BIF7

5-800 MHz Internally Matched IF Amplifier

Device Features

- OIP3 = 40.0 dBm @ 70 MHz
- Gain = 27.1 dB @ 70 MHz
- Output P1 dB = 21.3 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 BIF7 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 BIF7 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]

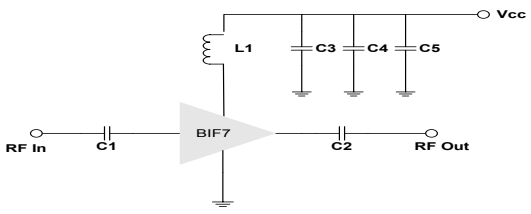
Parameter	Frequency					Unit
	70	140	250	500	800	MHz
Gain	27.1	27.0	26.7	25.7	25.0	dB
S11	-32.0	-41.0	-38.5	-28.6	-23.2	dB
S22	-12.1	-11.6	-10.1	-7.2	-6.5	dB
OIP3[2]	40.0	38.5	38.0	36.0	32.5	dBm
P1dB	21.3	21.5	21.5	21.0	19.7	dBm
Noise Figure	2.9	2.9	3.0	3.0	3.0	dB

[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)	85	95	105	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 = 12nH ±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.

Rev. D

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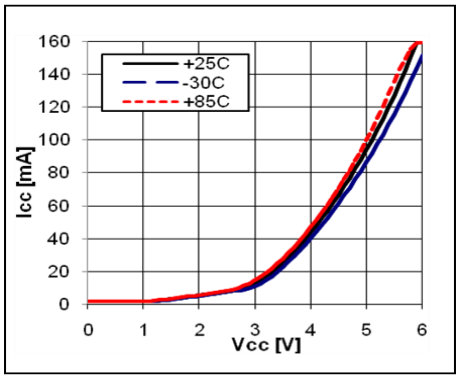
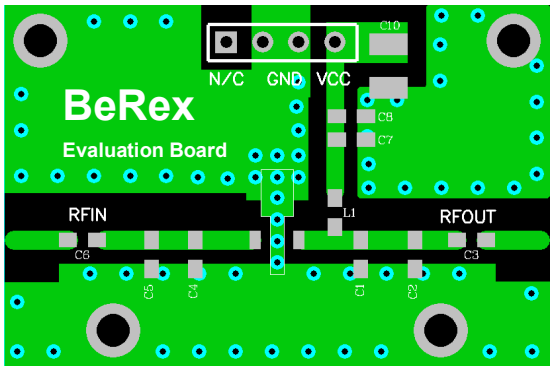
V-I Characteristics



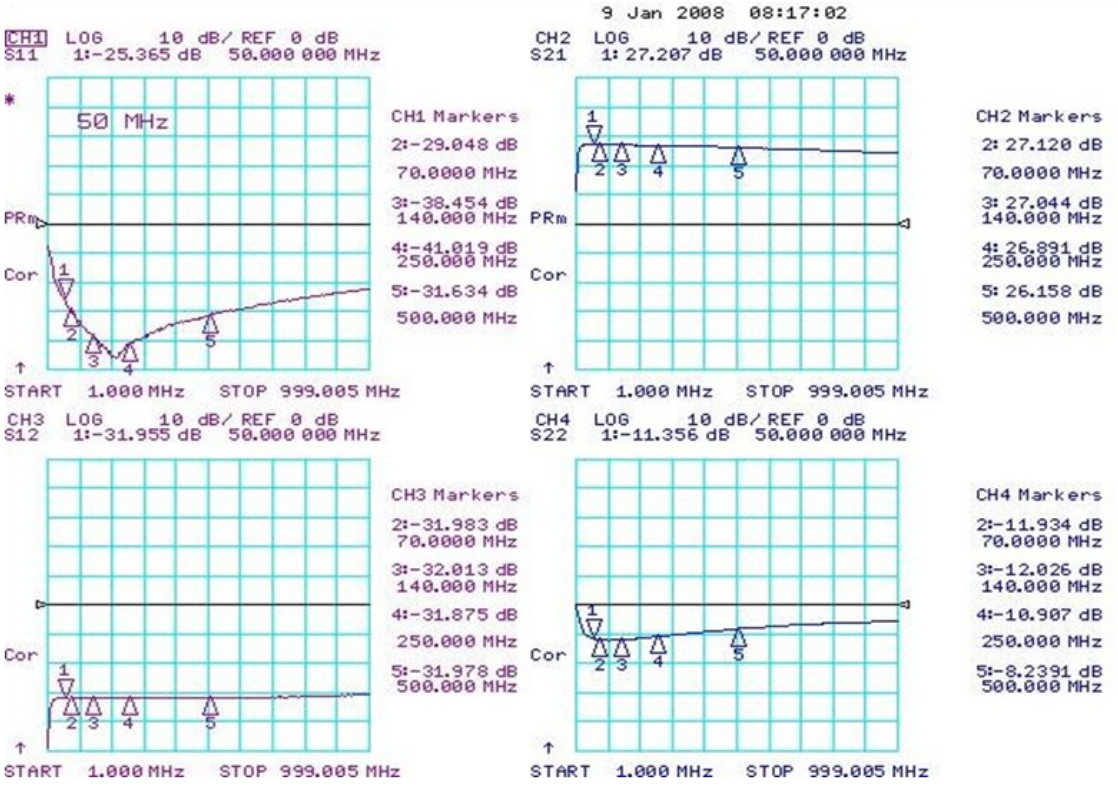
BeRex SOT89 Evaluation Board



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

Typical Device Data

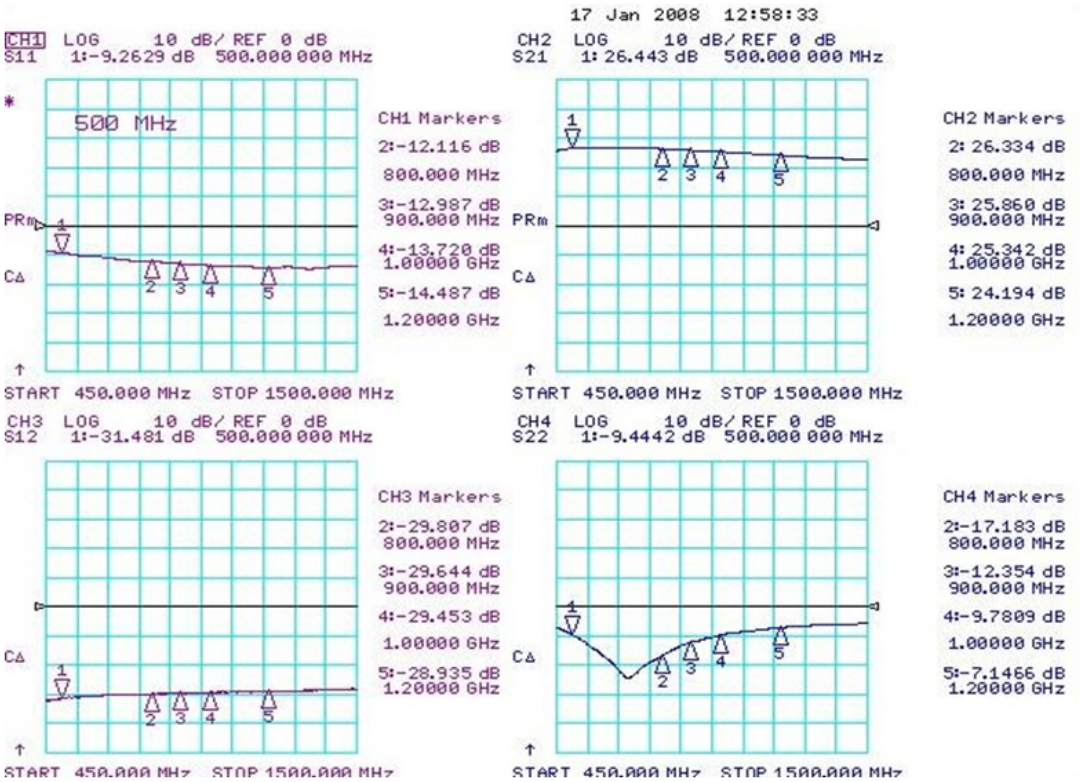
S-parameters (Vc=5V, Ic=95mA, T=25°C)



Rev. D

RF Bandwidth

S-parameters (Vc=5V, Ic=95mA, T=25°C)



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S-Parameter

(Vdevice = 5.0V, Icc = 95mA, 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	0.590	175.3	25.200	170.9	0.027	2.7	0.242	-20.9
500	0.540	155.4	19.772	139.2	0.027	10.0	0.341	-92.7
1000	0.484	140.8	14.791	116.0	0.028	21.8	0.449	-148.9
1500	0.495	126.4	12.899	102.3	0.039	30.7	0.541	171.2
2000	0.443	114.8	10.915	76.4	0.044	26.5	0.568	139.2
2500	0.492	100.3	9.942	69.3	0.051	33.4	0.593	113.8
3000	0.473	82.1	10.121	41.0	0.062	22.0	0.609	89.9
3500	0.499	70.9	7.532	20.2	0.062	17.5	0.617	69.4
4000	0.558	52.8	6.114	4.8	0.072	6.5	0.617	42.1

Typical Performance (Vd = 5V, Ic = 95mA, T = 25°C)

Freq	MHz	70	140	250	500	800
S21	dB	27.1	27.0	26.7	25.7	25
S11	dB	-32.0	-41.1	-38.5	-28.6	-23.2
S22	dB	-12.1	-11.6	-10.1	-7.2	-6.5
P1	dBm	21.3	21.5	21.5	21	19.7
OIP3	dBm	40.0	38.5	38.0	36.0	32.5
NF	dB	2.9	2.9	3.0	3.0	3.0

Typical Performance (Vd = 4.7V, Ic = 78mA, T = 25°C)

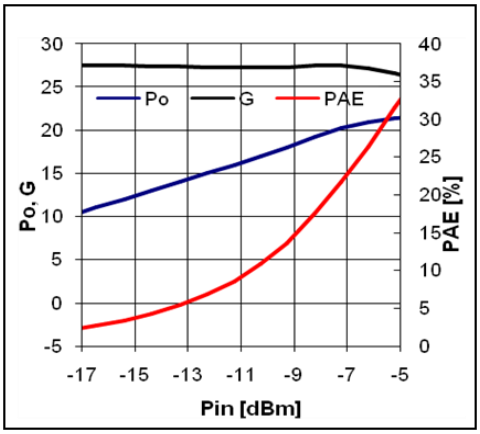
Freq	MHz	70	140	250	500	800
S21	dB	26.7	26.6	26.4	25.7	24.6
S11	dB	-28.5	-32.5	-29.2	-23.3	-19.8
S22	dB	-10.9	-11	-10.4	-8.2	-6
P1	dBm	20	20.5	20.5	20	19
OIP3	dBm	35.5	35.5	35	33	31.5
NF	dB	2.9	2.9	3.0	3.0	3.0

Typical Performance (Vd = 4.5V, Ic = 67mA, T = 25°C)

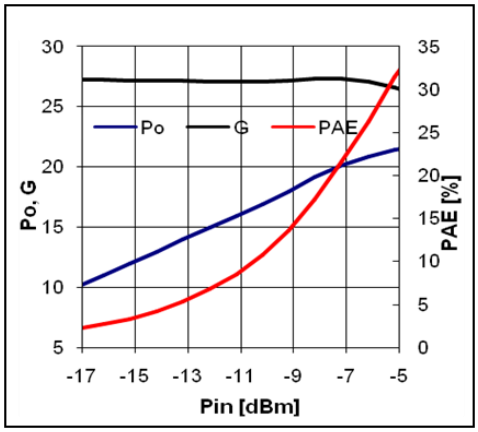
Freq	MHz	70	140	250	500	800
S21	dB	26.7	26.6	26.2	25.1	24.5
S11	dB	-26.6	-28.2	-26	-21.6	-18.8
S22	dB	-10.5	-10.6	-10.1	-8	-5.8
P1	dBm	18.8	19.2	19.5	19.6	17.4
OIP3	dBm	34.5	34.0	33.0	31.5	33
NF	dB	2.9	2.9	3.0	3.0	3.0

Device Performance

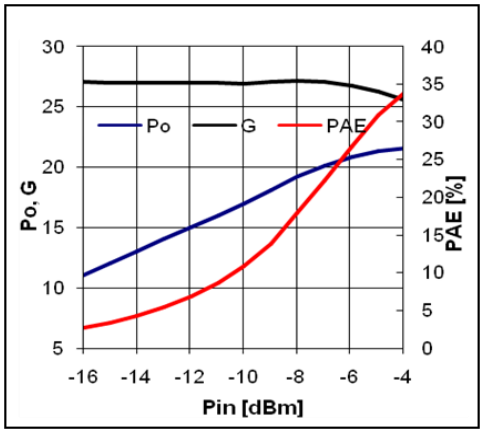
Pin-Pout-Gain



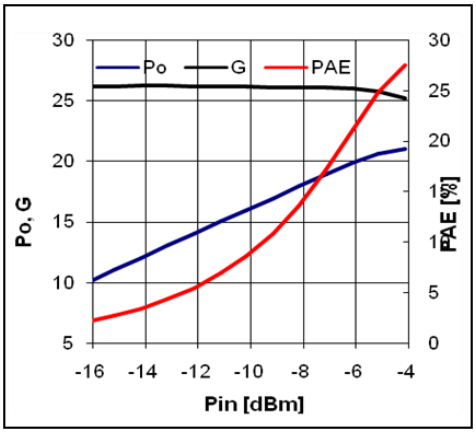
70MHz, 5V/95mA



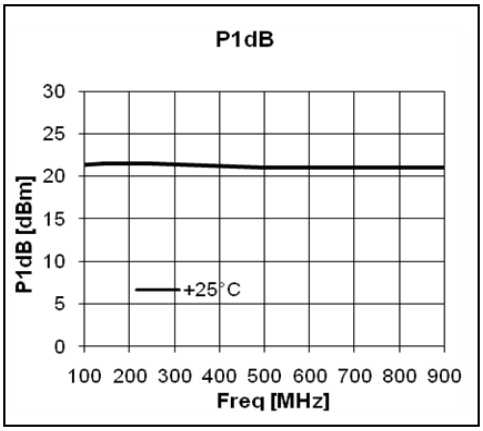
140MHz, 5V/95mA



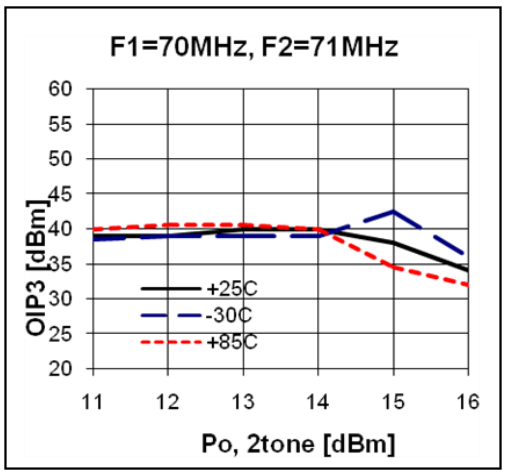
250MHz, 5V/95mA

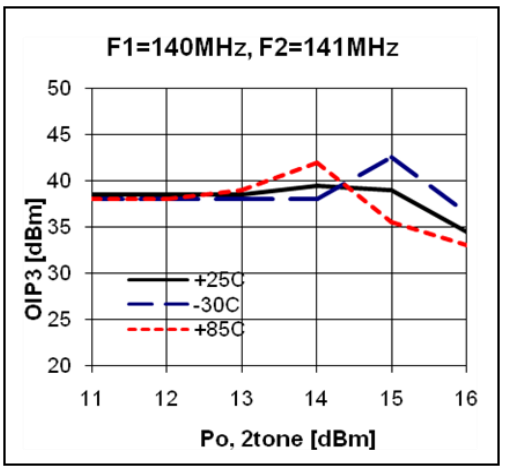


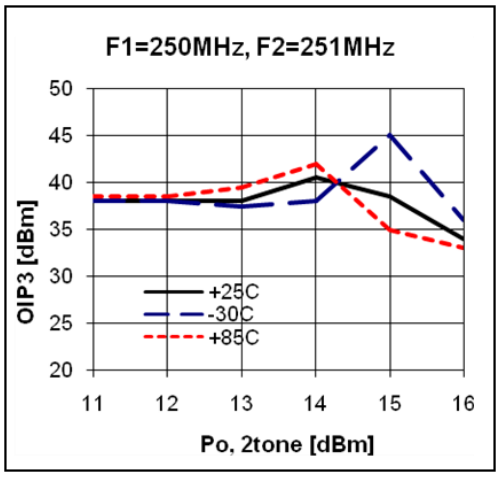
500MHz, 5V/95mA

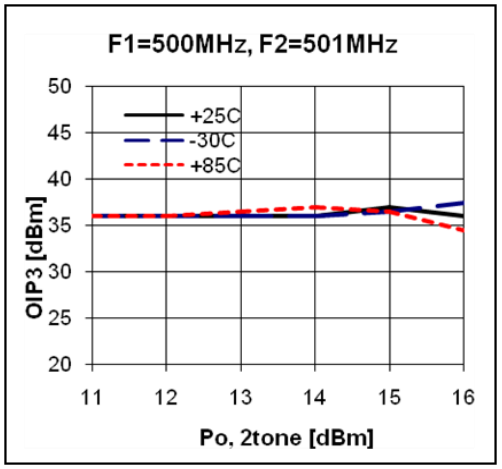


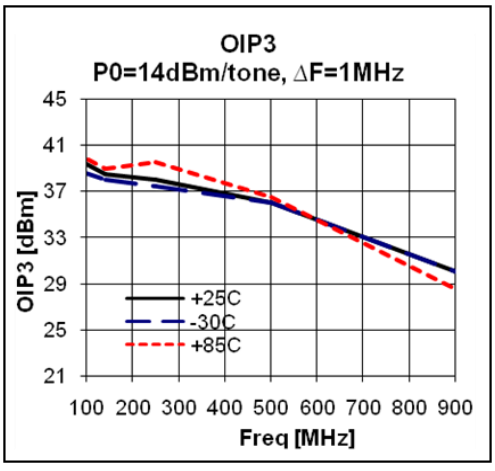
OIP3



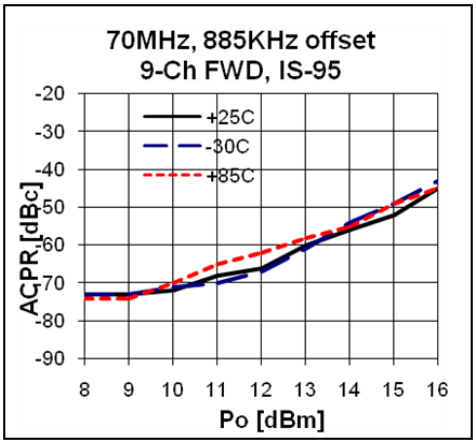


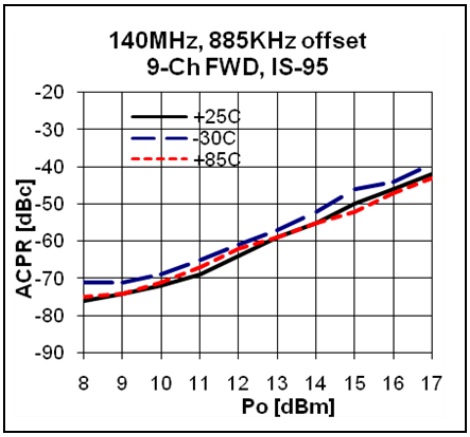


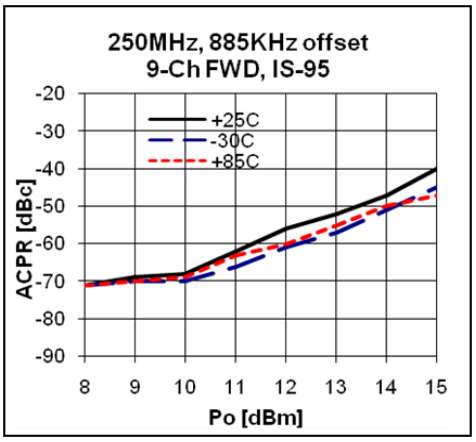


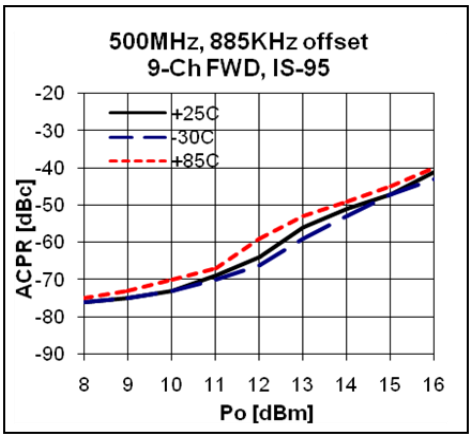


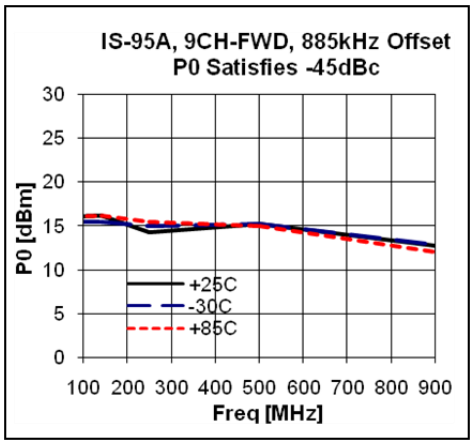
ACPR



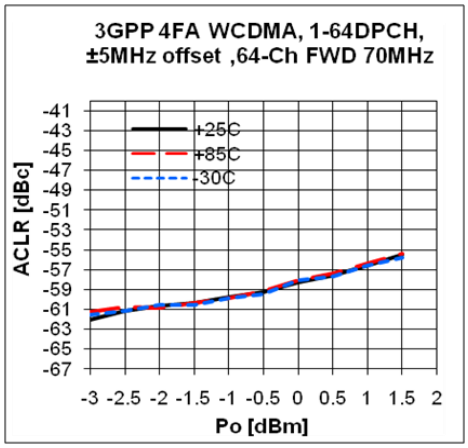




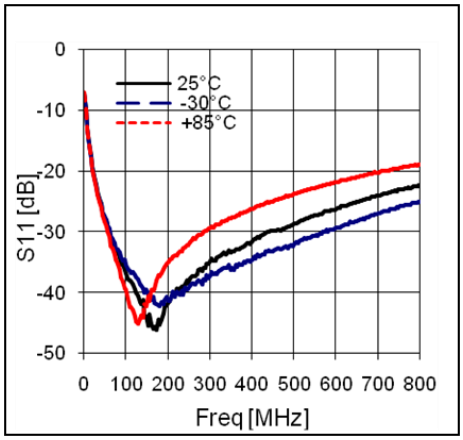


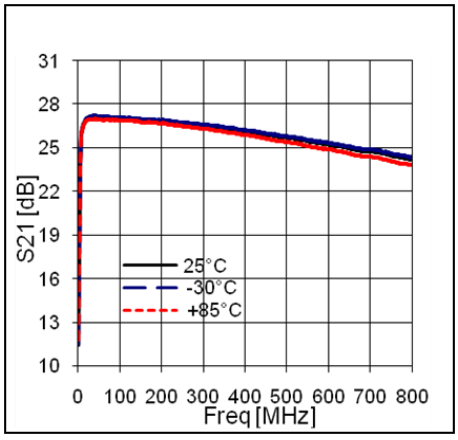


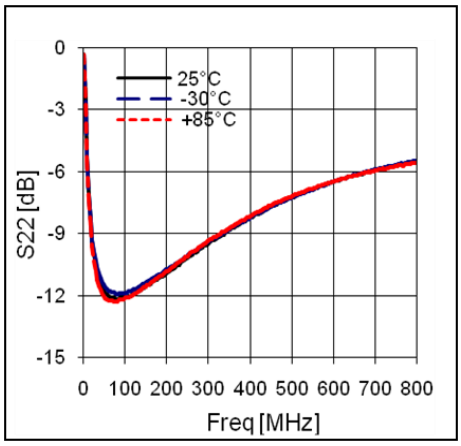
ACLR

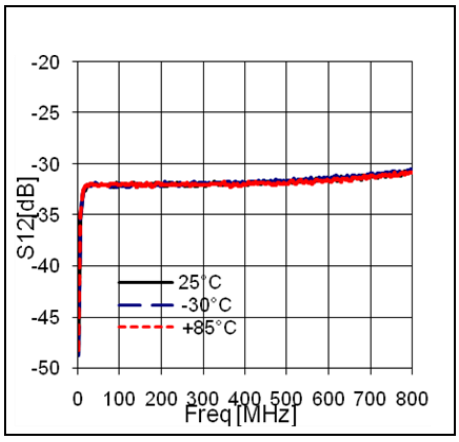


S-Parameters over Temperature









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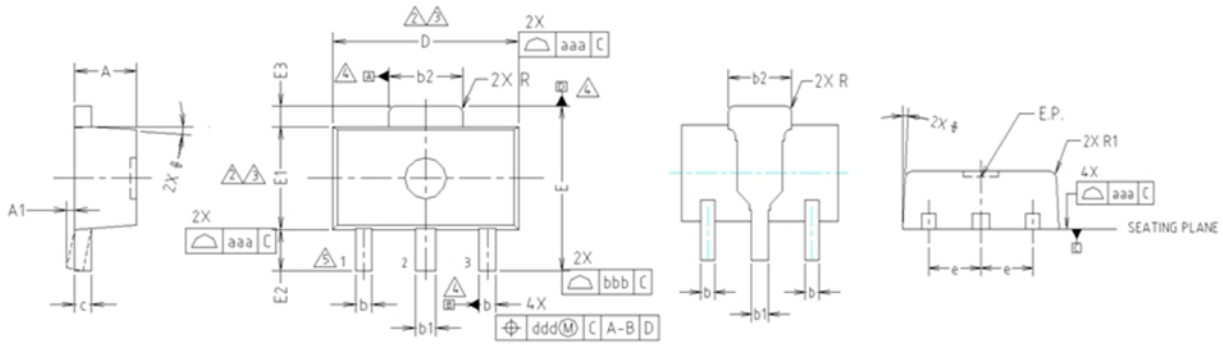
Package Outline Dimension



NOTE:

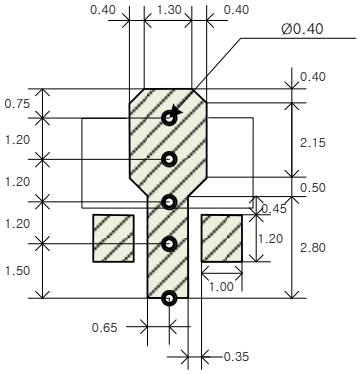
1. DIMENSIONS IN MILLIMETERS.
2. DIMENSION D DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.5mm PER END. DIMENSION E1 DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.5mm PER SIDE.
3. DIMENSIONS 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 0.10mm 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

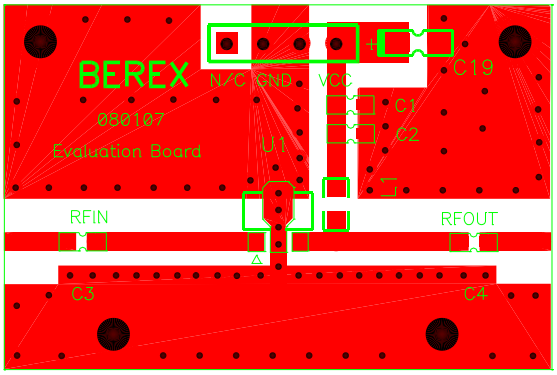
PCB Land Pattern



Note : All dimension _ millimeters

PCB lay out _ on BeRex website

PCB Mounting



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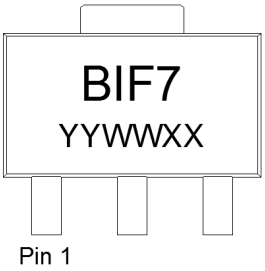
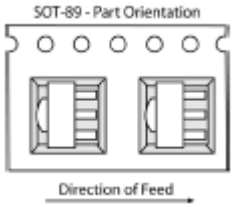
Package Marking



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

NATO CAGE code:

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