

BT05VG

1500-4000 MHz Wideband Drive Amplifier



Device Features

- OIP3 = 39.0 dBm @ 1900 MHz
- Gain = 18.0 dB @ 1900 MHz
- Output P1 dB = 22.5 dBm @ 1900 MHz
- 50 Ω Cascadable
- Lead-free/RoHS-compliant SOT-89 SMT package



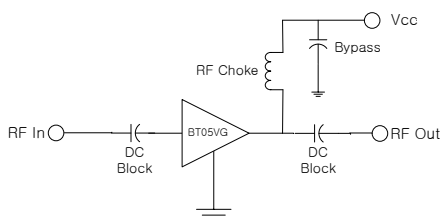
Product Description

BeRex's BT05VG 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 (85mA) 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 port. All devices are 100% RF/DC tested.

Applications

- Base station Infrastructure/RFID
- Commercial/Industrial/Military wireless system

Application Circuits



*external matching circuit: refer to the page 5 to 11.

Typical Performance¹

Parameter	Frequency				Unit
	1900	2100	2450	3500	MHz
Gain	18.0	16.5	15.0	13.0	dB
S11	-18.0	-35.0	-12.0	-17.0	dB
S22	-30.0	-30.0	-13.0	-18.0	dB
OIP3 ²	39.0	39.0	39.0	41.0	dBm
P1dB	22.5	22.5	23.5	24.0	dBm
Noise Figure	4.6	5.0	4.6	5.0	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 10 dBm per tone separated by 1 MHz.

	Min.	Typical	Max.	Unit
Bandwidth	1500		4000	MHz
I _C @ (V _C = 5V)	75	85	95	mA
V _C		5.0		V
R _{TH}		50		°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	+6.5	V
Supply Current	180	mA
Input RF Power	23	dBm

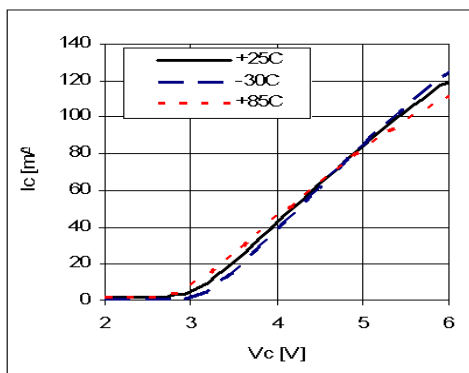
*Operation of this device above any of these parameters may result in permanent damage.

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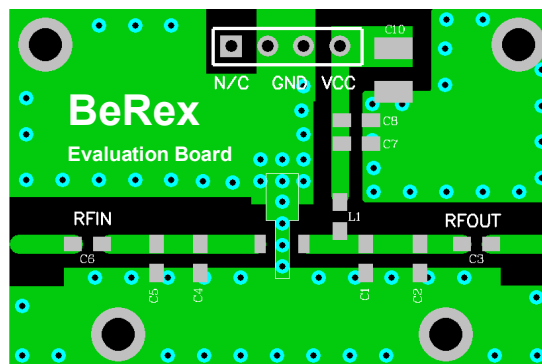
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V-I Characteristics



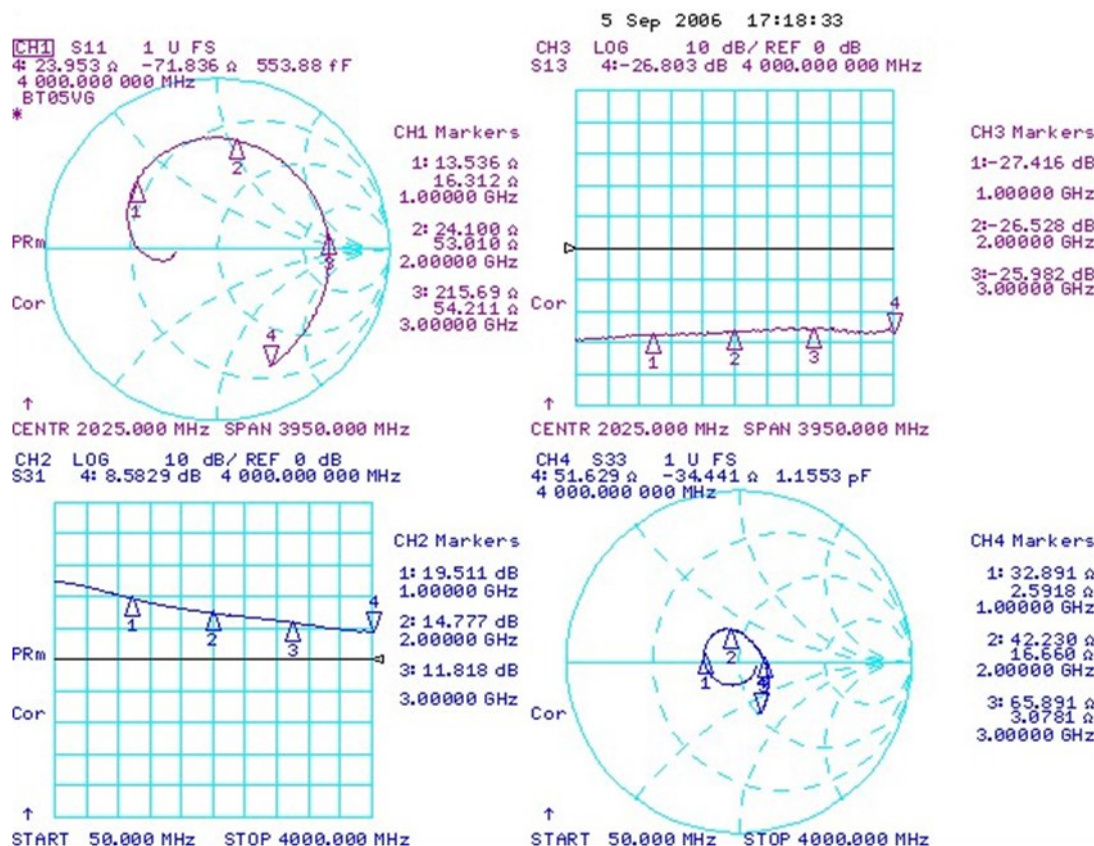
BeRex SOT89 Evaluation Board



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

Typical Device Data

S-parameters (Vc=5V, Ic=85mA, T=25°C)



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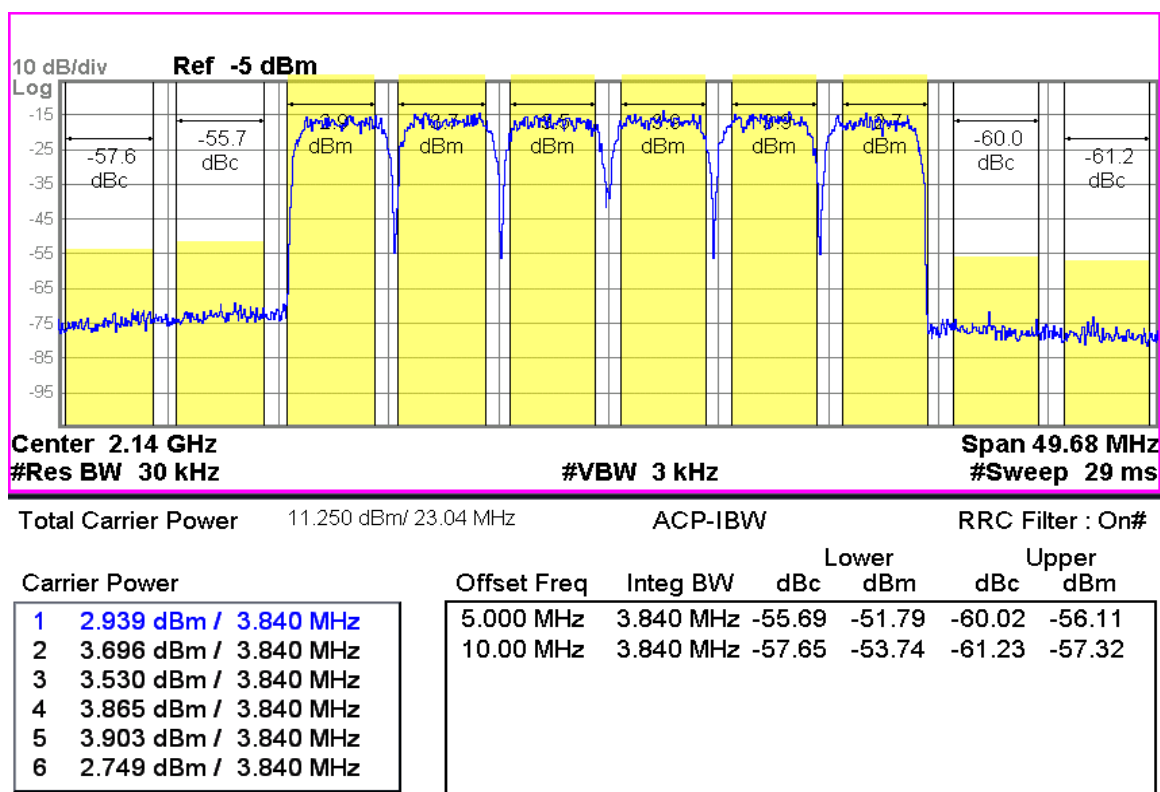


S-Parameter

(Vdevice = 5.0V, Icc = 85mA, T = 25 °C, calibrated to device leads)

Freq [MHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
100	0.26	-171	17.2	166	0.0352	-0.214	0.107	-33.4
500	0.468	178	13.8	118	0.0391	-6.83	0.159	-127
1000	0.608	141	9.46	74.9	0.0428	-23.2	0.207	170
1500	0.648	110	6.87	42.7	0.0441	-38.8	0.218	133
2000	0.646	80.6	5.48	13.4	0.0468	-52.6	0.198	105
2500	0.632	45.2	4.61	-16.1	0.0486	-69.1	0.147	68.3
3000	0.644	6.59	3.9	-46.2	0.0508	-93.1	0.139	9.32
3500	0.68	-34	3.14	-75.8	0.046	-114	0.224	-39.6
4000	0.74	-65.7	2.68	-101	0.0476	-135	0.32	-68.9

WCDMA 6FA 2140 -55dBc

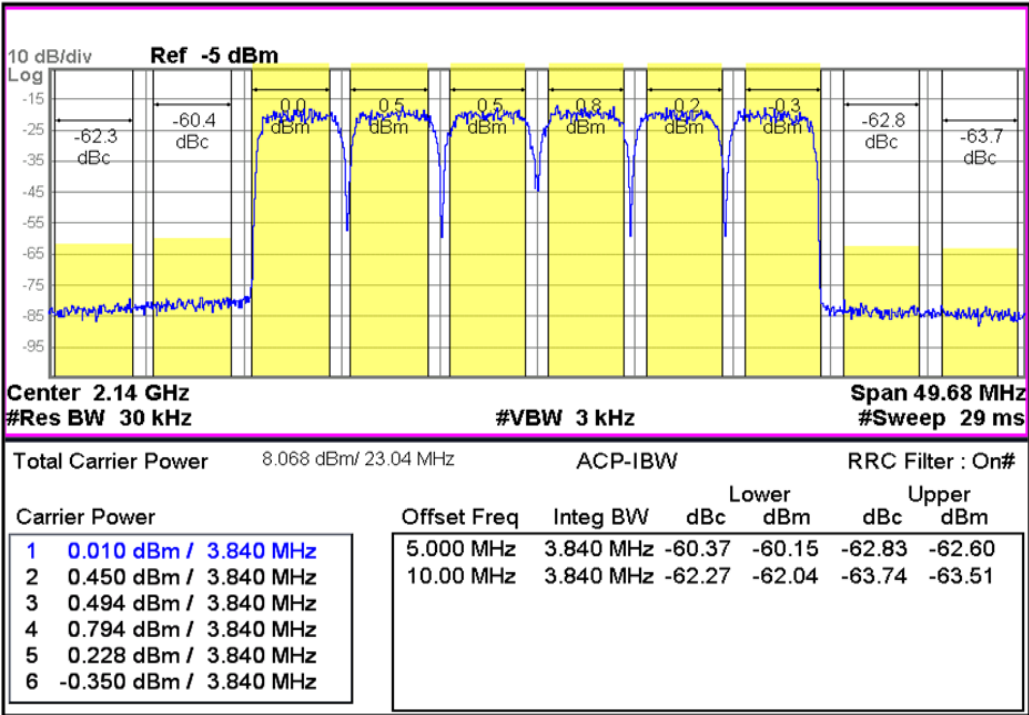


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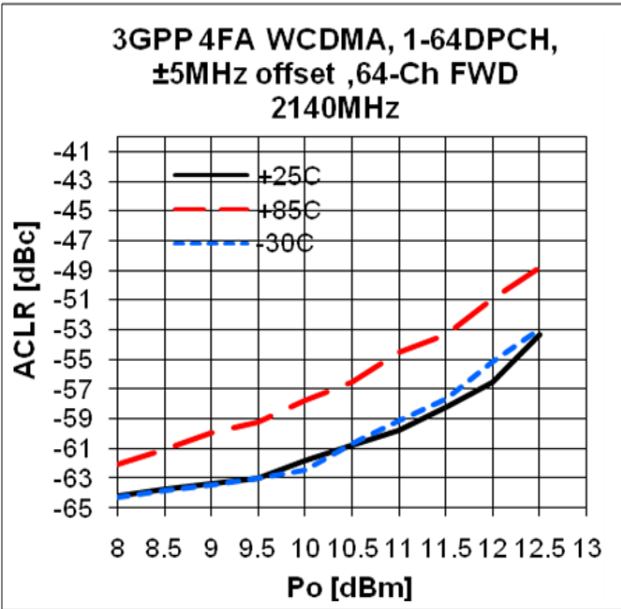
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WCDMA 6FA 2140 -60dBc



ACLR

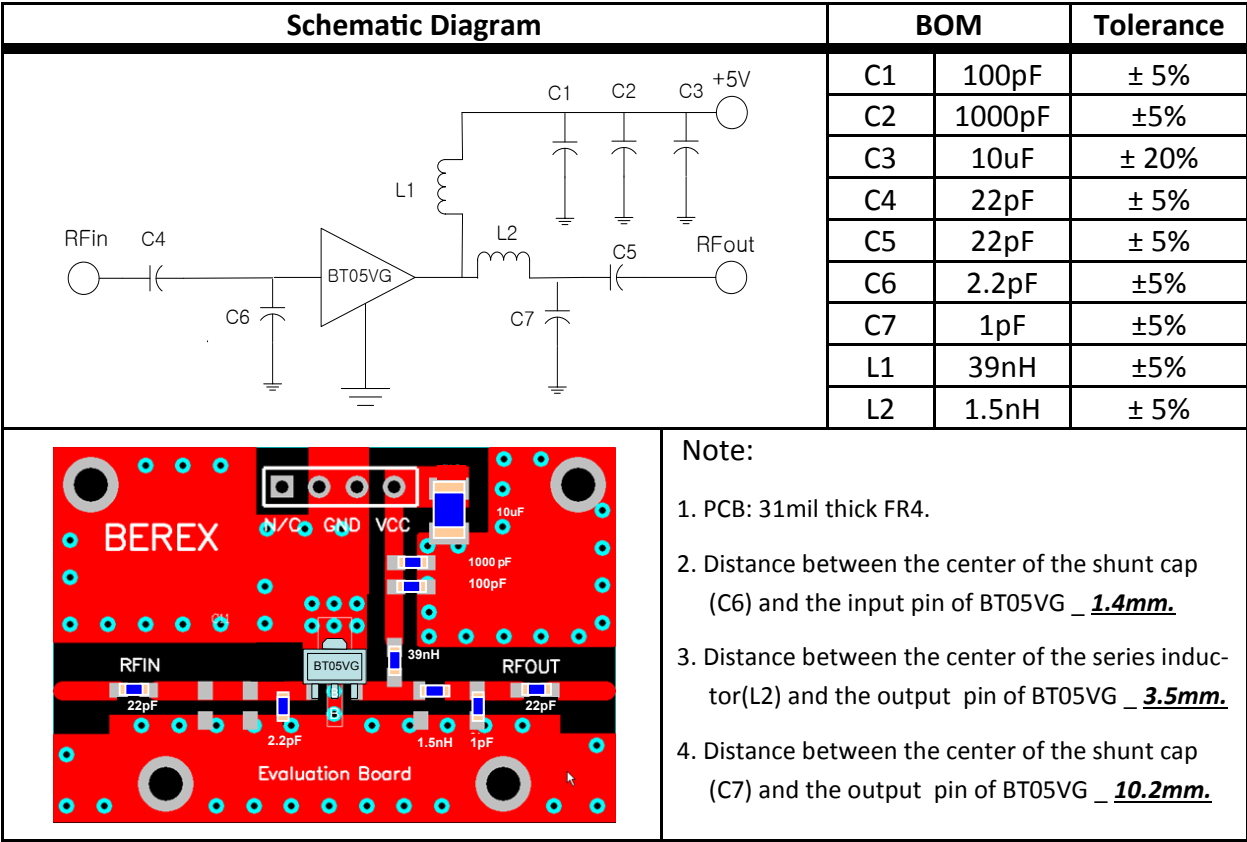


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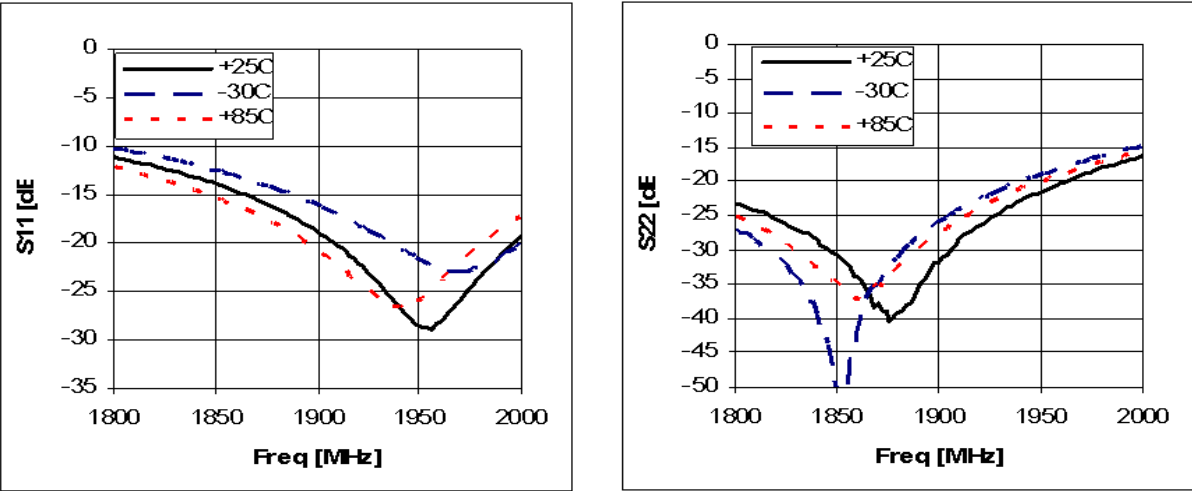
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Application Circuit: 1900 MHz

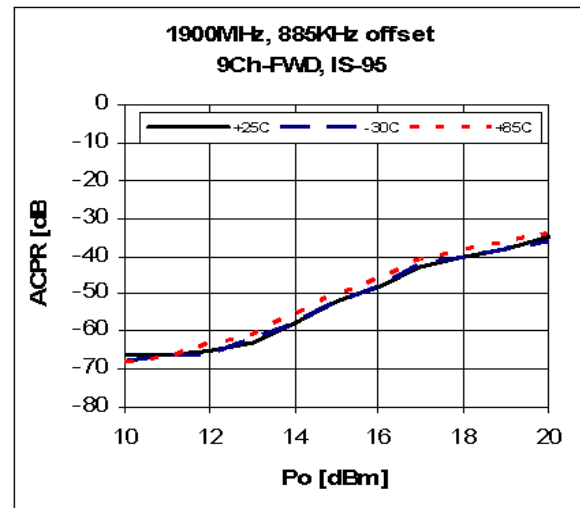
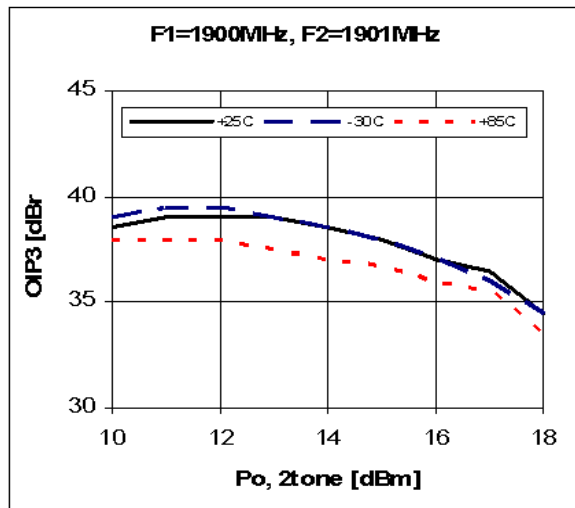
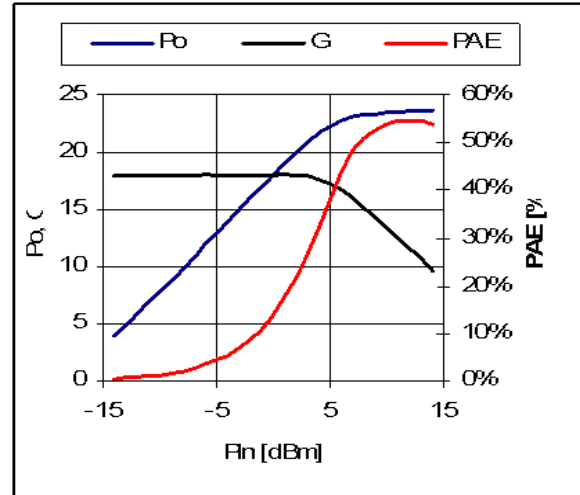
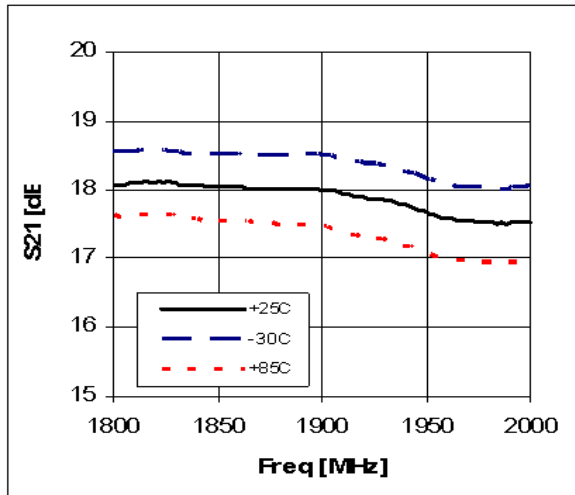


Typical Performance



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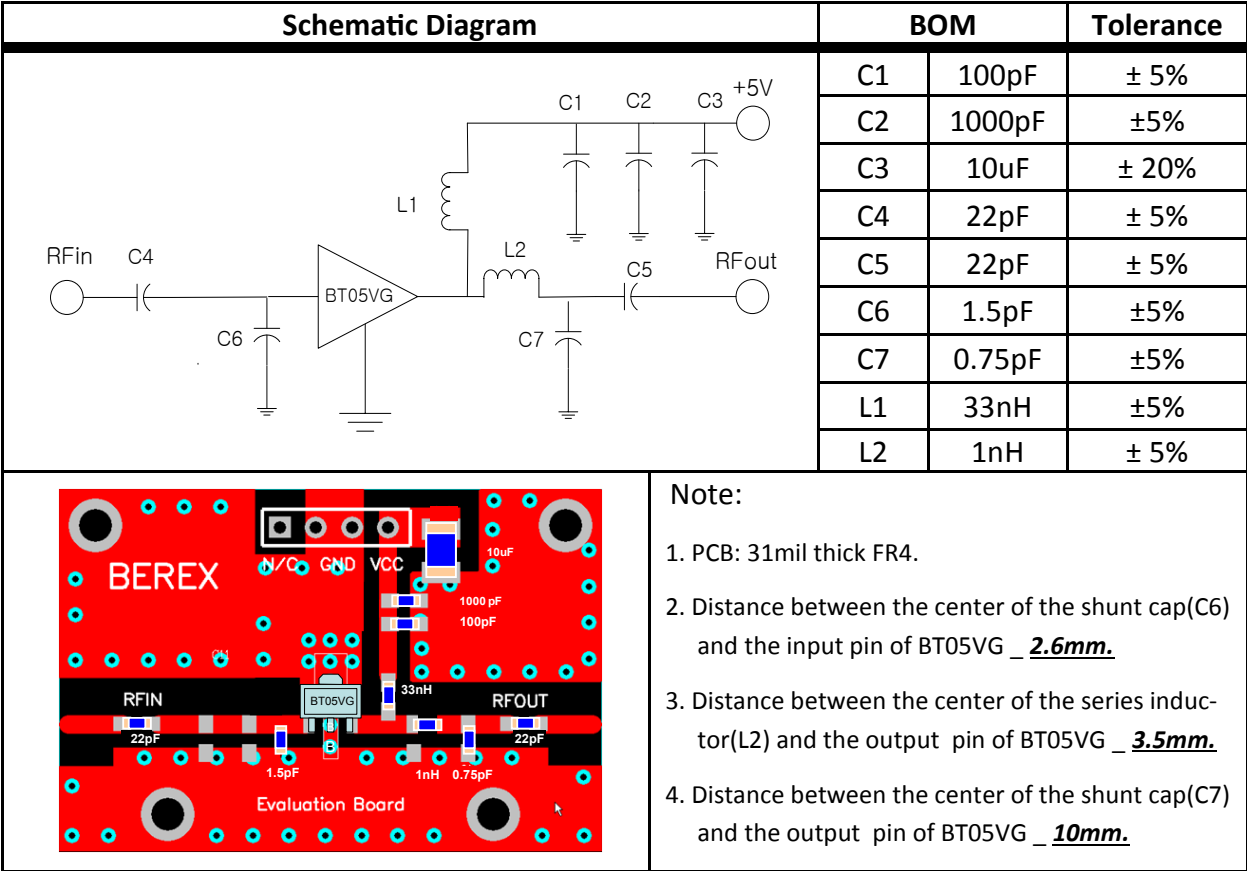


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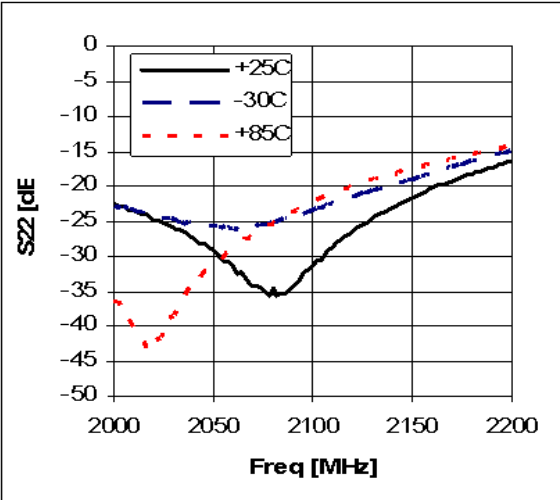
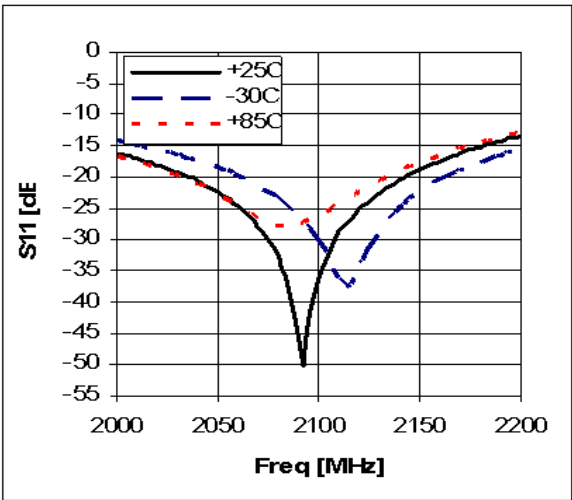
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Application Circuit: 2100 MHz

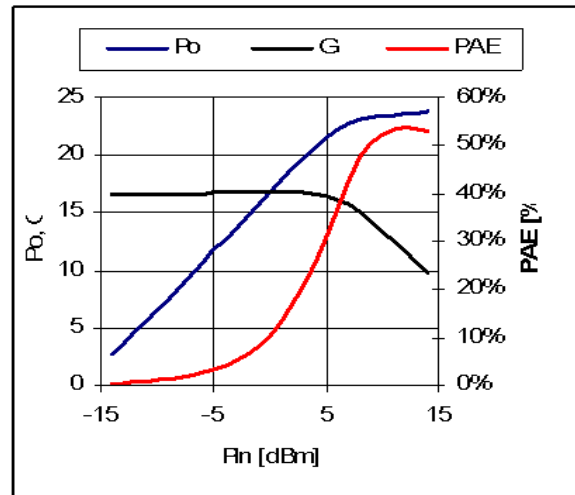
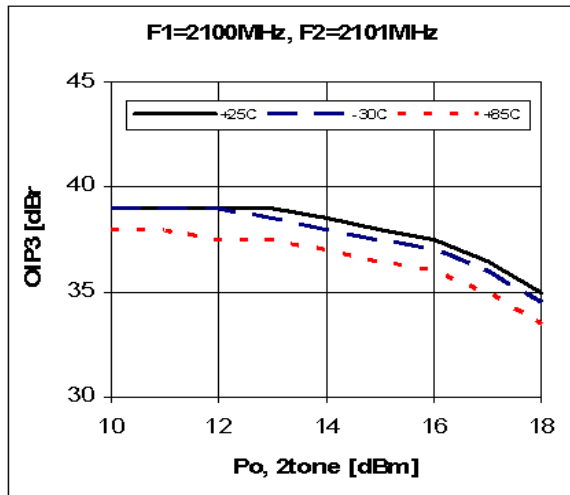


Typical Performance



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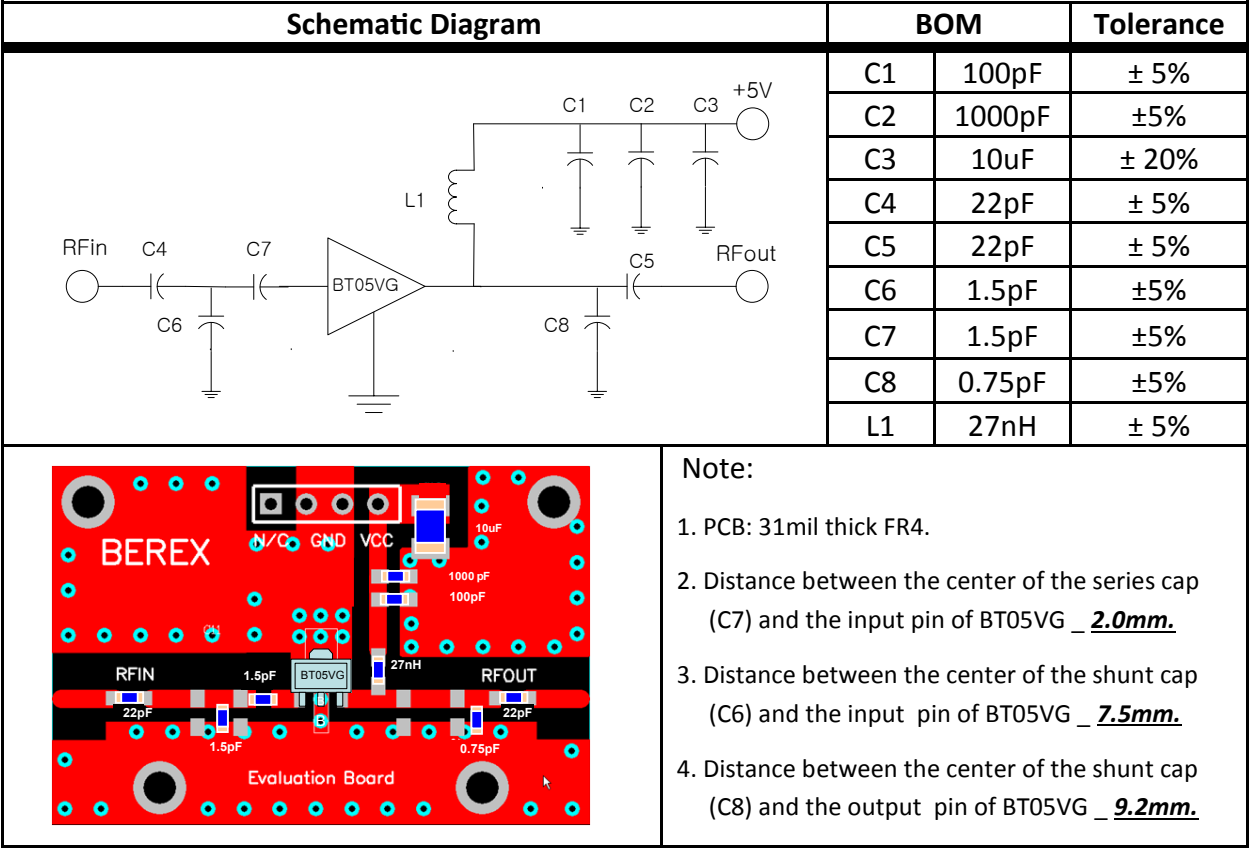


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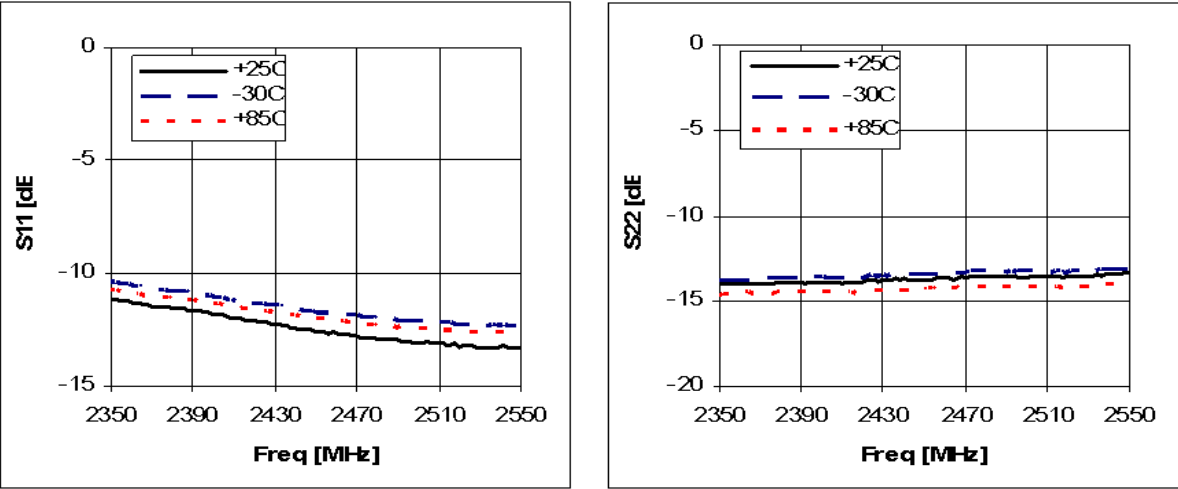
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Application Circuit: 2450MHz

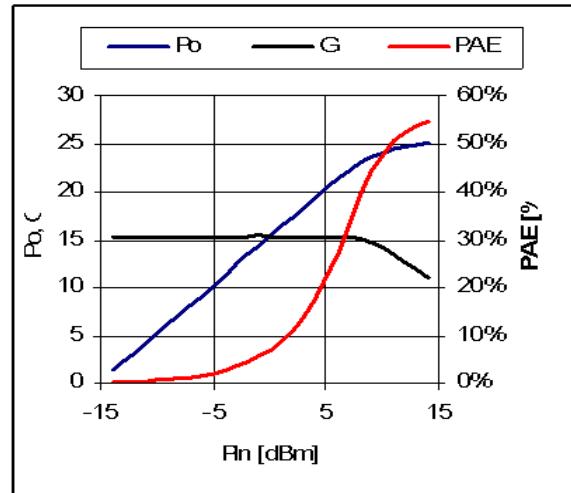
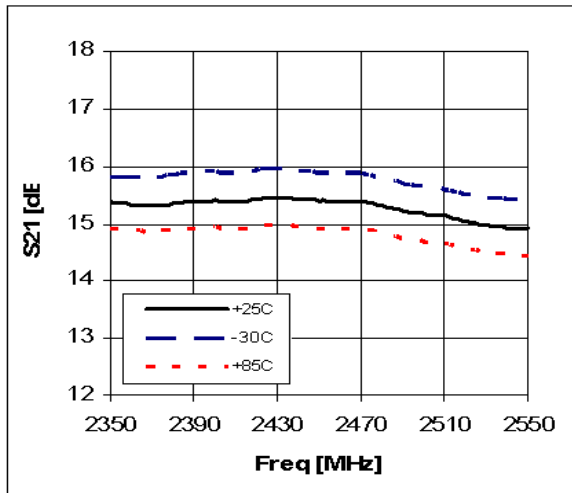


Typical Performance



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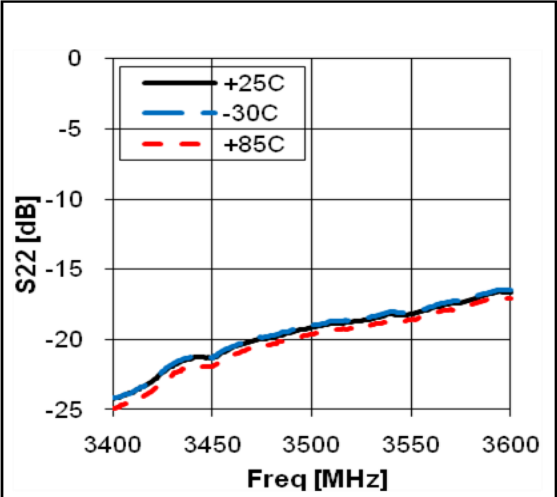
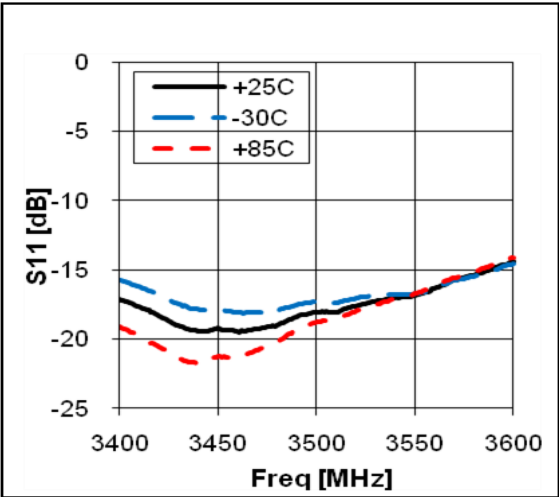


Application Circuit: 3500MHz

Schematic Diagram	BOM		Tolerance
	C1	100pF	±5%
	C2	1000pF	±5%
	C3	10uF	±20%
	C4	22pF	±5%
	C5	22uF	±5%
	C6	0.75pF	±5%
	C7	0.5pF	±5%
	L1	22nH	5%

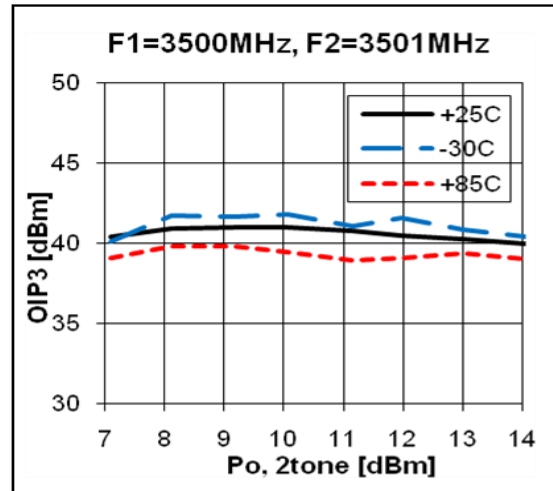
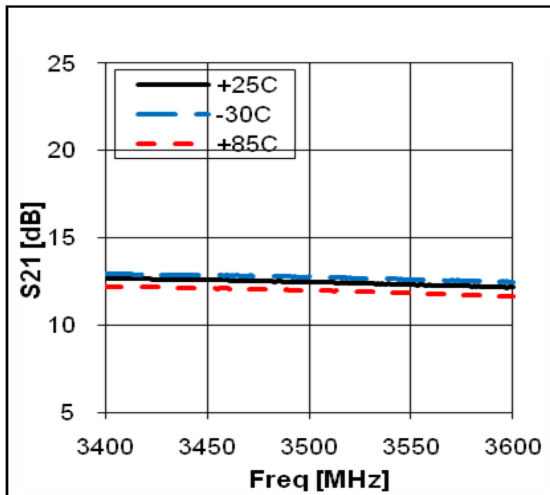
	Note:	
	1. PCB: 31mil thick FR4. 2. Distance between the center of the series cap (C7) and the input pin of BT05VG _ <u>2.0mm</u>. 3. Distance between the center of the shunt cap (C6) and the input pin of BT05VG _ <u>9.4mm</u>.	

Typical Performance



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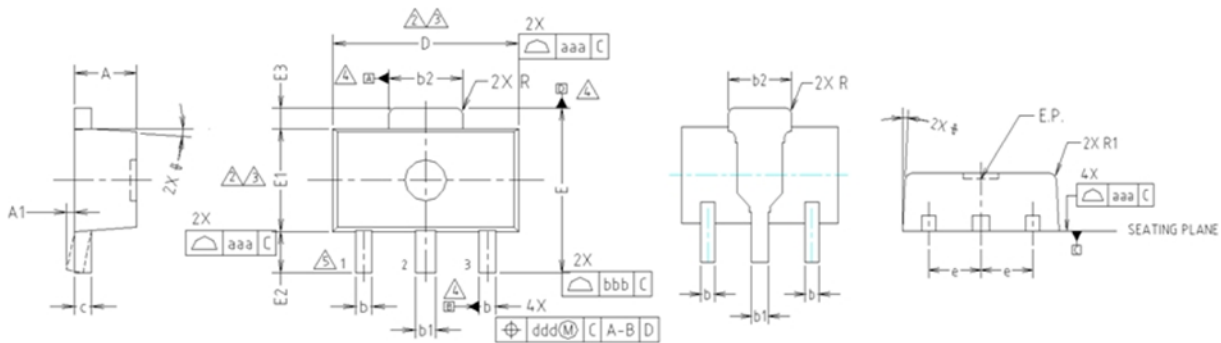


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Package Outline Dimension

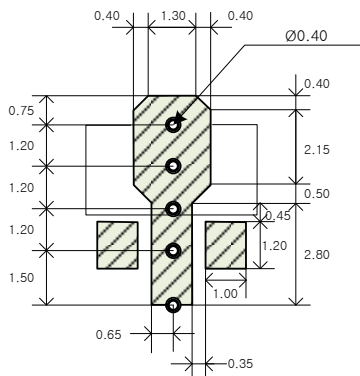


- NOTE:
1. DIMENSIONS IN MILLIMETERS.
- ⚠ DIMENSION D DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.5mm PER END. DIMENSION E1 DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.5mm PER SIDE.
- ⚠ DIMENSIONS D AND E1 ARE DETERMINED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE 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

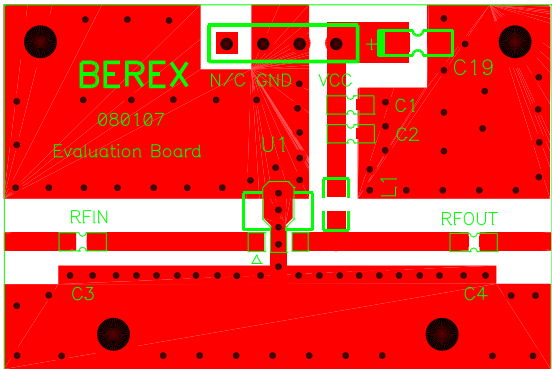
PCB Land Pattern



Note : All dimension are in millimeters

PCB lay out _ on BeRex website

PCB Mounting

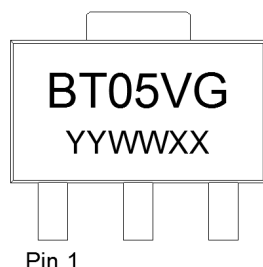


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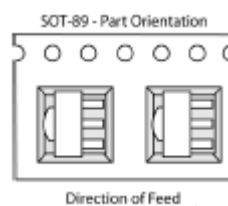
Package Marking



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 1B
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
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