TOSHIBA

MICROWAVE SEMICONDUCTOR
TECHNICAL DATA

MICROWAVE POWER GaAs FET

TIM7785-16SL

FEATURES :

- LOW INTERMODULATION DISTORTION
  IM_3 = −45 dBc at Po = 31.5 dBm, Single Carrier Level
- HIGH POWER
  P_{1dB} = 42.5 dBm at 7.7 GHz to 8.5 GHz
- HIGH EFFICIENCY
  ηadd = 29 % at 7.7 GHz to 8.5 GHz
- HIGH GAIN
  G_{1dB} = 5.5 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 1 dB Compression Point	P_{1dB}	V_{DS} = 10 V f = 7.7 ~ 8.5 GHz	dBm	41.5	42.5	–
Power Gain at 1 dB Compression Point	G_{1dB}		dB	4.5	5.5	–
Drain Current	I_{DS}		A	–	4.4	5.0
Gain Flatness	ΔG		dB	–	–	±0.8
Power Added Efficiency	η_{add}		%	–	29	–
3rd Order Intermodulation Distortion	IM_3	Note 1	dBc	−42	−45	–
Channel-Temperature Rise	ΔTch	$V_{DS} \times I_{DS} \times R_{th}$ (c−c)	°C	–	–	80

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

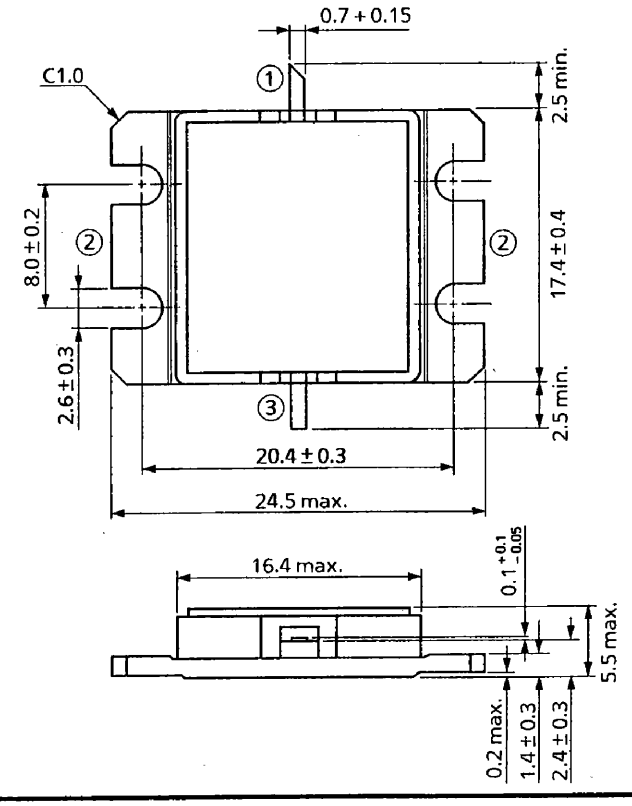
CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Transconductance	gm	V_{DS} = 3 V I_{DS} = 6.0 A	mS	–	3600	–
Pinch-off Voltage	V_{GSoff}	V_{DS} = 3 V I_{DS} = 60 mA	V	−1	−2.5	−4.0
Saturated Drain Current	I_{DSS}	V_{DS} = 3 V V_{GS} = 0 V	A	–	10.5	14.0
Gate-Source Breakdown Voltage	V_{GSO}	I_{GS} = −200 μA	V	−5	–	–
Thermal Resistance	$R_{th\ (c-c)}$	Channel to Case	°C/W	–	1.5	2.0

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

ABSOLUTE MAXIMUM RATINGS (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	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)



Unit in mm

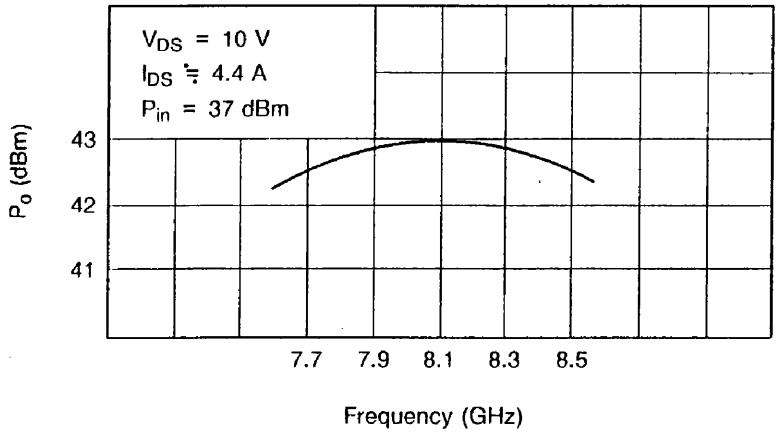
① Gate
② Source
③ Drain

HANDLING PRECAUTIONS FOR PACKAGED TYPE

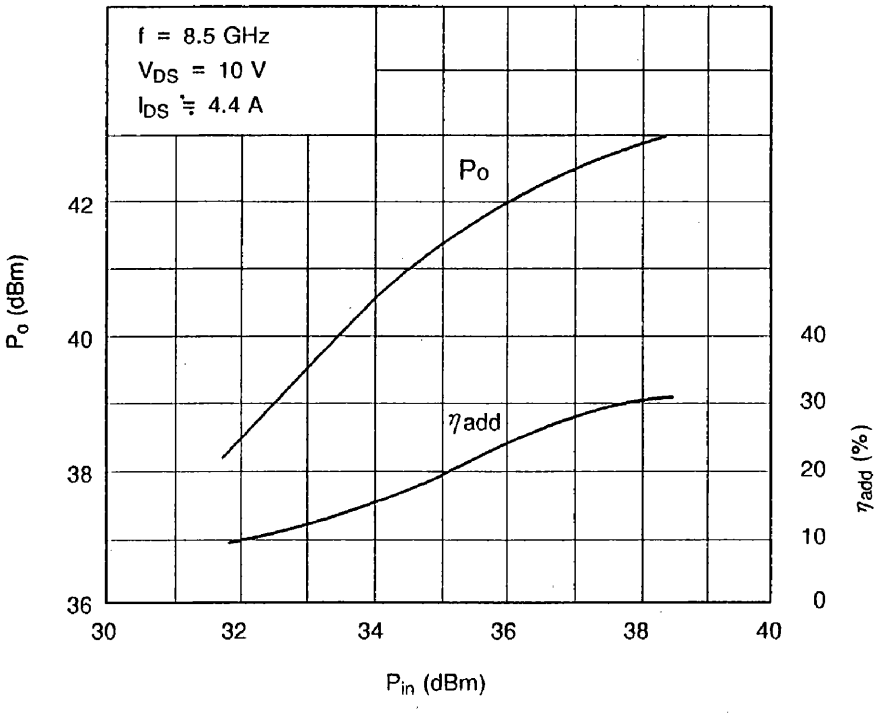
Soldering iron should be grounded and the operating time should not exceed 10 seconds at 260°C.

RF PERFORMANCES

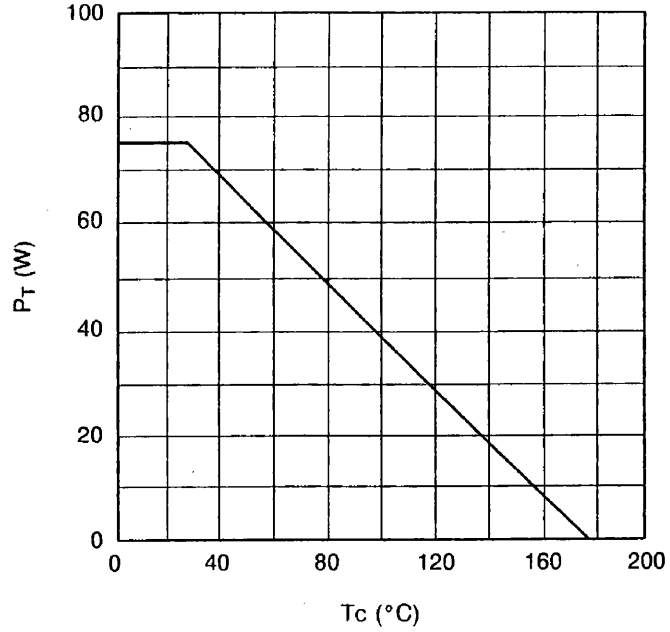
Output Power vs. Frequency



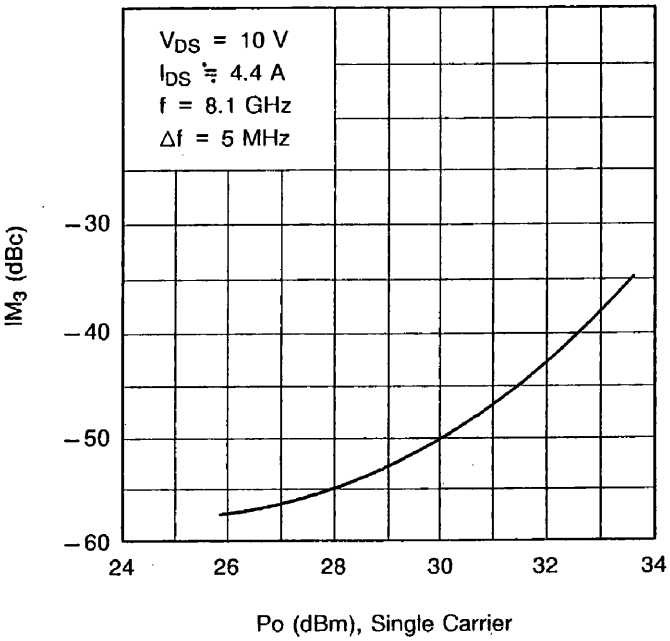
Output Power vs. Input Power



POWER DISSIPATION VS. CASE TEMPERATURE



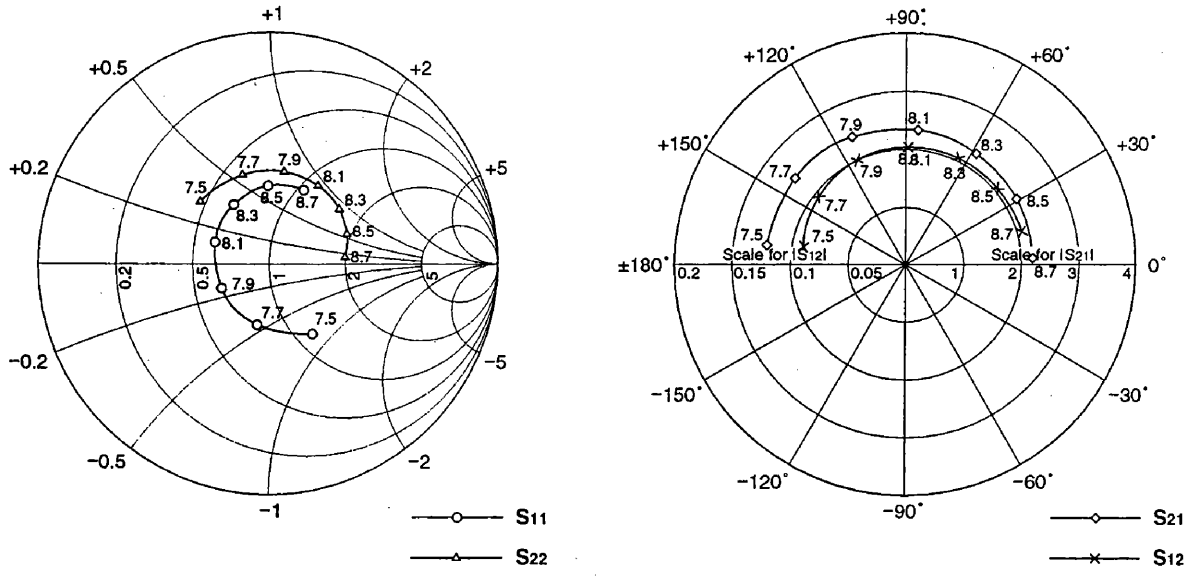
IM_3 VS. OUTPUT POWER CHARACTERISTICS



TIM7785-16SL S-PARAMETERS
(MAGN. and ANGLES)

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

f =7.5 ~ 8.7GHz



FREQUENCY (GHz)	S11 MAG	S11 ANG	S12 MAG	S12 ANG	S21 MAG	S21 ANG	S22 MAG	S22 ANG
7.50	0.358	-58	0.090	170	2.427	172	0.405	138
7.70	0.269	-101	0.096	142	2.440	142	0.405	107
7.90	0.232	-153	0.100	115	2.406	113	0.406	81
8.10	0.255	158	0.102	89	2.340	85	0.401	58
8.30	0.302	121	0.103	64	2.270	58	0.388	38
8.50	0.341	91	0.103	40	2.227	31	0.364	21
8.70	0.354	65	0.104	16	2.197	3	0.333	5