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

Features

- Low intermodulation distortion
  - IM_3 = -43 dBc at Po = 31.5 dBm,
  - Single carrier level
- High power
  - P_{1dB} = 41.5 dBm at 7.7 GHz to 8.5 GHz
- High gain
  - G_{1dB} = 6.5 dB at 7.7 GHz to 8.5 GHz
- Broad band internally matched
- Hermetically sealed package

RF Performance Specifications (Ta = 25° C)

Characteristics	Symbol	Condition	Unit	Min.	Typ.	Max
Output Power at 1dB Compression Point	P_{1dB}	V_{DS} = 10V f = 7.7 ~ 8.5 GHz	dBm	40.5	41.5	–
Power Gain at 1dB Compression Point	G_{1dB}		dB	5.5	6.5	–
Drain Current	I_{DS1}		A	–	4.2	5.0
Gain Flatness	ΔG		dB	–	–	±0.6
Power Added Efficiency	η_{add}		%	–	26	–
3rd Order Intermodulation Distortion	IM_3	Note 1	dBc	-40	-43	–
Drain Current	I_{DS2}		A	–	4.2	5.0
Channel-Temperature Rise	ΔT_{ch}	V_{DS}xI_{DS}xR_{th}(c-c)	°C	–	–	80

Electrical Characteristics (Ta = 25° C)

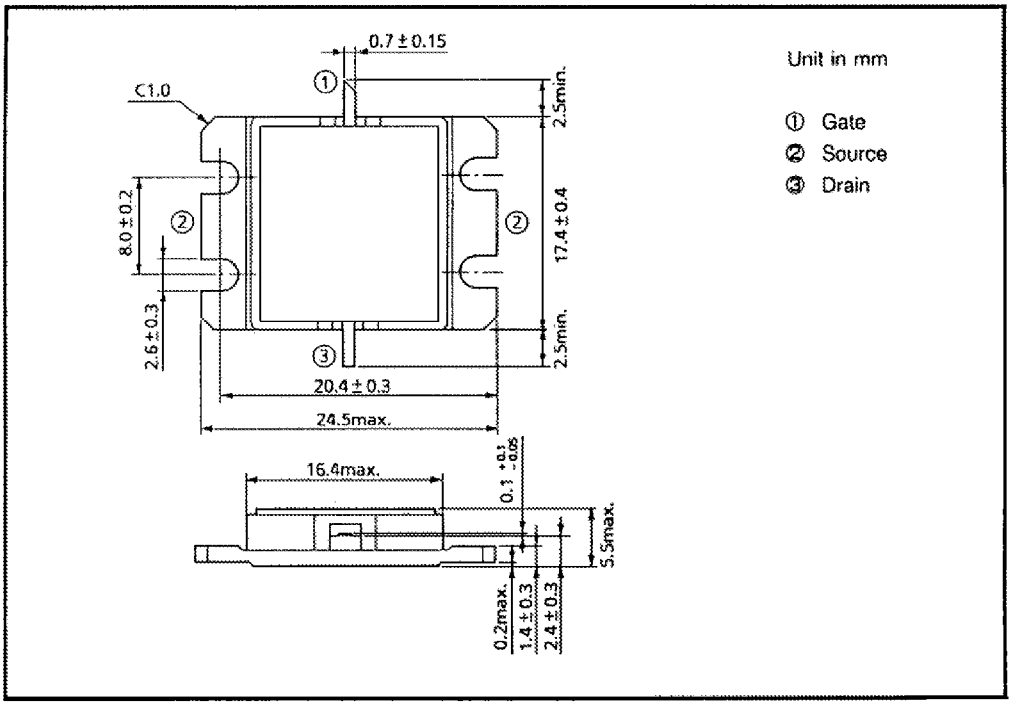
Characteristic	Symbol	Condition	Unit	Min.	Typ.	Max
Trans-conductance	gm	V_{DS} = 3V I_{DS} = 5.2A	mS	–	3200	–
Pinch-off Voltage	V_{GSoff}	V_{DS} = 3V I_{DS} = 70mA	V	-2	-3.5	-5.0
Saturated Drain Current	I_{DSS}	V_{DS} = 3V V_{GS} = 0V	A	–	10.0	13.0
Gate-Source Breakdown Voltage	V_{GSO}	I_{GS} = -210μA	V	-5	–	–
Thermal Resistance	$R_{th\ (c-c)}$	Channel to case	°C/W	–	1.9	2.5

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

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	13
Total Power Dissipation (T_c = 25°C)	P_T	W	60
Channel Temperature	T_{ch}	°C	175
Storage Temperature	T_{stg}	°C	-65~175

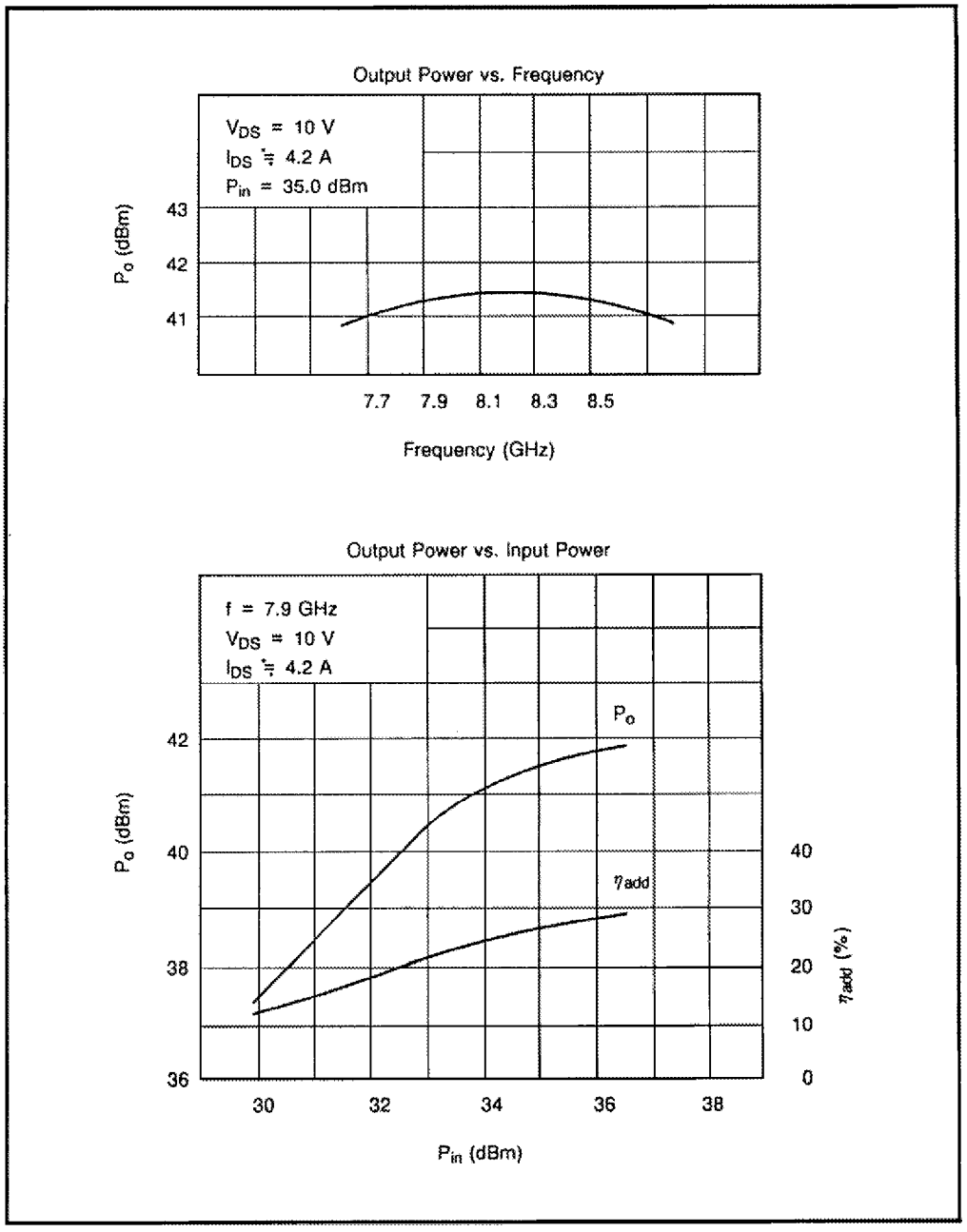
Package Outline (2-16G1B)



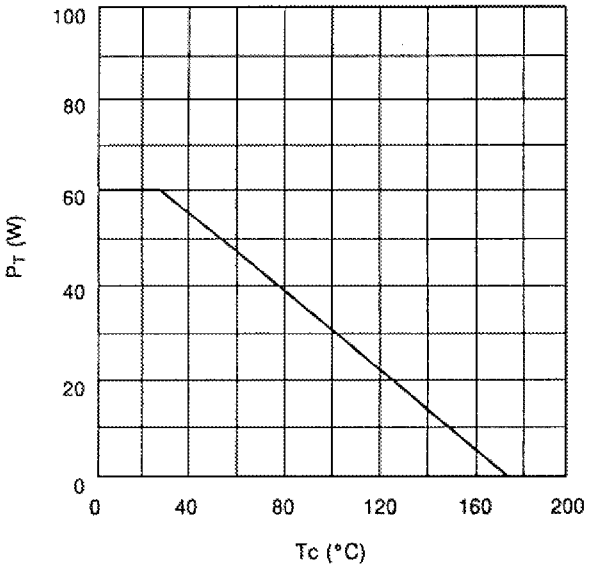
Handling Precautions for Packaged Type

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

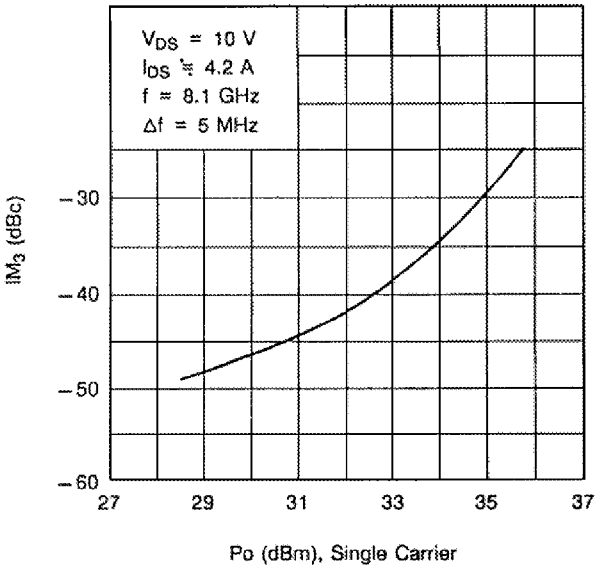
RF Performances



Power Dissipation vs. Case Temperature

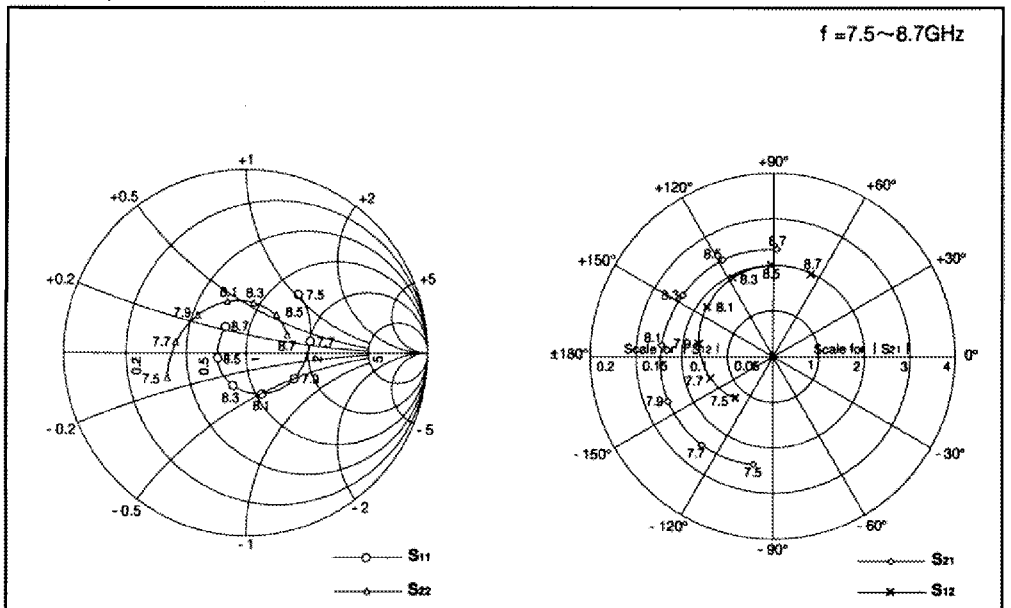


IM_3 vs. Output Power Characteristics



TIM7785-14L S-Parameters
(MAGN. and ANGLES)

V_{DS} = 10V, I_{DS} = 4.2A



FREQUENCY (MHz)	S_{11} MAG	S_{11} ANG	S_{12} MAG	S_{12} ANG	S_{21} MAG	S_{21} ANG	S_{22} MAG	S_{22} ANG
7.5	0.431	47.4	0.061	-132.7	2.401	-100.9	0.460	-162.8
7.7	0.366	10.1	0.073	-162.0	2.469	-129.4	0.396	170.6
7.9	0.304	-27.6	0.083	170.4	2.483	-157.8	0.340	141.8
8.1	0.243	-67.4	0.091	143.8	2.466	174.2	0.299	111.0
8.3	0.189	-113.2	0.096	117.7	2.426	146.3	0.277	79.8
8.5	0.159	-170.0	0.099	91.8	2.377	118.2	0.264	50.1
8.7	0.180	127.2	0.099	65.3	2.320	89.4	0.246	22.8