

7.7-8.5 GHz 4-Watt Internally-Matched Power FET

FEATURES

- 7.7 – 8.5 GHz Bandwidth
- Input/Output Impedance Matched to 50 Ohms
- +36.5 dBm Output Power at 1dB Compression
- 8.5 dB Power Gain at 1dB Compression
- 34% Power Added Efficiency
- -46 dBc IM3 at $P_o = 25.5$ dBm SCL
- Hermetic Metal Flange Package
- 100% Tested for DC, RF, and R_{TH}



DESCRIPTION

The EIC7785-4 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 ¹	MIN	TYP	MAX	UNITS
P_{1dB}	Output Power at 1dB Compression $f = 7.7\text{-}8.5$ GHz $V_{DS} = 10$ V, $I_{DSQ} \approx 1100$ mA	35.5	36.5		dBm
G_{1dB}	Gain at 1dB Compression $f = 7.7\text{-}8.5$ GHz $V_{DS} = 10$ V, $I_{DSQ} \approx 1100$ mA	7.5	8.5		dB
ΔG	Gain Flatness $f = 7.7\text{-}8.5$ GHz $V_{DS} = 10$ V, $I_{DSQ} \approx 1100$ mA			± 0.6	dB
PAE	Power Added Efficiency at 1dB Compression $V_{DS} = 10$ V, $I_{DSQ} \approx 1100$ mA $f = 7.7\text{-}8.5$ GHz		34		%
I_{d1dB}	Drain Current at 1dB Compression $f = 7.7\text{-}8.5$ GHz		1100	1300	mA
IM3	Output 3rd Order Intermodulation Distortion $\Delta f = 10$ MHz 2-Tone Test; $P_{out} = 25.5$ dBm S.C.L. ² $V_{DS} = 10$ V, $I_{DSQ} \approx 65\%$ IDSS $f = 8.5$ GHz	-43	-46		dBc
I_{DSS}	Saturated Drain Current $V_{DS} = 3$ V, $V_{GS} = 0$ V		2000	2500	mA
V_P	Pinch-off Voltage $V_{DS} = 3$ V, $I_{DS} = 20$ mA		-2.5	-4.0	V
R_{TH}	Thermal Resistance ³		5.5	6.0	$^\circ\text{C/W}$

Notes:

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



EIC7785-4

ABSOLUTE MAXIMUM RATINGS FOR CONTINUOUS OPERATION^{1,2}

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	40 mA
P_{IN}	Input Power	@ 3dB compression
P_T	Total Power Dissipation	21 W
T_{CH}	Channel Temperature	150°C
T_{STG}	Storage Temperature	-65/+150°C

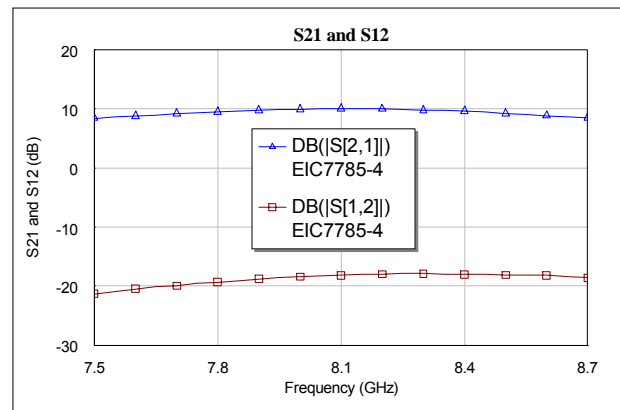
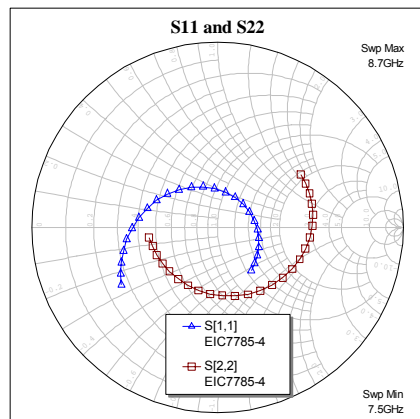
Notes:

- 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)

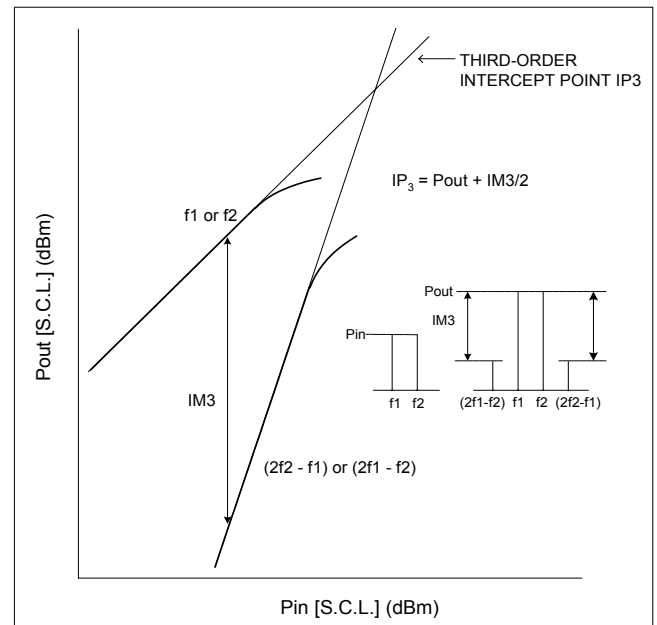
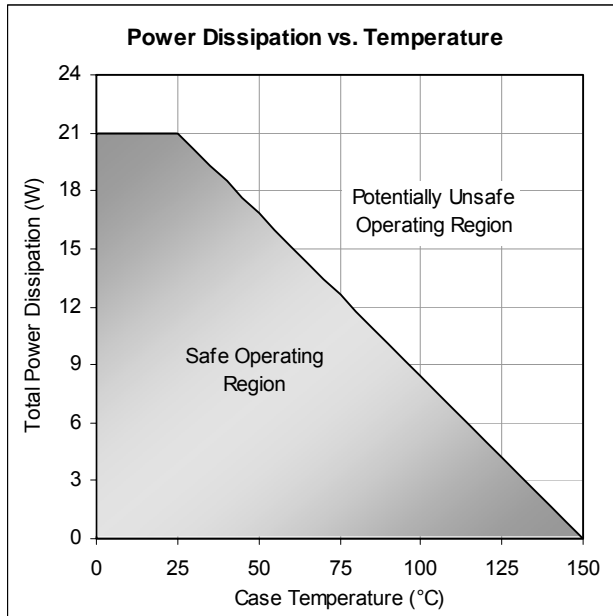
$V_{DS} = 10$ V, $I_{DSQ} \approx 1100$ mA



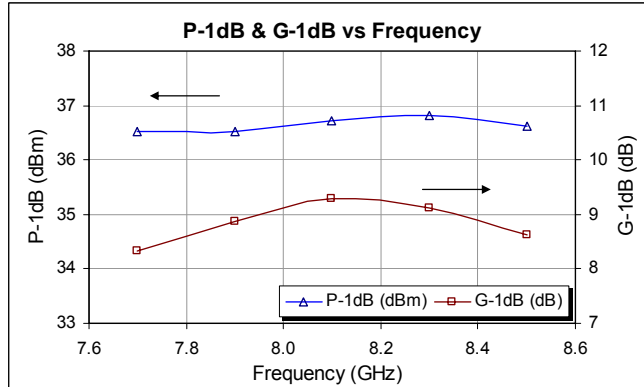
FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
7.5	0.6034	-149.14	2.6409	-81.54	0.0862	-138.31	0.5314	32.49
7.6	0.5516	-159.75	2.7534	-93.4	0.0948	-149.69	0.5287	20.36
7.7	0.4935	-172.49	2.8842	-105.71	0.1006	-161.26	0.5183	7.57
7.8	0.4264	173.09	2.9901	-118.6	0.1076	-174.38	0.5005	-6.22
7.9	0.3594	156.04	3.0911	-132.17	0.1154	172.85	0.4752	-21.19
8	0.29	135.54	3.152	-146.09	0.1203	159.84	0.4444	-37.73
8.1	0.2323	109.56	3.1785	-159.96	0.1233	146.34	0.4117	-56.07
8.2	0.1942	77.04	3.1614	-174.31	0.1262	132.54	0.3812	-75.72
8.3	0.1858	42.24	3.0973	171.66	0.1277	118.21	0.3633	-96.19
8.4	0.2013	9.94	3.0181	157.94	0.1256	105.29	0.3511	-117.08
8.5	0.2311	-14.73	2.9014	144.33	0.1242	92.6	0.3517	-137.38
8.6	0.2635	-35.41	2.7724	131.4	0.1232	79.73	0.3594	-155.44
8.7	0.2953	-51.98	2.6626	119.31	0.1178	66.75	0.3726	-171.45

Specifications are subject to change without notice.

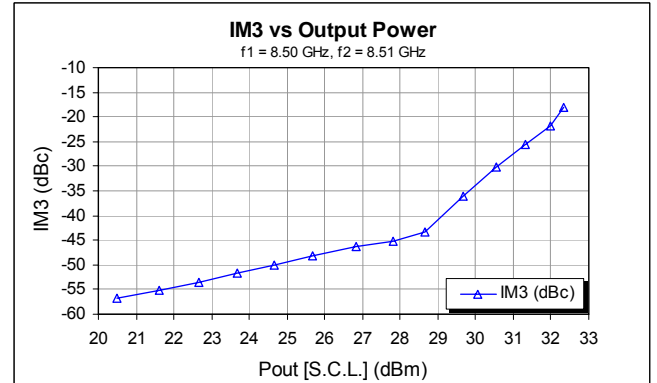
Power De-rating Curve and IM3 Definition



Typical Power Data ($V_{DS} = 10$ V, $I_{DSQ} = 1100$ mA)

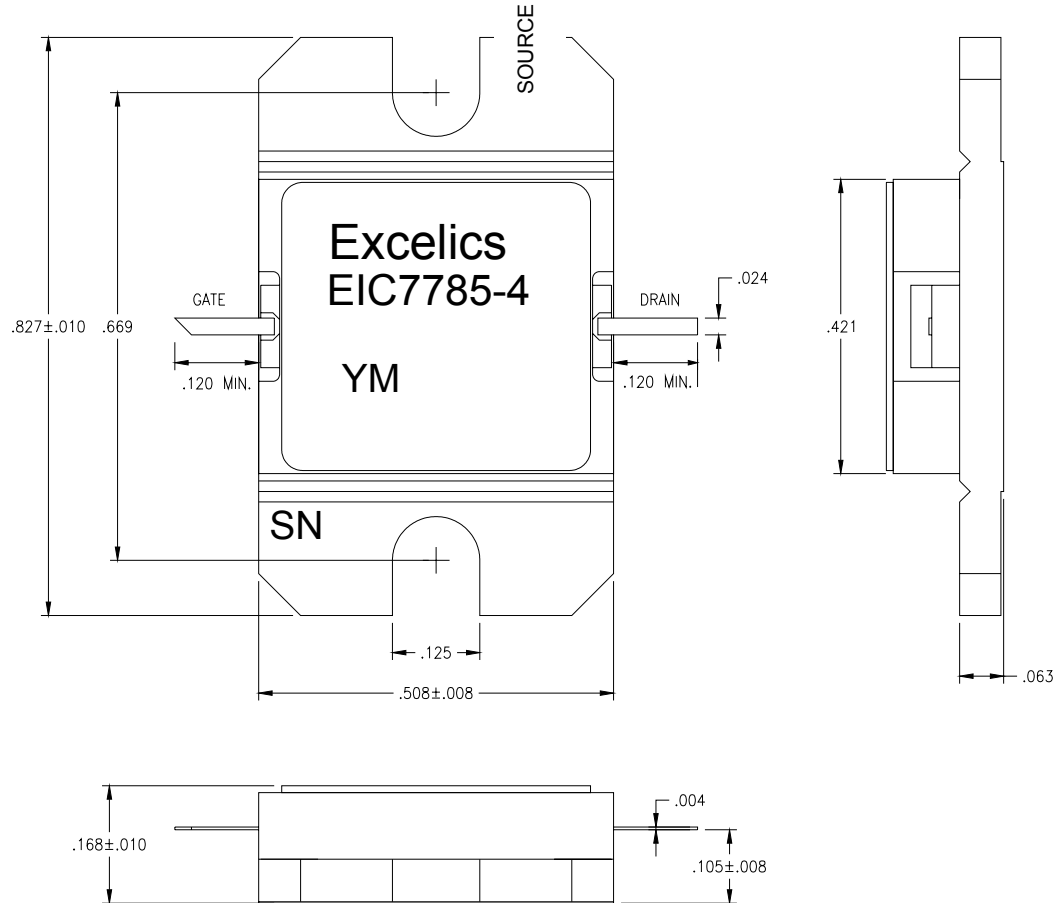


Typical IM3 Data ($V_{DS} = 10$ V, $I_{DSQ} \approx 65\%$ IDSS)



PACKAGE OUTLINE

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



ORDERING INFORMATION

Part Number	Grade ¹	f _{Test} (GHz)	P _{1dB} (min)	IM ₃ (min) ²
EIC7785-4	Industrial	7.7-8.5 GHz	35.5	-43

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