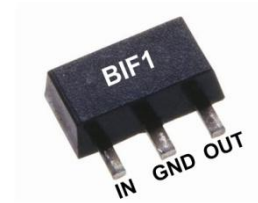


## 50-800 MHz Internally Matched IF Amplifier

### Device Features

- 44dBm Output IP3 at 10dBm/tone at 70MHz
- 15.1dB Gain at 250MHz
- 20.9dBm P1dB at 250MHz
- Highly Reliable InGaP/GaAs HBT Technology
- Temperature Compensation Circuit patent
- Over Voltage Protection Circuit patent
- SOT-89 Surface Mount Package
- 50 ohm Cascadeable
- Lead-free/Green/RoHS compliant
- Application: commercial, space, military wireless system



### Electrical Specifications ( $T_a = 25^\circ\text{C}$ , $V_s = 5\text{V}$ )

Parameters	Test Conditions	Min	Typ	Max	Unit
<b>Frequency Range</b>		50		800	MHz
<b>Gain</b>	70 MHz	14.2	15.2	16.2	dB
	140 MHz	14.2	15.2	16.2	
	250 MHz	14.1	15.1	16.1	
	500 MHz	14.0	15.0	16.0	
<b>S11</b>	70 MHz		-18.0		dB
	140 MHz		-17.0		
	250 MHz		-18.0		
	500 MHz		-18.0		
<b>S22</b>	70 MHz		-16.0		dB
	140 MHz		-17.0		
	250 MHz		-16.0		
	500 MHz		-15.0		
<b>OIP3</b>	70 MHz	42.0	44.0		dBm
	140 MHz	38.0	42.0		
	250 MHz	38.5	40.5		
	500 MHz	35.5	37.5		
<b>P1dB</b>	70 MHz	19.0	20.0		dBm
	140 MHz	19.8	20.8		
	250 MHz	19.9	20.9		
	500 MHz	20.0	21.0		
<b>Ic</b>	$V_c = 5.0\text{V}$	95	105	115	mA
<b>Vc</b>			5.0		V
<b>dG/dT</b>			-0.001		dB/°C
<b>Rth</b>	Thermal Resistance		50		°C/W

Typical test conditions unless otherwise noted.

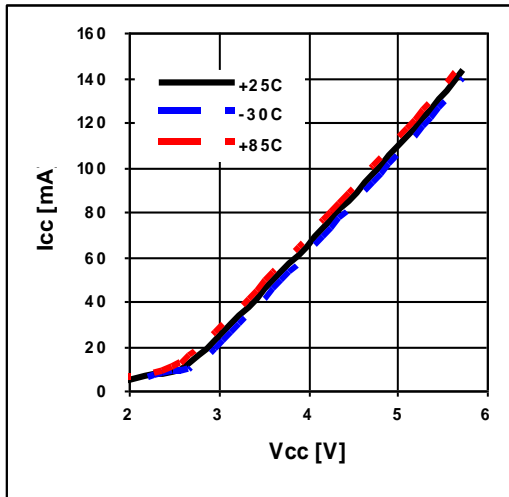
1. Device performance is measured on BeRex evaluation board at 25C, 50 ohm system
2. OIP3 measured with two tones at an output power of 10dBm/tone separated by 1MHz.

**Absolute Maximum Ratings**

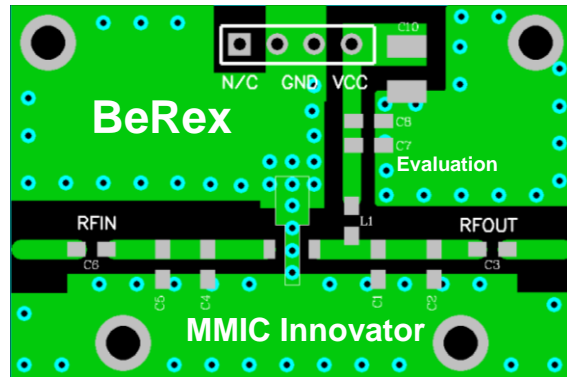
Parameters	Rating
Operating Case temperature	-40 to +85°C
Storage Temperature	-55 to +155°C
Junction Temperature	+220°C
Supply Voltage/Current ( Above this voltage, device goes to protection mode)	7V/180mA
Input RF Power	23dBm

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

**[I-V Characteristics]**



**[Generic SOT89 Evaluation Board]**



- \*Dielectric constant is 4.2
- \*RF pattern width 52mil
- \*31mil thick FR4 PCB

**Application Circuit: 50 - 800 MHz**

Schematic Diagram	BOM	Tolerance
	C1	8200pF ±5%
	C2	8200pF ±5%
	C3	100pF ±5%
	C4	1000pF ±5%
	C5	10uF ±20%
	L1	1200nH 5%

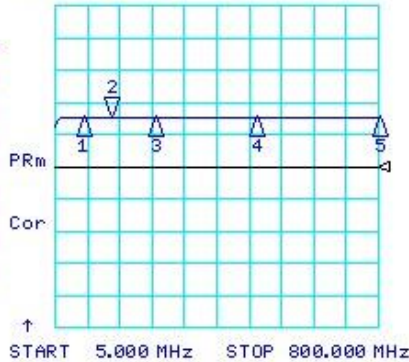
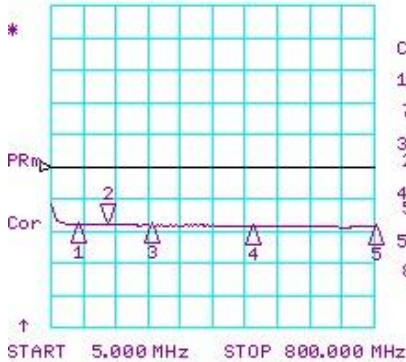
### Typical Device Data

S-parameters (Vc=5V, Ic=105mA, T=25°C)

17 May 2007 15:37:57

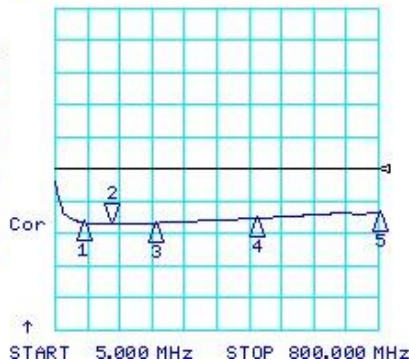
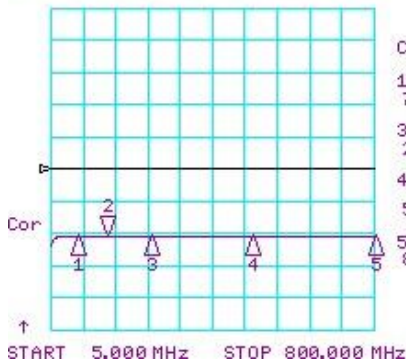
CH1 LOG 10 dB/ REF 0 dB  
S11 2:-18.070 dB 140.000 000 MHz

CH2 LOG 10 dB/ REF 0 dB  
S31 2: 15.426 dB 140.000 000 MHz



CH3 LOG 10 dB/ REF 0 dB  
S13 2:-20.961 dB 140.000 000 MHz

CH4 LOG 10 dB/ REF 0 dB  
S33 2:-16.944 dB 140.000 000 MHz



### Typical Performance (Vdevice = 5.0V, Ic = 108mA, Ta = 25°C)

Freq	MHz	70	140	250	500	800
S21	dB	15.2	15.2	15.1	15.0	14.7
S11	dB	-18	-18	-18	-18	-19
S22	dB	-16	-17	-16	-15	-13
P1	dBm	20.0	20.8	20.9	21.0	20.7
OIP3	dBm	44.0	42.0	40.5	40.0	37.5
NF	dB	4.2	4.3	4.3	4.4	4.5

Typical Performance (V device = 4.7 V, Ic = 87 mA, Ta = 25 °C)

Freq	MHz	70	140	250	500	800
S21	dB	15.2	15.2	15.1	15	14.8
S11	dB	-18.6	-20.4	-21.6	-23.3	-25.6
S22	dB	-11.9	-14.6	-15.6	-14.1	-10.9
P1	dBm	18.9	19.5	19.4	19.8	19.3
OIP3	dBm	42.5	38.5	41	38	34.9
NF	dB	4.2	4.3	4.3	4.4	4.5

Typical Performance (V device = 4.5 V, Ic = 79 mA, Ta = 25 °C)

Freq	MHz	70	140	250	500	800
S21	dB	15.1	15.1	15.0	14.9	14.9
S11	dB	-18.7	-20.7	-22	-23.8	-26.1
S22	dB	-11.8	-14.5	-15.4	-14	-10.8
P1	dBm	18.6	19.3	19.4	19.3	19.4
OIP3	dBm	42.4	42.0	38.0	38.0	36.0
NF	dB	4.2	4.3	4.3	4.4	4.5

Typical Performance (V device = 4 V, Ic = 60 mA, Ta = 25 °C)

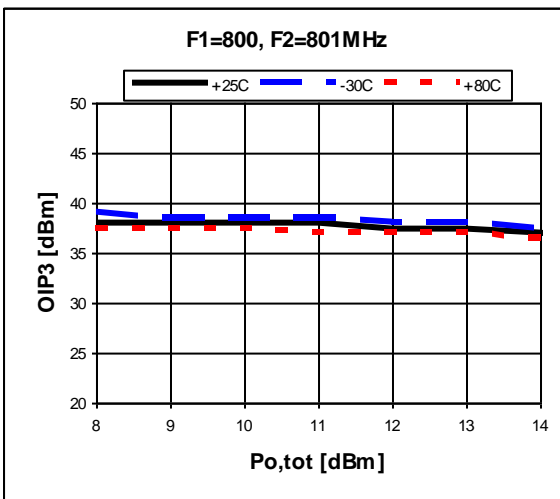
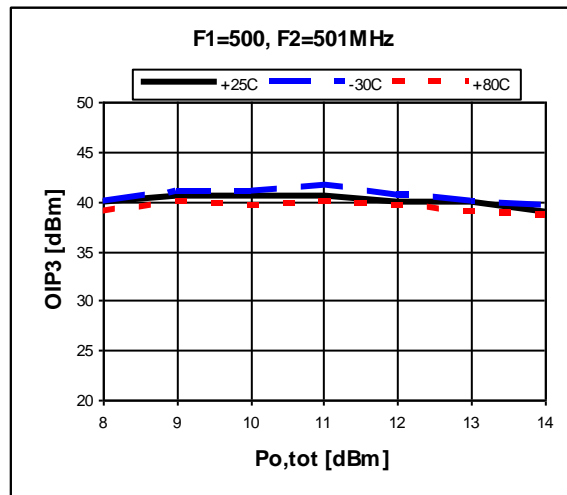
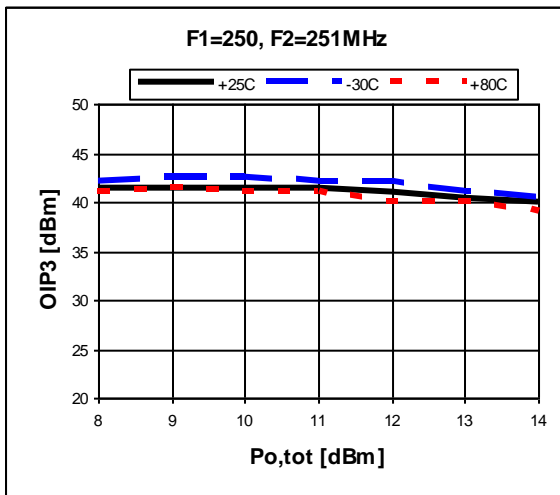
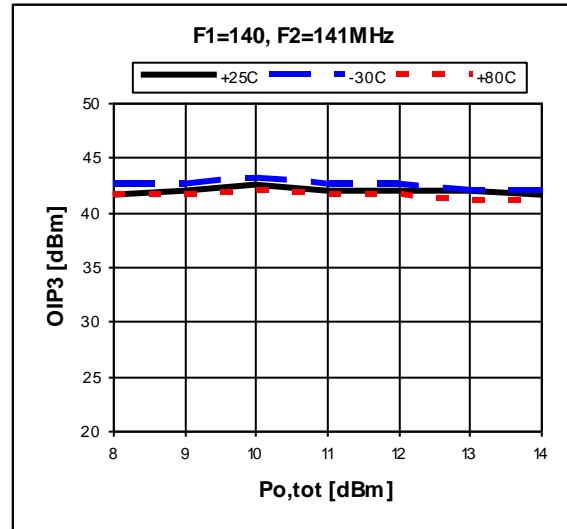
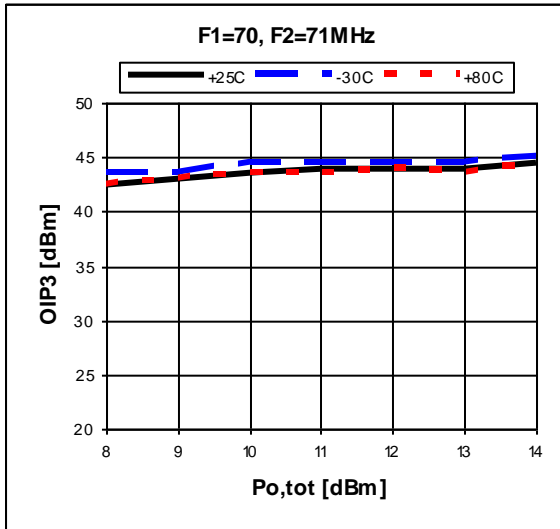
Freq	MHz	70	140	250	500	800
S21	dB	15	15.1	15	14.8	14.6
S11	dB	-19.4	-21.8	-23.4	-25.5	-28
S22	dB	-11.7	-14.2	-15.1	-13.7	-10.6
P1	dBm	16.4	16.9	17	16.9	16.7
OIP3	dBm	37.5	35.5	36.5	34.5	32.2
NF	dB	4.2	4.3	4.3	4.4	4.5

Typical Performance (V device = 3.5 V, Ic = 40 mA, Ta = 25 °C)

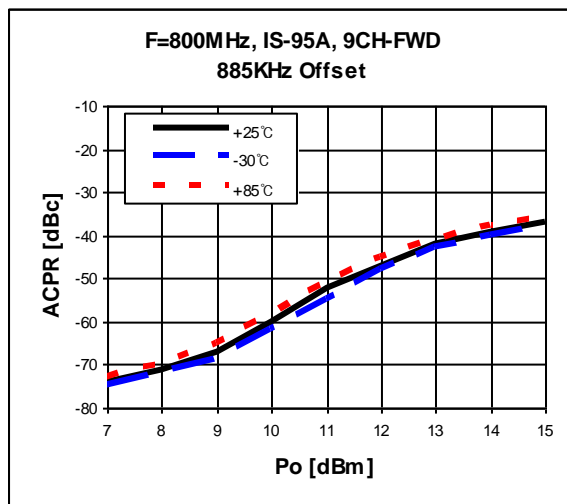
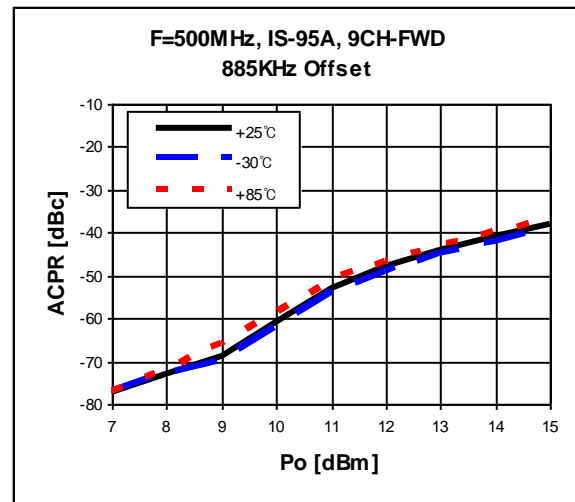
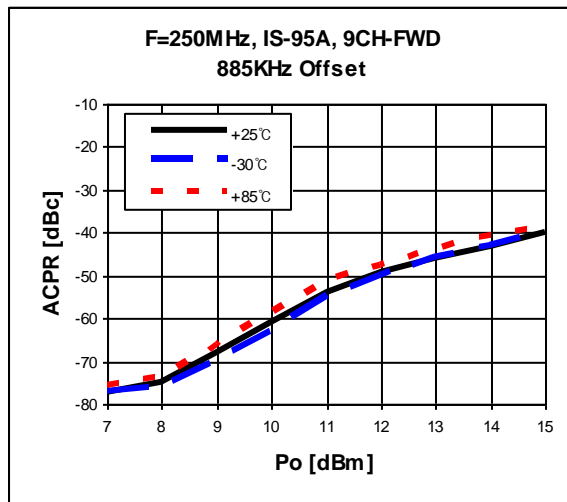
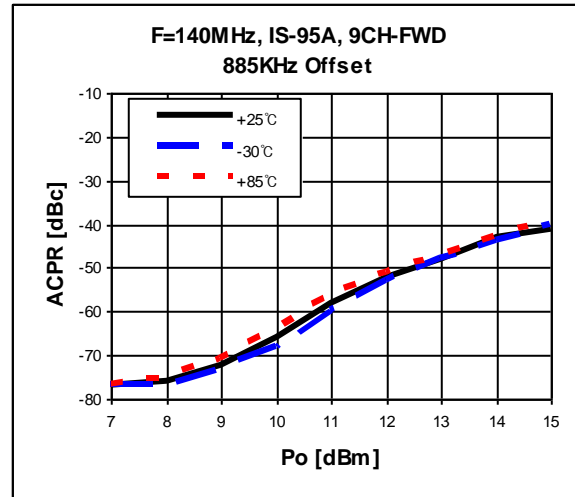
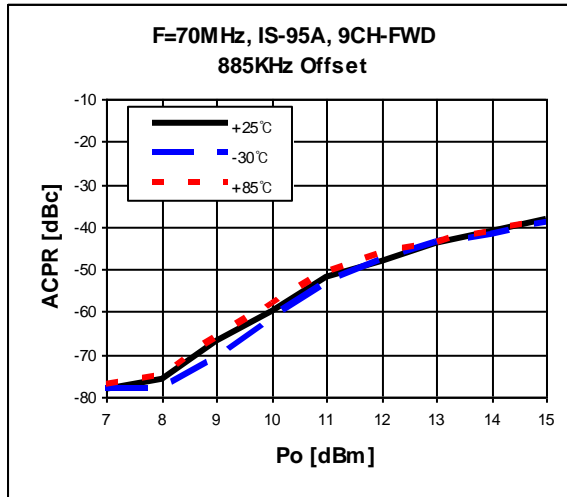
Freq	MHz	70	140	250	500	800
S21	dB	14.8	14.9	14.8	14.6	14.4
S11	dB	-20.7	-24.4	-26.9	-30	-32.1
S22	dB	-11.4	-13.6	-14.4	-13.1	-10.2
P1	dBm	13.4	14.1	14.2	13.6	13.3
OIP3	dBm	34	31.5	30.5	29.5	28.6
NF	dB	4.2	4.3	4.3	4.4	4.5

# Device Performance

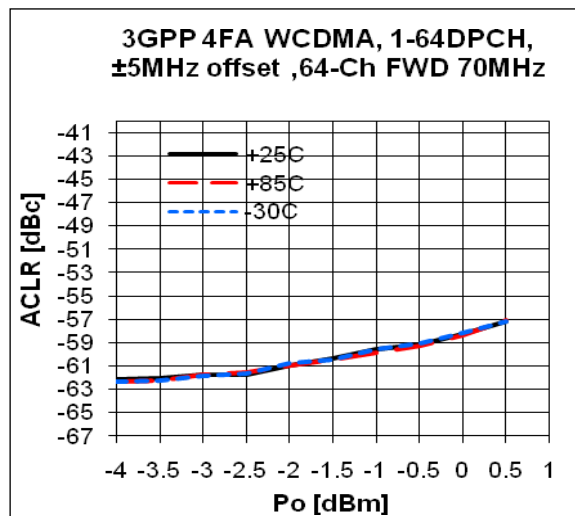
## OIP3



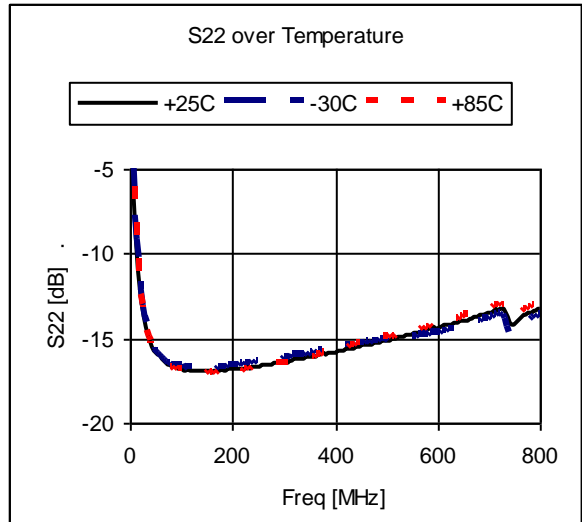
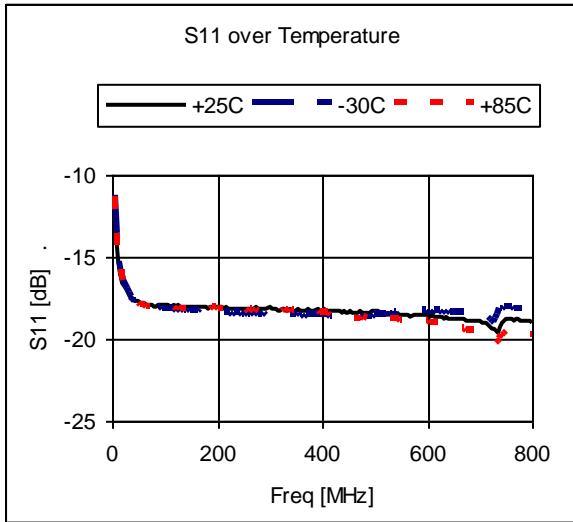
ACPR



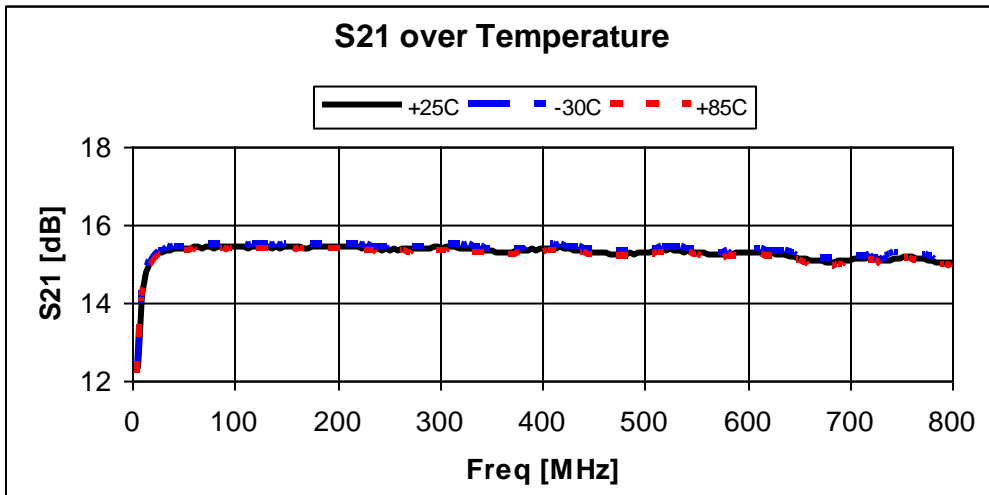
ACLR



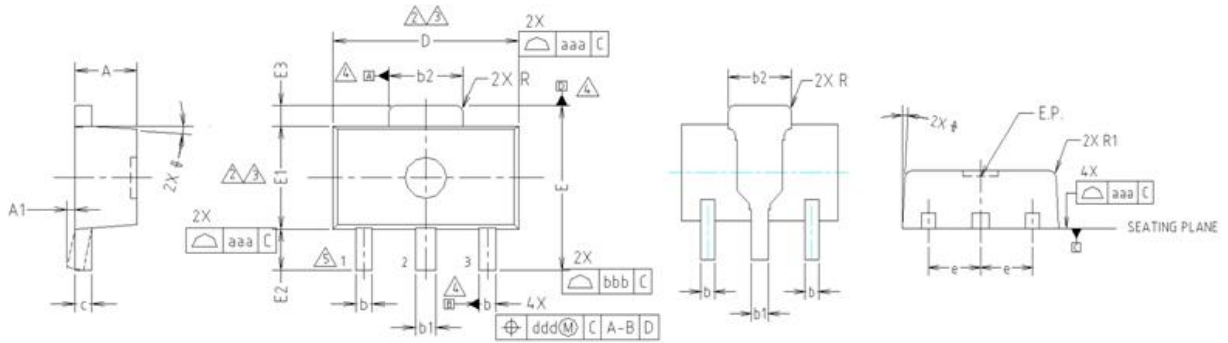
### S-Parameters(S11/S22)



### Gain Flatness



### Package Outline Dimension



**NOTE:**  
 1. DIMENSIONS IN MILLIMETERS.

**△** 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.

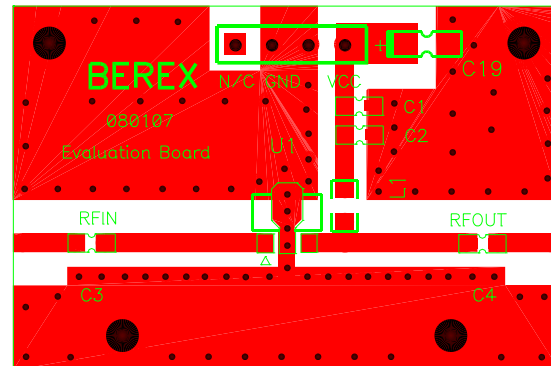
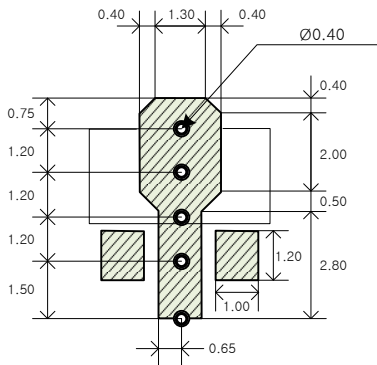
**△** DIMENSIONS D AND E1 ARE DETERMINED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.

**△** DATUMS A, B AND D TO BE DETERMINED 0.18mm FROM THE LEAD TIP.

**△** TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
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.			
φ	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			

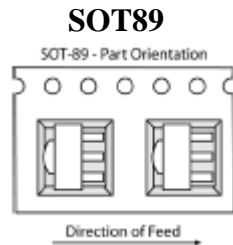
### Suggested PCB Land Pattern and PAD Layout



**Note :** All dimension are in millimeters  
 Visit <http://www.berex.com> for PCB layout



## Tape & Reel



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
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## NOTICE

BeRex Corporation reserves the right to make changes of product specification or to discontinue product at any time without notice.