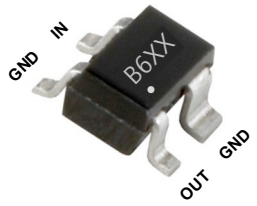
BGS6

50-4000 MHz SILICON GERMANIUM Gain Block

Device Features

- 3 ~ 3.3V supply
- No Dropping Resistor Required
- No matching circuit needed
- Green/RoHS2 compliant SOT-343 package

Part Marking (X: Wafer number)



Pin Description	
RF IN	3
RF OUT	1
GND	2,4

Product Description

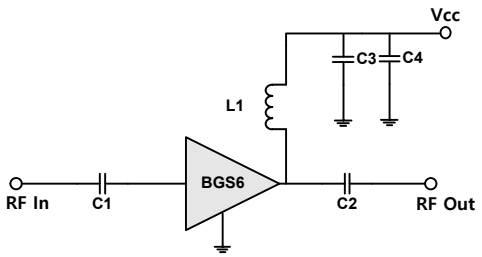
BeRex's BGS6 is a high SiGe HBT MMIC amplifier, internally matched to 50 Ohms without the need for external components. Designed to run directly from a 3.3V supply. The BGS6 is designed for high linearity 3.3V gain block applications . It is packaged in a RoHS2-compliant with SOT-343 surface mount package.

Applications

- Drive Amplifier
- Cellular, PCS, GSM, UMTS, WCDMA, LTE
- Wireless Data

Applications Circuit

Application Circuit Values Example		
Freq.	300~500MHz	700MHz ~ 3GHz
C1/C2	2nF	100pF
C3	100pF	100pF
C4	1nF	1nF
L1 (1608 Chip Ind.)	820nH	56nH



Electrical Specifications

Device performance _ measured on a BeRex evaluation board at 25°C, Vd=3V, 50 Ω system.

Parameter	Conditions	Min	Typ	Max	Unit
Operational Frequency Range		50		5000	MHz
Test Frequency			900		MHz
Gain		20.3	21.8		dB
Input Return Loss			-19.0		dB
Output Return Loss			-16.0		dB
Output IP3	0 dBm / tone , Δf=1 MHz	23.0	26.0		dBm
Output P1dB		16.0	17.0		dBm
Noise Figure			2.9		dB

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Bandwidth	50		4000	MHz
I_C @ (Vc = 3.3V)	22	27	32	mA
V_C	3.0	3.3	3.45	V
R_{TH}		130		°C/W
Operating Case Temperature	-40		+105	°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	+165	°C
Supply Voltage	+4.0	V
Supply Current	100	mA
Input RF Power	15	dBm

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

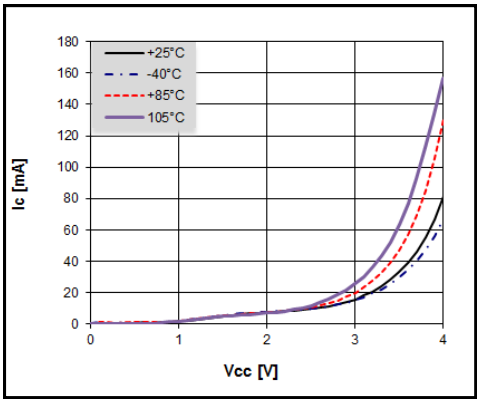
Typical Performance (Vc = 3.3V, Ic = 27mA, T = 25°C)

Freq	MHz	400	900	1900	2450	2650
S21	dB	23.3	21.8	18.0	16.2	15.7
S11	dB	-22.1	-19.2	-17.1	-17.1	-16.6
S22	dB	-19.2	-16.1	-10.3	-10.0	-10.2
P1	dBm	16.5	17.0	14.1	12.5	12.1
OIP3	dBm	26.1	26.1	25.9	24.1	23.0
NF	dB	3.0	2.9	3.1	3.3	3.5

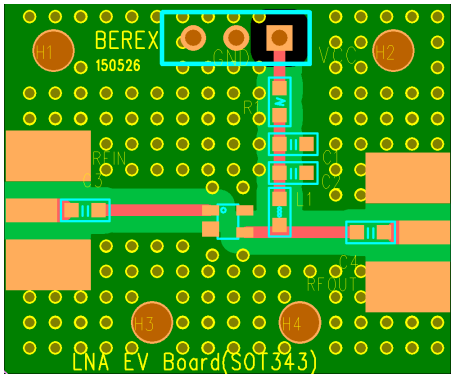
Typical Performance (Vc = 3.0V, Ic = 16mA, T = 25°C)

Freq	MHz	400	900	1900	2450	2650
S21	dB	23.1	21.5	17.7	16.0	15.4
S11	dB	-23.8	-22.8	-18.7	-17.2	-16.3
S22	dB	-19.6	-18.4	-11.1	-10.1	-10.1
P1	dBm	15.5	16.7	13.9	12.2	11.8
OIP3	dBm	24.3	24.4	24.1	23.3	22.6
NF	dB	2.5	2.4	2.5	2.9	3.1

V-I Characteristics



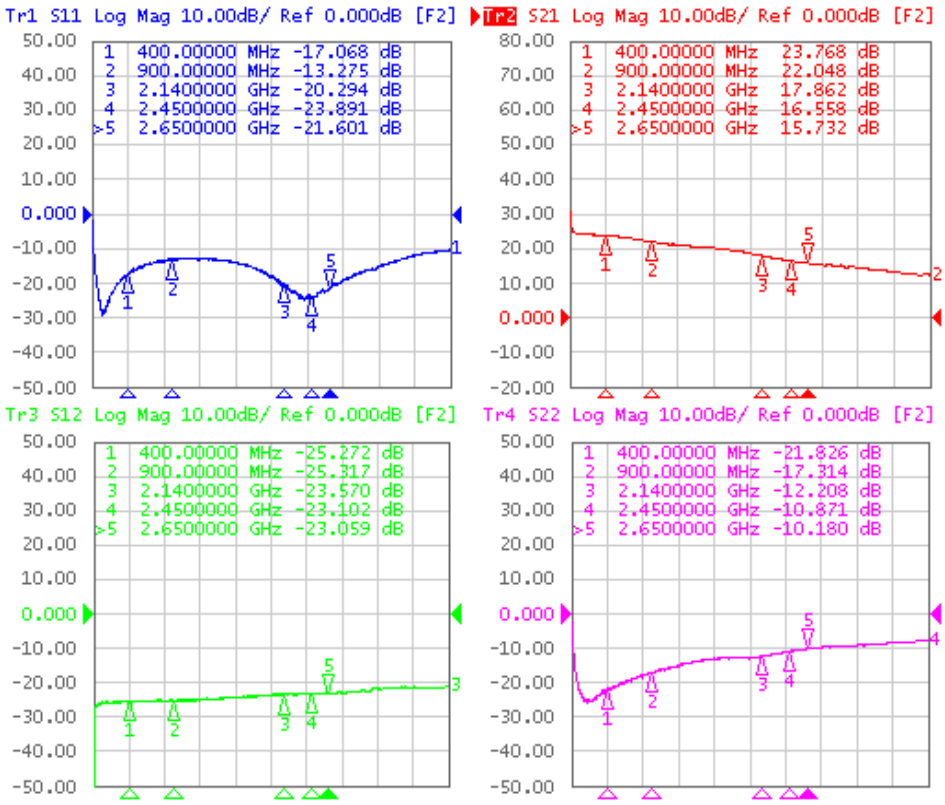
BeRex SOT-343 Evaluation Board



*Dielectric constant _ 4.2 *31mil thick FR4 PCB

Typical Device Data

S-parameters (Vc=3.3V, Ic=27mA, T=25°C)



S-Parameter

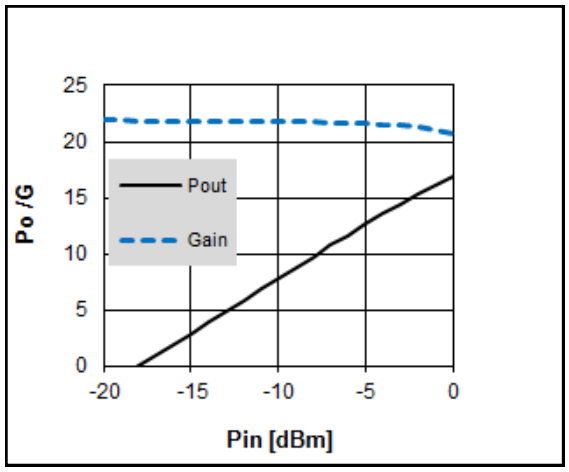
(Vdevice = 3.3V, Icc = 27mA, T = 25 °C, calibrated to device leads)

Freq [MHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
70	0.04	-155.22	16.29	167.53	0.04	7.11	0.06	-145.56
900	0.21	41.30	12.62	125.42	0.05	13.57	0.13	86.41
1000	0.22	36.48	12.10	121.86	0.05	13.35	0.14	83.10
1500	0.21	20.11	10.43	103.05	0.05	21.21	0.21	72.16
2000	0.12	10.78	8.53	80.43	0.06	24.96	0.23	65.68
2500	0.06	68.07	6.41	66.87	0.07	26.22	0.28	67.77
3500	0.22	98.26	4.80	45.86	0.08	31.06	0.36	55.89
4000	0.30	82.94	4.07	36.16	0.08	34.11	0.40	49.61

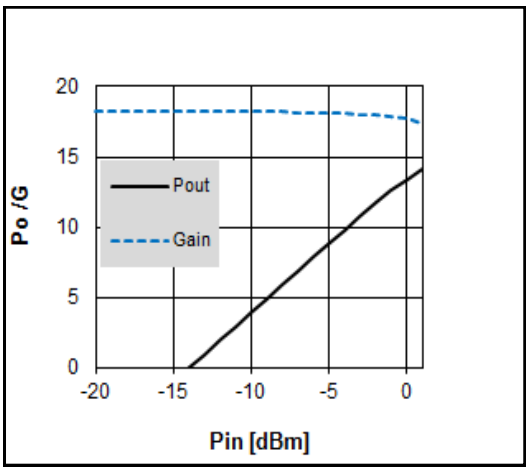
Typical Performance

(Vc=3.3V, Ic=27mA, T=25°C)

Pin-Pout-Gain

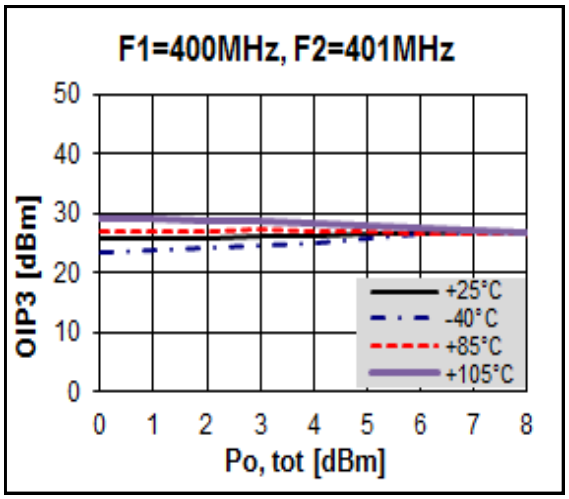


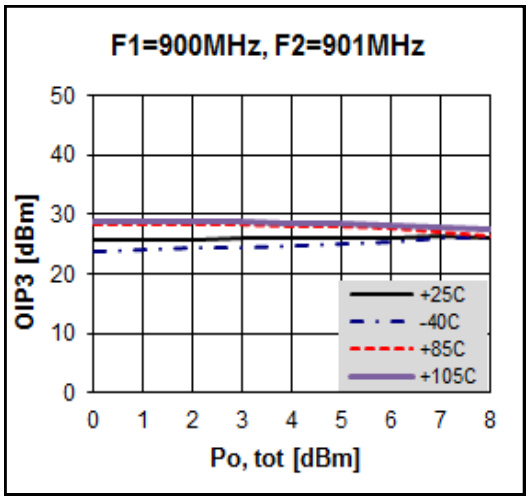
900MHz, 3.3V/26mA



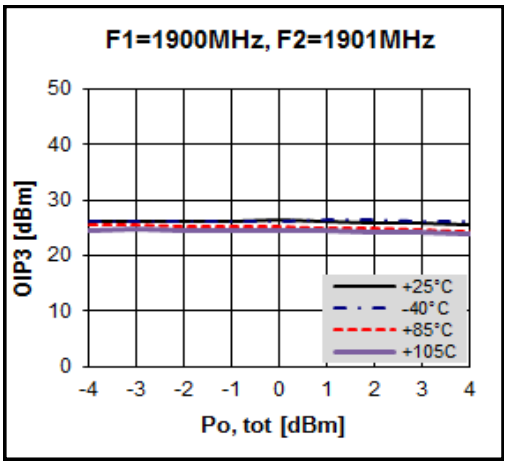
1900 MHz, 3.3V/26mA

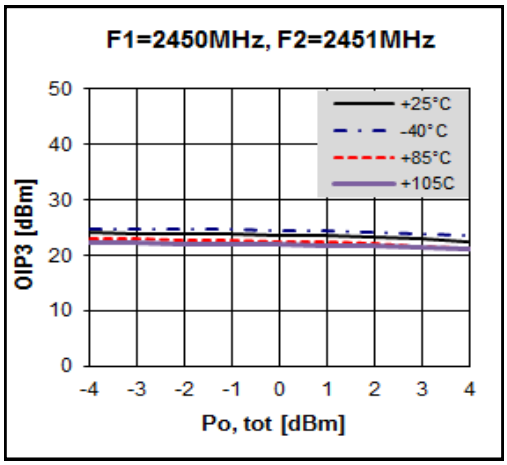
OIP3

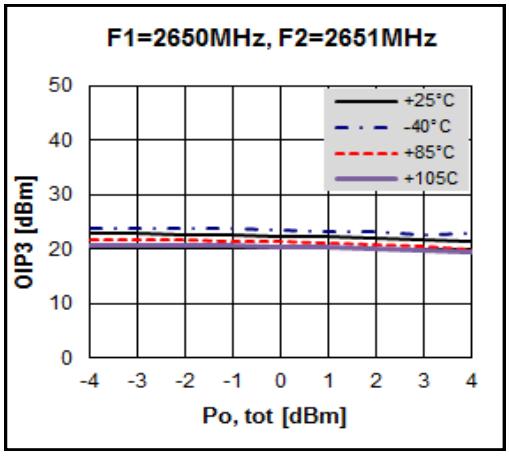


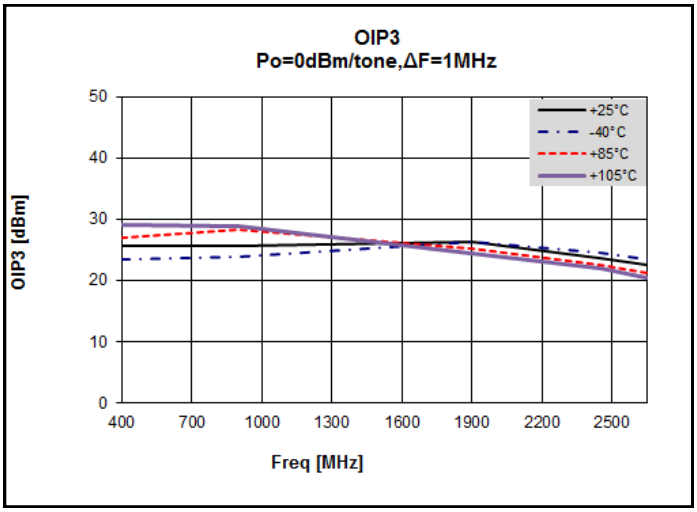


OIP3

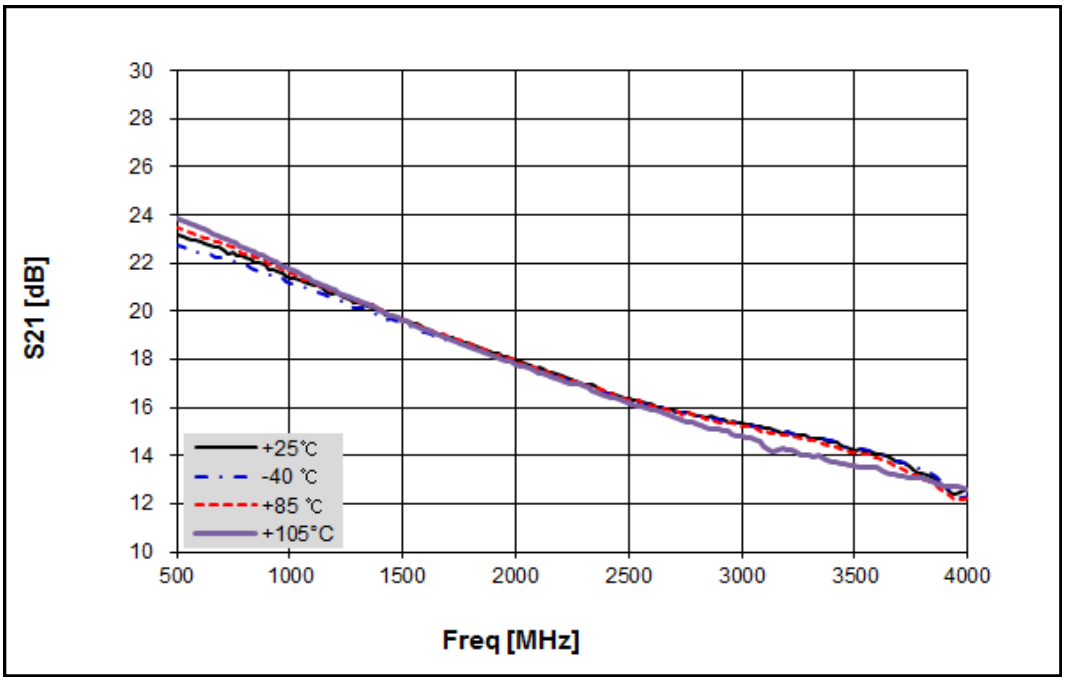




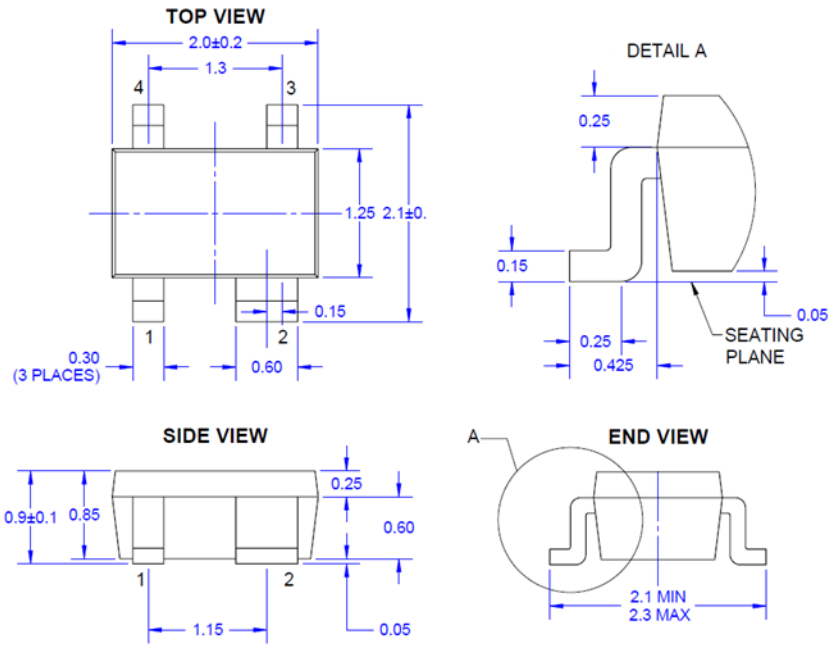




Gain Flatness

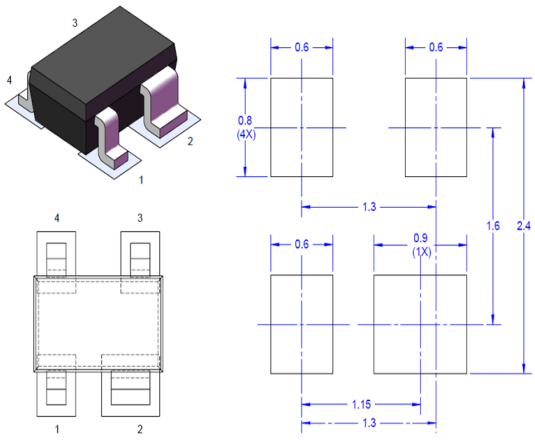


SOT-343 Package Outline Dimension (Unit. mm)

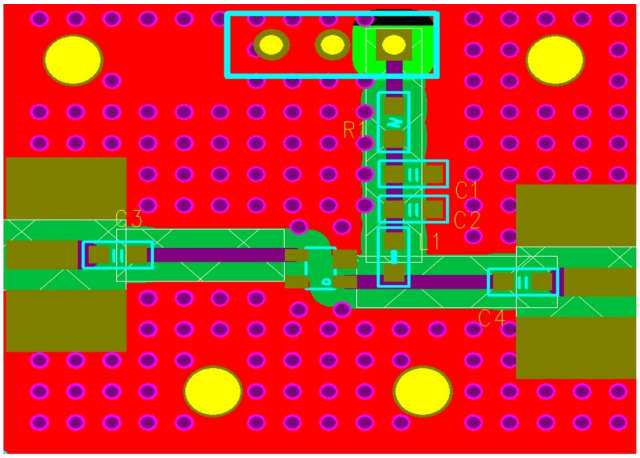


Suggested PCB Land Pattern and PAD Layout

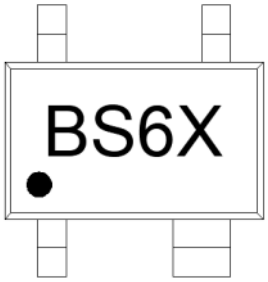
PCB Land Pattern



PCB Mounting



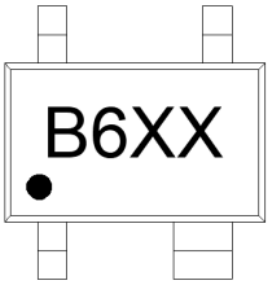
Package Marking



X = Wafer No.

Pin 1

New Package Marking



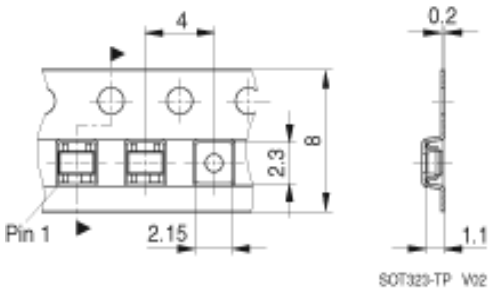
XX = Wafer No.

Pin 1

* Note : New Package marking has been modified from BS6X to B6XX since June 2017.

Tape & Reel

SOT-343



Packaging information:

Tape Width (mm): 8

Reel Size (inches): 7

Device Cavity Pitch (mm): 4

Devices Per Reel: 3000

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 JS-001-2012
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**