



FREQUENCY (GHz)	$S_{11}$		$S_{12}$		$S_{21}$		$S_{22}$	
10.7	0.69	92	0.076	-121	2.20	-66	0.67	-143
10.9	0.65	74	0.095	-137	2.37	-83	0.64	-154
11.1	0.58	50	0.118	-161	2.59	-106	0.59	174
11.3	0.49	30	0.137	-179	2.78	-125	0.55	154
11.5	0.39	7	0.155	162	2.94	-145	0.50	132
11.7	0.24	-41	0.174	135	3.04	-173	0.40	102
11.9	0.17	-104	0.181	115	2.99	166	0.31	77
12.1	0.23	-166	0.185	95	2.84	145	0.21	49
12.3	0.35	153	0.180	71	2.63	120	0.13	-6
12.5	0.45	131	0.177	53	2.46	101	0.14	-63
12.7	0.53	112	0.170	35	2.25	83	0.19	-102
12.9	0.60	89	0.156	14	2.02	61	0.26	-130
13.1	0.63	73	0.145	-1	1.85	45	0.30	-143
13.3	0.66	57	0.138	-16	1.70	30	0.33	-153
13.5	0.69	36	0.127	-34	1.54	10	0.35	-164
13.7	0.70	21	0.118	-47	1.43	-6	0.36	-172

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