

13.75-14.50 GHz 4-Watt Internally-Matched Power FET

FEATURES

- 13.75-14.50 GHz Bandwidth
- Input/Output Impedance Matched to 50 Ohms
- +36.0 dBm Output Power at 1dB Compression
- 6.0 dB Power Gain at 1dB Compression
- 25% Power Added Efficiency
- -45 dBc IM3 at $P_o = 25.0$ dBm SCL
- Hermetic Metal Flange Package
- 100% Tested for DC, RF, and R_{TH}



DESCRIPTION

The EIC1314-4 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 $f = 13.75-14.50\text{GHz}$ $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$	35.5	36.0		dBm
G_{1dB}	Gain at 1dB Compression $f = 13.75-14.50\text{GHz}$ $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$	5.0	6.0		dB
ΔG	Gain Flatness $f = 13.75-14.50\text{GHz}$ $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$			± 0.6	dB
PAE	Power Added Efficiency at 1dB Compression $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$ $f = 13.75-14.50\text{GHz}$		25		%
I_{d1dB}	Drain Current at 1dB Compression $f = 13.75-14.50\text{GHz}$		1100	1300	mA
IM3	Output 3rd Order Intermodulation Distortion $\Delta f = 10\text{ MHz}$ 2-Tone Test; $P_{out} = 25.0\text{ dBm}$ S.C.L. ² $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 65\% I_{DSS}$ $f = 14.50\text{GHz}$	-42	-45		dBc
I_{DSS}	Saturated Drain Current $V_{DS} = 3\text{ V}$, $V_{GS} = 0\text{ V}$		2080	2880	mA
V_P	Pinch-off Voltage $V_{DS} = 3\text{ V}$, $I_{DS} = 20\text{ mA}$		-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.



EIC1314-4

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

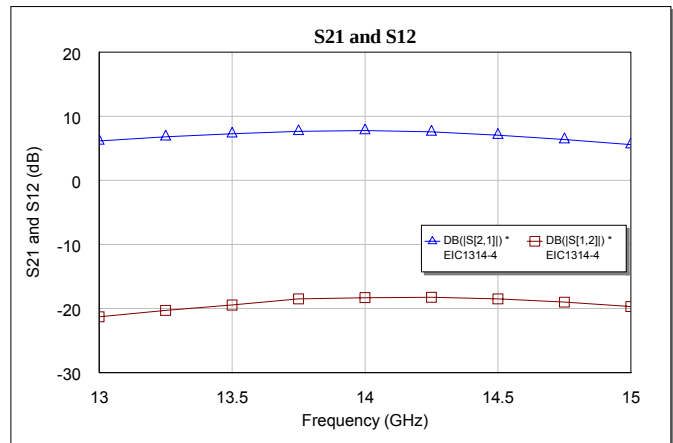
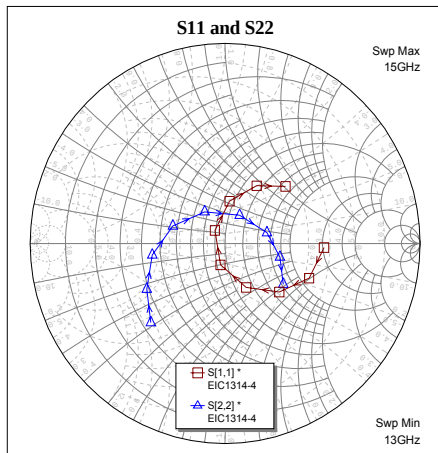
Notes:

- 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)

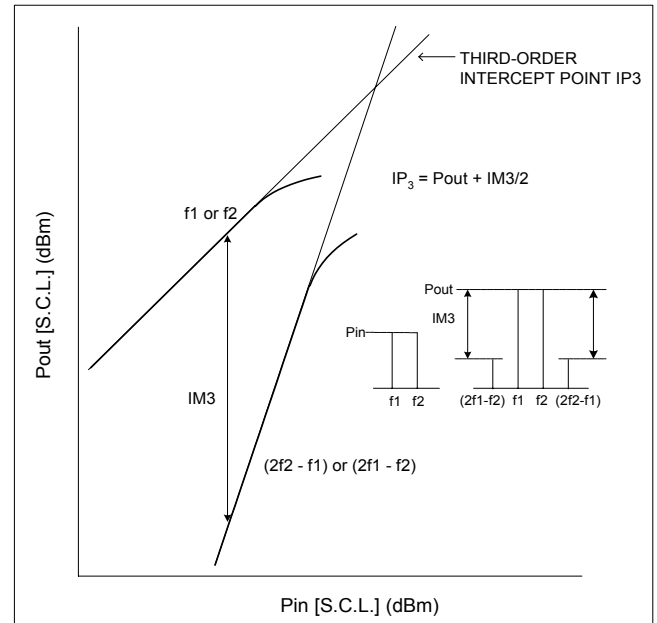
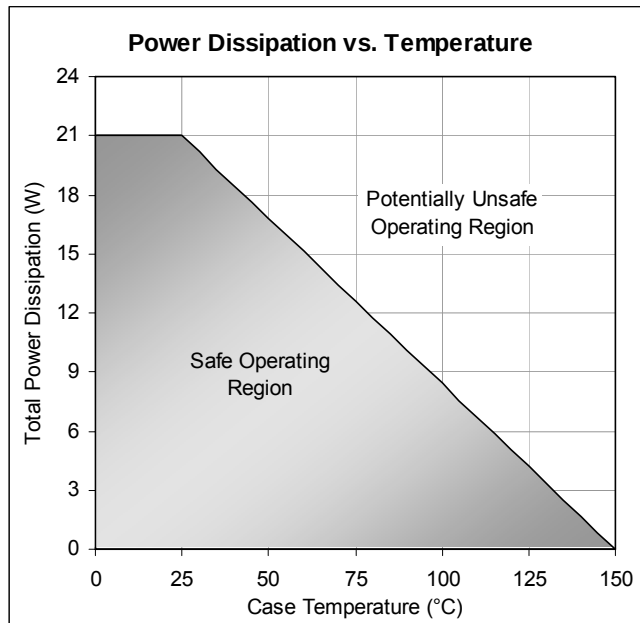
$V_{DS} = 10$ V, $I_{DSQ} \approx 1100$ mA



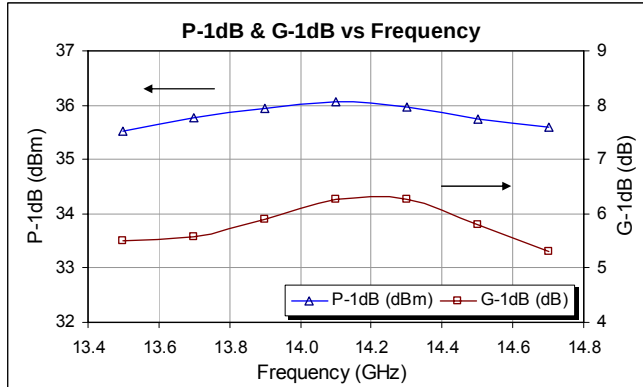
FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
13.0	0.5078	-2.28	2.0327	-117.68	0.0863	-144.55	0.5488	-133.93
13.2	0.4776	-17.96	2.1494	-132.66	0.095	-160.68	0.4743	-146.87
13.4	0.4118	-33.24	2.2575	-148.8	0.1036	-176.01	0.4121	-161.98
13.6	0.3207	-49.12	2.3651	-165.3	0.1096	167.92	0.3481	179.95
13.8	0.2203	-70.57	2.431	176.6	0.1188	150.43	0.2602	155.82
14.0	0.1094	-102.37	2.4478	158.24	0.1217	132.03	0.1895	123.3
14.2	0.0627	152.39	2.4123	139.92	0.1227	115.1	0.1576	76.56
14.4	0.1622	96.78	2.3192	121.93	0.1196	96.75	0.1927	30.27
14.6	0.2642	73.83	2.1858	104.48	0.1158	80.23	0.2491	1.19
14.8	0.353	56.65	2.0523	88.18	0.1109	63.47	0.3031	-18.21
15.0	0.421	42.58	1.9018	72.39	0.1037	48.43	0.3615	-34.26

Specifications are subject to change without notice.

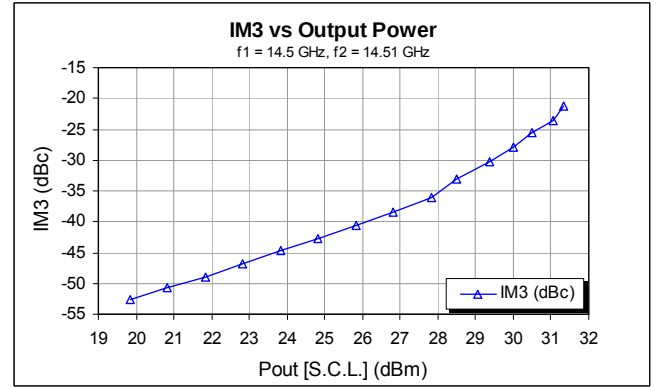
Power De-rating Curve and IM3 Definition



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

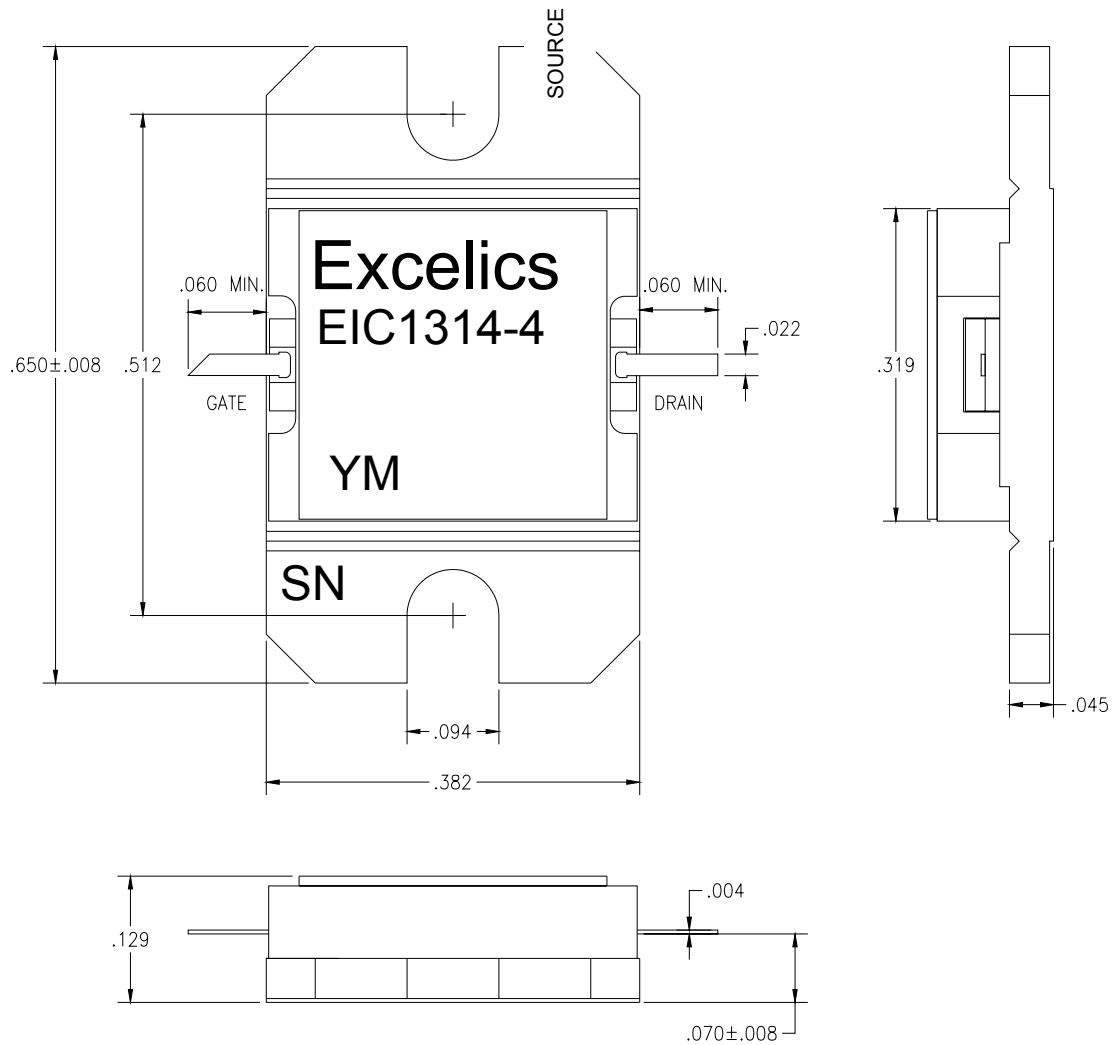


Typical IM3 Data ($V_{DS} = 10$ V, $I_{DSQ} \approx 65\%$ IDSS)



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
EIC1314-4	Industrial	13.75-14.50 GHz	35.5	-42

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