

### Low Distortion Internally Matched Power GaAs FETs (C-Band)

#### Features

- Low intermodulation distortion
  - $IM_3 = -45$  dBc at  $P_o = 34.5$  dBm,
  - Single carrier level
- High power
  - $P_{1dB} = 45$  dBm at 3.7 GHz to 4.2 GHz
- High gain
  - $G_{1dB} = 10.0$  dB at 3.7 GHz to 4.2 GHz
- Broad band internally matched
- 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	$P_{1dB}$	$V_{DS} = 10V$ $f = 3.7 \sim 4.2 \text{ GHz}$	dBm	44.0	45.0	—
Power Gain at 1dB Compression Point	$G_{1dB}$		dB	9.0	10.0	—
Drain Current	$I_{DS1}$		A	—	8.0	9.0
Gain Flatness	$\Delta G$		dB	—	—	$\pm 0.8$
Power Added Efficiency	$\eta_{add}$		%	—	36	—
3rd Order Intermodulation Distortion	$IM_3$	Note 1	dBc	-42	-45	—
Drain Current	$I_{DS2}$		A	—	8.0	9.0
Channel-Temperature Rise	$\Delta T_{ch}$	$V_{DS} \times I_{DS} \times R_{th}(c-c)$	$^\circ\text{C}$	—	—	80

#### Electrical Characteristics ( $T_a = 25^\circ \text{C}$ )

Characteristic	Symbol	Condition	Unit	Min.	Typ.	Max
Trans-conductance	gm	$V_{DS} = 3V$ $I_{DS} = 10.5A$	mS	—	6300	—
Pinch-off Voltage	$V_{GSoff}$	$V_{DS} = 3V$ $I_{DS} = 140mA$	V	-2	-3.5	-5.0
Saturated Drain Current	$I_{DSS}$	$V_{DS} = 3V$ $V_{GS} = 0V$	A	—	20	26
Gate-Source Breakdown Voltage	$V_{GSO}$	$I_{GS} = -420\mu A$	V	-5	—	—
Thermal Resistance	$R_{th}(c-c)$	Channel to case	$^\circ\text{C/W}$	—	0.8	1.0

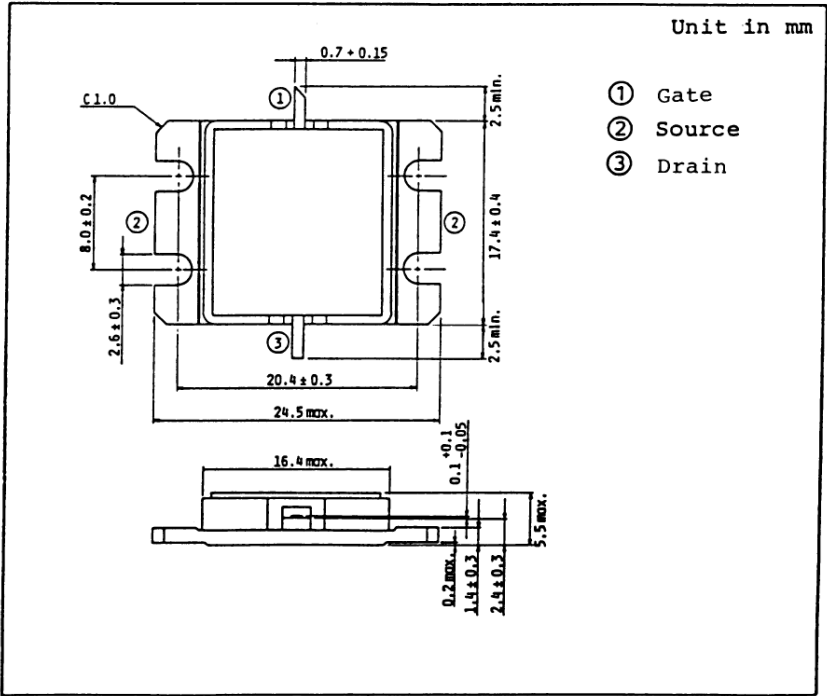
Note 1: 2 tone Test Pout = 34.5dBm Single Carrier Level.

The information contained here is subject to change without notice.  
The information contained herein is presented only as 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. These TOSHIBA products are intended for usage in general electronic equipments (office equipment, communication equipment, measuring equipment, domestic electrification, etc.) Please make sure that you consult with us before you use these TOSHIBA products in equipments which require high quality and/or reliability, and in equipments which could have major impact to the welfare of human life (atomic energy control, spaceship, traffic signal, combustion control, all types of safety devices, etc.). TOSHIBA cannot accept liability to any damage which may occur in case these TOSHIBA products were used in the mentioned equipments without prior consultation with TOSHIBA.

Absolute Maximum Ratings (Ta = 25° C)

Characteristic	Symbol	Unit	Rating
Drain-Source Voltage	$V_{DS}$	V	15
Gate-Source Voltage	$V_{GS}$	V	-5
Drain Current	$I_{DS}$	A	26
Total Power Dissipation ( $T_c = 25^{\circ}C$ )	$P_T$	W	120
Channel Temperature	$T_{ch}$	°C	175
Storage Temperature	$T_{stg}$	°C	-65~175

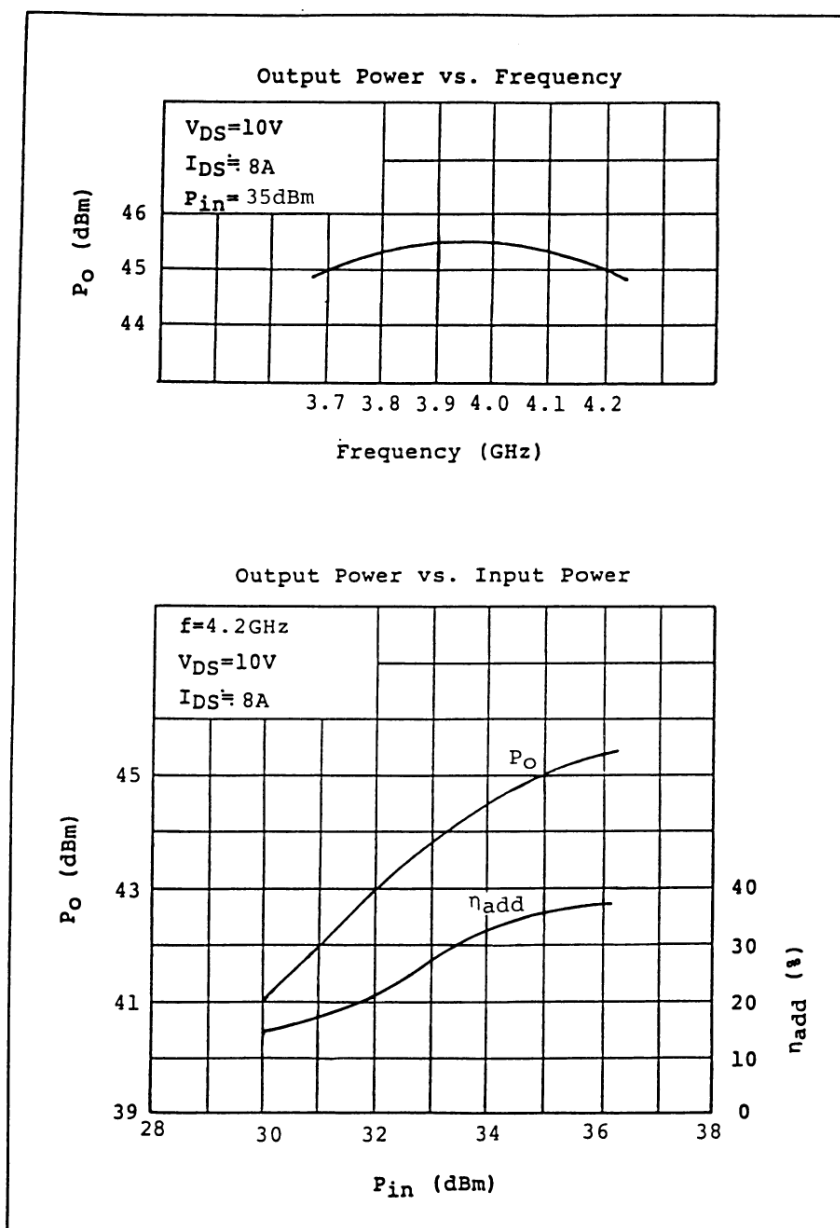
Package Outline (2-16G1B)



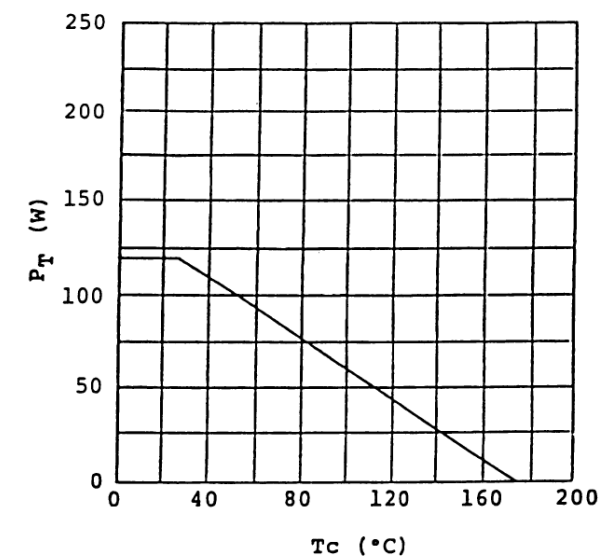
Handling Precautions for Packaged Type

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

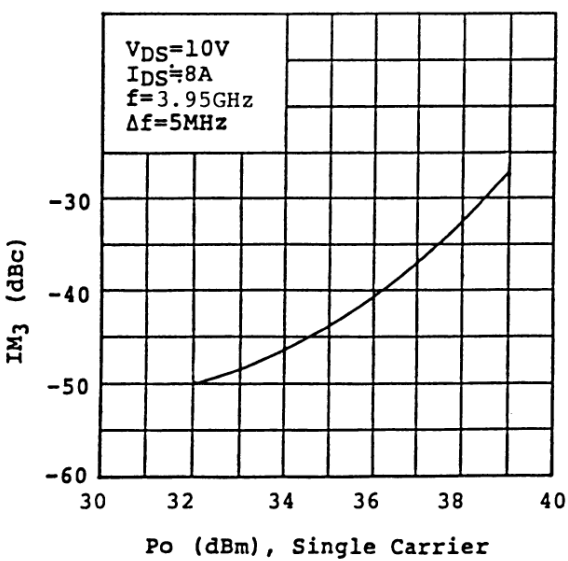
## RF Performances



Power Dissipation vs. Case Temperature



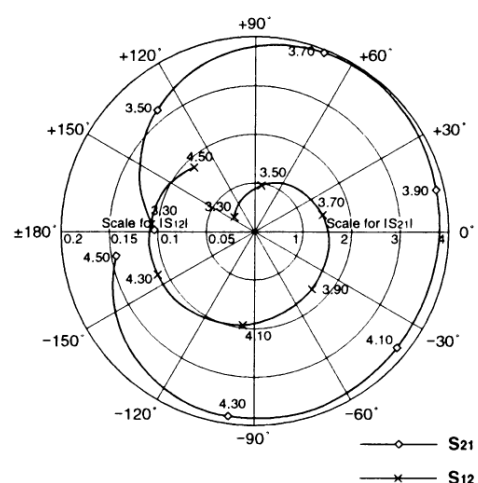
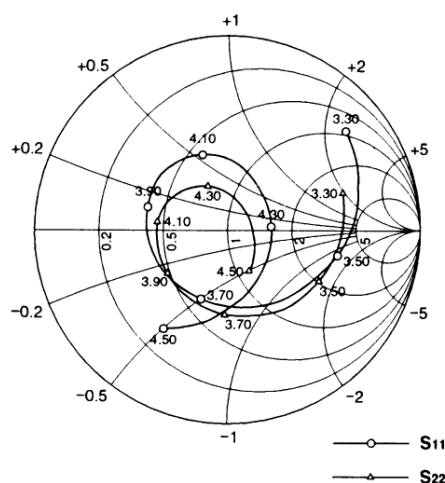
$IM_3$  vs. Output Power Characteristics



# TIM3742-30L S-Parameters (MAGN. and ANGLES)

$V_{DS} = 10V$ ,  $I_{DS} = 8.0A$

$f = 3.3 \sim 4.5GHz$



FREQUENCY (GHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
3.30	0.794	40	2.071	179	0.026	144	0.629	18
3.50	0.586	-13	3.213	129	0.048	82	0.543	-29
3.70	0.382	-111	3.937	69	0.072	14	0.439	-91
3.90	0.441	164	3.832	13	0.084	-45	0.385	-144
4.10	0.411	109	3.792	-39	0.097	-97	0.366	173
4.30	0.227	5	3.844	-98	0.110	-156	0.245	115
4.50	0.607	-123	2.901	-170	0.092	134	0.240	-62