50-800 MHz Internally Matched IF Amplifier

Device Features

- 44dBm Output IP3 at 8dBm/tone at 70MHz
- 20.3dB Gain at 70MHz
- 24.5dBm P1dB at 140MHz
- Highly Reliable InGaP/GaAs HBT Technology
- 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°C, Vs = 5V)

Parameters	Test Conditions	Min	Typ	Max	Unit
Frequency Range		50		800	MHz
Gain	70 MHz 140 MHz 250 MHz 500 MHz	19.3 19.2 18.9 18.0	20.3 20.2 19.9 19.0	21.3 21.2 20.9 20.0	dB
S11	70 MHz 140 MHz 250 MHz 500 MHz		-19.0 -18.0 -15.0 -11.0		dB
S22	70 MHz 140 MHz 250 MHz 500 MHz		-16.0 -17.0 -16.0 -13.0		dB
OIP3	70 MHz 140 MHz 250 MHz 500 MHz	42.0 39.5 38.5 38.5	44.0 41.5 40.5 40.5		dBm
P1dB	70 MHz 140 MHz 250 MHz 500 MHz	22.5 23.5 23.5 23.2	23.5 24.5 24.5 24.2		dBm
Ic	Vc = 5.0V	75	85	97	mA
Vc			5.0		V
dG/dT			-0.004		dB/°C
Rth	Thermal Resistance		45		°C/W

Typical test conditions unless otherwise noted.

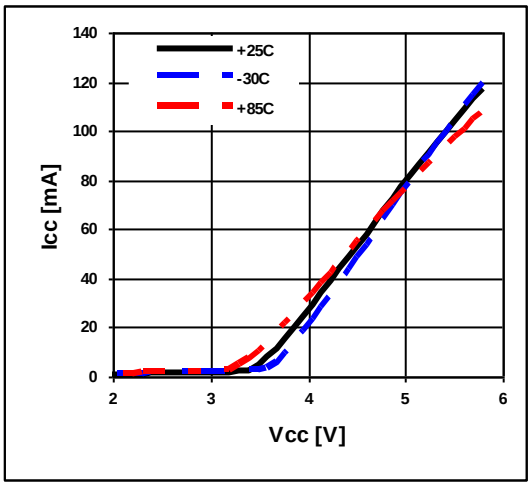
1. Device performance is measured on BeRex evaluation board at 25C, 50 ohm system
2. OIP3 measured with two tones at an output power of 8dBm/tone separated by 1MHz.

Absolute Maximum Ratings

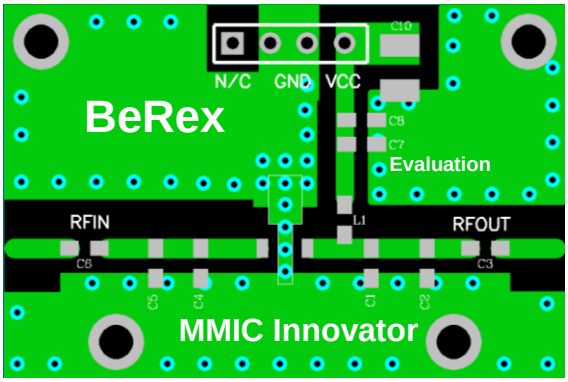
Parameters	Rating
Operating Case temperature	-40 to +85°C
Storage Temperature	-55 to +155°C
Junction Temperature	+220°C
Supply Voltage/Current (Above this voltage, device goes to protection mode)	7V/140mA
Input RF Power	23dBm

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

[I-V Characteristics]

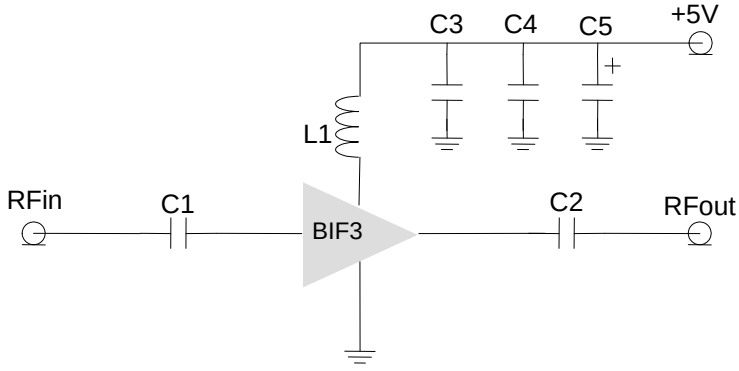


[Generic SOT89 Evaluation Board]



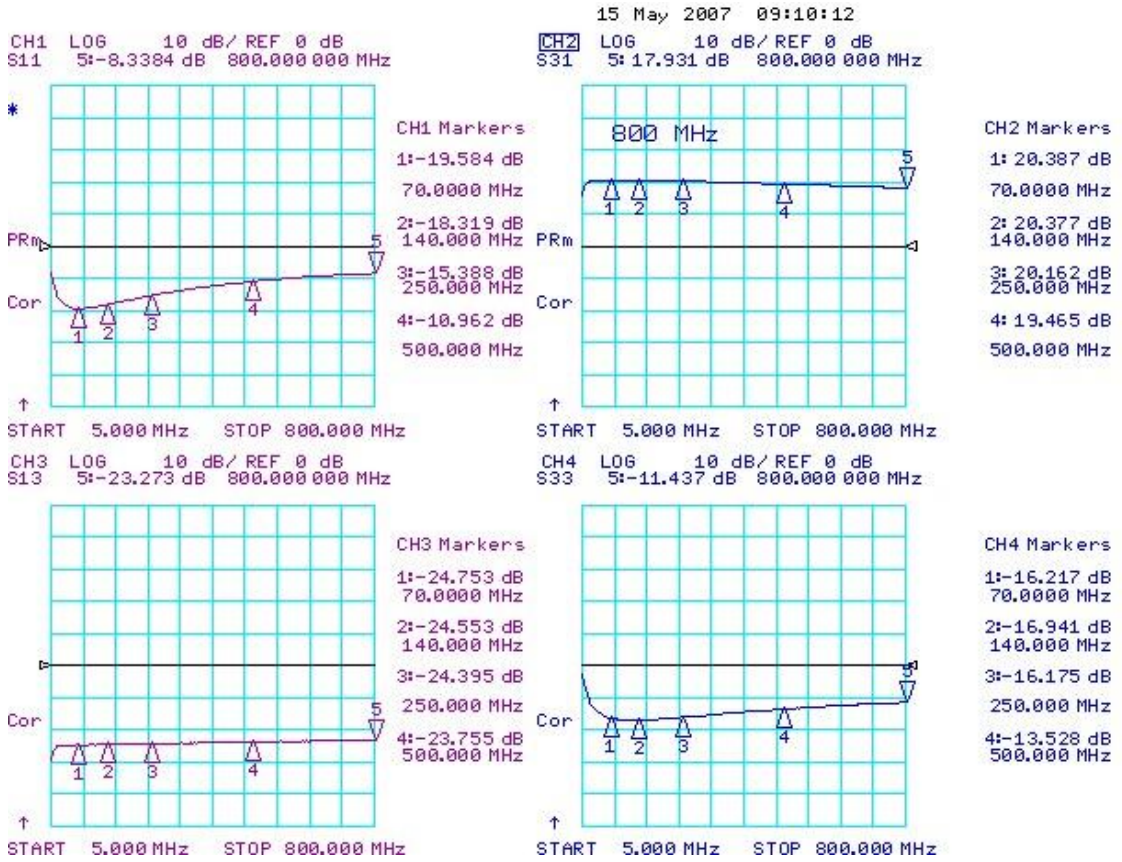
*Dielectric constant is 4.2
*RF pattern width 52mil
*31mil thick FR4 PCB

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	680nH	5%

Typical Device Data

S-parameters (Vc=5V, Ic=80mA, T=25°C)



Typical Performance (Vdevice = 5.0V, Ic = 85mA, Ta = 25°C)

Freq	MHz	70	140	250	500	800
S21	dB	20.3	20.2	19.9	19.0	17.9
S11	dB	-19	-18	-15	-11	-8
S22	dB	-16	-17	-16	-13	-11
P1	dBm	23.5	24.5	24.5	24.2	24.0
OIP3	dBm	44	41.5	40.5	40.5	39.5
NF	dB	5.1	5.2	5.2	5.3	5.3

Typical Performance (V device = 4.7 V, Ic = 64 mA, Ta = 25 ℃)

Freq	MHz	70	140	250	500	800
S21	dB	20.1	19.9	19.7	18.9	17.6
S11	dB	-27.2	-24.6	-16.8	-11.3	-9.3
S22	dB	-13.1	-12.6	-13	-12.5	-9.7
P1	dBm	22.9	23.5	23.3	23.3	22.7
OIP3	dBm	35.0	38.5	39.5	36.5	35.3
NF	dB	5.1	5.2	5.2	5.3	5.3

Typical Performance (V device = 4.5 V, Ic = 54 mA, Ta = 25 ℃)

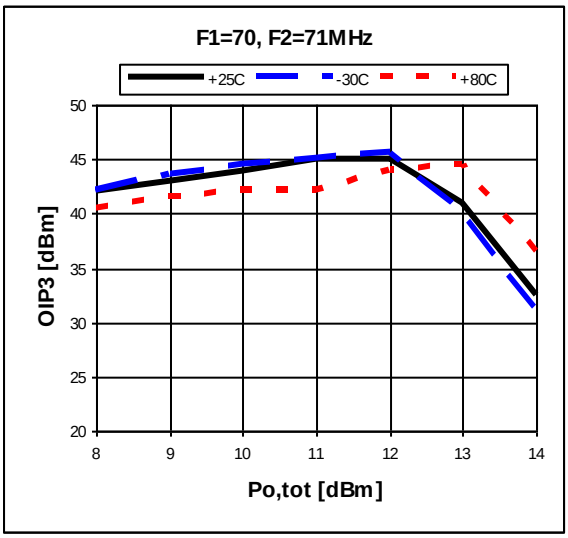
Freq	MHz	70	140	250	500	800
S21	dB	20.2	20.2	19.8	18.7	17.5
S11	dB	-18.8	-19	-16.1	-11.8	-9.2
S22	dB	-14.1	-16	-15.1	-11.8	-9.6
P1	dBm	22.1	23.0	23.1	22.6	22.2
OIP3	dBm	34.5	37.5	34.5	35.5	34.5
NF	dB	5.1	5.2	5.2	5.3	5.3

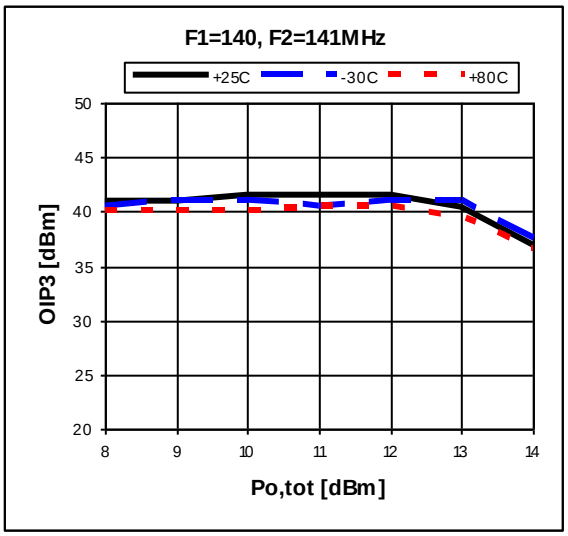
Typical Performance (V device = 4 V, Ic = 28 mA, Ta = 25 ℃)

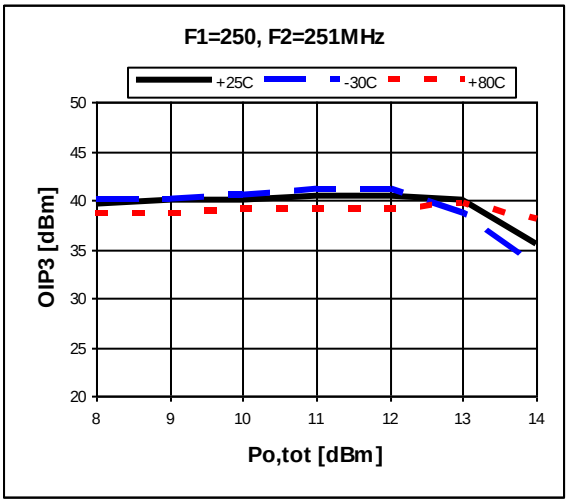
Freq	MHz	70	140	250	500	800
S21	dB	19.5	19.4	19.1	18.1	16.8
S11	dB	-18.4	-18.5	-15.8	-11.5	-8.9
S22	dB	-12.3	-13.8	-13.5	-11.3	-9.4
P1	dBm	20.7	21.2	21.2	20.7	13.5
OIP3	dBm	35	29	27.5	25.5	31
NF	dB	5.1	5.2	5.2	5.3	5.3

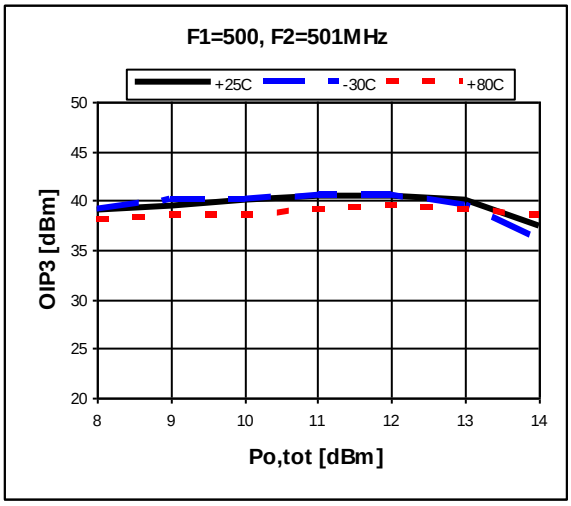
Device Performance

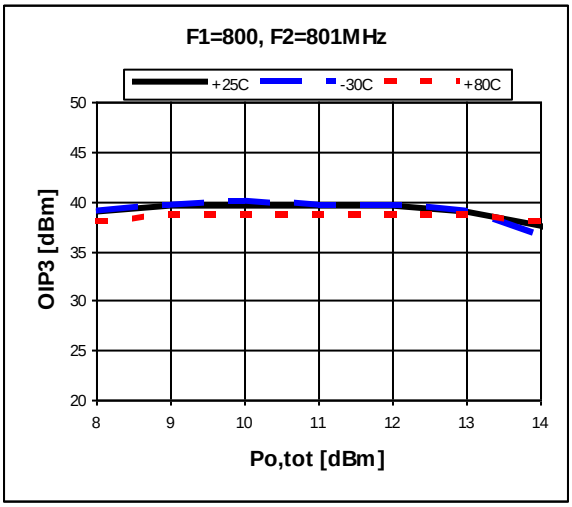
OIP3



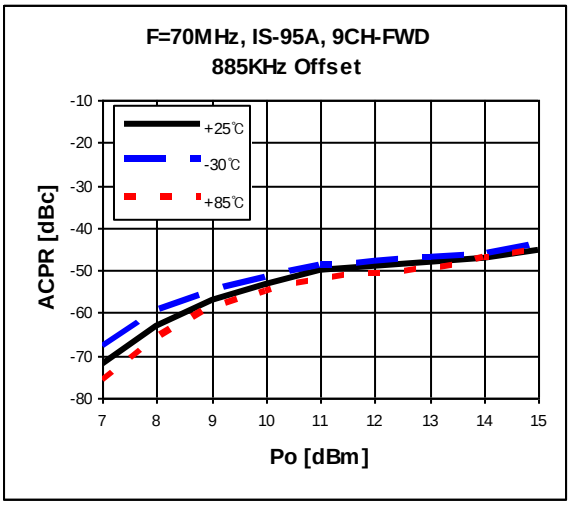


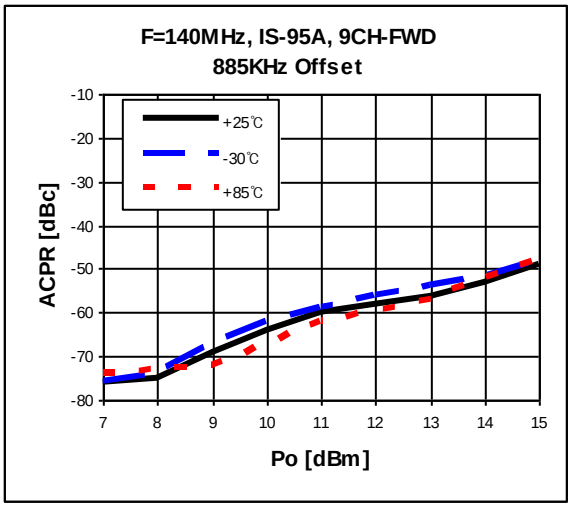


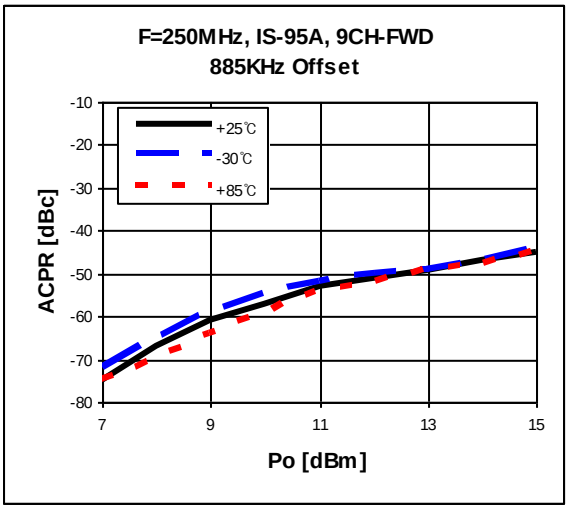


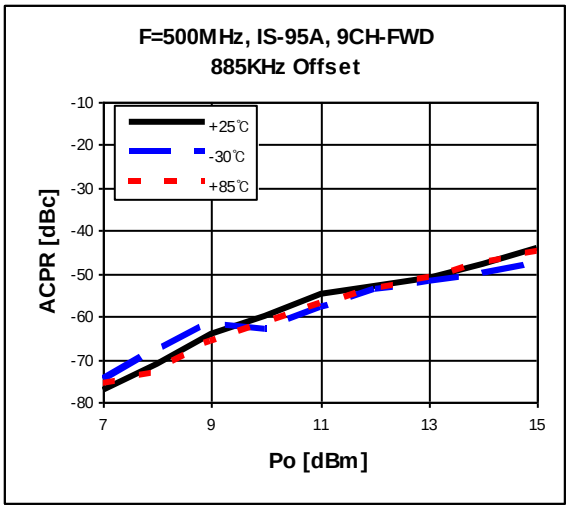


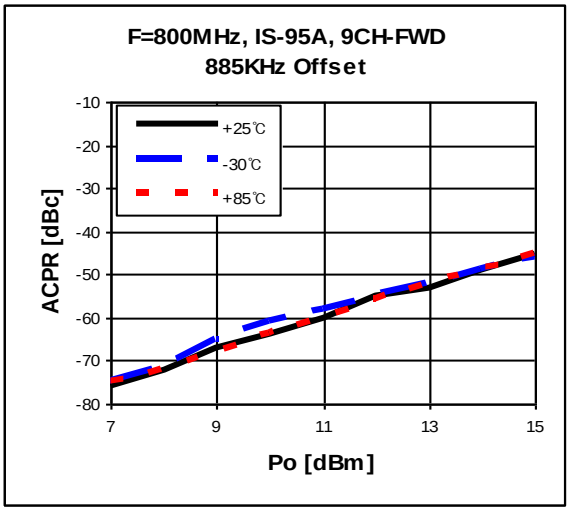
ACPR


F=70MHz, IS-95A, 9CH-FWD
885KHz Offset
ACPR [dBc]
Po [dBm]
+25℃
-30℃
+85℃

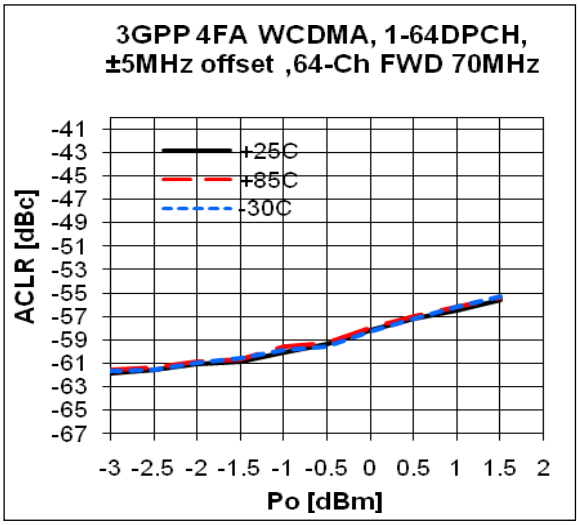

F=140MHz, IS-95A, 9CH-FWD
885KHz Offset
ACPR [dBc]
Po [dBm]
+25℃
-30℃
+85℃


F=250MHz, IS-95A, 9CH-FWD
885KHz Offset
ACPR [dBc]
Po [dBm]
+25℃
-30℃
+85℃

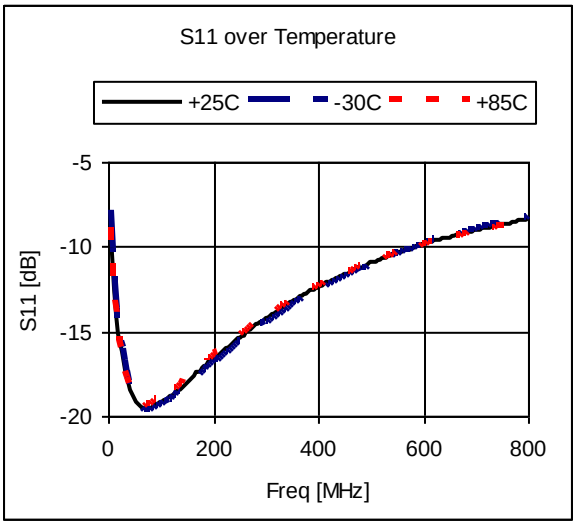

F=500MHz, IS-95A, 9CH-FWD
885KHz Offset
ACPR [dBc]
Po [dBm]
+25℃
-30℃
+85℃

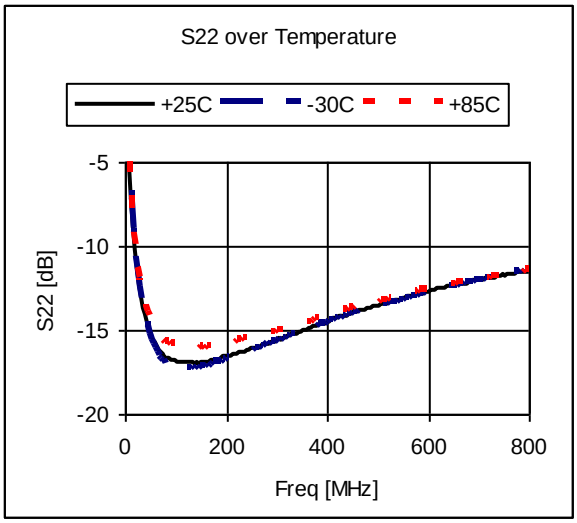

F=800MHz, IS-95A, 9CH-FWD
885KHz Offset
ACPR [dBc]
Po [dBm]
+25℃
-30℃
+85℃

ACLR

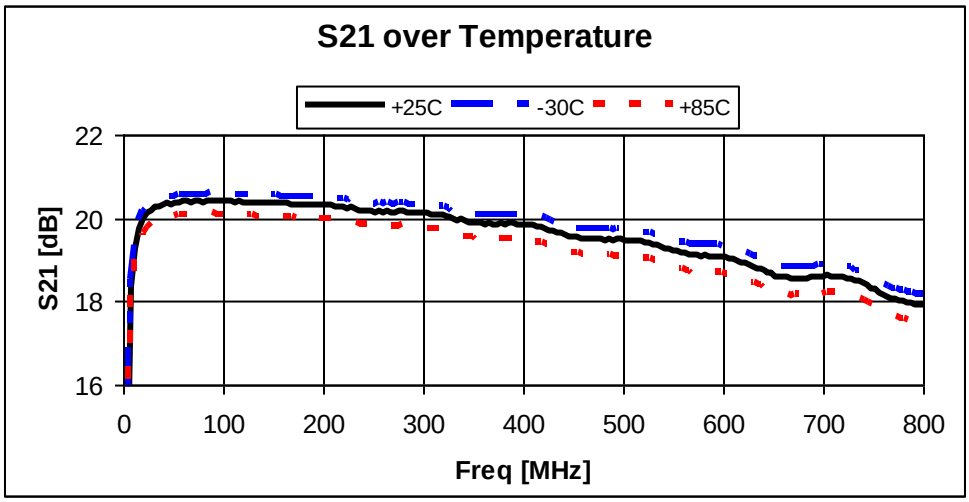

3GPP 4FA WCDMA, 1-64DPCH,
±5MHz offset ,64-Ch FWD 70MHz
ACLR [dBc]
Po [dBm]
+25C
+85C
-30C

S-Parameters(S11/S22)

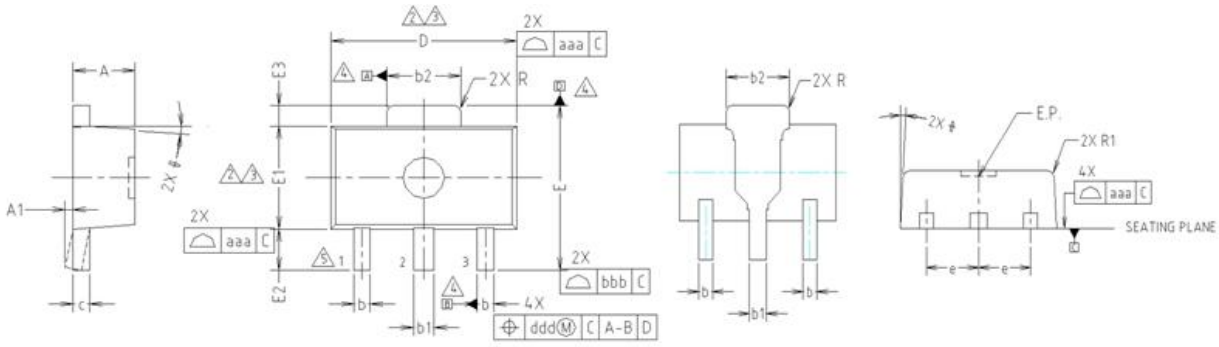




Gain Flatness



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.

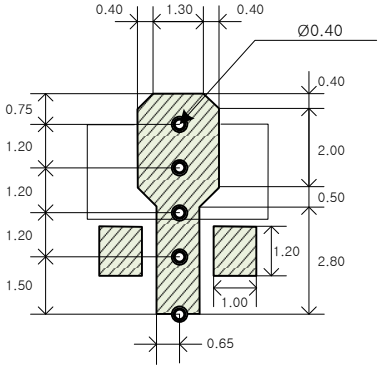
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

SYMBOL	MILLIMETERS			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.			
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	

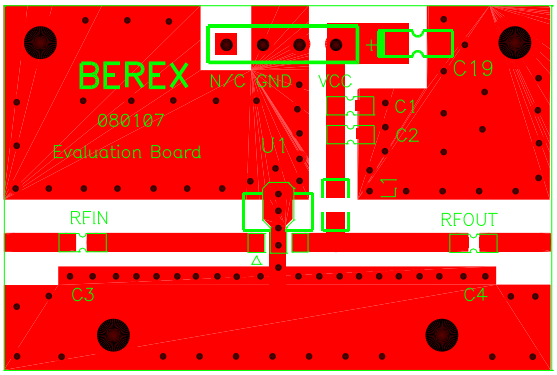
Suggested PCB Land Pattern and PAD Layout

PCB Land Pattern



Note : All dimension are in millimeters

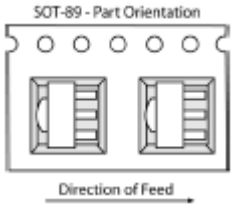
PCB Mounting



Visit http://www.berex.com for PCB layout

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**

NOTICE

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