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

Features

- Low intermodulation distortion
  - IM_3 = -44 dBc at Po = 28 dBm,
  - Single carrier level
- High power
  - P_{1dB} = 39 dBm at 7.7 GHz to 8.5 GHz
- High gain
  - G_{1dB} = 5.0 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	38.0	39.0	–
Power Gain at 1dB Compression Point	G_{1dB}		dB	4.0	5.0	–
Drain Current	I_{DS1}		A	–	2.3	2.8
Gain Flatness	ΔG		dB	–	–	±0.6
Power Added Efficiency	η_{add}		%	–	24	–
3rd Order Intermodulation Distortion	IM_3	Note 1	dBc	-41	-44	–
Drain Current	I_{DS2}		A	–	2.3	2.8
Channel-Temperature Rise	ΔT_{ch}	V_{DS}xI_{DS}xR_{th}(c-c)	°C	–	–	80

Electrical Characteristics (Ta = 25° C)

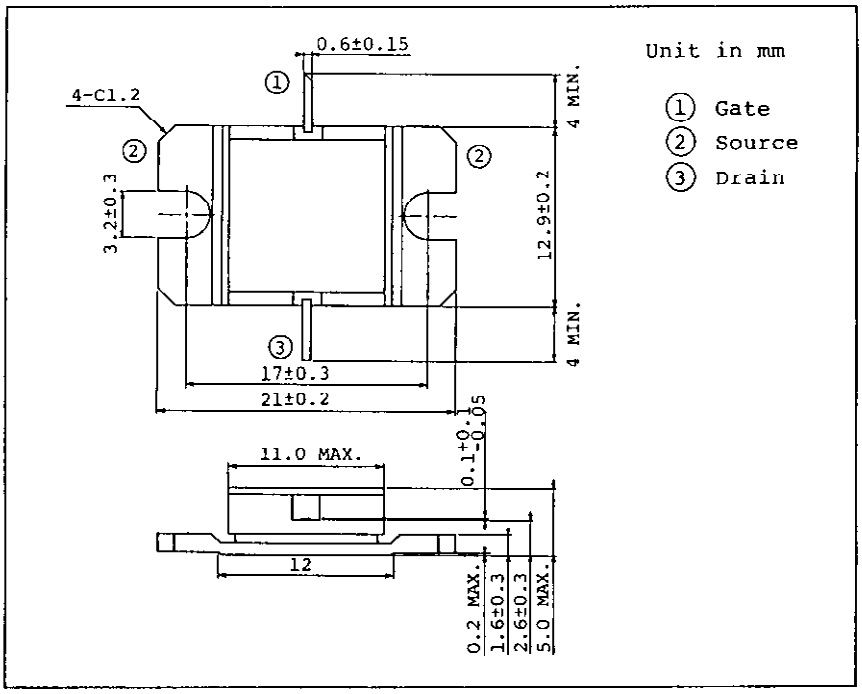
Characteristic	Symbol	Condition	Unit	Min.	Typ.	Max
Trans-conductance	gm	V_{DS} = 3V I_{DS} = 3.0A	mS	–	1800	–
Pinch-off Voltage	V_{GSoff}	V_{DS} = 3V I_{DS} = 40mA	V	-2	-3.5	-5.0
Saturated Drain Current	I_{DSS}	V_{DS} = 3V V_{GS} = 0V	A	–	5.8	7.5
Gate-Source Breakdown Voltage	V_{GSO}	I_{GS} = -120μA	V	-5	–	–
Thermal Resistance	$R_{th\ (c-c)}$	Channel to case	°C/W	–	2.3	3.5

Note 1: 2 tone Test Pout = 28dBm 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	8
Total Power Dissipation (T_c = 25°C)	P_T	W	37.5
Channel Temperature	T_{ch}	˚C	175
Storage Temperature	T_{stg}	˚C	-65~175

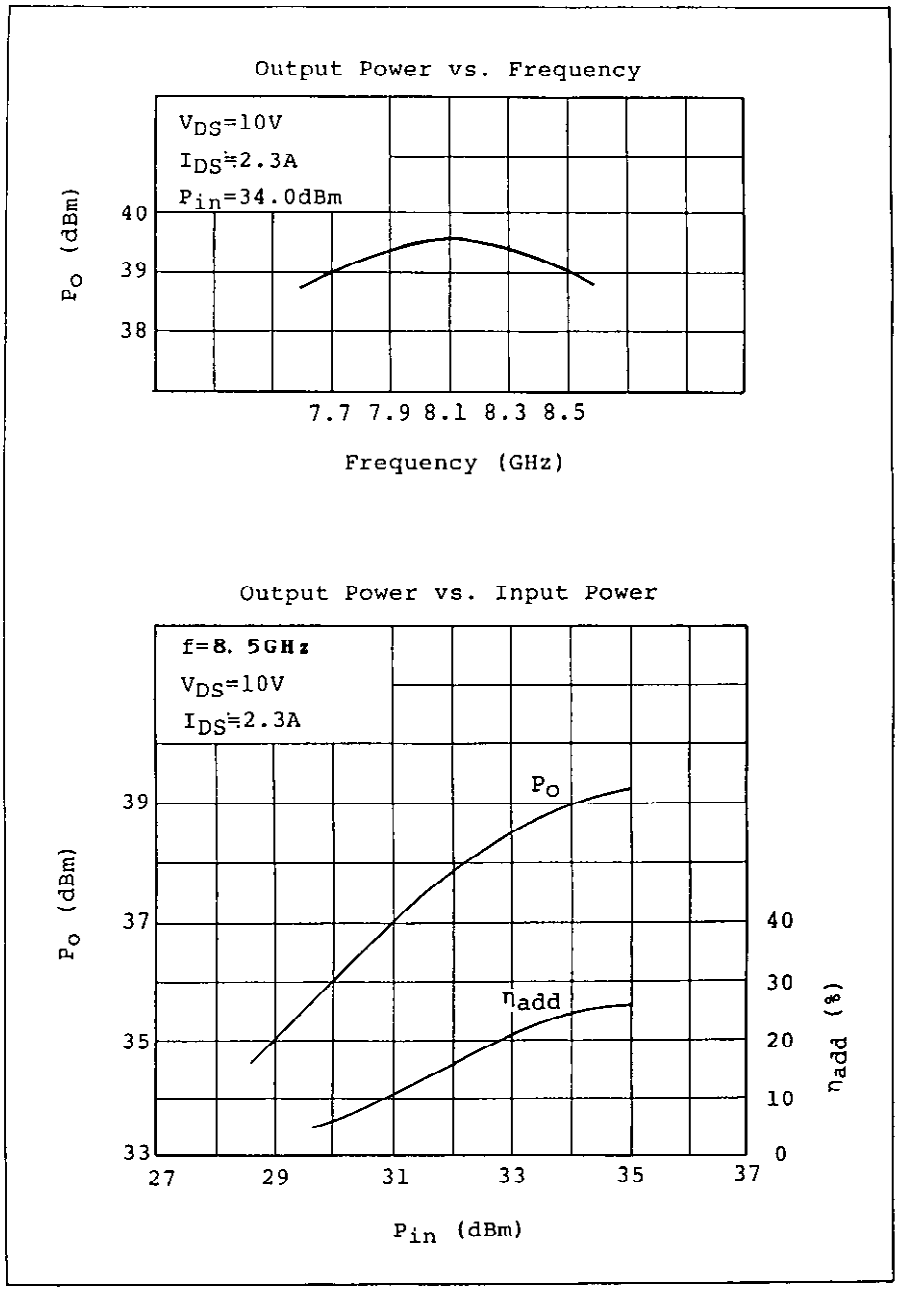
Package Outline (2-11D1B)



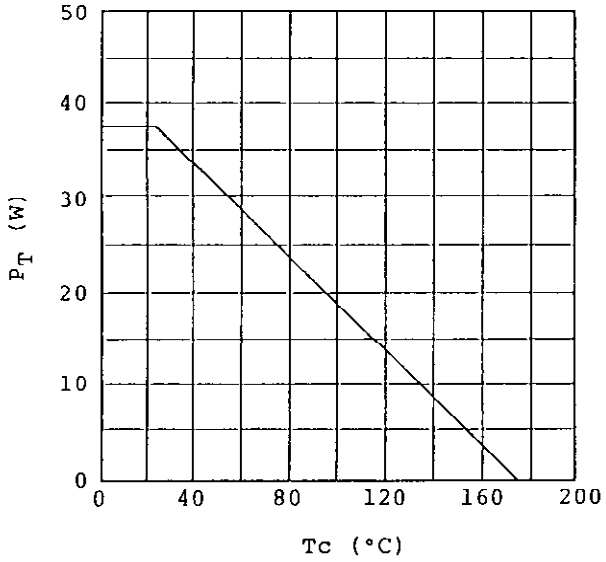
Handling Precautions for Packaged Type

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

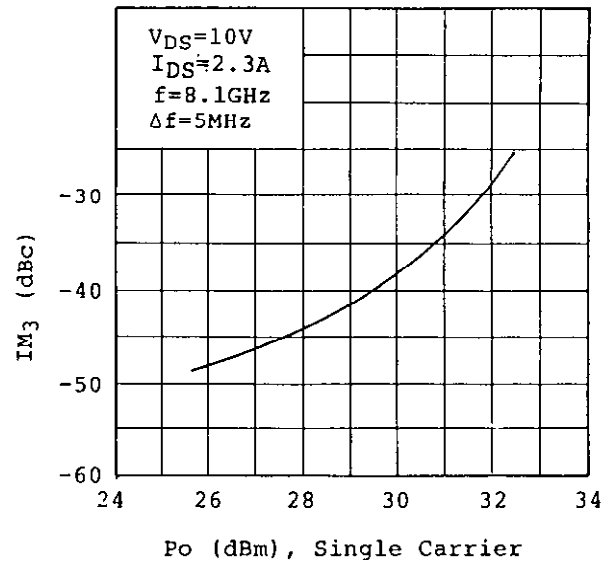
RF Performances



Power Dissipation vs. Case Temperature

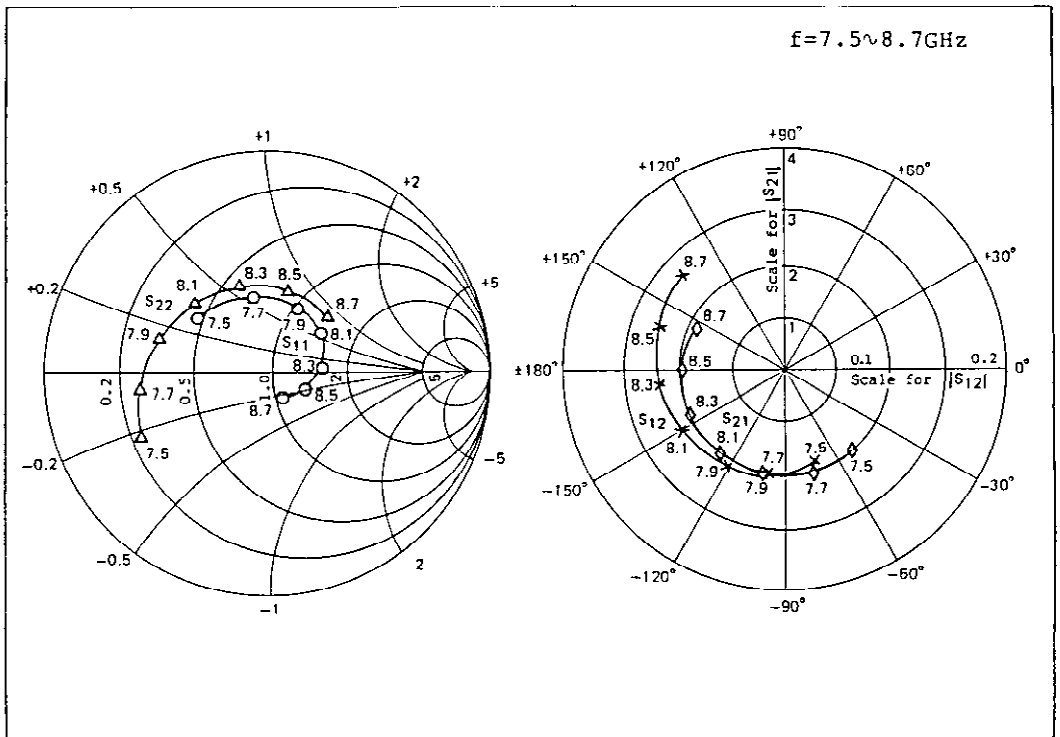


IM_3 vs. Output Power Characteristics



TIM7785-8L S-Parameters
(MAGN. and ANGLES)

V_{DS}=10V, I_{DS}=2.0A



FREQUENCY (GHz)	S_{11}		S_{12}		S_{21}		S_{22}	
7.5	0.41	141	0.091	-73	1.88	-50	0.64	-155
7.7	0.37	102	0.101	-98	1.99	-76	0.58	-174
7.9	0.33	67	0.109	-123	2.05	-103	0.52	162
8.1	0.30	37	0.115	-149	2.07	-129	0.46	135
8.3	0.25	5	0.122	-173	2.02	-156	0.42	108
8.5	0.17	-20	0.126	162	1.95	179	0.39	77
8.7	0.12	-61	0.131	138	1.90	154	0.37	44