AHB3612S6 Data Sheet

950 ~ 6500 MHz Wide-band Gain Block Amplifier MMIC

1. Product Overview

1.1 General Description

AHB3612S6, a gain block amplifier MMIC, has high linearity, low noise and high efficiency over a wide range of frequency from 950 MHz to 6500 MHz, being suitable for use in both receiver and transmitter of telecommunication system up to 6.5 GHz. It has an active bias network for stable current over temperature and process variation. The amplifier is available in an SOT363 package and passes through the stringent DC, RF, and reliability tests.

1.2 Features

- 14.8 dB gain at 2000 MHz
- 12.5 dBm P1dB at 2000 MHz
- 25.0 dBm OIP3 at 2000 MHz
- Gain flatness = 4.2 dB at 950 ~ 6500 MHz
- 50 Ω input & output matching
- MTTF > 100 Years
- Single supply: +3 V

1.3 Applications

- Wide-band application at 950 ~ 6500 MHz

1.4 Package Profile & RoHS Compliance

	
SOT363, 2.1x2.0 mm^2, surface mount	RoHS-compliant

2. Summary on Product Performances

2.1 Typical Performance

Supply voltage = +3 V, T_A = +25 °C, Z_O = 50 Ω.

Parameter	Typical							Unit
Frequency	950	2000	3000	4000	5000	6000	6500	MHz
Gain	15.5	14.8	14.0	13.4	12.7	11.9	11.3	dB
S11	-14.0	-14.0	-14.0	-16.0	-15.0	-10.0	-8.0	dB
S22	-12.0	-20.0	-20.0	-20.0	-17.0	-11.0	-10.0	dB
Noise Figure	1.5	1.6	1.7	1.8	2.0	2.3	2.5	dB
Output IP3[1)]	24.5	25.0	24.0	22.0	22.0	21.5	20.5	dBm
Output P1dB	12.5	12.5	12.0	11.0	10.5	10.0	9.0	dBm
Current	27							
Device Voltage	+3							

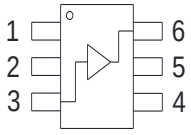
1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1MHz.

2.2 Product Specification

Supply voltage = +3 V, T_A = +25 °C, Z_O = 50 Ω.

Parameter	Min	Typ	Max	Unit
Frequency		2000		MHz
Gain		14.8		dB
S11		-14.0		dB
S22		-20.0		dB
Noise Figure		1.6		dB
OIP3		25.0		dBm
P1dB		12.5		dBm
Current		27		mA
Device Voltage		+3		V

2.3 Pin Configuration

Pin	Description	Simplified Outline
1, 2, 4, 5	Ground	
3	RF_INPUT	
6	RF_OUT & Bias	

2.4 Absolute Maximum Ratings

Parameters	Max. Ratings
Operation Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+6 V
Operation Junction Temperature	+150 °C
Input RF Power (CW, 50 Ω matched)*	+25 dBm

2.5 Thermal Resistance

Symbol	Description	Typ	Unit
R_{th}	Thermal resistance from junction to lead	210	°C/W

2.6 ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM	Class 1A	Voltage Level : 250~500 V

CAUTION: Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Moisture Sensitivity Level

MSL 3 at 260 °C reflow

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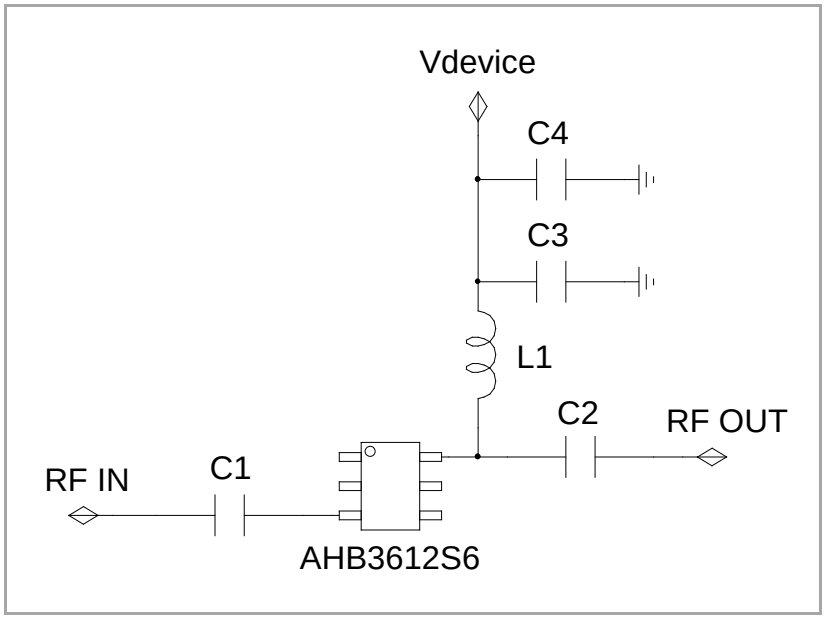
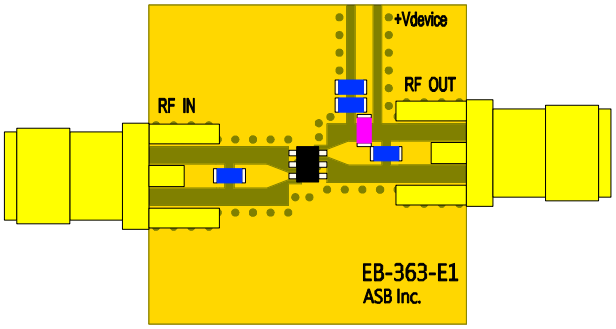
3. Application: 950 ~ 6500 MHz

3.1 Application Circuit & Evaluation Board





PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	18x18
EB No.	EB-363-E1

Bill of Material

Symbol	Value	Size	Description	Manufacturer
AHB3612S6	-	-	MMIC Amplifier	ASB
C1, C2	100 pF	0603	DC blocking capacitor	Murata
C3	100 pF	0603	Decoupling capacitor	Murata
C4	1 μF	0603	Decoupling capacitor	Murata
L1	15 nH	0603	RF choke inductor	Murata

3.2 Performance Table

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Parameter	Typical							Unit
Frequency	950	2000	3000	4000	5000	6000	6500	MHz
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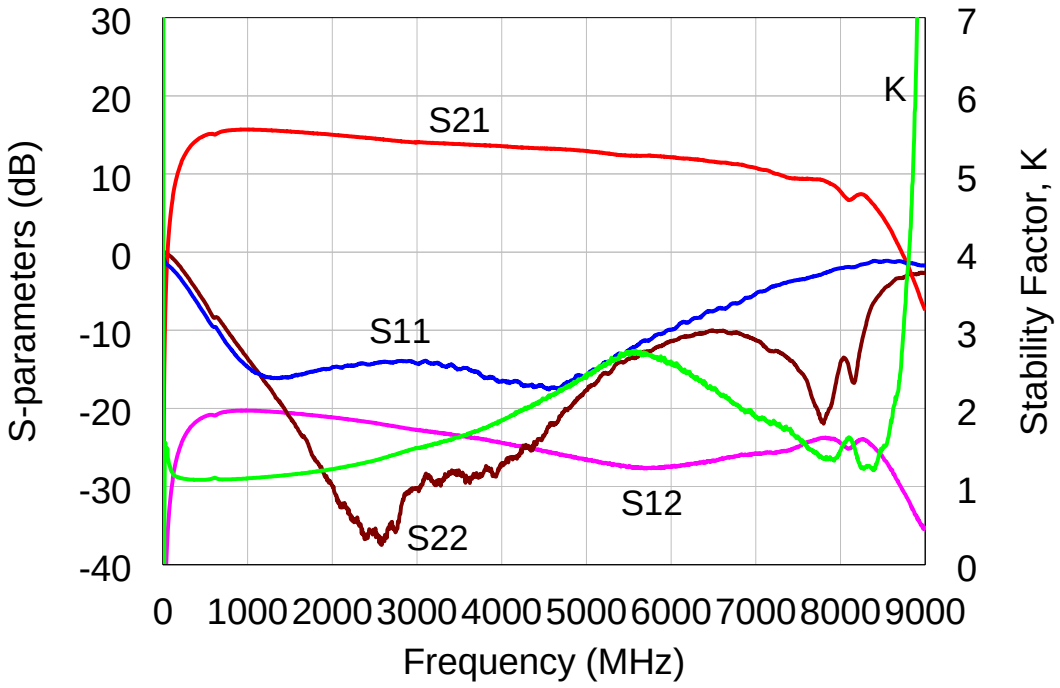
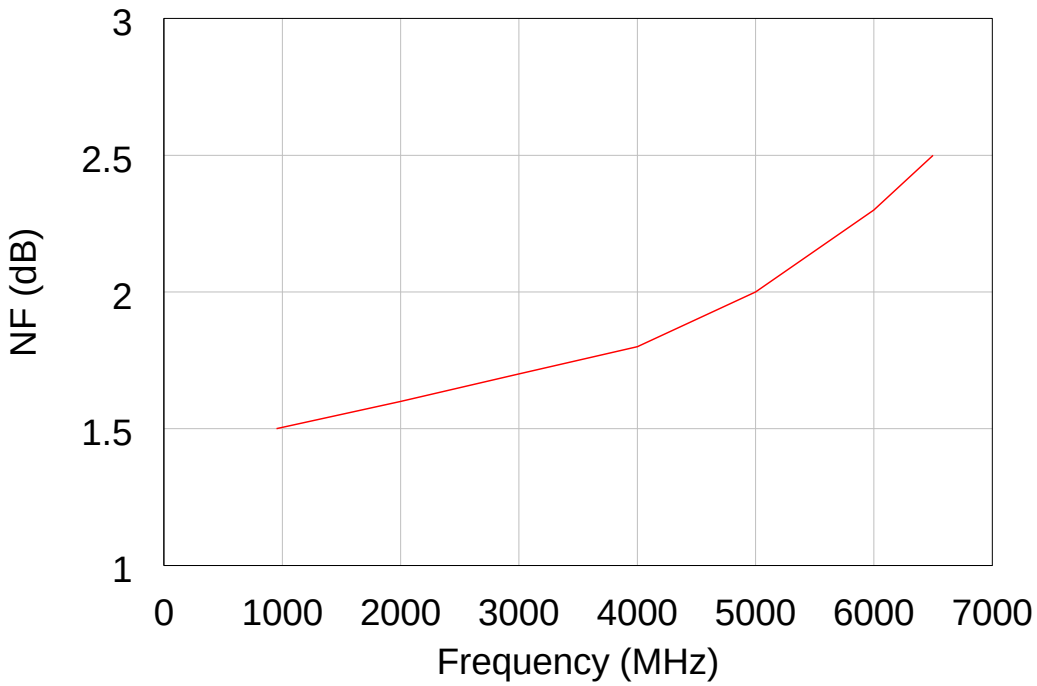
Output IP3[1)]	24.5	25.0	24.0	22.0	22.0	21.5	20.5	dBm
Output P1dB	12.5	12.5	12.0	11.0	10.5	10.0	9.0	dBm
Current	27							mA
Device Voltage	+3							V

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1MHz.

3.3 Plot of S-parameter & Stability Factor





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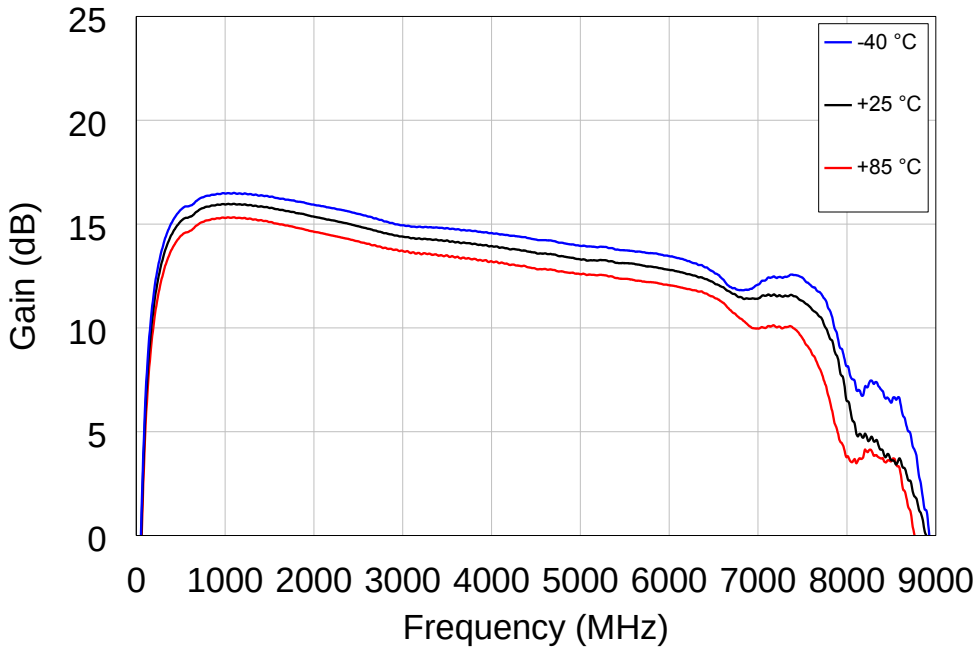
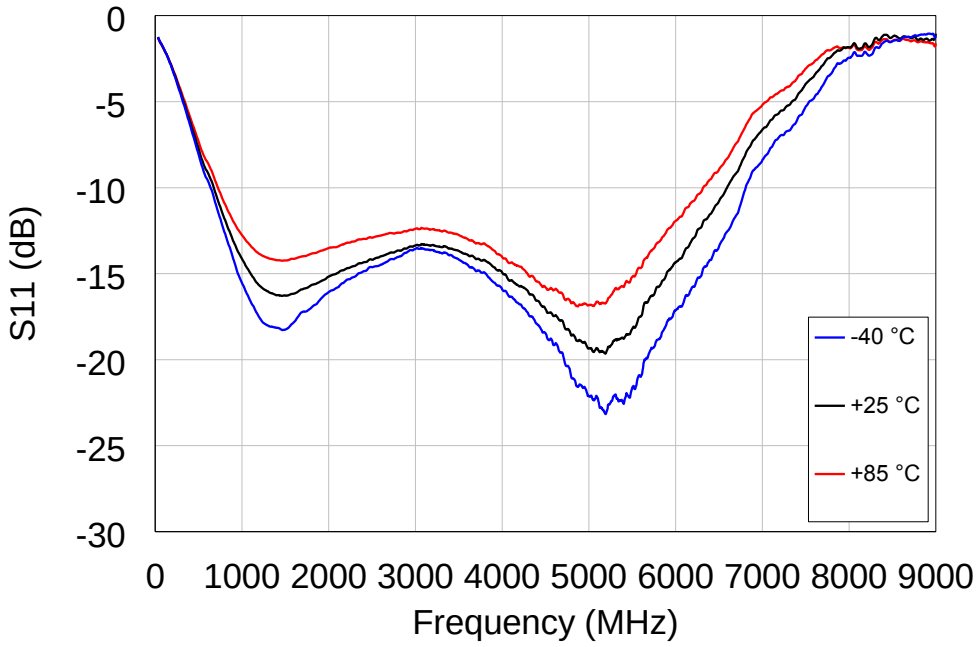
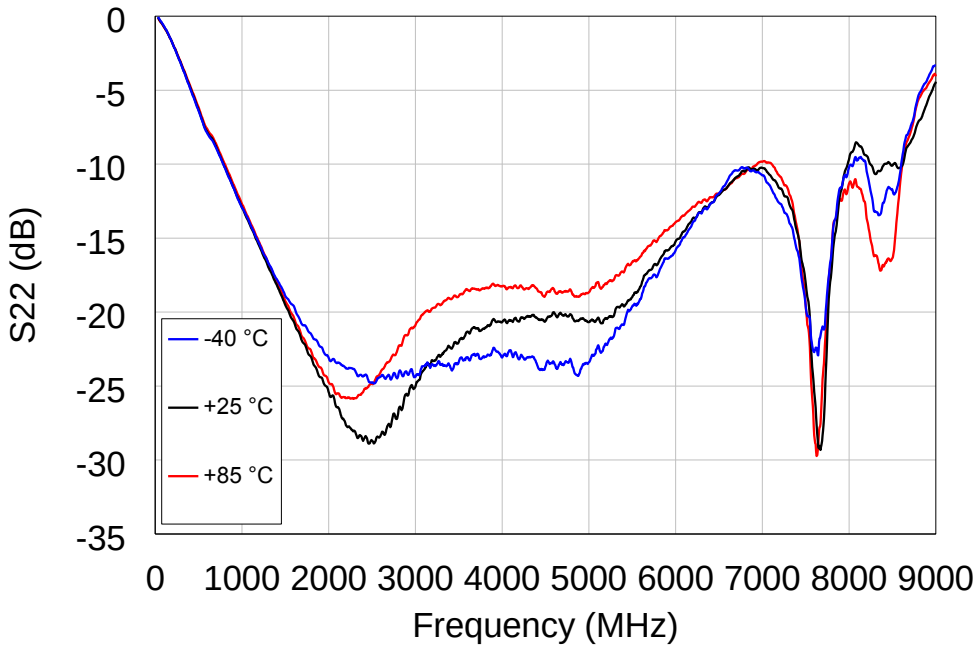
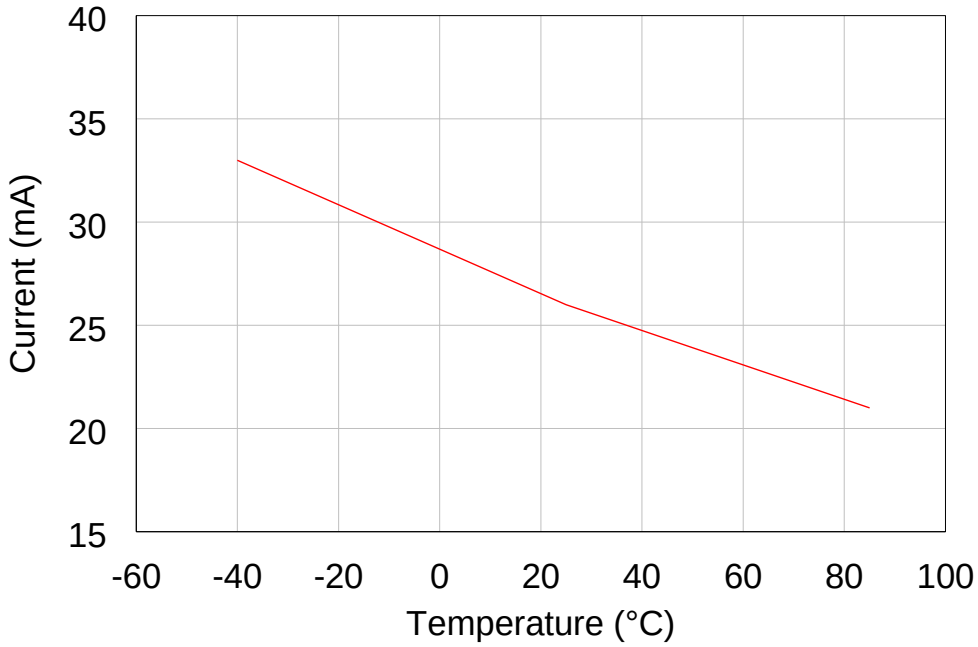
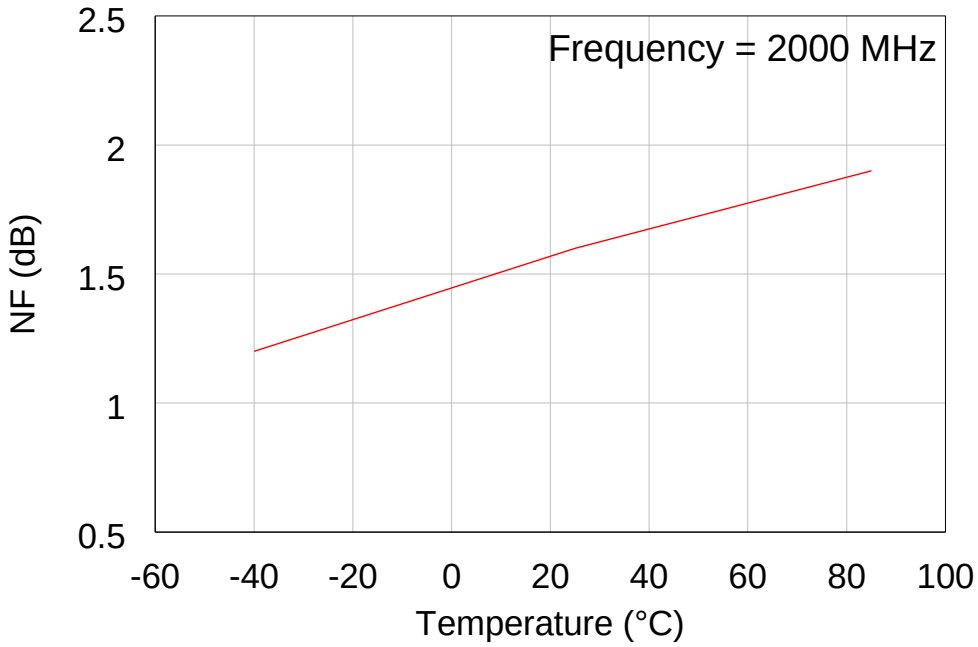
3.4 Plot of Noise Figure and Performances with Temperature

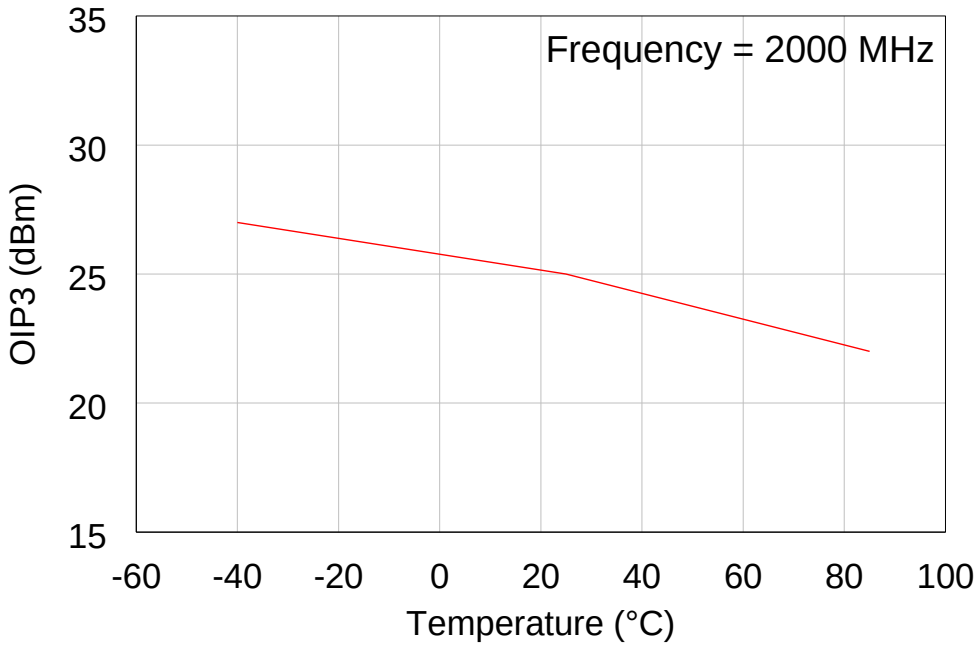


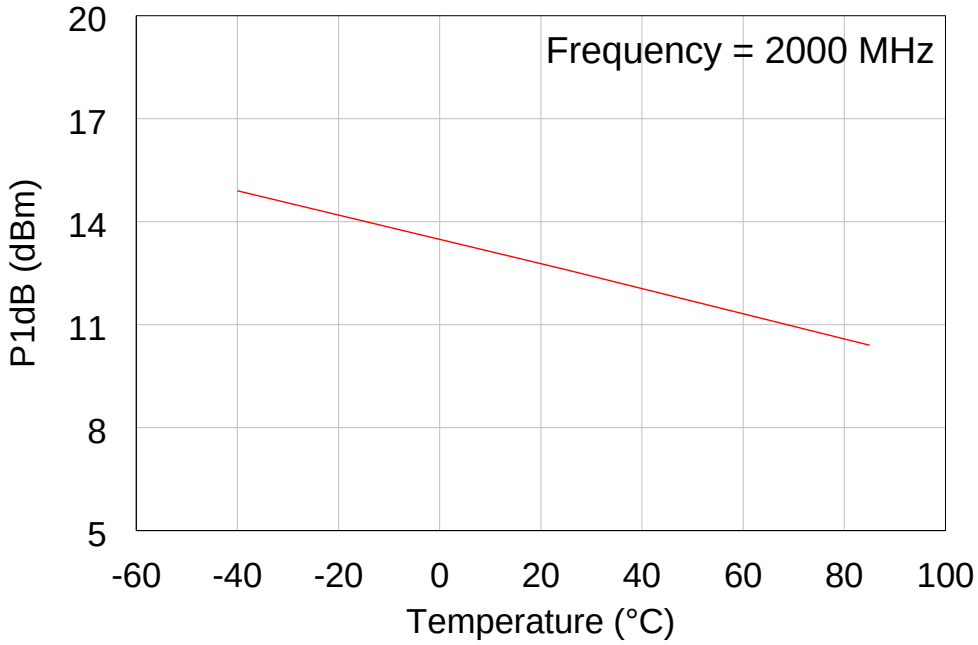



0
-5
-10
-15
-20
-25
-30
-35
S22 (dB)
-40 °C
+25 °C
+85 °C
0 1000 2000 3000 4000 5000 6000 7000 8000 9000
Frequency (MHz)


40
35
30
25
20
15
Current (mA)
-60 -40 -20 0 20 40 60 80 100
Temperature (°C)


Frequency = 2000 MHz
NF (dB)
2.5
2
1.5
1
0.5
-60
-40
-20
0
20
40
60
80
100
Temperature (°C)


Frequency = 2000 MHz
OIP3 (dBm)
35
30
25
20
15
-60
-40
-20
0
20
40
60
80
100
Temperature (°C)



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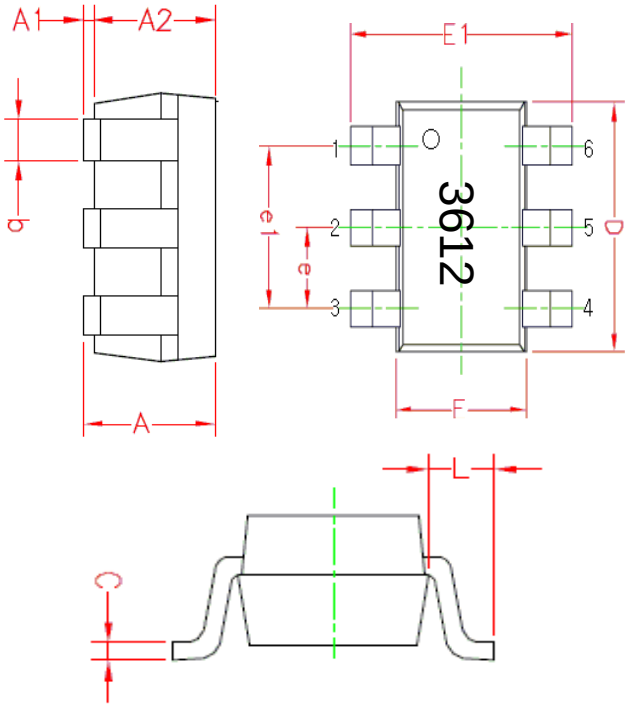
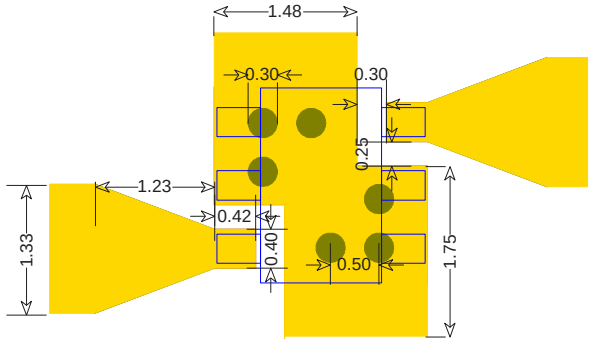
4. Package Outline (SOT363, 2.1x2.0x1.0 mm)



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	0.900	1.000	1.10
A1	0.025	0.062	0.10
A2	0.875	0.937	1.00
b	0.200	0.300	0.40
C	0.100	0.125	0.15
D	1.900	2.000	2.10
F	1.150	1.250	1.35
E1	2.000	2.100	2.20
e	0.65BSC		
e1	1.30BSC		
L	0.425REF		

5. Surface Mount Recommendation (In mm)

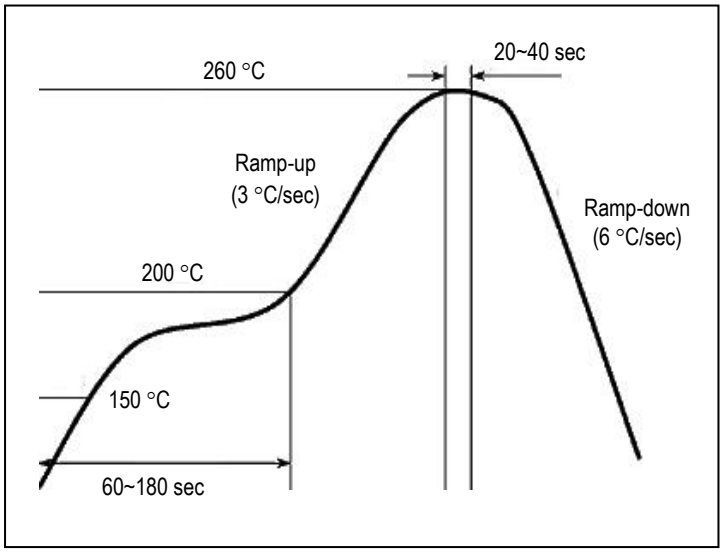


NOTE

1. The number and size of ground via holes in a circuit board are critical for thermal and RF grounding considerations.

2. Recommend is that the ground via holes be placed on the bottom of the ground leads of the device for better RF and thermal performance, as shown in the drawing at the left side.

6. Recommended Soldering Reflow Profile



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