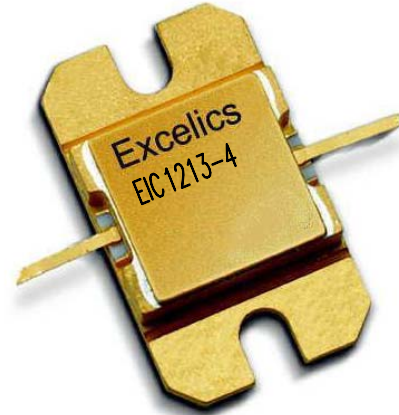


## 12.7-13.2 GHz 4-Watt Internally-Matched Power FET

### FEATURES

- 12.7-13.2 GHz Bandwidth
- Input/Output Impedance Matched to 50 Ohms
- +36.0 dBm Output Power at 1dB Compression
- 6.5 dB Power Gain at 1dB Compression
- 28% Power Added Efficiency
- -44 dBc IM3 at  $P_o = 25.5$  dBm SCL
- Hermetic Metal Flange Package
- 100% Tested for DC, RF, and  $R_{TH}$



### DESCRIPTION

The EIC1213-4 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 <sup>1</sup>	MIN	TYP	MAX	UNITS
$P_{1dB}$	Output Power at 1dB Compression $f = 12.7-13.2\text{GHz}$ $V_{DS} = 10\text{ V}, I_{DSQ} \approx 1100\text{mA}$	35.5	36.0		dBm
$G_{1dB}$	Gain at 1dB Compression $f = 12.7-13.2\text{GHz}$ $V_{DS} = 10\text{ V}, I_{DSQ} \approx 1100\text{mA}$	5.5	6.5		dB
$\Delta G$	Gain Flatness $f = 12.7-13.2\text{GHz}$ $V_{DS} = 10\text{ V}, I_{DSQ} \approx 1100\text{mA}$			$\pm 0.6$	dB
PAE	Power Added Efficiency at 1dB Compression $V_{DS} = 10\text{ V}, I_{DSQ} \approx 1100\text{mA}$ $f = 12.7-13.2\text{GHz}$		28		%
$I_{d1dB}$	Drain Current at 1dB Compression $f = 12.7-13.2\text{GHz}$		1100	1300	mA
IM3	Output 3rd Order Intermodulation Distortion $\Delta f = 10\text{ MHz}$ 2-Tone Test; $P_{out} = 25.5\text{ dBm}$ S.C.L. <sup>2</sup> $V_{DS} = 10\text{ V}, I_{DSQ} \approx 65\% I_{DSS}$ $f = 13.2\text{GHz}$	-42	-44		dBc
$I_{DSS}$	Saturated Drain Current $V_{DS} = 3\text{ V}, V_{GS} = 0\text{ V}$	1280	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 <sup>3</sup>		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.

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

SYMBOL	CHARACTERISTIC	VALUE
V <sub>DS</sub>	Drain to Source Voltage	10 V
V <sub>GS</sub>	Gate to Source Voltage	-4.5 V
I <sub>DS</sub>	Drain Current	IDSS
I <sub>GSF</sub>	Forward Gate Current	40 mA
P <sub>IN</sub>	Input Power	@ 3dB compression
P <sub>T</sub>	Total Power Dissipation	21 W
T <sub>CH</sub>	Channel Temperature	150°C
T <sub>STG</sub>	Storage Temperature	-65/+150°C

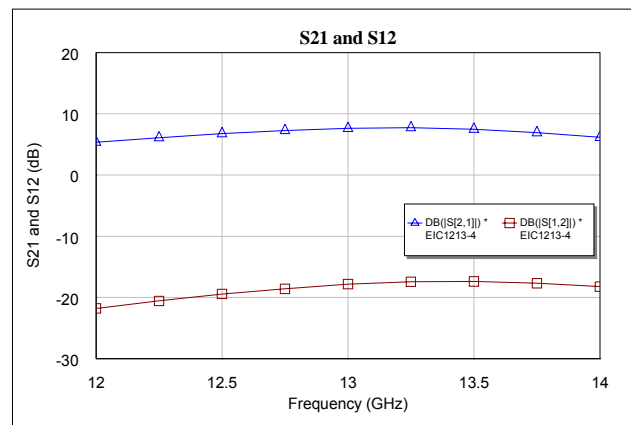
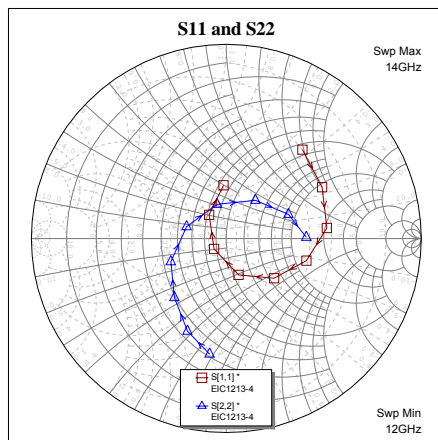
Notes:

- 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)

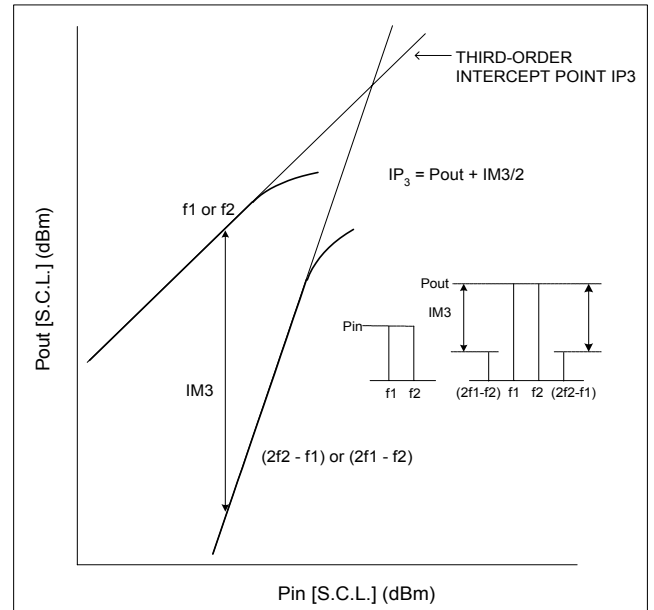
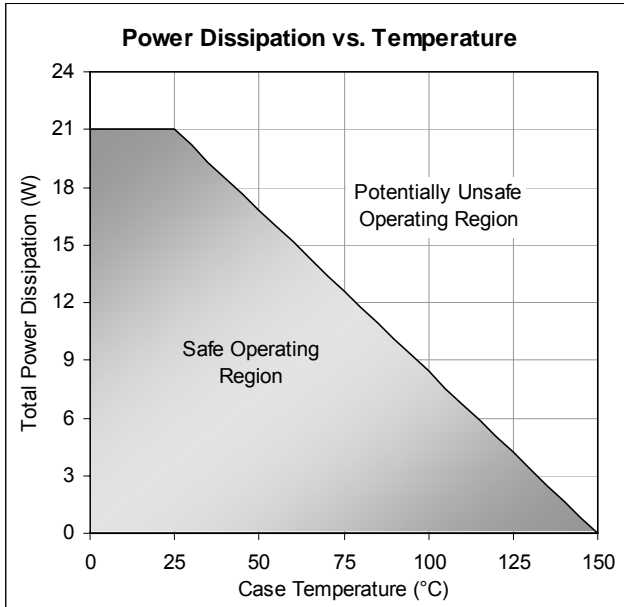
V<sub>DS</sub> = 10 V, I<sub>DSQ</sub> ≈ 1100mA



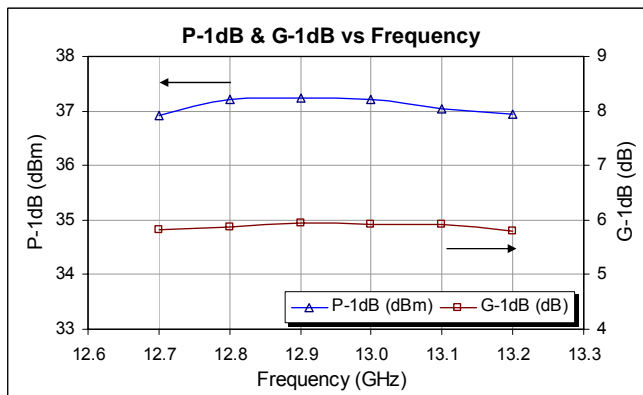
FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
12.0	0.6013	49.54	1.8523	-73.04	0.0813	-101.01	0.602	-98.17
12.2	0.5629	32.76	1.9838	-88.24	0.0911	-116.63	0.5402	-109.62
12.4	0.5404	14.98	2.1132	-104.28	0.1011	-132.11	0.4471	-123.24
12.6	0.4871	-2.5	2.234	-121.18	0.1114	-148.78	0.3645	-140.48
12.8	0.4055	-19.9	2.3293	-138.38	0.1196	-166.24	0.2874	-163.34
13.0	0.3196	-39.9	2.4047	-156.51	0.1284	176.28	0.2125	163.54
13.2	0.2249	-63.97	2.4359	-175.14	0.1342	158.11	0.179	117.02
13.4	0.118	-101.47	2.4042	166.07	0.1355	139.57	0.2111	71.43
13.6	0.0879	170.88	2.322	147.76	0.1342	121.8	0.2843	38.35
13.8	0.1766	117.33	2.1849	129.28	0.1288	104.29	0.3574	16.48
14.0	0.2745	92.92	2.0299	112.36	0.1226	87.32	0.4104	0.75

Specifications are subject to change without notice.

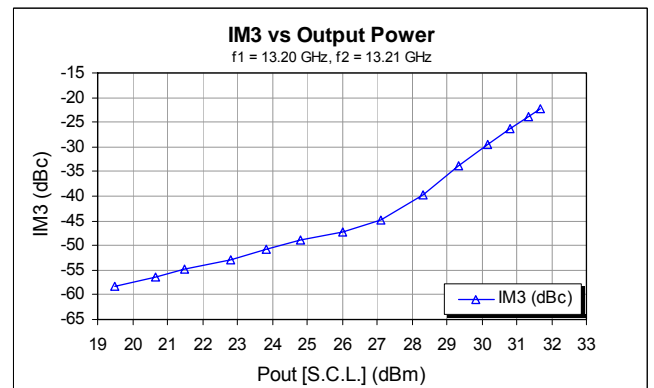
## Power De-rating Curve and IM3 Definition



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

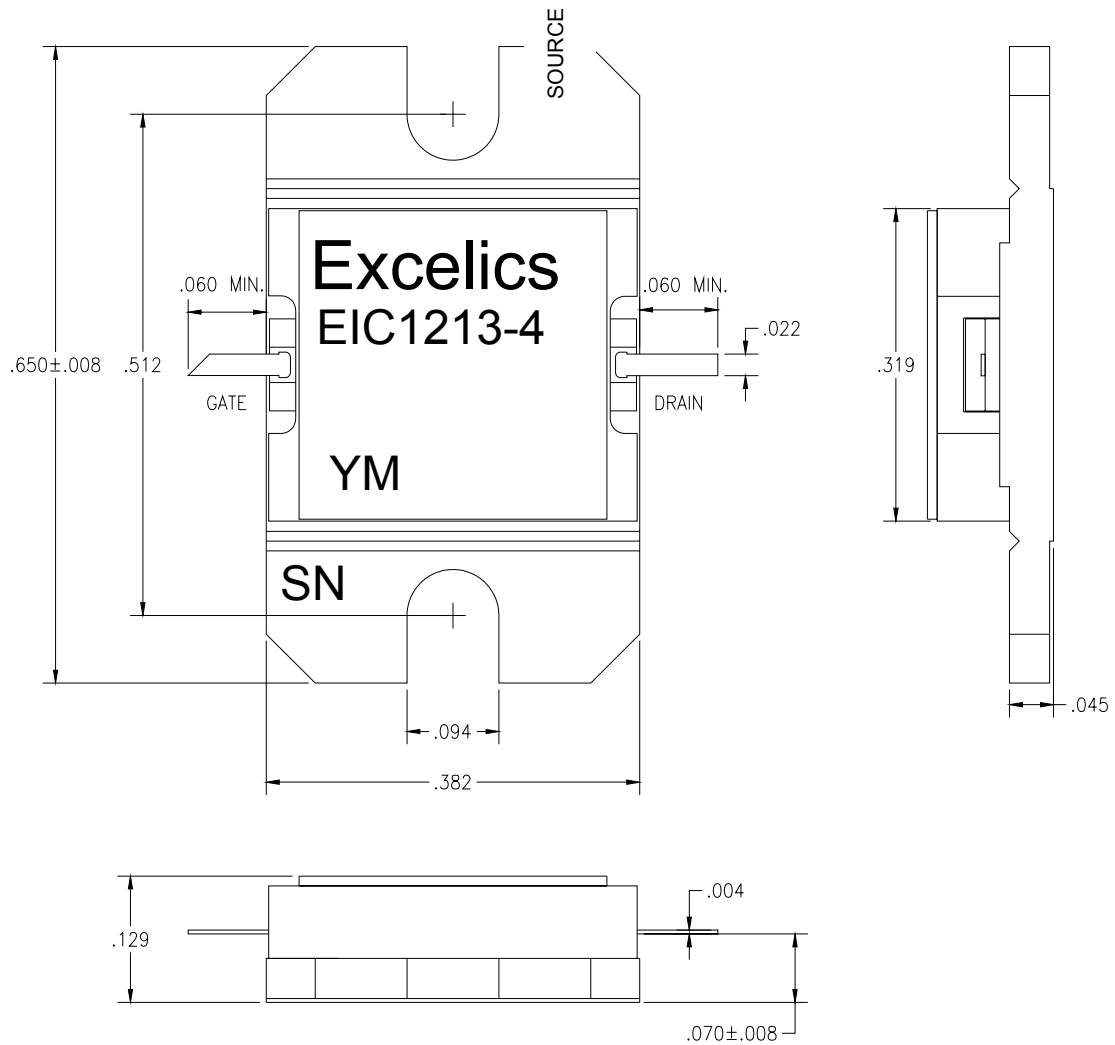


## Typical IM3 Data ( $V_{DS} = 10$ V, $I_{DSQ} \approx 65\%$ IDSS)



## PACKAGE OUTLINE

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



## ORDERING INFORMATION

Part Number	Grade <sup>1</sup>	$f_{\text{Test}}$ (GHz)	$P_{1\text{dB}}$ (min)	$IM_3$ (min) <sup>2</sup>
EIC1213-4	Industrial	12.7-13.2 GHz	35.5	-42

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