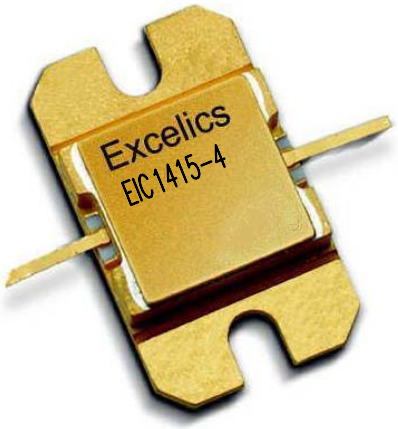
EIC1415-4

14.40-15.35 GHz 4-Watt Internally-Matched Power FET

FEATURES

- **14.40-15.35 GHz Bandwidth**
- **Input/Output Impedance Matched to 50 Ohms**
- **+36.0 dBm Output Power at 1dB Compression**
- **5.0 dB Power Gain at 1dB Compression**
- **25% Power Added Efficiency**
- **-43 dBc IM3 at Po = 25.0 dBm SCL**
- **Hermetic Metal Flange Package**
- **100% Tested for DC, RF, and R_{TH}**



DESCRIPTION

The EIC1415-4 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°C)

SYMBOL	PARAMETERS/TEST CONDITIONS[1]	MIN	TYP	MAX	UNITS
P_{1dB}	Output Power at 1dB Compression f = 14.40-15.35GHz V_{DS} = 10 V, I_{DSQ} ≈ 1100mA	35.5	36.0		dBm
G_{1dB}	Gain at 1dB Compression f = 14.40-15.35GHz V_{DS} = 10 V, I_{DSQ} ≈ 1100mA	4.5	5.0		dB
ΔG	Gain Flatness f = 14.40-15.35GHz V_{DS} = 10 V, I_{DSQ} ≈ 1100mA			±0.6	dB
PAE	Power Added Efficiency at 1dB Compression V_{DS} = 10 V, I_{DSQ} ≈ 1100mA f = 14.40-15.35GHz		25		%
Id_{1dB}	Drain Current at 1dB Compression f = 14.40-15.35GHz		1100	1300	mA
IM3	Output 3rd Order Intermodulation Distortion Δf = 10 MHz 2-Tone Test; Pout = 25.0 dBm S.C.L[2] V_{DS} = 10 V, I_{DSQ} ≈ 65% IDSS f = 15.35 GHz	-40	-43		dBc
I_{DSS}	Saturated Drain Current V_{DS} = 3 V, V_{GS} = 0 V		2080	2880	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	°C/W

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

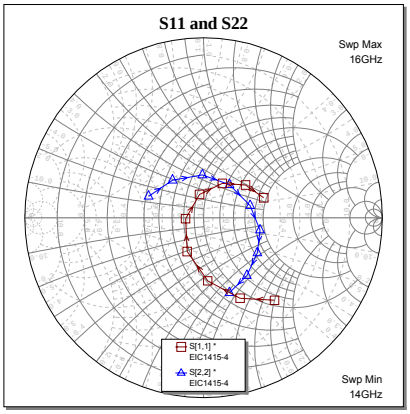
ABSOLUTE MAXIMUM RATINGS FOR CONTINUOUS OPERATION[1,2]

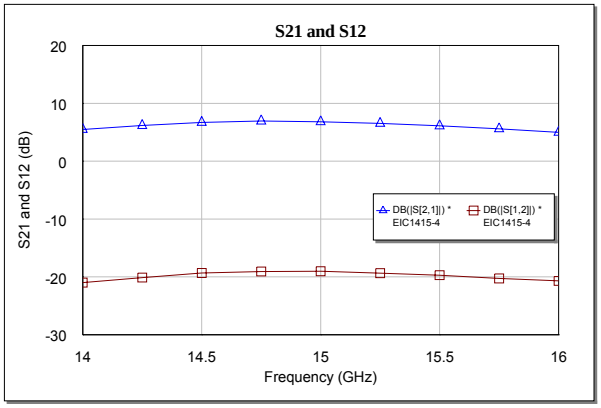
SYMBOL	CHARACTERISTIC	VALUE
V_{DS}	Drain to Source Voltage	10 V
V_{GS}	Gate to Source Voltage	-4.5 V
I_{DS}	Drain Current	IDSS
I_{GSF}	Forward Gate Current	40 mA
P_{IN}	Input Power	@ 3dB compression
P_T	Total Power Dissipation	25 W
T_{CH}	Channel Temperature	150°C
T_{STG}	Storage Temperature	-65/+150°C

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

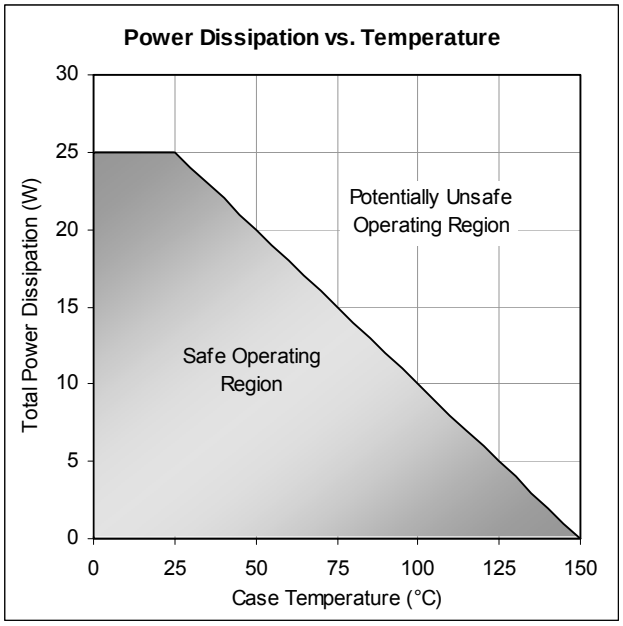
Typical S-Parameters (T= 25°C, 50Ω system, de-embedded to edge of package)
V_{DS} = 10 V, I_{DSQ} ≈ 1100mA

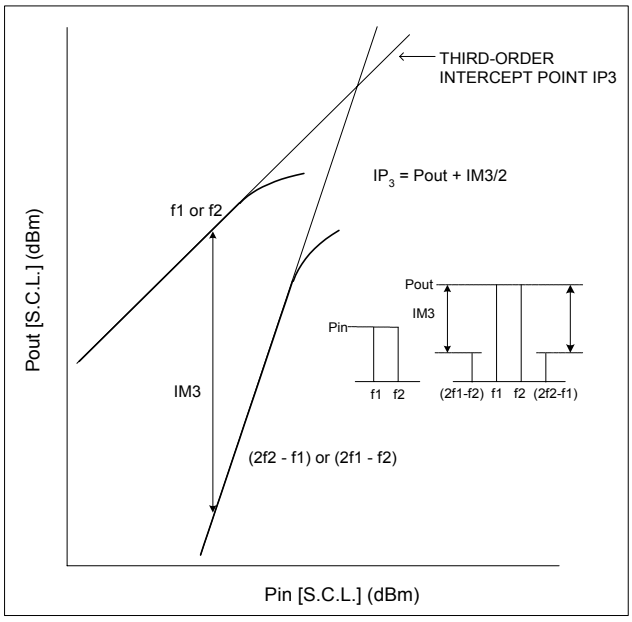




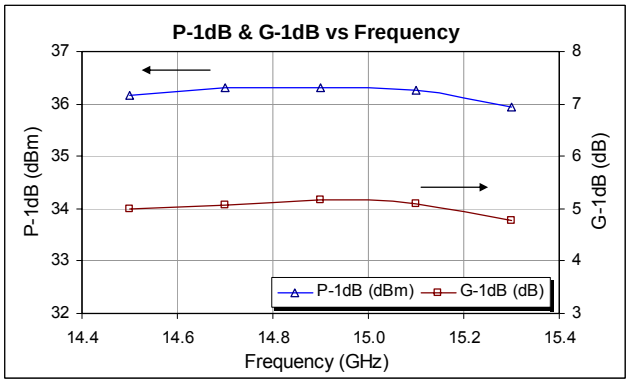
FREQ	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
14.0	0.6068	-49.15	1.877	-177.59	0.0891	165.79	0.3297	158.87
14.2	0.5179	-62.08	2.0095	167.01	0.0968	151.06	0.2845	136.09
14.4	0.408	-76.91	2.1124	149.96	0.1045	134.45	0.2476	108.17
14.6	0.2953	-96.76	2.1936	132.35	0.1105	118.01	0.229	75.76
14.8	0.1842	-124.53	2.2226	114.65	0.1123	100.02	0.2344	43.28
15.0	0.1005	-176.76	2.1863	96.84	0.1117	82.9	0.2691	14.39
15.2	0.1135	111.12	2.1382	79.55	0.1076	66.18	0.3153	-8.02
15.4	0.1828	73.41	2.0646	62.7	0.106	50.07	0.3511	-25.07
15.6	0.2549	50.97	1.9841	46.37	0.1007	34	0.3776	-41.25
15.8	0.3111	33.55	1.8752	30.24	0.0959	19.23	0.4118	-56.52
16.0	0.3548	18.22	1.7781	14.56	0.0921	3.91	0.4413	-70.84

Power De-rating Curve and IM3 Definition

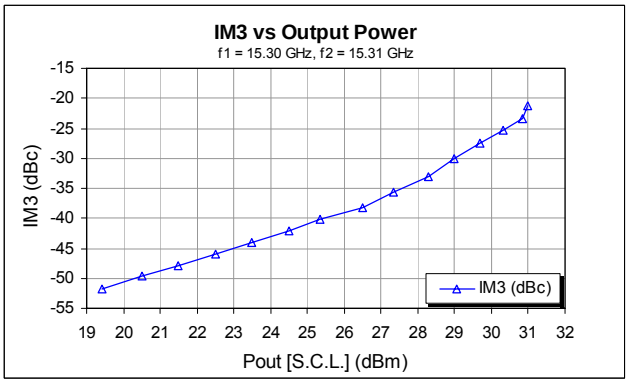




Typical Power Data (V_{DS} = 10 V, I_{DSQ} = 1100 mA)

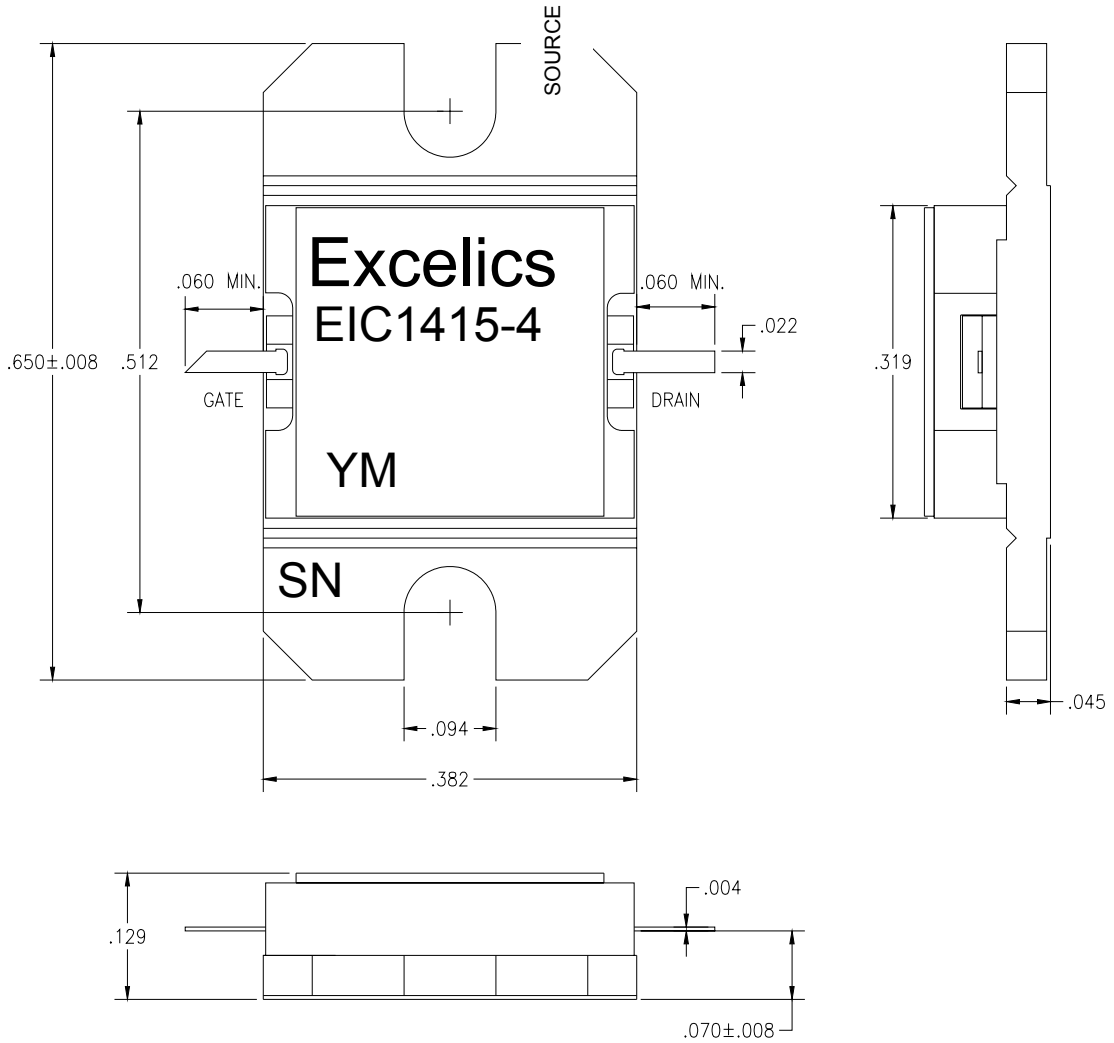


Typical IM3 Data (V_{DS} = 10 V, I_{DSQ} ≈ 65% IDSS)



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]
EIC1415-4	Industrial	14.40-15.35 GHz	35.5	-40.0

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