

50-4000 MHz Cascadeable InGaP HBT Gain Block

Device Features

- 35dBm Output IP3 at 7dBm/tone at 900MHz
- 24.1dB Gain at 900MHz
- 19.5dBm P1dB at 900MHz
- 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
Frequency Range		50		4000	MHz
Gain	500MHz		24.3		dB
	900MHz		24.1		
	1900MHz		22.2		
	2450MHz		20.8		
S11	500MHz		-13.0		dB
	900MHz		-22.0		
	1900MHz		-21.0		
	2450MHz		-17.0		
S22	500MHz		-15.0		dB
	900MHz		-23.0		
	1900MHz		-21.0		
	2450MHz		-27.0		
OIP3	500MHz		36.0		dBm
	900MHz		35.0		
	1900MHz		32.0		
	2450MHz		30.5		
P1dB	500MHz		19.5		dBm
	900MHz		19.5		
	1900MHz		19.0		
	2450MHz		17.3		
Ic	Vc = 5.0V		83		mA
Vc			5.0		V
dG/dT			-0.004		dB/°C
Rth	Thermal Resistance		50		°C/W

Test conditions unless otherwise noted.

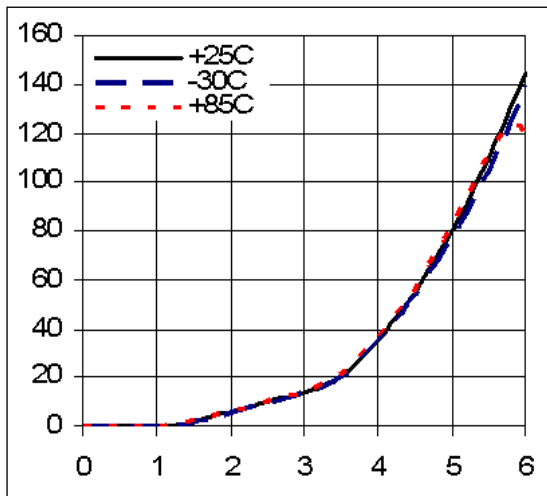
1. Device performance is measured on BeRex evaluation board at 25°C, 50 ohm system.
2. OIP3 measured with two tones at an output power of 7dBm/tone separated by 1MHz.

Absolute Maximum Ratings

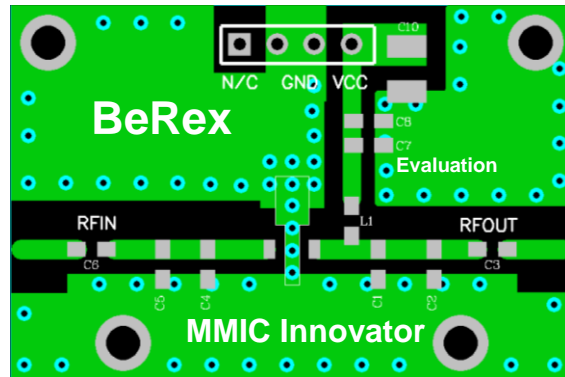
Parameters	Rating
Operating Case temperature	-40 to +85°C
Storage Temperature	-55 to +155°C
Junction Temperature	+220°C
Supply Voltage	6.0V
Max. Device Current	160mA
Input RF Power	23dBm

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: 500-4000 MHz

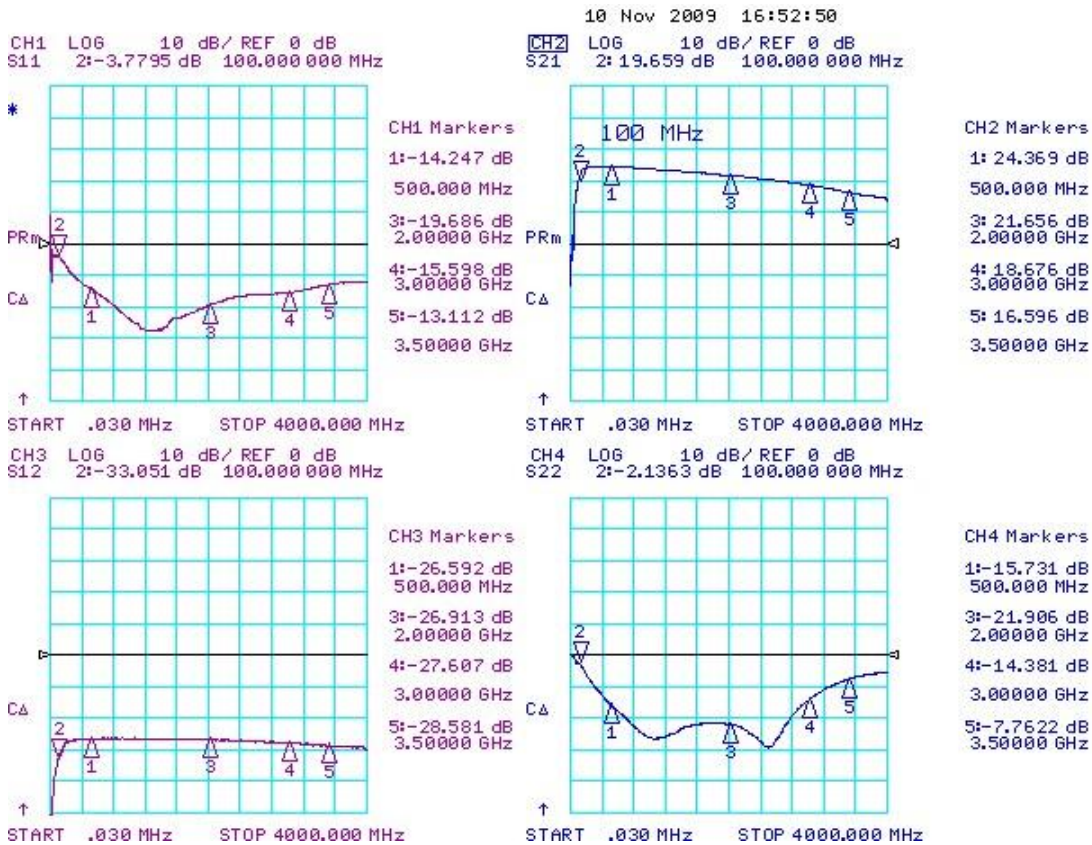
Schematic Diagram	BOM	Tolerance
	C1	100pF ± 5%
	C2	100 pF ± 5%
	C3	100pF ± 5%
	C4	1000pF ± 5%
	C5	10uF ± 20%
	L1	33nH ±5%

Typical Performance (V_{device} = 5V, I_c = 83mA, T_a = 25°C)

Freq	MHz	500	900	1900	2140	2450	3000
S21	dB	24.3	24.1	22.2	21.7	20.8	19.0
S11	dB	-13.0	-21.0	-22.0	-20.0	-18.0	-15.0
S22	dB	-15.0	-22.0	-20.0	-22.0	-26.0	-14.0
P1	dBm	19.5	19.5	19.0	18.8	17.3	15.7
OIP3	dBm	36	35	32	31.5	30.5	27
NF	dB	4.2	4.2	4.3	4.4	4.5	4.9

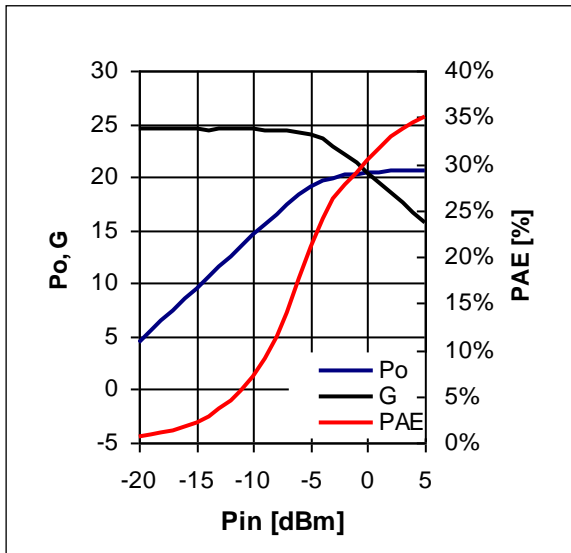
Typical Device Data

S-parameters (V_c=5V, I_c=83mA, T=25°C)

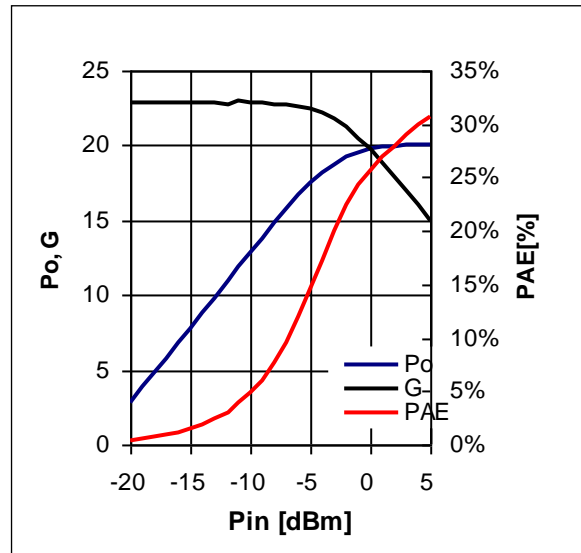


Device Performance

Pin-Pout-Gain

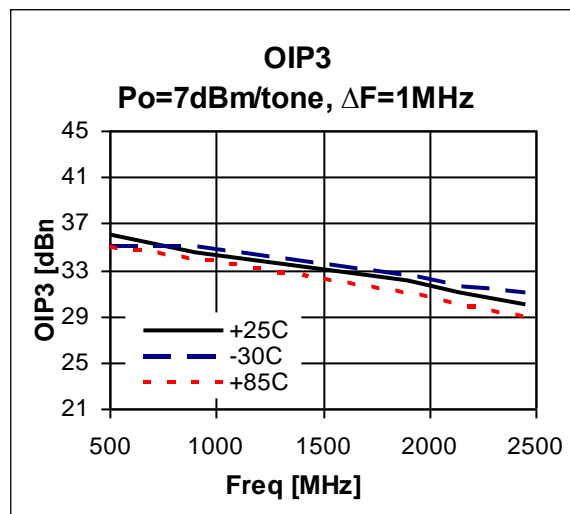
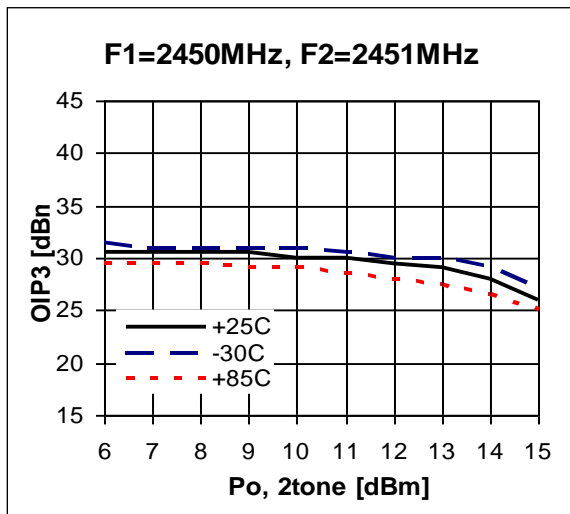
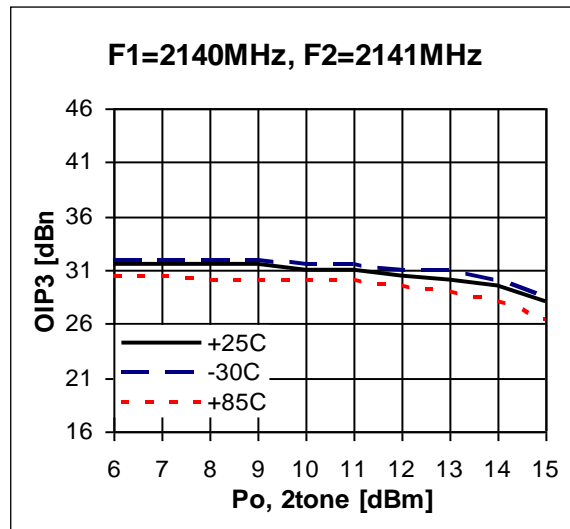
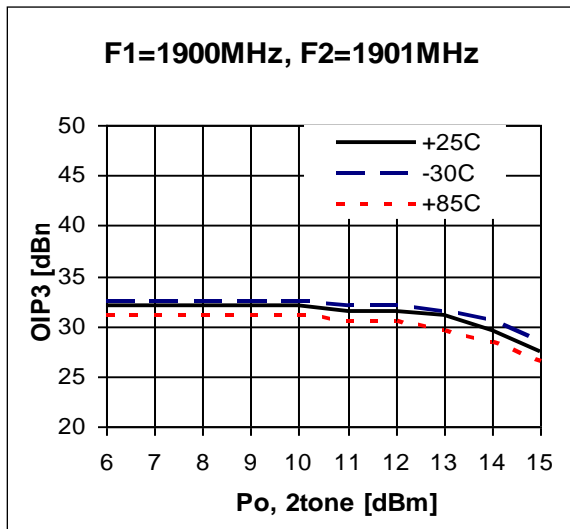
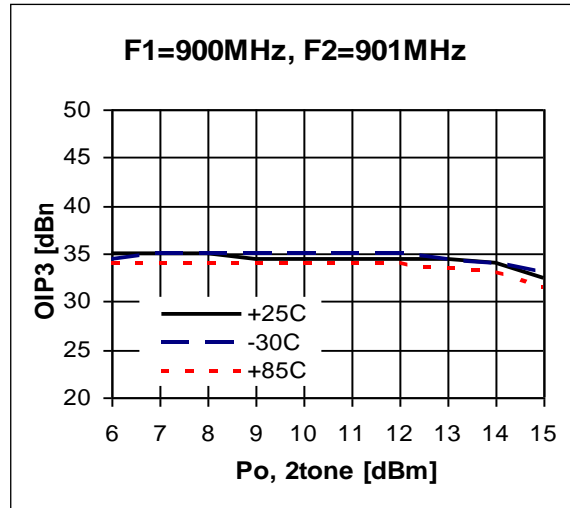
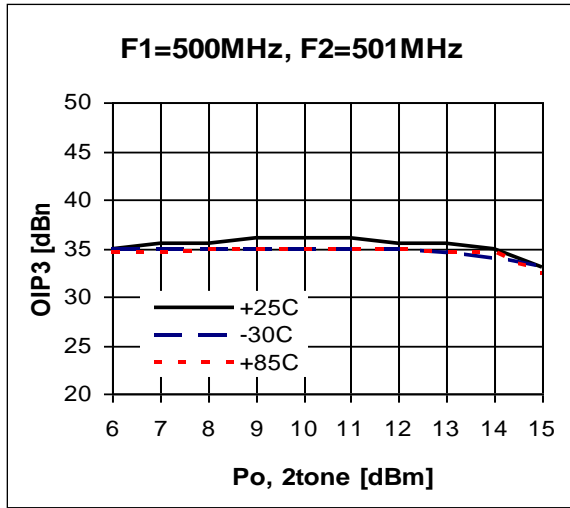


900MHz, 5V/78mA

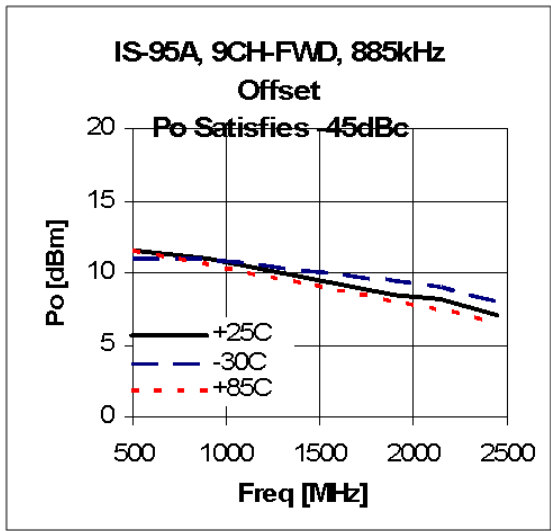
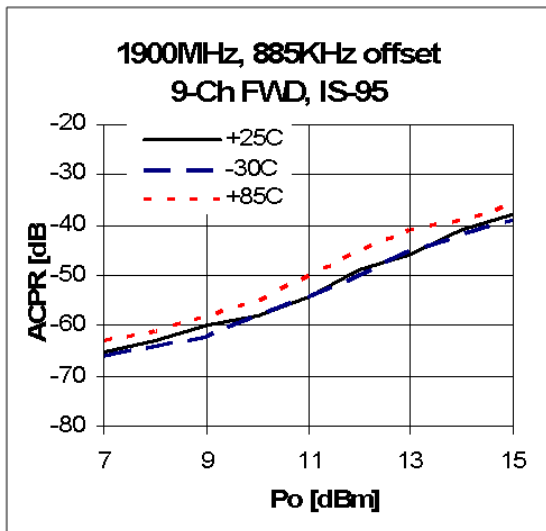
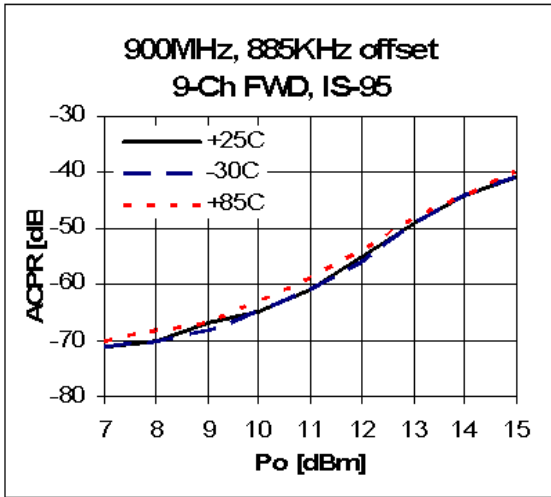
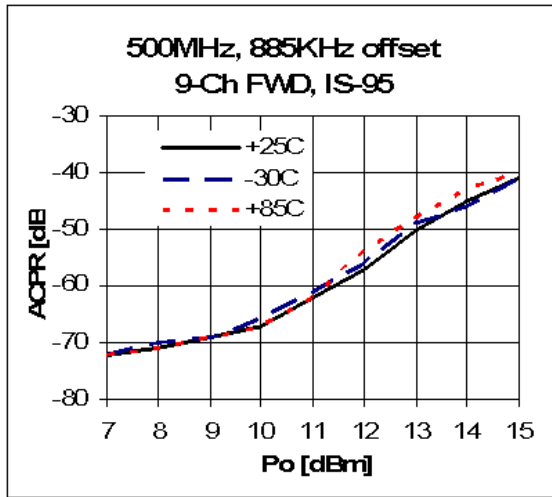


1900MHz, 5V/78mA

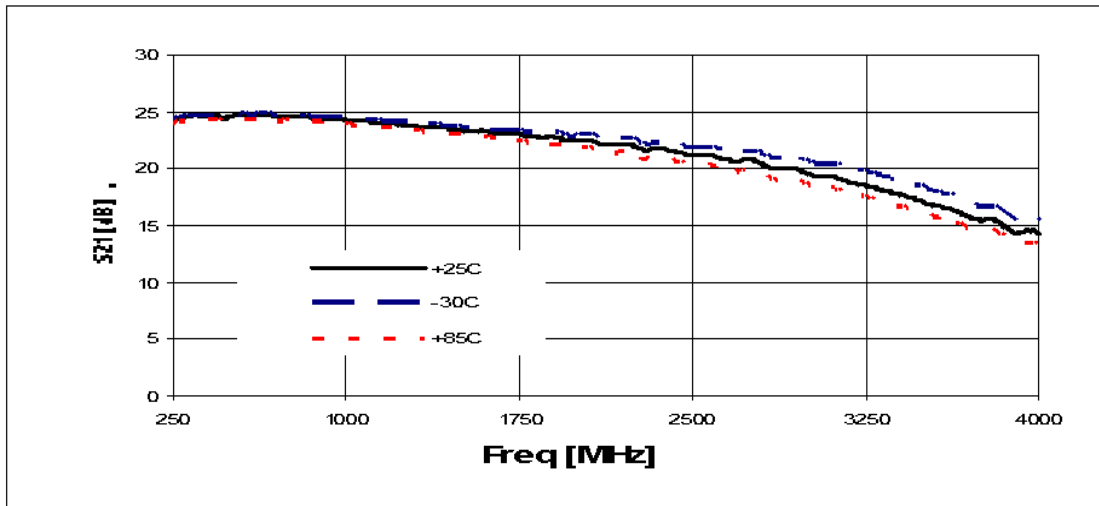
OIP3



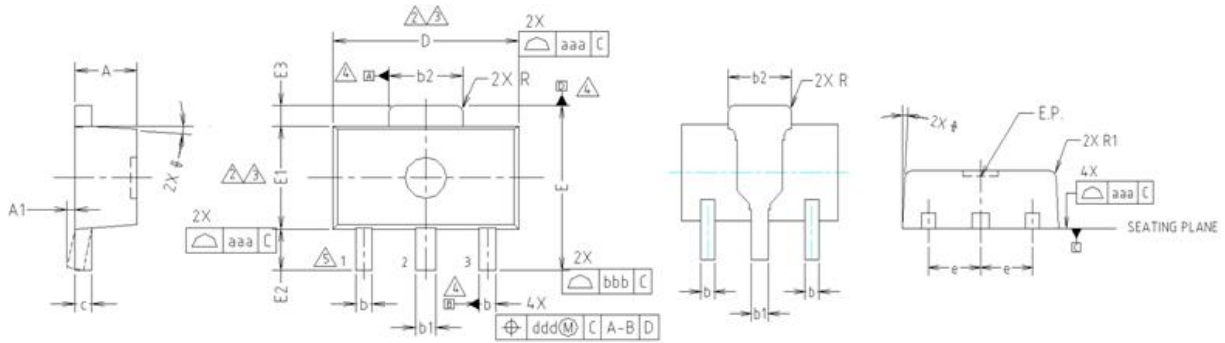
ACPR



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.

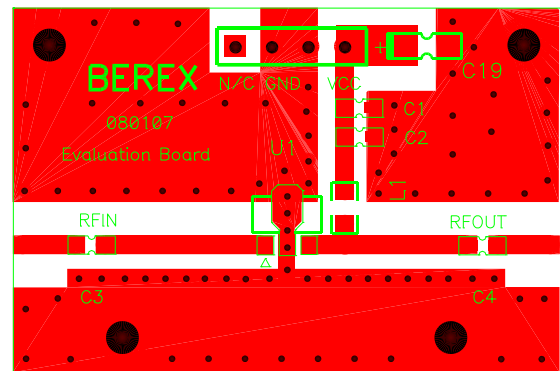
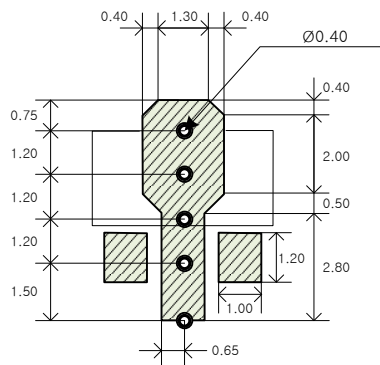
⚠ DIMENSIONS D AND E1 ARE DETERMINED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.

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

⚠ TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

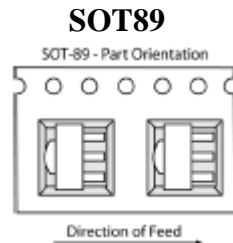
SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.40	1.50	1.60	
A1	0.00	—	0.10	
b	0.38	0.42	0.48	
b1	0.48	0.52	0.58	
b2	1.79	1.82	1.87	
c	0.40	0.42	0.46	
D	4.40	4.50	4.70	2,3
E	3.70	4.00	4.30	
E1	2.40	2.50	2.70	2,3
E2	0.80	1.00	1.20	
E3	0.40	0.50	0.60	
e	1.50 TYP.			
φ	4° TYP.			
R	0.15 TYP.		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