

# TOSHIBA

MICROWAVE SEMICONDUCTOR

## TECHNICAL DATA

MICROWAVE POWER GaAs FET

### TIM7785-30SL

#### FEATURES:

- LOW INTERMODULATION DISTORTION  
IM<sub>3</sub> = -45 dBc at P<sub>o</sub> = 34.5 dBm,  
Single Carrier Level
- HIGH POWER  
P<sub>1dB</sub> = 45 dBm at 7.7 GHz to 8.5 GHz
- HIGH EFFICIENCY  
 $\eta_{add}$  = 34 % at 7.7 GHz to 8.5 GHz
- HIGH GAIN  
G<sub>1dB</sub> = 6.0dB 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 <sub>1dB</sub>	V <sub>DS</sub> = 10V f = 7.7~8.5GHz	dBm	44.0	45.0	-
Power Gain at 1 dB Compression Point	G <sub>1dB</sub>		dB	5.0	6.0	-
Drain Current	I <sub>DS</sub>		A	-	7.0	8.0
Power Added Efficiency	$\eta_{add}$		%	-	34	-
3rd Order Intermodulation Distortion	IM <sub>3</sub>	Note 1	dBc	-42	-45	-
Channel Temperature Rise	$\Delta T_{ch}$	V <sub>DS</sub> × I <sub>DS</sub> × R <sub>th(c-c)</sub>	°C	-	-	100

#### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTICS	SYMBOL	CONDITION	UNIT	MIN.	TYP.	MAX.
Trans-conductance	gm	V <sub>DS</sub> = 3V I <sub>DS</sub> = 10A	mS	-	6300	-
Pinch-off Voltage	V <sub>GSoFF</sub>	V <sub>DS</sub> = 3V I <sub>DS</sub> = 100mA	V	-1.0	-2.5	-4.0
Saturated Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 3V V <sub>GS</sub> = 0V	A	-	18	22
Gate-Source Breakdown Voltage	V <sub>GSO</sub>	I <sub>GS</sub> = -350 $\mu$ A	V	-5	-	-
Thermal Resistance	R <sub>th(c-c)</sub>	Channel to Case	°C/W	-	1.0	1.3

Note 1: 2 tone Test Pout = 34.5dBm Single Carrier Level.  
Recommended Gate Resistance(R<sub>g</sub>) : R<sub>g</sub> = R<sub>g1</sub>(10  $\Omega$ ) + R<sub>g2</sub>(18  $\Omega$ ) = 28  $\Omega$  (MAX.)

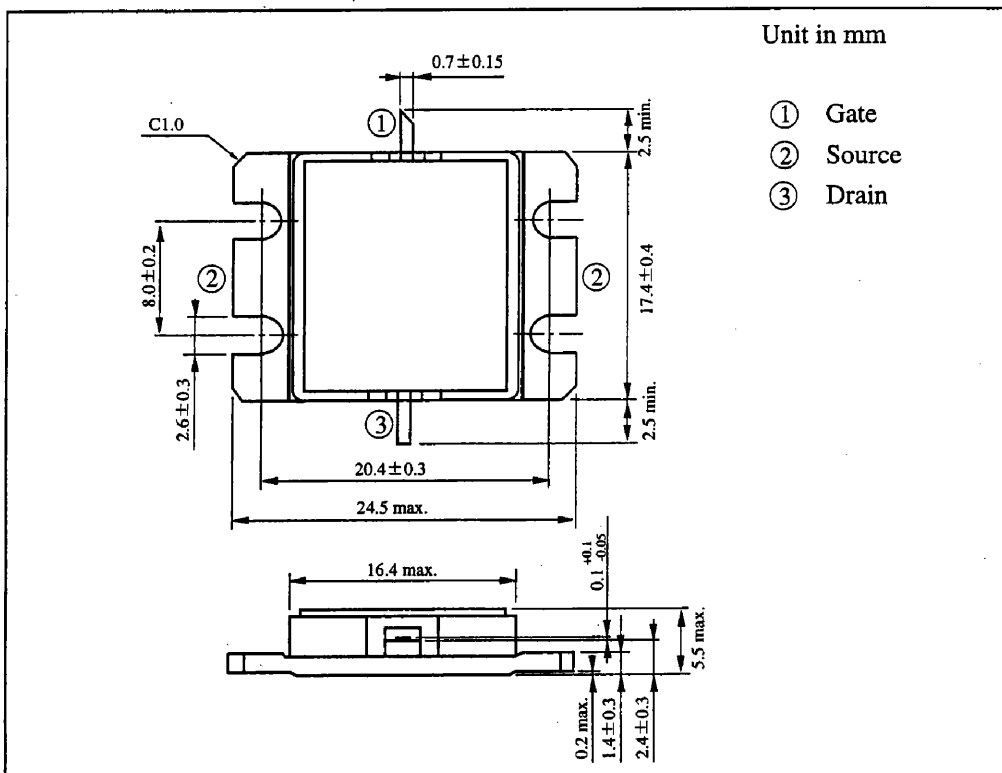
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## ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	UNIT	RATING
Drain-Source Voltage	V <sub>DS</sub>	V	15
Gate-Source Voltage	V <sub>GS</sub>	V	-5
Drain Current	I <sub>DS</sub>	A	22
Total Power Dissipation (Tc=25°C)	P <sub>T</sub>	W	115
Channel Temperature	T <sub>ch</sub>	°C	175
Storage Temperature	T <sub>stg</sub>	°C	-65~175

## PACKAGE OUTLINE (2-16G1B)



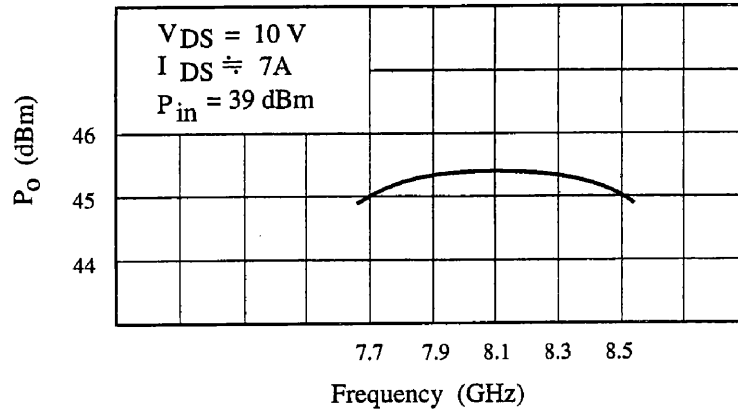
## HANDLING PRECAUTIONS FOR PACKAGED TYPE

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

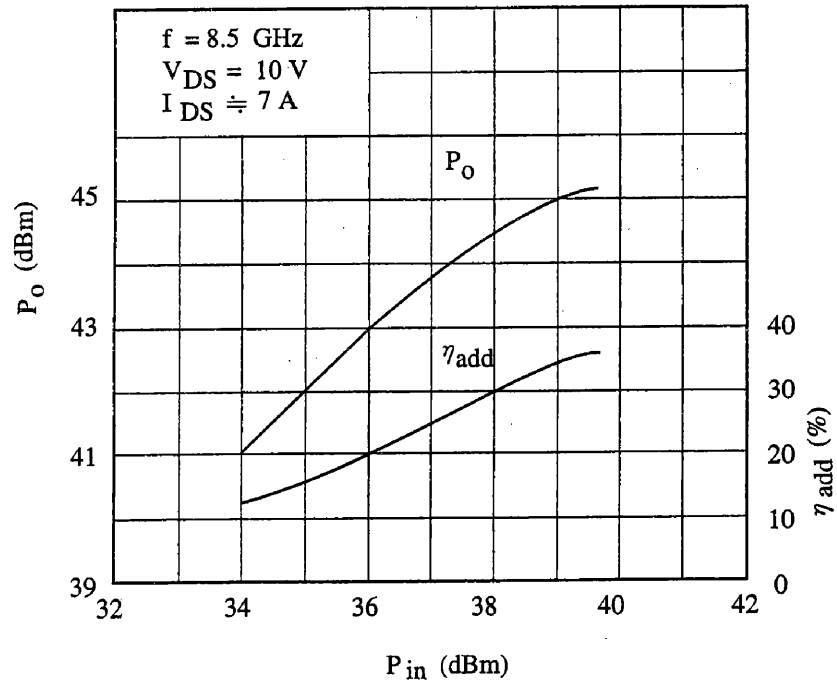
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## RF PERFORMANCES

### Output Power vs. Frequency

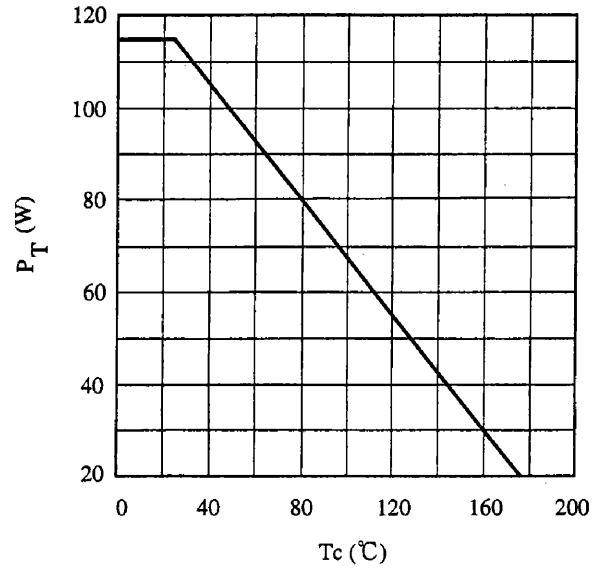


### Output Power vs. Input Power

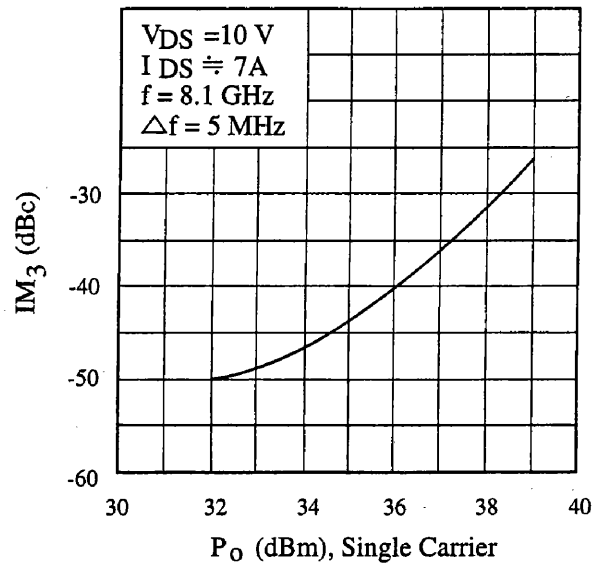


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## POWER DISSIPATION VS. CASE TEMPERATURE



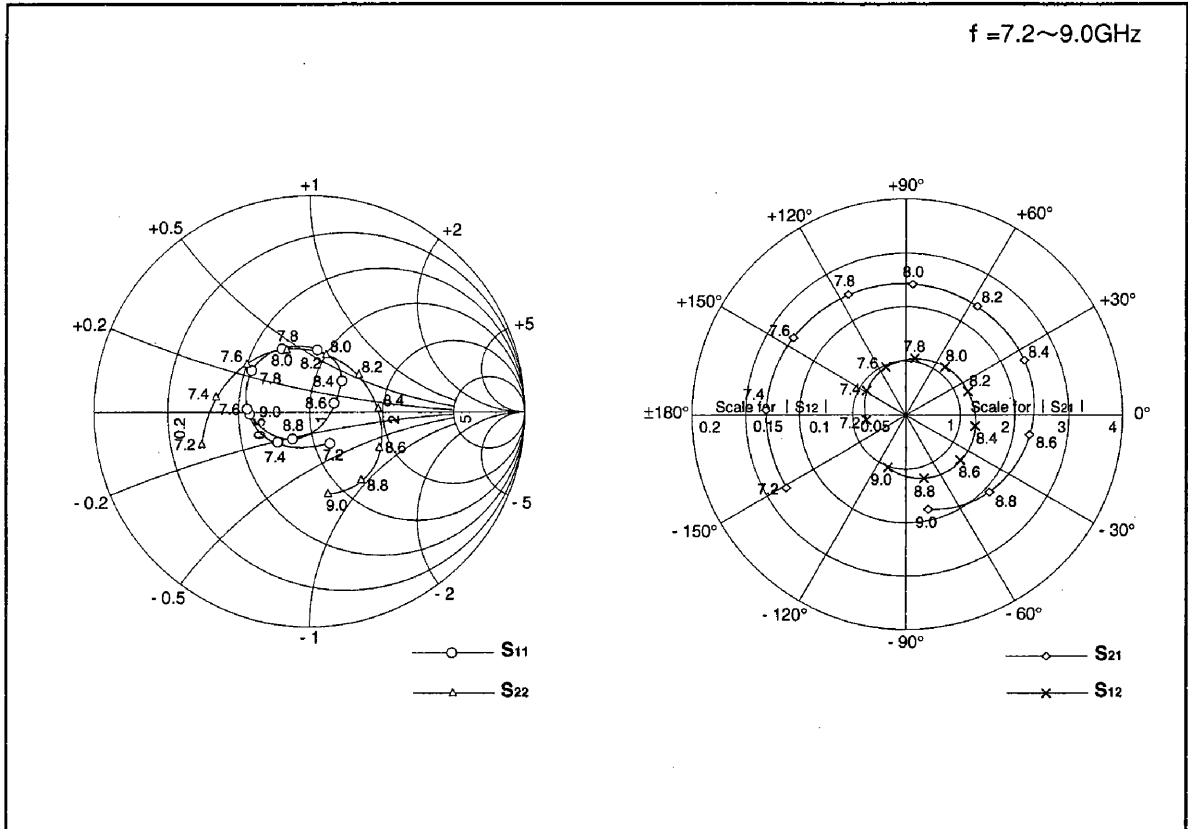
## IM<sub>3</sub> VS. OUTPUT POWER CHARACTERISTICS



# TIM7785-30L

## TIM7785-30SL S-PARAMETERS (MAGN.and ANGLES)

$V_{ds} = 10V, I_{ds} = 7.0A$



FREQUENCY (GHz)	$S_{11}$		$S_{21}$		$S_{12}$		$S_{22}$	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
7.2	0.17	-57	2.61	-149	0.037	-173	0.52	-164
7.4	0.20	-138	2.62	178	0.043	148	0.44	170
7.6	0.29	177	2.55	146	0.048	113	0.37	142
7.8	0.33	144	2.47	116	0.053	81	0.31	110
8.0	0.32	114	2.41	87	0.057	51	0.28	74
8.2	0.29	83	2.39	57	0.061	21	0.29	38
8.4	0.21	44	2.39	25	0.064	-9	0.32	4
8.6	0.12	21	2.29	-9	0.065	-40	0.36	-26
8.8	0.15	-123	2.09	-43	0.061	-74	0.39	-52
9.0	0.28	-179	1.79	-77	0.051	-109	0.38	-77