BIG2

50-600 MHz Internally Matched IF Amplifier

Preliminary Datasheet

Device Features

- OIP3 = 41 dBm @ 140 MHz
- Gain = 16 dB @ 140 MHz
- Output P1 dB = 20.5 dBm @ 140 MHz
- NF = 3.2 @ 140MHz at Demo Board

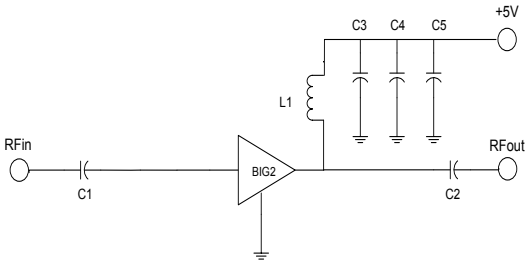
Product Description

BeRex's BIG2 is a high performance InGaP/ GaAs HBT MMIC amplifier, internally matched to 50 Ohms. The BIG2 is designed for high linearity IF amplifier that require excellent gain ,high OIP3 and flatness. It is packaged in a RoHS-compliant with SOT-89 surface mount package.

Applications

- Base station Infrastructure/RFID

Applications Circuit



*C1, C2, =330 pF ± 5%; C3= 100 pF ± 5%; C4 = 1000 pF ± 5%

* C5 = 10uF ± 10%; L1 = 560nH ±10%

Typical Performance[1]

Parameter	Frequency				Unit
	70	140	200	500	MHz
Gain	15.5	16.0	16.0	16.0	dB
S11	-17.0	-22.5	-22.0	-17.5	dB
S22	-13.5	-13.5	-14.0	-15.0	dB
OIP3[2]	40.0	41.0	40.0	38.0	dBm
P1dB	20.0	20.5	20.5	20.2	dBm
Noise Figure	3.3	3.2	3.2	3.3	dB

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

[2] OIP3 _ measured on two tones with a output power 8 dBm/ tone , F2—F1 = 1 MHz.

	Min.	Typical	Max.	Unit
Bandwidth	30		600	MHz
I_C @ (Vc = 5V)	74	84	94	mA
V_C		5.0		V
dG/dT		-0.002		dB/°C
R_{TH}		55.9		°C/W

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	+7.0	V
Supply Current	180	mA
Input RF Power	24	dBm

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

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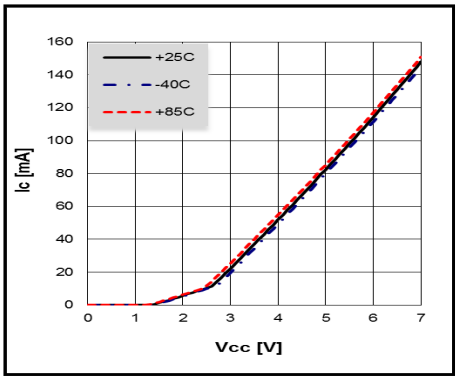
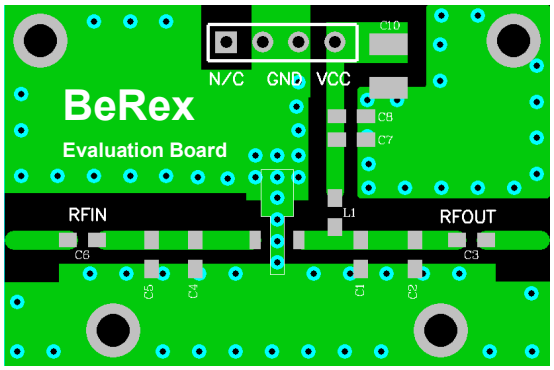
V-I Characteristics



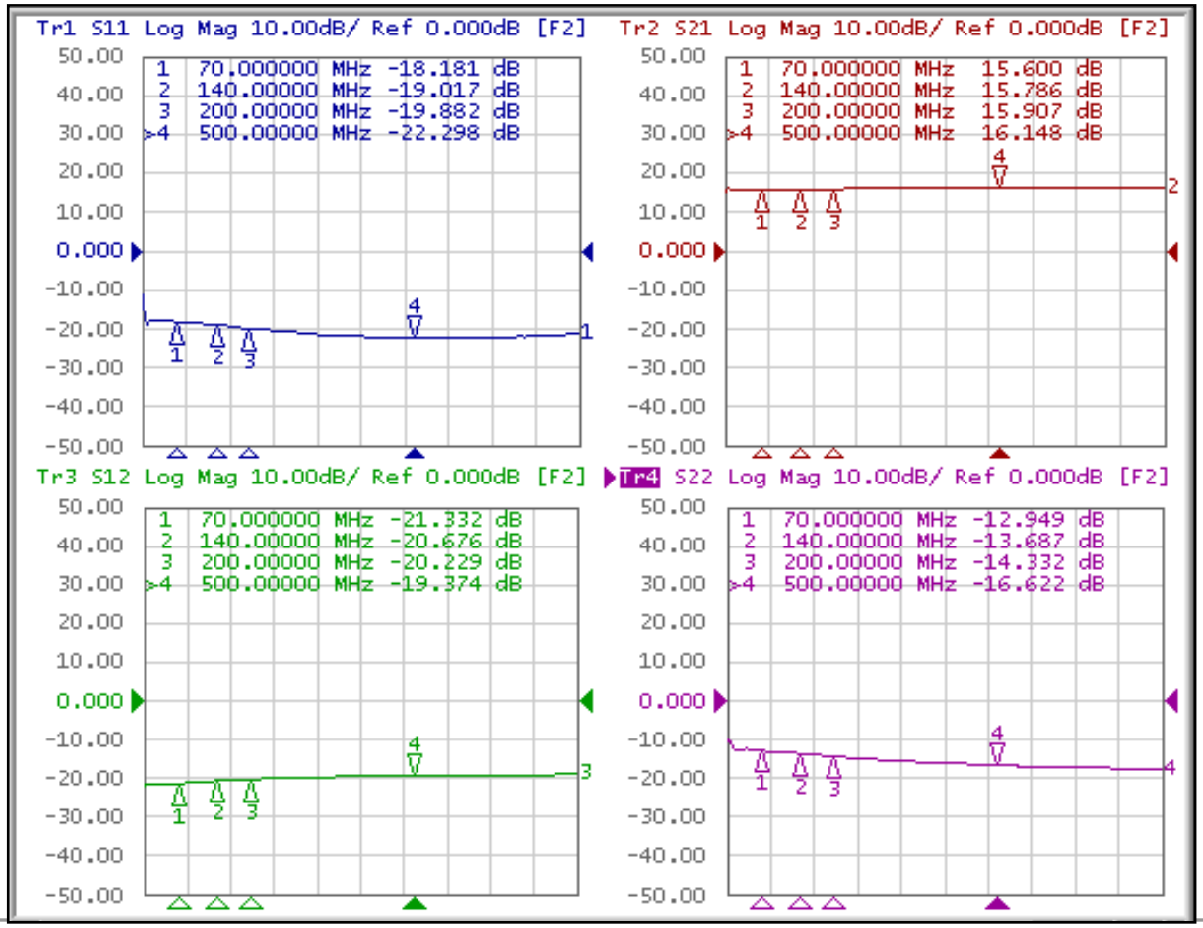
BeRex SOT89 Evaluation Board



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

Typical Device Data

S-parameters (Vc=5V, Ic=83mA, T=25°C)



S-Parameter

(Vdevice = 5.0V, Icc = 83mA, T = 25 °C, calibrated to device leads)

Freq	S11 [Mag]	S11 [Ang]	S21 [Mag]	S21 [Ang]	S12 [Mag]	S12 [Ang]	S22 [Mag]	S22 [Ang]
10	0.187	115.549	0.084	-9.417	6.255	169.273	0.306	21.492
50	0.125	169.888	0.084	4.269	5.991	179.597	0.230	-19.298
100	0.118	161.079	0.088	6.932	6.080	178.471	0.219	-36.430
150	0.110	153.957	0.093	7.905	6.173	177.055	0.204	-50.812
200	0.101	147.131	0.097	7.639	6.242	175.131	0.192	-63.246
250	0.093	140.839	0.101	6.973	6.293	173.094	0.182	-73.023
300	0.087	134.988	0.103	6.110	6.340	171.053	0.172	-80.582
350	0.082	132.110	0.104	5.548	6.345	169.314	0.163	-88.471
400	0.081	125.136	0.106	4.916	6.390	167.388	0.156	-93.145
450	0.078	119.954	0.107	4.277	6.398	165.652	0.152	-97.735
500	0.077	112.538	0.107	3.755	6.415	163.578	0.148	-100.771
550	0.077	103.617	0.109	3.148	6.440	161.482	0.143	-103.798
600	0.076	97.304	0.109	2.749	6.423	159.524	0.141	-106.078

Application Circuit: 70-500 MHz

Typical Performance (Vd = 5V, Ic = 83mA, T = 25°C)

Freq	MHz	70	140	200	500
S21	dB	15.6	15.8	15.9	15.9
S11	dB	-19.6	-22.6	-22.4	-17.4
S22	dB	-13.1	-13.5	-14.1	-15.0
P1	dBm	20.3	20.7	20.9	20.0
OIP3	dBm	40.0	41.5	40.1	38.2
NF	dB	3.3	3.3	3.3	3.2

Typical Performance (Vd = 4.7V, Ic = 74mA, T = 25°C)

Freq	MHz	70	140	200	500
S21	dB	15.6	15.8	15.8	15.8
S11	dB	-19.9	-23.1	-22.7	-17.4
S22	dB	-13.0	-13.4	-14.0	-14.9
P1	dBm	19.4	19.6	19.8	19.2
OIP3	dBm	38.3	40.3	38.0	36.7
NF	dB	3.3	3.3	3.2	3.2

Typical Performance (Vd = 4.5V, Ic = 68mA, T = 25°C)

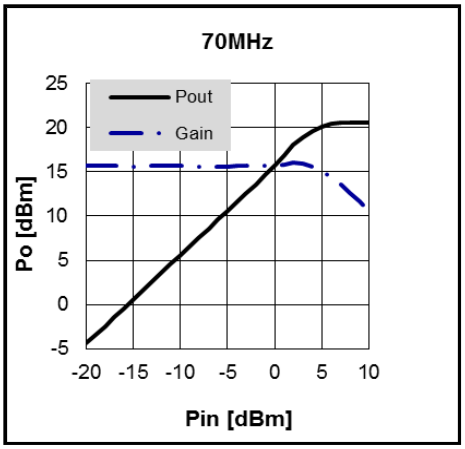
Freq	MHz	70	140	200	500
S21	dB	15.6	15.7	15.8	15.8
S11	dB	-20.2	-23.5	-23.0	-17.5
S22	dB	-13.0	-13.4	-14.0	-14.9
P1	dBm	18.6	18.8	18.9	18.6
OIP3	dBm	38.0	38.5	37.5	35.5
NF	dB	3.2	3.2	3.1	3.1

Typical Performance (Vd = 4V, Ic = 53mA, T = 25°C)

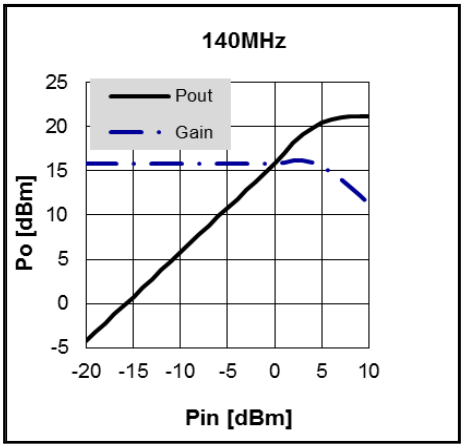
Freq	MHz	70	140	200	500
S21	dB	15.5	15.6	15.7	15.7
S11	dB	-21.2	-25.2	-24.1	-17.7
S22	dB	-12.7	-13.1	-13.8	-14.7
P1	dBm	16.5	16.5	16.4	16.2
OIP3	dBm	33.5	32.9	31.6	31.5
NF	dB	3.1	3.1	3.0	3.0

Device Performance

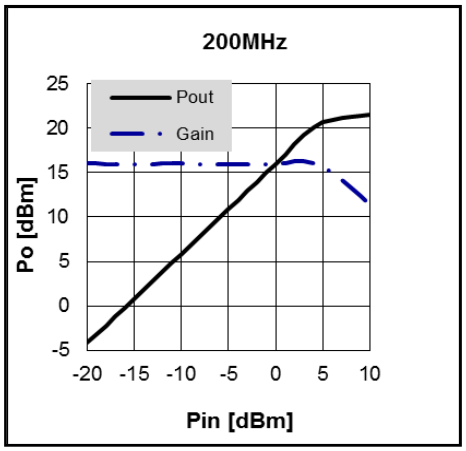
Pin-Pout-Gain



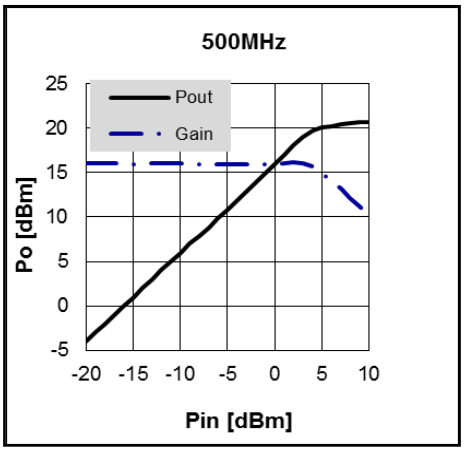
70MHz, 5V/83mA



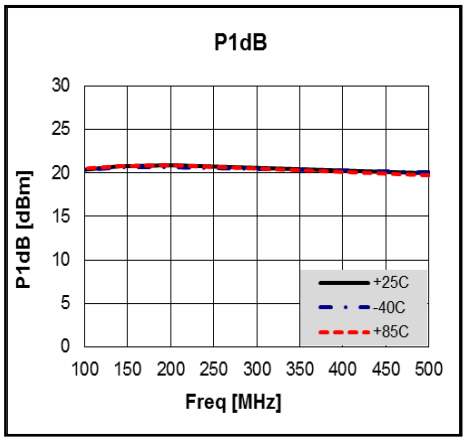
140MHz, 5V/83mA



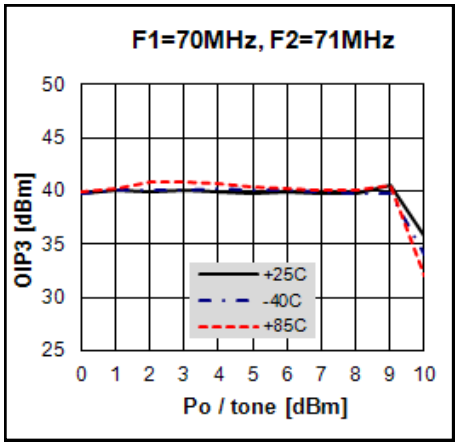
200MHz, 5V/83mA

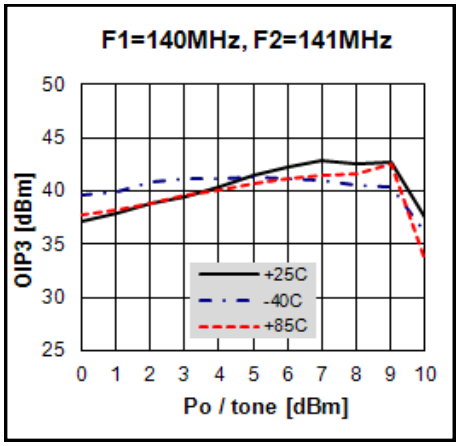


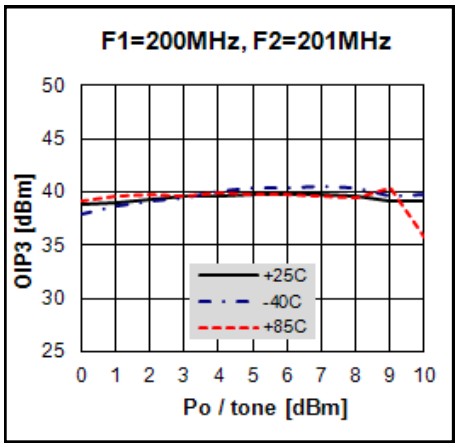
500MHz, 5V/83mA

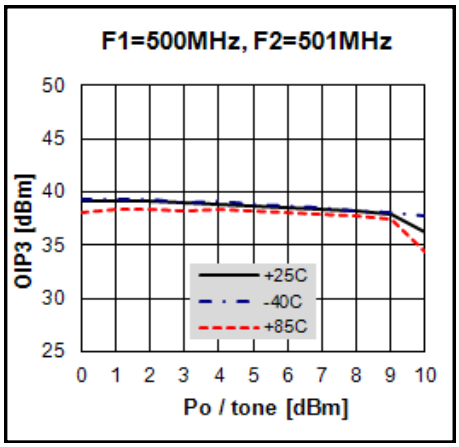


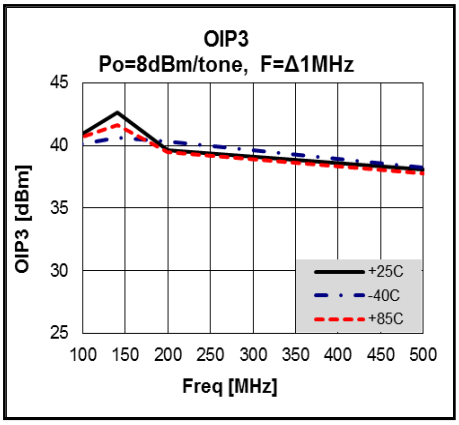
OIP3



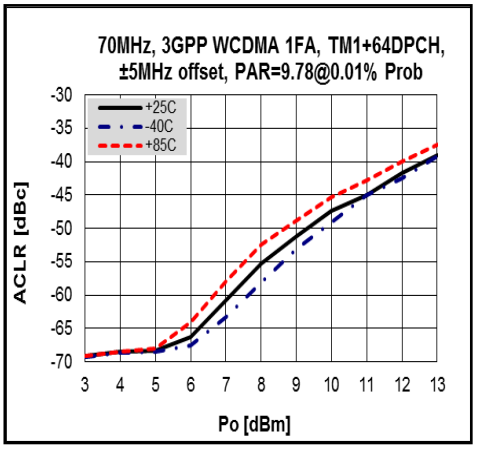


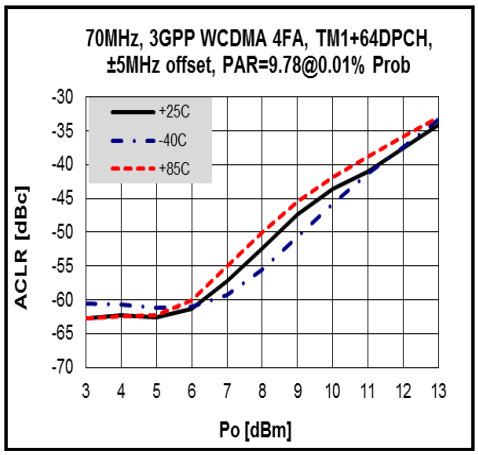


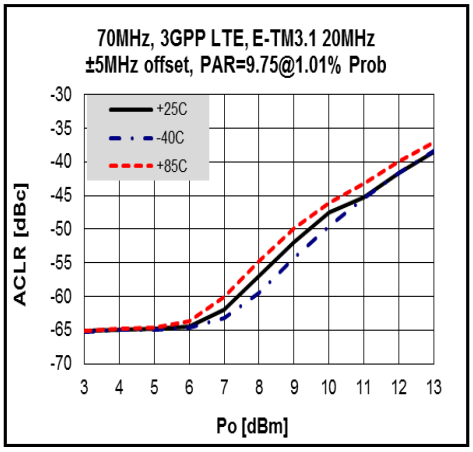


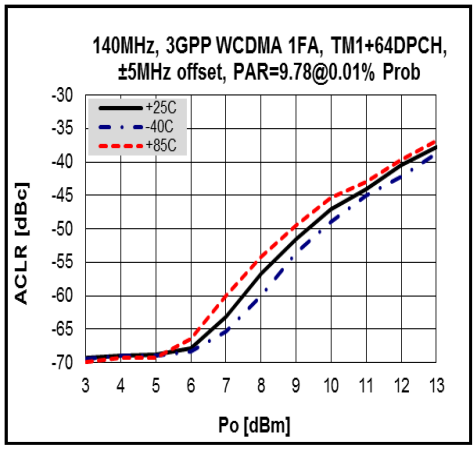


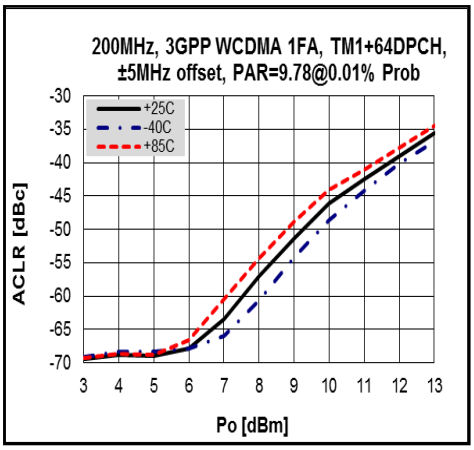
ACLR / LTE

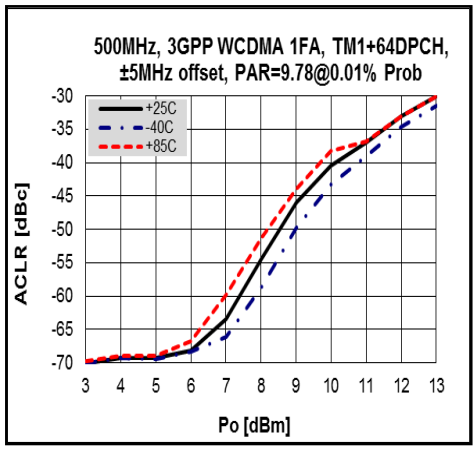


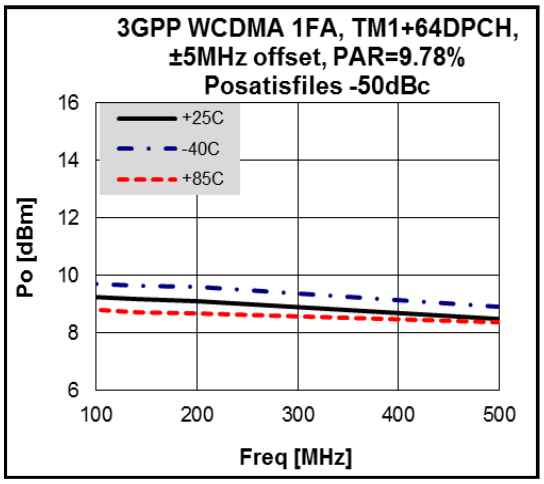




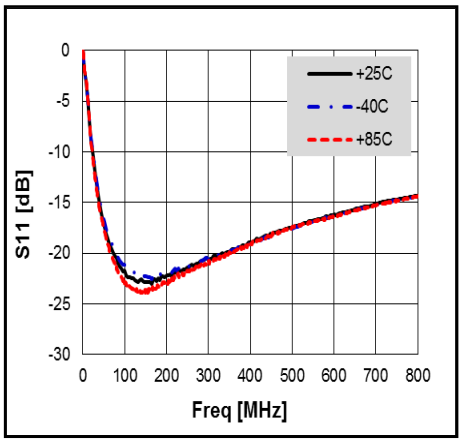


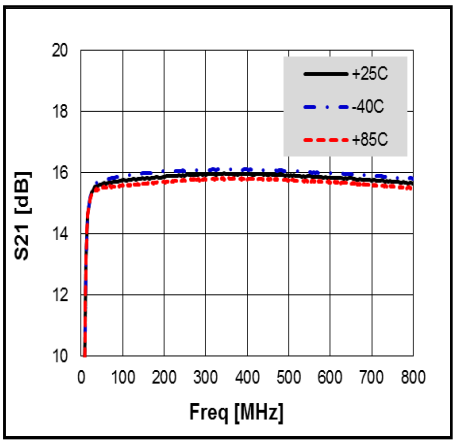


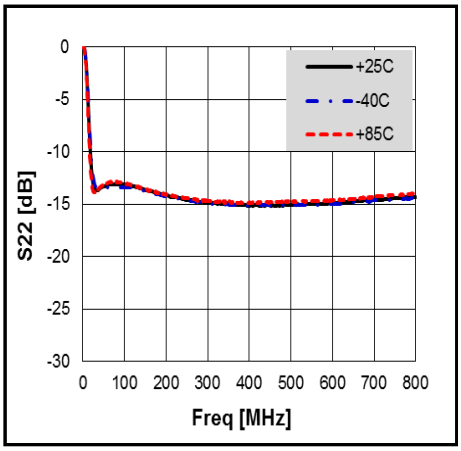


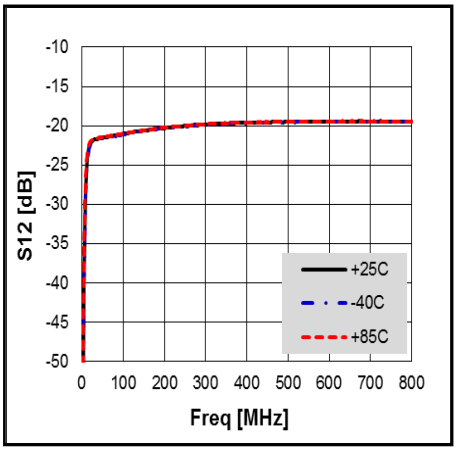


S-Parameters over Temperature

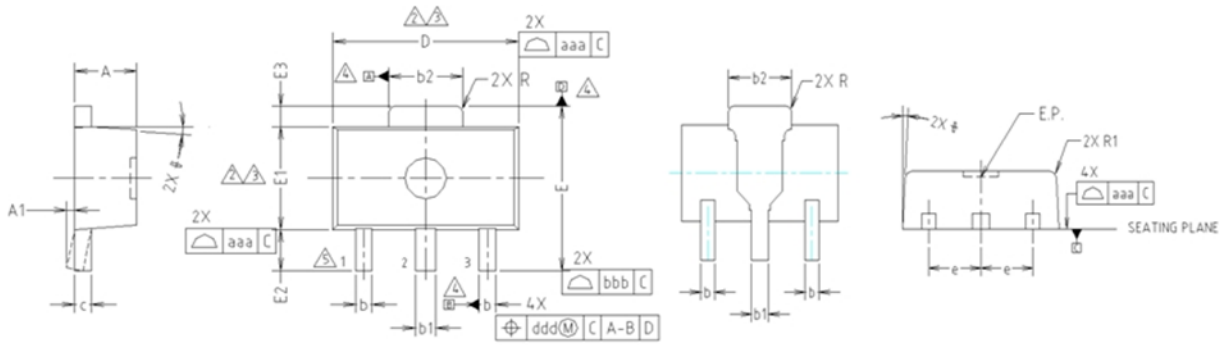








Package Outline Dimension



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.

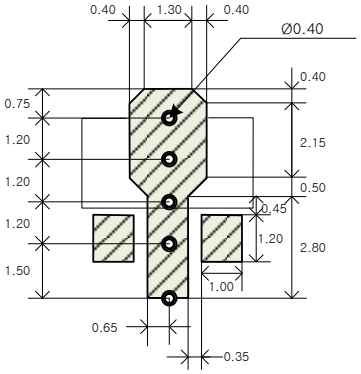
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

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

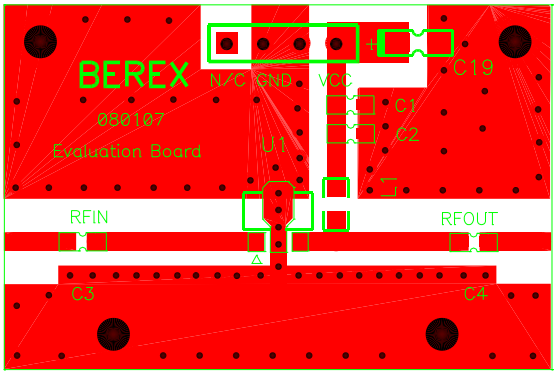
PCB Land Pattern



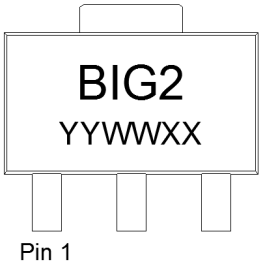
Note : All dimension _ millimeters

PCB lay out _ on BeRex website

PCB Mounting



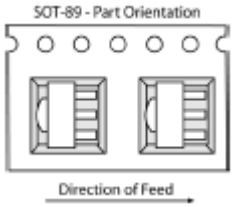
Package Marking



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**