

### Device Features

- Single Fixed 3.3V supply
- Supply current = 31mA
- Gain = 20.5 dB @ 1900MHz
- Output P1 dB = 14.2 dBm @ 1900MHz
- LTE 20MHz ACLR = 3.4 dBm @ 1900MHz
- Internally matched to 50 ohms
- RoHS2-compliant SOT-363 SMT package

### Product Description

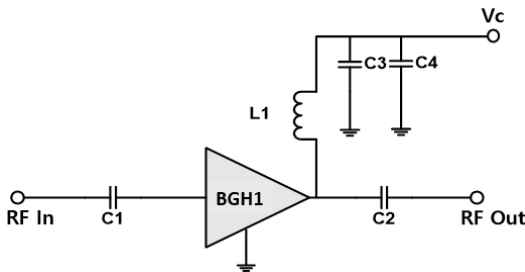
The BGH1 is a BroadBand, HBT Amplifier that is ideal for applications demanding high linearity in a wideband of 40-5000 MHz. The product is targeted for using as low current gain block amplifier for wireless infrastructure applications.

The BGH1 is internally matched to 50 Ohms and requires no external matching components. It is available in RoHS2-compliant SOT363 SMT package. These devices are 100% DC and RF tested to assure quality and performance.

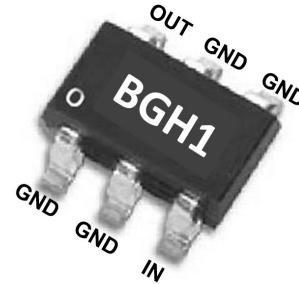
### Applications

- Mobile Infrastructure
- LTE / WCDMA / EDGE / 5G NR / WIFI
- General Purpose Wireless

### Applications Circuit



Application Circuit Values Example			
Freq.	0.04 ~ 0.8GHz	0.8 ~ 2.8GHz	2.8 ~ 5GHz
C1	150 pF	82 pF	7 pF
C2	150 pF	82 pF	7 pF
C3	100 pF	100 pF	100 pF
C4	1 nF	1 nF	1 nF
L1	560 nH	22 nH	18 nH



Pin Description	
RF IN	3
RF OUT	6
GND	1,2,4,5

### Electrical Specifications

\*Device performance \_measured on a BeRex evaluation board at 25°C, Vc=3.3V, 50 Ω system.

Parameter	Conditions	Min	Typ	Max	Unit
Operational Frequency Range		40		5000	MHz
Test Frequency			900		MHz
Gain		21.5	23.0		dB
Input Return Loss			-13.0		dB
Output Return Loss			-15.0		dB
Output IP3	0 dBm / tone , Δf=1MHz	23.3	26.3		dBm
Output P1dB		12.8	13.8		dBm
LTE 20M ACLR*		3.0	4.0		dBm
Noise Figure			2.5	3.0	dB

\*ACLR Channel Power measured at -50dBc.

\*LTE set-up: 3GPP LTE, FDD E-TM3.1, 20MHz BW, ±20MHz offset, PAR 9.75 at 0.01% Prob.

### Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Bandwidth	40		5000	MHz
Ic @ (Vc = 3.3V)	25	31	37	mA
Vc	3.0	3.3	3.6	V
dG/dT		-0.003		dB/°C
RTH		50.7		°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	130	°C
Supply Voltage	+4	V
Supply Current	140	mA
Input RF Power	25	dBm

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

### Typical Performance (Vc=3.3V, Ic=31mA, T=25°C)

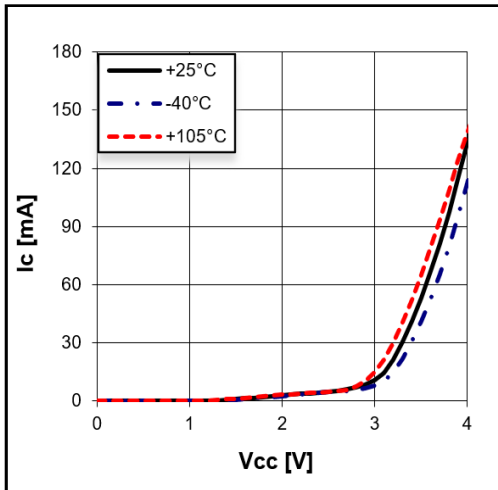
Parameter	Frequency							Unit
	50	70	900	1900	2140	3500	4500	
Gain	24.0	24.0	23.1	20.5	20.0	17.0	15.0	dB
S11	-12.3	-13.2	-13.0	-17.9	-17.6	-10.7	-8.2	dB
S22	-11.5	-10.9	-15.6	-12.2	-11.5	-15.0	-19.5	dB
OIP3	26.3	25.5	26.3	26.3	26.2	22.6	19.8	dBm
P1dB	13.6	13.7	13.8	14.2	13.8	11.8	9.5	dBm
LTE 20M ACLR*	4.0	3.4	4.0	3.4	3.5	-	-	dBm
5G NR ACLR*	-	-	-	-	-	-0.5	-2.9	dBm
Noise Figure	2.3	2.3	2.5	2.7	2.7	2.7	3.0	dB

\*ACLR Channel Power measured at -50dBc.

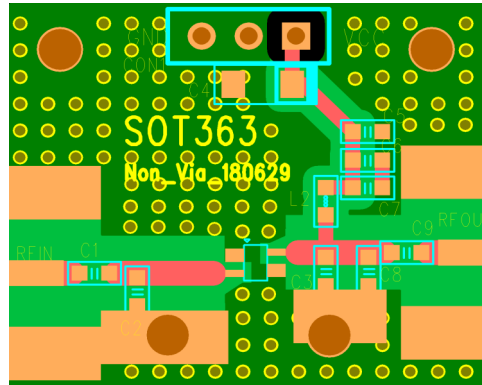
- LTE set-up: 3GPP LTE, FDD E-TM3.1, 20MHz BW, ±20MHz offset, PAR 9.75 at 0.01% Prob.

- 5G set-up: 3GPP 5G NR, 100MHz BW, ±100MHz offset, PAR 9.5 at 0.01% Prob.

### V-I Characteristics



### BeRex SOT-363 Evaluation Board

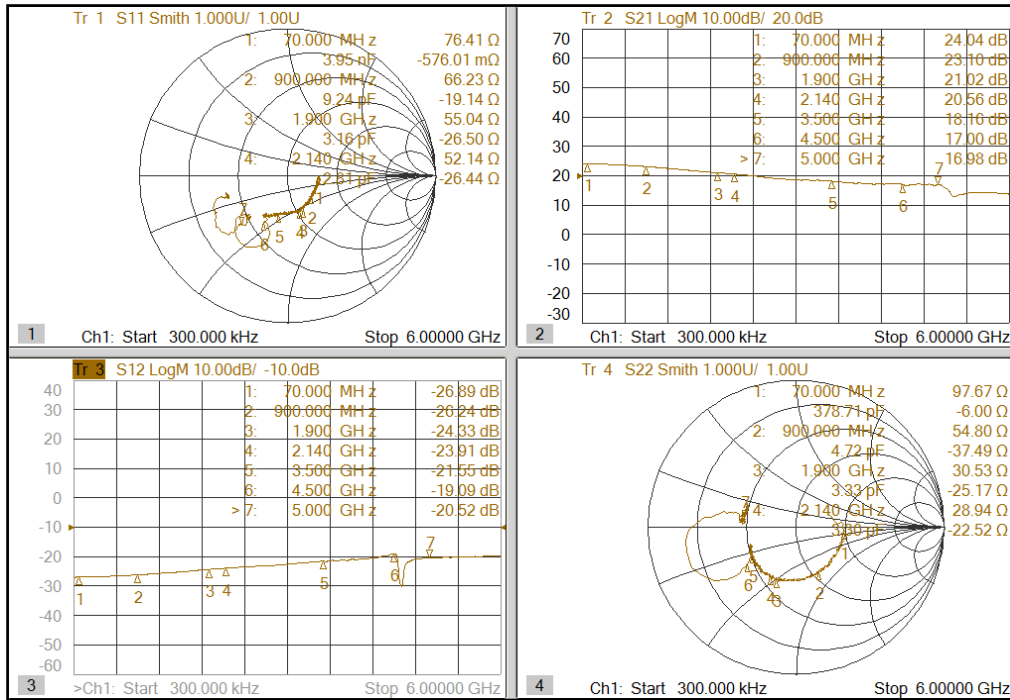


\*Dielectric constant \_4.2 \*RF pattern width 52mil \*31mil thick FR4

\*Without vias under device degrade device performance.

### Typical Device Data

S-parameters ( $V_c=3.3V$ ,  $I_c=31mA$ ,  $T=25^\circ C$ , Bias Tee Data)



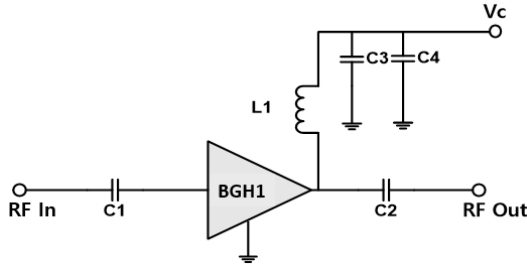
### S-Parameter

( $V_c = 3.3V$ ,  $I_c = 31mA$ ,  $T = 25^\circ C$ , calibrated to device leads, Bias Tee Data)

Freq [MHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
100	0.20	-5.77	15.92	175.60	0.05	1.64	0.32	-7.29
500	0.21	-24.89	15.31	158.95	0.05	9.34	0.33	-36.19
1000	0.22	-44.53	14.07	139.67	0.05	17.55	0.35	-68.40
1500	0.22	-57.05	12.35	123.01	0.06	23.40	0.37	-94.21
2000	0.25	-69.31	10.98	109.29	0.06	25.95	0.38	-112.22
2500	0.25	-80.84	9.59	95.77	0.07	26.57	0.38	-127.53
3000	0.26	-92.62	8.62	87.06	0.07	28.49	0.37	-137.42
3500	0.27	-103.50	8.06	74.77	0.08	25.92	0.35	-147.51
4000	0.30	-115.76	7.35	67.05	0.09	25.05	0.34	-155.36
4500	0.36	-116.36	7.08	51.51	0.11	-1.58	0.42	-143.55
5000	0.46	-133.07	7.14	34.94	0.09	25.38	0.36	170.48

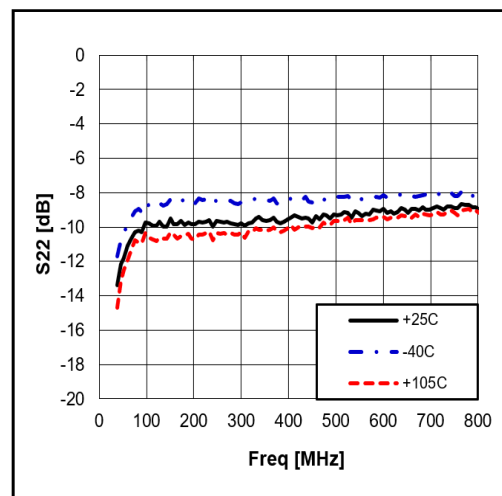
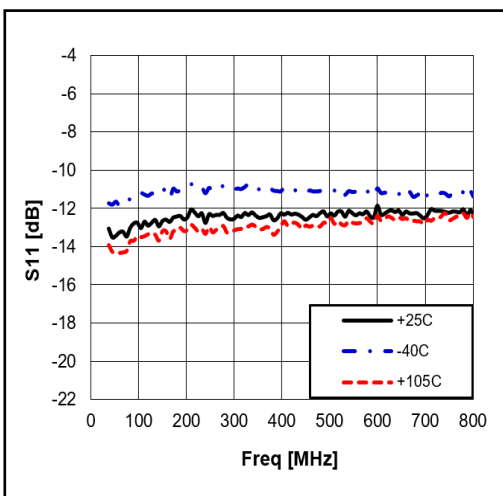
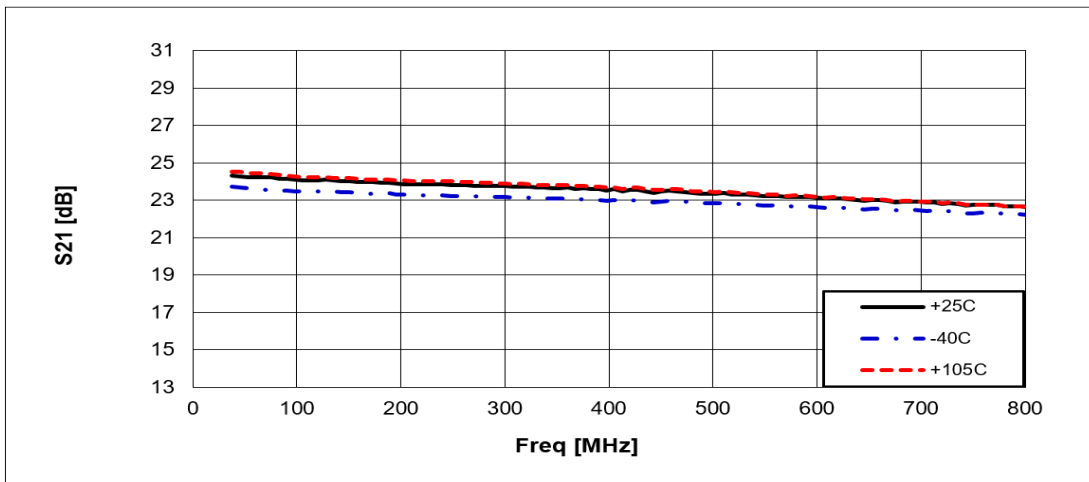
Preliminary Datasheet

### RF Application Circuit: 40 ~ 800MHz

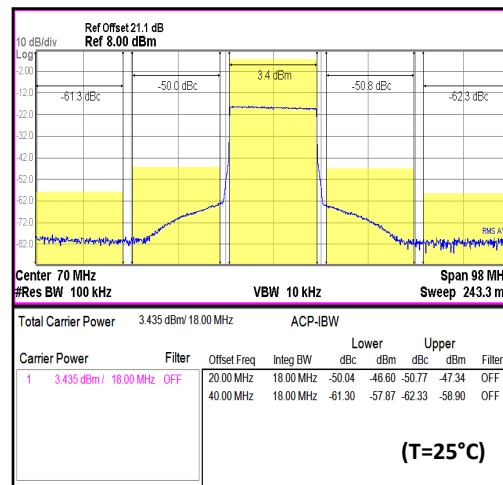
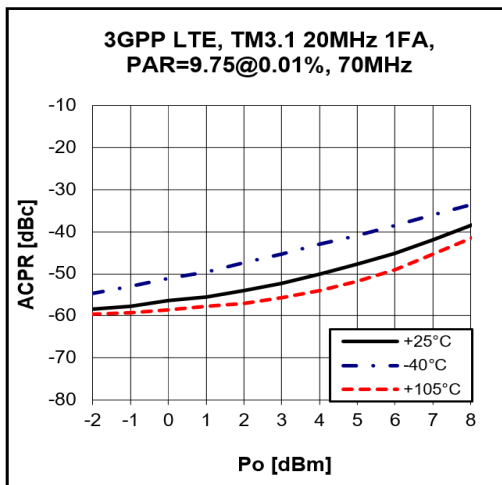
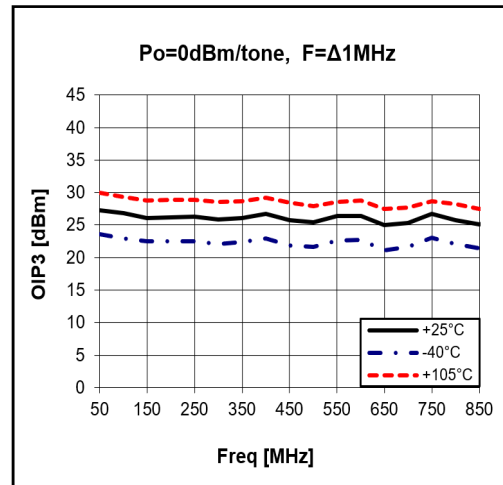
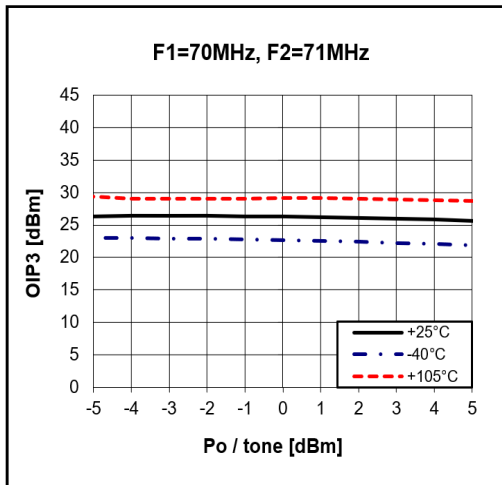
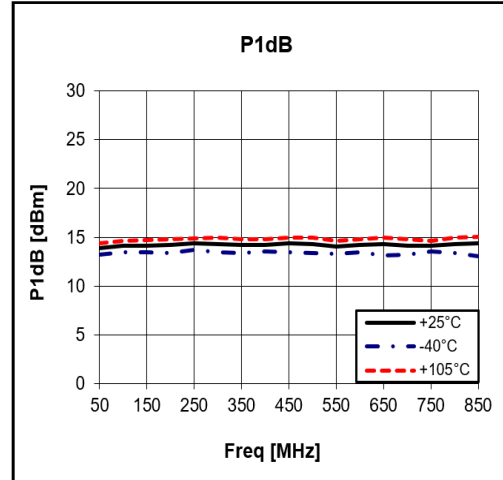
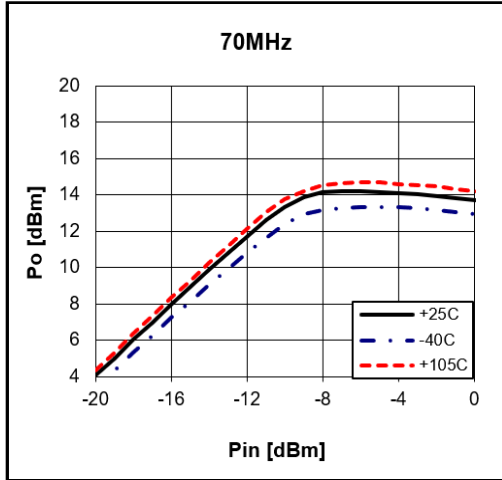
Schematic Diagram		BOM		Size(Inch)
	C1	150 pF	0603	
	C2	150 pF	0603	
	C3	100 pF	0603	
	C4	1 nF	0603	
	L1	560 nH	0603	

### Typical Performance

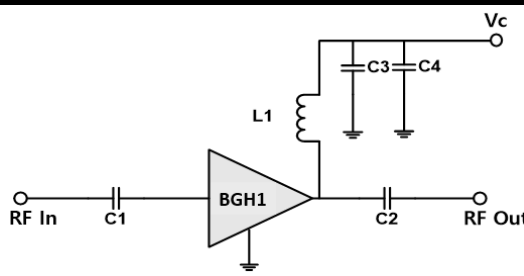
$V_c = 3.3V, I_c = 31mA, T = 25^\circ C$



Preliminary Datasheet

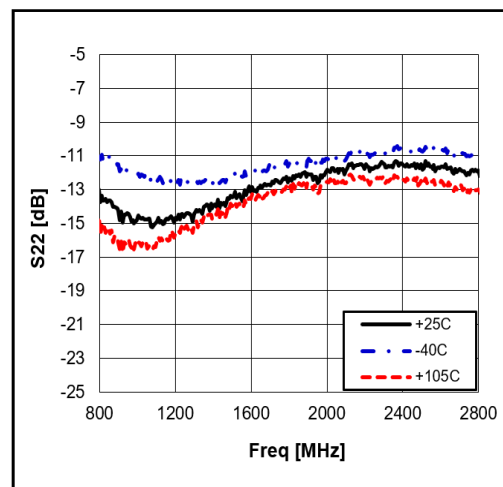
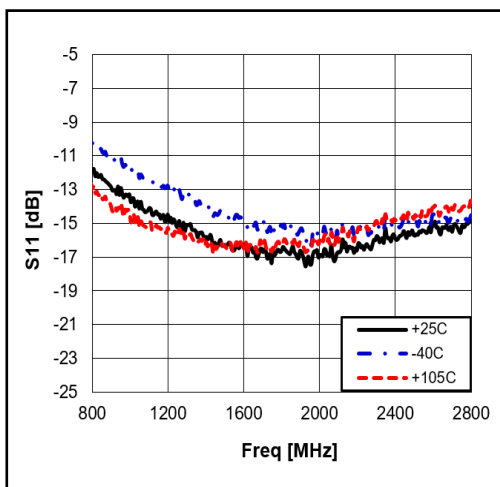
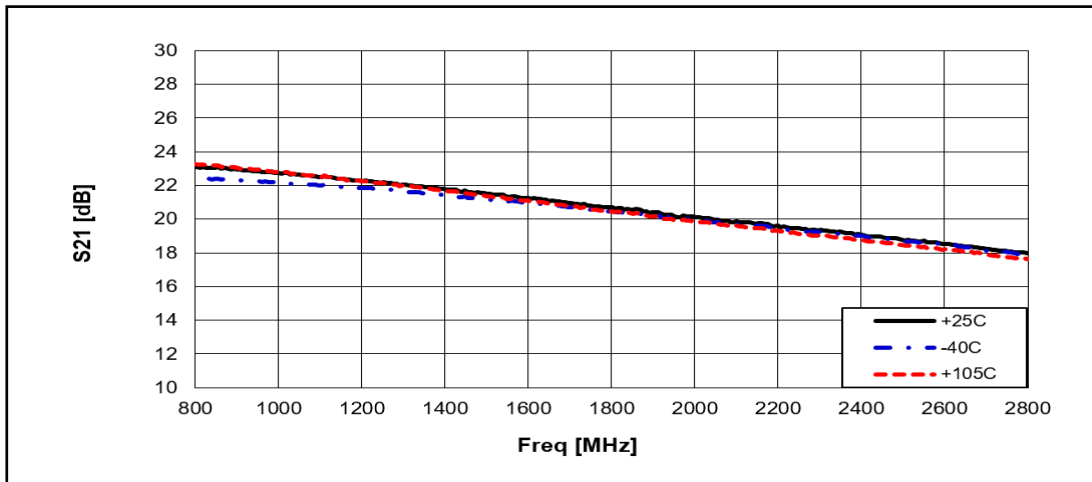


### RF Application Circuit: 800 ~ 2800MHz

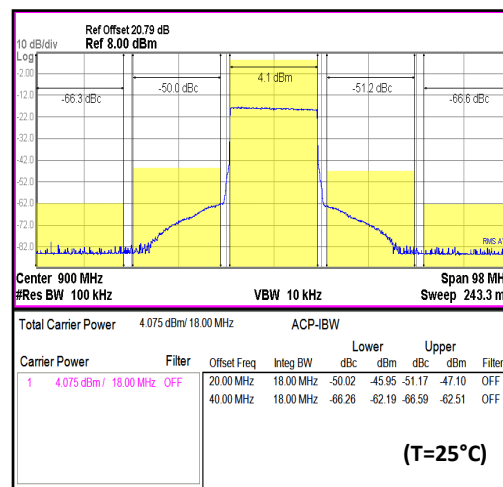
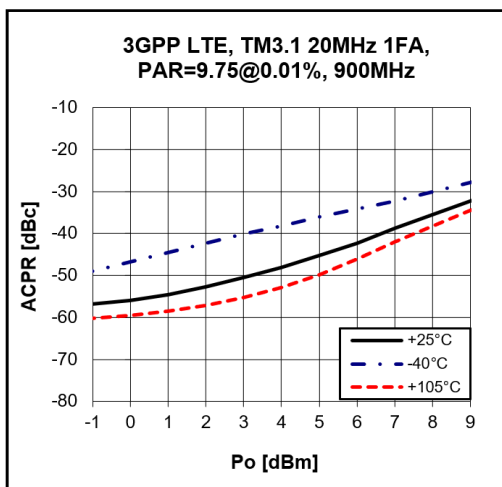
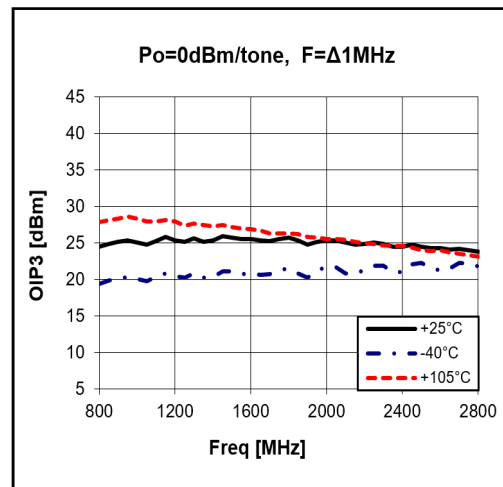
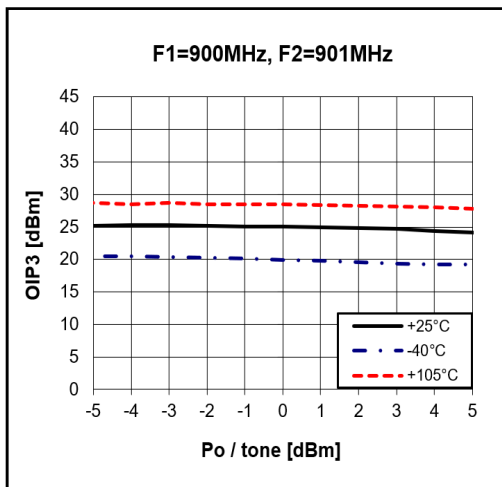
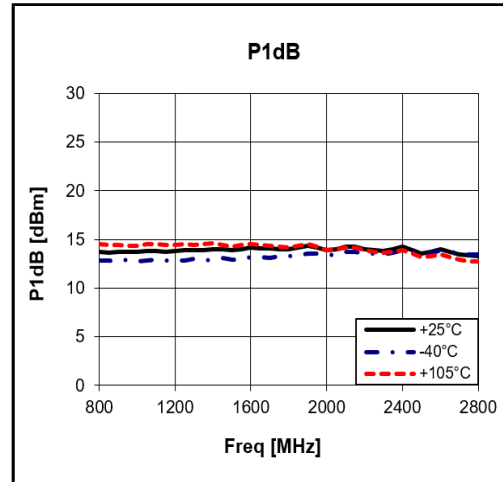
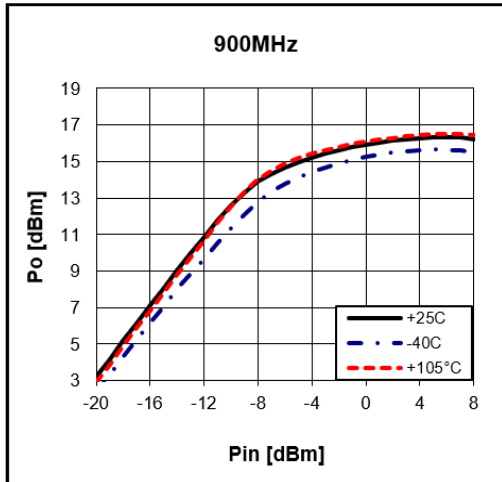
Schematic Diagram		BOM		Size(Inch)
	C1	82 pF	0603	
	C2	82 pF	0603	
	C3	100 pF	0603	
	C4	1 nF	0603	
	L1	22 nH	0603	

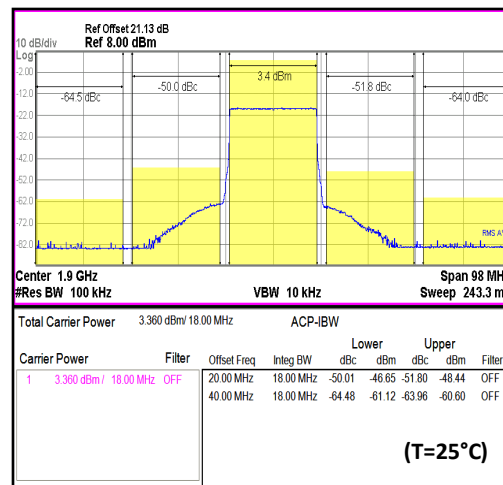
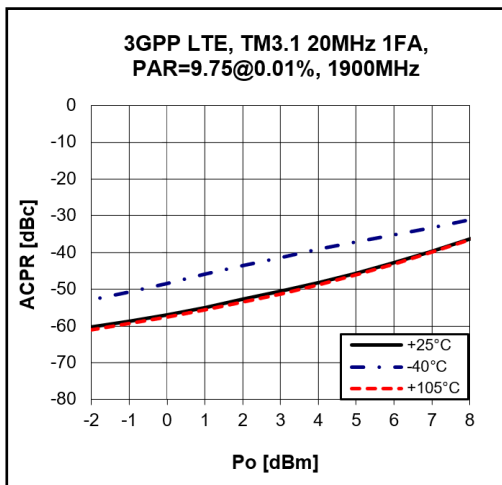
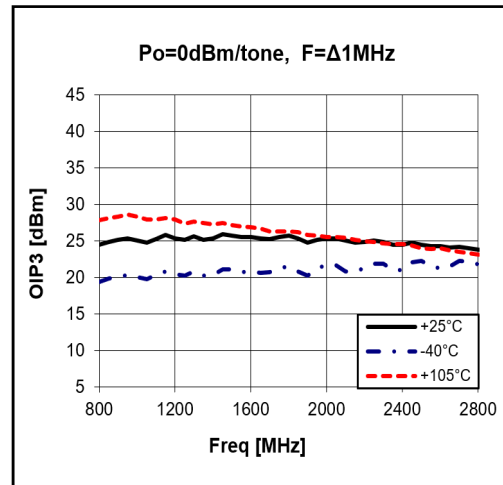
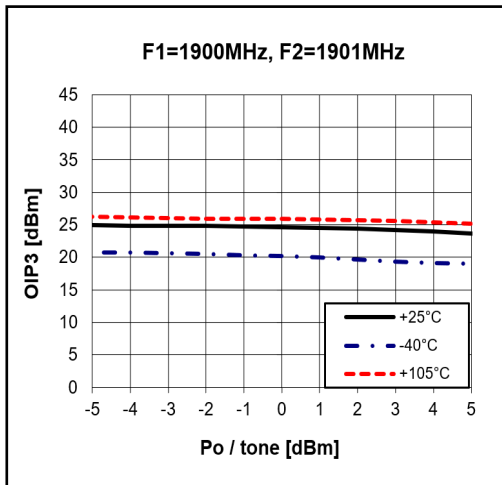
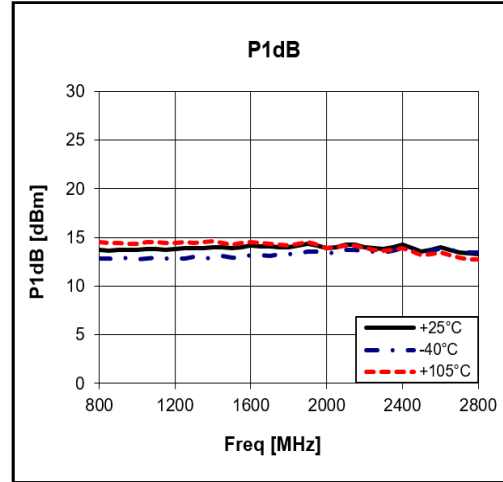
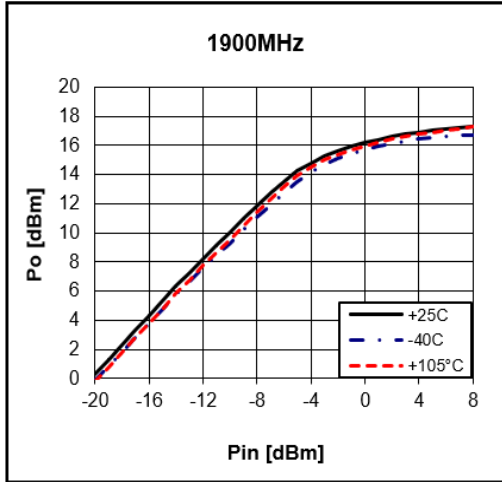
### Typical Performance

$V_c = 3.3V, I_c = 31mA, T = 25^\circ C$

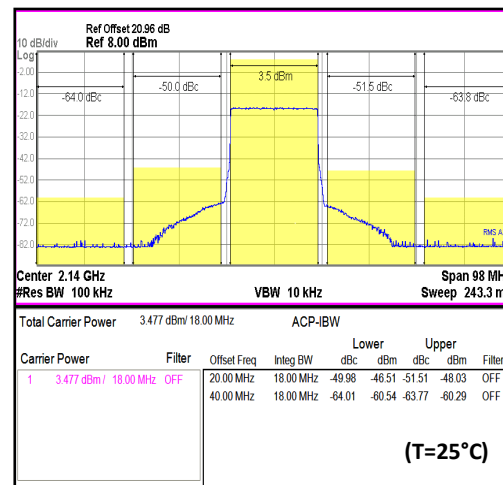
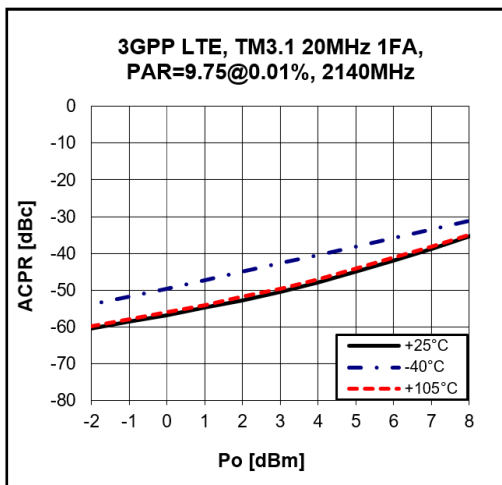
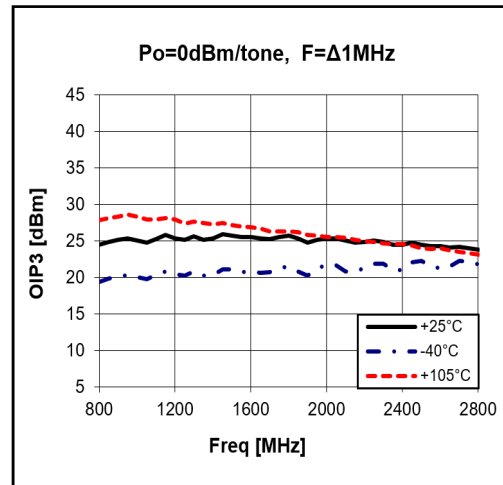
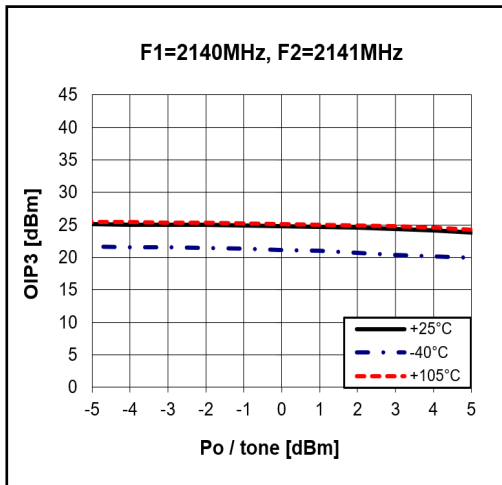
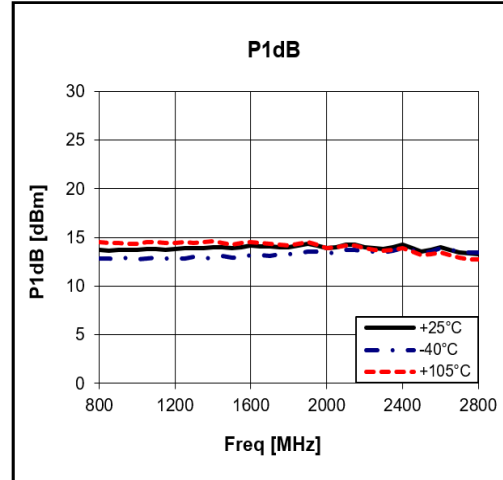
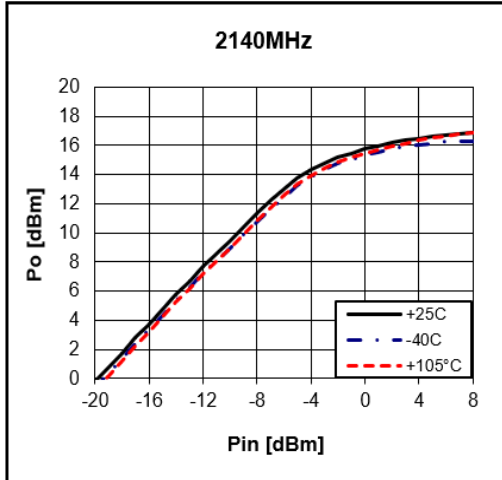


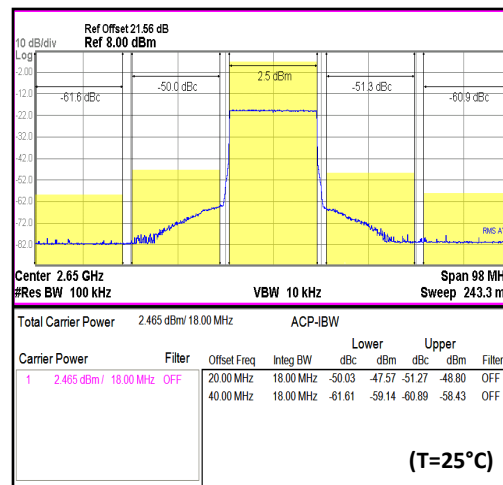
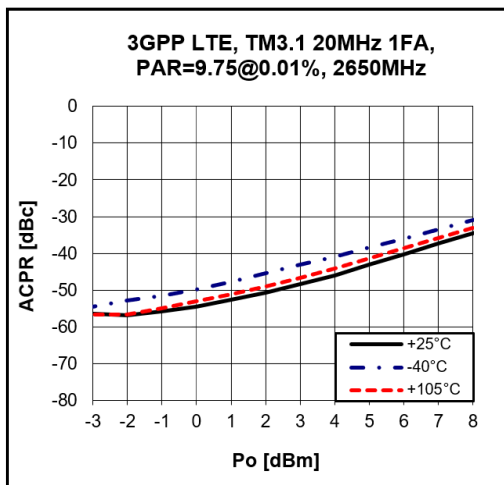
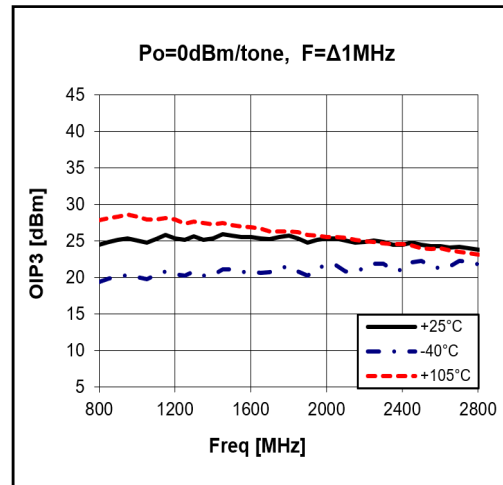
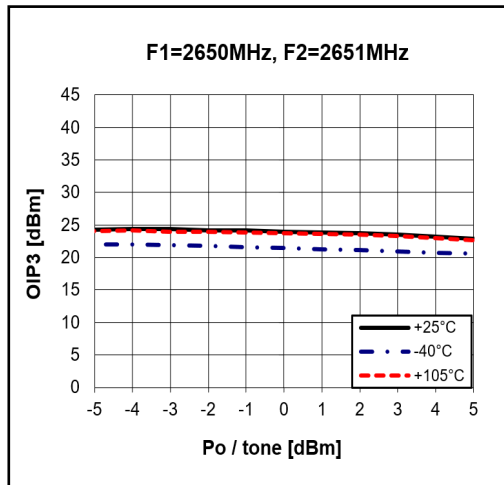
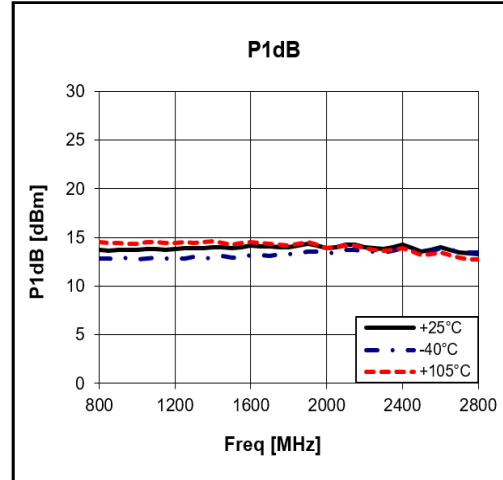
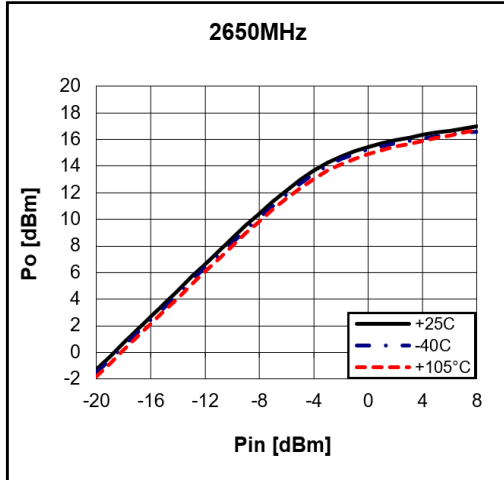
# Preliminary Datasheet



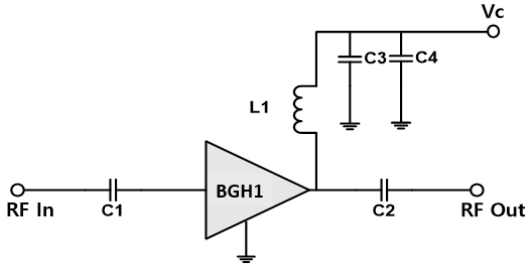






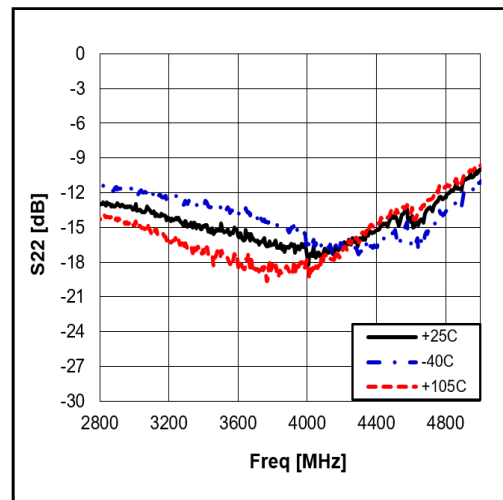
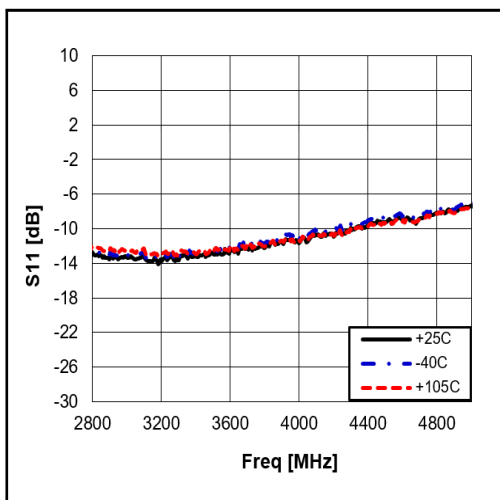
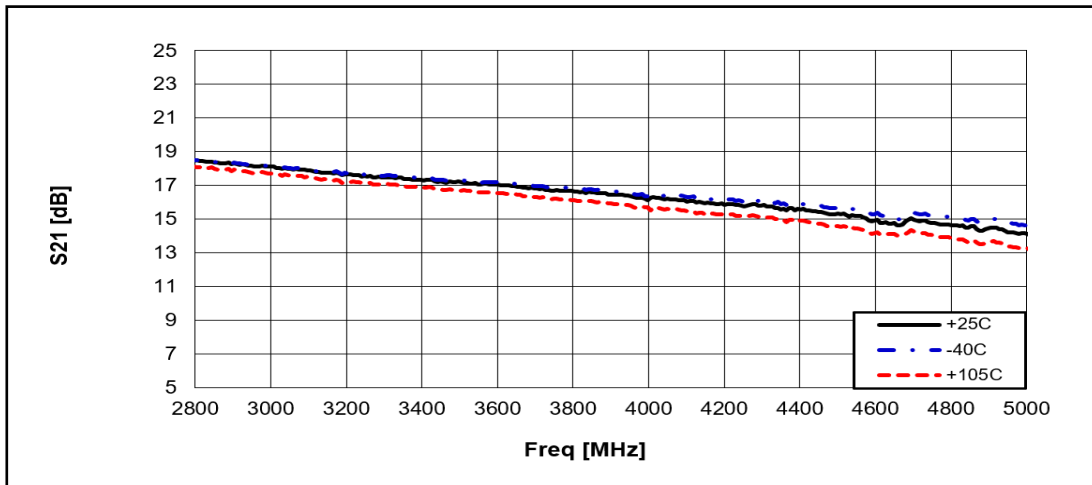


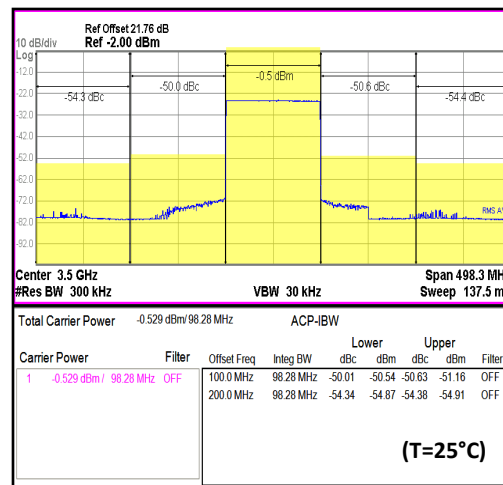
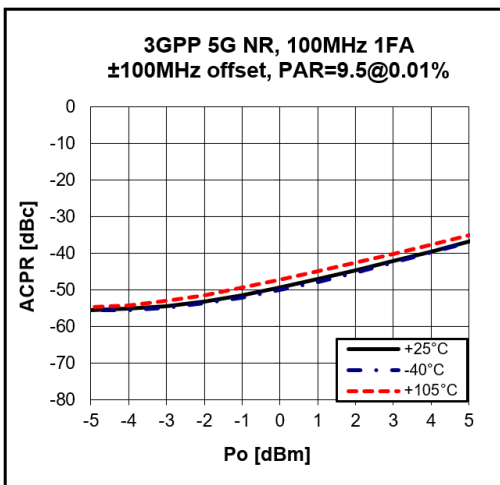
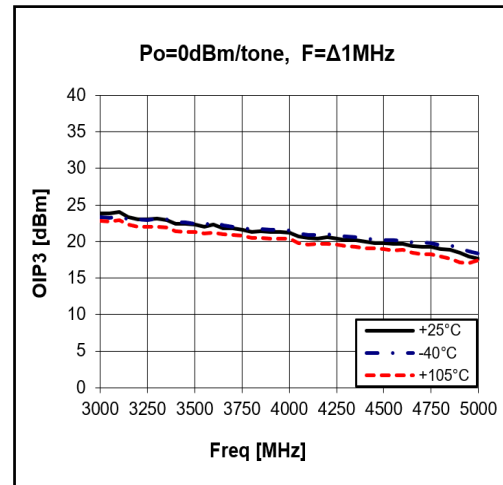
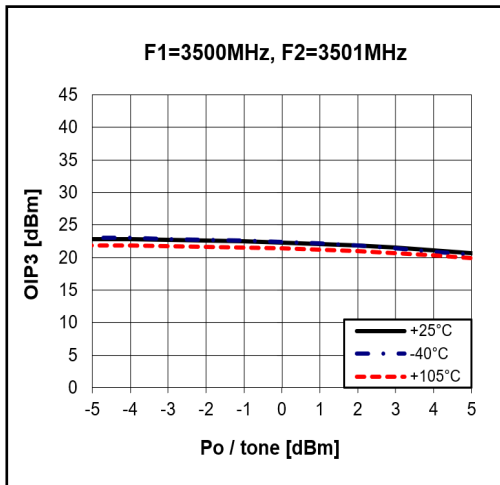
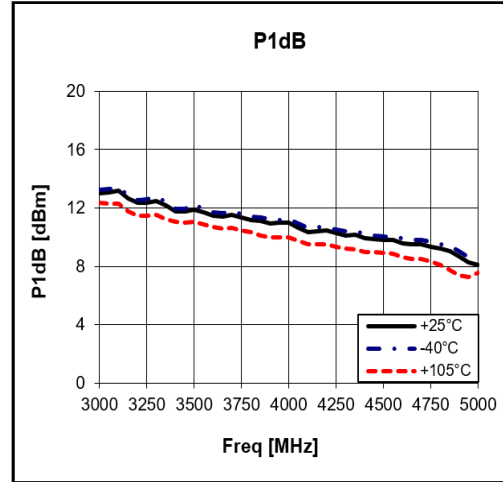
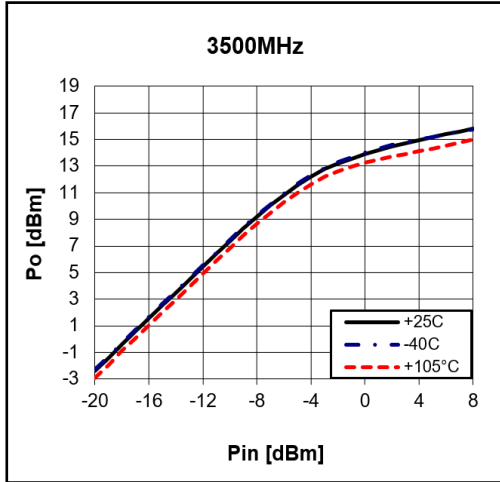
### RF Application Circuit: 2800 ~ 5000MHz

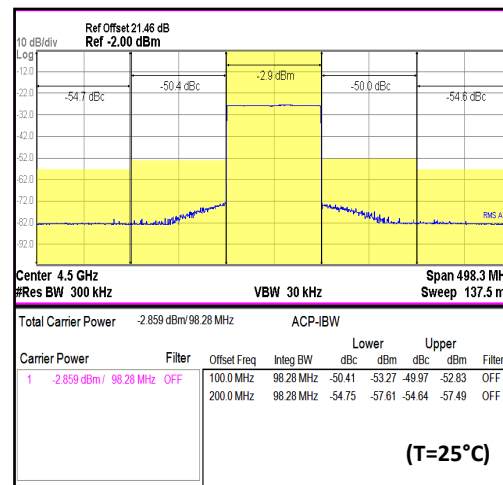
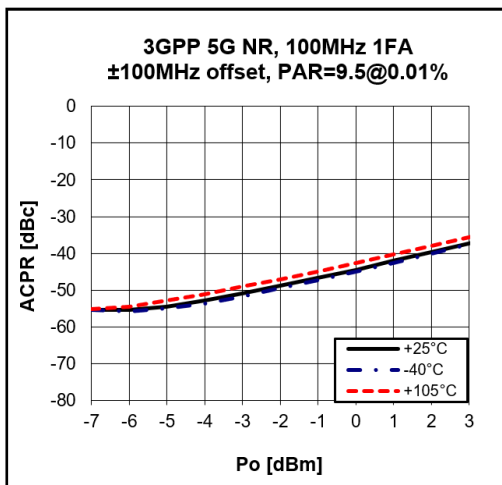
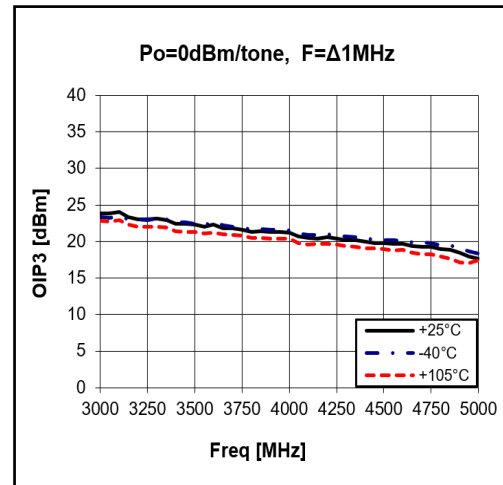
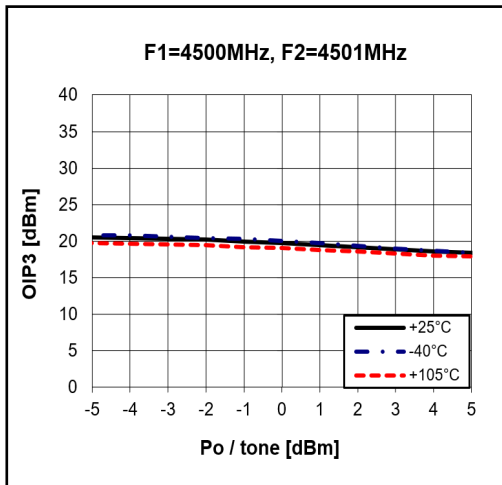
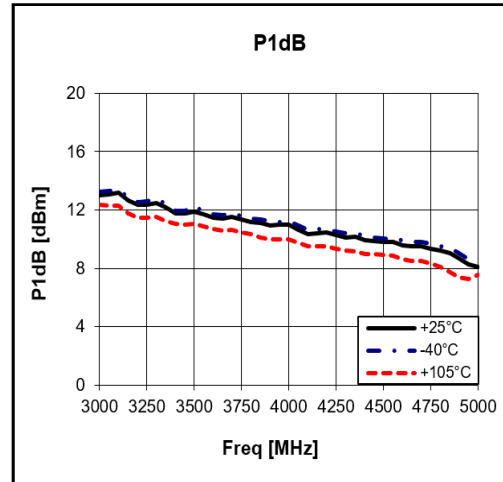
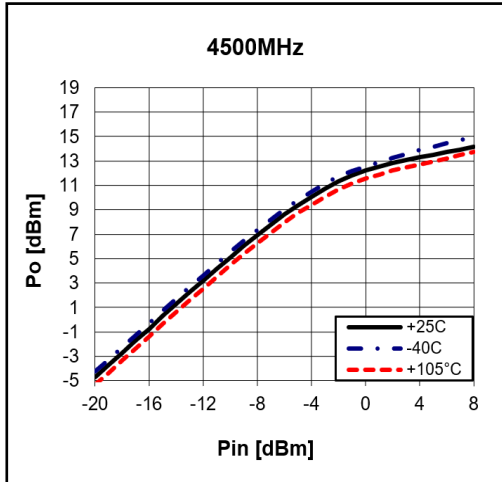
Schematic Diagram		BOM		Size(Inch)
	C1	7 pF	0603	
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	C3	100 pF	0603	
	C4	1 nF	0603	
	L1	18 nH	0603	

### Typical Performance

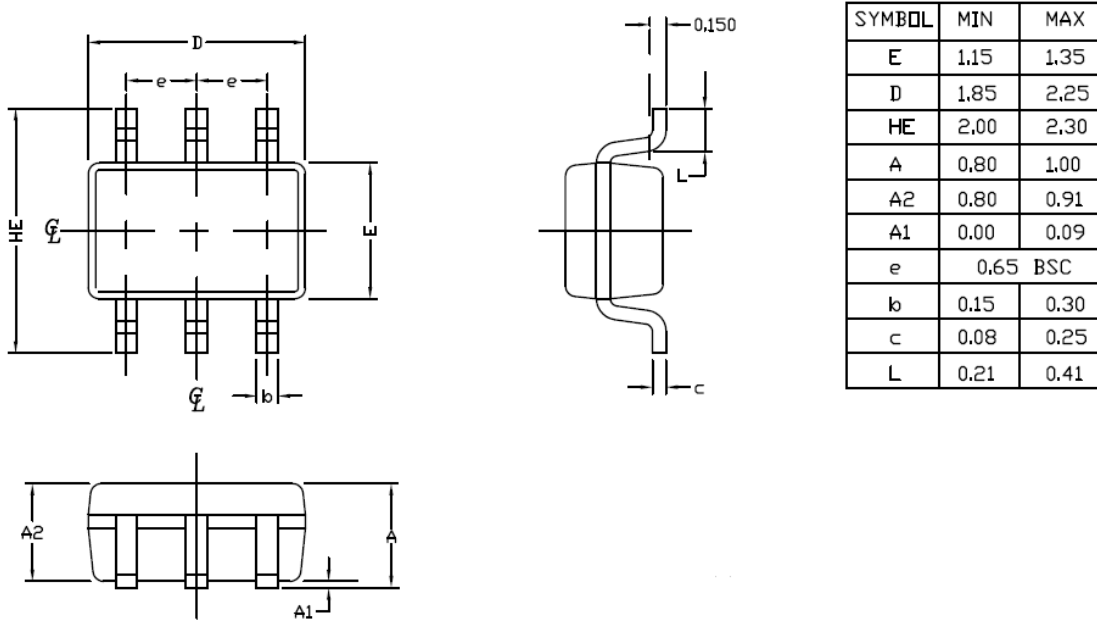
$V_c = 3.3V, I_c = 31mA, T = 25^\circ C$



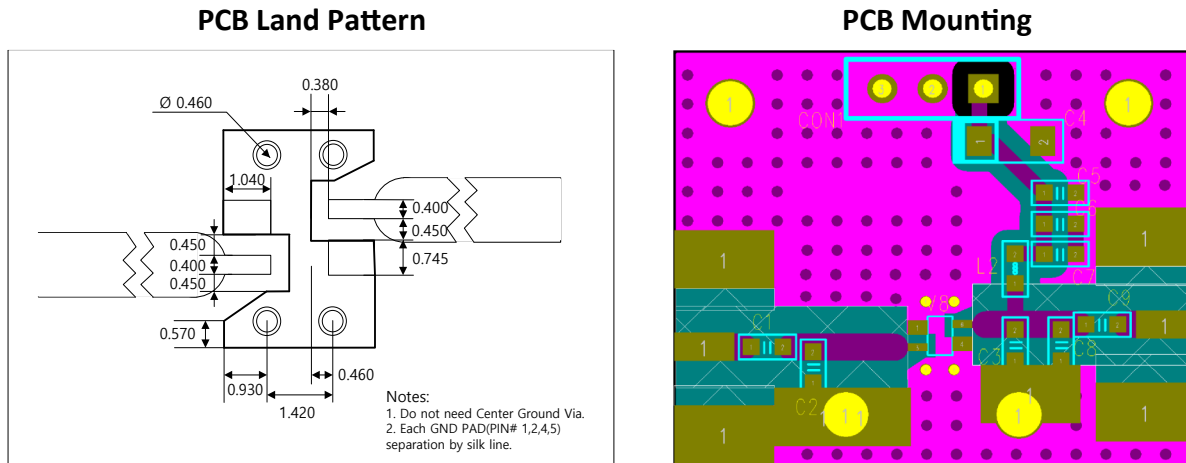




### Package Outline Dimension



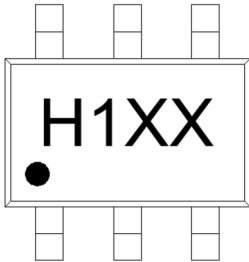
### Suggested PCB Land Pattern and PAD Layout



Note : All dimension \_ millimeters

PCB lay out \_ on BeRex website

### Package Marking



H1 = Product No.  
XX = Wafer No.

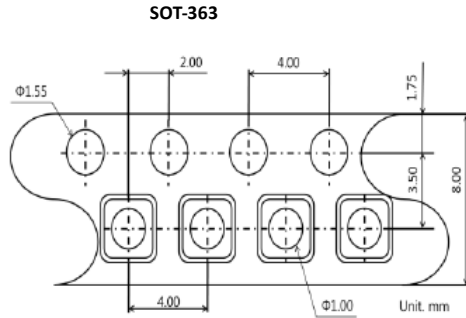
### Pin 1

### 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.)

### Tape & Reel



Packaging information:

- Tape Width (mm): 8
- Reel Size (inches): 7
- Device Cavity Pitch (mm): 4
- Devices Per Reel: 3000

### MSL / ESD Rating

<b>ESD Rating:</b>	Class 1C
<b>Value:</b>	Passes < 2000V
<b>Test:</b>	Human Body Model (HBM)
<b>Standard:</b>	JEDEC Standard JS-001-2017
<b>MSL Rating:</b>	Level 1 at +260°C convection reflow
<b>Standard:</b>	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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