

Device Features

- OIP3 = 40.0 dBm @ 1900 MHz
- Gain = 20.8 dB @ 900 MHz
- Output P1 dB = 22.4 dBm @ 900 MHz
- RoHS2-compliant SOT-89 SMT package

Product Description

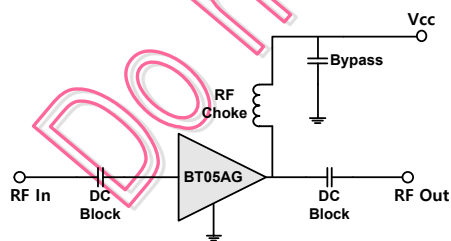
BeRex's BT05AG is a high performance and a high dynamic range amplifier in a low cost surface mount package(SOT-89) with a RoHS2-compliant, that incorporates reliable heterojunction-bipolar-transistor (HBT) devices fabricated with InGaP GaAs technology.

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.

Applications

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

Application Circuits



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

Electrical Specifications

Device performance _ measured on a BeRex evaluation board at 25°C, Vd=5V, 50 Ω system.

Parameter	Conditions	Min	Typ	Max	Unit
Operational		5		4000	MHz
Test Frequency			900		MHz
Gain		19.3	20.8		dB
Input Return Loss			-14.0		dB
Output Return Loss			-12.0		dB
Output IP3	10 dBm / tone , Δf=1 MHz	34.0	37.0		dBm
Output P1dB		21.4	22.4		dBm
Noise Figure			4.5		dB

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Bandwidth	5		4000	MHz
I _C @ (V _C = 5V)	68	85	102	mA
V _C	4.75	5.0	5.25	V
R _{TH}		50		°C/W
Operating Case Temperature	-40		+85	°C

Electrical specifications are measured at specified test conditions.

Specifications are not guaranteed over all recommended operating conditions.

Absolute Maximum Ratings

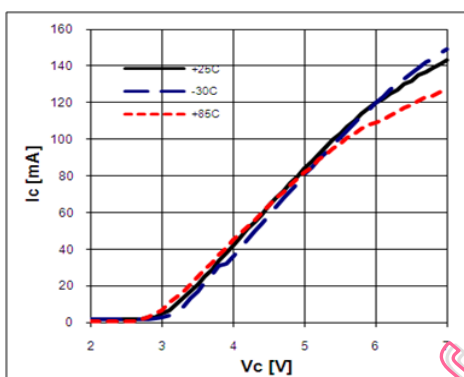
Parameter	Rating	Unit
Storage Temperature	-55 to +155	°C
Junction Temperature	+175	°C
Supply Voltage	+7.0	V
Supply Current	180	mA
Input RF Power	23	dBm

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

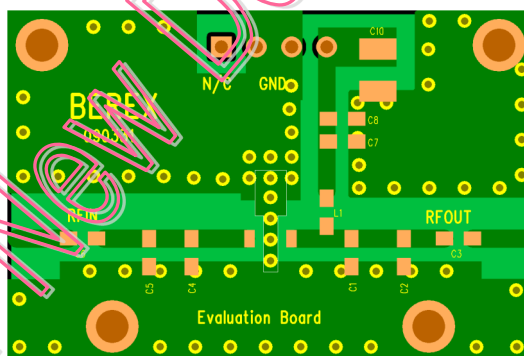
Typical Performance (Vc=5V, Ic=84mA, T=25°C)

Parameter	Frequency				Unit
	900	1900	2450	3500	MHz
Gain	20.8	16.3	14.3	11.1	dB
S11	-14.0	-20.0	-22.0	-16.0	dB
S22	-12.0	-12.0	-12.0	-13.0	dB
OIP3	37.0	40.0	37.5	40.0	dBm
P1dB	22.4	19.5	23.0	22.8	dBm
Noise Figure	4.5	4.4	4.3	4.5	dB

V-I Characteristics

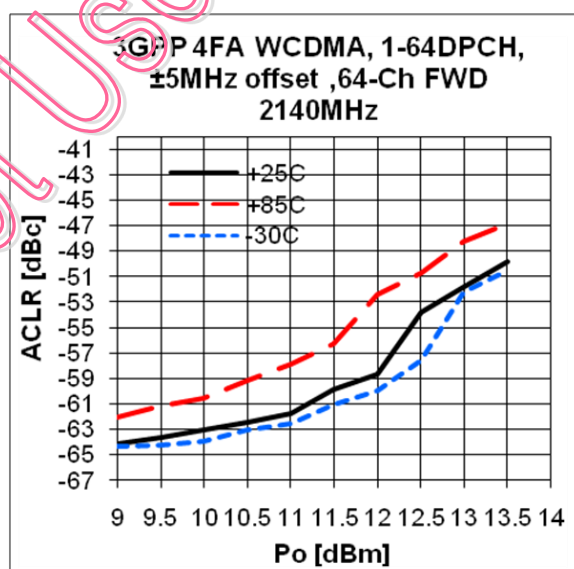


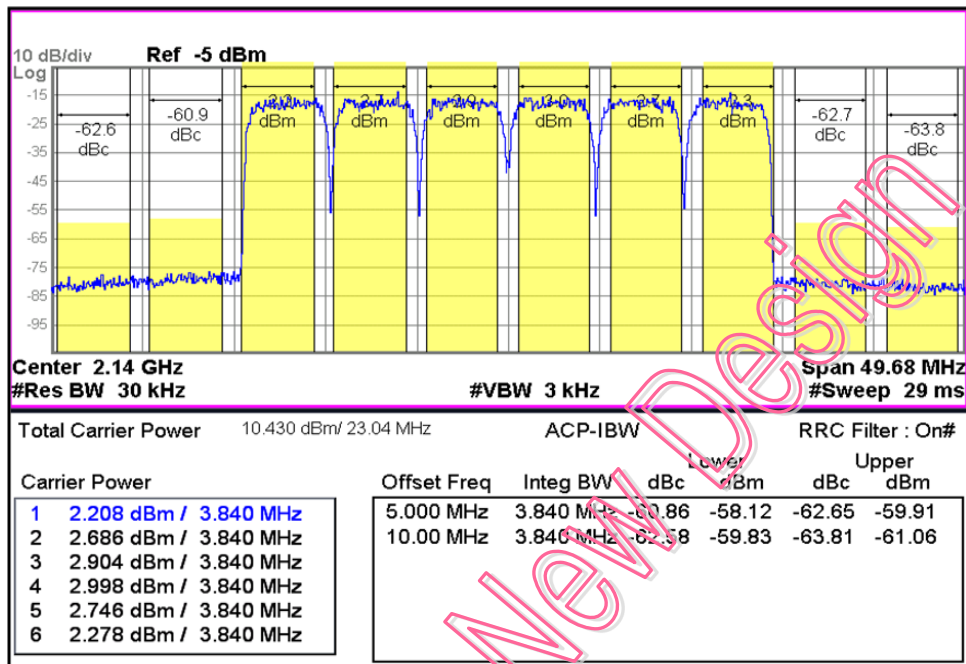
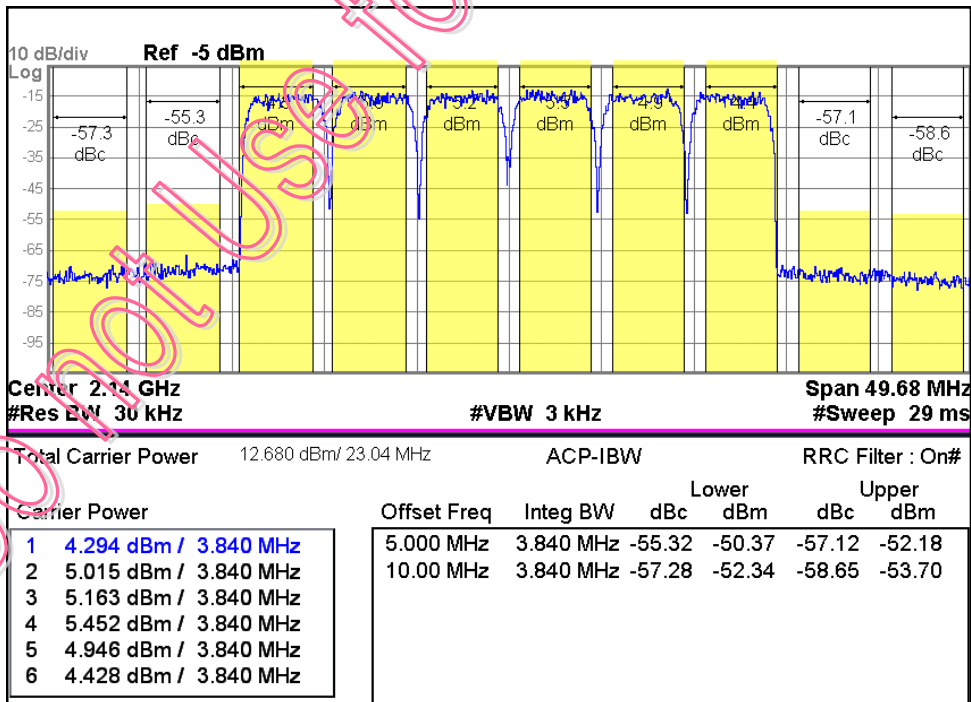
BeRex SOT89 Evaluation Board



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

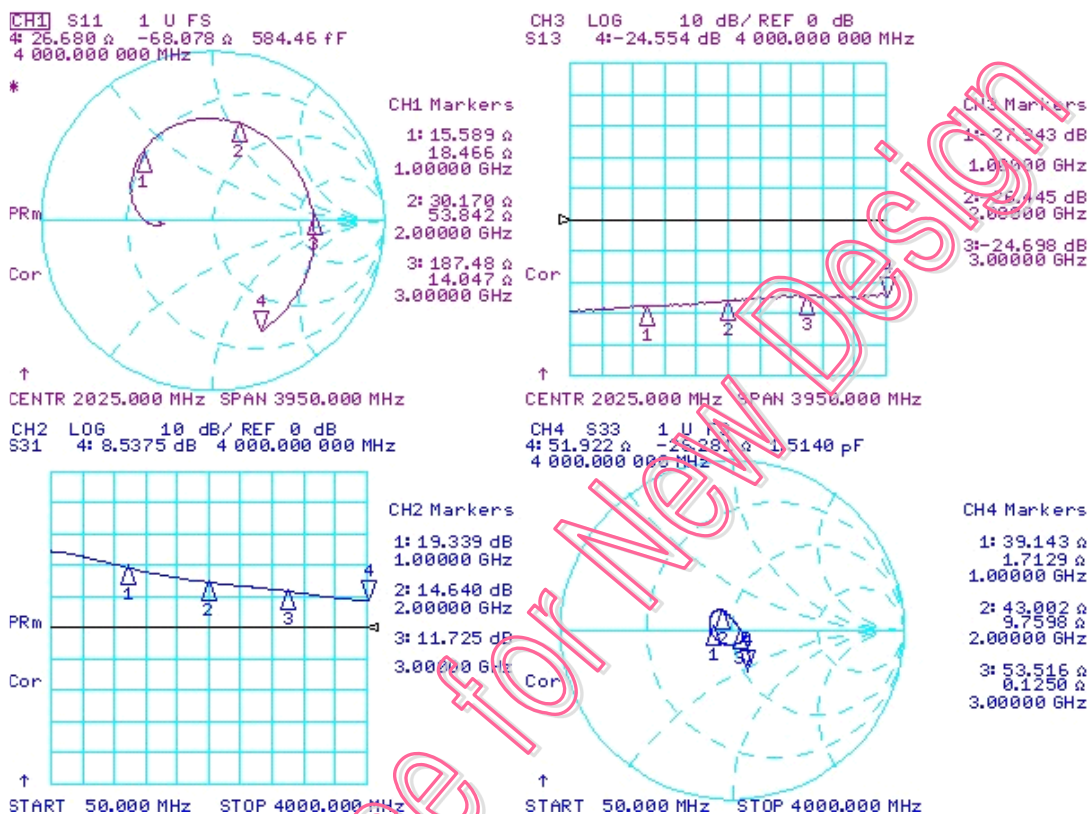
ACLR



WCDMA 6FA 2140 -60dBc

WCDMA 6FA 2140 -55dBc


Typical Device Data

S-parameters (Vc=5V, Ic=84mA, T=25°C)

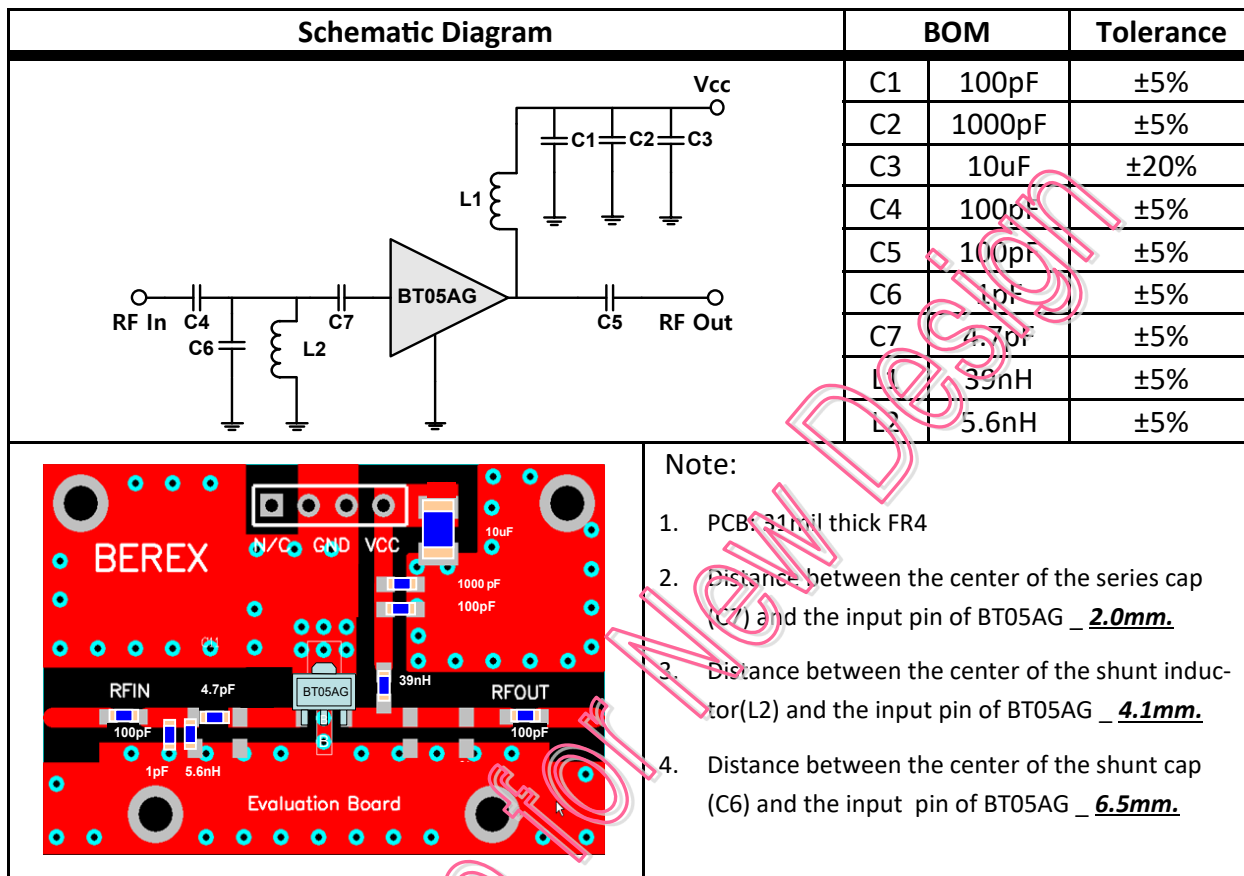


S-Parameter

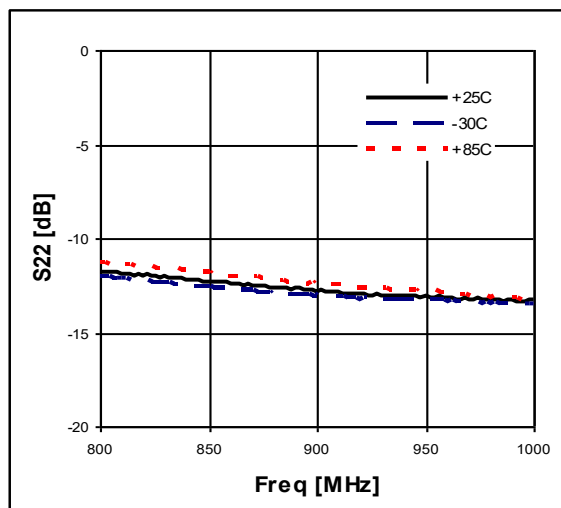
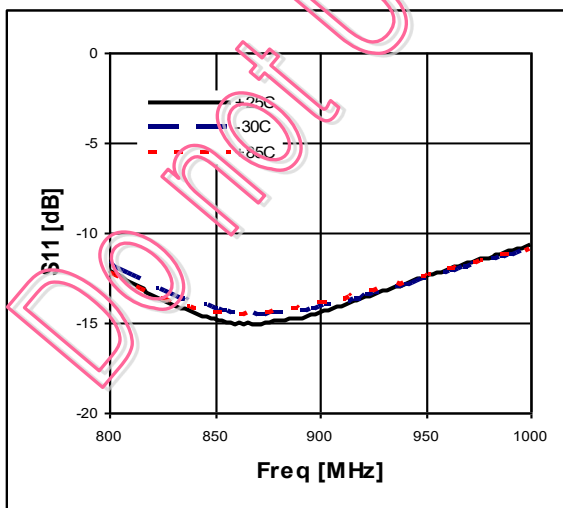
(Vdevice = 5.0V, Icc = 85mA, T = 25 °C, calibrated to device leads)

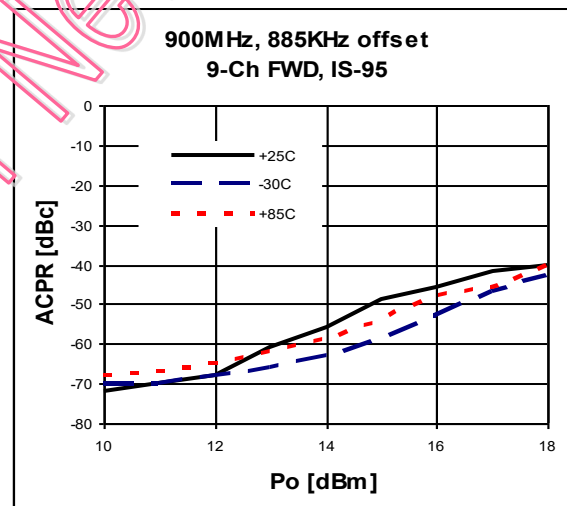
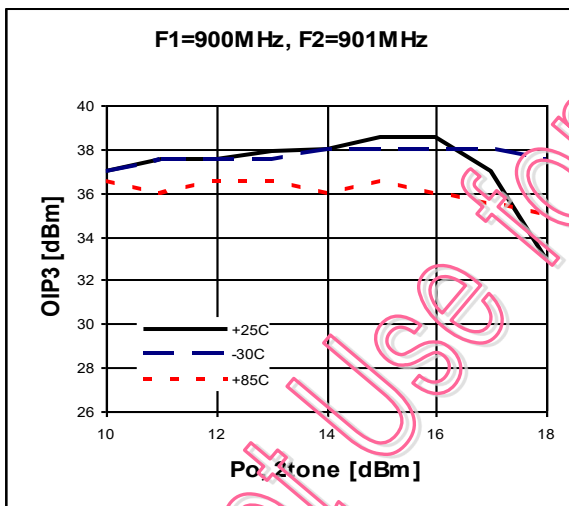
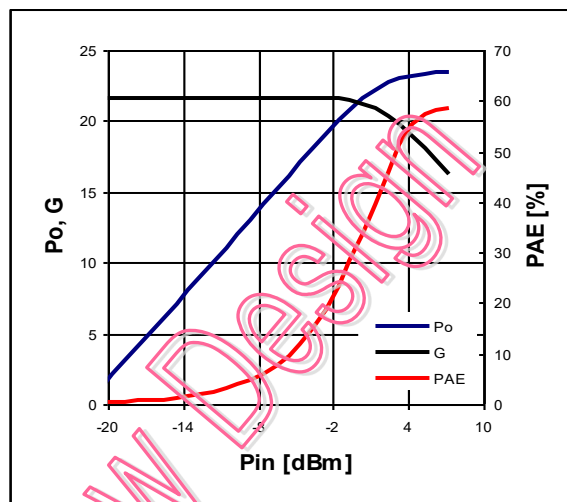
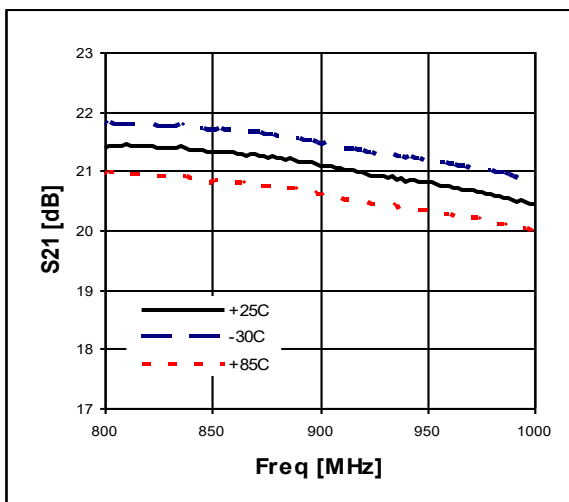
Freq [MHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
100	-10.6001	-176.08	24.3773	166.26	-29.173	-0.828	-21.805	-27.056
500	-6.89632	171.969	22.4951	118.889	-28.510	-5.512	-20.525	-120.815
1000	-4.83571	137.774	19.3111	75.4763	-27.637	-16.88	-17.519	170.039
1500	-4.36842	107.055	16.5624	42.7846	-27.010	-29.70	-16.447	137.451
2000	-4.49519	77.2739	14.5732	13.4329	-26.080	-41.79	-17.536	118.289
2500	-4.82222	43.2334	13.1214	-15.725	-25.166	-58.33	-22.101	99.7268
3000	-4.64574	3.39018	11.7047	-45.735	-24.318	-79.25	-27.037	4.66192
3500	-3.85543	-35.846	9.92492	-74.765	-25.101	-100.4	-16.664	-50.8784
4000	-3.0184	-66.883	8.4767	-100.82	-24.247	-119.41	-11.732	-71.031

Application Circuit: 900 MHz

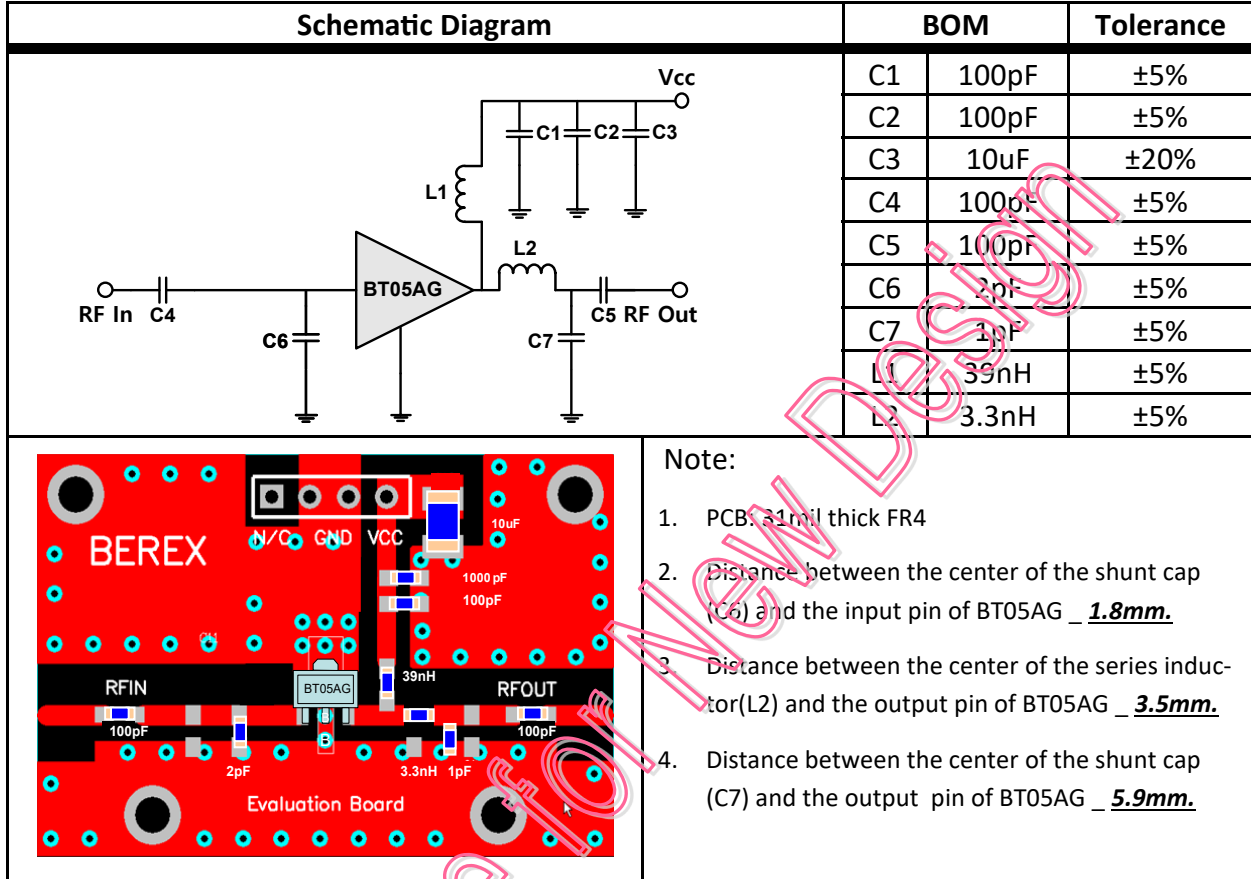


Typical Performance

(V_c=5V, I_c=84mA, T=25°C)


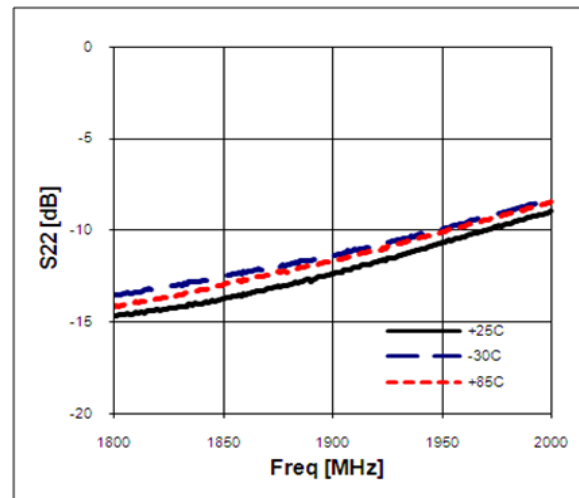
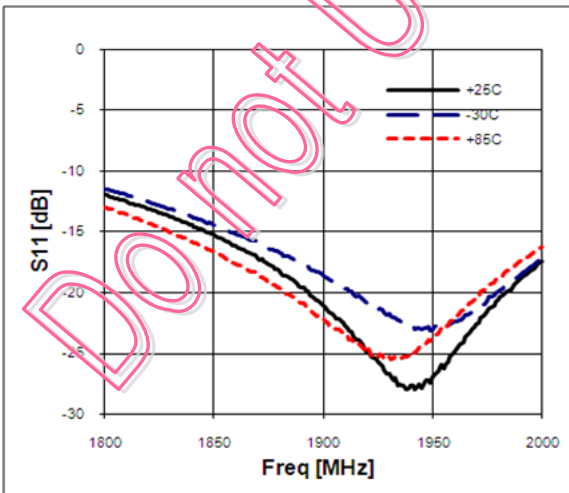


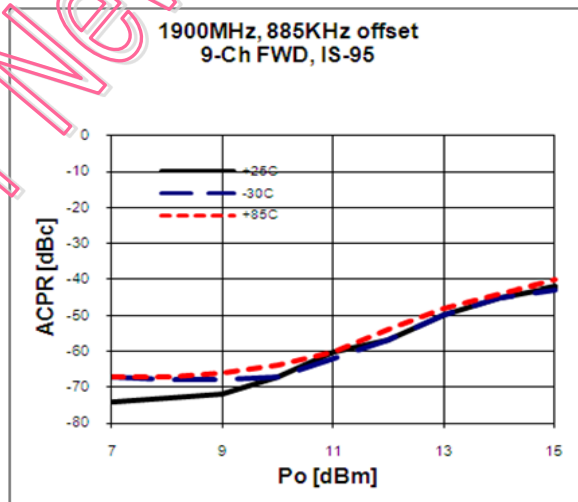
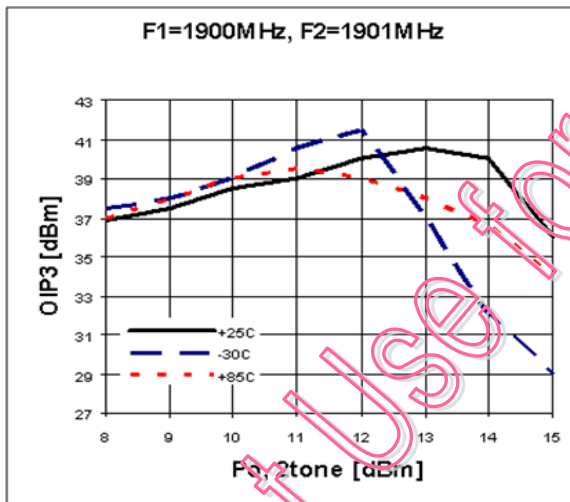
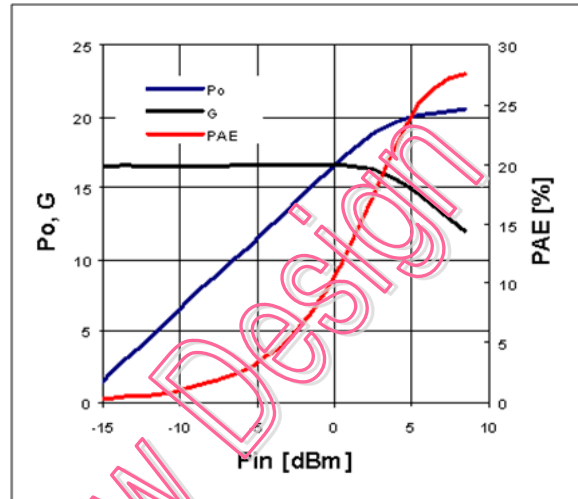
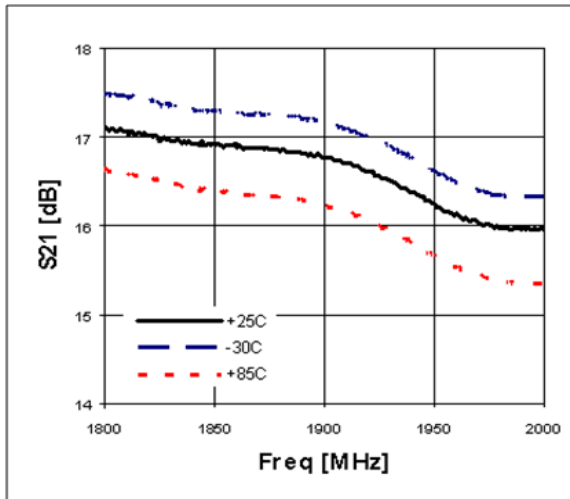
Application Circuit: 1900 MHz



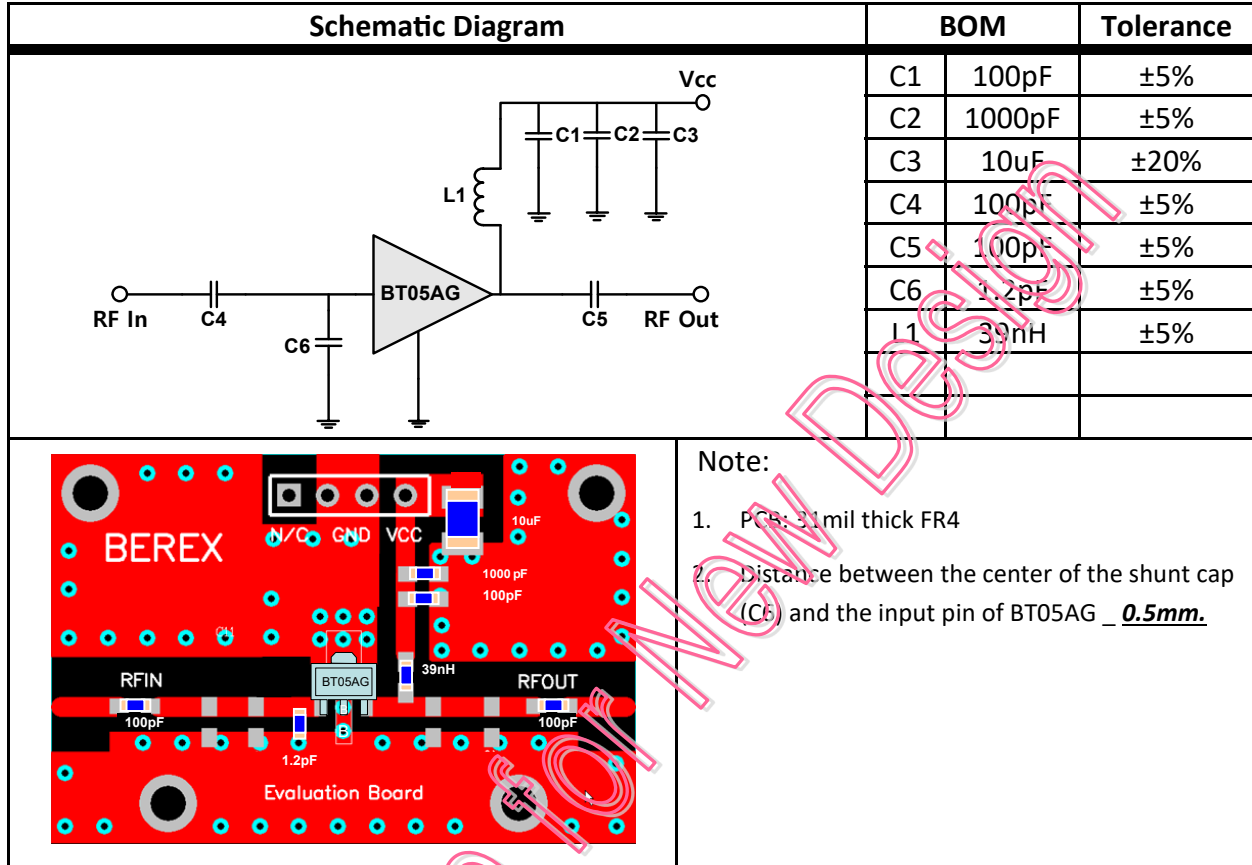
Typical Performance

(Vc=5V, Ic=84mA, T=25°C)

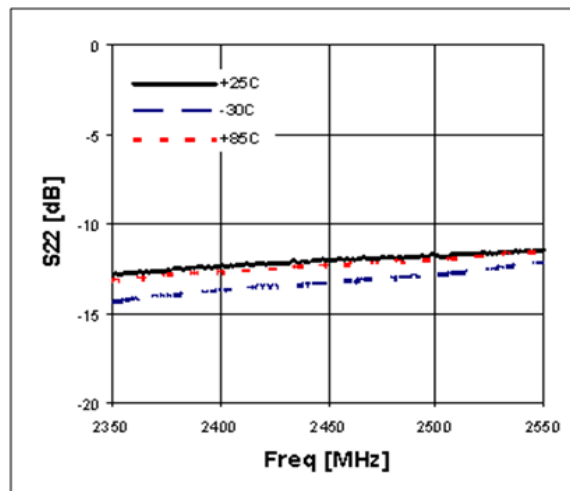
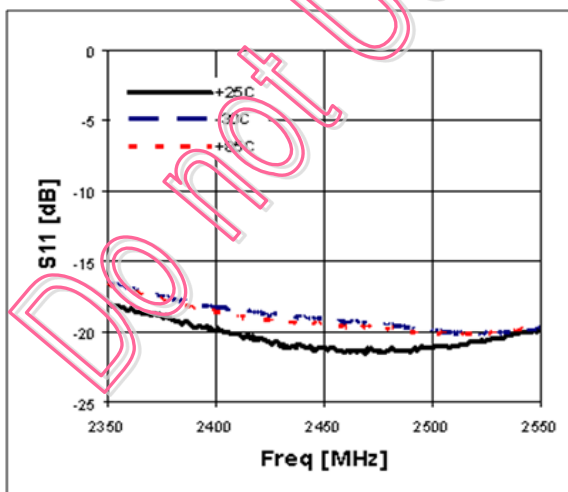


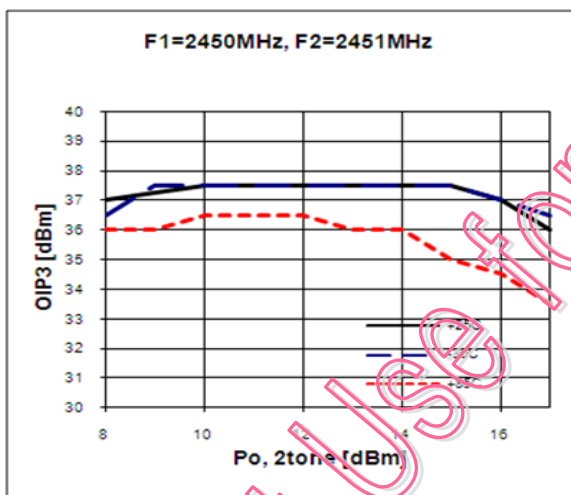
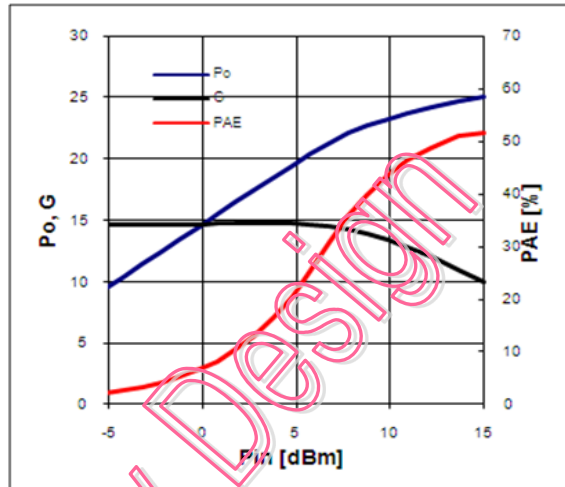
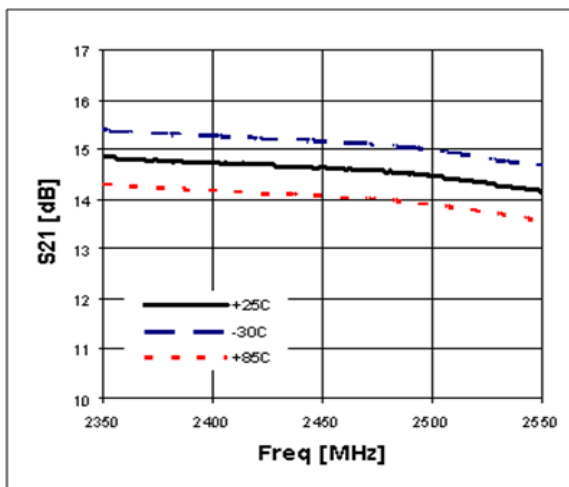


Application Circuit: 2450MHz

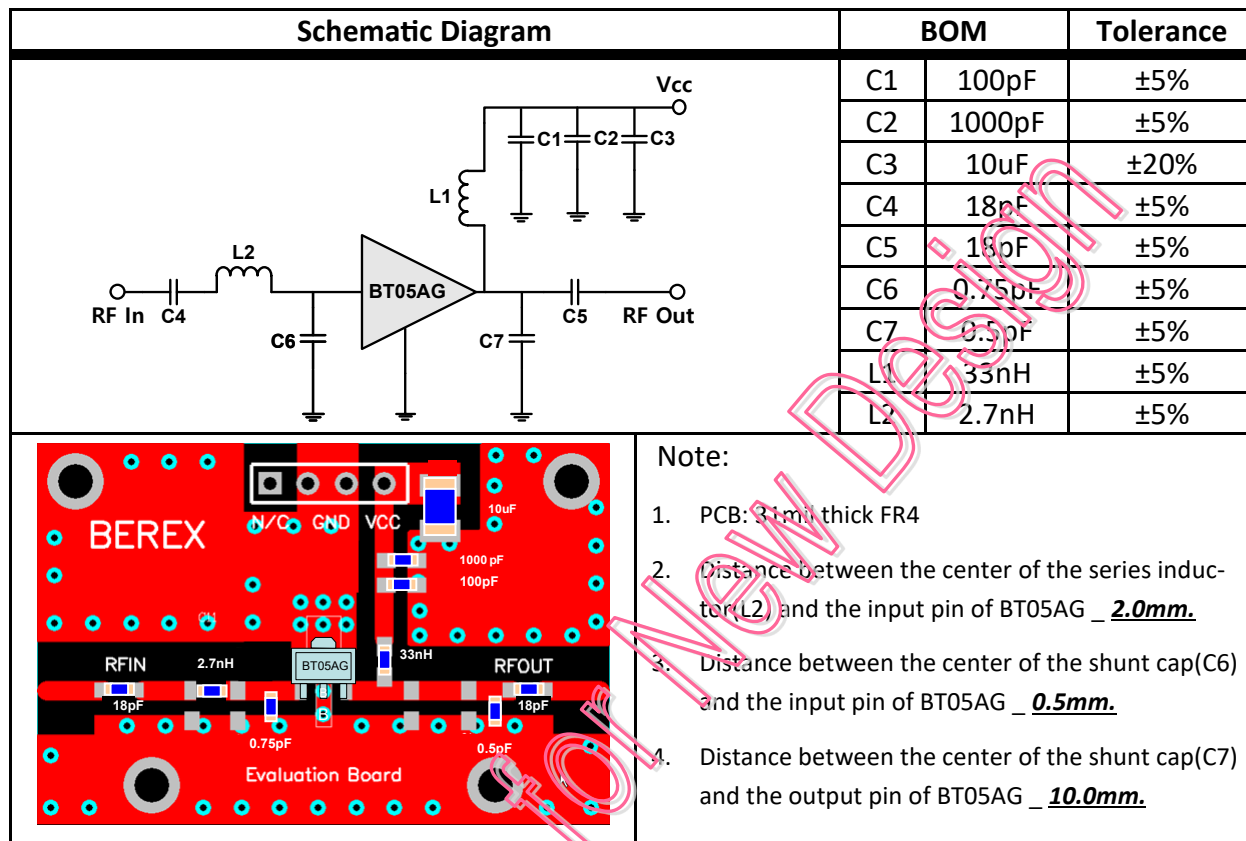


Typical Performance (Vc=5V, Ic=84mA, T=25°C)



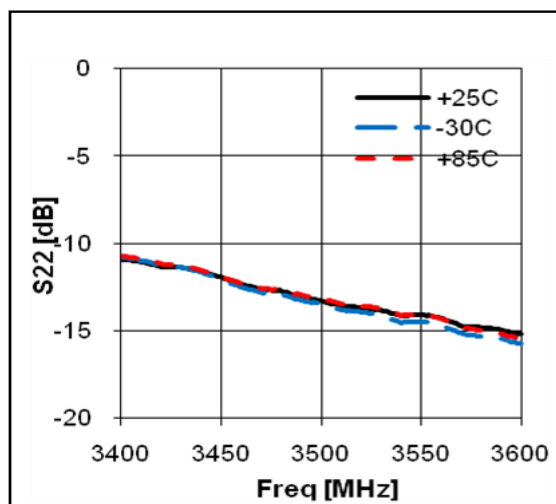
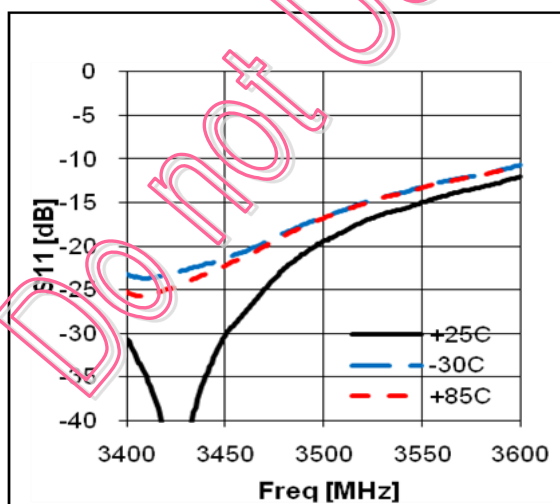


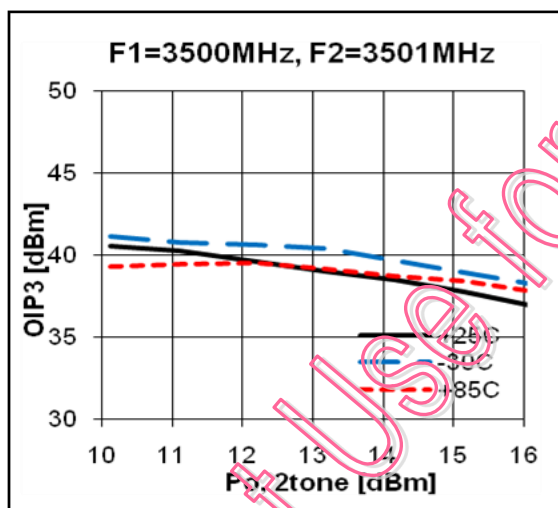
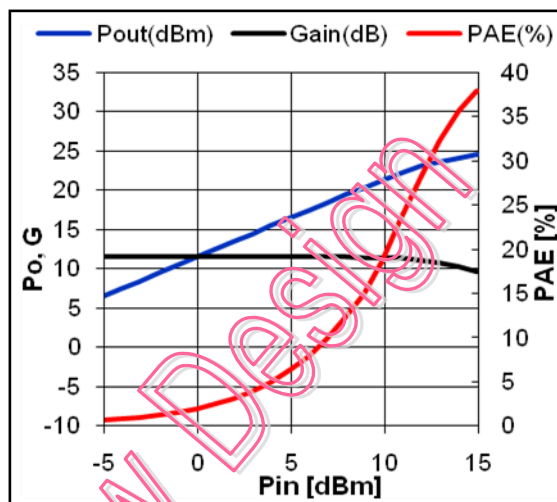
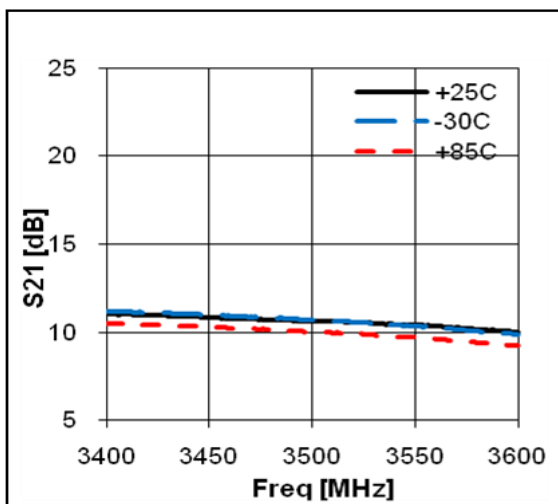
Application Circuit: 3500MHz



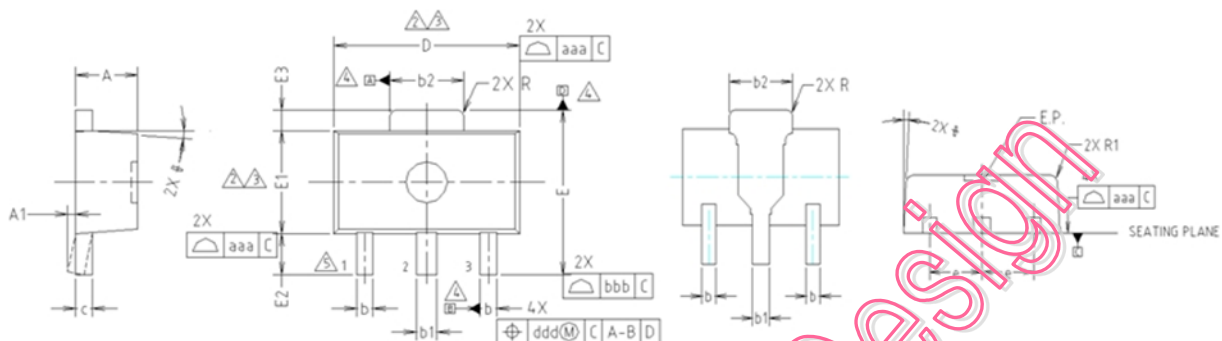
Typical Performance

(Vc=5V, Ic=84mA, T=25°C)





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.

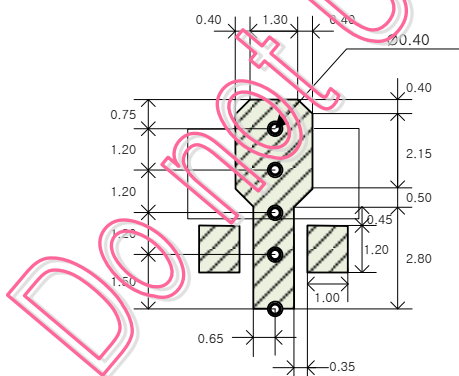
⚠ DATUMS A, B AND D TO BE DETERMINED 0.18mm FROM THE LEAD TIP.

⚠ TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.

SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	0.60	1.50	1.60	
A1	0.60	—	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	
TOLERANCES OF FORM AND POSITION				
aaa	0.15			
bbb	0.20			
ccc	0.10			
ddd	0.10			

Suggested PCB Land Pattern and PAD Layout

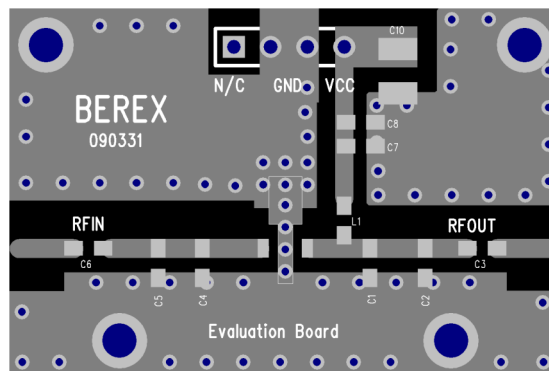
PCB Land Pattern



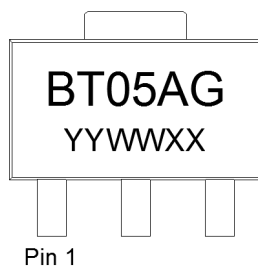
Note : All dimension _ millimeters

PCB lay out _ on BeRex website

PCB Mounting



Package Marking

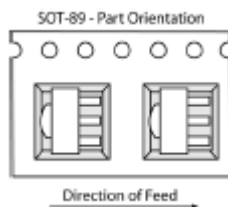


YY = Year, WW = Working Week,
XX = Wafer No.

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 1B
Value: Passes <1000V
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

MSL Rating: Level 1 at +260°C convection reflow
Standard: JEDEC Standard J-STD-020



Proper ESD procedures should be followed when handling this device.

RoHS Compliance

This part is compliant with Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2011/65/EU as amended by Directive 2015/863/EU.

This product also is compliant with a concentration of the Substances of Very High Concern (SVHC) candidate list which are contained in a quantity of less than 0.1%(w/w) in each components of a product and/or its packaging placed on the European Community market by the BeRex and Suppliers.

NATO CAGE code:

2	N	9	6	F
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Do not Use for New Design