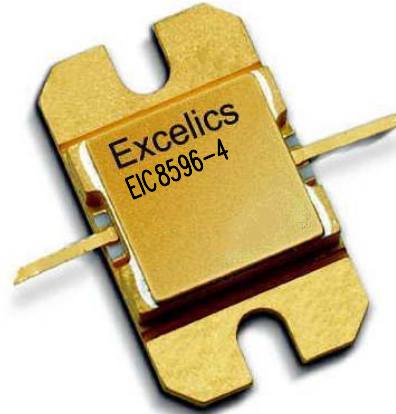


## 8.50-9.60 GHz 4-Watt Internally-Matched Power FET

Issued Date: 06-07-04

### FEATURES

- 8.50 – 9.60 GHz Bandwidth
- Input/Output Impedance Matched to 50 Ohms
- +36.5 dBm Output Power at 1dB Compression
- 7.5 dB Power Gain at 1dB Compression
- 30% Power Added Efficiency
- -43 dBc IM3 at  $P_o = 25.5$  dBm SCL
- Hermetic Metal Flange Package
- 100% Tested for DC, RF, and  $R_{TH}$



### DESCRIPTION

The EIC8596-4 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 $f = 8.50\text{-}9.60\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$	35.5	36.5		dBm
$G_{1dB}$	Gain at 1dB Compression $f = 8.50\text{-}9.60\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$	6.5	7.5		dB
$\Delta G$	Gain Flatness $f = 8.50\text{-}9.60\text{GHz}$ $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$			$\pm 0.6$	dB
PAE	Power Added Efficiency at 1dB Compression $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 1100\text{mA}$ $f = 8.50\text{-}9.60\text{GHz}$		30		%
$I_{d1dB}$	Drain Current at 1dB Compression $f = 8.50\text{-}9.60\text{GHz}$		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> $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 65\%$ IDSS $f = 9.60\text{ GHz}$	-40	-43		dBc
$I_{DSS}$	Saturated Drain Current $V_{DS} = 3\text{ V}$ , $V_{GS} = 0\text{ V}$		1800	2200	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>		5.0	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.



# EIC8596-4

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

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	20 W
$T_{CH}$	Channel Temperature	150°C
$T_{STG}$	Storage Temperature	-65/+150°C

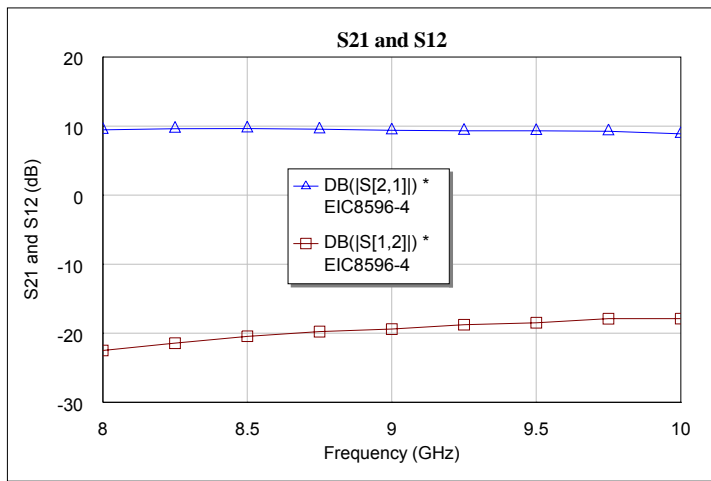
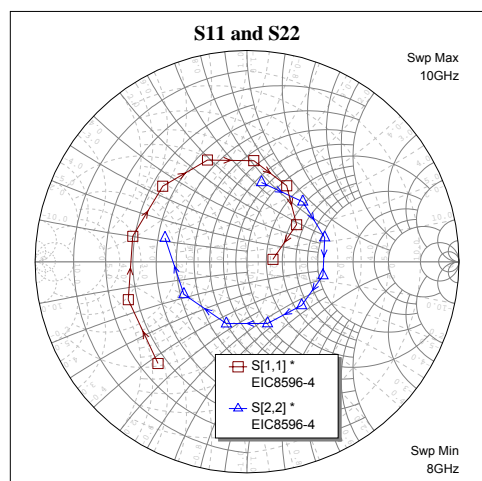
Notes:

- 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



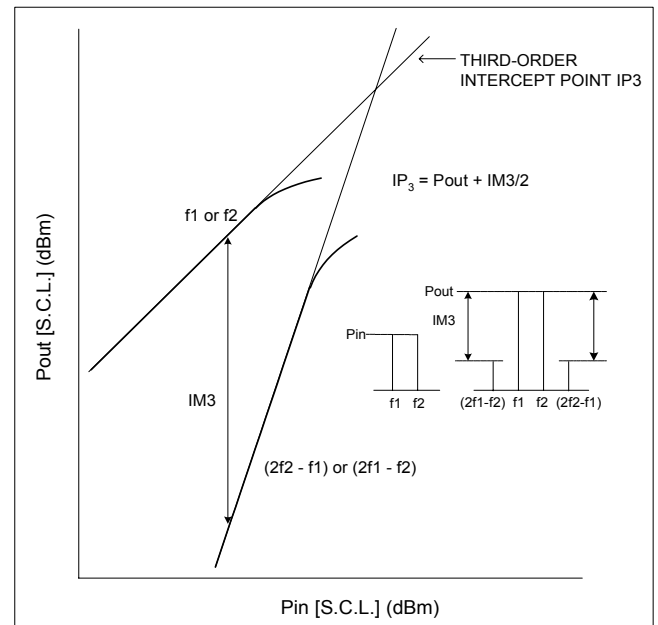
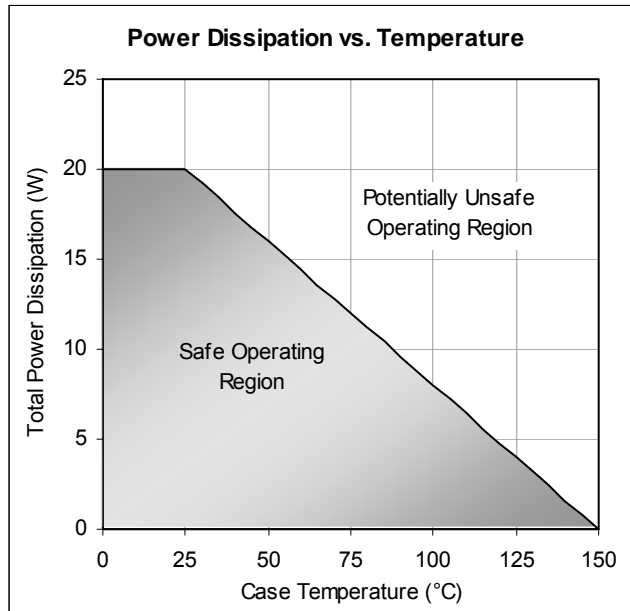
FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
8.00	0.639	-131.090	2.971	-43.850	0.075	-95.770	0.381	79.650
8.25	0.589	-162.210	3.029	-71.870	0.085	-125.560	0.387	47.150
8.50	0.553	167.390	3.042	-98.890	0.095	-152.800	0.384	17.300
8.75	0.535	138.050	2.997	-125.900	0.103	-179.370	0.364	-10.280
9.00	0.516	111.210	2.947	-152.010	0.107	155.110	0.331	-38.730
9.25	0.479	86.150	2.924	-178.400	0.115	128.390	0.308	-71.620
9.50	0.406	62.550	2.918	154.530	0.119	102.590	0.309	-108.380
9.75	0.292	36.850	2.901	125.240	0.127	74.230	0.336	-152.650
10.00	0.123	5.160	2.779	94.570	0.128	44.690	0.403	163.780
10.25	0.085	-167.640	2.588	62.670	0.123	13.470	0.499	126.800
10.50	0.278	157.010	2.245	31.830	0.112	-17.580	0.564	94.870

Specifications are subject to change without notice.

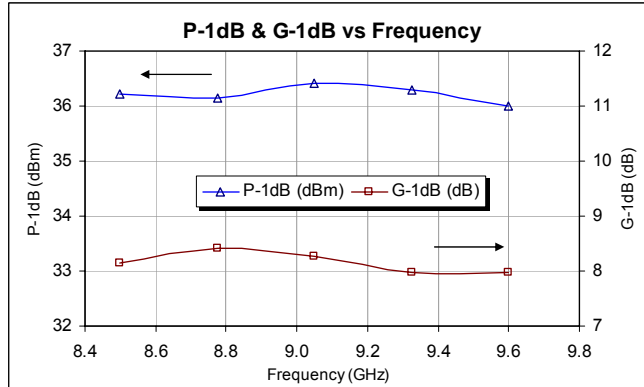
Excelics Semiconductor, Inc. 310 De Guigne Drive, Sunnyvale, CA 94085  
Phone: 408-737-1711 Fax: 408-737-1868 Web: [www.excelics.com](http://www.excelics.com)

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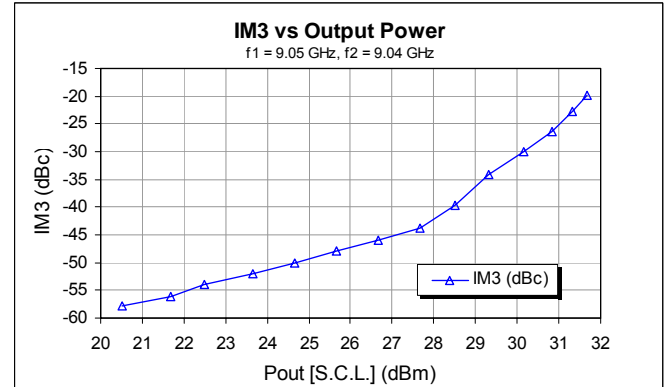
## Power De-rating Curve and IM3 Definition



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

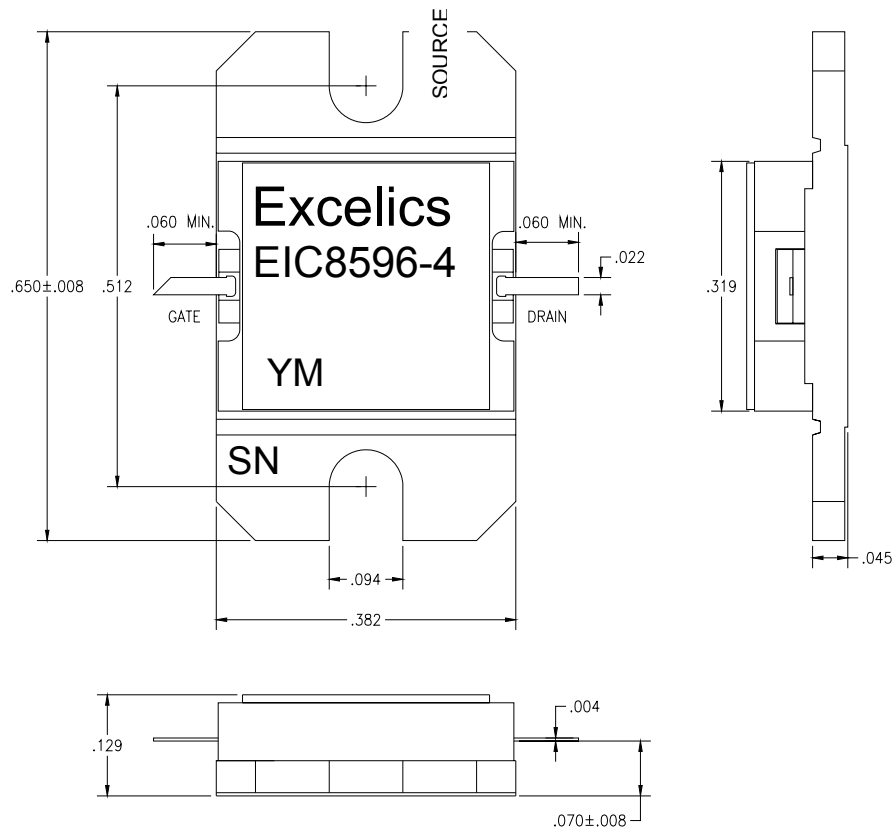


## Typical IM3 Data ( $V_{DS} = 10\text{ V}$ , $I_{DSQ} \approx 65\% IDSS$ )



## PACKAGE OUTLINE

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



## ORDERING INFORMATION

Part Number	Grade <sup>1</sup>	f <sub>Test</sub> (GHz)	P <sub>1dB</sub> (min)	IM <sub>3</sub> (min) <sup>2</sup>
EIC8596-4	Industrial	8.50-9.60 GHz	35.5	-40

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