

ABB1519 Data Sheet

50 ~ 1700 MHz Wide-band CATV Linear Amplifier MMIC

1. Product Overview

1.1 General Description

ABB1519, a wide-band linear amplifier MMIC, has high linearity and low noise over a wide range of frequency from 50 MHz to 1700 MHz, being suitable for use in the fiber receiver, distribution amplifiers, and drop amplifiers of CATV. The amplifier is available in an SOT89 package and passes through the stringent 100% DC & RF test in an automated test handler.

1.2 Features

- Low-noise and high linearity
- Wide-band CATV application at 50 ~ 1700 MHz
- 75 Ω input & output matching
- Robust under hard operating conditions
- 19.4 dB gain at 500 MHz
- CSO of 68 dBc, CTB of 61 dBc
@ Pout = 100 dB μ V flat for NTSC 77 channels, device voltage = +5 V
- Single supply: +5 V

1.3 Applications

- CATV Forward at 50 ~ 1200 MHz
- CATV Forward at 50 ~ 1700 MHz
- Optical Node, FTTH, RFoG

1.4 Package Profile & RoHS Compliance

 SOT89, 4.5x4.0 mm², surface mount	 RoHS-compliant
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2. Summary on Product Performances

2.1 Typical Performance

Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_O = 75\text{ }\Omega$.

Parameter	Typical			Unit
Frequency	50	500	1200	MHz
Noise Figure	1.8	2.0	2.1	dB
Gain	19.7	19.4	18.5	dB
S11	-16	-16	-17	dB
S22	-16	-20	-20	dB
Output IP3 ¹⁾	40	41	38	dBm
Output IP2 ²⁾	59			dBm
Output P1dB	21	21	20	dBm
CSO	68 ³⁾			dBc
CTB	61 ³⁾			dBc
Current	123			mA
Device Voltage	+5			V

1) OIP3 is measured with two tones at an output power of +6 dBm/tone separated by 6 MHz.

2) OIP2 is measured with two tones ($F_1 = 400\text{ MHz} + F_2 = 450\text{ MHz}$) at an output power of +6 dBm/tone.

3) CSO & CTB measured at $P_{out} = 100\text{ dB}\mu\text{V}$ flat for NTSC 77 channels.

2.2 Product Specification

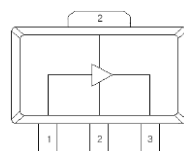
Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_O = 75\text{ }\Omega$.

Parameter	Min	Typ	Max	Unit
Frequency		500		MHz
Noise Figure		2.0		dB
Gain	18.4	19.4	20.4	dB
S11		-16		dB
S22		-20		dB
Output IP3 ¹⁾		41		dBm
Output IP2 ²⁾		59		dBm
Output P1dB		21		dBm
Current	103	123	143	mA
Device Voltage		+5		V

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2) OIP2 is measured with two tones ($F_1 = 400\text{ MHz} + F_2 = 450\text{ MHz}$) at an output power of +6 dBm/tone.

2.3 Pin Configuration

Pin	Description	Simplified Outline
1	RF_IN	
2	Ground	
3	RF_OUT & Bias	

2.4 Absolute Maximum Ratings, $T_A = +25\text{ }^{\circ}\text{C}$

Parameters	Max. Ratings
Operating Case Temperature	-40 to +85 $^{\circ}\text{C}$
Storage Temperature	-40 to +150 $^{\circ}\text{C}$
Device Voltage	+6 V
Device Current	160 mA
Power Dissipation	+0.8 W
Junction Temperature	+150 $^{\circ}\text{C}$
Input RF Power (CW, 75 Ω matched)	+25 dBm

Note: operation of this device in excess of any of these limits may cause permanent damage.

2.5 Thermal Resistance

Symbol	Description	Typ	Unit
R_{th}	Thermal resistance from junction to lead	67	$^{\circ}\text{C/W}$

2.6 ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM	Class 1A
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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.

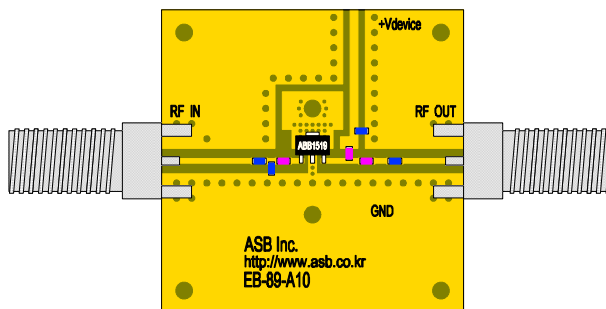
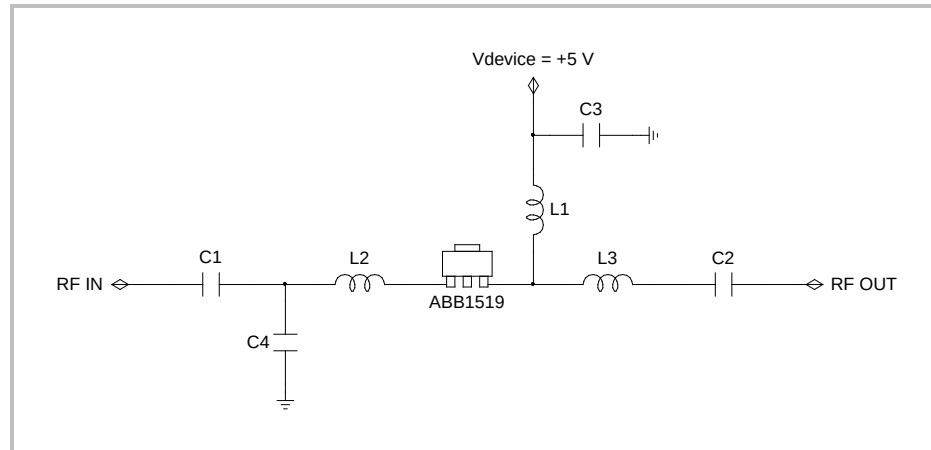
Moisture Sensitivity Level

MSL 3 at 260 $^{\circ}\text{C}$ reflow
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3. Application: 50 ~ 1200 MHz ($V_{\text{device}} = +5 \text{ V}$)

3.1 Application Circuit & Evaluation Board



PCB Information

Material	FR4
Thickness (mm)	0.8
Size (mm)	40x40
EB No.	EB-89-A10

Bill of Material

Symbol	Value	Size	Description	Manufacturer
ABB1519	-	-	MMIC Amplifier	ASB
C1, C2	1 μF	0603	DC blocking capacitor	Murata
C3	10 μF	0805	Decoupling capacitor	Murata
C4	0.75 pF	0603	Matching capacitor	Murata
L1	1 μH	1206	RF choke inductor	Murata
L2	6.8 nH	0603	Matching inductor	Murata
L3	4.7 nH	0603	Matching inductor	Murata

3.2 Performance Table

Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_0 = 75\text{ }\Omega$.

Parameter	Typical			Unit
Frequency	50	500	1200	MHz
Noise Figure	1.8	2.0	2.1	dB
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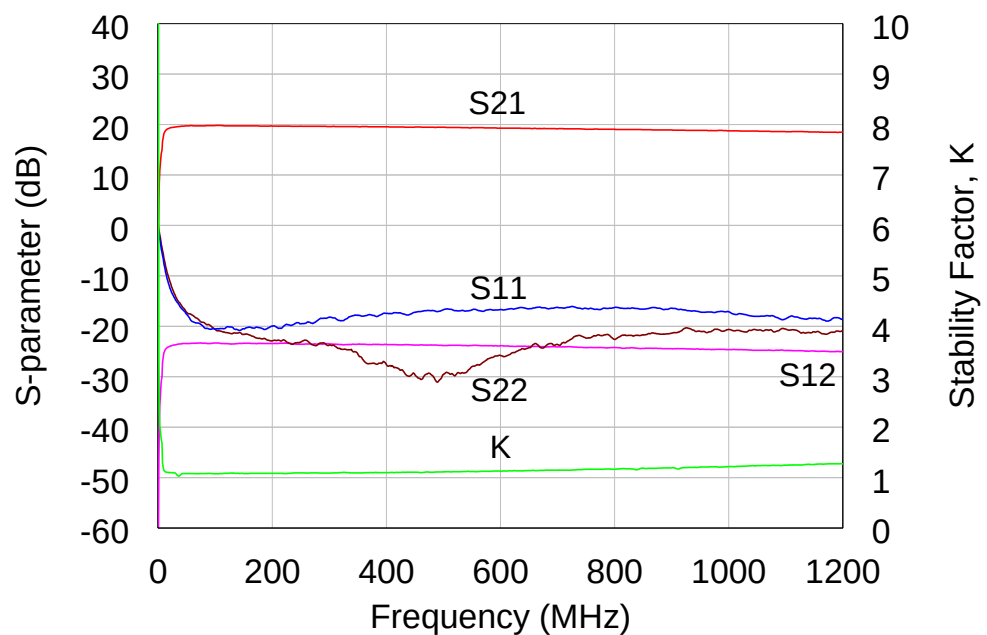
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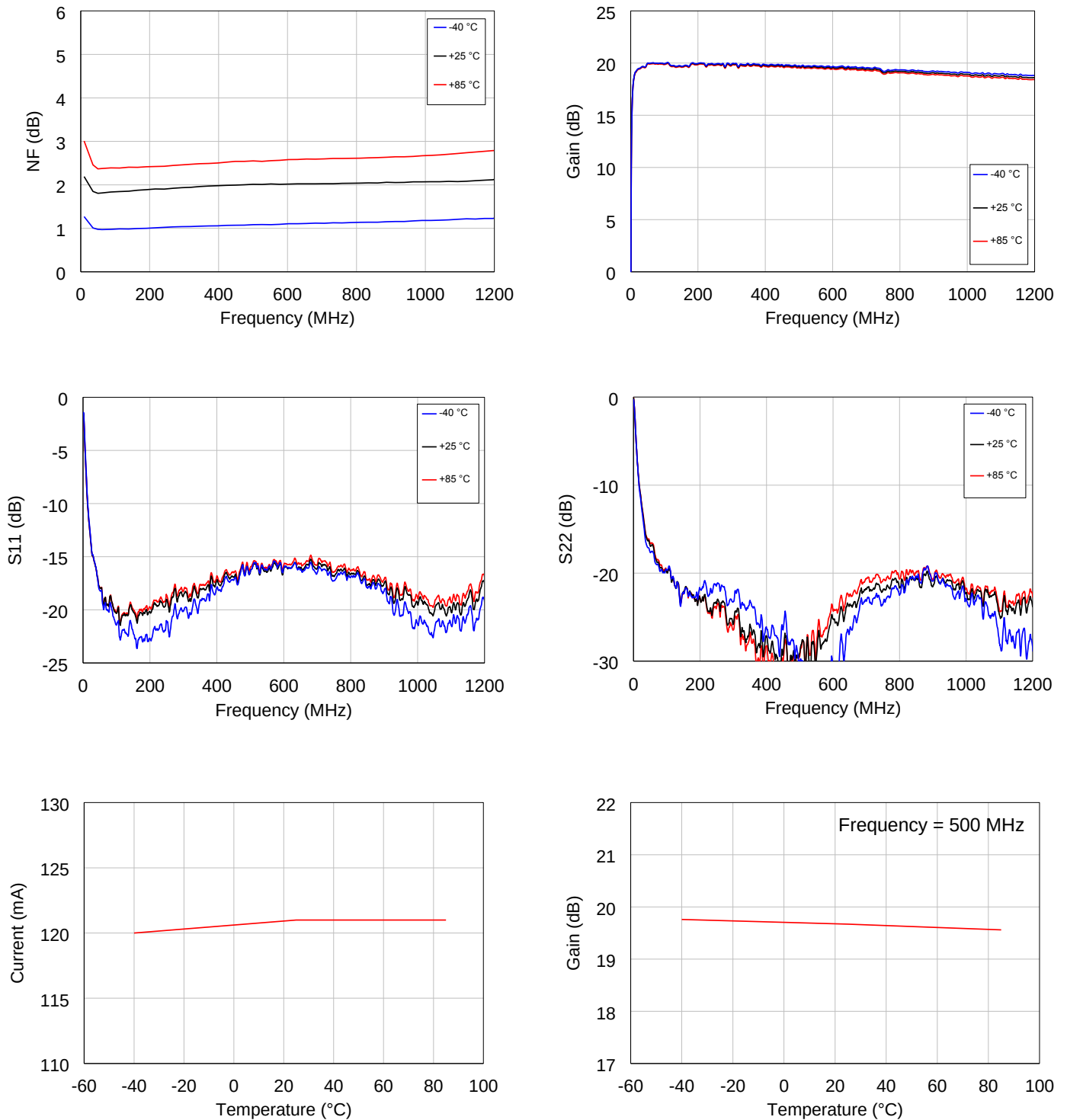
3) CSO & CTB measured at $P_{out} = 100\text{ dB}\mu\text{V}$ flat for NTSC 77 channels.

Note: P_{out} is $102\text{ dB}\mu\text{V}$ @ flat ch. and $102\text{ dB}\mu\text{V}$ @ 9 dB tilt for CENELEC 42 ch. at CSO, CTB > 60 dBc.

3.3 Plot of S-parameter & Stability Factor

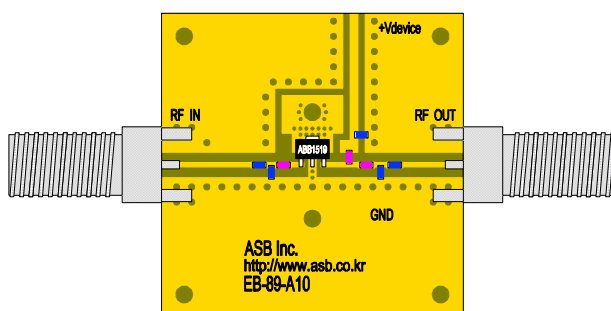
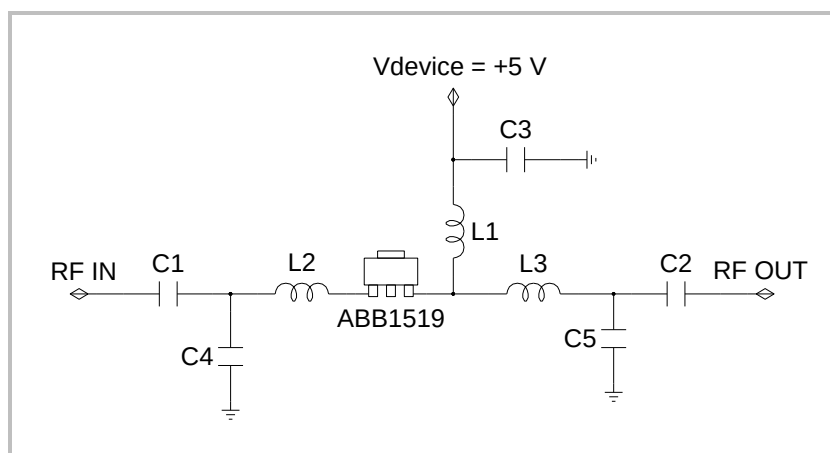


3.4 Plots of Noise Figure and Performances with Temperature



4. Application: 50 ~ 1700 MHz ($V_{\text{device}} = +5 \text{ V}$)

4.1 Application Circuit & Evaluation Board



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C5	0.5 pF	0603	Matching capacitor	Murata
L1	1 μH	1206	RF choke inductor	Murata
L2	5.6 nH	0603	Matching inductor	Murata
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4.2 Performance Table

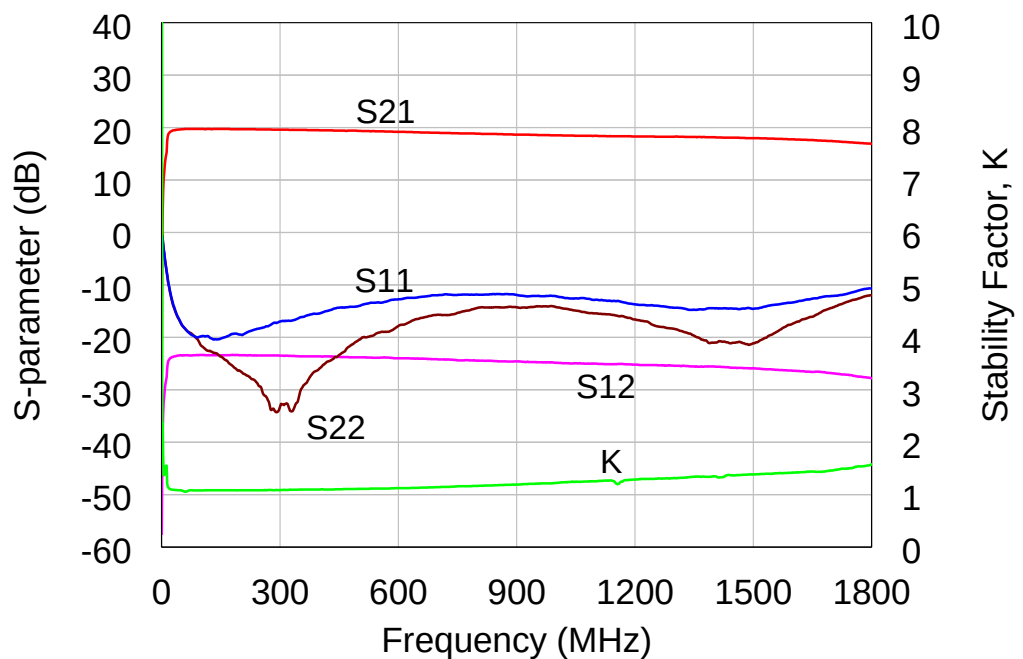
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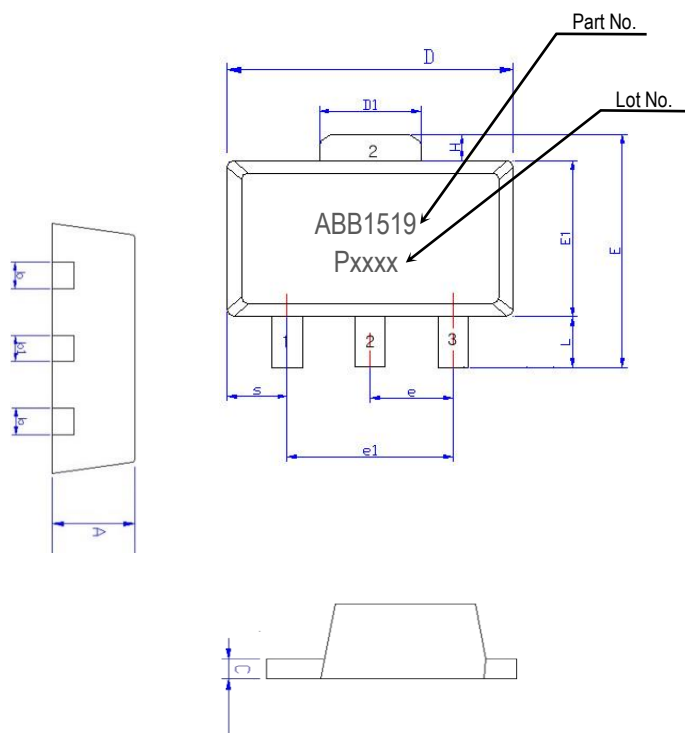
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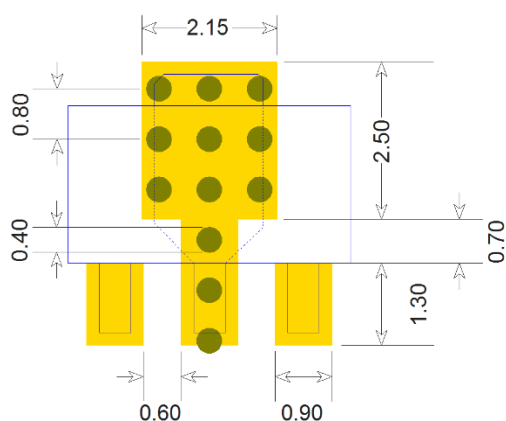


5. Package Outline (SOT89, 4.5x4.0x1.5 mm)



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	1.40	1.50	1.60
L	0.89	1.04	1.20
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
C	0.38	0.40	0.43
D	4.40	4.50	4.60
D1	1.40	1.60	1.75
E	3.64	---	4.25
E1	2.40	2.50	2.60
e1	2.90	3.00	3.10
H	0.35	0.40	0.45
S	0.65	0.75	0.85
e	1.40	1.50	1.60

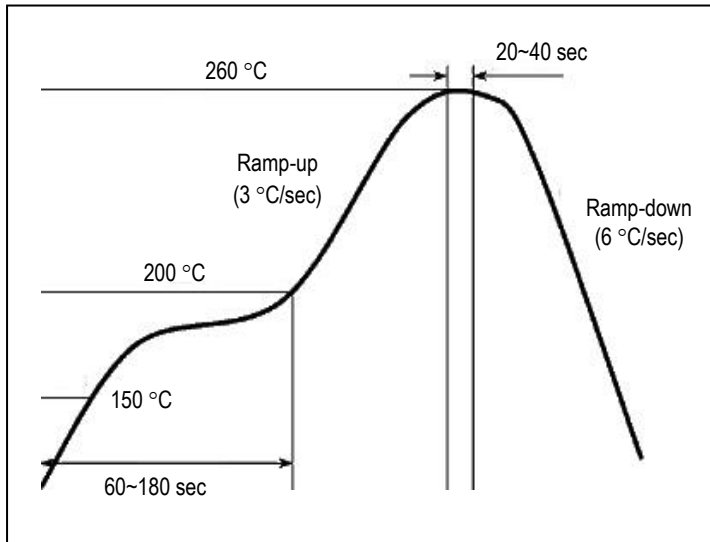
6. Surface Mount Recommendation (In mm)



NOTE

1. The number and size of ground via holes in a circuit board are critical for thermal and RF grounding considerations.
2. Recommended is that the ground via holes be placed on the bottom of the lead pin 2 and exposed pad of the device for better RF and thermal performance, as shown in the drawing at the left side.

7. Recommended Soldering Reflow Profile



(End of Datasheet)

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