



Product Features

- 3000-6000 MHz Bandwidth
- +39 dBm Output IP3
- 2.4 dB Noise Figure
- +21 dBm P1dB
- Single or Dual Supply Operation
- MTBF >100 Years
- SOT-89 SMT Package



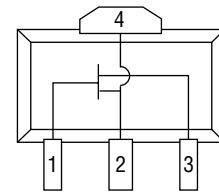
Actual Size

Product Description

The FHF1 is a high dynamic range FET packaged in a low cost surface mount package. The combination of low noise figure and high output IP3 at the same bias point makes it ideal for receiver and transmitter applications. The FHF1 achieves +39 dBm OIP3 at a mounting temperature of 85°C with an associated MTBF of >100 years⁶. The package is a SOT-89. All devices are 100% RF and DC tested.

The product is targeted for applications where high linearity is required.

Functional Diagram



Function	Pin No.
Gate	1
Source	2
Drain	3
Source	4

Specifications

DC Electrical Parameter	Units	Minimum	Typical	Maximum	Condition
Saturated Drain Current, Idss	mA	100	140	170	Vgs = 0 V
Transconductance, Gm	mS		120		
Pinch Off Voltage, Vp	V	-3.0	-1.5		Ids = 0.6 mA

RF Parameter	Units	Minimum	Typical	Maximum	Condition
Small Signal Gain, Gss	dB	10	12		
Maximum Stable Gain, Gmsg	dB		17		
Third Order Output Intercept, OIP3	dBm	+37	+39		
1 dB Compression Point, P1dB	dBm		+21		
Noise Figure, NF	dB		2.4		

Notes:

- DC and RF parameters measured under the following conditions unless otherwise noted.
25°C with Vds = 5.0 V, Vgs = 0 V, test frequency = 3000 MHz, 50 Ω system.
- OIP3 measured with two tones at an output power of 5 dBm/tone separated by 10 MHz. The suppression on the largest IM3 product is used to calculate the OIP3 using a 2:1 slope rule.
- Degradation of OIP3 occurs at low temperatures. Minimum typical OIP3 at -40°C is +36 dBm.
- Idss is measured with Vgs = 0 V.
- Pinch off voltage is measured when Ids = 0.6 mA.
- MTBF calculated with channel temperature at 155°C.

Absolute Maximum Ratings

Parameter	Rating
Drain to Source Voltage	8.0 V
Gate to Source Voltage	-6.0 V
Gate Current	4.5 mA
Storage Temperature	-55 to +125°C
RF Input Power (continuous)	+10 dBm

Operation of this device above any of these parameters may cause permanent damage.

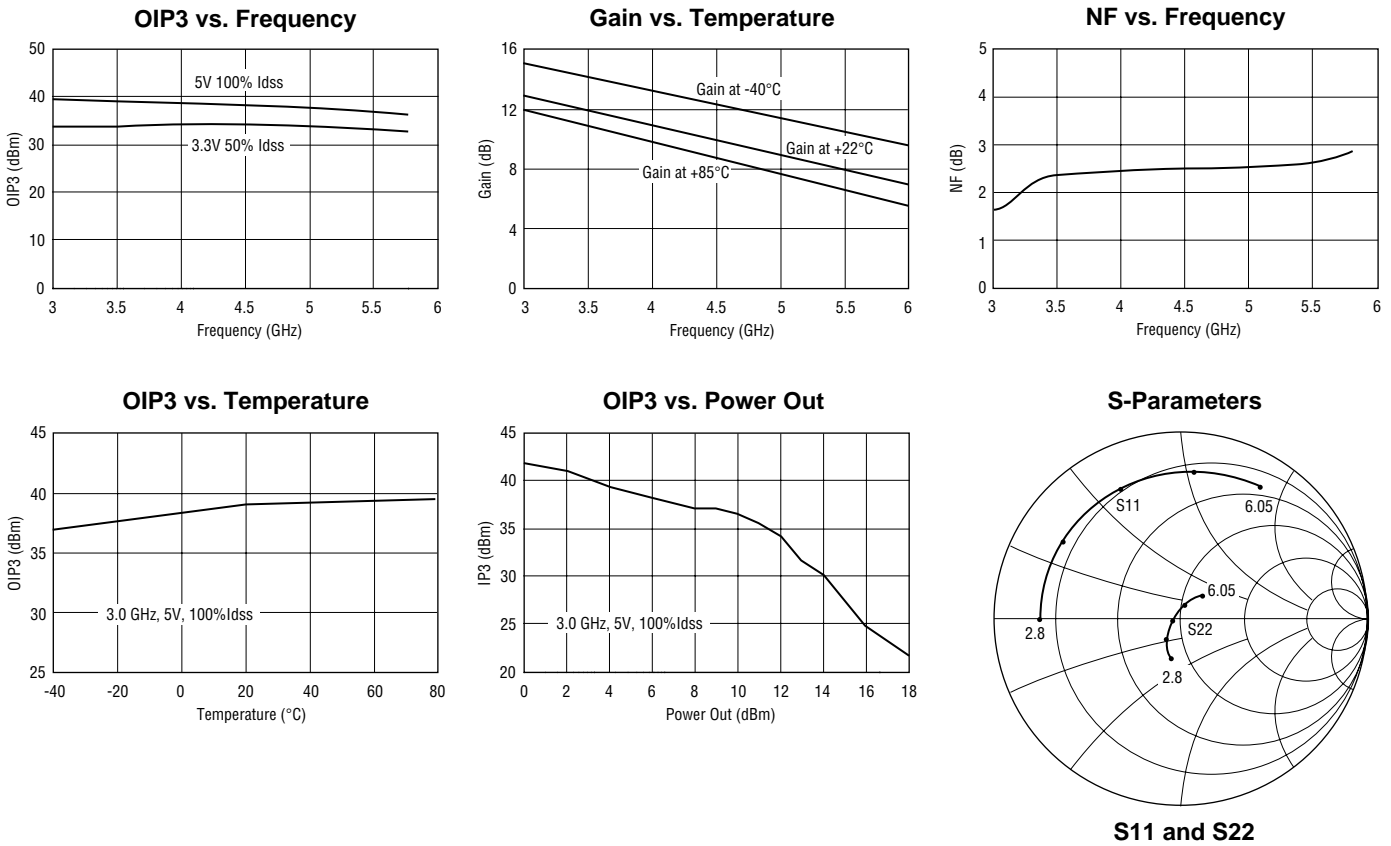
Ordering Information

Part No.	Description
FHF1	High Dynamic Range FET (Available in tape and reel)

FHF1

Advanced Product Information

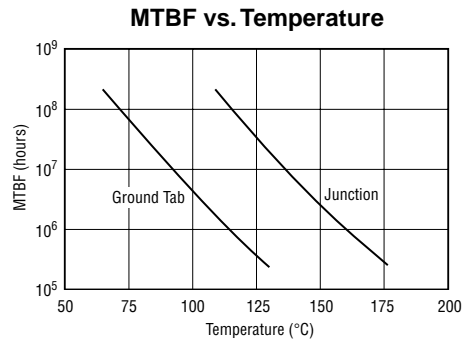
Performance Charts (Vds = 5.0 V, Ids = 150 mA, T = 22°C, 50 ohm system)



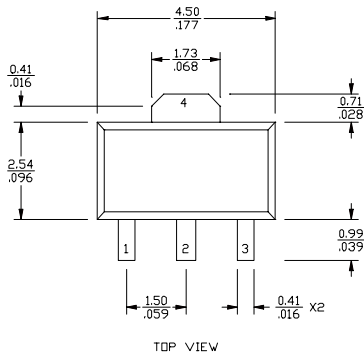
Thermal Specifications

Parameter	Rating
Operating Case Temperature	-40 to +85°C
Thermal Resistance (Maximum)	59°C/W
Junction Temperature (Recommended Maximum)	+155°C

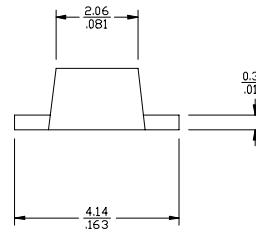
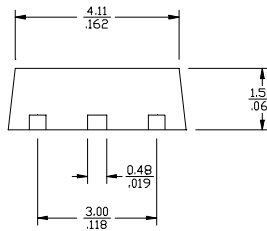
Notes:
 1. Thermal Resistance determined at Maximum Tab Temperature and Maximum Power Dissipation.
 2. Recommended Maximum Junction Temperature insures a MTBF of 1 million hours.



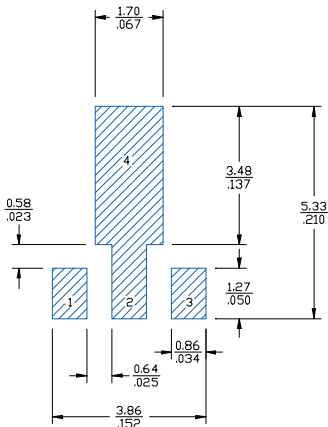
Outline Drawing



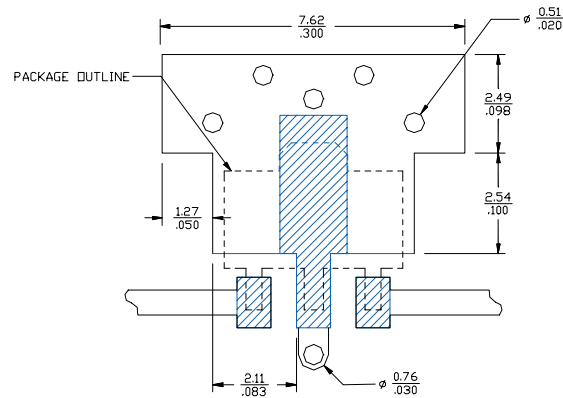
mm
inch



Land Pattern



Mounting Configuration



FUNCTION	PIN NO.
INPUT	1
GROUND	2
OUTPUT (BIAS)	3
GROUND	4

- Notes: 1. Ground vias are critical for thermal and RF grounding considerations.
 2. A minimum of 6 ground vias are required for 14 ml and 28 ml FR4 board.
 3. If your PCB design rules allow, ground vias should be placed under the land pattern for better RF and thermal performance. Otherwise ground vias should be placed as close to land pattern as possible.
 4. Trace width depends on PC board.

This document contains information on a new product. Specifications and information are subject to change without notice.



Caution! ESD sensitive device.

Typical Test Data

S-Parameters (Vds = +5 V, 100% Idss, T = 22°C, unmatched device in a 50 ohm system)

Freq (GHz)	S11 (Mag)	S11 (Ang)	S21 (dB)	S21 (Mag)	S21 (Ang)	S12 (Mag)	S12 (Ang)	S22 (Mag)	S22 (Ang)	K Value
2.80	0.754	-180.000	13.679	4.830	49.600	0.074	-5.810	0.216	-103.000	0.5746
3.05	0.748	169.000	13.103	4.520	41.200	0.075	-12.300	0.191	-110.000	0.6242
3.30	0.749	159.000	12.547	4.240	32.900	0.076	-17.600	0.165	-117.000	0.6725
3.55	0.759	148.000	12.041	4.000	24.500	0.075	-23.300	0.139	-123.000	0.7042
3.80	0.759	139.000	11.527	3.770	16.800	0.077	-27.800	0.113	-132.000	0.7675
4.05	0.757	129.000	11.053	3.570	8.940	0.076	-33.100	0.087	-143.000	0.8173
4.30	0.764	120.000	10.578	3.380	0.975	0.075	-38.100	0.061	-158.000	0.8469
4.55	0.770	110.000	10.103	3.200	-6.850	0.074	-42.400	0.043	172.000	0.8732
4.80	0.781	101.000	9.629	3.030	-14.700	0.073	-47.100	0.040	122.000	0.8962
5.05	0.785	91.800	9.097	2.850	-22.700	0.071	-51.600	0.059	88.700	0.9528
5.30	0.796	82.700	8.627	2.700	-30.500	0.070	-55.900	0.087	70.100	0.9914
5.55	0.808	73.900	8.097	2.540	-38.100	0.068	-59.900	0.120	60.200	1.0313
5.80	0.817	65.800	7.532	2.380	-45.800	0.068	-64.300	0.151	52.900	1.0687
6.05	0.825	59.800	7.082	2.260	-51.800	0.066	-68.000	0.178	47.500	1.1102

S-Parameters (Vds = +3.3 V, 50% Idss, T = 22°C, unmatched device in a 50 ohm system)

Freq (GHz)	S11 (Mag)	S11 (Ang)	S21 (dB)	S21 (Mag)	S21 (Ang)	S12 (Mag)	S12 (Ang)	S22 (Mag)	S22 (Ang)	K Value
2.80	0.755	-175.000	13.625	4.800	52.000	0.089	-6.810	0.169	-138.000	0.6190
3.05	0.747	174.000	13.064	4.500	43.400	0.090	-13.400	0.150	-152.000	0.6719
3.30	0.745	163.000	12.527	4.230	35.100	0.090	-19.500	0.133	-168.000	0.7133
3.55	0.755	151.000	11.954	3.960	26.000	0.088	-24.700	0.119	-179.000	0.7456
3.80	0.753	142.000	11.434	3.730	18.200	0.088	-30.200	0.102	-156.000	0.7882
4.05	0.753	132.000	10.955	3.530	10.300	0.088	-35.300	0.104	-134.000	0.8550
4.30	0.757	123.000	10.501	3.350	2.490	0.089	-40.900	0.121	-113.000	0.9027
4.55	0.763	114.000	10.021	3.170	-5.310	0.090	-47.800	0.145	-96.800	0.9433
4.80	0.773	104.000	9.571	3.010	-13.000	0.090	-53.600	0.174	-83.400	0.9851
5.05	0.778	94.700	9.005	2.820	-21.000	0.088	-58.200	0.199	-72.500	1.0559
5.30	0.788	85.300	8.498	2.660	-28.900	0.086	-63.000	0.230	-63.300	1.0930
5.55	0.800	76.300	7.959	2.500	-36.600	0.083	-68.400	0.262	-55.300	1.1350
5.80	0.809	68.000	7.347	2.330	-44.200	0.081	-73.300	0.293	-48.500	1.1729
6.05	0.817	61.700	6.888	2.210	-50.200	0.078	-77.400	0.319	-43.200	1.2156