



# EIC1414-4

UPDATED 08/21/2007

## 14.00-14.50GHz 4-Watt Internally-Matched Power FET

### FEATURES

- 14.00 –14.50GHz 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
- 100% Tested for DC, RF, and  $R_{TH}$



### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



Caution! ESD sensitive device.

SYMBOL	PARAMETERS/TEST CONDITIONS <sup>1</sup>	MIN	TYP	MAX	UNITS
$P_{1dB}$	Output Power at 1dB Compression $f = 14.00\text{-}14.50\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$	35.5	36.0		dBm
$G_{1dB}$	Gain at 1dB Compression $f = 14.00\text{-}14.50\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$	5.0	6.0		dB
$\Delta G$	Gain Flatness $f = 14.00\text{-}14.50\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$			$\pm 0.6$	dB
PAE	Power Added Efficiency at 1dB Compression $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$ $f = 14.00\text{-}14.50\text{GHz}$		25		%
$I_{d1dB}$	Drain Current at 1dB Compression $f = 14.00\text{-}14.50\text{GHz}$		1100	1300	mA
IM3	Output 3rd Order Intermodulation Distortion $\Delta f = 10\text{ MHz}$ 2-Tone Test; $P_{out} = 25.0\text{ dBm S.C.L}^2$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 65\% IDSS$ $f = 14.50\text{GHz}$	-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 <sup>3</sup>		5.5	6.0	$^\circ\text{C/W}$

Note: 1. Tested with 100 Ohm gate resistor.

2. S.C.L. = Single Carrier Level.

3. Overall  $R_{th}$  depends on case mounting.

### ABSOLUTE MAXIMUM RATING FOR EFD

SYMBOLS	PARAMETERS	ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>
$V_{ds}$	Drain-Source Voltage	15V	10V
$V_{gs}$	Gate-Source Voltage	-5V	-4V
$I_{gf}$	Forward Gate Current	48mA	14.4mA
$I_{gr}$	Reverse Gate Current	-9.6mA	-2.4mA
$P_{in}$	Input Power	35.5dBm	@ 3dB Compression
$T_{ch}$	Channel Temperature	175C	175C
$T_{stg}$	Storage Temperature	-65C to +175C	-65C to +175C
$P_t$	Total Power Dissipation	25W	25W

Note: 1. Exceeding any of the above ratings may result in permanent damage.

2. Exceeding any of the above ratings may reduce MTTF below design goals.

Specifications are subject to change without notice.

Excelics Semiconductor, Inc. 310 De Guigne Drive, Sunnyvale, CA 94085

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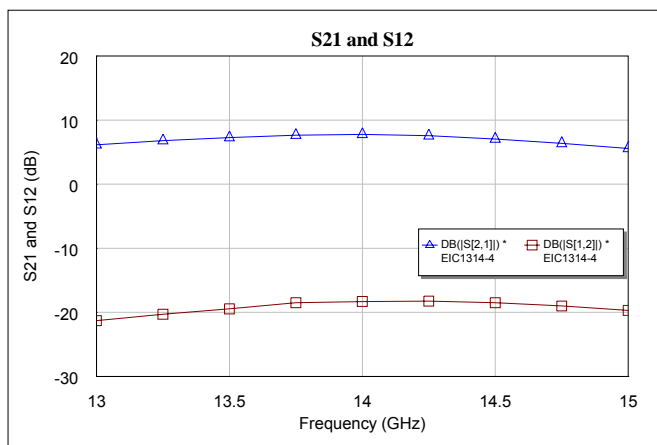
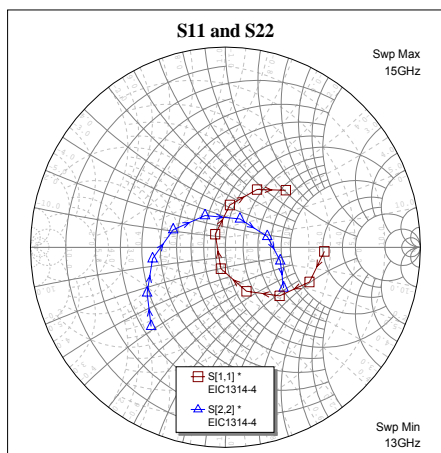
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### PERFORMANCE DATA

Typical S-Parameters (T= 25°C, 50Ω system, de-embedded to edge of package)

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

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

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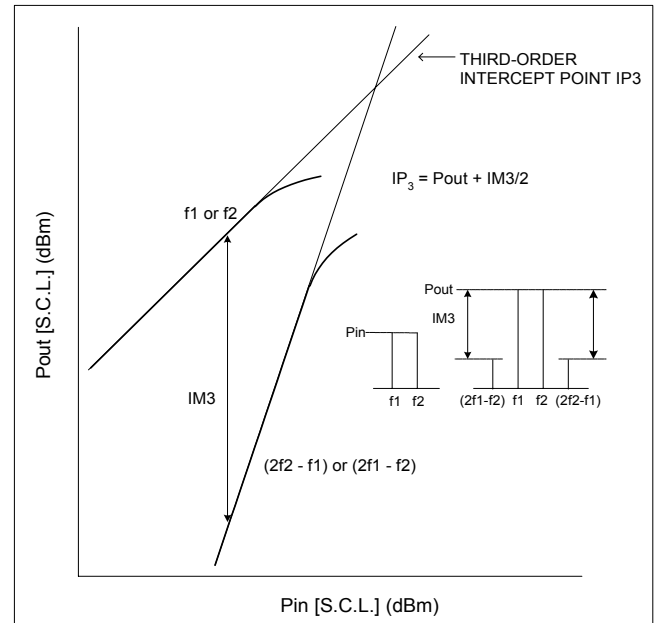
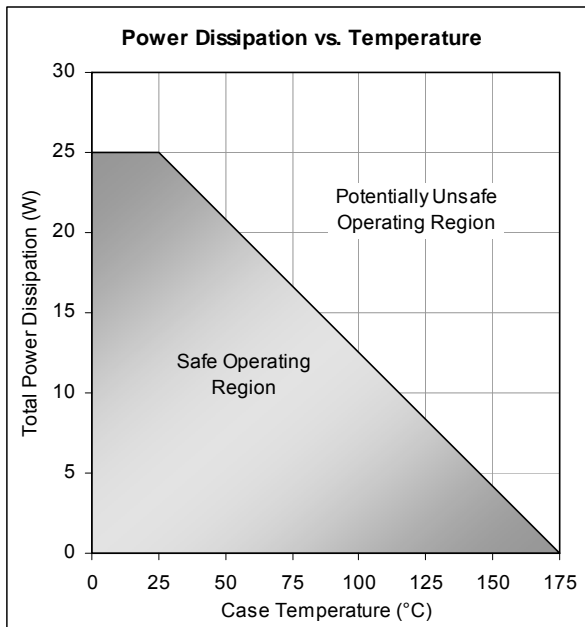
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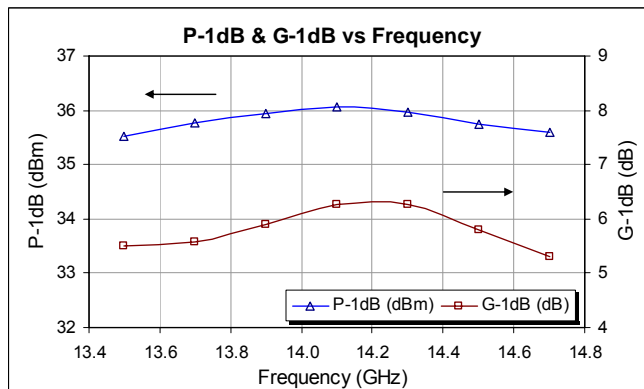
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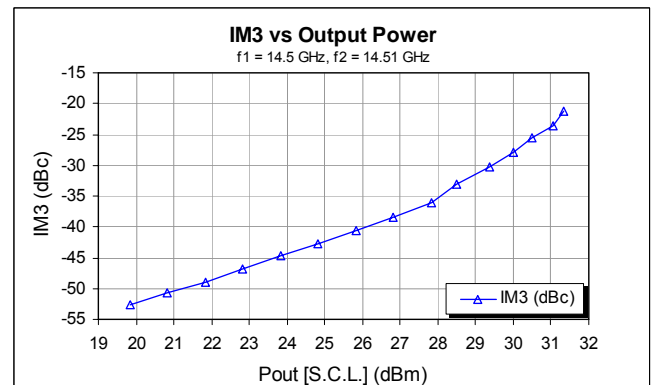
### Power De-rating Curve and IM3 Definition



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



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



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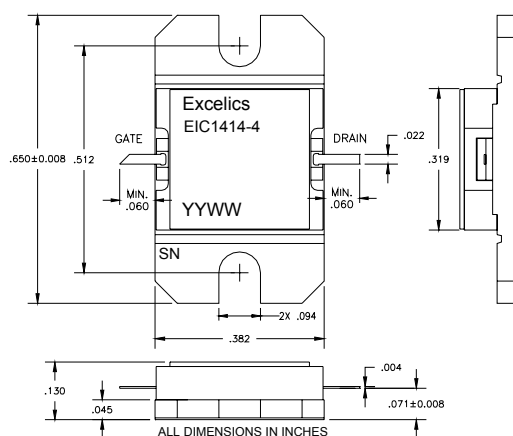
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### PACKAGES OUTLINE

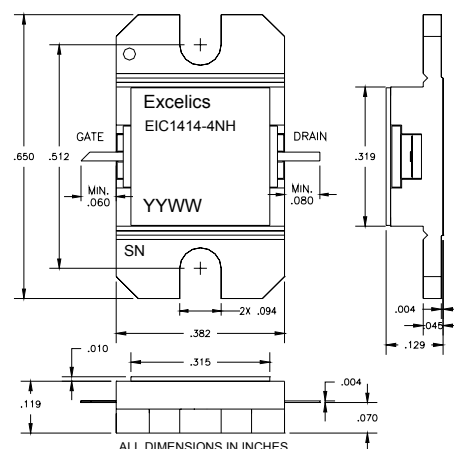
Dimensions in inches, Tolerance  $\pm .005$  unless otherwise specified

**EIC1414-4 (Hermetic)**



**Caution! ESD sensitive device.**

**EIC1414-4NH (Non-Hermetic)**



**Caution! ESD sensitive device.**

### ORDERING INFORMATION

Part Number	Packages	Grade <sup>1</sup>	f <sub>Test</sub> (GHz)	P <sub>1dB</sub> (min)	IM <sub>3</sub> (min) <sup>2</sup>
EIC1414-4	Hermetic	Industrial	14.00-14.50GHz	35.5	-42
EIC1414-4NH	Non-Hermetic	Industrial	14.00-14.50GHz	35.5	-42

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

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