

ASL54T8 Data Sheet

High Gain, Low Noise Amplifier

1. Product Overview

1.1 General Description

ASL54T8 is a low noise amplifier with high linearity over a wide range of frequency up to 1.5 ~ 4.0 GHz with S11 & S22 < -10 dB. It is also suitable for use in the mobile wireless systems such as PCS, WCDMA, LTE, WiBro, WiMAX, WLAN and so on. It has an active bias circuit for stable current over temperature and process variation. The amplifier is available in TDFN8 package and passes the stringent DC, RF and reliability tests.

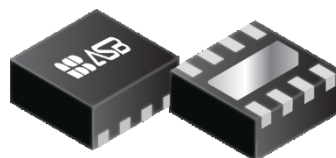
1.2 Features

- 16.5 dB Gain at 2000 MHz
- 37.0 dBm OIP3 at 2000 MHz
- 19.5 dBm OP1dB at 2000 MHz
- 0.7 dB NF at 2000 MHz
- Current adjustable with R2 (in application circuit 3.1)
- MTTF > 100 Years
- Single Supply: +3 ~ +5 V

1.3 Applications

- Low Noise Amplifier for PCS, WCDMA, WLAN, and WiMAX
- Other Low Noise Applications

1.4 Package Profile & RoHS Compliance



TDFN8, 2.0x2.0 mm², surface mount



RoHS-compliant

2. Summary on Product Performances

2.1 Typical Performance

Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$.

Parameter	Typical					Unit
Frequency	1500	1700	1800	2000	2500	MHz
Noise Figure	0.65	0.65	0.65	0.70	0.90	dB
Gain	18.7	17.7	17.2	16.5	14.3	dB
S11	-12.0	-14.0	-15.0	-17.0	-18.0	dB
S22	-10.0	-11.0	-11.0	-12.0	-12.0	dB
Output IP3 ¹⁾	33.0	34.0	35.0	37.0	38.0	dBm
Output P1dB	19.5	19.5	19.5	19.5	19.5	dBm
Current	45					mA
Device Voltage	+5					V

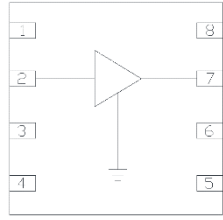
1) OIP3 is measured with two tones at the output power of +4 dBm/tone separated by 1 MHz.

2.2 Product Specification

Supply voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$.

Parameter	Min	Typ	Max	Unit
Frequency		2000		MHz
Noise Figure		0.70		dB
Gain		16.5		dB
S11		-17.0		dB
S22		-12.0		dB
Output IP3		37.0		dBm
Output P1dB		19.5		dBm
Current		45		mA
Device Voltage		+5		V

2.3 Pin Configuration

Pin	Description	Simplified Outline
1	Bias	
2	RF_IN	
7	RF_OUT	
3,4,5,6,8	NC or GND	
Backside paddle	GND	

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	80	°C/W

2.6 ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM	Class 1A	Voltage Level: 400 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.

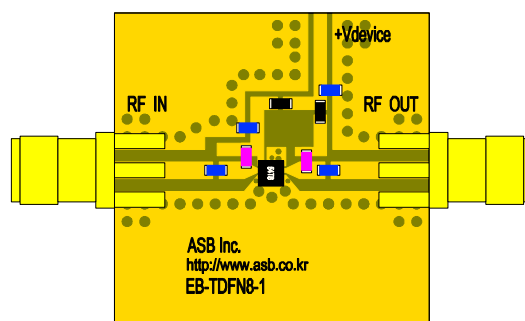
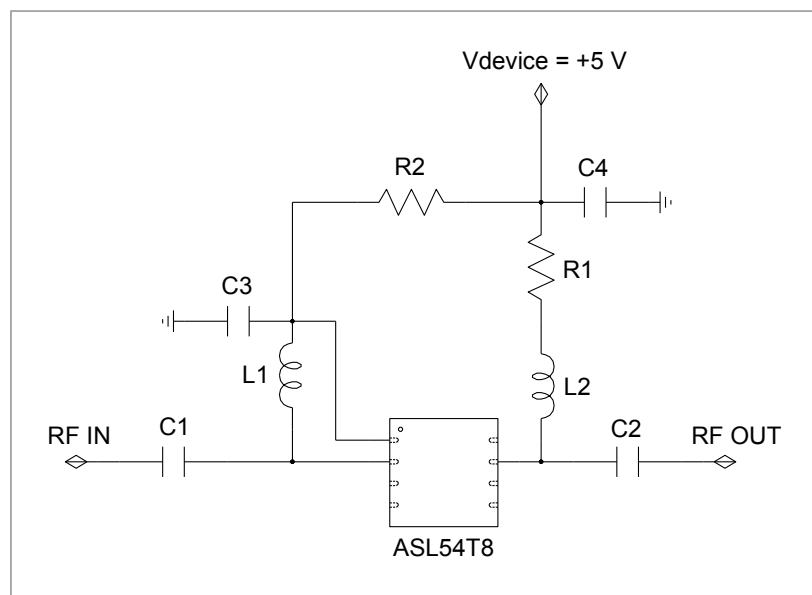
Moisture Sensitivity Level

MSL 3 at 260 °C reflow

(Intentionally Blanked)

3. Application: 1500 ~ 2500 MHz ($V_{\text{supply}} = +5 \text{ V}$)

3.1 Application Circuit & Evaluation Board



PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	25x25
EB No.	EB-TDFN8-1

Bill of Material

Symbol	Value	Size	Description	Manufacturer
ASL54T8	-	-	MMIC Amplifier	ASB
C1, C2	100 pF	0603	DC blocking capacitor	Murata
C3	22 pF	0603	Decoupling capacitor	Murata
C4	1 μF	0603	Decoupling capacitor	Murata
L1	8.2 nH	0603	RF choke inductor	Murata
L2	6.8 nH	0603	RF choke inductor	Murata
R1	4.7 Ω	0603	Bias resistor	Samsung
R2	6.8 k Ω	0603	Current adjust resistor	Samsung

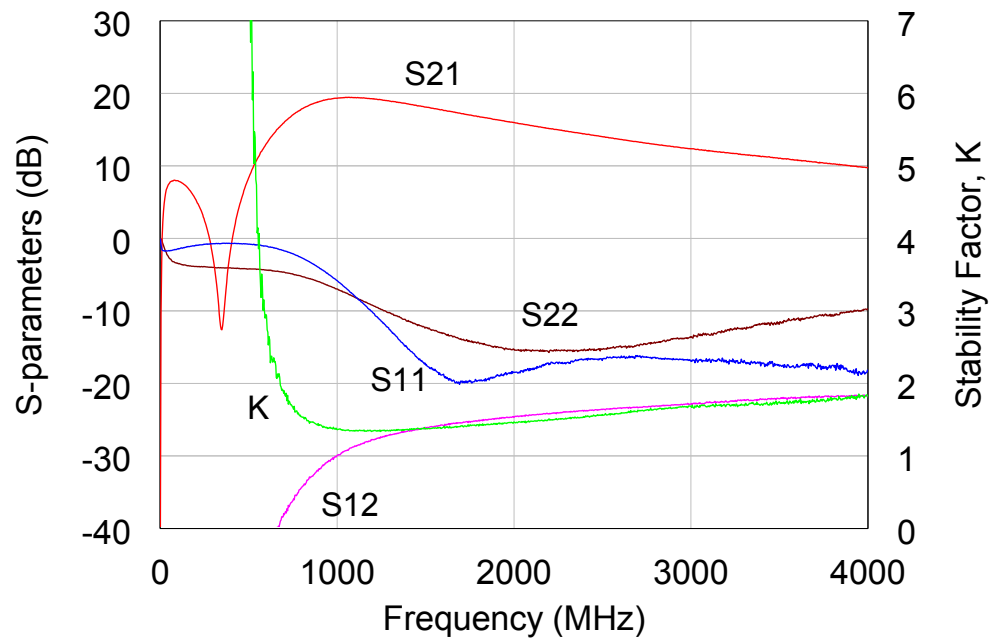
3.2 Performance Table

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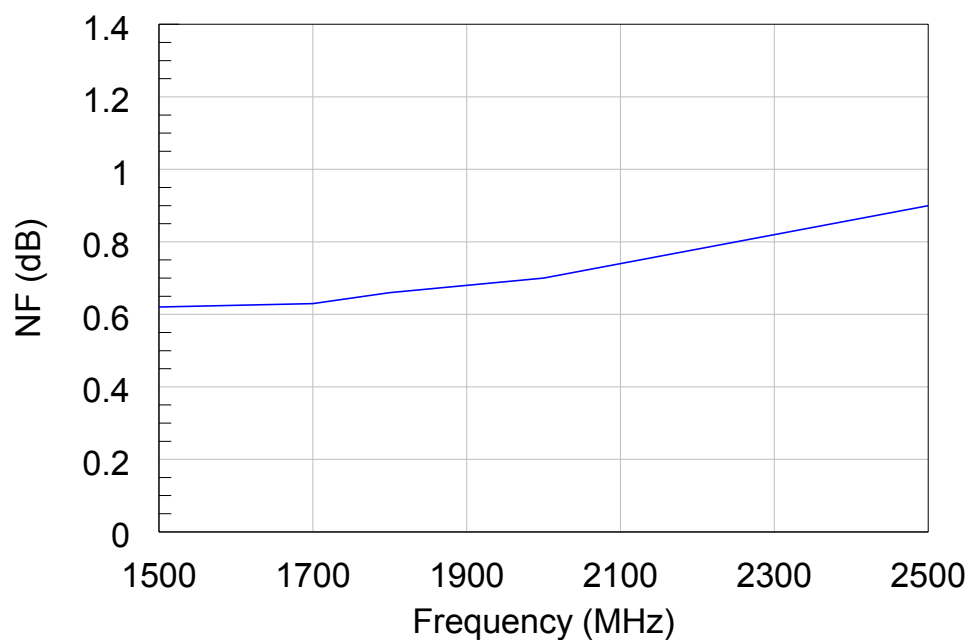
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Output P1dB	19.5	19.5	19.5	19.5	19.5	dBm
Current	45					mA
Device Voltage	+5					V

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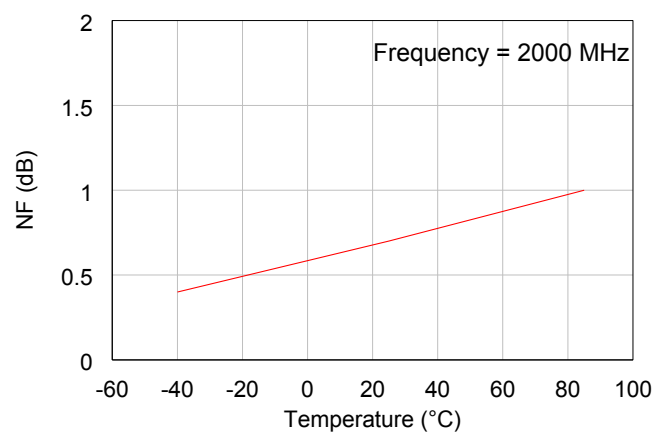
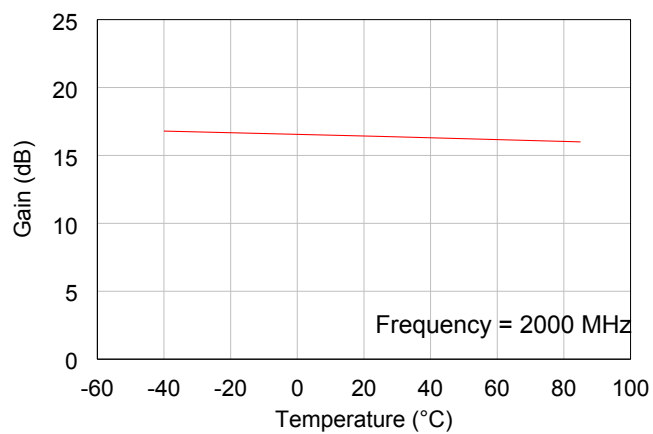
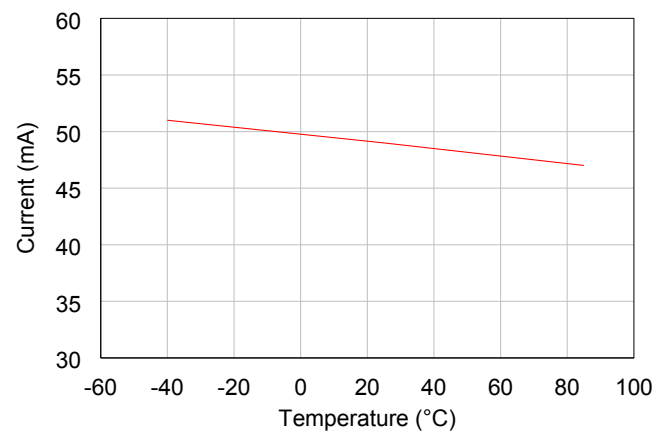
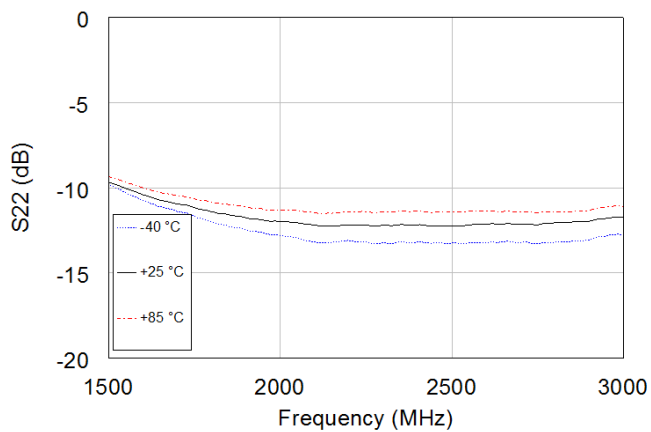
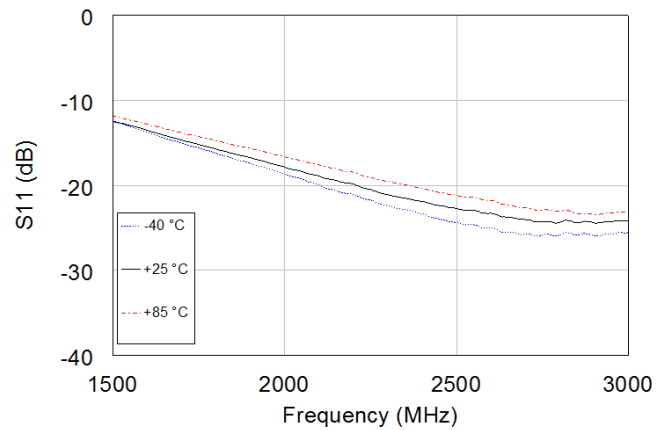
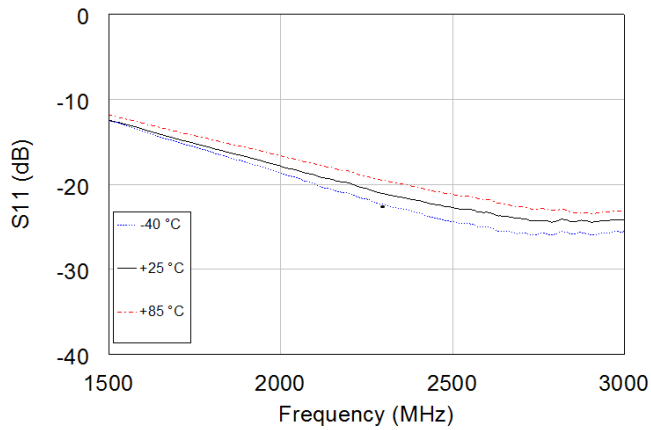
3.3 Plot of S-parameter & Stability Factor

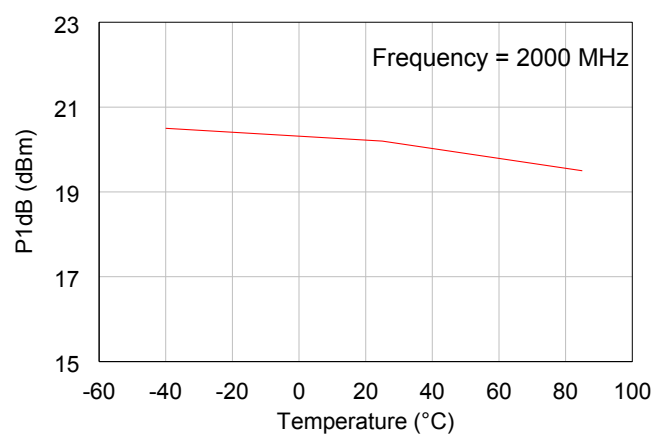
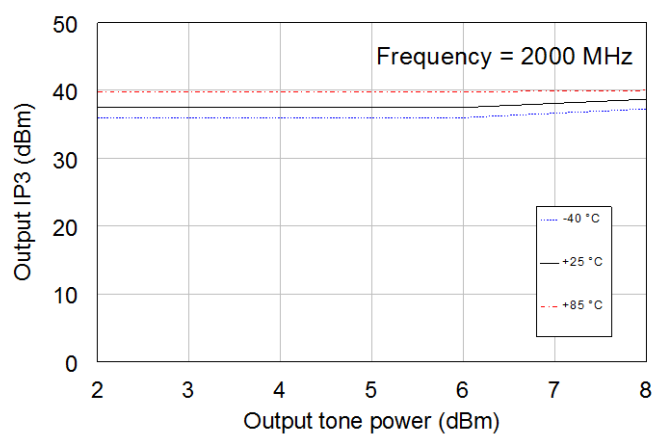


3.4 Plot of Noise Figure



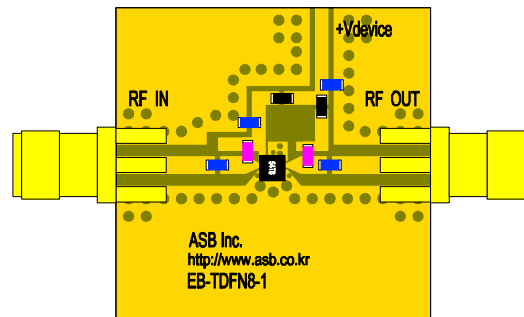
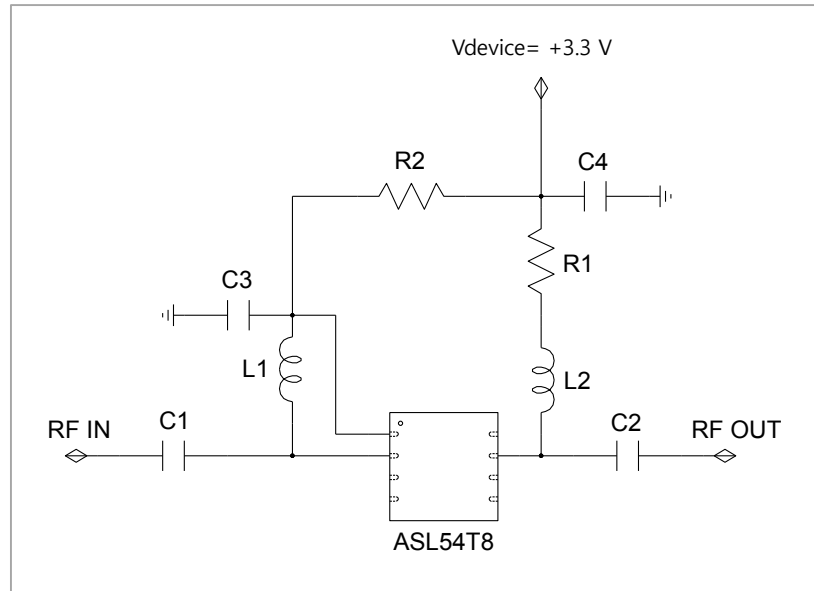
3.5 Plots of Noise Figure and Performances with Temperature





4. Application: 1500 ~ 2500 MHz($V_{\text{supply}} = +3.3 \text{ V}$)

4.1 Application Circuit & Evaluation Board



PCB Information	
Material	FR4
Thickness (mm)	0.8
Size (mm)	25x25
EB No.	EB-TDFN8-1

Bill of Material

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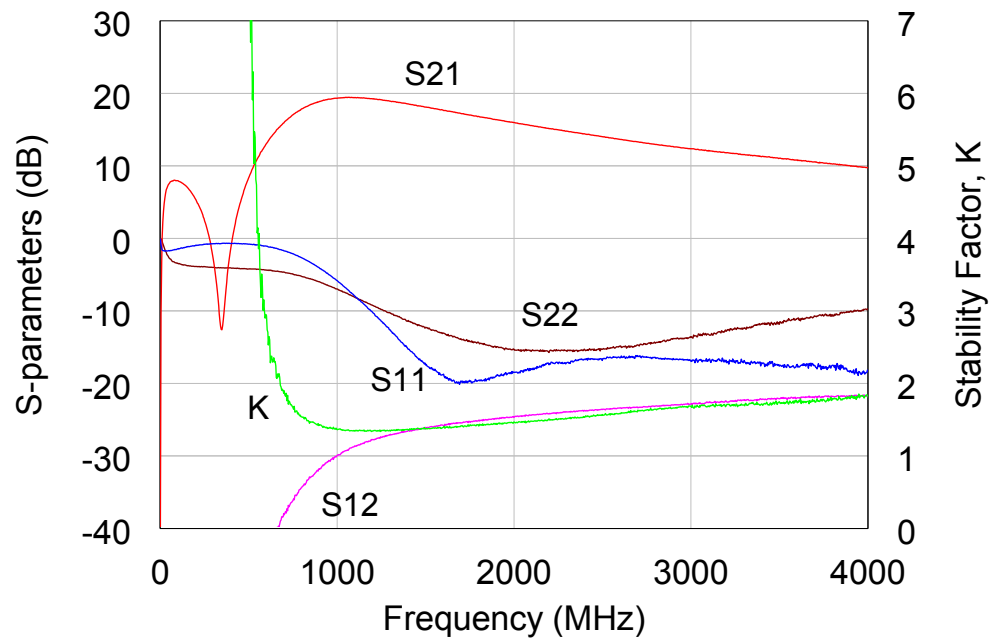
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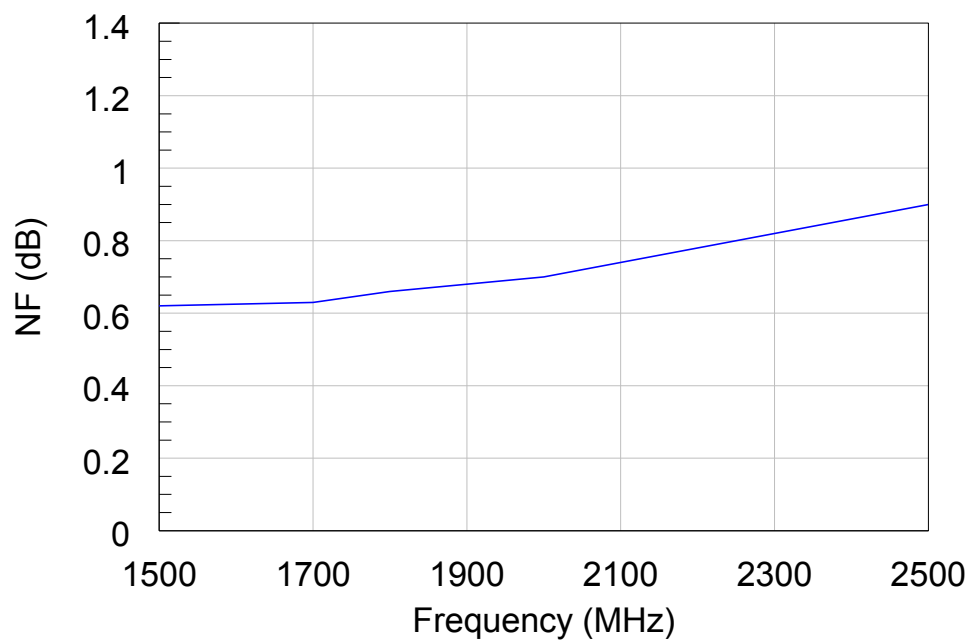
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S22	-10.0	-11.0	-11.0	-12.0	-12.0	dB
Output IP3 ¹⁾	31.0	31.0	32.0	32.0	33.0	dBm
Output P1dB	16.5	16.5	16.5	16.5	16.5	dBm
Current	45					mA
Device Voltage	+3.3					V

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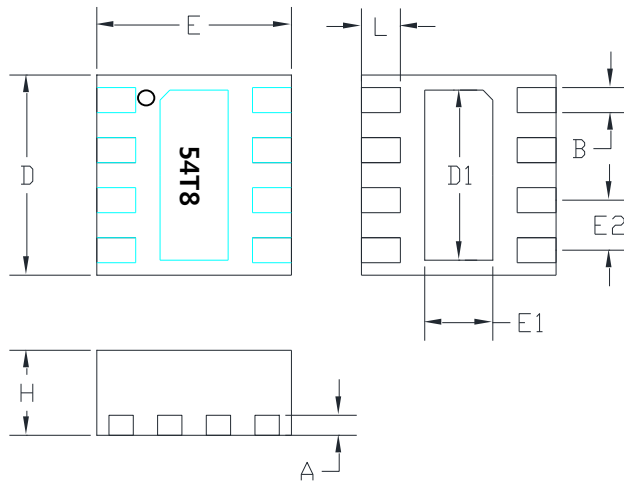
4.3 Plot of S-parameter & Stability Factor



4.4 Plot of Noise Figure

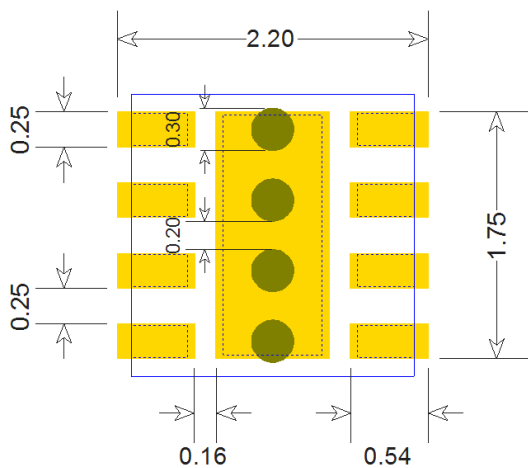


5. Package Outline (TDFN8)



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	-	0.20REF	-
B	0.18	0.23	0.28
D	1.95	2.00	2.03
D1	-	1.7BSC	-
E	1.95	2.00	2.03
E1	-	0.7BSC	-
E2	-	0.5BSC	-
L	0.35	0.40	0.45
H	0.80	0.85	0.90

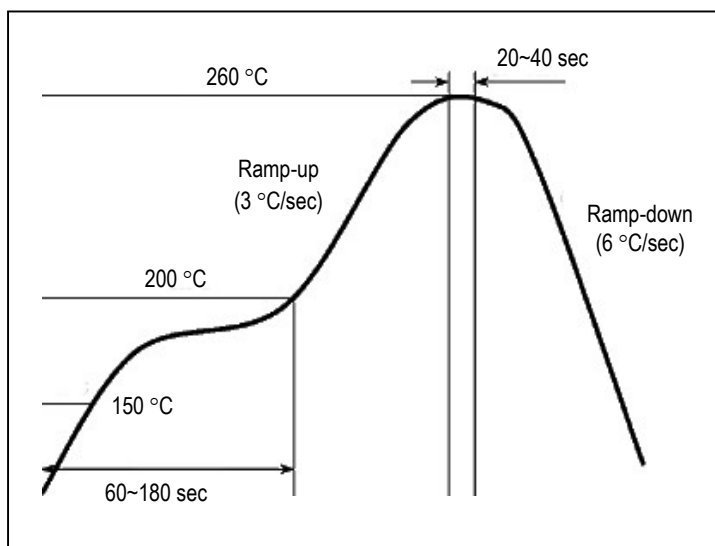
6. Surface Mount Recommendation (In mm)



NOTE

1. Recommended is that the ground via holes be placed on the bottom of 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)