

7.10-7.90 GHz 4-Watt Internally-Matched Power FET

Issued Date: 06-22-04

FEATURES

- 7.10 – 7.90 GHz Bandwidth
- Input/Output Impedance Matched to 50 Ohms
- +36.5 dBm Output Power at 1dB Compression
- 9.0 dB Power Gain at 1dB Compression
- 35% Power Added Efficiency
- -46 dBc IM3 at $P_o = 25.5$ dBm SCL
- Hermetic Metal Flange Package
- 100% Tested for DC, RF, and R_{TH}



DESCRIPTION

The EIC7179-4 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 $f = 7.10\text{-}7.90\text{GHz}$ $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$	35.5	36.5		dBm
G_{1dB}	Gain at 1dB Compression $f = 7.10\text{-}7.90\text{GHz}$ $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$	7.5	8.5		dB
ΔG	Gain Flatness $f = 7.10\text{-}7.90\text{GHz}$ $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$			± 0.6	dB
PAE	Power Added Efficiency at 1dB Compression $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 1100\text{mA}$ $f = 7.10\text{-}7.90\text{GHz}$		35		%
I_{d1dB}	Drain Current at 1dB Compression $f = 7.10\text{-}7.90\text{GHz}$		1200	1400	mA
IM3	Output 3rd Order Intermodulation Distortion $\Delta f = 10\text{ MHz}$ 2-Tone Test; $P_{out} = 25.5\text{ dBm S.C.L.}^2$ $V_{DS} = 10\text{ V}$, $I_{DSQ} \approx 65\%$ IDSS $f = 7.90\text{GHz}$	-43	-46		dBc
I_{DSS}	Saturated Drain Current $V_{DS} = 3\text{ V}$, $V_{GS} = 0\text{ V}$		2000	2500	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.



EIC7179-4

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

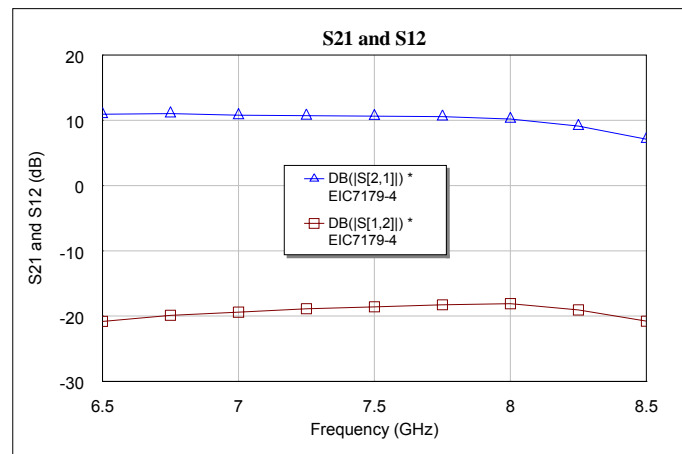
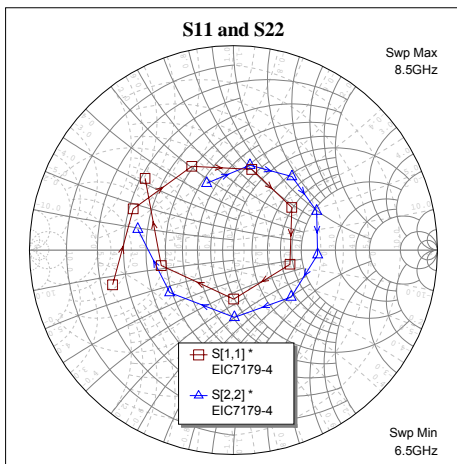
Notes:

- 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



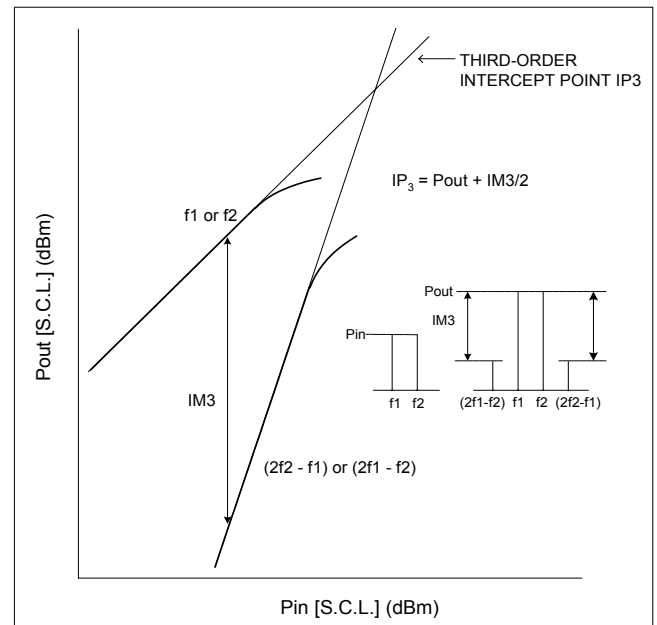
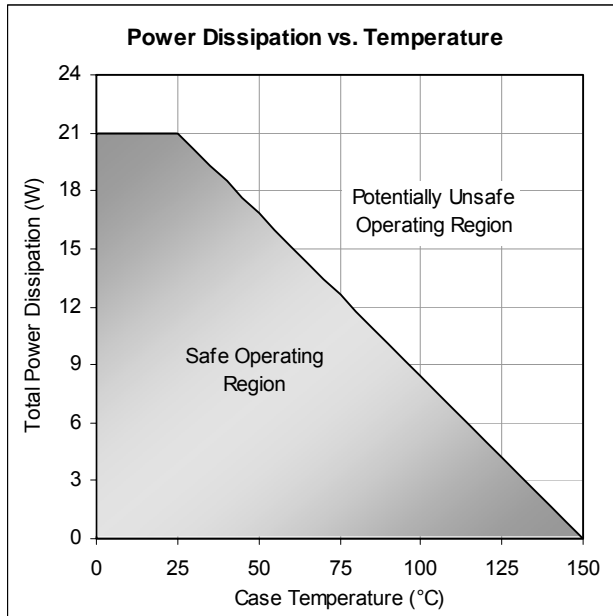
FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
6.25	0.717	-129.010	3.341	8.410	0.078	-50.550	0.258	158.370
6.50	0.616	-164.030	3.517	-25.170	0.091	-84.550	0.352	111.870
6.75	0.531	157.650	3.563	-58.820	0.101	-117.910	0.422	78.950
7.00	0.458	116.510	3.454	-90.850	0.107	-148.130	0.460	51.440
7.25	0.405	77.140	3.425	-121.930	0.114	-179.030	0.451	25.010
7.50	0.354	36.120	3.404	-154.300	0.118	149.090	0.413	-2.990
7.75	0.285	-14.050	3.372	171.750	0.122	117.150	0.365	-39.080
8.00	0.240	-89.650	3.238	134.430	0.125	81.280	0.329	-89.170
8.25	0.362	-167.970	2.854	95.090	0.111	42.800	0.375	-146.450
8.50	0.557	140.990	2.268	56.400	0.091	6.000	0.480	167.620
8.75	0.698	106.670	1.652	22.050	0.068	-26.910	0.568	137.060

Specifications are subject to change without notice.

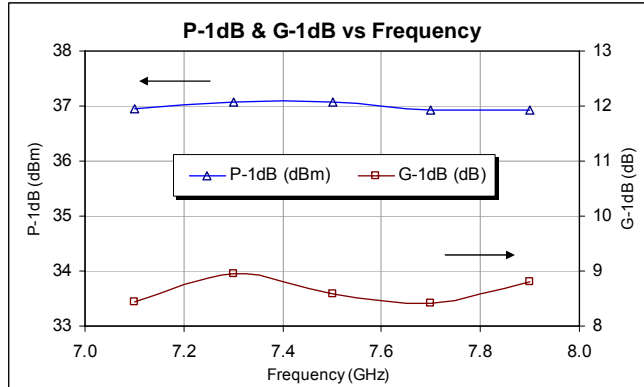
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Revised July 2004

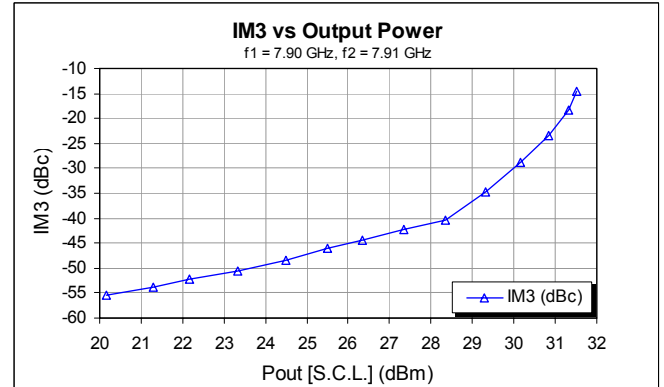
Power De-rating Curve and IM3 Definition



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

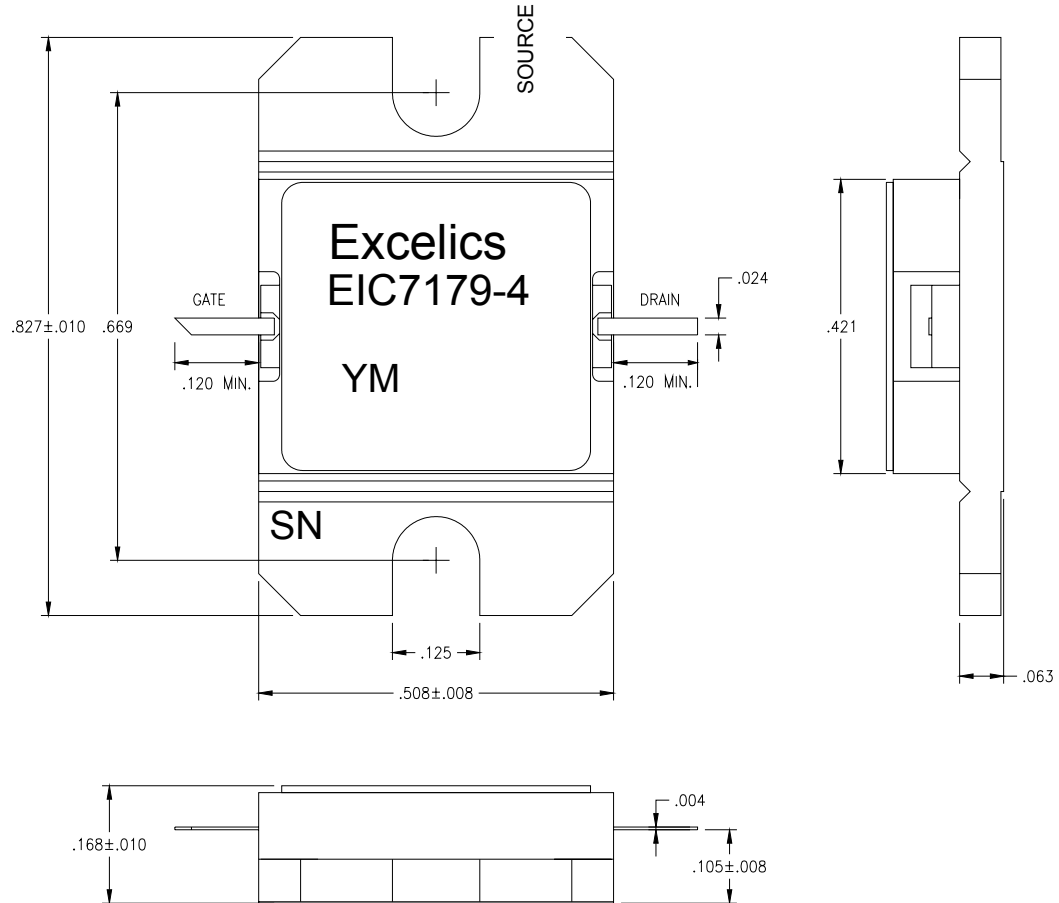


Typical IM3 Data ($V_{DS} = 10$ V, $I_{DSQ} \approx 65\%$ IDSS)



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
EIC7179-4	Industrial	7.10-7.90 GHz	35.5	-43

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