High Efficiency and Low Distortion Internally Matched Power GaAs FETs (C-Band)

Features

- Low intermodulation distortion
  - IM_3 = -45 dBc at Po = 31.5 dBm, Single Carrier Level
- High power
  - P_{1dB} = 42.5 dBm at 5.9 GHz to 6.4 GHz
- High gain
  - G_{1dB} = 8.0 dB at 5.9 GHz to 6.4 GHz
- Broadband internally matched
- Hermetically sealed package

RF Performance Specifications (T_a = 25°C)

Characteristic	Symbol	Condition	Unit	Min.	Typ.	Max.
Output Power at 1dB Compression Point	P_{1dB}	V_{DS} = 10V f = 5.9 ~ 6.4 GHz	dBm	41.5	42.5	–
Power Gain at 1dB Compression Point	G_{1dB}		dB	7.0	8.0	–
Drain Current	I_{DS}		A	–	4.4	5.0
Gain Flatness	ΔG		dB	–	–	±0.8
Power Added Efficiency	η_{add}		%	–	34	–
3rd Order Intermodulation Distortion	IM_3	Note 1	dBc	-42	-45	–
Channel-Temperature Rise	ΔT_{ch}	V_{DS} x I_{DS} x $R_{th\ (c\text{-}c)}$	°C	–	–	80

Electrical Characteristics (T_a = 25°C)

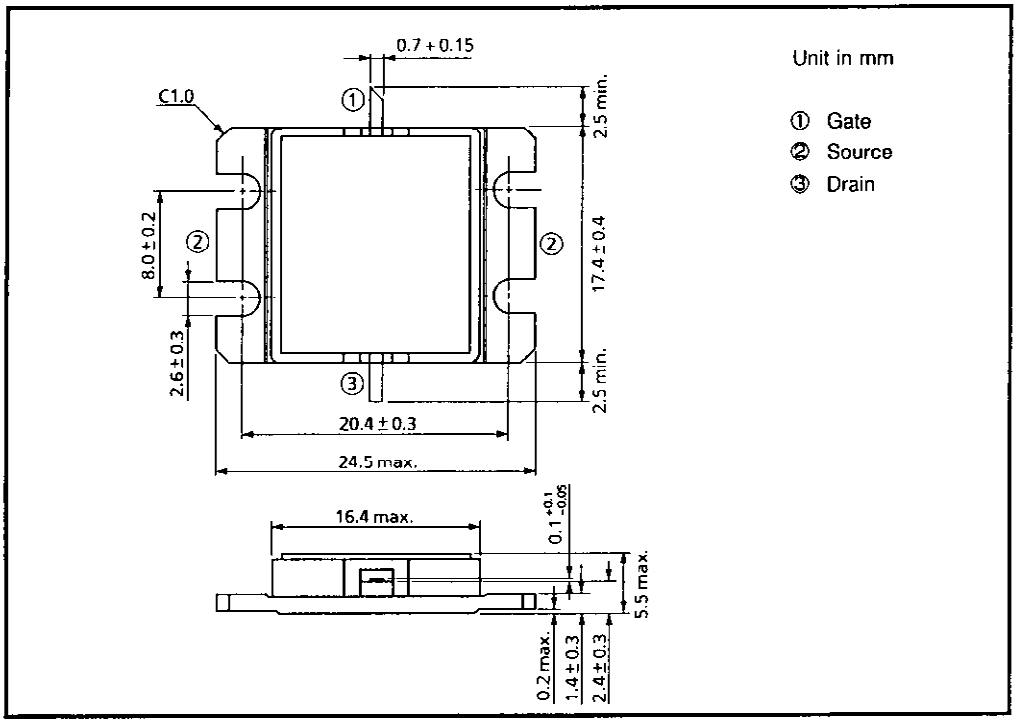
Characteristic	Symbol	Condition	Unit	Min.	Typ.	Max.
Transconductance	gm	V_{DS} = 3V I_{DS} = 6.0A	mS	–	3600	–
Pinch-off Voltage	V_{GSoff}	V_{DS} = 3V I_{DS} = 60 mA	V	-1	-2.5	-4.0
Saturated Drain Current	I_{DSS}	V_{DS} = 3V V_{GS} = 0V	A	–	10.5	14.0
Gate-Source Breakdown Voltage	V_{GSO}	I_{GS} = -200 μA	V	-5	–	–
Thermal Resistance	$R_{th\ (c\text{-}c)}$	Channel to Case	°C/W	–	1.5	2.0

Note 1: 2-tone Test Pout = 31.5 dBm Single Carrier Level.

Absolute Maximum Ratings (T_a = 25°C)

Characteristic	Symbol	Unit	Rating
Drain-Source Voltage	V_{DS}	V	15
Gate-Source Voltage	V_{GS}	V	-5
Drain Current	I_D	A	14
Total Power Dissipation (T_c = 25°C)	P_T	W	75
Channel Temperature	T_{ch}	°C	175
Storage Temperature	T_{stg}	°C	-65 ~ 175

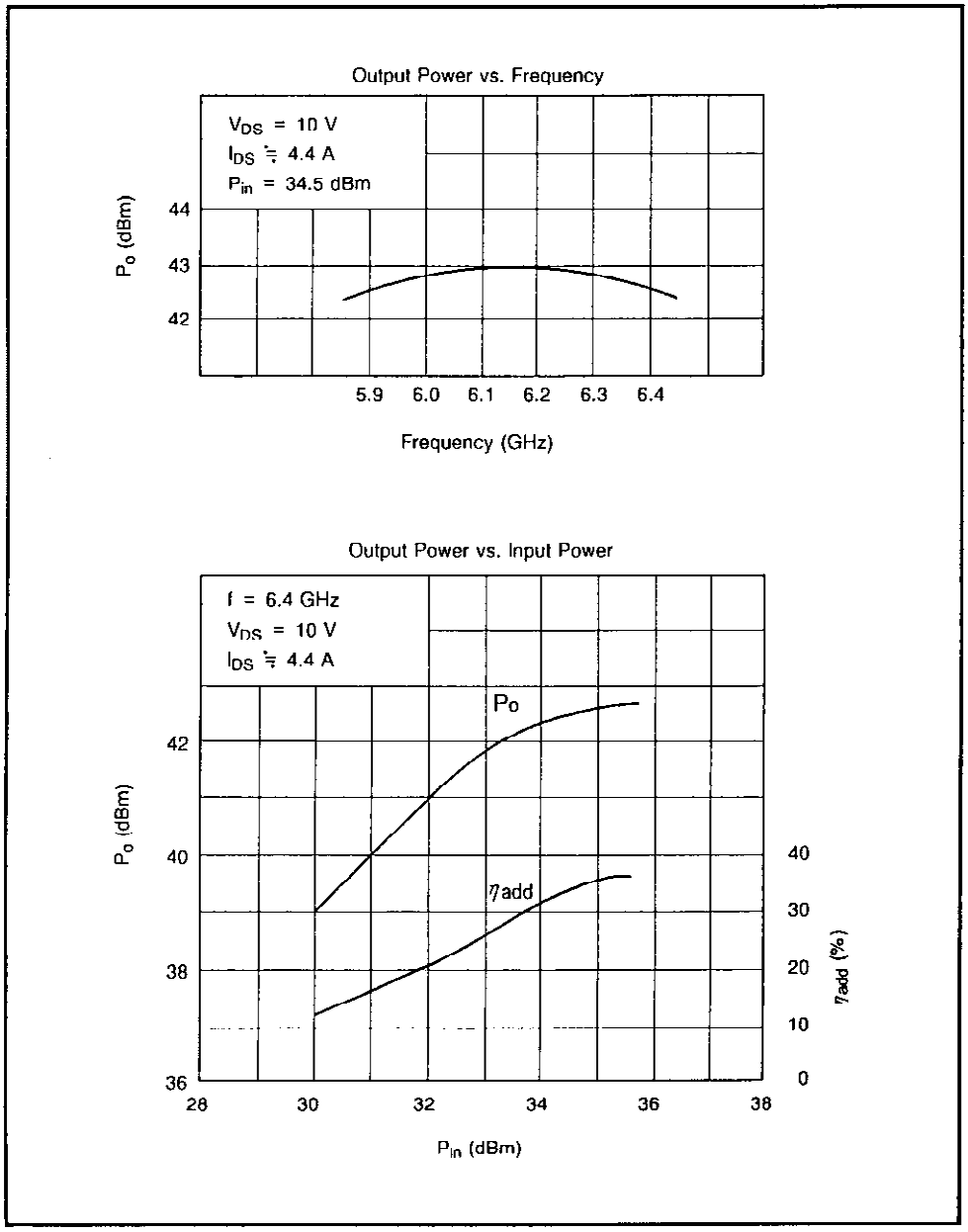
Package Outline (2-16G1B)



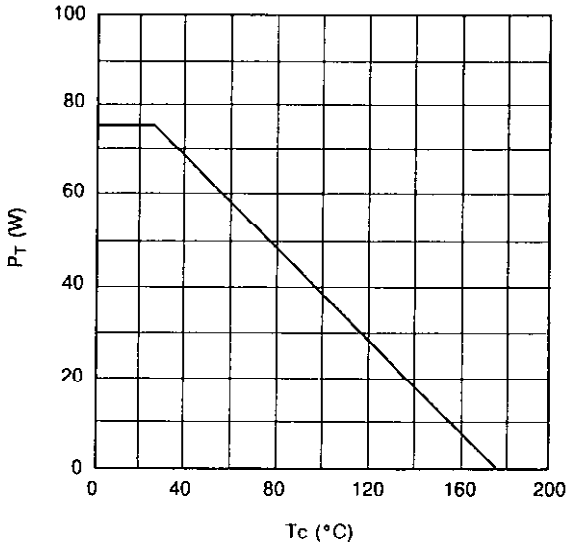
Handling Precautions for Packaged Type

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

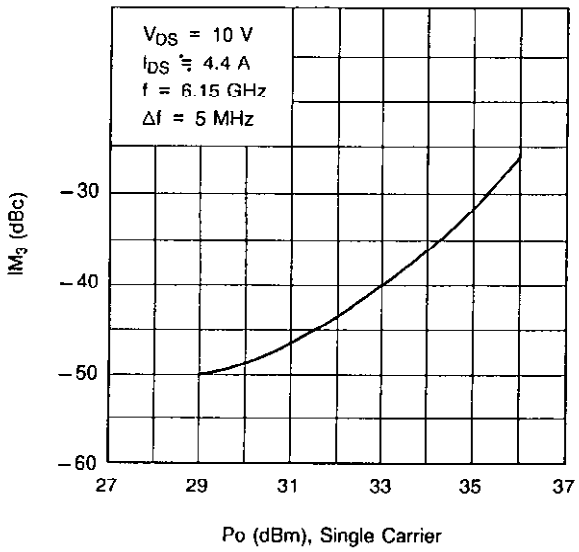
RF Performances



Power Dissipation vs. Case Temperature

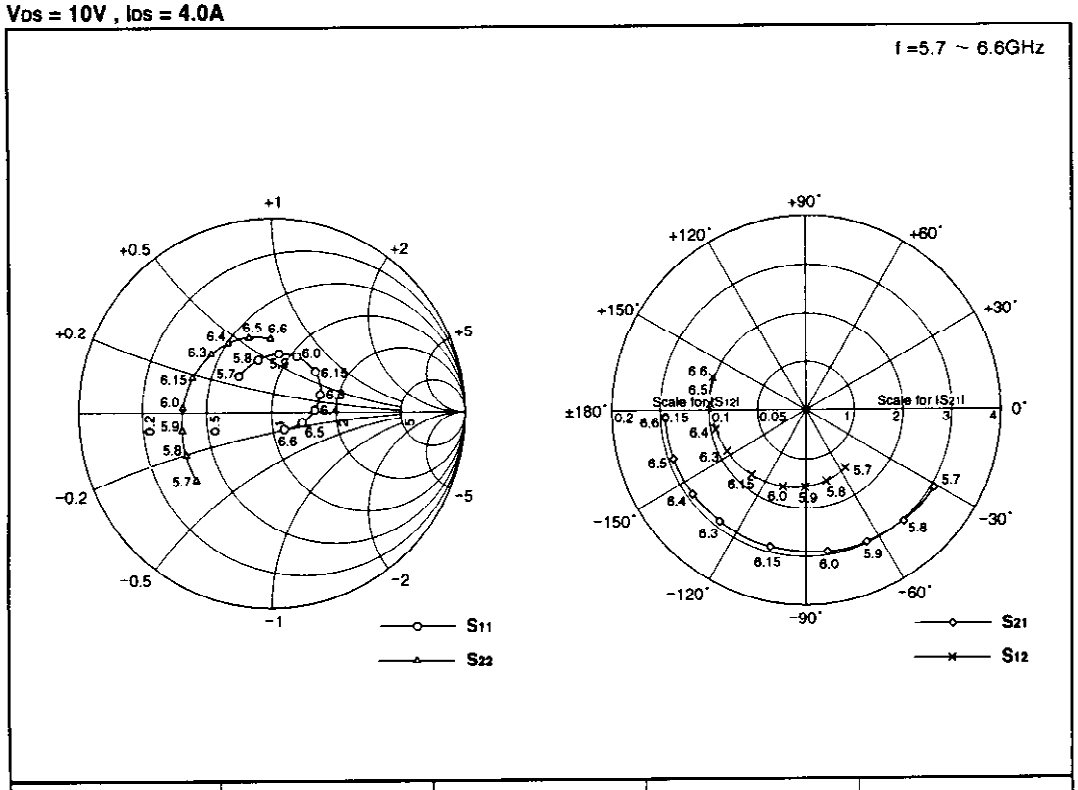


IM_3 vs. Output Power Chacteristics



TIM5964-16SL S-Parameters (Magn. and Angles)

V_{DS} = 10V , I_{DS} = 4.0A



FREQUENCY (GHz)	S_{11} MAG	S_{11} ANG	S_{21} MAG	S_{21} ANG	S_{12} MAG	S_{12} ANG	S_{22} MAG	S_{22} ANG
5.70	0.252	131.6	3.056	-31.1	0.071	-55.6	0.515	-138.3
5.80	0.281	104.2	3.025	-48.5	0.075	-73.8	0.487	-153.9
5.90	0.306	83.0	2.974	-65.3	0.078	-90.8	0.467	-168.8
6.00	0.318	65.8	2.928	-81.4	0.081	-107.1	0.456	176.8
6.15	0.310	43.1	2.886	-104.9	0.086	-130.5	0.444	156.1
6.30	0.268	20.2	2.877	-128.3	0.091	-153.2	0.433	135.7
6.40	0.224	3.3	2.882	-144.1	0.095	-168.4	0.422	121.7
6.50	0.167	-17.8	2.893	-160.3	0.099	176.0	0.404	106.7
6.60	0.107	-52.2	2.898	-177.1	0.102	160.1	0.381	90.6