

# A50 Data Sheet

## 1. Product Overview

### 1.1 General Description

A50, a wideband linear amplifier MMIC, has high linearity, low noise and high efficiency over a wide range of frequency from 87 MHz to 1700 MHz, being suitable for use in shark antenna for vehicle FM/DAB/DVB/GPS. The amplifier is available in an SOT89 package and passes through the stringent DC, RF, and reliability tests.



### 1.2 Features

- 15.9 dB Gain at 200 MHz
- 1.9 dB NF at 200 MHz
- 22 dBm P1dB at 200 MHz
- 40 dBm OIP3 at 200 MHz
- MTTF > 100 Years
- Single Supply: +6.0 V

### 1.3 Applications

- FM/DAB/DVB/GPS antenna

### 1.4 Package Profile & RoHS Compliance

 <p>SOT89, 4.5x4.0 mm<sup>2</sup>, surface mount</p>	 <p>RoHS-compliant</p>
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## 2. Summary on Product Performances

### 2.1 Typical Performance

Supply voltage = +6.0 V,  $T_A = +25\text{ }^\circ\text{C}$ ,  $Z_O = 50\ \Omega$ .

Parameter	Typical			Unit
Frequency	87	200	1500	MHz
Gain	15.6	15.9	14.6	dB
S11	-12	-12	-10	dB
S22	-18	-15	-14	dB
Noise Figure	2.4	1.9	2.2	dB
Output IP3 <sup>1)</sup>	40.0	40.0	35.5	dBm
Output P1dB	21.0	22.0	19.5	dBm
Current	80			mA
Device Voltage	+6.0			V

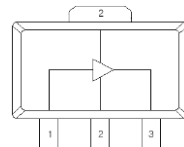
1) OIP3 is measured with two tones at an output power of +7 dBm/tone separated by 1MHz.

### 2.2 Product Specification

Supply voltage = +6.0 V,  $T_A = +25\text{ }^\circ\text{C}$ ,  $Z_O = 50\ \Omega$ .

Parameter	Min	Typ	Max	Unit
Frequency		200		MHz
Gain	15.0	15.9		dB
S11	-8	-12		dB
S22	-10	-15		dB
Noise Figure		1.9	2.2	dB
OIP3	37	40		dBm
P1dB	20.5	22		dBm
Current	65	80	100	mA
Device Voltage		+6.0		V

### 2.3 Pin Configuration

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

## 2.4 Absolute Maximum Ratings

Parameters	Max. Ratings
Operation Case Temperature	-40 to +105 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+6.5 V
Operation Junction Temperature	+150 °C
Input RF Power (CW, 50 Ω matched)	+20 dBm

\*Please find the max. input power data from [http://www.asb.co.kr/pdf/Maximum\\_Input\\_Power\\_Analysis.pdf](http://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf)  
 The max. input power, in principle, depends upon the application frequency and matching circuit.

## 2.5 Thermal Resistance

Symbol	Description	Typ	Unit
R <sub>th</sub>	Thermal resistance from junction to lead	43	°C/W

## 2.6 ESD Classification & Moisture Sensitivity Level

### ESD Classification

HBM	Class 1B	Voltage Level: 550 V
MM	Class A	Voltage Level: 50 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.

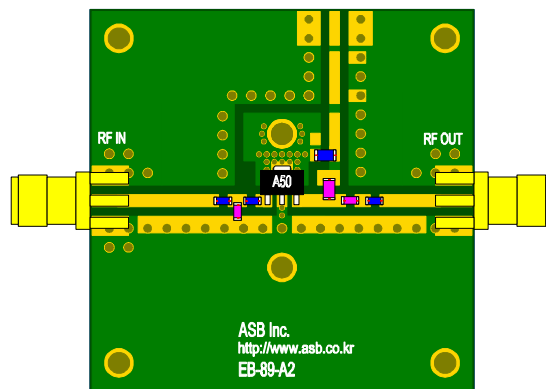
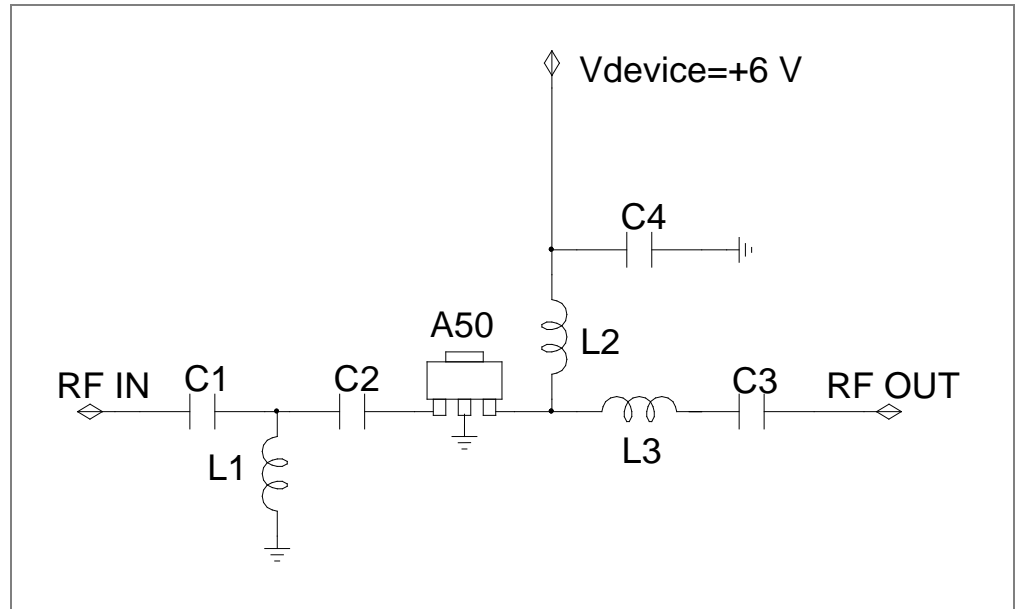
### Moisture Sensitivity Level

MSL 3 at 260 °C reflow
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### 3. Application: 87 ~ 1500 MHz (FM/DAB/DVB/GPS, $V_{supply} = +6.0\text{ V}$ )

#### 3.1 Application Circuit & Evaluation Board



PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	40x40
EB No.	EB-89-A2

#### Bill of Material

Symbol	Size(Inch)	Value	Description	Manufacturer
A50	-	-	MMIC Amplifier	ASB
C1, C3	0603	56 pF	Matching capacitor	Murata
C2	0603	1 nF	DC blocking capacitor	Murata
C4	0805	10 $\mu$ F	Decoupling capacitor	Murata
L1	0603	82 nH	Matching inductor	Murata
L2	1208	120 nH	RF choke inductor	Murata
L3	0603	2.7 nH	Matching inductor	Murata

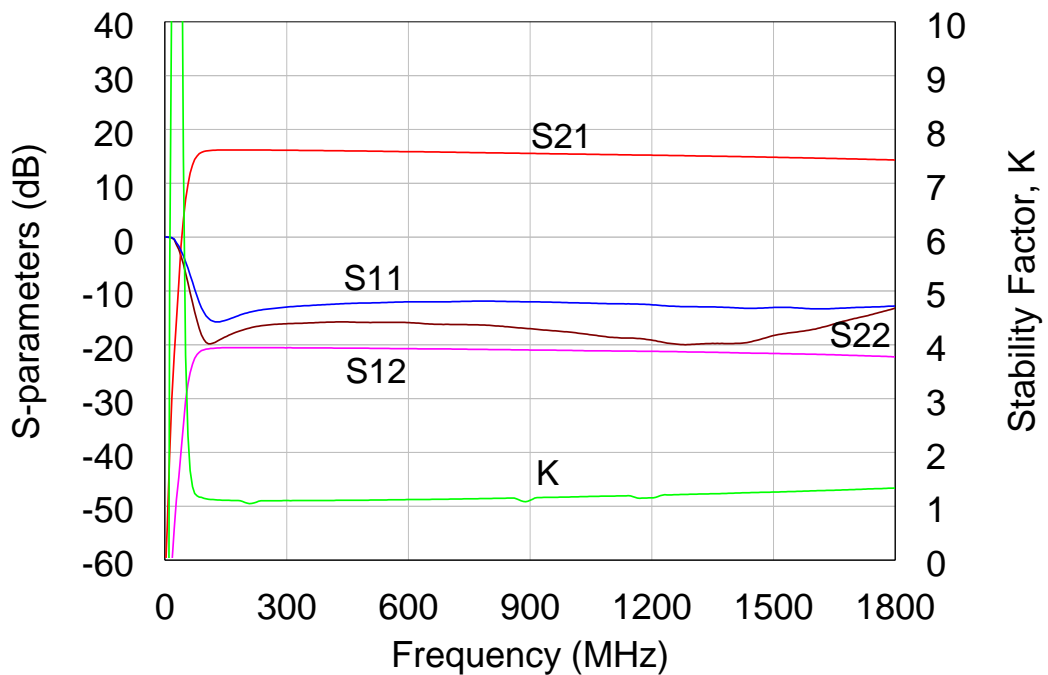
### 3.2 Performance Table

Supply voltage = +6.0 V,  $T_A = +25\text{ }^\circ\text{C}$ ,  $Z_O = 50\ \Omega$ .

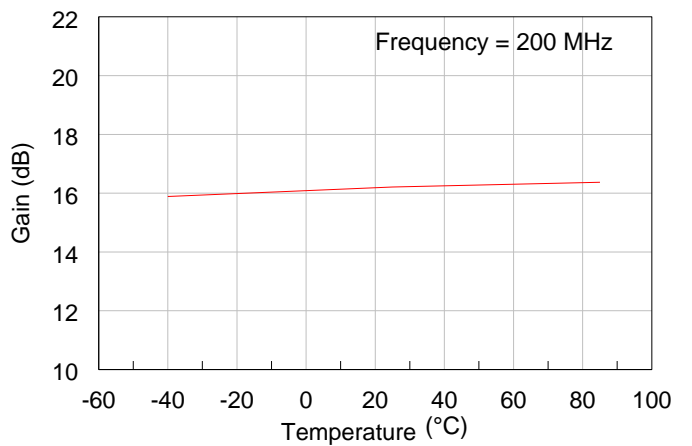
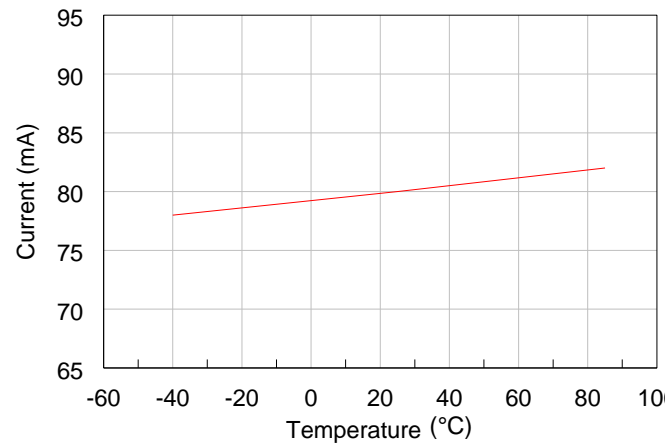
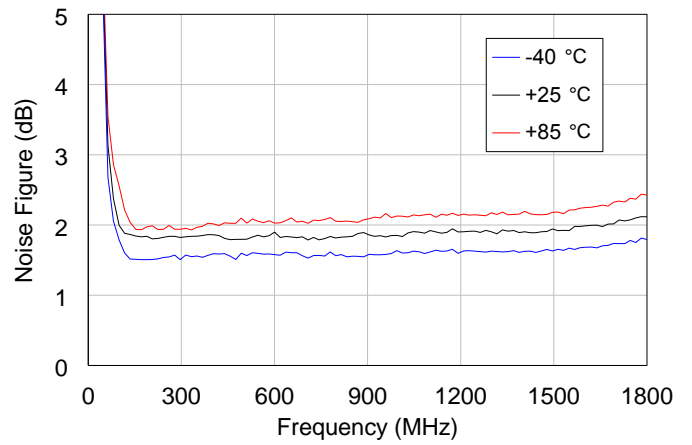
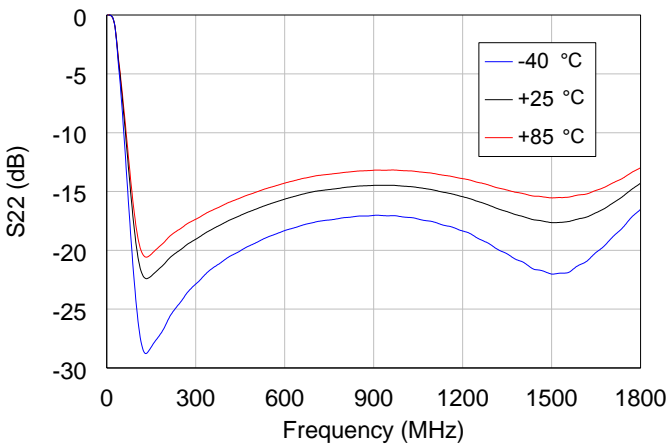
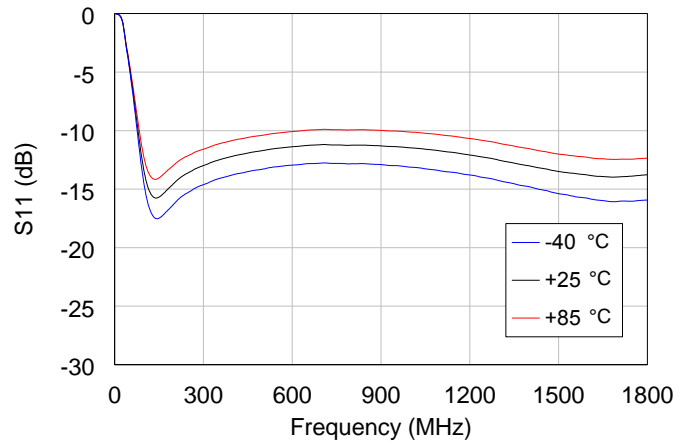
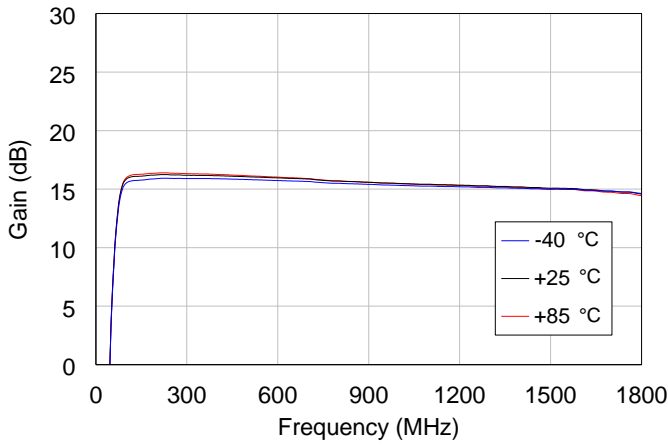
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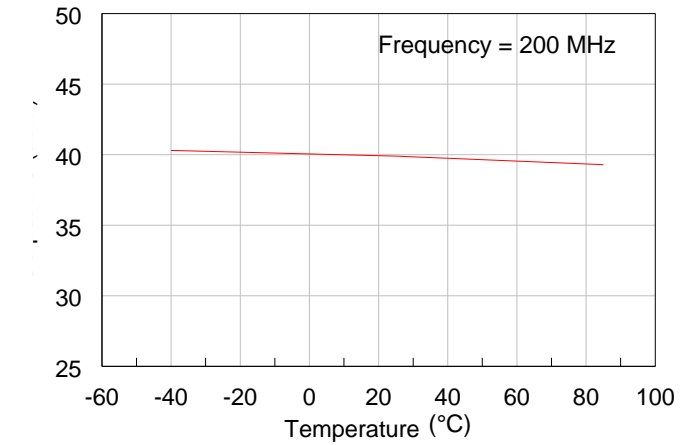
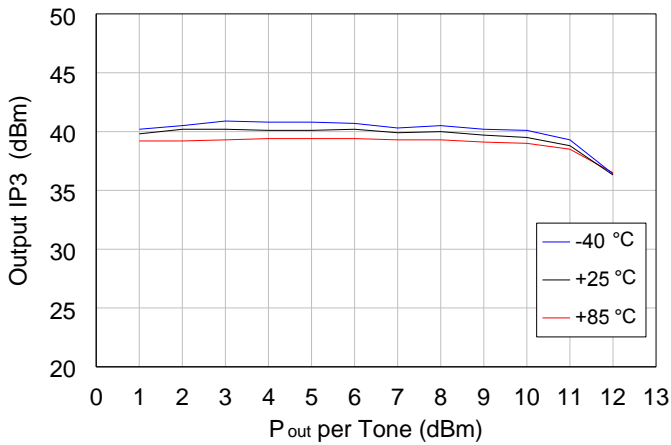
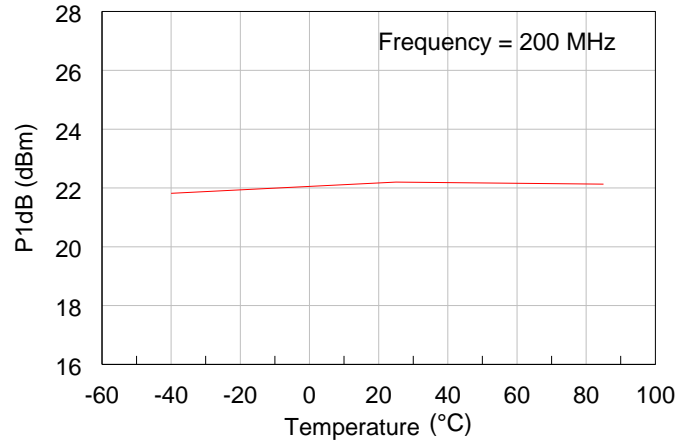
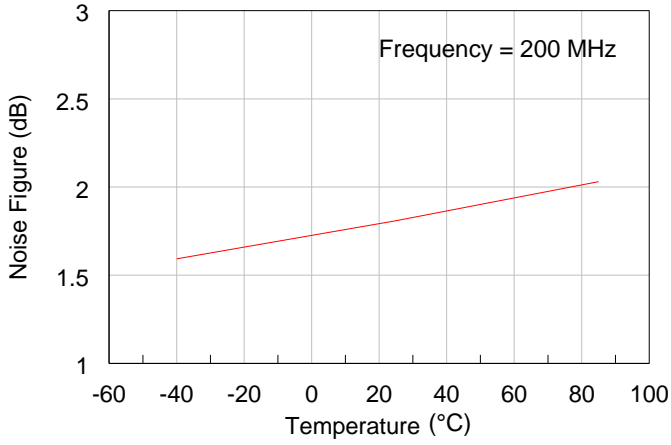
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### 3.3 Plot of S-parameter & Stability Factor

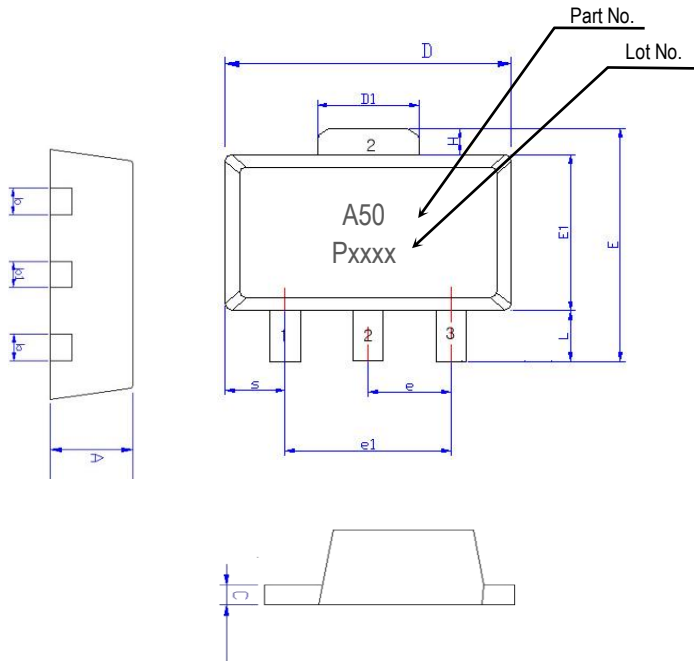


### 3.4 Plot of Performances with Temperature



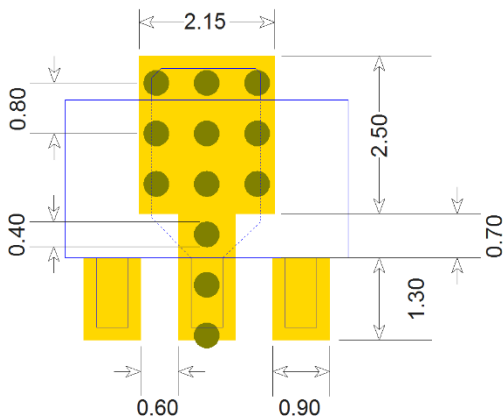


#### 4. Package Outline (SOT89, 4.5x4.0x1.5 mm)



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

#### 5. Surface Mount Recommendation (In mm)

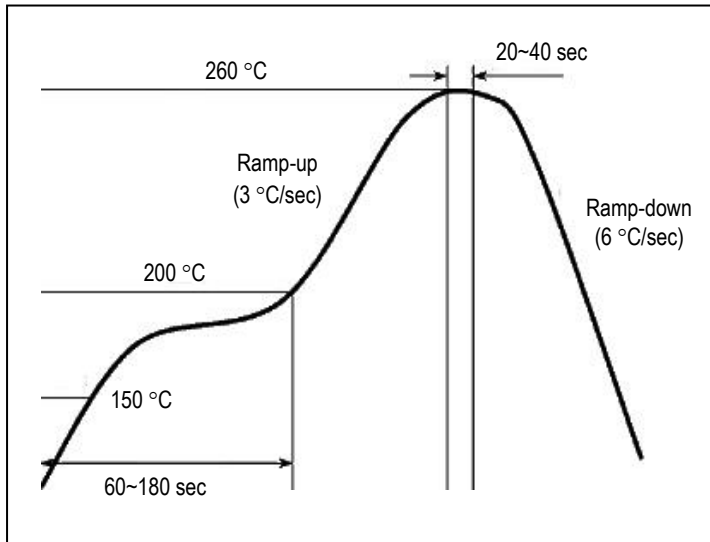


#### NOTE

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



## 6. Recommended Soldering Reflow Profile



*(End of Datasheet)*