BIF5

5-800 MHz Internally Matched IF Amplifier

Device Features

- OIP3 = 43.0 dBm @ 70 MHz
- Gain = 17.5 dB @ 70 MHz
- Output P1 dB = 20.5 dBm @ 70 MHz
- 50 Ω Cascadable
- Patented temperature compensation
- Patented over voltage protection
- Lead-free/RoHS-compliant SOT-89 SMT package



Product Description

BeRex's BIF5 is a high performance InGaP/ GaAs HBT MMIC amplifier, internally matched to 50 Ohms and uses a patented ***temperature compensation*** circuit to provide stable current over the operating temperature range without the need for external components and a patented ***over voltage protection*** circuit to protect a internal device. The BIF5 is designed for high linearity IF amplifier that requires excellent gain, high OIP3 and flatness. It is packaged in a RoHS-compliant with SOT-89 surface mount package.

Applications

- Base station Infrastructure/RFID
- Commercial/Industrial/Military wireless system

Typical Performance[1]

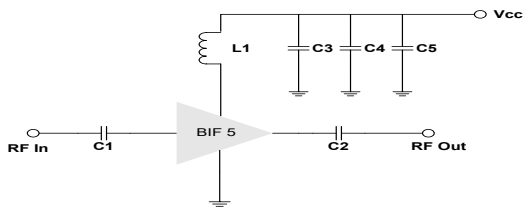
Parameter	Frequency					Unit
	70	140	250	500	800	MHz
Gain	17.5	17.5	17.5	17.5	17.1	dB
S11	-15.8	-15.4	-15.5	-14.1	-18.3	dB
S22	-17.1	-19.1	-26.3	-16.1	-10.8	dB
OIP3[2]	43.0	42.5	41.0	40.0	37.0	dBm
P1dB	20.5	20.5	20.5	21.0	21.0	dBm
Noise Figure	4.0	4.1	4.2	4.3	4.3	dB

[1] Device performance _ measured on a BeRex evaluation board at 25°C, 50 Ω system.

[2] OIP3 _ measured with two tones at an output of 10 dBm per tone separated by 1 MHz.

	Min.	Typical	Max.	Unit
Bandwidth	5		800	MHz
I_C @ (Vc = 5V)	97	107	117	mA
V_C		5.0		V
dG/dT		-0.003		dB/°C
R_{TH}		50		°C/W

Applications Circuit



*C1, C2=100nF ± 5%; C3 = 100 pF ± 5%; C4 = 1000pF ±5%

*C5 = 10uF; L1 = 1uH ±5%

*C1, C2 = 100pF; L1 = 33nH ±5% for RF Bandwidth

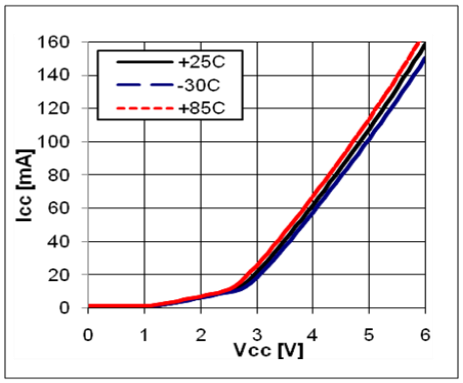
Absolute Maximum Ratings

Parameter	Rating	Unit
Operating Case Temperature	-40 to +85	°C
Storage Temperature	-55 to +155	°C
Junction Temperature	+220	°C
Operating Voltage	+6.0	V
Supply Current	160	mA
Input RF Power	23	dBm

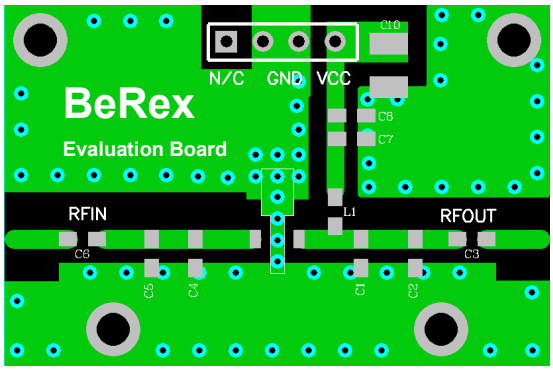
Operation of this device above any of these parameters may result in permanent damage.

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V-I Characteristics



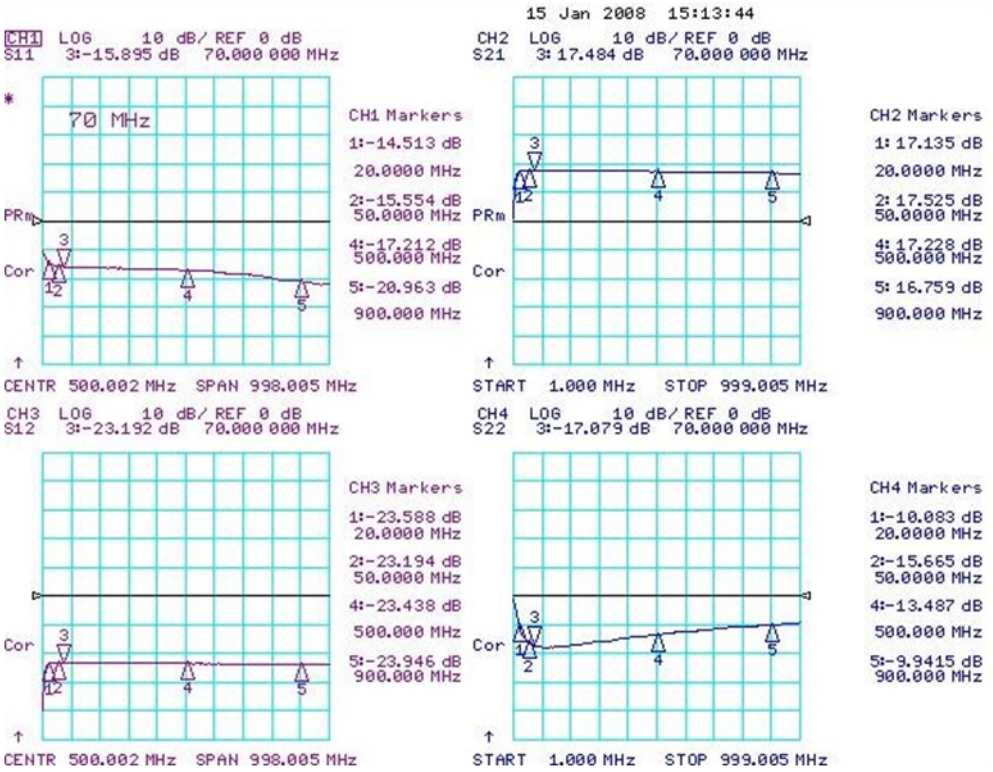
BeRex SOT89 Evaluation Board



*Dielectric constant _ 4.2 *RF pattern width 52mil *31mil thick FR4 PCB

Typical Device Data

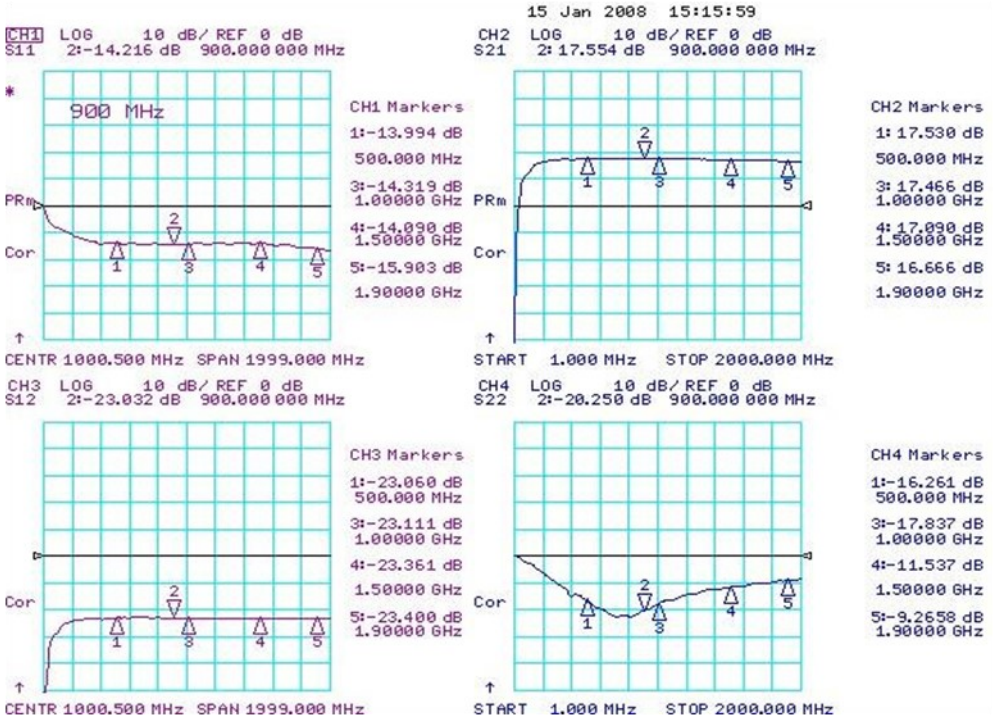
S-parameters (Vc=5V, Ic=107mA, T=25°C)



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RF Bandwidth

S-parameters (Vc=5V, Ic=107mA, T=25°C)



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S-Parameter

(Vdevice = 5.0V, Icc = 107mA, T = 25 °C, calibrated to device leads)

Freq [MHz]	S11 [Mag]	S11 [Ang]	S21 [Mag]	S21 [Ang]	S12 [Mag]	S12 [Ang]	S22 [Mag]	S22 [Ang]
100	0.635	175.5	8.232	175.6	0.066	0.3	0.155	-12.0
500	0.627	157.0	7.315	159.7	0.072	-1.4	0.178	-62.9
1000	0.603	136.7	7.880	144.7	0.066	-1.8	0.235	-111.5
1500	0.580	118.0	6.733	131.1	0.070	2.4	0.322	-151.7
2000	0.491	99.4	6.895	114.4	0.069	-1.7	0.393	175.7
2500	0.471	86.3	6.953	104.4	0.071	5.1	0.470	147.9
3000	0.432	69.7	8.427	80.7	0.080	-0.9	0.549	119.3
3500	0.415	63.8	7.474	53.8	0.079	-0.9	0.608	97.8
4000	0.457	51.4	6.617	32.7	0.090	-8.8	0.640	68.7

Typical Performance (Vd = 5V, Ic = 107mA, T = 25°C)

Freq	MHz	70	140	250	*500	800
S21	dB	17.5	17.5	17.5	17.5	17.1
S11	dB	-15.8	-15.4	-15.5	-14.1	-18.3
S22	dB	-17.1	-19.1	-26.3	-16.1	-10.8
P1	dBm	20.5	20.5	20.5	21.0	21
OIP3	dBm	43	42.5	41.0	40.0	37
NF	dB	4.0	4.1	4.2	4.3	4.3

Typical Performance (Vd = 4.7V, Ic = 95mA, T = 25°C)

Freq	MHz	70	140	250	500	800
S21	dB	17.6	17.5	17.4	17.4	17.1
S11	dB	-15.1	-17.3	-18.1	-17.5	-18.7
S22	dB	-14.3	-13.7	-14.1	-14	-10.7
P1	dBm	19.6	20.2	20.1	20.4	20
OIP3	dBm	41	40.5	39.5	37	35.5
NF	dB	4.0	4.1	4.2	4.3	4.3

Typical Performance (Vd = 4.5V, Ic = 85mA, T = 25°C)

Freq	MHz	70	140	250	500	800
S21	dB	17.4	17.4	17.5	17.4	17
S11	dB	-15.3	-17.6	-18.3	-17.8	-18.9
S22	dB	-14.2	-13.5	-13.9	-13.9	-10.6
P1	dBm	19.2	19.0	19.2	19.4	19.4
OIP3	dBm	40.0	41.0	38.5	36.5	35
NF	dB	4.0	4.1	4.2	4.3	4.3

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Typical Performance (Vd = 4V, Ic = 63mA, T = 25°C)

Freq	MHz	70	140	250	500	800
S21	dB	17.4	17.3	17.2	17.2	16.9
S11	dB	-16	-18.6	-19.5	-18.9	-20.1
S22	dB	-13.8	-13.1	-13.5	-13.5	-10.3
P1	dBm	17	17.5	17.7	17.5	17.2
OIP3	dBm	35.5	35.5	35	33	32
NF	dB	4.0	4.1	4.2	4.3	4.3

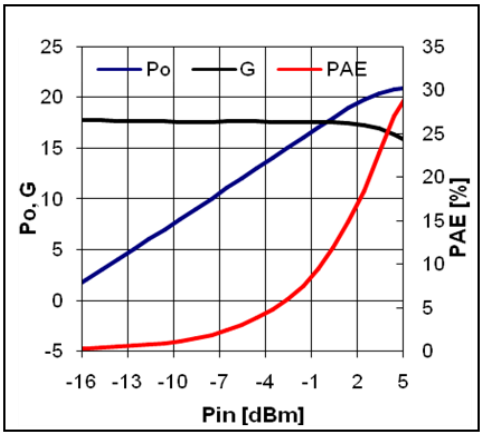
Typical Performance (Vd = 3.5V, Ic = 41mA, T = 25°C)

Freq	MHz	70	140	250	500	800
S21	dB	17.1	17.0	16.9	16.8	16.5
S11	dB	-17.9	-21.2	-22.6	-21.7	-23.1
S22	dB	-13.1	-12.3	-12.6	-12.6	-9.8
P1	dBm	13.7	14.6	14.6	14.5	14.2
OIP3	dBm	29	29	29	27.5	27.5
NF	dB	4.0	4.1	4.2	4.3	4.3

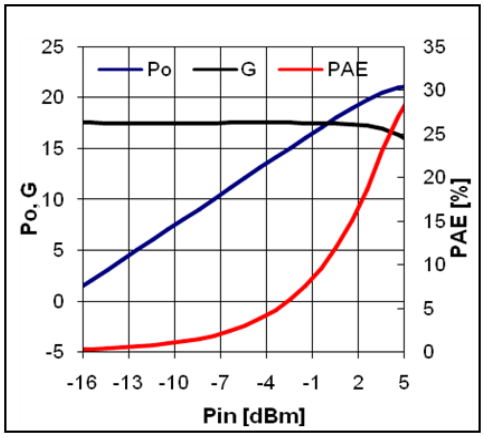
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Device Performance

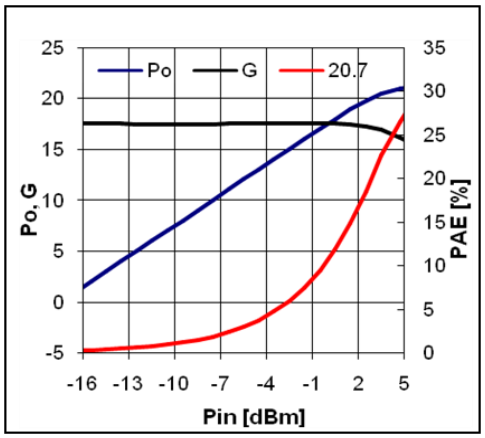
Pin-Pout-Gain



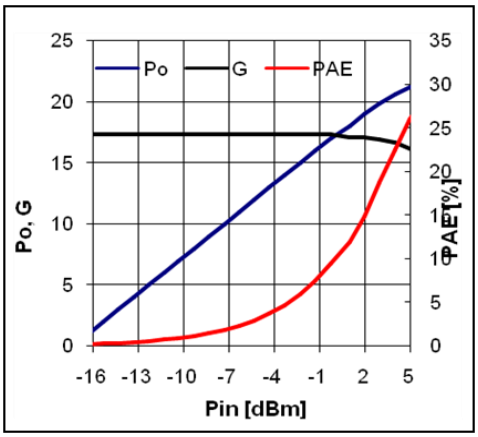
70MHz, 5V/107mA



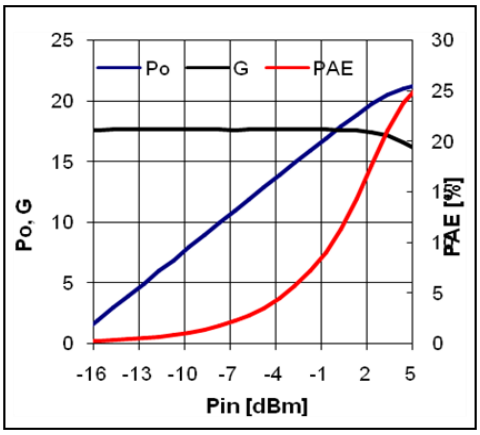
140MHz, 5V/107mA



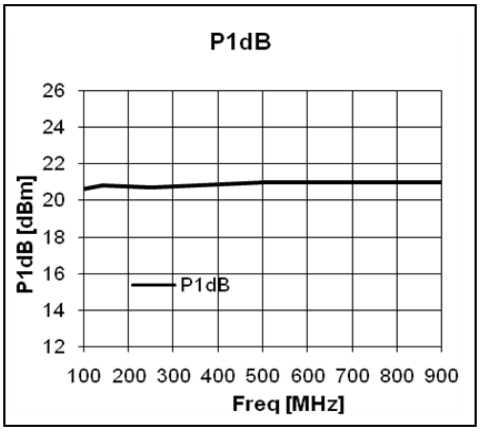
250MHz, 5V/107mA



500MHz, 5V/107mA

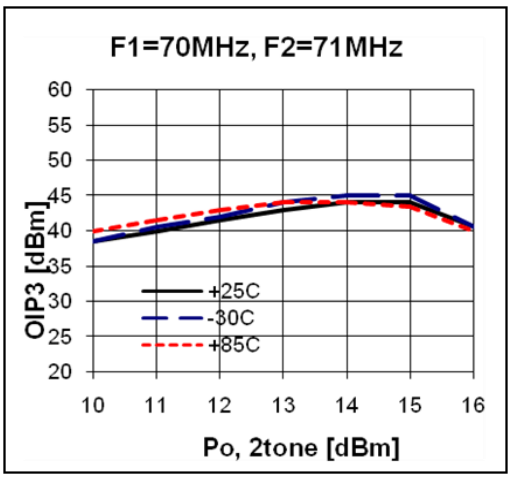


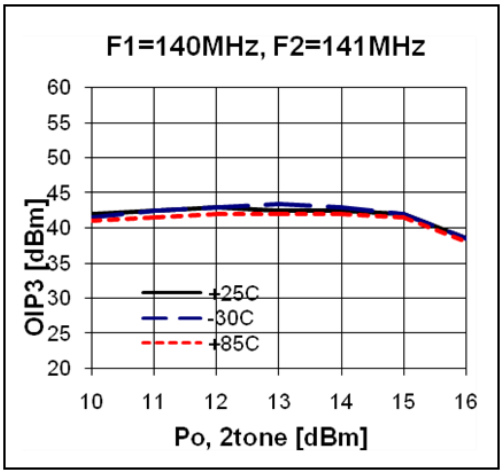
900MHz, 5V/107mA

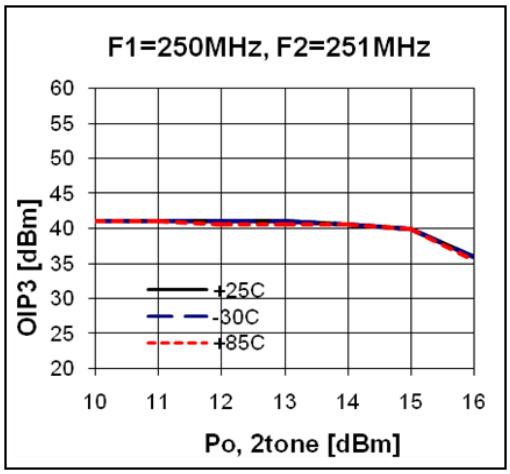


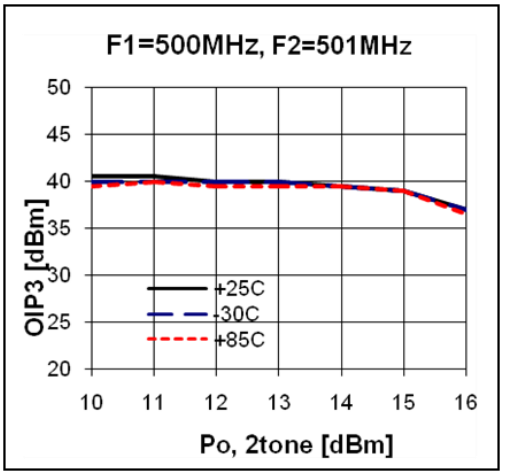
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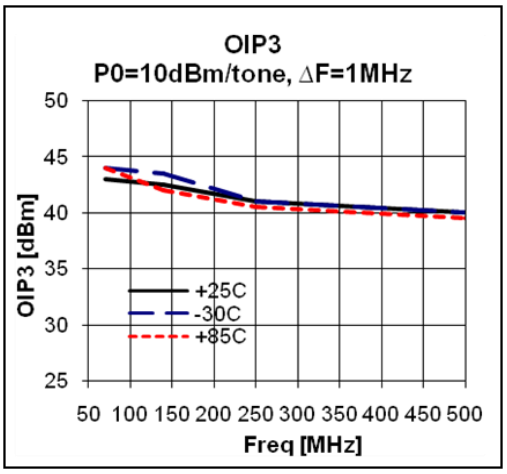
OIP3





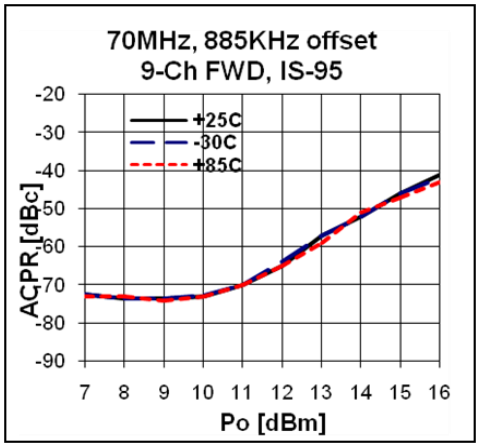


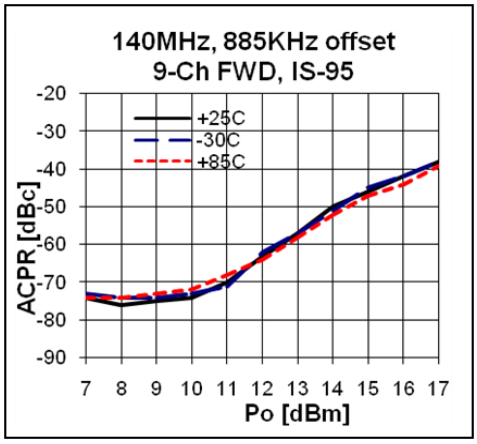


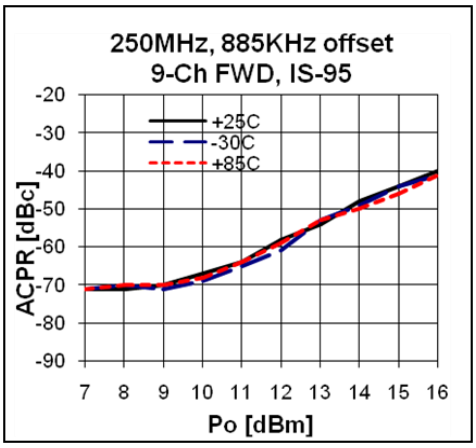


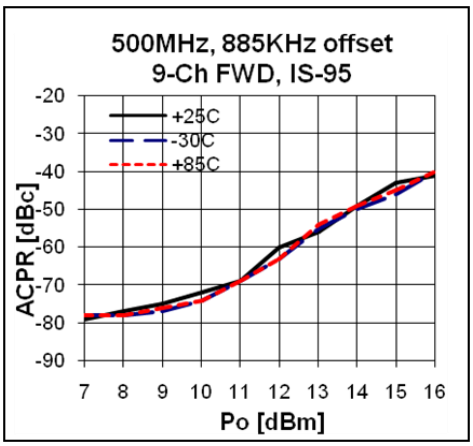
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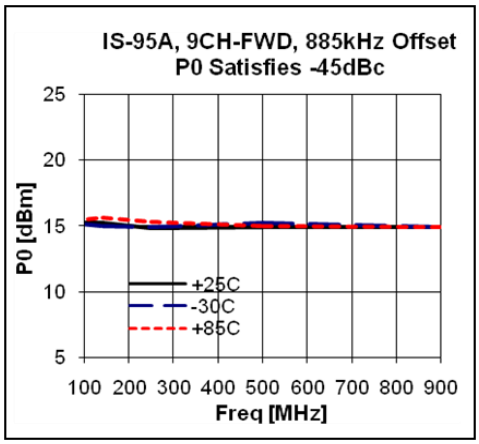
ACPR





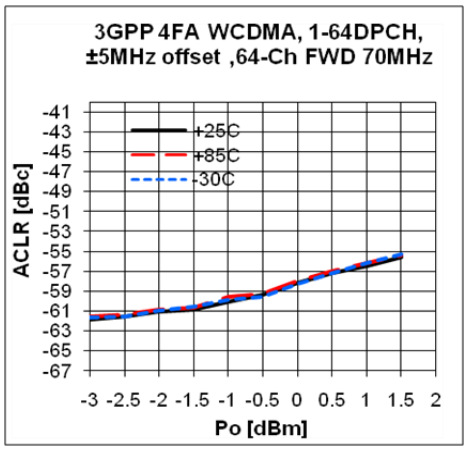




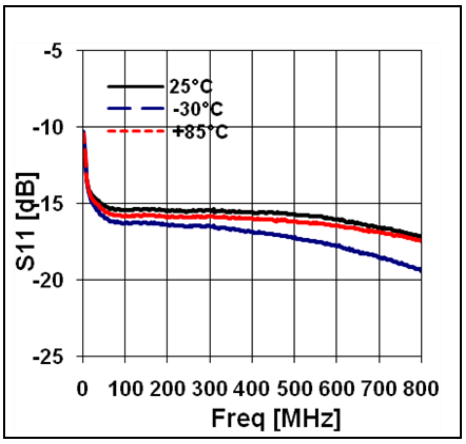


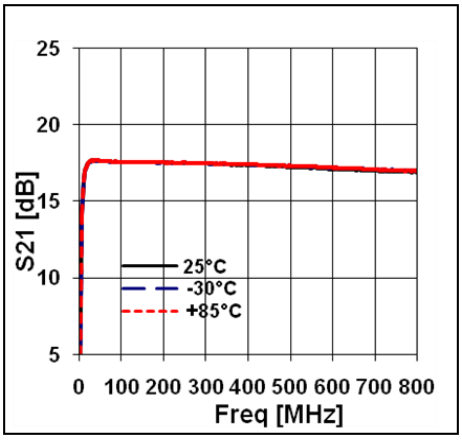
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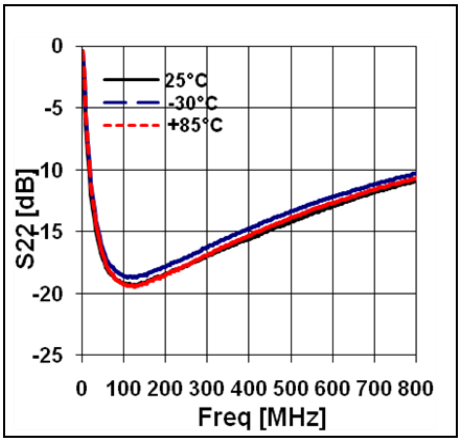
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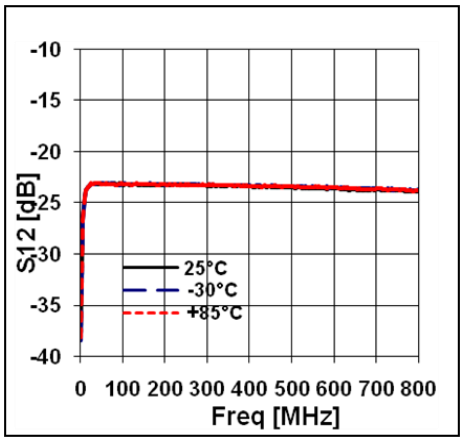


S-Parameters over Temperature



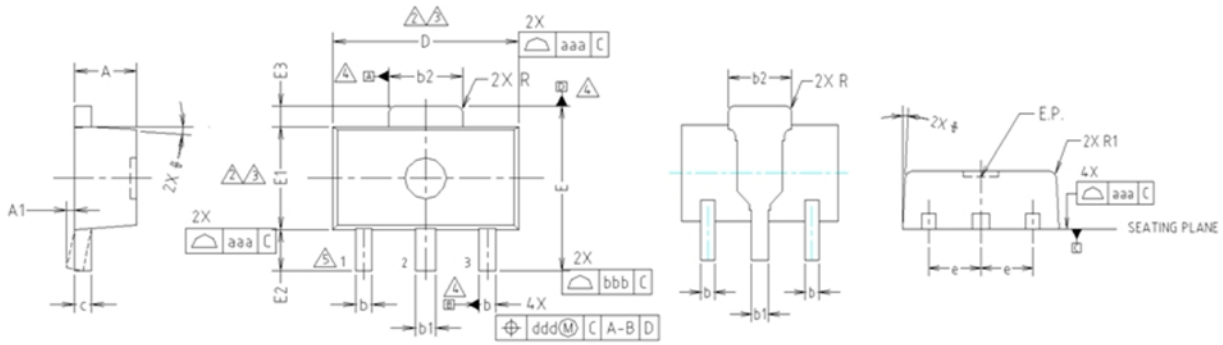






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Package Outline Dimension



NOTE:

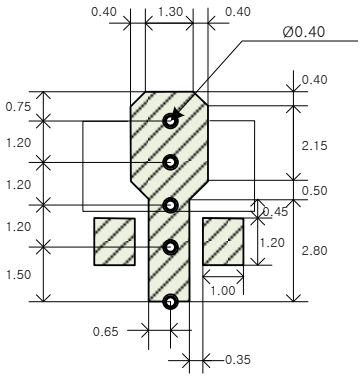
1. DIMENSIONS IN MILLIMETERS.
2. DIMENSION D DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.5mm PER END. DIMENSION E1 DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.5mm PER SIDE.
3. DIMENSIONS D AND E1 ARE DETERMINED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. DATUMS A, B AND D TO BE DETERMINED 0.18mm FROM THE LEAD TIP.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

SYMBOL	MILLIMETERS MINIMUM	NOMINAL	MAXIMUM	NOTE
A	1.40	1.50	1.60	
A1	0.00	–	0.10	
b	0.38	0.42	0.48	
b1	0.48	0.52	0.58	
b2	1.79	1.82	1.87	
c	0.40	0.42	0.46	
D	4.40	4.50	4.70	2,3
E	3.70	4.00	4.30	
E1	2.40	2.50	2.70	2,3
E2	0.80	1.00	1.20	
E3	0.40	0.50	0.60	
e	1.50 TYP.			
θ	4° TYP.			
R	0.15 TYP.			
R1	–	–	0.20	

SYMBOL	TOLERANCES OF FORM AND POSITION	NOTE
aaa	0.15	
bbb	0.20	
ccc	0.10	
ddd	0.10	

Suggested PCB Land Pattern and PAD Layout

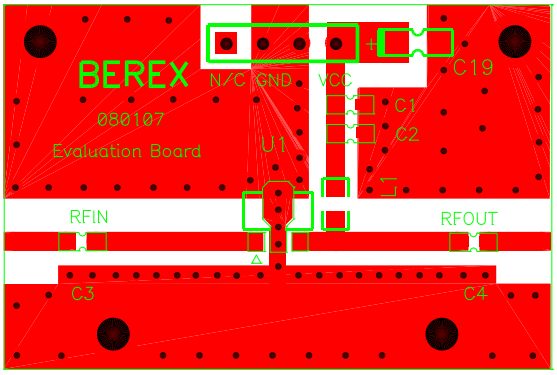
PCB Land Pattern



Note : All dimension _ millimeters

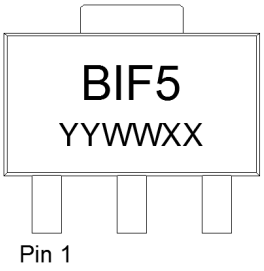
PCB lay out _ on BeRex website

PCB Mounting



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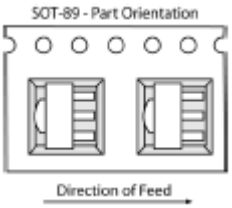
Package Marking



YY = Year, WW = Working Week,
XX = Wafer No.

Tape & Reel

SOT89



Packaging information:

Tape Width (mm): 12

Reel Size (inches): 7

Device Cavity Pitch (mm): 8

Devices Per Reel: 1000

Lead plating finish

100% Tin Matte finish

(All BeRex products undergoes a 1 hour, 150 degree C, Anneal bake to eliminate thin whisker growth concerns.)

MSL / ESD Rating

ESD Rating:	Class 1C
Value:	**Passes <2000V**
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114B
MSL Rating:	**Level 1 at +265°C convection reflow**
Standard:	JEDEC Standard J-STD-020



Proper ESD procedures should be followed when handling this device.

NATO CAGE code:

2	**N**	**9**	**6**	**F**

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