BIG8

50-600 MHz Internally Matched IF Amplifier

Device Features

- OIP3 = 41.5 dBm @ 500 MHz
- Gain = 27 dB @ 140 MHz
- Output P1 dB = 21 dBm @ 140 MHz
- NF = 2.7 @ 70MHz at Demo Board

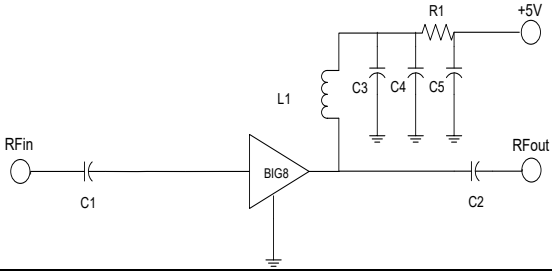
Product Description

BeRex's BIG8 is a high performance InGaP/ GaAs HBT MMIC amplifier, internally matched to 50 Ohms. The BIG8 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



BOM	50~100MHz	100~300MHz	300~600MHz
C1	1000pF	1000pF	100pF
C2	1000pF	1000pF	100pF
C3	100pF	100pF	100pF
C4	1000pF	1000pF	1000pF
C5	10uF	10uF	10uF
L1	1uH	560nH	100nH
R1	1.6ohm	1.6ohm	1.6ohm

Typical Performance[1]

Parameter	Frequency				Unit
	70	140	200	500	MHz
Gain	27.0	27.0	27.0	26.0	dB
S11	-21.0	-20.0	-20.5	-18.5	dB
S22	-17.5	-18.0	-18.0	-17.5	dB
OIP3[2]	40.5	40.0	39.0	41.5	dBm
P1dB	20.5	21.0	21.0	20.5	dBm
Noise Figure	2.7	2.9	3.0	3.1	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	50		600	MHz
I_C @ (Vc = 5V)	83	94	105	mA
V_C		5		V
dG/dT		-0.004		dB/°C
R_{TH}		66.6		°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	V
Supply Current	250	mA
Input RF Power	24	dBm

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

BeRex ●website: www.berex.com ●email: sales@berex.com

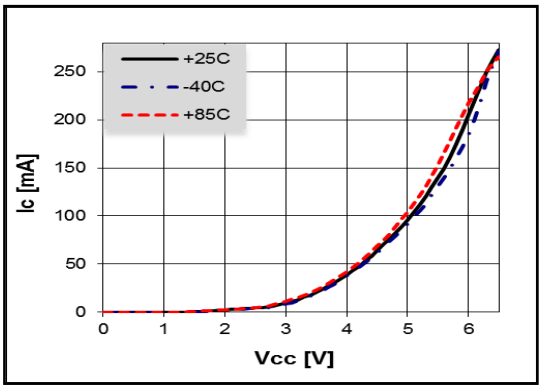
Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

All other trademarks are the property of their respective owners. © 2014 BeRex

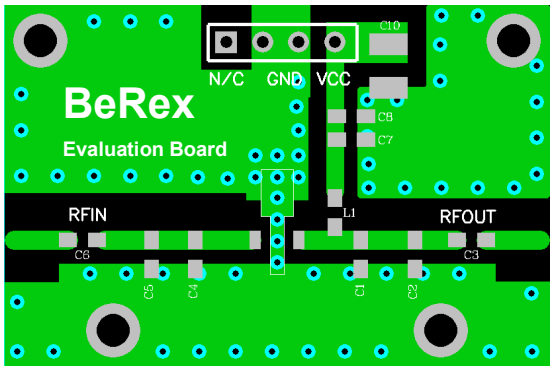
BIG8

50-600 MHz Internally Matched IF Amplifier

V-I Characteristics

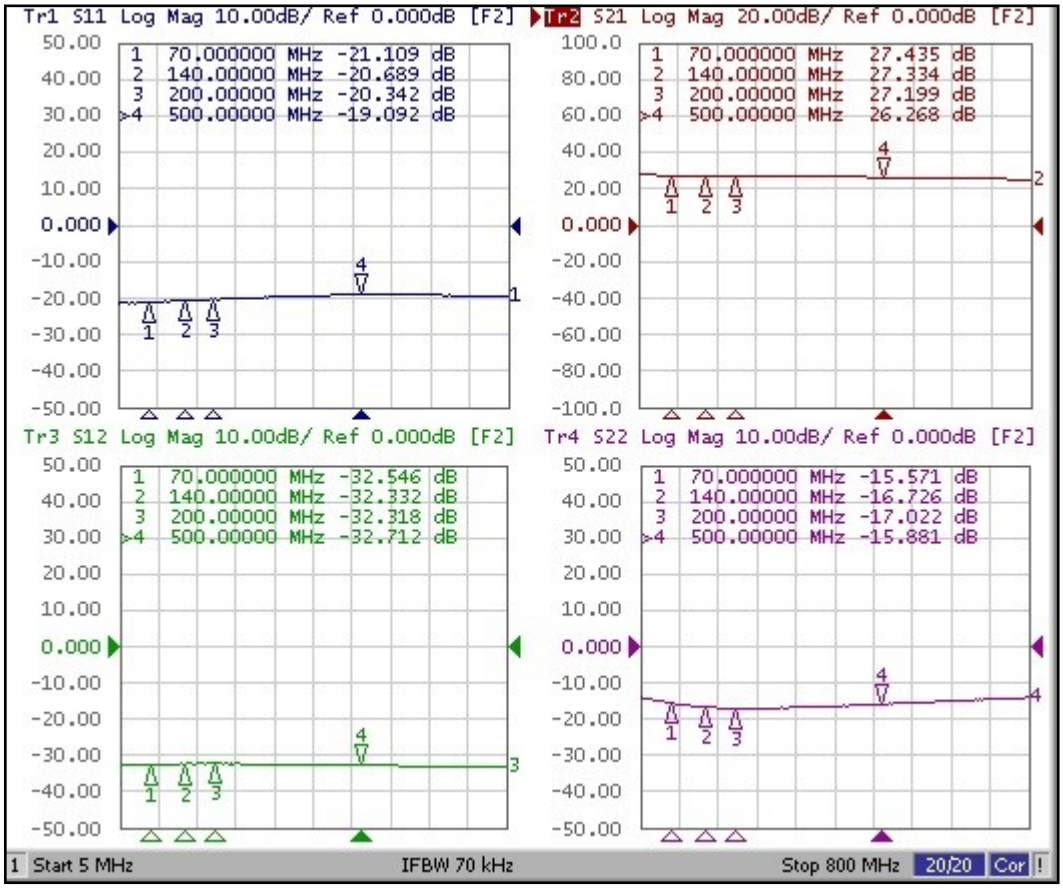


BeRex SOT89 Evaluation Board



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

Typical Device Data



Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

All other trademarks are the property of their respective owners. © 2014 BeRex

S-Parameter

(Vdevice = 5.0V, Icc = 94mA, 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	0.09	-162.49	23.38	-179.10	0.023	2.97	0.19	4.87
50	0.09	-173.26	23.23	176.20	0.024	2.42	0.17	-14.29
100	0.09	-173.63	23.07	171.97	0.024	2.27	0.15	-22.65
150	0.09	-173.14	22.84	167.99	0.025	1.63	0.14	-26.46
200	0.10	-173.82	22.54	164.17	0.025	1.14	0.14	-29.49
250	0.10	-173.69	22.22	160.50	0.025	0.99	0.14	-32.38
300	0.10	-172.72	21.80	156.86	0.025	0.76	0.14	-36.27
350	0.10	-174.64	21.47	153.48	0.024	0.66	0.14	-38.76
400	0.11	-176.60	21.09	150.24	0.024	0.93	0.15	-41.05
450	0.11	-177.87	20.65	146.99	0.024	0.92	0.15	-44.18
500	0.11	179.34	20.27	144.05	0.024	1.25	0.15	-46.40
550	0.11	175.61	19.86	140.85	0.023	1.48	0.16	-48.84
600	0.11	172.99	19.39	137.92	0.023	1.79	0.17	-51.58

Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

All other trademarks are the property of their respective owners. © 2014 BeRex

Application Circuit: 70-500 MHz

Typical Performance (Vd = 5V, Ic = 94mA, T = 25°C)

Freq	MHz	70	140	200	500
S21	dB	27.0	27.1	26.9	26.0
S11	dB	-21.0	-20.1	-20.4	-18.6
S22	dB	-17.5	-17.8	-18.6	-17.7
P1	dBm	20.7	21	21	20.2
OIP3	dBm	40.5	40.2	39	41.6
NF	dB	2.7	2.9	3.0	3.2

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

Freq	MHz	70	140	200	500
S21	dB	26.9	26.9	26.7	25.8
S11	dB	-21.8	-21.6	-21.8	-20.0
S22	dB	-16.7	-16.9	-17.2	-16.5
P1	dBm	20.0	20.1	20.1	19.4
OIP3	dBm	37.5	37.6	36.1	37.5
NF	dB	2.8	2.8	2.8	3.0

Typical Performance (Vd = 4.5V, Ic = 66mA, T = 25°C)

Freq	MHz	70	140	250	500
S21	dB	26.7	26.7	26.5	25.7
S11	dB	-23.3	-23.3	-23.7	-21.1
S22	dB	-15.8	-15.9	-16.2	-15.6
P1	dBm	19.1	19.2	19.1	18.4
OIP3	dBm	34.8	34.9	33.7	34.5
NF	dB	2.8	2.8	2.8	2.9

Typical Performance (Vd = 4V, Ic = 40mA, T = 25°C)

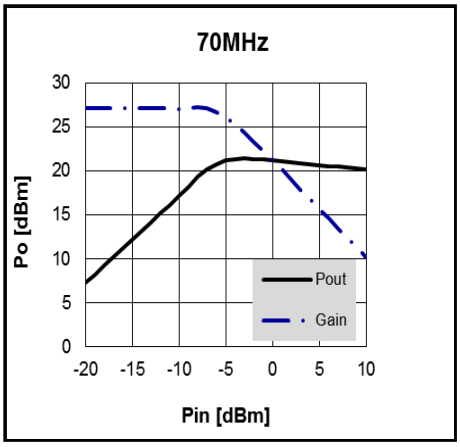
Freq	MHz	70	140	250	500
S21	dB	25.8	25.9	25.7	25.0
S11	dB	-26.8	-29.8	-33.7	-26.9
S22	dB	-12.9	-12.8	-13.0	-12.7
P1	dBm	16.2	16.2	15.5	14.5
OIP3	dBm	28.2	28.3	27.3	25.8
NF	dB	2.7	2.7	2.6	2.7

Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

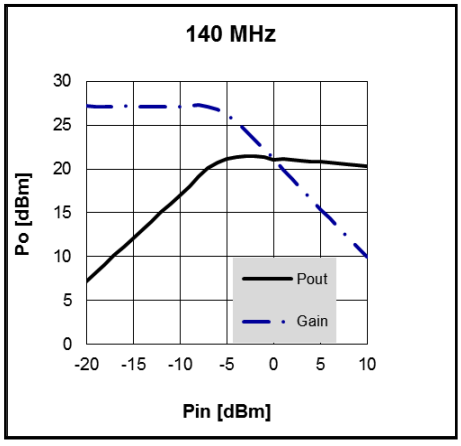
All other trademarks are the property of their respective owners. © 2014 BeRex

Device Performance

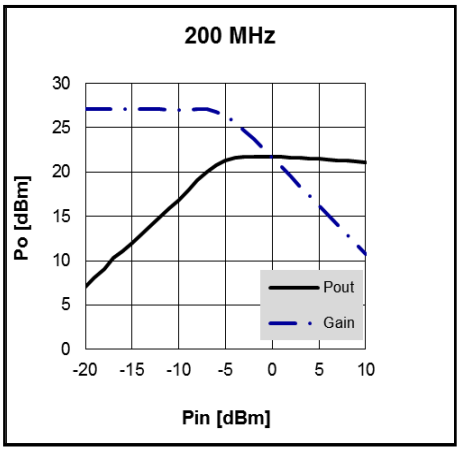
Pin-Pout-Gain



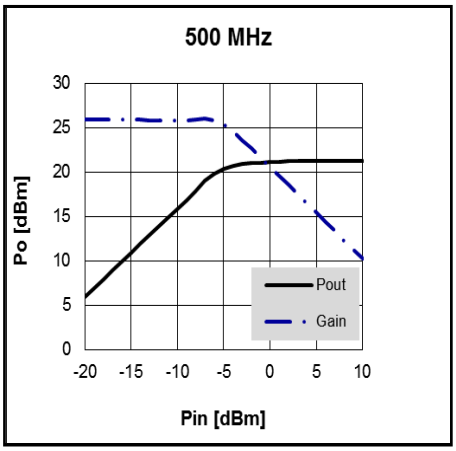
70MHz, 5V/94mA



140MHz, 5V/94mA



200MHz, 5V/94mA

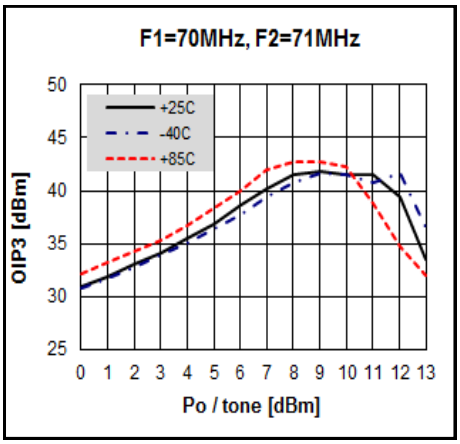


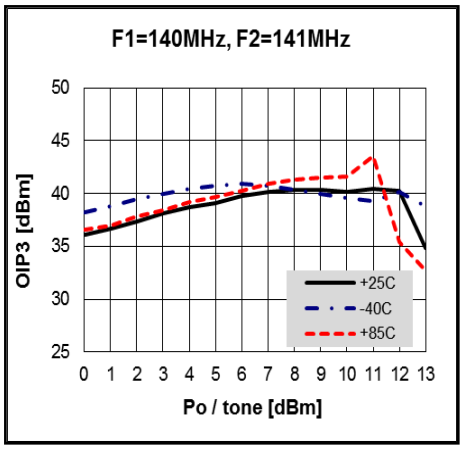
500MHz, 5V/94mA

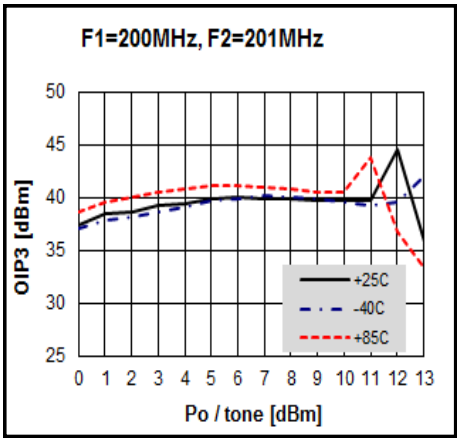
Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

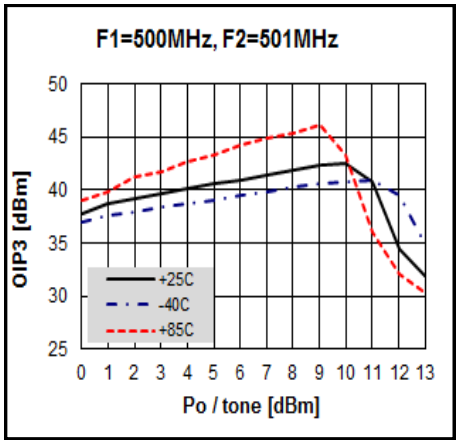
All other trademarks are the property of their respective owners. © 2014 BeRex

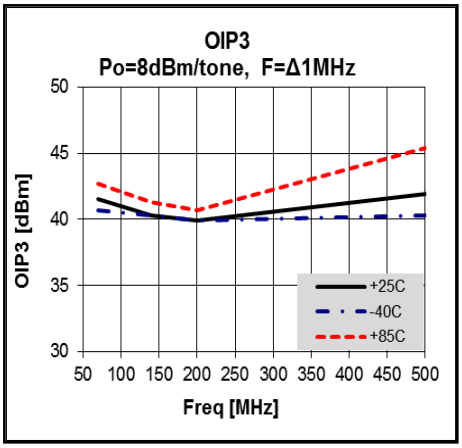
OIP3







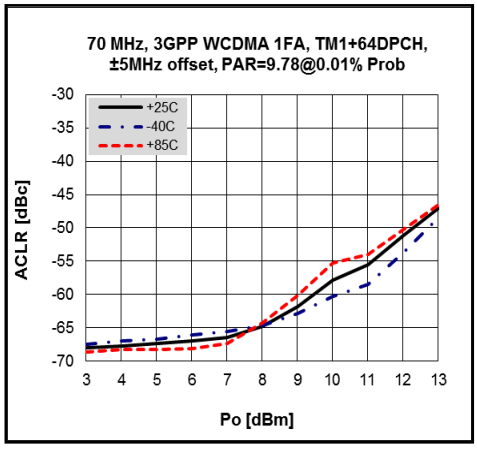


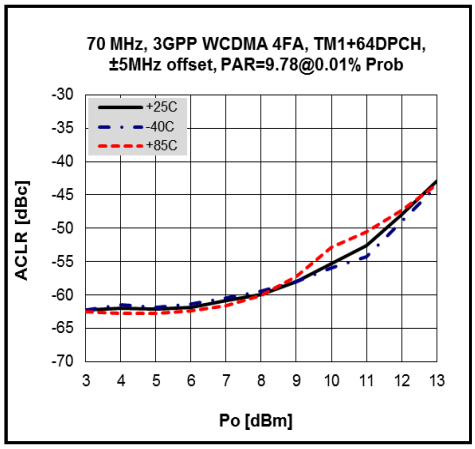


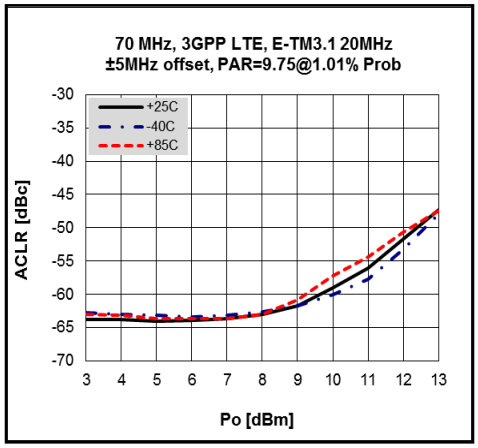
Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

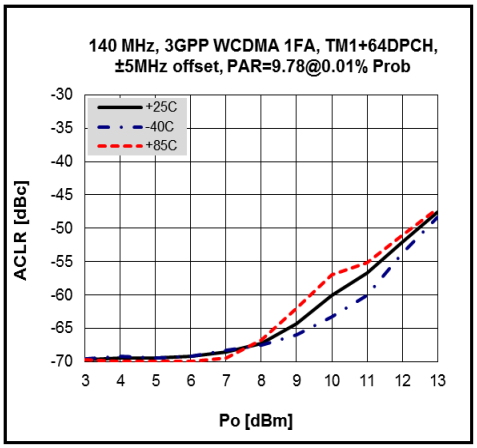
All other trademarks are the property of their respective owners. © 2014 BeRex

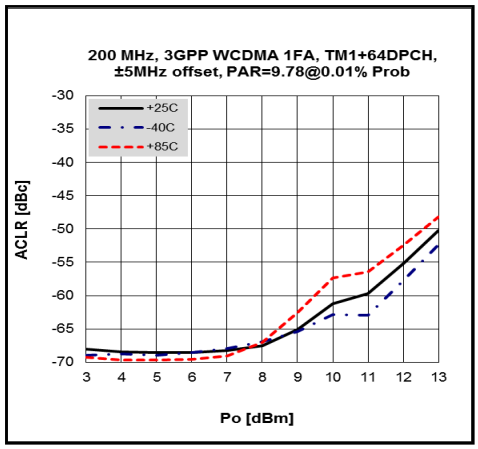
ACLR / LTE

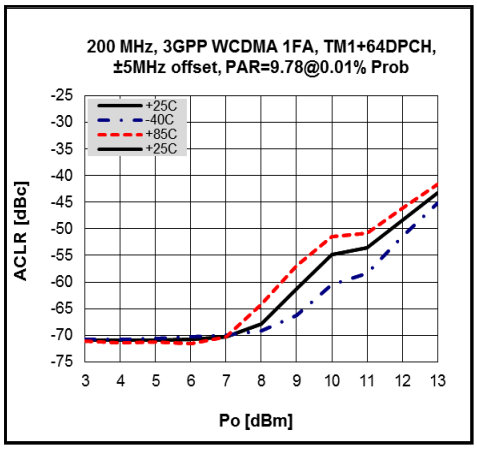






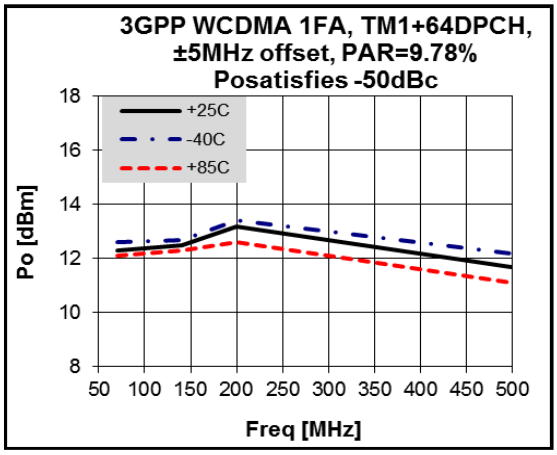




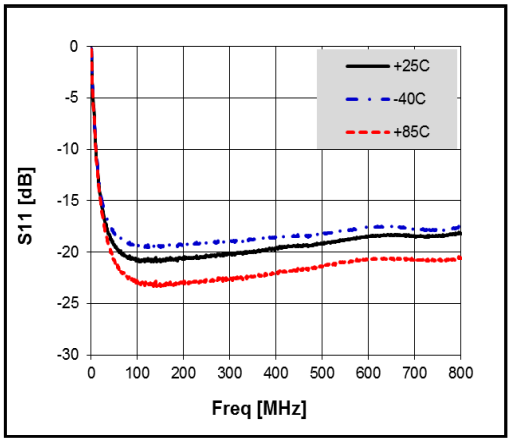


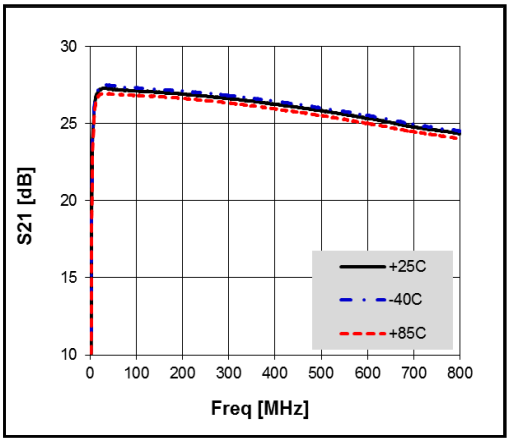
Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

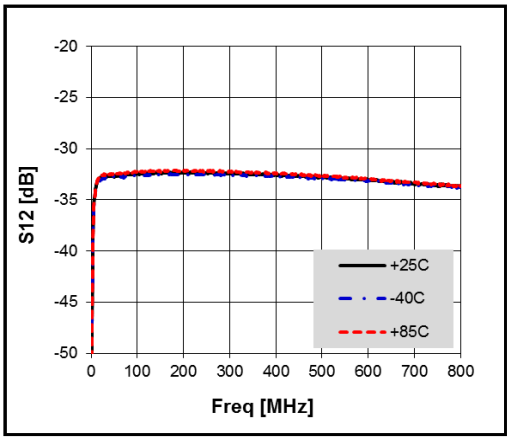
All other trademarks are the property of their respective owners. © 2014 BeRex

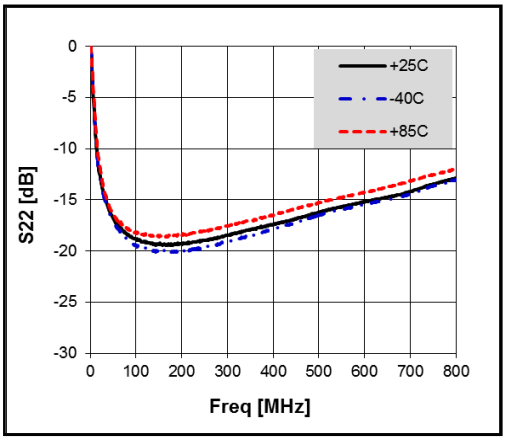


S-Parameters over Temperature (70MHz)







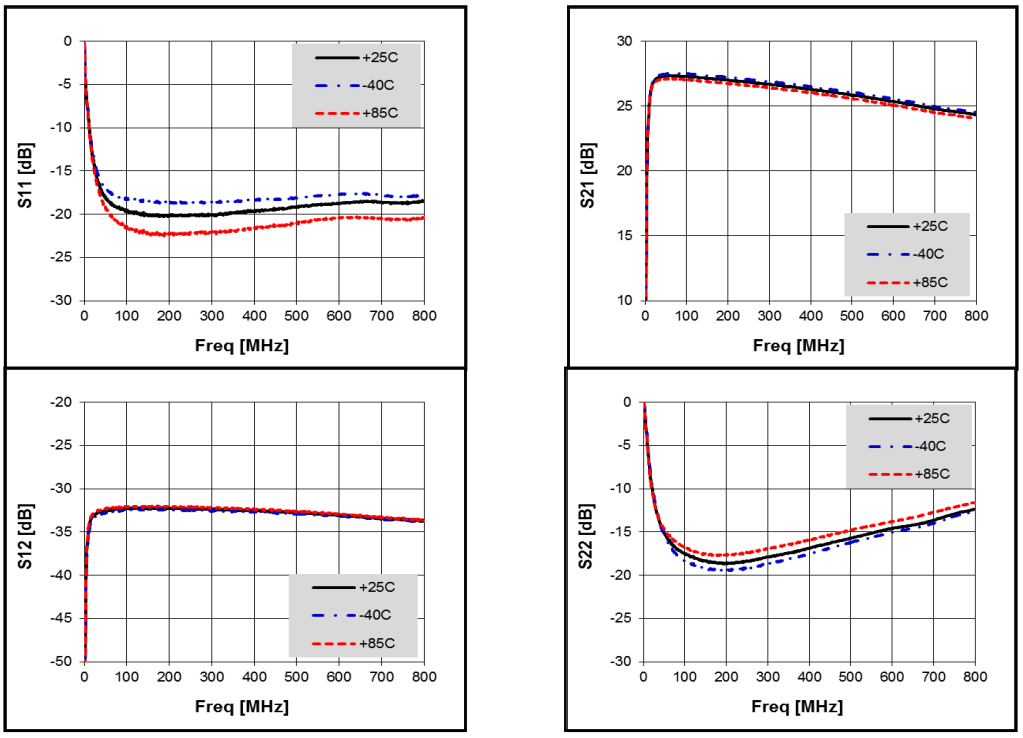


Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

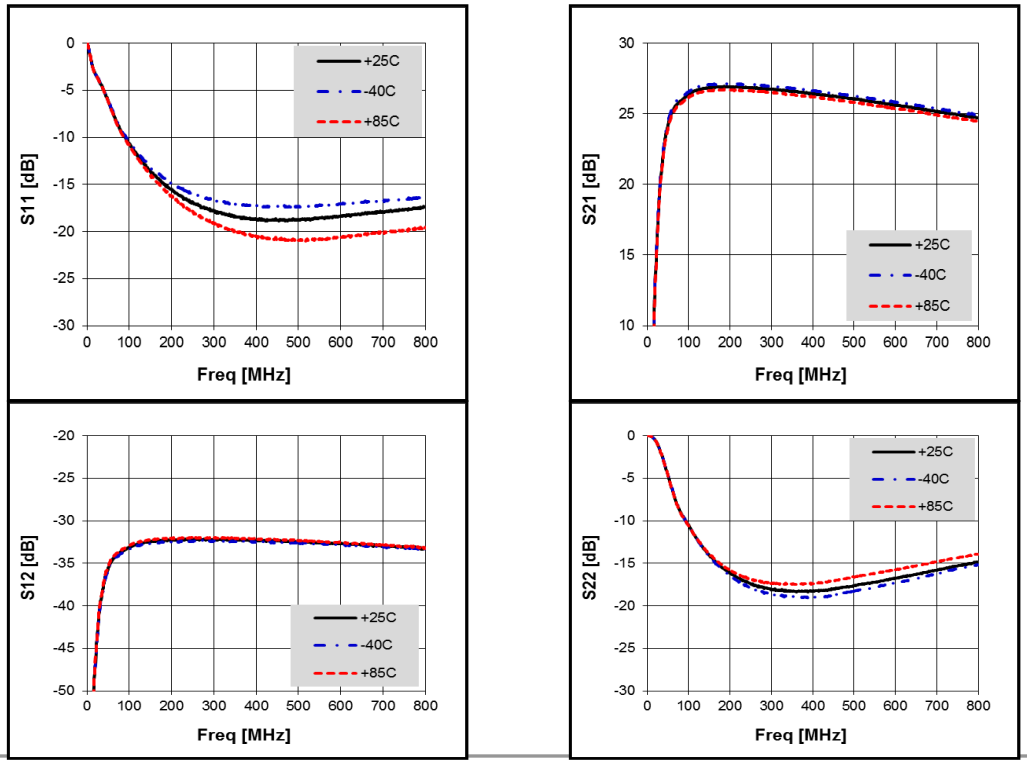
All other trademarks are the property of their respective owners. © 2014 BeRex

Preliminary Datasheet

S-Parameters over Temperature (140MHz,200MHz)



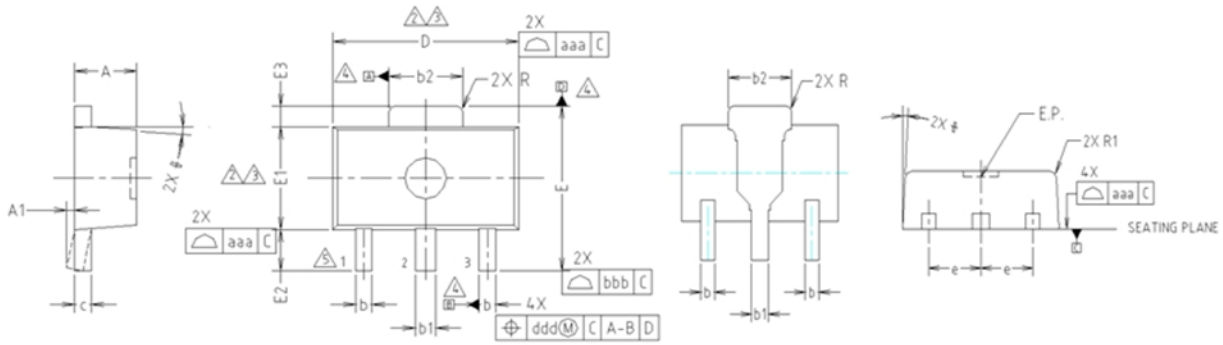
S-Parameters over Temperature (500MHz)



Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

All other trademarks are the property of their respective owners. © 2014 BeRex

Package Outline Dimension



NOTE:

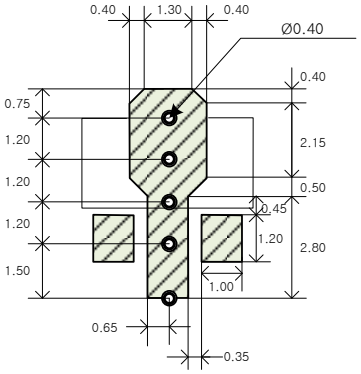
1. DIMENSIONS IN MILLIMETERS.
2. DIMENSION D DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.5mm PER END. DIMENSION E1 DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.5mm PER SIDE.
3. DIMENSIONS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

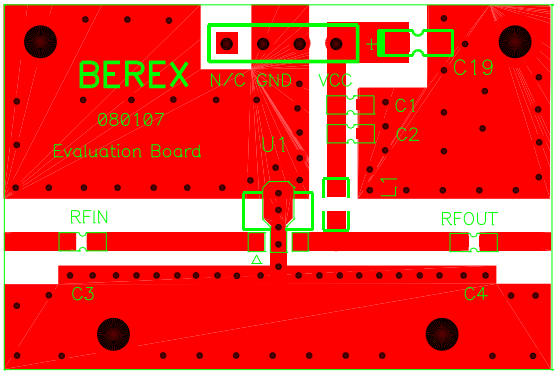
PCB Land Pattern



Note : All dimension _ millimeters

PCB lay out _ on BeRex website

PCB Mounting



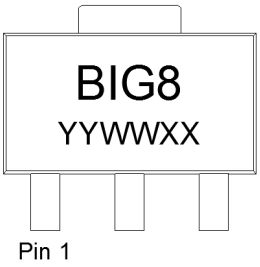
Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

All other trademarks are the property of their respective owners. © 2014 BeRex

BIG8

50-600 MHz Internally Matched IF Amplifier

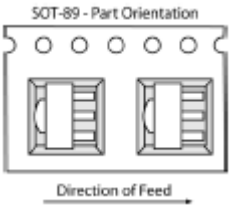
Package Marking



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 2
Value:	**Passes <4000V**
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114
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**

Specifications and information are subject to change and products may be discontinued without notice. BeRex is a trademark of BeRex.

All other trademarks are the property of their respective owners. © 2014 BeRex