1. Description

- The M7127L is a Bi-Directional Amplifier MMIC integrated amplifier, SPDT switch and digital control circuit, fabricated on GaAs p-HEMT MMIC process in a 5mm×5mm ACLGA package. It operates over 10-15GHz(Rx) and 13-15GHz(Tx), the OP-1dB of Rx is 5dBm with 13dB gain and 3.5dB noise figure, the PSAT of Tx is 23dBm with 24dB gain.



M7127L-PDS-F01

Figure 1. M7127L Package Outline

2. Applications

- TX/RX Modules
- Satellite Communications
- Defense

3. Features

- T_X Frequency Range: 13-15GHz
- T_X Small Signal Gain: 24dB
- T_X S11/S22: -10dB/-12dB
- T_X Saturated Output Power: 23dBm
- T_X Quiescent Current: 120mA
- R_X Frequency Range: 10-15GHz
- R_X Small Signal Gain: 13dB
- R_X S11/S22: -12dB/-10dB
- R_X Noise Figure: 3.5dB
- R_X Output P_{-1dB}: 5dBm
- R_X Quiescent Current: 28mA
- Dimensions: 5.0 x 5.0 x 1.17 mm

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	Data	Unit
T_X Frequency Range	13-15	GHz
T_X Small Signal Gain	24	dB
T_X Saturated Output Power	23	dBm
T_X Quiescent Current	120	mA
R_X Frequency Range	10-15	GHz
R_X Small Signal Gain	13	dB
R_X Noise Figure	3.5	dB
R_X Output P_{-1dB}	5	dBm
R_X Quiescent Current	28	mA

Table of Contents

No.	Contents	Page
1	Description	1
2	Applications	1
3	Features	1
4	Brief Typical Performance	1
5	Recommended Operating Conditions	3
6	RF Characteristics	3
7	Typical Performance Curve	4
8	Package Outline	7
9	Application Circuit	8
10	Recommended Solder Temperature Profile	8
11	Handling Precautions	8
12	Contact Information	9
13	Disclaimer	9

5. Recommended Operating Conditions

Table 2. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Temperature Range	-55	25	85	°C
T_X / R_X Control Voltage, SW	-	0/5	-	V
R_X Supply Voltage, RX_VD	-	5	-	V
T_X Supply Voltage, TX_VD	-	5	-	V

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics[1]

Parameter	Symbol	Min.	Typ.	Max.	Units
T_X Frequency Range	Freq_T_X	13	-	15	GHz
T_X Small Signal Gain	S21_T_X	-	24	-	dB
T_X S11	S11_T_X	-	-10	-	dB
T_X S22	S22_T_X	-	-12	-	dB
T_X Saturated Output Power	P_{SAT}_T_X	-	23	-	dBm
T_X Quiescent Current	I_{DQ}_T_X	-	120	-	mA
R_X Frequency Range	Freq_R_X	10	-	15	GHz
R_X Small Signal Gain	S21_R_X	-	13	-	dB
R_X S11	S11_R_X	-	-12	-	dB
R_X S22	S22_R_X	-	-10	-	dB
R_X Noise Figure	NF	-	3.5	-	dB
R_X Output P_{-1dB}	OP_{-1dB}_R_X	-	5	-	dBm
R_X Quiescent Current	I_{DQ}_R_X	-	28	-	mA

[1]. Test condition: Input signal CW

7. Typical Performance Curve

■ Small-signal Characteristics Curve

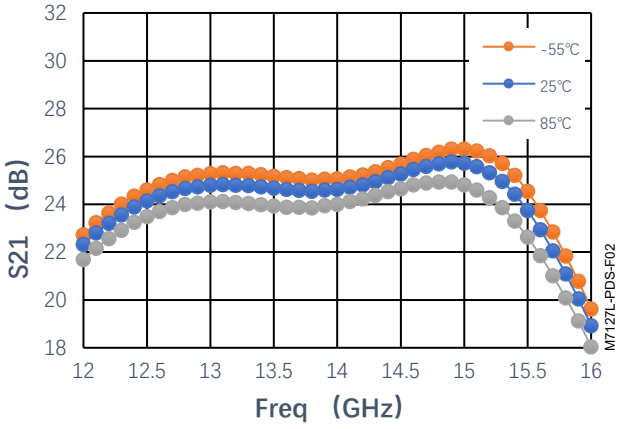


Figure 2. T_X Small-signal Gain Characteristics

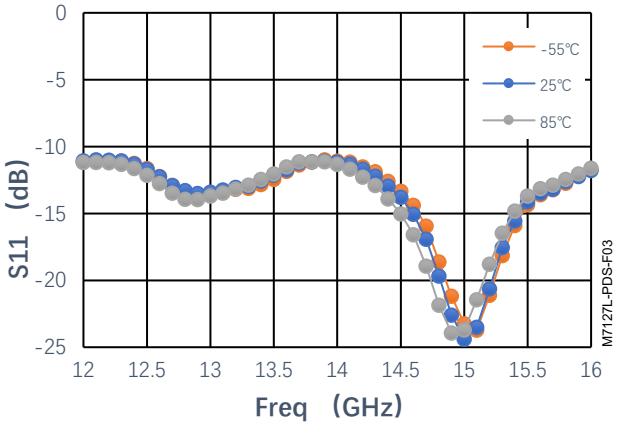


Figure 3. T_X Small-signal S11 Characteristics

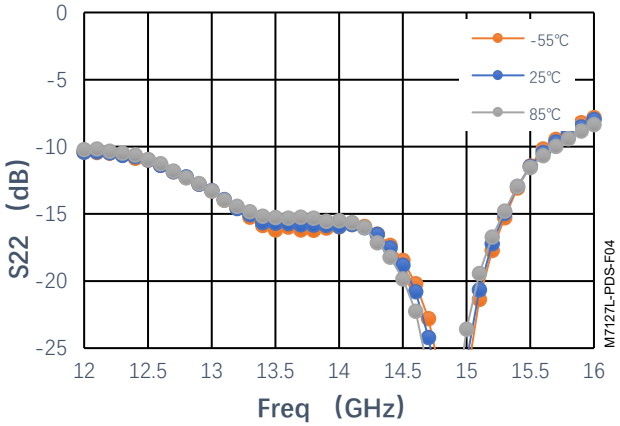


Figure 4. T_X Small-signal S22 Characteristics

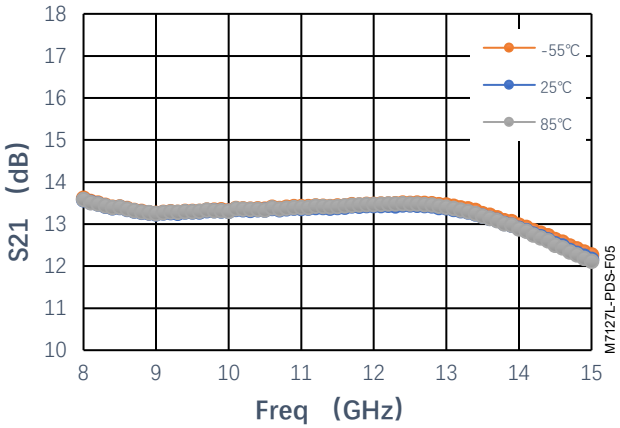


Figure 5. R_X Small-signal Gain Characteristics

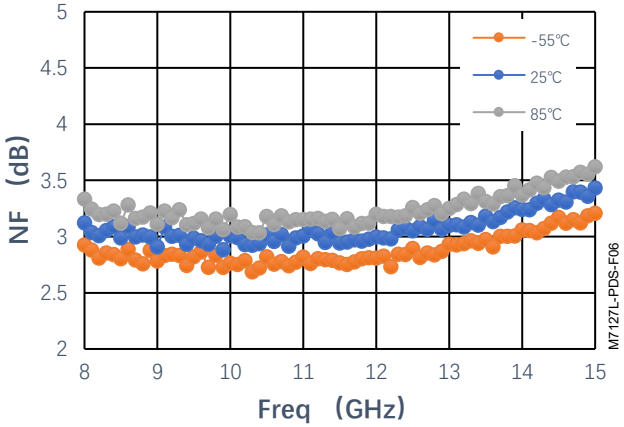


Figure 6. R_X Noise Figure Characteristics

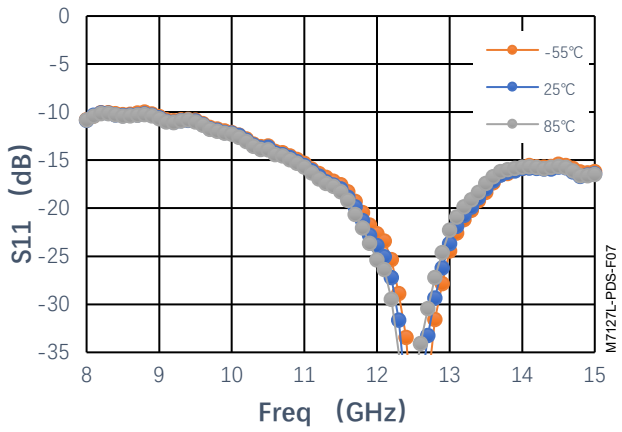


Figure 7. R_X Small-signal S11 Characteristics

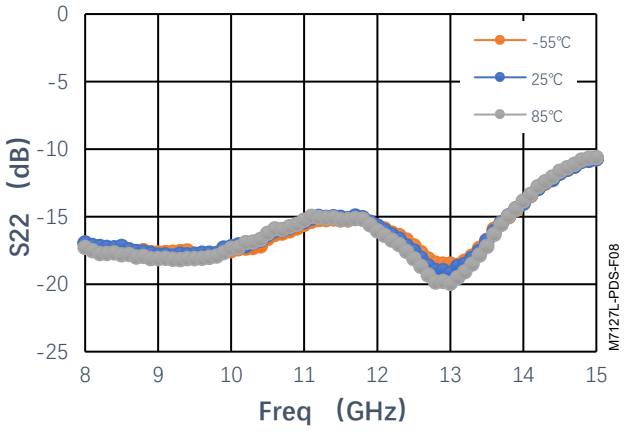


Figure 8. R_X Small-signal S22 Characteristics

■ Power Characteristic Curve

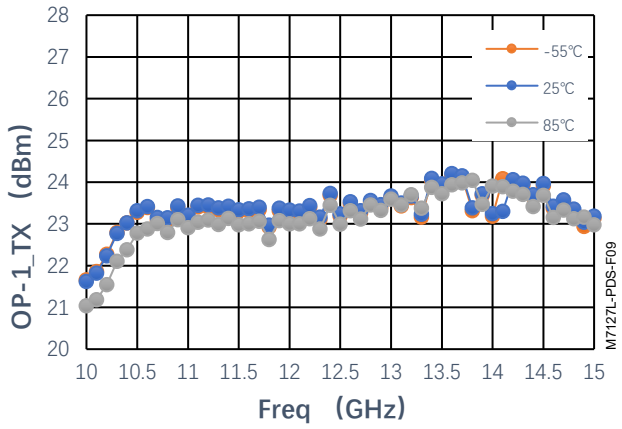


Figure 9. T_X P_{SAT} Characteristics

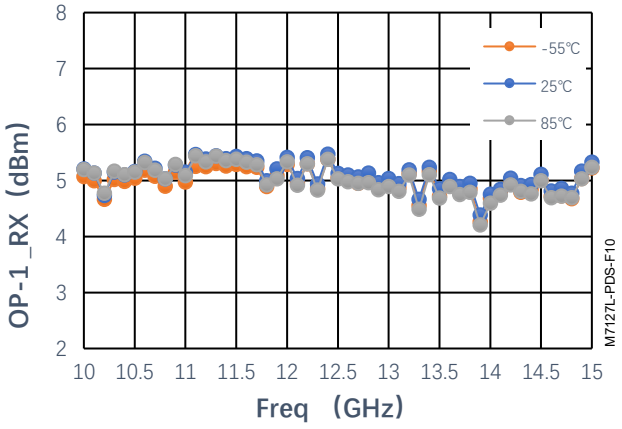
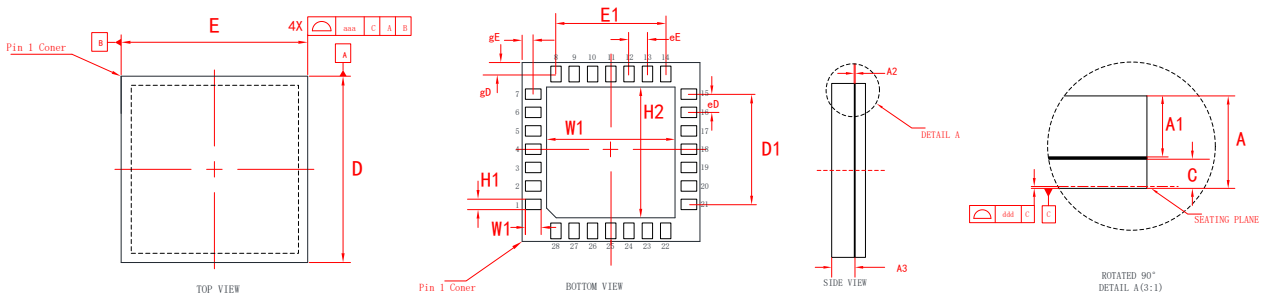


Figure 10. R_X OP_{-1dB} Characteristics

8. Package Outline



Item		Symbol	Common Dimensions		
			MIN.	NOM.	MAX.
Body Size	X	E	4.900	5.000	5.100
	Y	D	4.900	5.000	5.100
Land Pitch	X	eE		0.500	
	Y	eD		0.500	
Total Thickness		A	1.070	1.170	1.270
Substrate Thickness		C	0.295	0.330	0.365
Holder Height		A1	0.770	0.800	0.830
Glue Thickness		A2		0.040TYP	
Top of PKG to Substrate		A3		0.840TYP	
Land Size	X	W1	0.350	0.400	0.450
	Y	H1	0.200	0.250	0.300
	X	W2	3.400	3.500	3.600
	Y	H2	3.400	3.500	3.600
Package Edge Tolerance		aaa		0.100	
Coplanarity		ddd		0.100	
Land Count		n		29	
Edge Land Center to Center	X	E1		3.000	
	Y	D1		3.000	
Edge Land Center to Package Edge	X	gE		0.300	
	Y	gD		0.300	

- Dimensions shown in micrometre

M7127L-PDS-F11

Figure 11. M7127L Outline Dimensions

9. Application Circuit

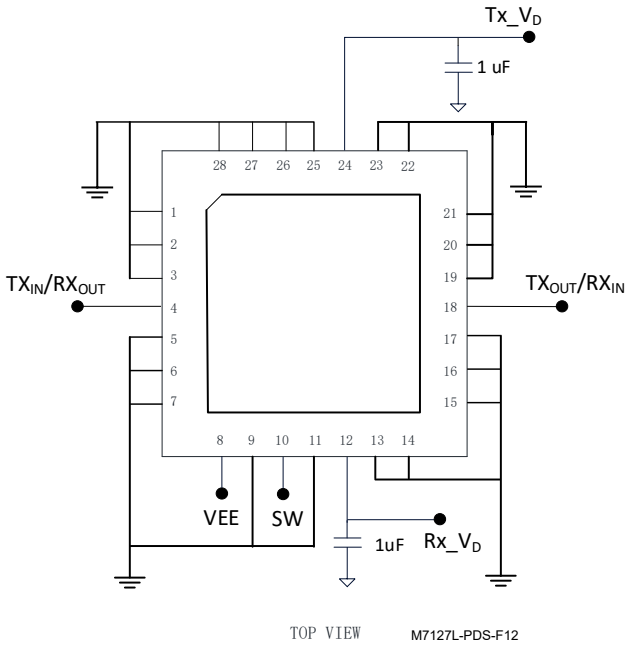


Figure 12. M7127L Application Circuit

Table 4. PIN Description

Pin	Symbol	Description
4	TX_{IN}/RX_{OUT}	T_X Input / R_X Output
18	TX_{OUT}/RX_{IN}	T_X Output / R_X Input
8	VEE	Supply Voltage
10	SW	T_X / R_X Control Voltage
12	$R_X_V_D$	R_X Supply Voltage
24	$T_X_V_D$	T_X Supply Voltage
1,2,3,5,6,7,9,11,13,14,15,16,17, 19,20,21,22,23,25,26,27,28	N/C	-

Table 5. Truth Table

VEE	SW	VT	VR	Channel Selection
-5	5	5	0	T_X Channel
-5	0	0	5	R_X Channel

10. Recommended Solder Temperature Profile

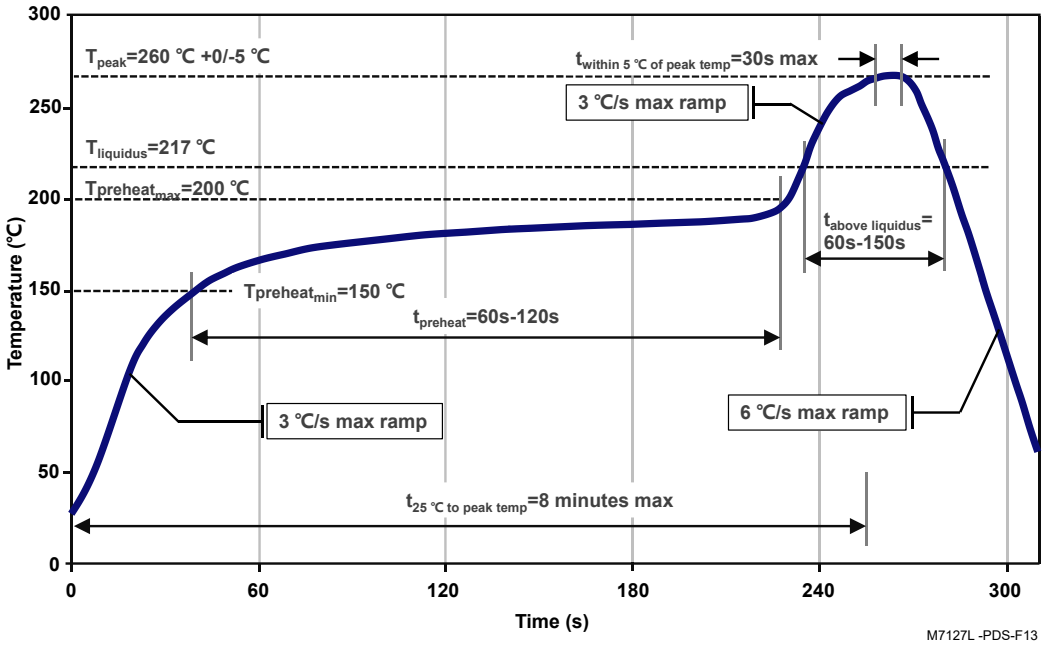


Figure 13. Recommended Solder Temperature Profile

11. Handling Precautions

- **Storage**
  All bare dies ship in either Waffle or Gel Pak, which is an ESD protective container, and then sealed in an ESD protective bag. After opening the sealed ESD protective bag, all dies must be stored in a dry nitrogen environment.
- **Cleanliness**
  Handle the dies in a clean environment. Never use liquid cleaning systems to clean the dies.
- **ESD Caution**
  ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore proper ESD precautions should be taken to avoid performance degradation or loss of functionality.



12. Contact Information

For the latest specifications, additional product information, technical support and sales support, please contact:

- **Email:** RF.support@raytrontek.com
- **Web:** www.raytrontek.com

13. Disclaimer

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