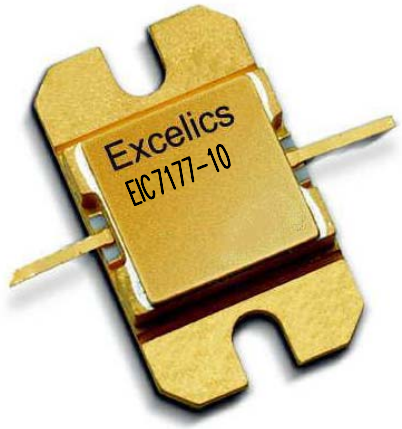
EIC7177-10

7.10-7.70 GHz 10-Watt Internally-Matched Power FET

FEATURES

- **7.10 – 7.70 GHz Bandwidth**
- **Input/Output Impedance Matched to 50 Ohms**
- **+40.5 dBm Output Power at 1dB Compression**
- **9 dB Power Gain at 1dB Compression**
- **35% Power Added Efficiency**
- **-46 dBc IM3 at Po = 29.5 dBm SCL**
- **Hermetic Metal Flange Package**
- **100% Tested for DC, RF, and R_{TH}**



DESCRIPTION

The EIC7177-10 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°C)

SYMBOL	PARAMETERS/TEST CONDITIONS[1]	MIN	TYP	MAX	UNITS
P_{1dB}	Output Power at 1dB Compression f = 7.10-7.70GHz V_{DS} = 10 V, I_{DSQ} ≈ 3200mA	39.5	40.5		dBm
G_{1dB}	Gain at 1dB Compression f = 7.10-7.70GHz V_{DS} = 10 V, I_{DSQ} ≈ 3200mA	8.0	9.0		dB
ΔG	Gain Flatness f = 7.10-7.70GHz V_{DS} = 10 V, I_{DSQ} ≈ 3200mA			±0.6	dB
PAE	Power Added Efficiency at 1dB Compression V_{DS} = 10 V, I_{DSQ} ≈ 3200mA f = 7.10-7.70GHz		35		%
Id_{1dB}	Drain Current at 1Db Compression f = 7.10-7.70GHz		3200	3600	mA
IM3	Output 3rd Order Intermodulation Distortion Δf = 10 MHz 2-Tone Test; Pout = 29.5 dBm S.C.L[2] V_{DS} = 10 V, I_{DSQ} ≈ 65% IDSS f = 7.70 GHz	-43	-46		dBc
I_{DSS}	Saturated Drain Current V_{DS} = 3 V, V_{GS} = 0 V		5800	6400	mA
V_P	Pinch-off Voltage V_{DS} = 3 V, I_{DS} = 60 mA		-2.5	-4.0	V
R_{TH}	Thermal Resistance[3]		2.5	3.0	°C/W

Notes:
1. Tested with 100 Ohm gate resistor.
2. S.C.L. = Single Carrier Level.
3. Overall Rth depends on case mounting.

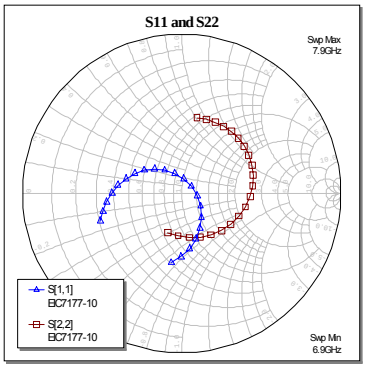
ABSOLUTE MAXIMUM RATINGS FOR CONTINUOUS OPERATION[1,2]

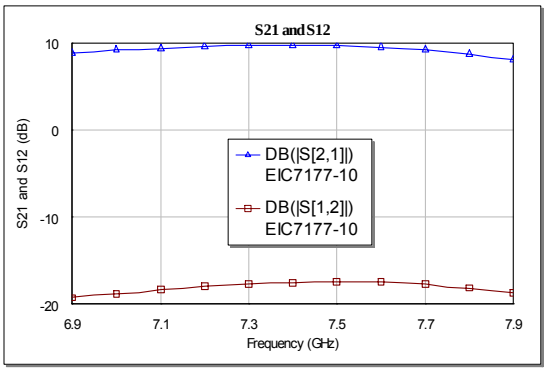
SYMBOL	CHARACTERISTIC	VALUE
V_{DS}	Drain to Source Voltage	10 V
V_{GS}	Gate to Source Voltage	-4.5 V
I_{DS}	Drain Current	IDSS
I_{GSF}	Forward Gate Current	120 mA
P_{IN}	Input Power	@ 3dB compression
P_T	Total Power Dissipation	42 W
T_{CH}	Channel Temperature	150°C
T_{STG}	Storage Temperature	-65/+150°C

Notes:
1. Operating the device beyond any of the above ratings may result in permanent damage or reduction of MTTF.
2. 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

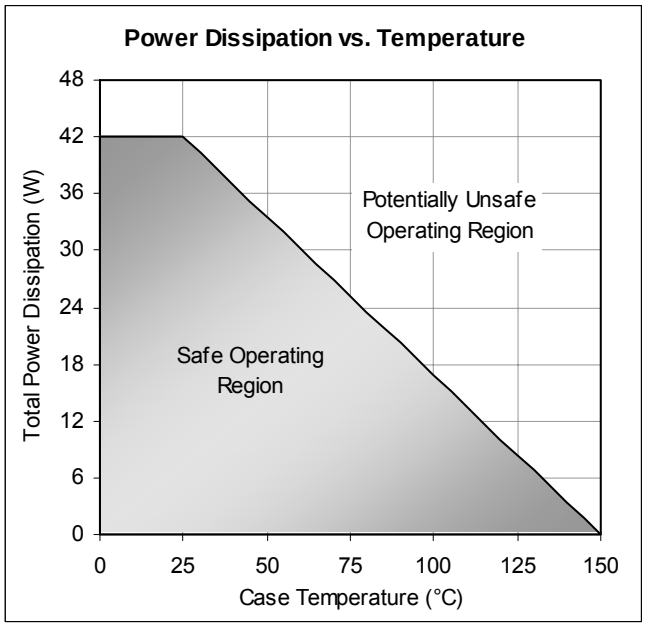
Typical S-Parameters (T= 25°C, 50Ω system, de-embedded to edge of package)
V_{DS} = 10 V, I_{DSQ} ≈ 3200mA

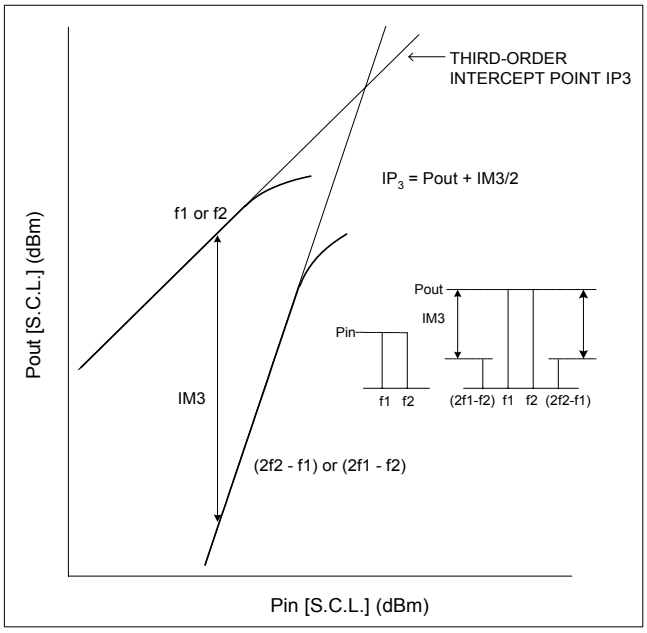




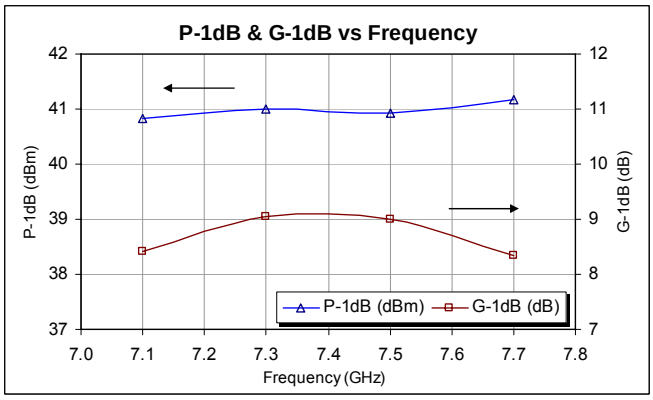
FREQ	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
6.5	0.7175	-118.04	2.3853	-7.81	0.0894	-64.67	0.3979	134.6
6.7	0.6394	-138.29	2.5751	-32.99	0.0982	-88.45	0.4476	105.78
6.9	0.54	-161.16	2.7688	-59.03	0.1091	-114.52	0.4847	78.66
7.1	0.4059	172.55	2.9473	-86.83	0.1214	-141.21	0.4996	51.55
7.3	0.2293	138.08	3.0573	-116.9	0.1304	-170.74	0.4755	22.06
7.5	0.0747	37.07	3.0519	-148.09	0.135	158.19	0.4083	-11.96
7.7	0.2466	-62.75	2.8762	179.32	0.1302	126.14	0.3168	-54.79
7.9	0.4397	-98.59	2.5317	147.48	0.1164	95.19	0.261	-109.71
8.1	0.583	-126.77	2.1134	117.67	0.0983	66.91	0.2876	-160.97
8.3	0.6761	-150.57	1.7287	91.05	0.0833	40.52	0.3632	165.41
8.5	0.7392	-171.1	1.3981	66.41	0.0708	18.29	0.4355	143.08

Power De-rating Curve and IM3 Definition

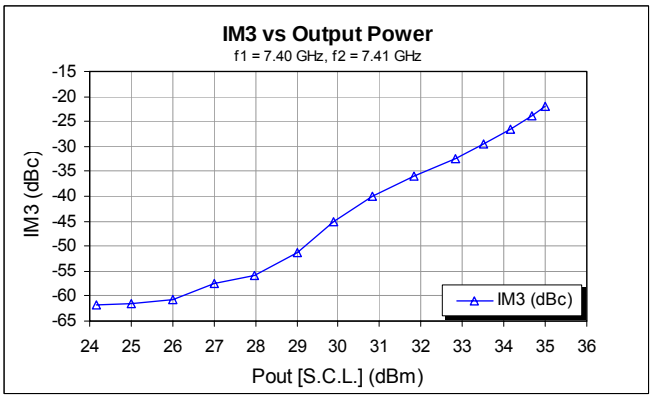




Typical Power Data (V_{DS} = 10 V, I_{DSQ} = 3200 mA)

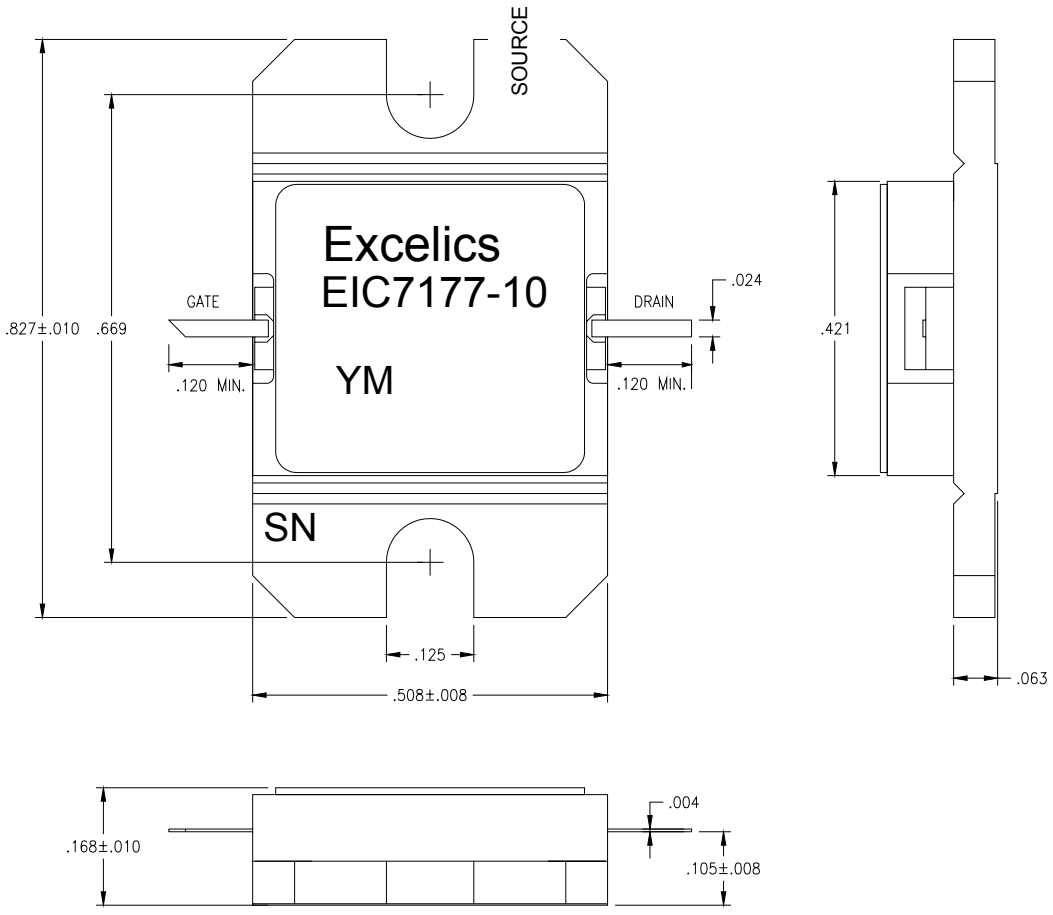


Typical IM3 Data (V_{DS} = 10 V, I_{DSQ} ≈ 65% IDSS)



PACKAGE OUTLINE

Dimensions in inches, Tolerance ± .005 unless otherwise specified



ORDERING INFORMATION

Part Number	Grade[1]	f_{Test} (GHz)	P_{1dB} (min)	IM_3 (min)[2]
EIC7177-10	Industrial	7.1-7.7 GHz	39.5	-43

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