

TOSHIBA
MICROWAVE SEMICONDUCTOR
TECHNICAL DATA

MICROWAVE POWER GaAs FET
TIM1414-10B

FEATURES :

- HIGH POWER
 $P_{1dB} = 40.5 \text{ dBm}$ at 14.0 GHz to 14.5 GHz
- BROAD BAND INTERNALLY MATCHED
- HIGH GAIN
 $G_{1dB} = 8.0 \text{ dB}$ at 14.0 GHz to 14.5 GHz
- HERMETICALLY SEALED PACKAGE

RF PERFORMANCE SPECIFICATIONS ($T_a = 25^\circ\text{C}$)

CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Output Power at 1dB Compression Point	P_{1dB}	$V_{DS} = 9 \text{ V}$ $f = 14.0 \sim 14.5 \text{ GHz}$	dBm	40.0	40.5	—
Power Gain at 1dB Compression Point	G_{1dB}		dB	5.5	8.0	—
Drain Current	I_{DS}		A	—	4.0	5.0
Power Added Efficiency	η_{add}		%	—	23	—
Channel-Temperature Rise	ΔT_{ch}	$V_{DS} \times I_{DS} \times R_{th(c-c)}$	$^\circ\text{C}$	—	—	90

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

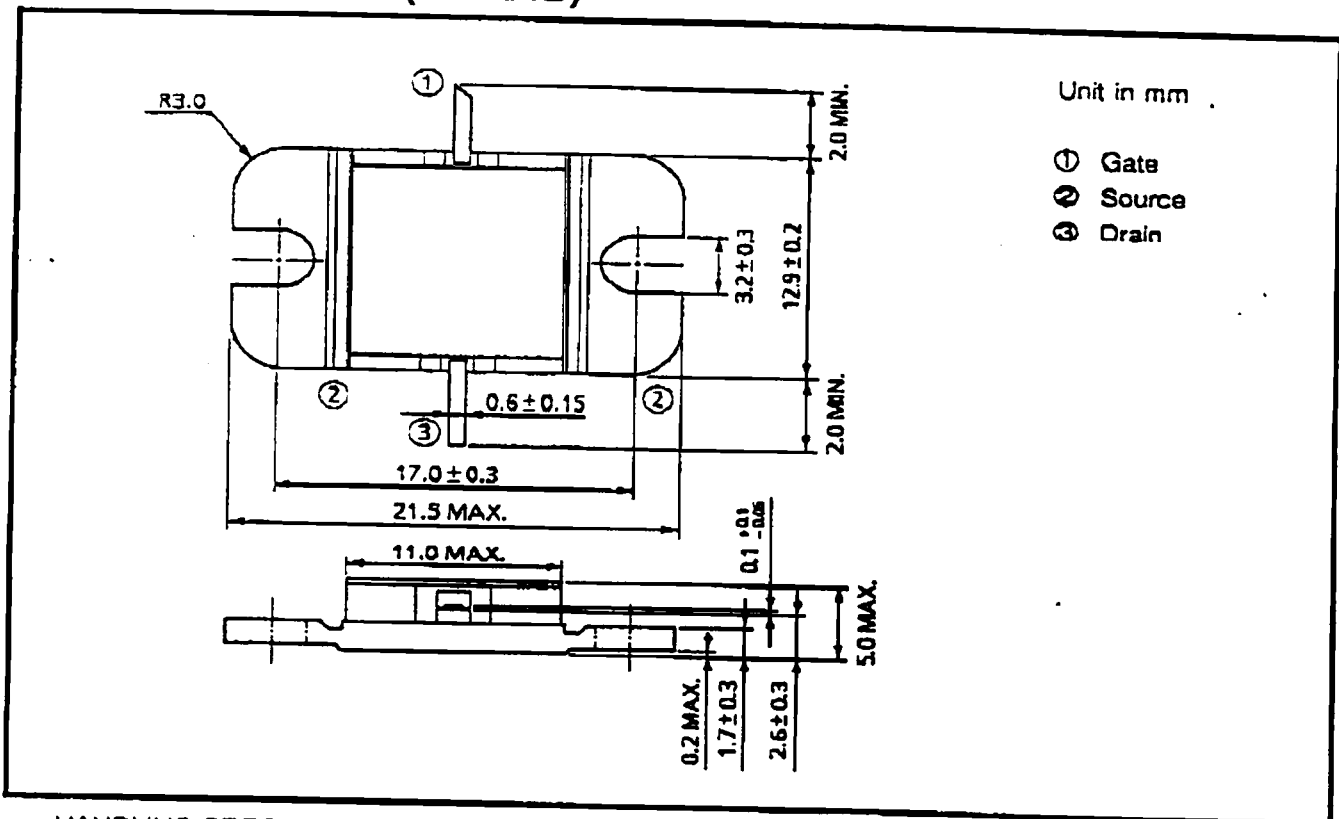
CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Transconductance	g_m	$V_{DS} = 3 \text{ V}$ $I_{DS} = 4.0 \text{ A}$	mS	—	2800	—
Pinch-off Voltage	$V_{DS(off)}$	$V_{DS} = 3 \text{ V}$ $I_{DS} = 145 \text{ mA}$	V	-2.0	-3.5	-6.0
Saturated Drain Current	I_{DSS}	$V_{DS} = 3 \text{ V}$ $V_{GS} = 0 \text{ V}$	A	—	10.0	11.5
Gate-Source Breakdown Voltage	V_{GSO}	$I_{GS} = -145 \mu\text{A}$	V	-5	—	—
Thermal Resistance	$R_{th(c-c)}$	Channel to Case	$^\circ\text{C/W}$	—	2.0	2.5

★ The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
 ★ 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.

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTICS	SYMBOL	UNIT	RATING
Drain-Source Voltage	V _{DS}	V	15
Gate-Source Voltage	V _{GS}	V	-5
Drain Current	I _{DS}	A	11.5
Total Power Dissipation (T _C = 25°C)	P _T	W	50
Channel Temperature	T _{ch}	°C	175
Storage Temperature	T _{stg}	°C	-85~175

PACKAGE OUTLINE (2-11C1B)

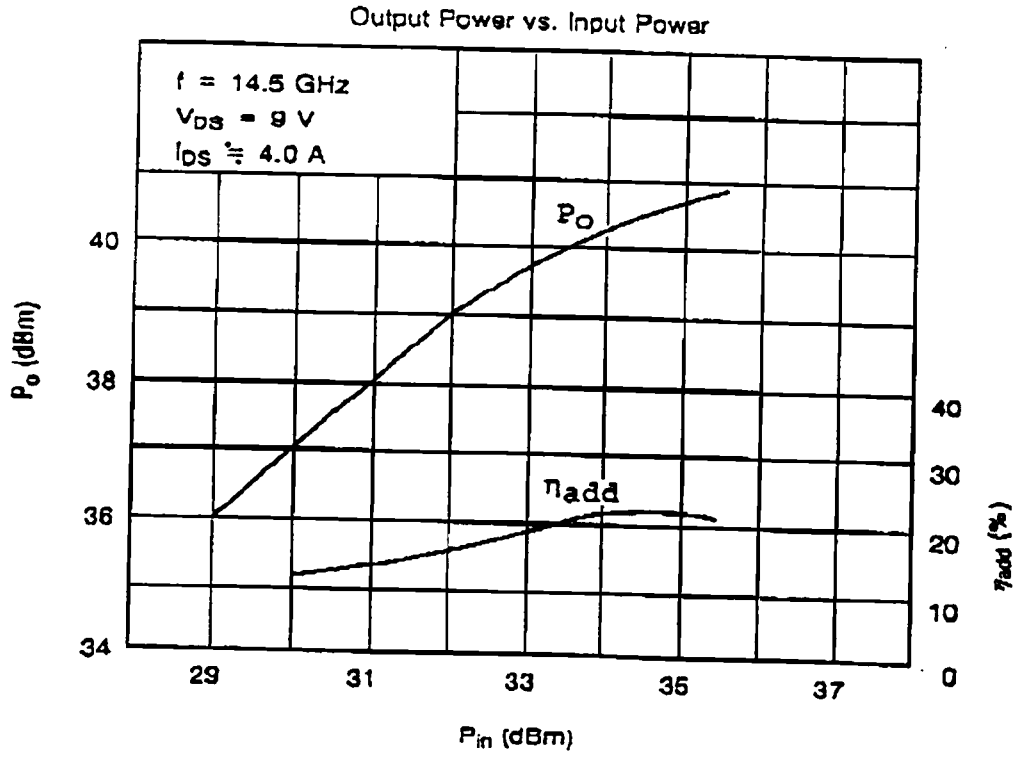
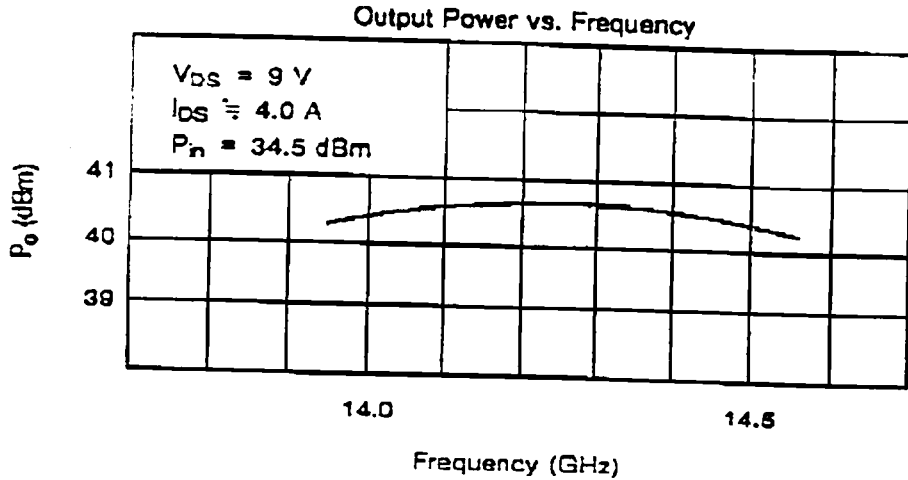


HANDLING PRECAUTIONS FOR PACKAGED TYPE

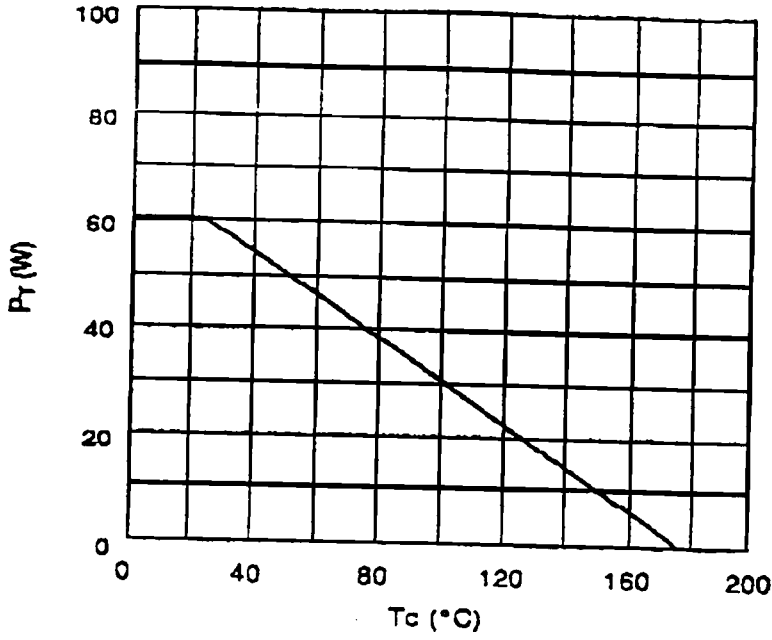
Soldering iron should be grounded and the operating time should not exceed 10 seconds at 260°C.

RF PERFORMANCES

TMM1414-10B



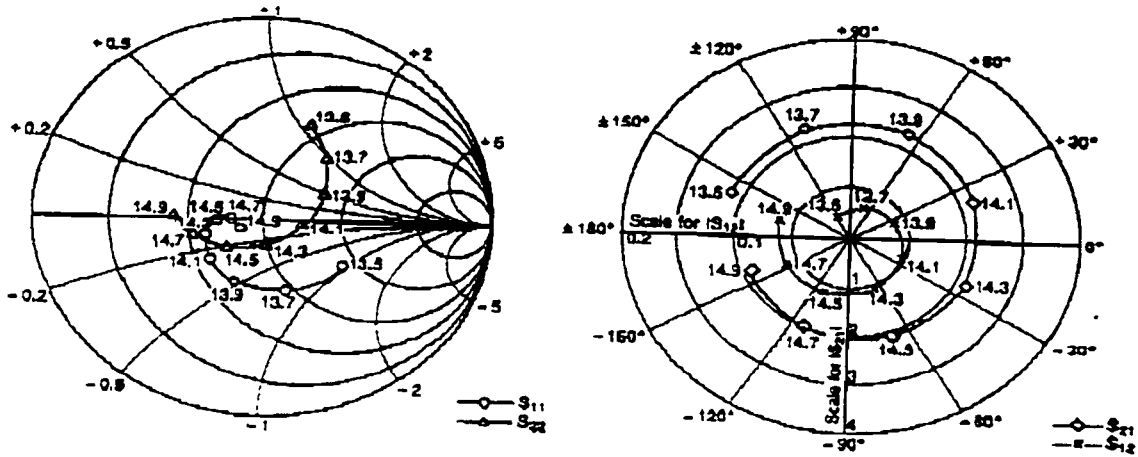
POWER DISSIPATION VS. CASE TEMPERATURE



TIM1414-10B S-PARAMETERS (MAGN. and ANGLES)

$V_{DS} = 9\text{ V}$, $I_{DS} = 4.0\text{ A}$

$f = 13.5 \sim 14.9\text{ GHz}$



FREQUENCY (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
13.50	0.42	-33	2.23	158	0.048	116	0.51	57
13.60	0.40	-53	2.28	135	0.057	93	0.46	58
13.70	0.38	-73	2.31	111	0.085	89	0.41	49
13.80	0.36	-92	2.33	88	0.073	46	0.35	39
13.90	0.34	-109	2.31	65	0.081	23	0.29	27
14.00	0.32	-124	2.29	43	0.089	1	0.23	12
14.10	0.30	-137	2.27	20	0.096	-22	0.17	-9
14.20	0.28	-150	2.24	-2	0.104	-44	0.13	-42
14.30	0.26	-161	2.20	-24	0.109	-66	0.13	-82
14.40	0.22	-170	2.16	-47	0.116	-88	0.17	-116
14.50	0.20	-177	2.11	-69	0.119	-110	0.21	-136
14.60	0.18	180	2.05	-91	0.123	-132	0.27	-152
14.70	0.13	178	1.98	-113	0.125	-153	0.32	-163
14.80	0.11	169	1.82	-136	0.127	-174	0.36	-173
14.90	0.10	153	1.85	-157	0.128	165	0.39	179