BT07

400-2700 MHz Medium Power Amplifier

Preliminary Datasheet

Device Features

- OIP3 = 43.0 dBm @ 1900 MHz
- Gain = 17.5 dB @ 900 MHz
- Output P1 dB = 27 dBm @ 900 MHz
- 50 Ω Cascadable
- Patented Over Voltage Protection Circuit
- Lead-free/RoHS-compliant SOT-89 SMT package

Product Description

BeRex's BT07 is a high performance and a high dynamic range amplifier in a low cost surface mount package(SOT-89) with a RoHS-compliant, that incorporates reliable heterojunction-bipolar-transistor (HBT) devices fabricated with InGaP GaAs technology.

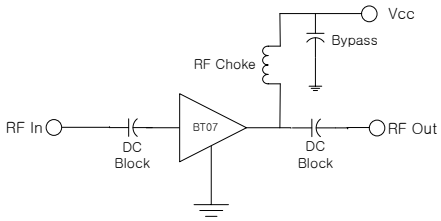
This device is designed for use where high linearity is required and features high OIP3 and P1 with low consumption current (125mA) and requires a few external matching components such as a DC blocking capacitors on the In/Output pin, a bypass capacitor and a RF choke for the out

Applications

Base station Infrastructure/RFID

Commercial/Industrial/Military wireless system

Application Circuits



*external matching circuit: refer to the page 7 to 11.

Typical Performance[1]

Parameter	Frequency			Unit
	900	1900	2140	MHz
Gain	17.5	13.5	13	dB
S11	-16	-14	-16	dB
S22	-15	-21	-17	dB
OIP3[2]	41	43	42	dBm
P1dB	27	26.5	26	dBm
WCDMA ACLR	15.2	16.7	18.9	dBm
Noise Figure	6.5	6.5	6.5	dB

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

[2] OIP3 _ measured with two tones at an output of 13 dBm per tone separated by 1 MHz.

*ACLR CH Power _ measured at 45dBc, 900MHz_2FA, 1900/2140MHz_4FA

	Min.	Typical	Max.	Unit
Bandwidth	400		2700	MHz
I_C @ (Vc = 5V)	115	125	135	mA
V_C		5.0		V
R_{TH}		43		°C/W

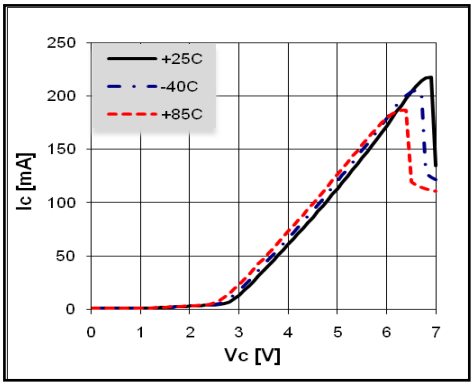
Absolute Maximum Ratings

Parameter	Rating	Unit
Operating Case Temperature	-40 to +85	°C
Storage Temperature	-40 to +155	°C
Junction Temperature	+220	°C
Operating Voltage	+7.0	V
Supply Current	200	mA
Input RF Power	23	dBm

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

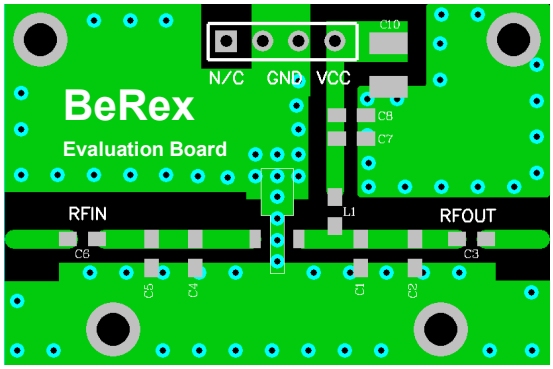
Preliminary Datasheet

V-I Characteristics



*Voltage protection works at 6~7 V

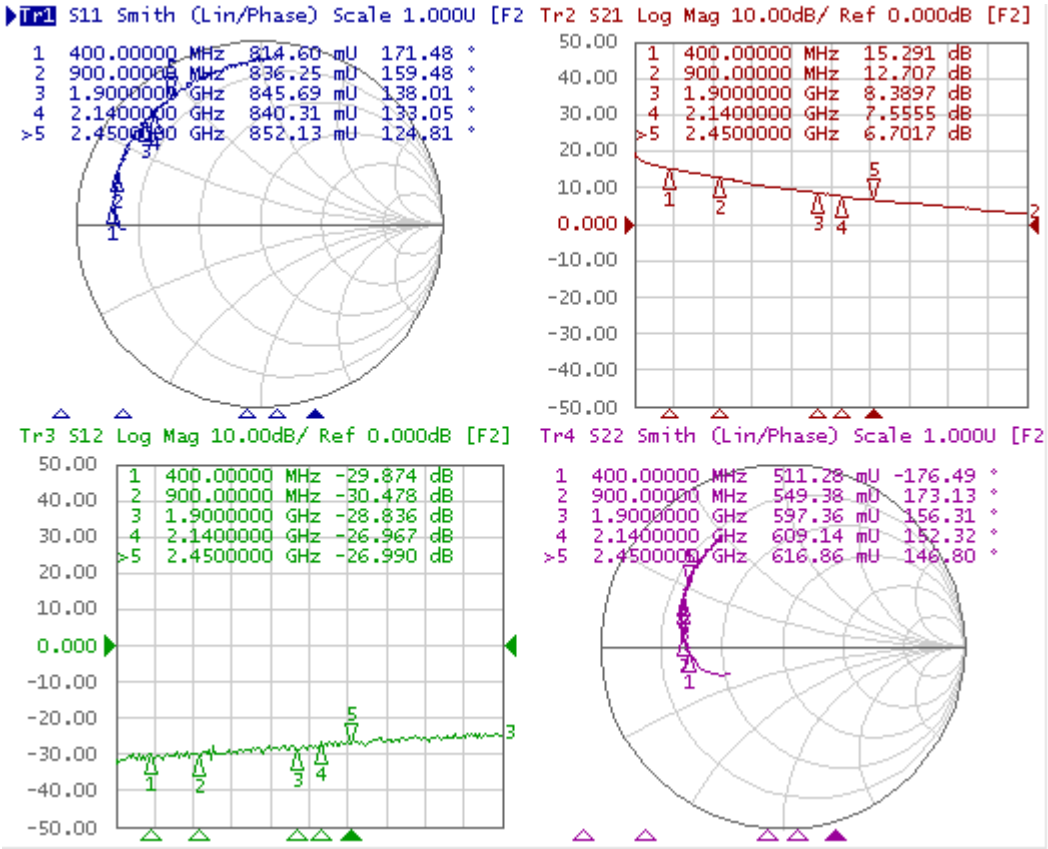
BeRex SOT89 Evaluation Board



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

Typical Device Data

S-parameters (Vc=5V, Ic=125mA, T=25°C)

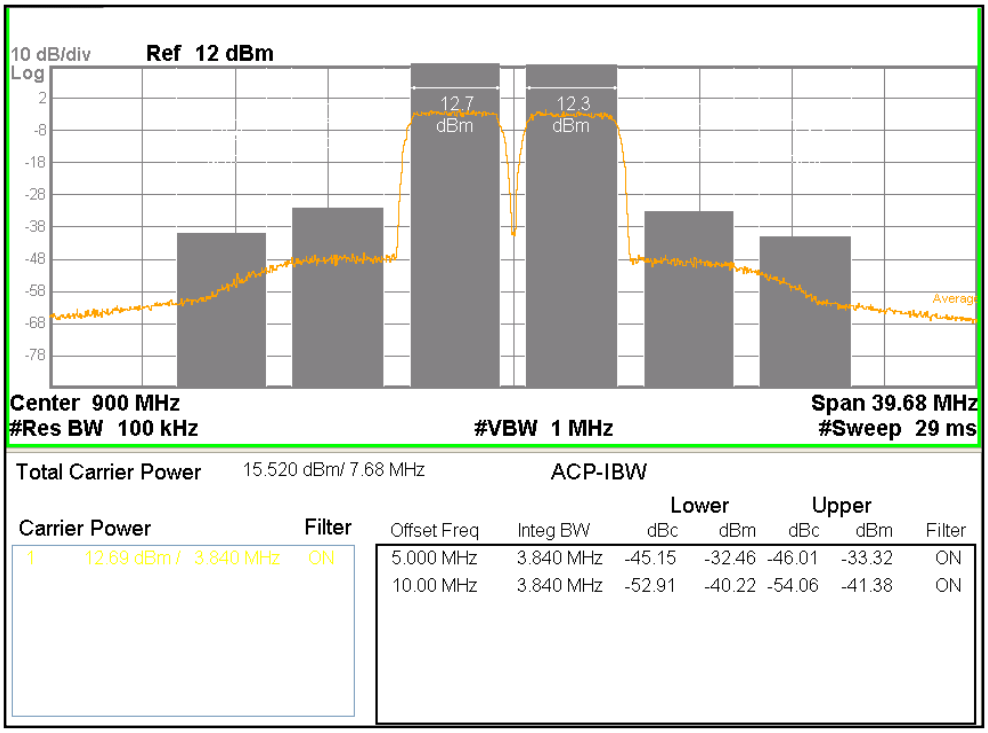


S-Parameter

(Vdevice = 5.0V, Icc = 125mA, T = 25 °C, calibrated to device leads)

Freq	S11 [Mag]	S11 [Ang]	S21 [Mag]	S21 [Ang]	S12 [Mag]	S12 [Ang]	S22 [Mag]	S22 [Ang]
100	0.774	-179.211	7.853	156.379	0.026	8.470	0.428	-159.832
250	0.802	176.030	6.496	149.432	0.027	9.667	0.494	-171.247
500	0.818	169.336	5.526	133.467	0.030	5.290	0.527	-178.538
750	0.832	162.881	4.776	119.366	0.029	13.498	0.545	176.508
1000	0.835	157.389	4.074	107.123	0.033	12.950	0.559	171.005
1250	0.837	152.209	3.527	96.339	0.035	14.070	0.580	167.071
1500	0.844	146.859	3.128	87.171	0.038	13.647	0.587	162.474
1750	0.843	141.765	2.834	77.849	0.036	17.205	0.594	158.393
2000	0.844	135.903	2.510	68.447	0.041	15.626	0.612	153.820
2250	0.855	130.397	2.295	61.489	0.045	13.295	0.623	150.811
2500	0.861	124.220	2.110	54.195	0.046	11.829	0.626	146.595

WCDMA 2FA 900MHz –45dBc



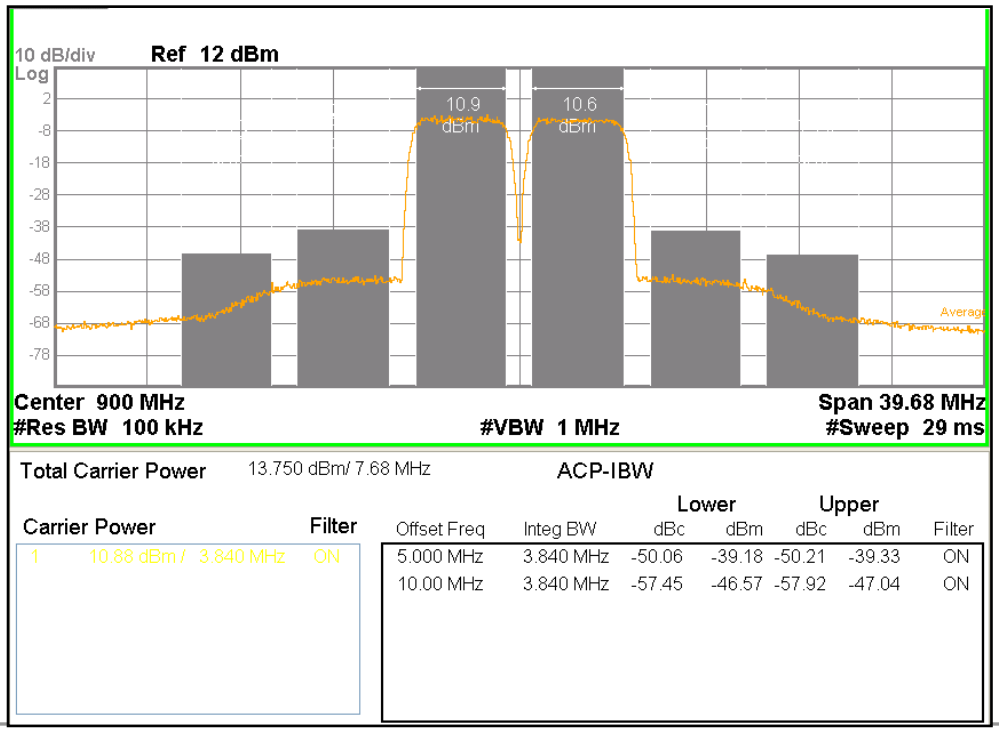
Total Carrier Power 15.520 dBm/ 7.68 MHz

ACP-IBW

Carrier Power		Filter
1	12.69 dBm / 3.840 MHz	ON

		Lower		Upper		
Offset Freq	Integ BW	dBc	dBm	dBc	dBm	Filter
5.000 MHz	3.840 MHz	-45.15	-32.46	-46.01	-33.32	ON
10.00 MHz	3.840 MHz	-52.91	-40.22	-54.06	-41.38	ON

WCDMA 2FA 900MHz –50dBc



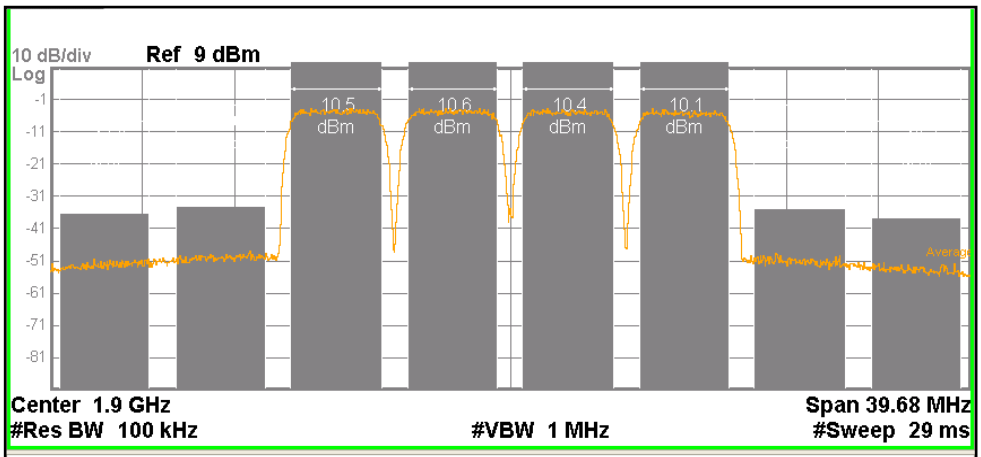
Total Carrier Power 13.750 dBm/ 7.68 MHz

ACP-IBW

Carrier Power		Filter
1	10.88 dBm / 3.840 MHz	ON

		Lower		Upper		
Offset Freq	Integ BW	dBc	dBm	dBc	dBm	Filter
5.000 MHz	3.840 MHz	-50.06	-39.18	-50.21	-39.33	ON
10.00 MHz	3.840 MHz	-57.45	-46.57	-57.92	-47.04	ON

WCDMA 4FA 1900MHz –45dBc

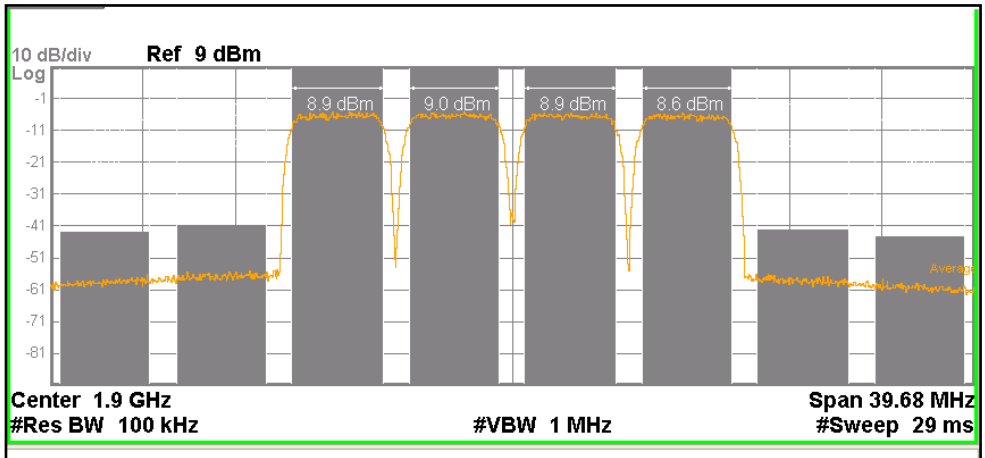


Total Carrier Power 16.430 dBm/ 15.36 MHz ACP-IBW

Carrier Power		Filter
1	10.51 dBm / 3.840 MHz	ON

		Lower		Upper		
Offset Freq	Integ BW	dBc	dBm	dBc	dBm	Filter
5.000 MHz	3.840 MHz	-45.00	-34.45	-46.03	-35.47	ON
10.00 MHz	3.840 MHz	-47.19	-36.63	-48.66	-38.10	ON

WCDMA 4FA 1900MHz –50dBc

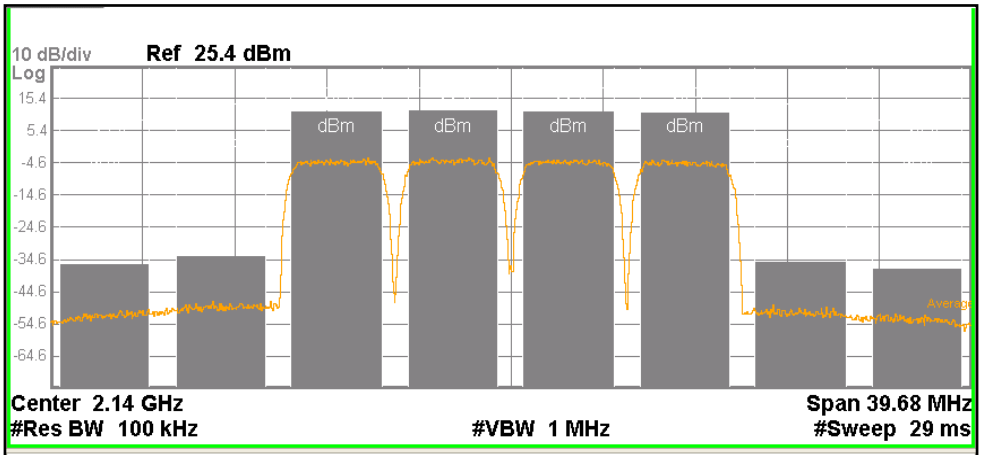


Total Carrier Power 14.870 dBm/ 15.36 MHz ACP-IBW

Carrier Power		Filter
1	8.890 dBm / 3.840 MHz	ON

		Lower		Upper		
Offset Freq	Integ BW	dBc	dBm	dBc	dBm	Filter
5.000 MHz	3.840 MHz	-50.16	-41.17	-51.50	-42.52	ON
10.00 MHz	3.840 MHz	-52.02	-43.04	-53.69	-44.70	ON

WCDMA 4FA 2140MHz –45dBc



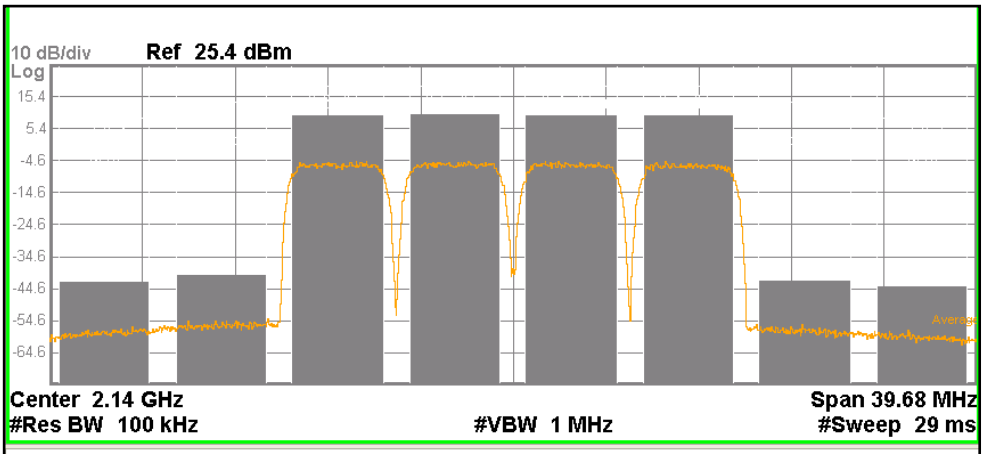
Total Carrier Power 17.010 dBm/ 15.36 MHz

Carrier Power		Filter
1	10.95 dBm / 3.840 MHz	ON

ACP-IBW

		Lower		Upper		
Offset Freq	Integ BW	dBc	dBm	dBc	dBm	Filter
5.000 MHz	3.840 MHz	-45.10	-33.82	-46.80	-35.52	ON
10.00 MHz	3.840 MHz	-47.77	-36.49	-48.94	-37.66	ON

WCDMA 4FA 2140MHz –50dBc



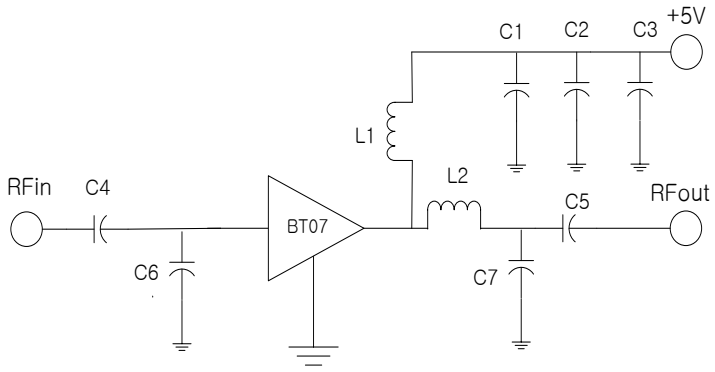
Total Carrier Power 15.380 dBm/ 15.36 MHz

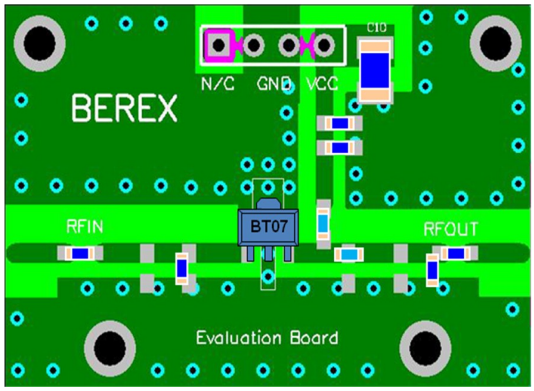
Carrier Power		Filter
1	9.349 dBm / 3.840 MHz	ON

ACP-IBW

		Lower		Upper		
Offset Freq	Integ BW	dBc	dBm	dBc	dBm	Filter
5.000 MHz	3.840 MHz	-50.06	-40.53	-51.76	-42.24	ON
10.00 MHz	3.840 MHz	-52.37	-42.84	-53.69	-44.16	ON

Application Circuit: 900 MHz

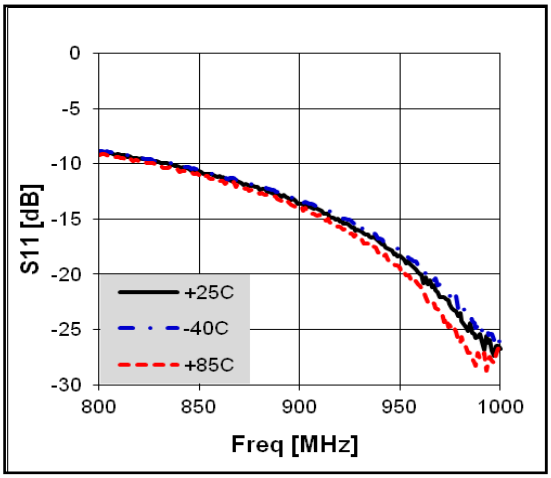
Schematic Diagram	BOM		Tolerance
	C1	100pF	±5%
	C2	1000pF	±5%
	C3	10uF	±20%
	C4	22pF	±5%
	C5	22pF	±5%
	C6	6pF	±5%
	C7	3pF	±5%
	L1	100nH	±5%
	L2	2.7nH	±5%

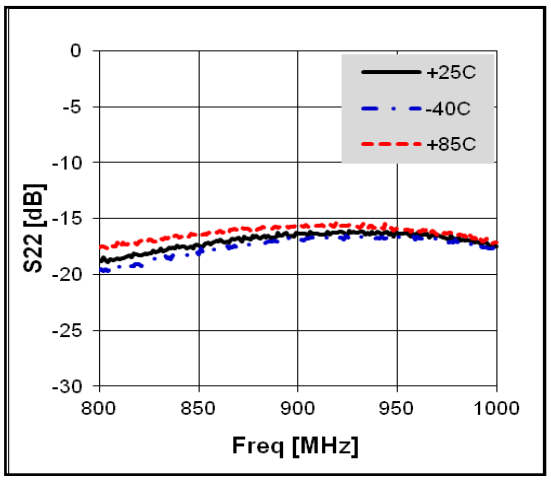


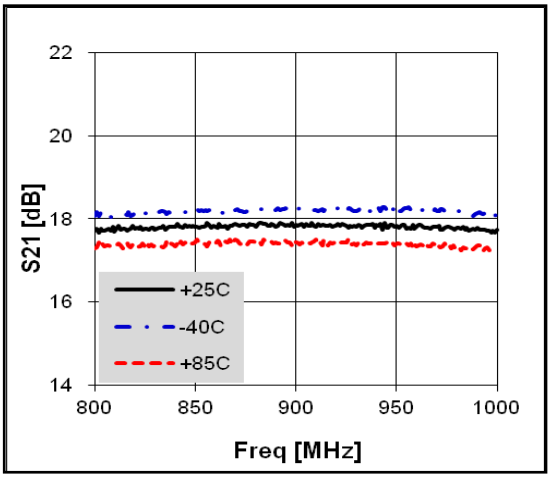
Note:

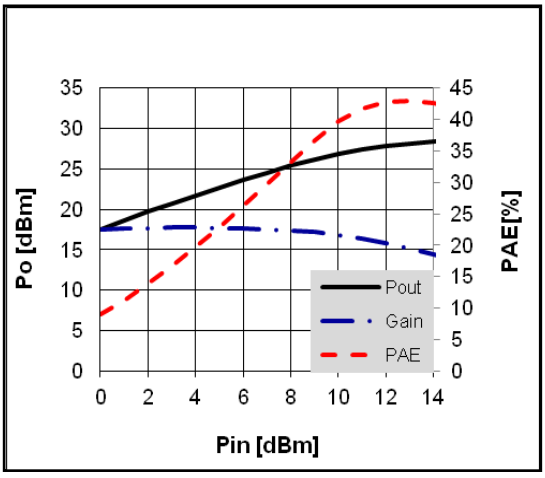
1. PCB: 31mil thick FR4.
2. Distance between the center of the shunt cap (C6) and the input pin of BT07 _ ***6.1mm.***
3. Distance between the center of the shunt cap (C7) and the output pin of BT07 _ ***11.1mm.***
4. C3 is tantalum capacitor

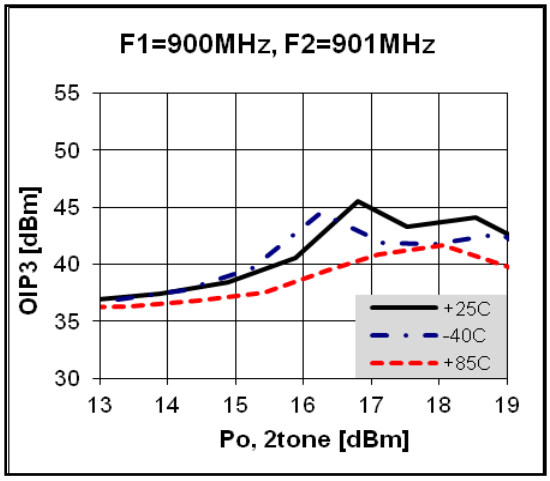
Typical Performance

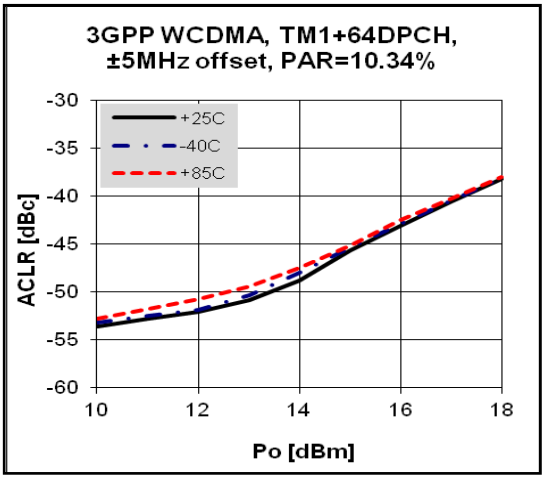






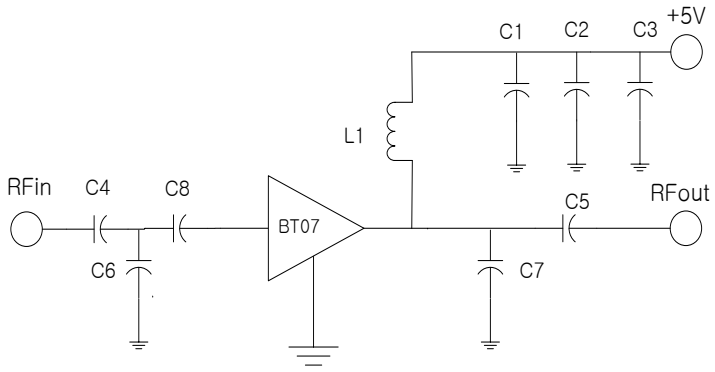




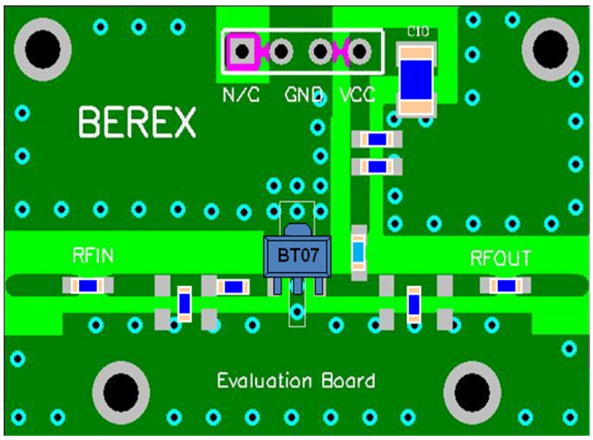


Application Circuit: 1900MHz

Schematic Diagram



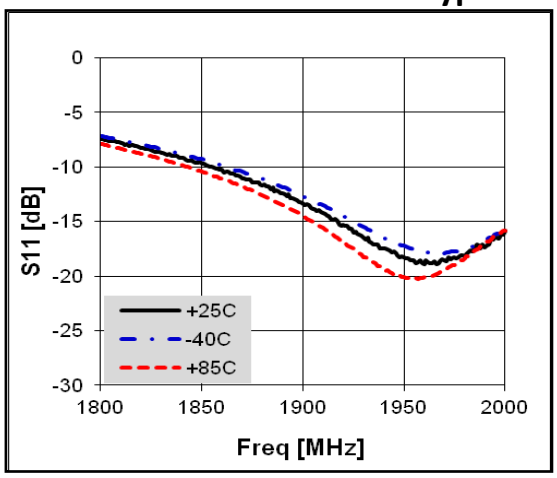
BOM		Tolerance
C1	100pF	±5%
C2	1000pF	±5%
C3	10uF	±20%
C4	100pF	±5%
C5	100pF	±5%
C6	2.2pF	±5%
C7	1pF	±5%
C8	3pF	±5%
L1	39nH	±5%

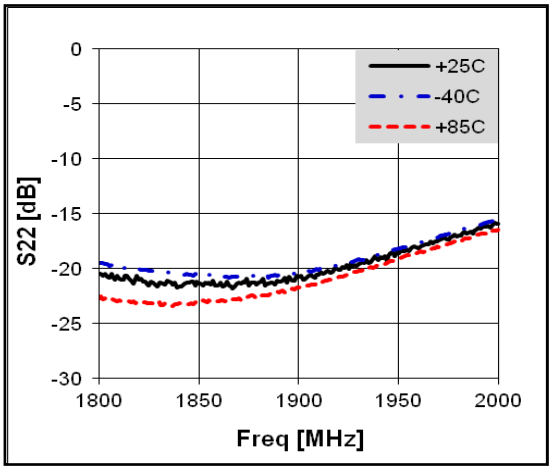


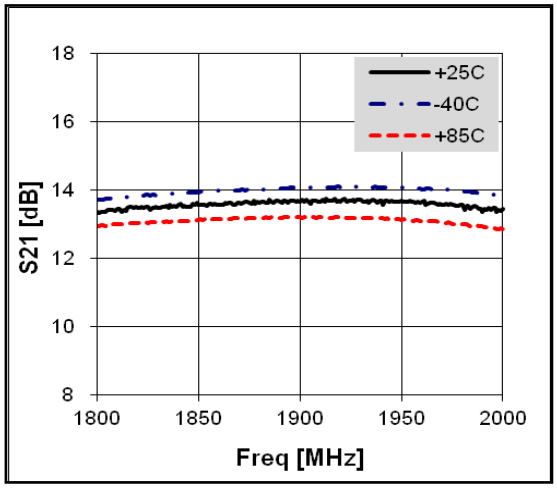
Note:

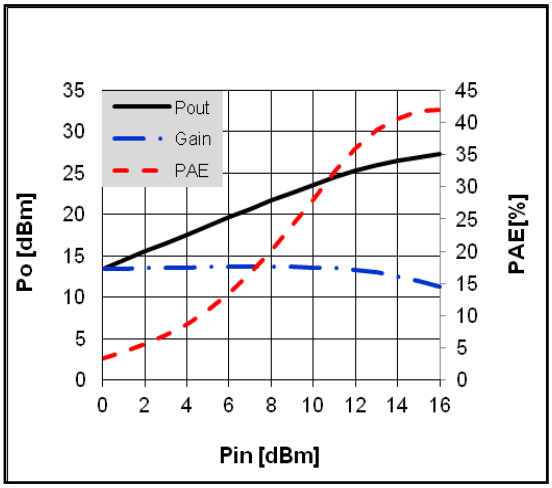
1. PCB: 31mil thick FR4
2. Distance between the center of the shunt cap (C6) and the input pin of BT07 _ ***7.3mm.***
3. Distance between the center of the shunt cap (C7) and the output pin of BT07 _ ***7.3mm.***
4. C3 is tantalum capacitor

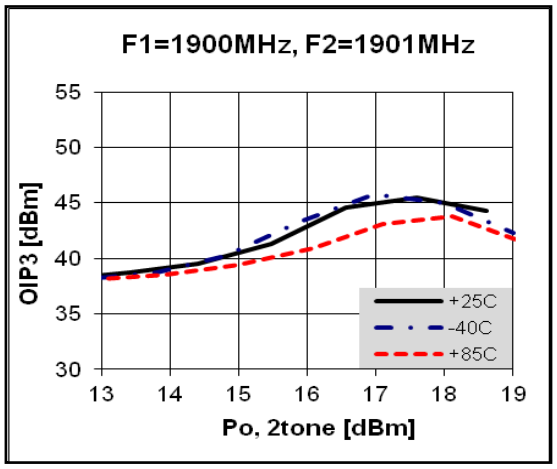
Typical Performance

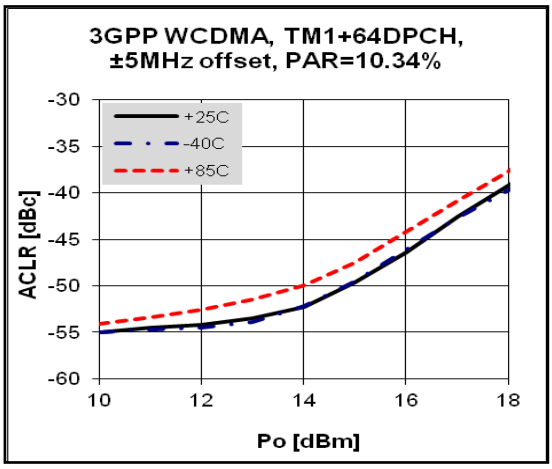






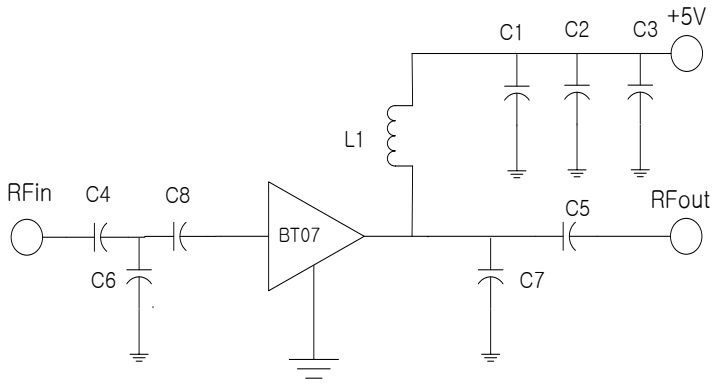




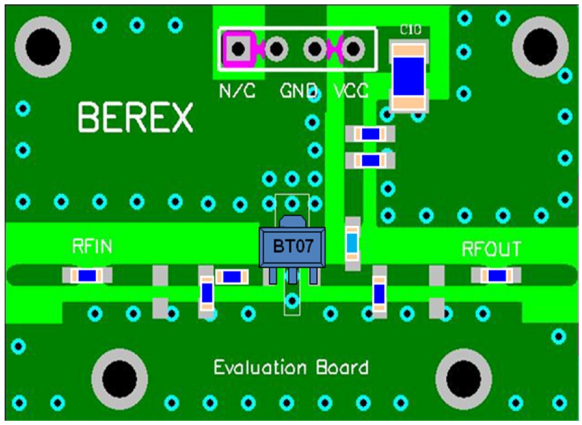


Application Circuit: 2140MHz

Schematic Diagram



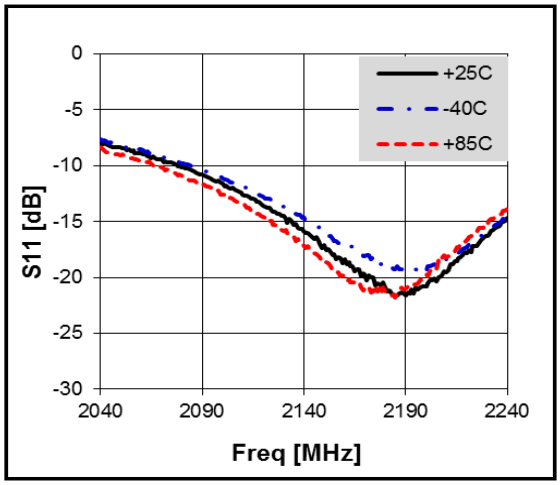
BOM		Tolerance
C1	100pF	±5%
C2	1000pF	±5%
C3	10uF	±15%
C4	100pF	±5%
C5	100pF	±5%
C6	1.8pF	±5%
C7	0.8pF	±5%
C8	2.2pF	±5%
L1	27nH	±5%

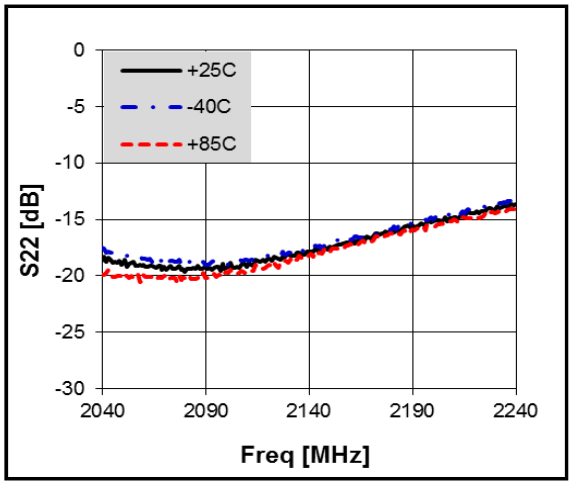


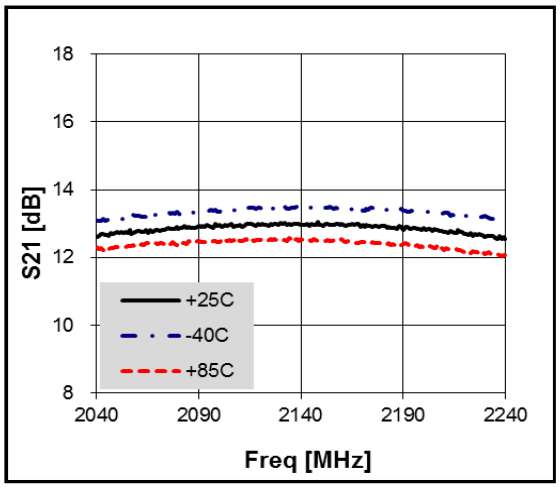
Note:

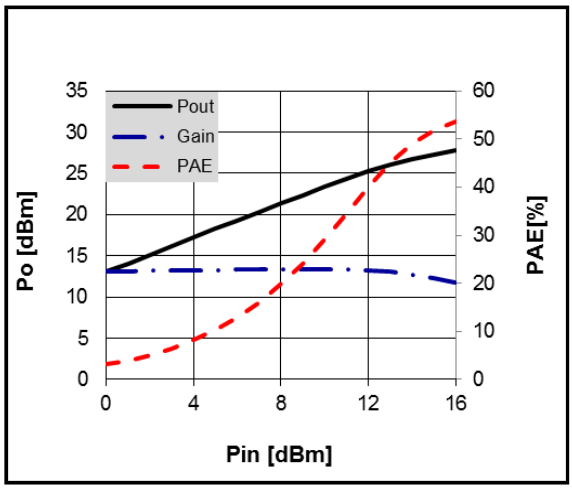
1. PCB: 31mil thick FR4
2. Distance between the center of the shunt cap (C6) and the input pin of BT07 _ ***5.6mm.***
3. Distance between the center of the shunt cap (C7) and the output pin of BT07 _ ***5.9mm.***
4. C3 is tantalum capacitor

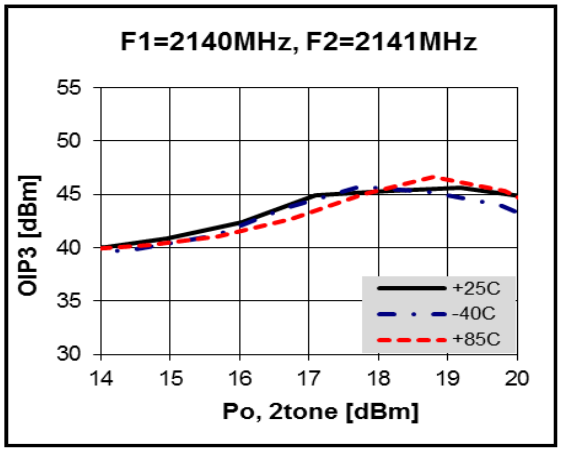
Typical Performance

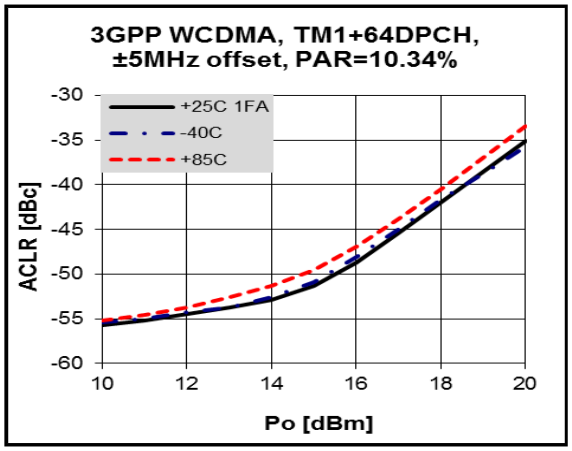




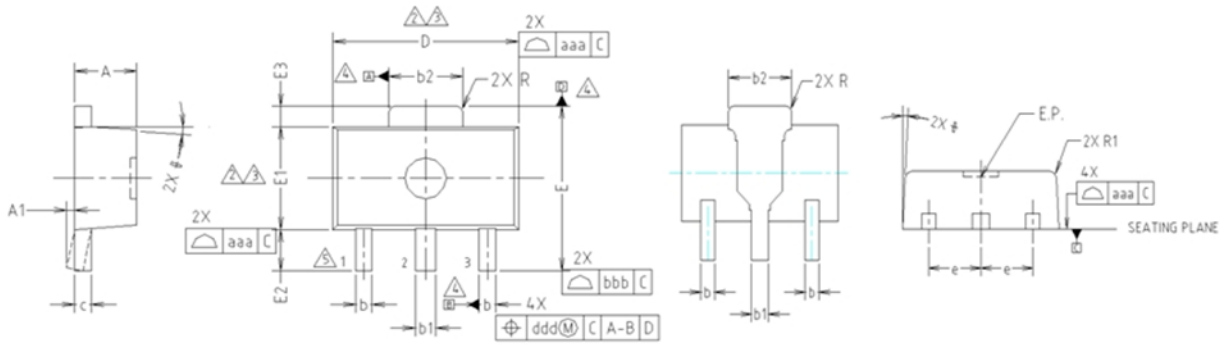








Package Outline Dimension



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.

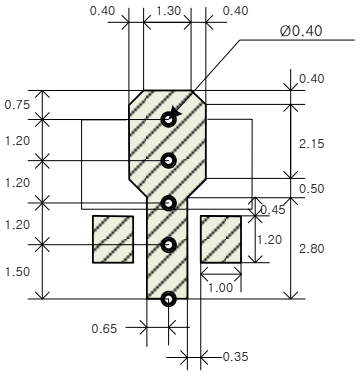
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

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

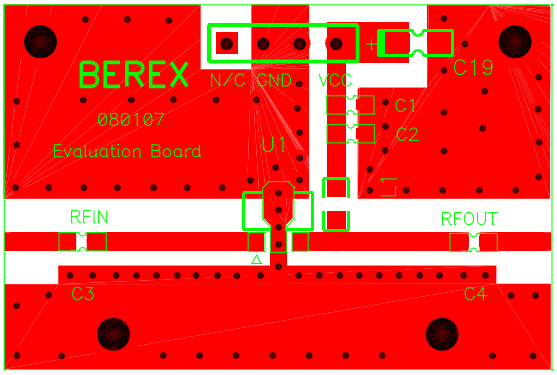
PCB Land Pattern



Note : All dimension are in millimeters

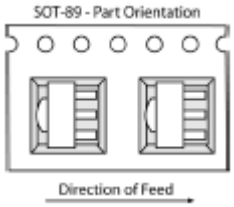
PCB lay out _ on BeRex website

PCB Mounting



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 <1000V**
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.