

### Device Features

- Single Fixed 3.3V supply
- Gain = 13.4 dB @ 850MHz
- Output IP3 = 32.3 dBm @ 850MHz
- 5G NR ACLR = 5.3 dBm @ 850MHz
- Internally matched to 50 ohms
- RoHS2-compliant SOT-363 SMT package

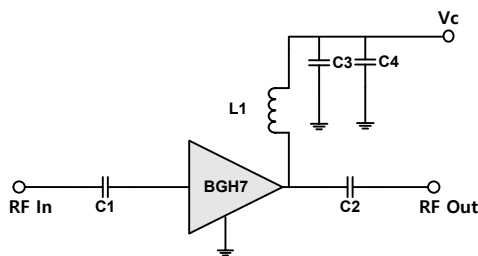
### Product Description

The BGH7 is a BroadBand, HBT Amplifier that is ideal for applications demanding high linearity in a wideband of 10-4200 MHz. The BGH7 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.                              | 0.01 ~ 0.6GHz | 0.6 ~ 2.4GHz | 2.4 ~ 4.2GHz |
| C1                                 | 1 nF          | 100 pF       | 12 pF        |
| C2                                 | 1 nF          | 100 pF       | 2 pF         |
| C3                                 | 100 pF        | 100 pF       | 100 pF       |
| C4                                 | 1 nF          | 1 nF         | 1 nF         |
| L1                                 | 1.2 uH        | 100 nH       | 15 nH        |

### Part Marking (XX:Wafer number)



| 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 |                         | 10   |       | 4200 | MHz  |
| Test Frequency              |                         |      | 850   |      | MHz  |
| Gain                        |                         | 11.9 | 13.4  |      | dB   |
| Input Return Loss           |                         |      | -10.5 |      | dB   |
| Output Return Loss          |                         |      | -16.0 |      | dB   |
| Output IP3                  | 0 dBm / tone , Δf=1 MHz | 29.3 | 32.3  |      | dBm  |
| Output P1dB                 |                         | 14.0 | 15.0  |      | dBm  |
| 5G NR ACLR*                 |                         | 4.3  | 5.3   |      | dBm  |
| Noise Figure                |                         |      | 4.9   |      | dB   |

\*ACLR Channel Power measured at -50dBc.

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

### Recommended Operating Conditions

| Parameter                  | Min | Typ     | Max  | Unit  |
|----------------------------|-----|---------|------|-------|
| Bandwidth                  | 10  |         | 4200 | MHz   |
| Ic @ (Vc = 3.3V)           | 44  | 55      | 66   | mA    |
| Vc                         | 3.0 | 3.3     | 3.6  | V     |
| dG/dT                      |     | -0.0008 |      | dB/°C |
| RTH                        |     | 72.3    |      | °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 | 125         | °C   |
| Supply Voltage       | +4          | V    |
| Supply Current       | 170         | mA   |
| Input RF Power       | 24          | dBm  |

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

### Typical Performance (Vc=3.3V, Ic=55mA, T=25°C)

| Parameter     | Frequency |       |       |       |       |       |       | Unit |
|---------------|-----------|-------|-------|-------|-------|-------|-------|------|
|               | 70        | 500   | 850   | 1950  | 2140  | 2600  | 3500  |      |
| Gain          | 13.6      | 13.4  | 13.4  | 13.0  | 12.8  | 13.0  | 13.3  | dB   |
| S11           | -11.0     | -11.3 | -10.7 | -13.4 | -15.0 | -15.4 | -16.3 | dB   |
| S22           | -15.0     | -15.8 | -16.2 | -32.7 | -30.1 | -13.3 | -12.9 | dB   |
| OIP3          | 33.0      | 33.0  | 33.3  | 28.3  | 27.6  | 28.0  | 23.7  | dBm  |
| P1dB          | 14.7      | 14.8  | 15.0  | 14.7  | 14.4  | 14.4  | 13.0  | dBm  |
| LTE 20M ACLR* | 5.5       | 5.5   | 5.3   | 4.6   | 4.3   | 4.5   | -     | dBm  |
| 5G NR ACLR*   | -         | -     | -     | -     | -     | -     | 0.5   | dBm  |
| Noise Figure  | 4.57      | 4.77  | 4.85  | 5.70  | 5.87  | 5.81  | 6.71  | dB   |

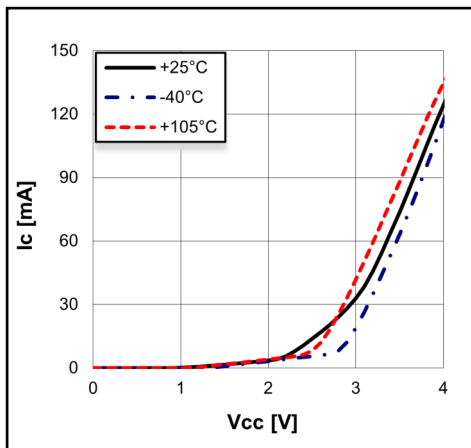
\*ACLR Channel Power measured at -50dBc.

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

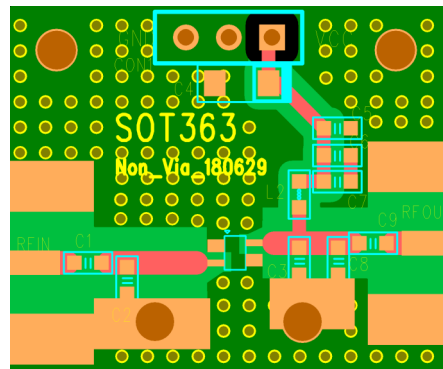
- 5G set-up: 3GPP 5G NR, 100MHz BW, ±100MHz offset, PAR 9.5 at 0.01% Prob.

Preliminary Datasheet

### V-I Characteristics



### BeRex SOT-363 Evaluation Board

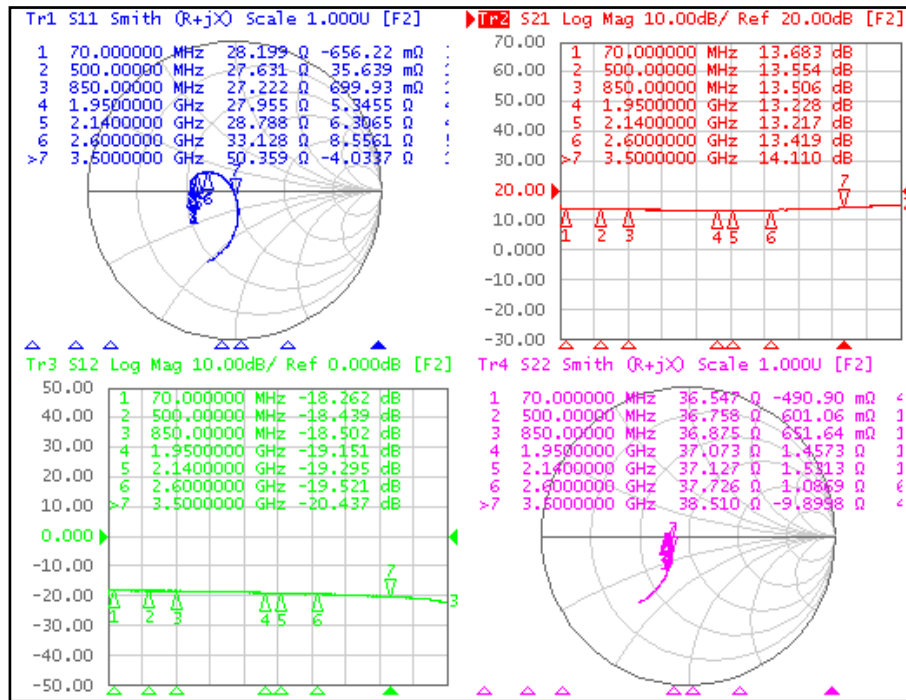


\*Dielectric constant \_ 4.2 \*RF pattern width 52mil \*31mil thick FR4

\*Without vias under device degrade device performance.

### Typical Device Data

S-parameters ( $V_c=3.3V$ ,  $I_c=55mA$ ,  $T=25^\circ C$ , Bias Tee Data)

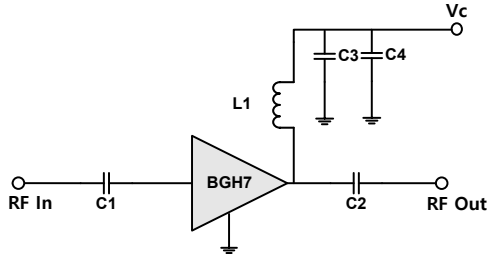


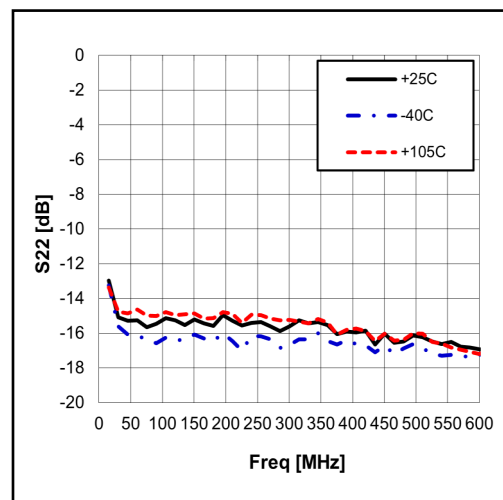
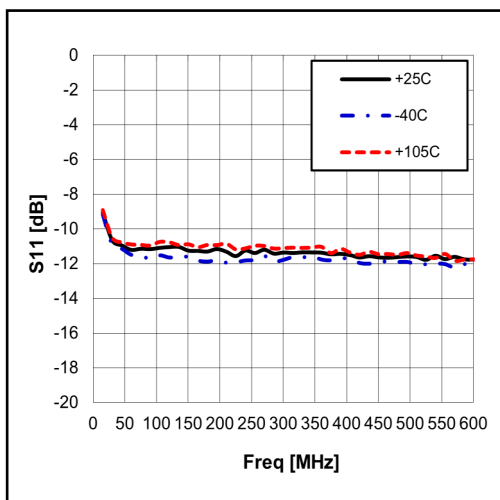
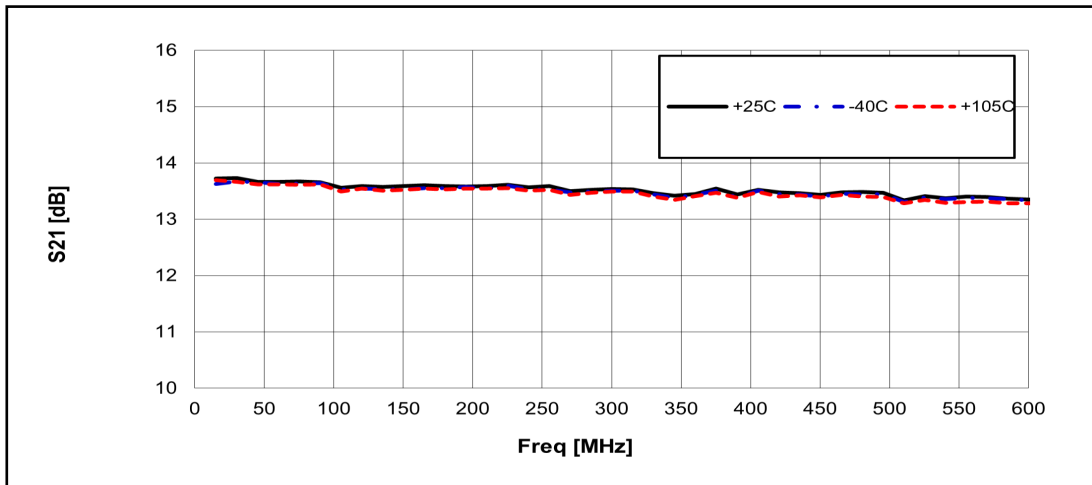
### S-Parameter

( $V_c = 3.3V$ ,  $I_c = 55mA$ ,  $T = 25^\circ C$ , calibrated to device leads, Bias Tee Data)

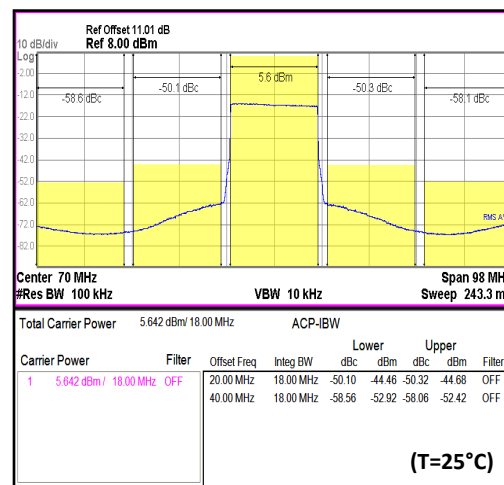
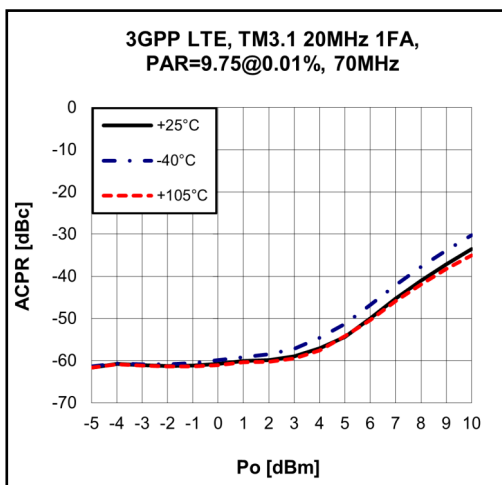
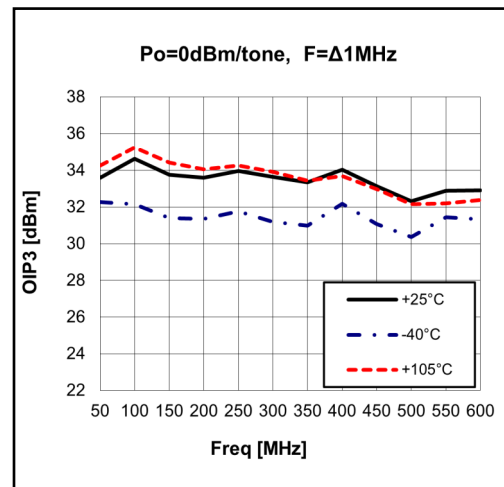
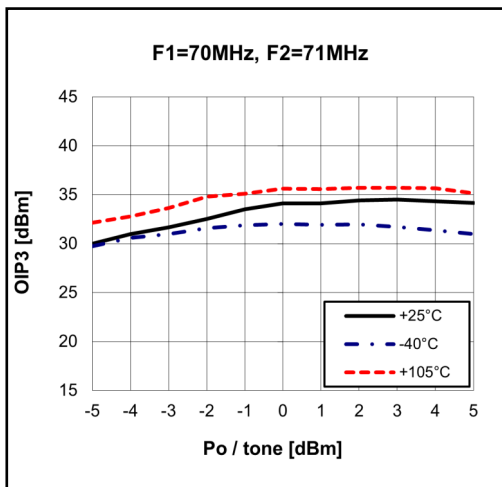
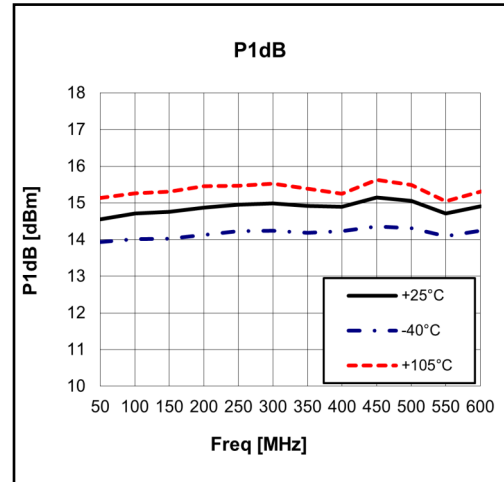
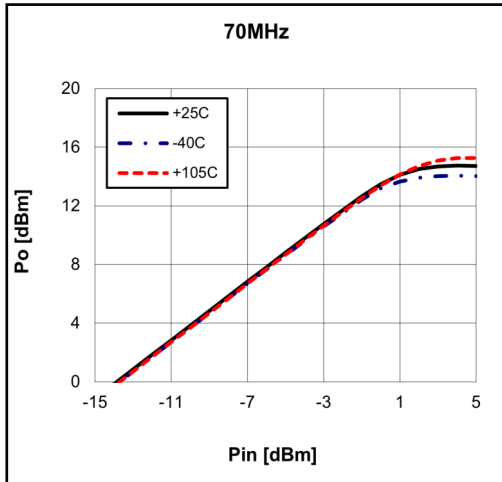
| Freq [MHz] | S11 Mag | S11 Ang | S21 Mag | S21 Ang | S12 Mag | S12 Ang | S22 Mag | S22 Ang |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|
| 100        | 0.28    | -178.33 | 4.82    | -175.44 | 0.12    | -0.93   | 0.16    | -178.65 |
| 500        | 0.29    | 179.74  | 4.75    | 160.21  | 0.12    | -6.21   | 0.15    | 177.57  |
| 1000       | 0.30    | 176.50  | 4.72    | 141.52  | 0.12    | -12.53  | 0.15    | 176.31  |
| 1500       | 0.30    | 169.67  | 4.64    | 122.36  | 0.11    | -19.24  | 0.15    | 174.26  |
| 2000       | 0.29    | 161.45  | 4.58    | 104.32  | 0.11    | -25.96  | 0.15    | 172.66  |
| 2500       | 0.24    | 150.35  | 4.65    | 85.89   | 0.11    | -32.64  | 0.14    | 172.78  |
| 3000       | 0.14    | 134.58  | 4.79    | 65.86   | 0.10    | -43.19  | 0.12    | -174.44 |
| 3500       | 0.04    | -81.94  | 5.09    | 43.29   | 0.09    | -56.55  | 0.17    | -132.56 |
| 4000       | 0.35    | -95.22  | 5.59    | 14.18   | 0.09    | -81.16  | 0.41    | -120.74 |
| 4200       | 0.51    | -110.87 | 5.51    | -2.00   | 0.07    | -95.40  | 0.56    | -127.10 |

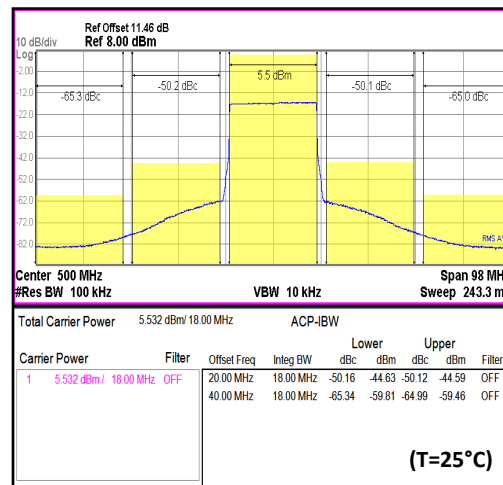
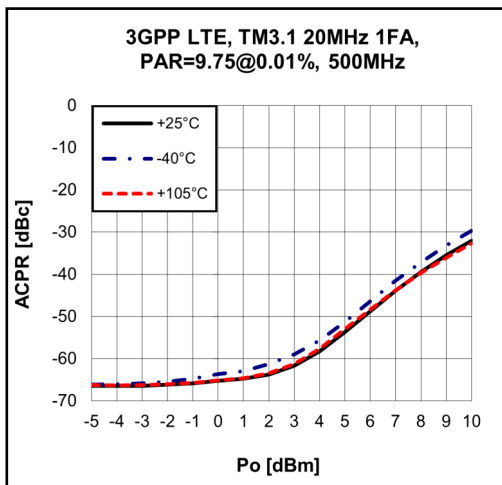
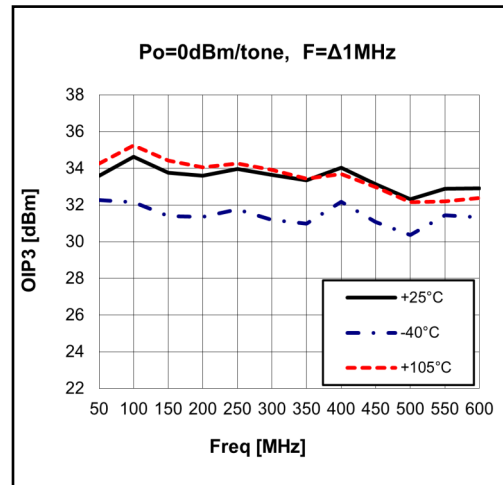
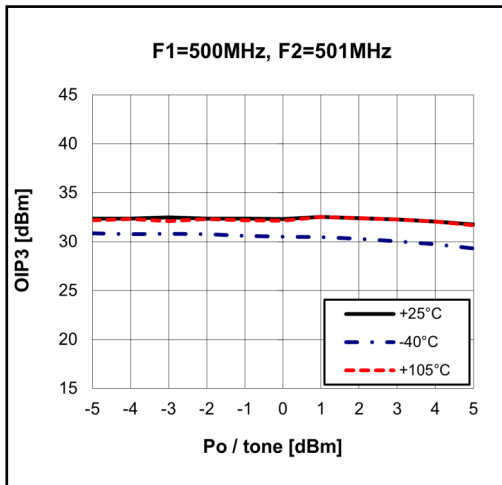
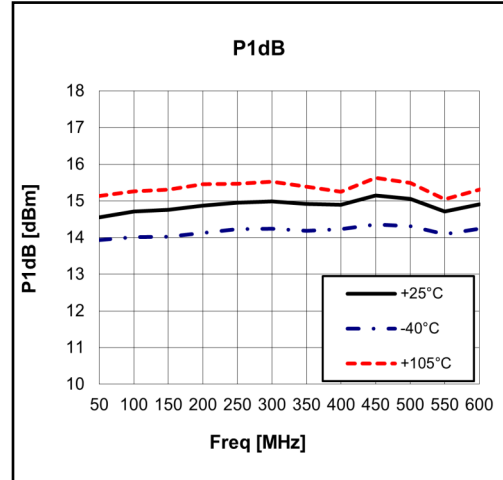
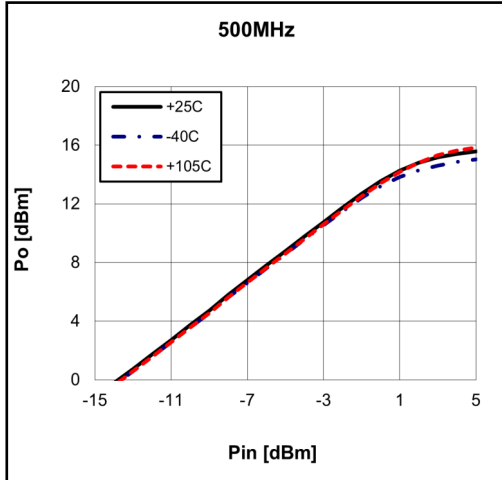
**RF Application Circuit: 10 – 600MHz**

| Schematic Diagram   |    | BOM    |      | Size(inch) |
|---|----|--------|------|------------|
|  | C1 | 1 nF   | 0603 |            |
|   | C2 | 1 nF   | 0603 |            |
|   | C3 | 100 pF | 0603 |            |
|   | C4 | 1 nF   | 0603 |            |
|   | L1 | 1.2 uH | 0603 |            |

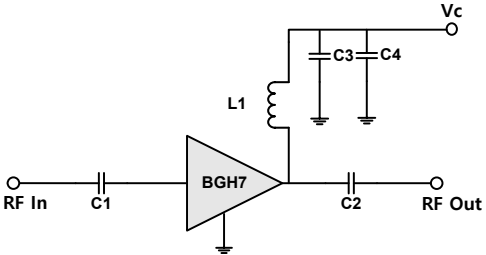
**Typical Performance**
 $V_c = 3.3V, I_c = 55mA, T = 25^\circ C$ 


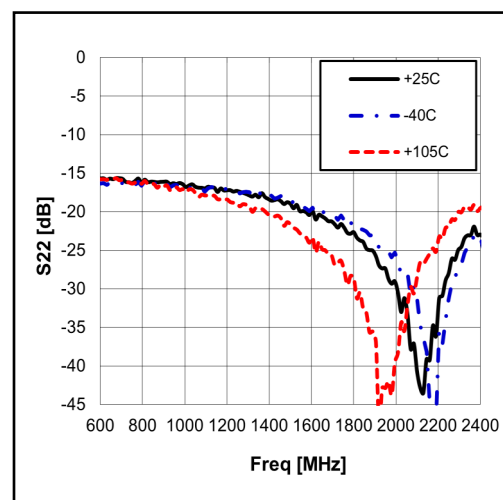
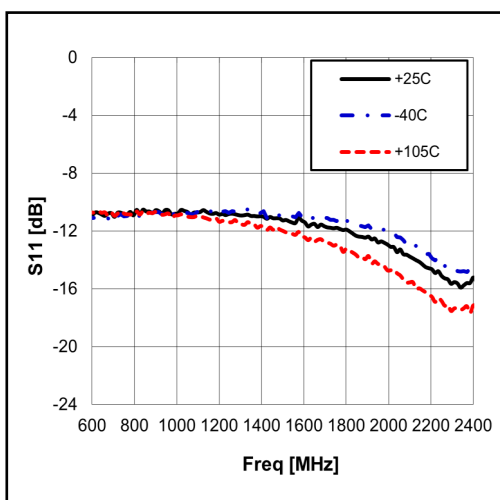
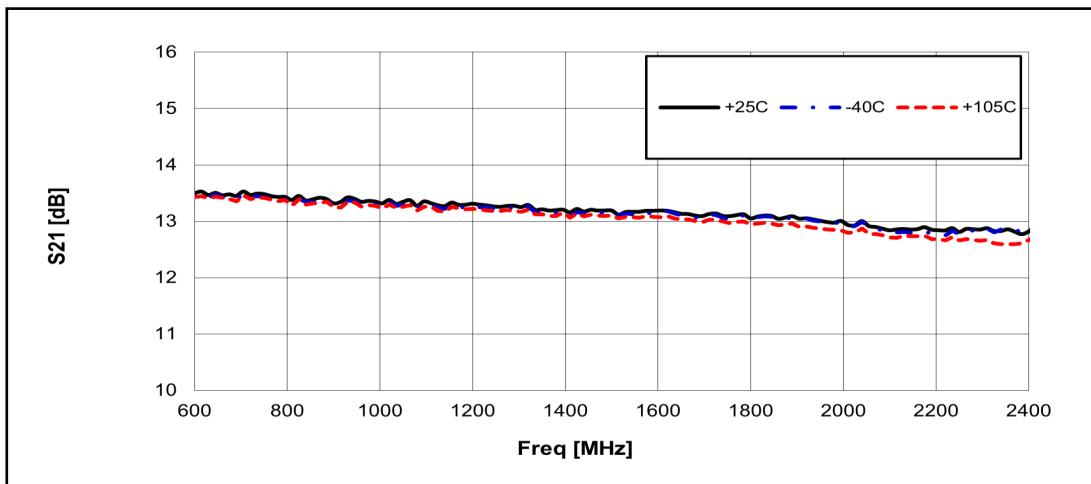
Preliminary Datasheet



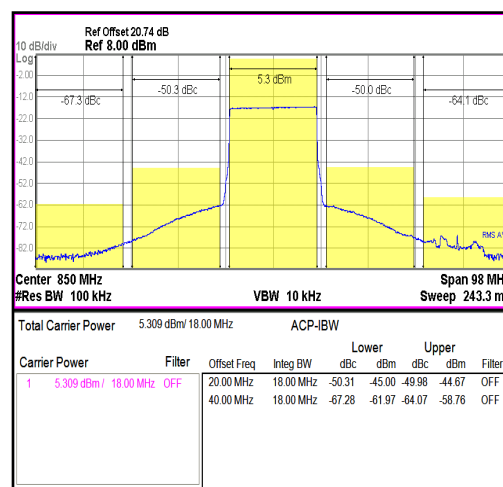
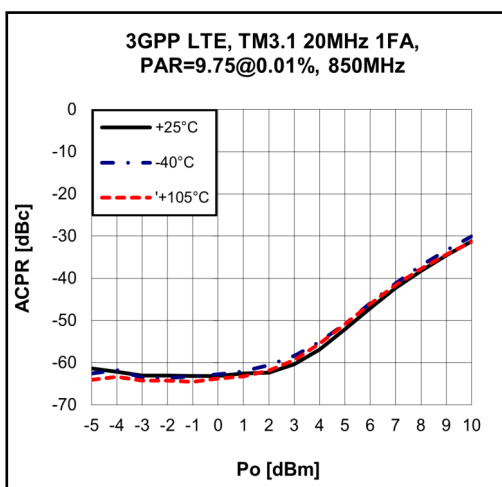
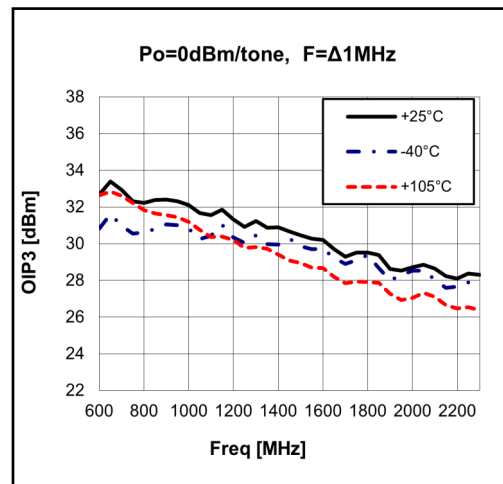
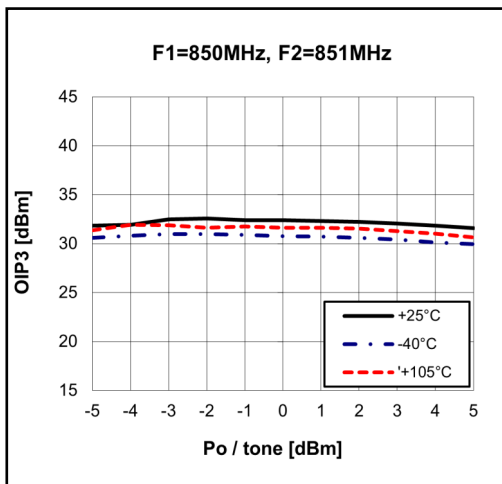
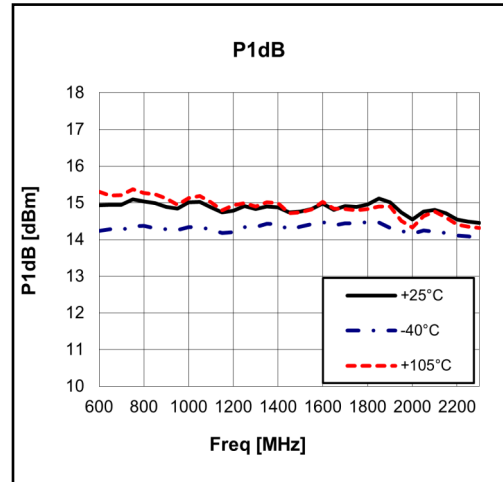
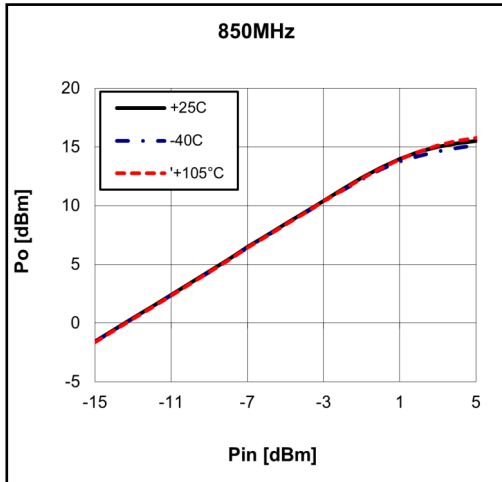


**RF Application Circuit: 600 – 2400MHz**

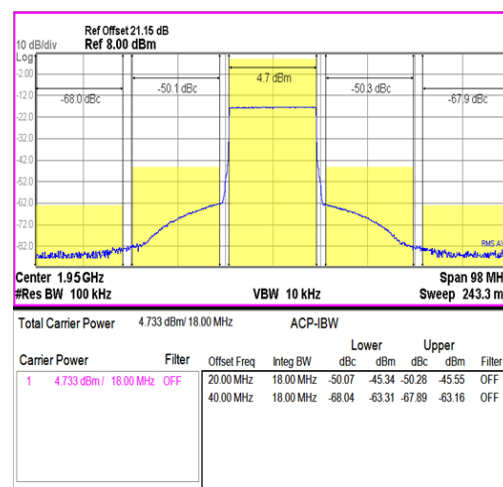
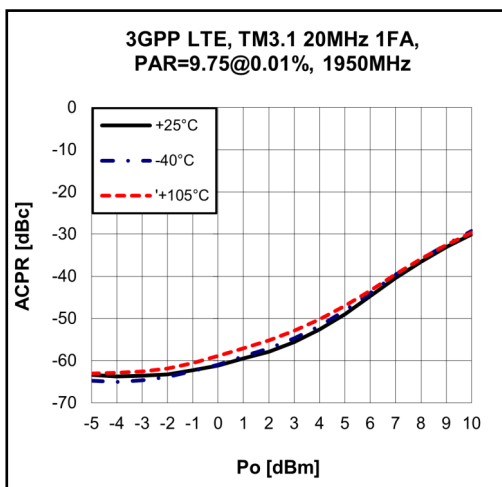
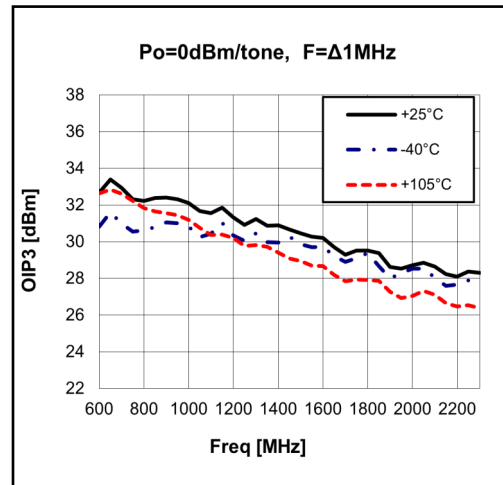
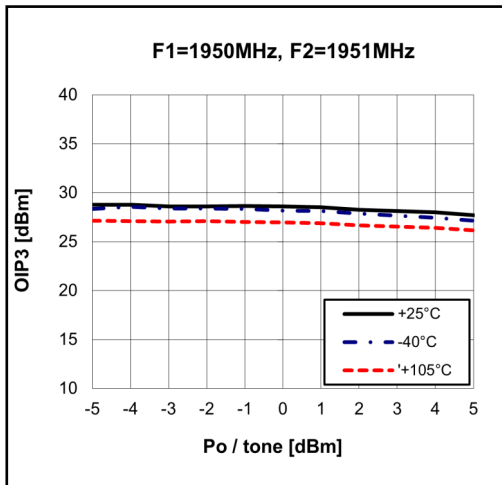
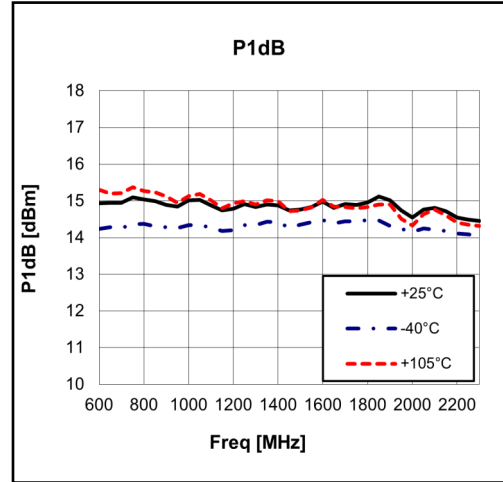
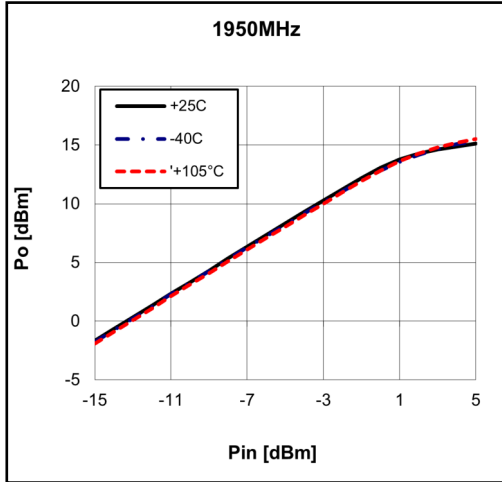
| Schematic Diagram   |    | BOM    |      | Size(inch) |
|---|----|--------|------|------------|
|  | C1 | 100 pF | 0603 |            |
|   | C2 | 100 pF | 0603 |            |
|   | C3 | 100 pF | 0603 |            |
|   | C4 | 1 nF   | 0603 |            |
|   | L1 | 100 nH | 0603 |            |

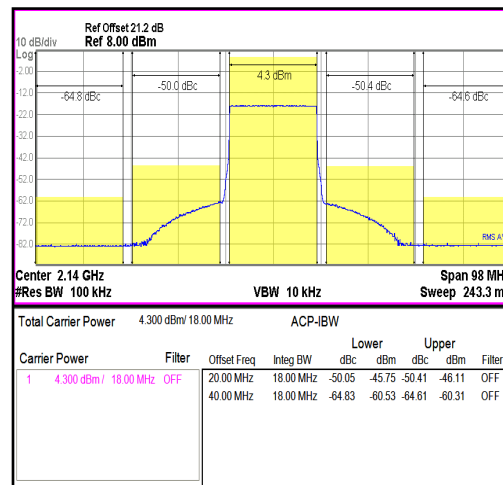
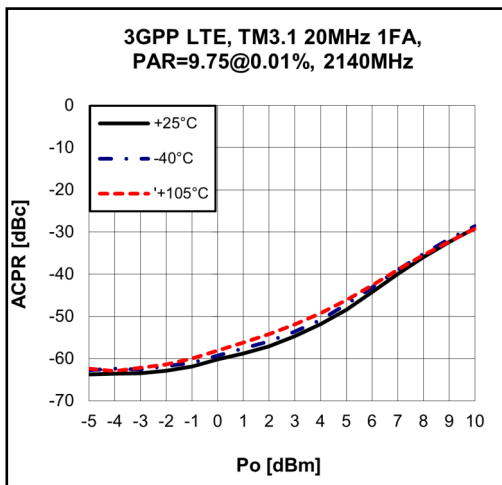
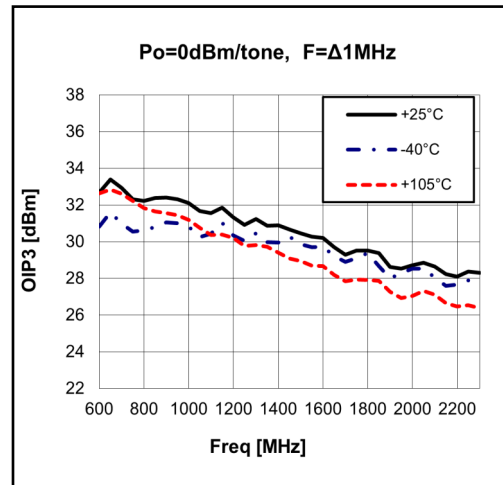
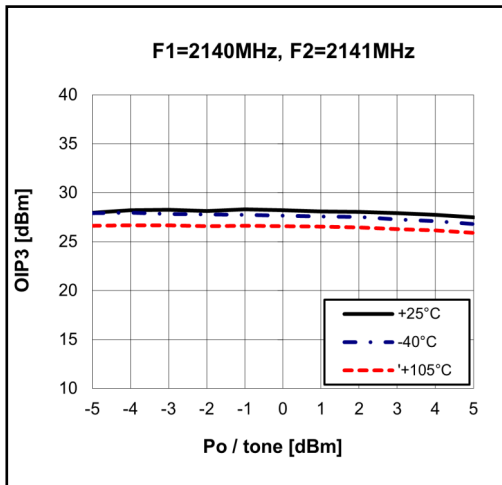
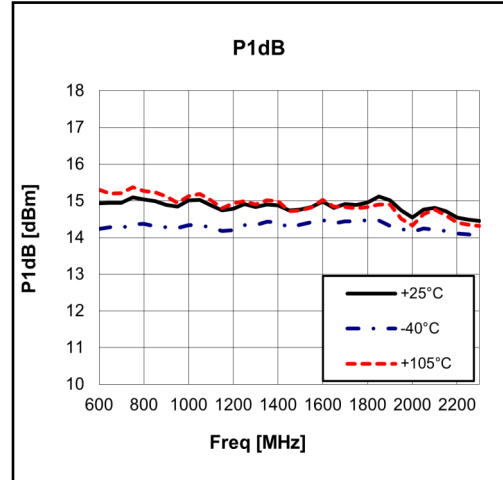
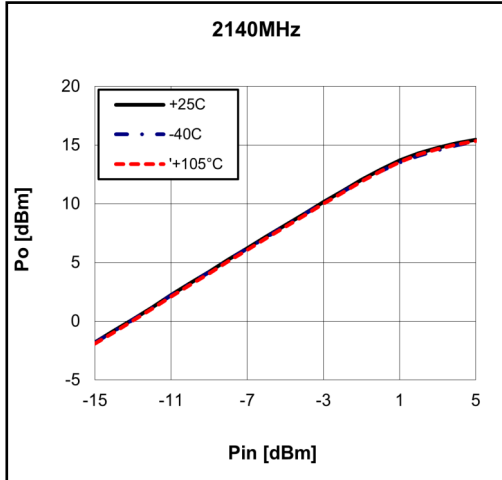
**Typical Performance**
 $V_c = 3.3V, I_c = 55mA, T = 25^\circ C$ 


Preliminary Datasheet

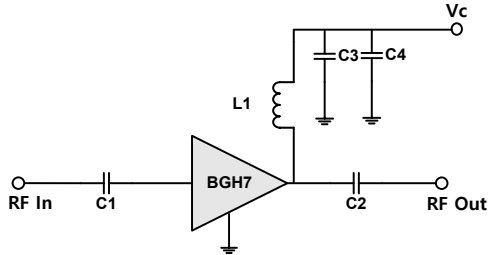


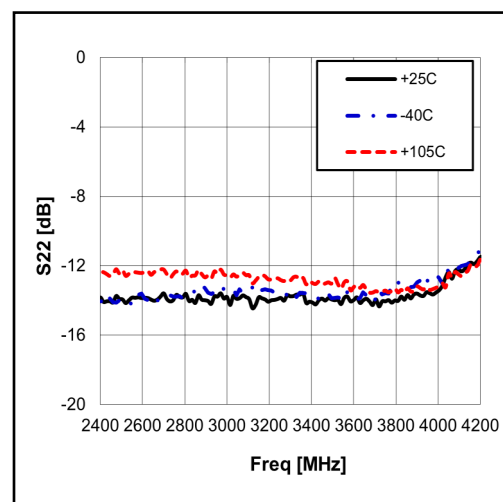
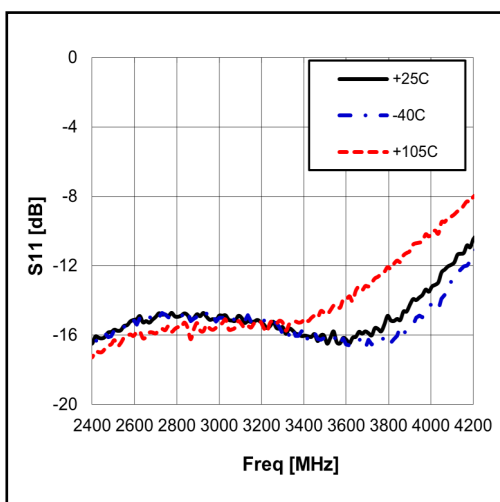
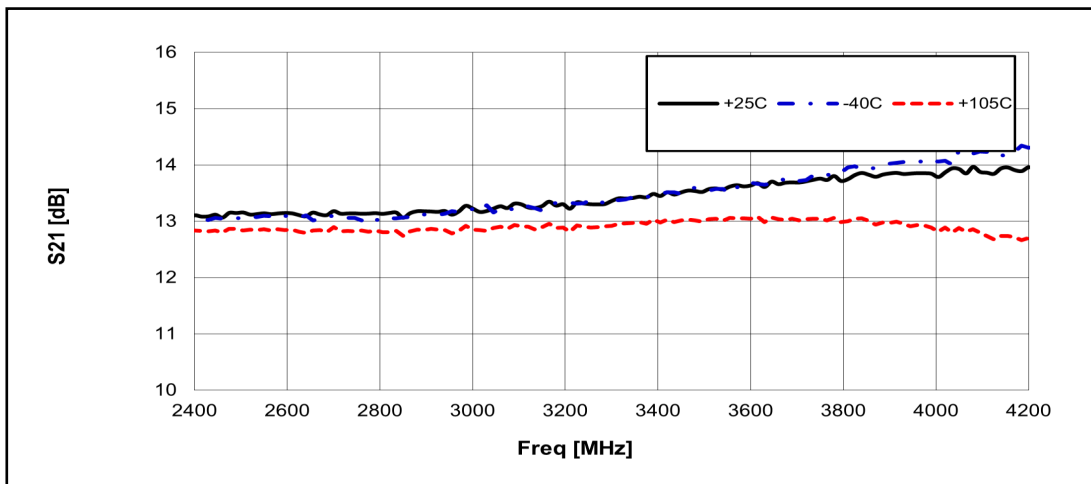




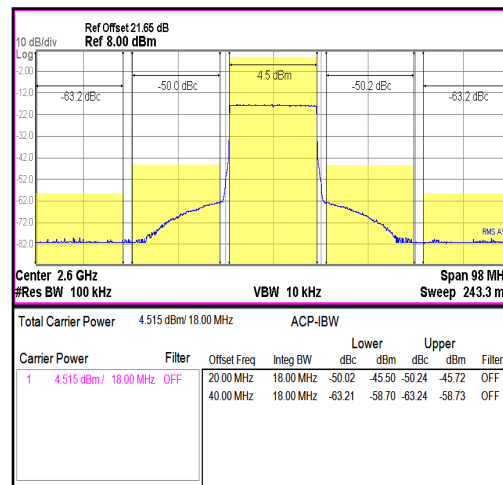
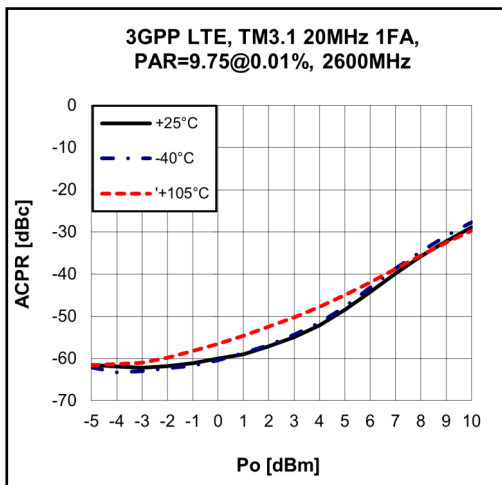
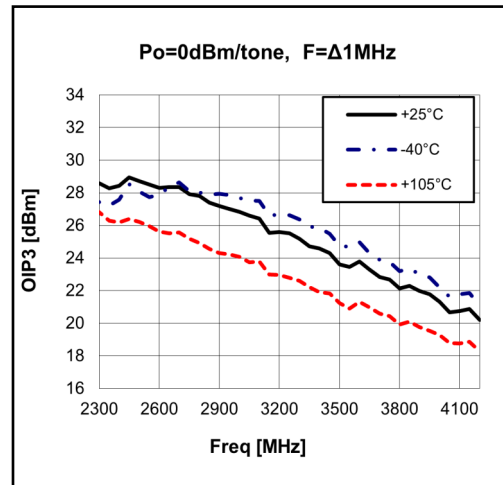
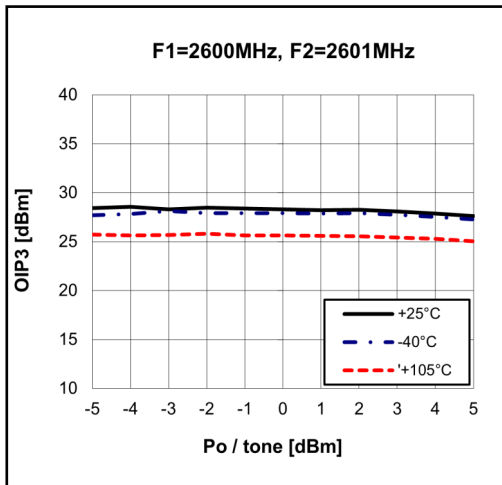
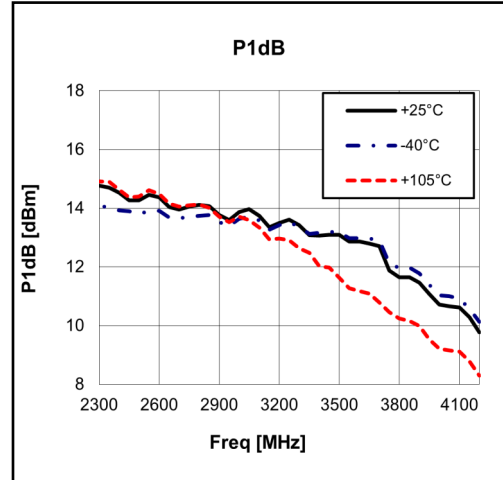
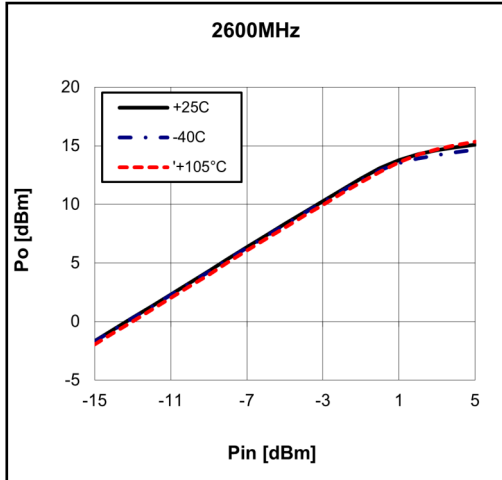


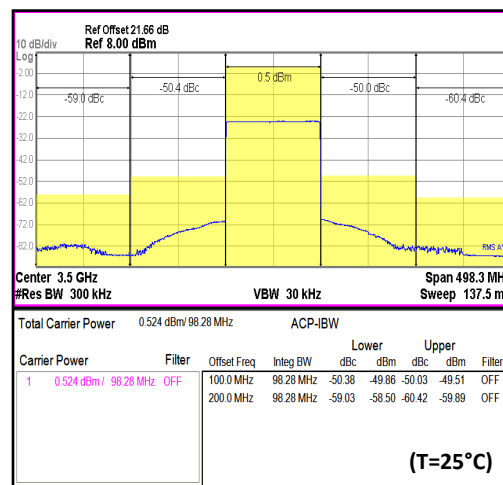
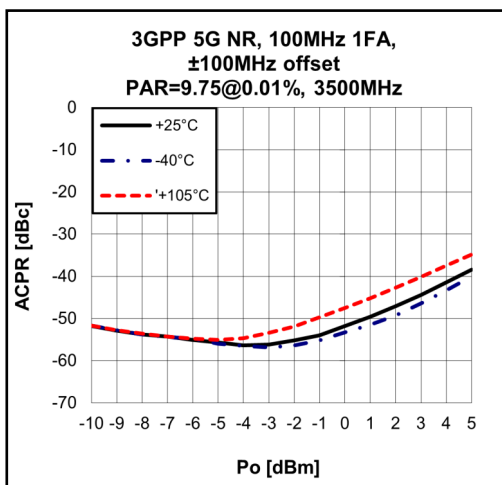
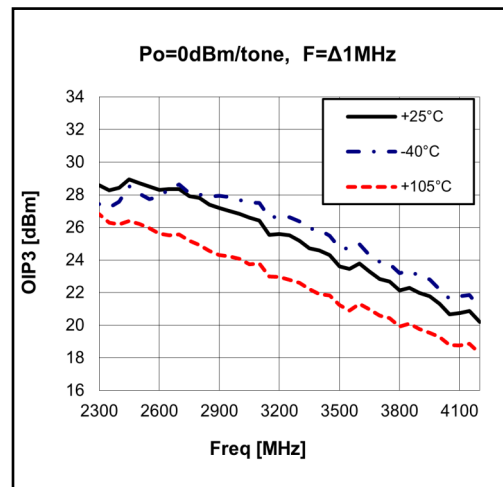
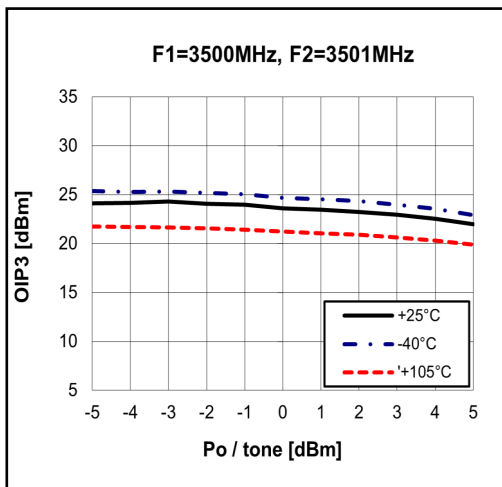
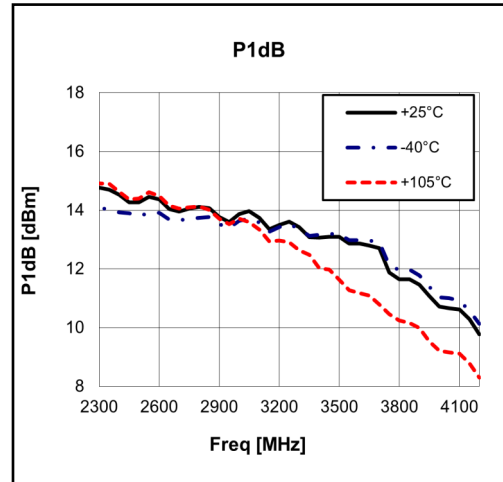
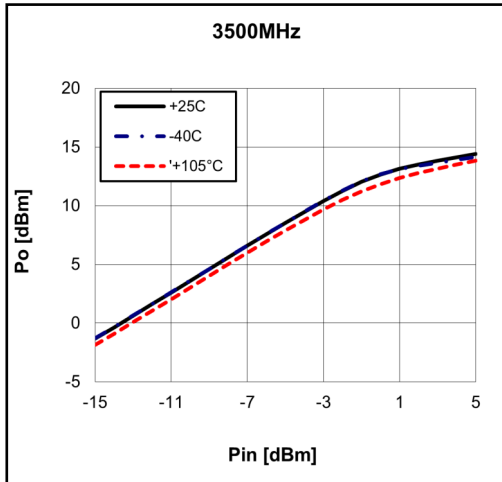
**RF Application Circuit: 2400 – 4200MHz**

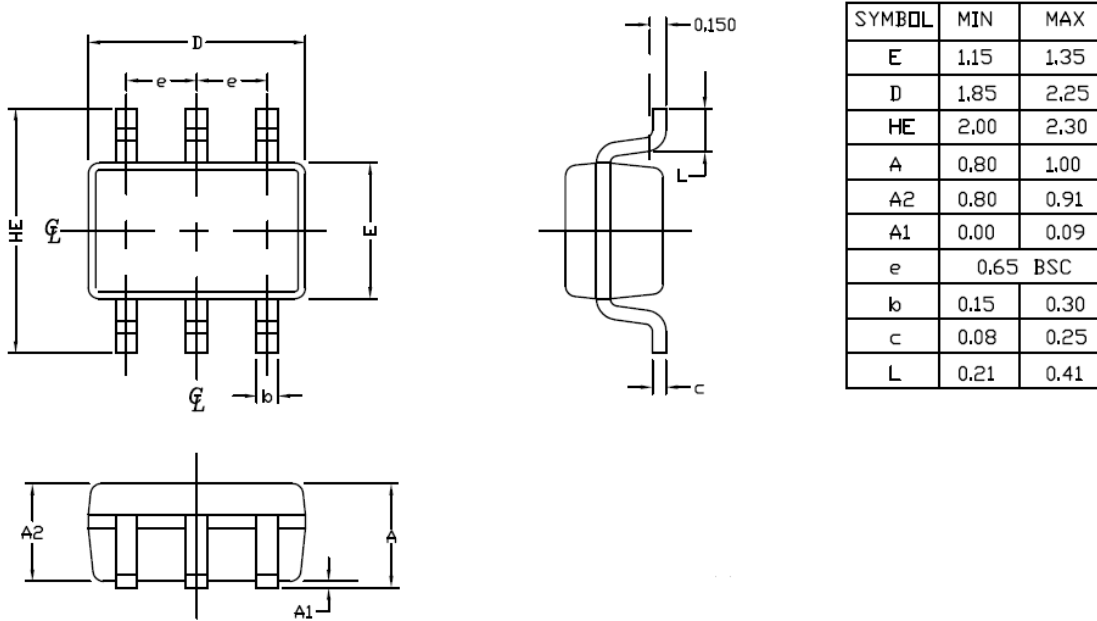
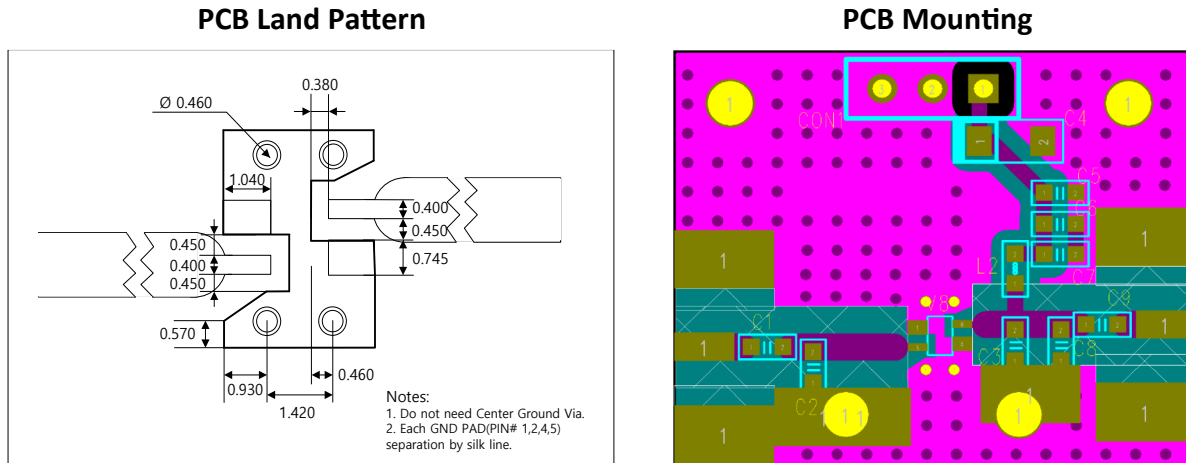
| Schematic Diagram   |  | BOM |        | Size(inch) |
|---|--|-----|--------|------------|
|  |  | C1  | 12 pF  | 0603       |
|   |  | C2  | 2 pF   | 0603       |
|   |  | C3  | 100 pF | 0603       |
|   |  | C4  | 1 nF   | 0603       |
|   |  | L1  | 15 nH  | 0603       |

**Typical Performance**
 $V_c = 3.3V, I_c = 55mA, T = 25^\circ C$ 


Preliminary Datasheet



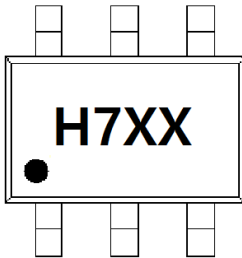


**Package Outline Dimension**

**Suggested PCB Land Pattern and PAD Layout**


Note : All dimension \_ millimeters

PCB lay out \_ on BeRex website

### Package Marking



H7 = Product No.  
XX = Wafer No.

### Pin 1

### Lead plating finish

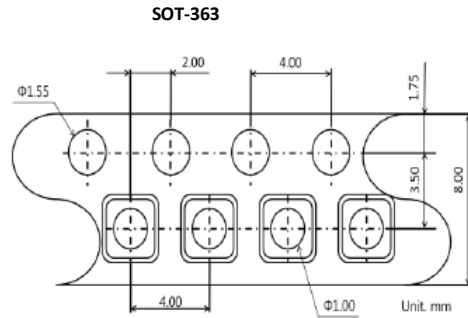
100% Tin Matte finish

(All BeRex products undergoes a 1 hour, 150 degree C, Anneal bake to eliminate thin whisker growth concerns.)

### MSL / ESD Rating

|                    |                                     |
|--------------------|-------------------------------------|
| <b>ESD Rating:</b> | Class 1B                            |
| <b>Value:</b>      | Passes <1000V                       |
| <b>Test:</b>       | Human Body Model (HBM)              |
| <b>Standard:</b>   | JEDEC Standard JS-001-2017          |
| <br>               |                                     |
| <b>MSL Rating:</b> | Level 1 at +260°C convection reflow |
| <b>Standard:</b>   | JEDEC Standard J-STD-020            |

### Tape & Reel



Packaging information:

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



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 |
|---|---|---|---|---|