

## 7.70-8.50 GHz 8-Watt Internally-Matched Power FET

### FEATURES

- 7.70 – 8.50 GHz Bandwidth
- Input/Output Impedance Matched to 50 Ohms
- +39.5 dBm Output Power at 1dB Compression
- 8.5 dB Power Gain at 1dB Compression
- 34% Power Added Efficiency
- -46 dBc IM3 at  $P_o = 28.5$  dBm SCL
- Hermetic Metal Flange Package
- 100% Tested for DC, RF, and  $R_{TH}$



### DESCRIPTION

The EIC7785-8 is a high power, highly linear, single stage MFET amplifier in a flange mount package. This amplifier features Excelics' unique MESFET transistor technology.



Caution! ESD sensitive device.

### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

SYMBOL	PARAMETERS/TEST CONDITIONS <sup>1</sup>	MIN	TYP	MAX	UNITS
$P_{1dB}$	Output Power at 1dB Compression $f = 7.70\text{-}8.50\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 2200\text{mA}$	38.5	39.5		dBm
$G_{1dB}$	Gain at 1dB Compression $f = 7.70\text{-}8.50\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 2200\text{mA}$	7.5	8.5		dB
$\Delta G$	Gain Flatness $f = 7.70\text{-}8.50\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 2200\text{mA}$			$\pm 0.6$	dB
PAE	Power Added Efficiency at 1dB Compression $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 2200\text{mA}$ $f = 7.70\text{-}8.50\text{GHz}$		34		%
$I_{d1dB}$	Drain Current at 1dB Compression $f = 7.70\text{-}8.50\text{GHz}$		2200	2600	mA
IM3	Output 3rd Order Intermodulation Distortion $\Delta f = 10\text{ MHz}$ 2-Tone Test; $P_{out} = 28.5\text{ dBm}$ S.C.L. <sup>2</sup> $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 65\%$ IDSS $f = 8.50\text{ GHz}$	-43	-46		dBc
$I_{DSS}$	Saturated Drain Current $V_{DS} = 3\text{ V}$ , $V_{GS} = 0\text{ V}$		4000	4500	mA
$V_P$	Pinch-off Voltage $V_{DS} = 3\text{ V}$ , $I_{DS} = 40\text{ mA}$		-2.5	-4.0	V
$R_{TH}$	Thermal Resistance <sup>3</sup>		3.5	4.0	$^\circ\text{C/W}$

Notes:

1. Tested with 100 Ohm gate resistor.
2. S.C.L. = Single Carrier Level.
3. Overall  $R_{th}$  depends on case mounting.



# EIC7785-8

## ABSOLUTE MAXIMUM RATINGS FOR CONTINUOUS OPERATION<sup>1,2</sup>

SYMBOL	CHARACTERISTIC	VALUE
$V_{DS}$	Drain to Source Voltage	10 V
$V_{GS}$	Gate to Source Voltage	-4.5 V
$I_{DS}$	Drain Current	IDSS
$I_{GSF}$	Forward Gate Current	80 mA
$P_{IN}$	Input Power	@ 3dB compression
$P_T$	Total Power Dissipation	32 W
$T_{CH}$	Channel Temperature	150°C
$T_{STG}$	Storage Temperature	-65/+150°C

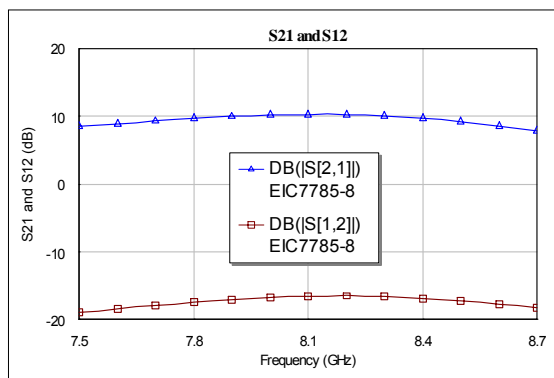
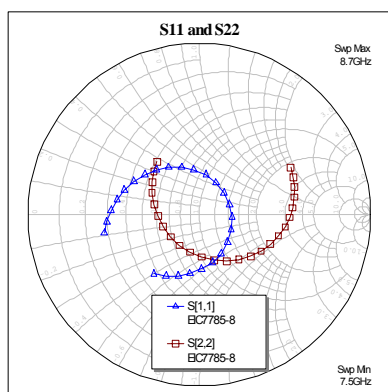
Notes:

- Operating the device beyond any of the above ratings may result in permanent damage or reduction of MTTF.
- Bias conditions must also satisfy the following equation  $P_T < (T_{CH} - T_{PKG})/R_{TH}$ ; where  $T_{PKG}$  = temperature of package, and  $P_T = (V_{DS} * I_{DS}) - (P_{OUT} - P_{IN})$ .

## PERFORMANCE DATA

Typical S-Parameters (T= 25°C, 50Ω system, de-embedded to edge of package)

$V_{DS} = 10$  V,  $I_{DSQ} \approx 2200$ mA



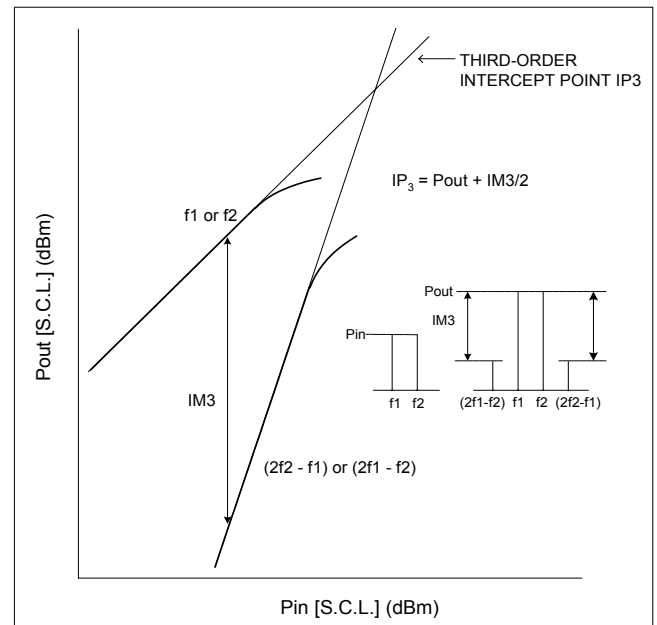
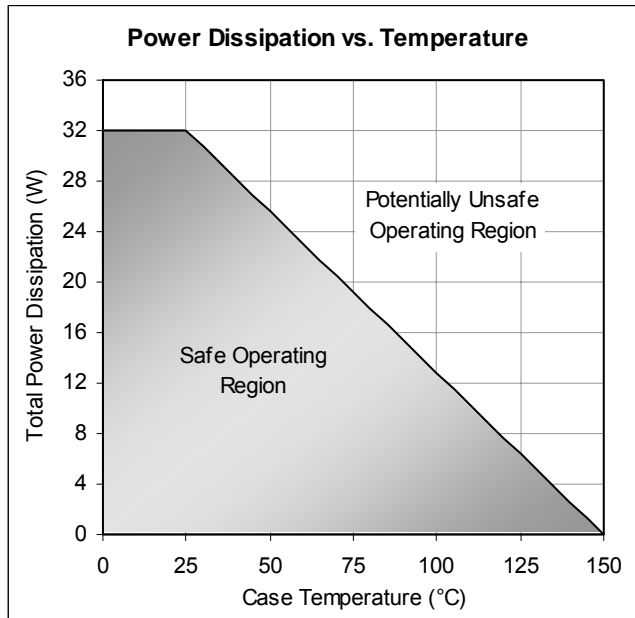
FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
7.5	0.5659	-169.06	2.653	-99.16	0.1125	-153.47	0.5992	27.25
7.6	0.5159	177.44	2.7741	-111.83	0.1208	-165.72	0.5788	16.12
7.7	0.4615	161.8	2.9098	-125.33	0.127	-178.82	0.5468	4.26
7.8	0.3953	143.64	3.0355	-139.33	0.1344	167.39	0.5069	-8.19
7.9	0.3292	123.15	3.1442	-153.81	0.1405	153.05	0.4486	-22.61
8	0.2633	96.94	3.2247	-169.11	0.1461	138.07	0.3863	-39.28
8.1	0.2092	62.41	3.2539	174.99	0.1485	122.37	0.3151	-59.64
8.2	0.1858	17.93	3.2534	158.73	0.1502	107.25	0.2486	-87.21
8.3	0.2058	-25.56	3.1658	142.39	0.1484	91.76	0.2147	-122.78
8.4	0.2616	-60.84	3.0487	126.26	0.143	76.38	0.2226	-161.62
8.5	0.3184	-87.64	2.8796	110.62	0.1378	60.95	0.27	167.25
8.6	0.3806	-108.87	2.6767	95.4	0.1301	46.15	0.3349	145.24
8.7	0.4359	-127.56	2.4875	81.13	0.1224	30.86	0.3959	128.51

Specifications are subject to change without notice.

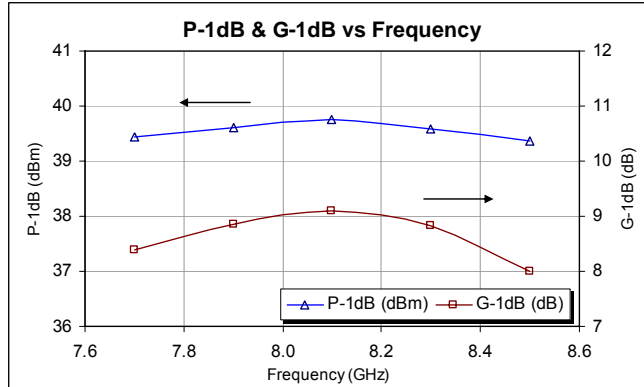
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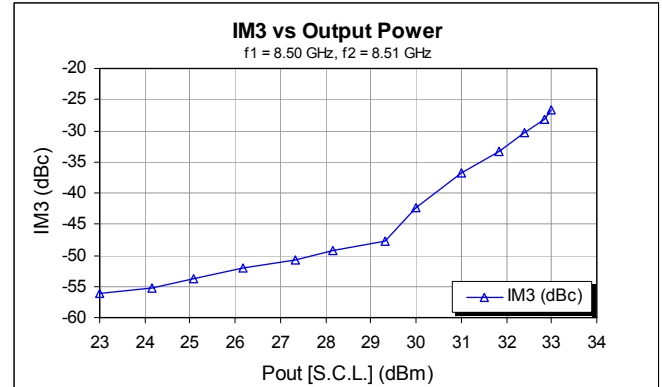
## Power De-rating Curve and IM3 Definition



## Typical Power Data ( $V_{DS} = 10$ V, $I_{DSQ} = 2200$ mA)

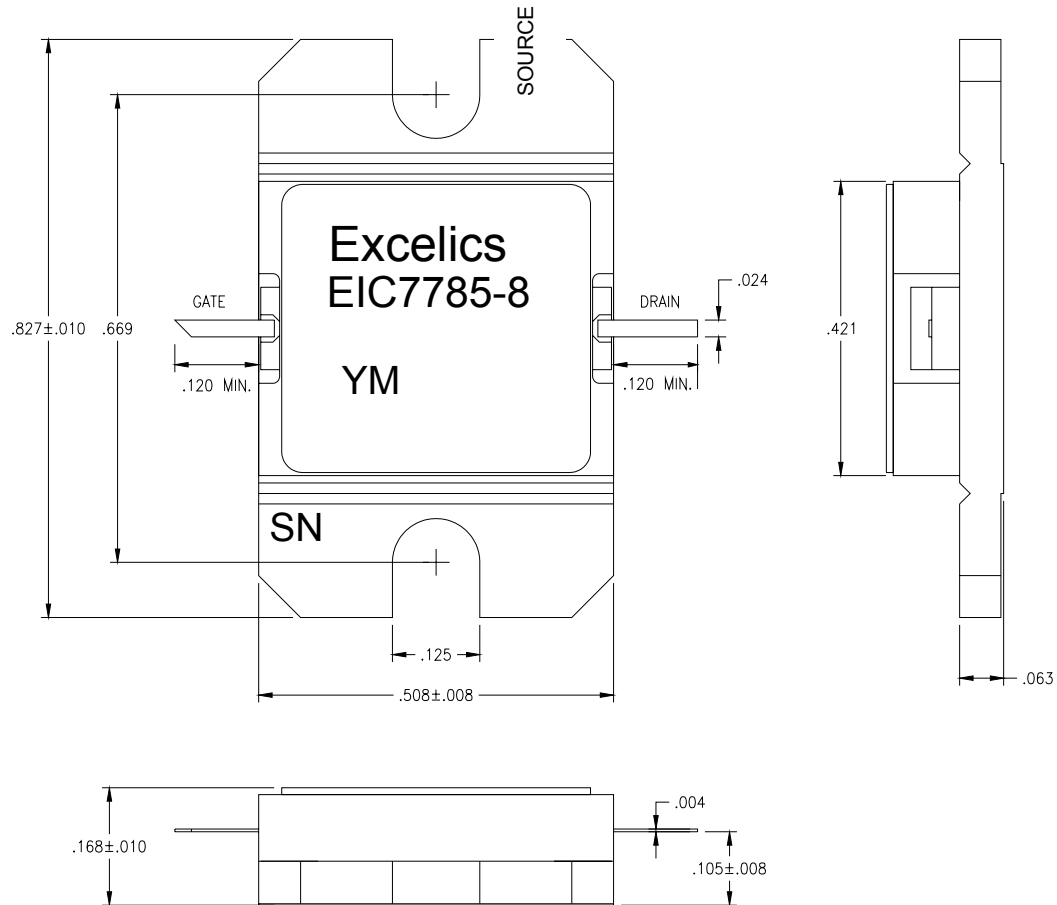


## Typical IM3 Data ( $V_{DS} = 10$ V, $I_{DSQ} \approx 65\%$ IDSS)



## PACKAGE OUTLINE

Dimensions in inches, Tolerance  $\pm .005$  unless otherwise specified



## ORDERING INFORMATION

Part Number	Grade <sup>1</sup>	f <sub>Test</sub> (GHz)	P <sub>1dB</sub> (min)	IM <sub>3</sub> (min) <sup>2</sup>
EIC7785-8	Industrial	7.7-8.5 GHz	38.5	-43

Notes: 1. Contact factory for military and hi-rel grades.  
2. Exact test conditions are specified in "Electrical Characteristics" table.