1. Description

- The M5302Q is a 48dBm ($IP_{-0.3dB}$) wideband SPDT switch fabricated on GaN HEMT MMIC process in a 5mm x 5mm QFN package. It operates over 5-13GHz with -28V or -40V control voltage.



M5302Q-PDS-F01

Figure 1. M5302Q Package Outline

2. Applications

- TX/RX Modules
- Phased Array Radar System

3. Features[1]

- Frequency Range: 5-13GHz
- Insertion Loss: 1.0dB
- Isolation: 40dB
- Input/Output Return Loss: -12dB
- Input/Output Impedance: 50ohm
- Package Size: 5 x 5 x 0.75mm

[1.] EVB Test

4. Brief Typical Performance

Table 1. Brief Typical Performance

Parameter	5-13GHz	Units
Insertion Loss	1.0	dB
Isolation	40	dB
Input Return Loss	-12	dB
Output Return Loss	-12	dB
Input Power for 0.3dB Compression	48	dBm

Test condition: Input signal Pulsed, Pulse width = 1ms, Duty cycle = 20%

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5. Recommended Operating Conditions

Table 2. Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating Temperature Range	-55	25	125	°C
Control Voltage，VC1/VC2	-	0/-28 or 0/-40V	-	V

6. RF Characteristics (T_C = 25˚C)

Table 3. RF Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Insertion Loss	IL	0.8	1.0	1.5	dB
Isolation	ISO	-	40	-	dB
Input/Output Return Loss	RL_{IN}/ RL_{OUT}	-	-12	-	dB
Input Power for 0.3dB Compression	$IP_{-0.3dB}$	-	48	-	dBm

Test condition: Input signal Pulsed, Pulse width = 1ms, Duty cycle = 20%

7. Typical Performance Curve

■ Small-signal Characteristics Curve

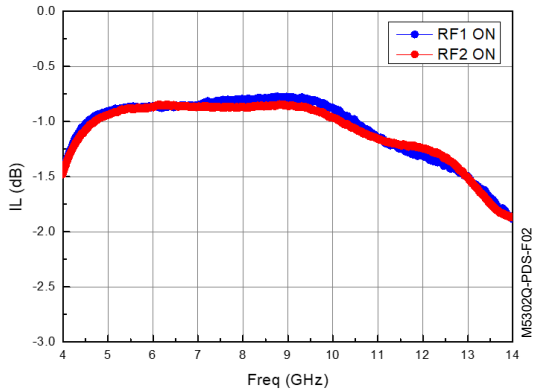


Figure 2. Insertion Loss Characteristics

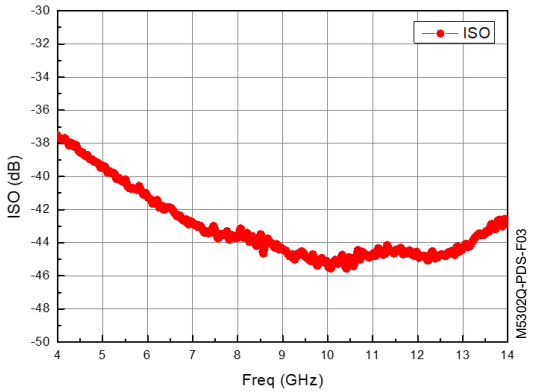


Figure 3. Isolation Characteristics

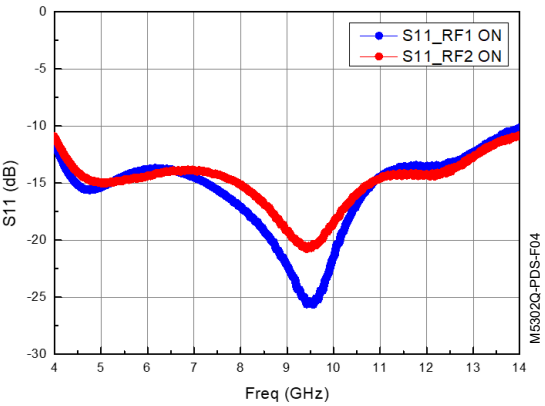


Figure 4. Input Return Loss Characteristics

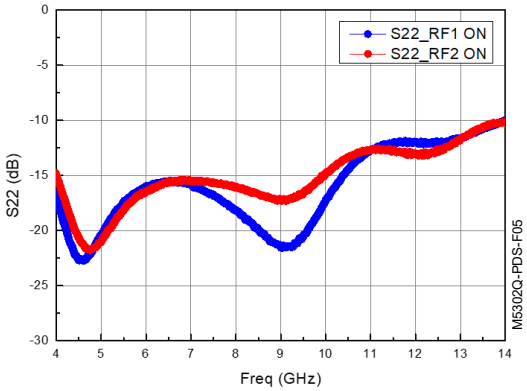


Figure 5. Output Return Loss Characteristics

■ Power Characteristics Curve （Pulse width = 1ms, Duty cycle = 20%）

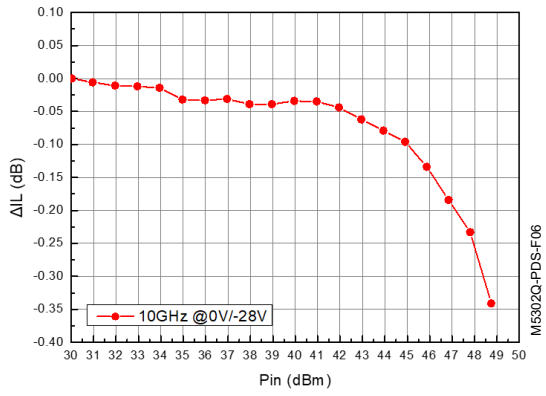


Figure 6. Delta IL vs. P_{in} Characteristics

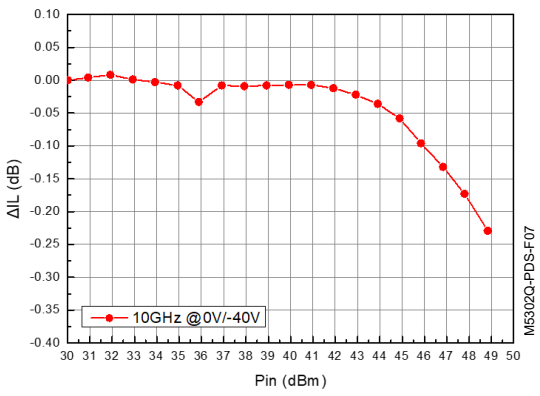


Figure 7. Delta IL vs. P_{in} Characteristics

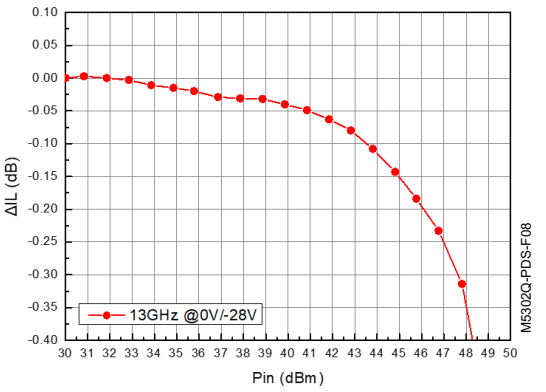


Figure 8. Delta IL vs. P_{in} Characteristics

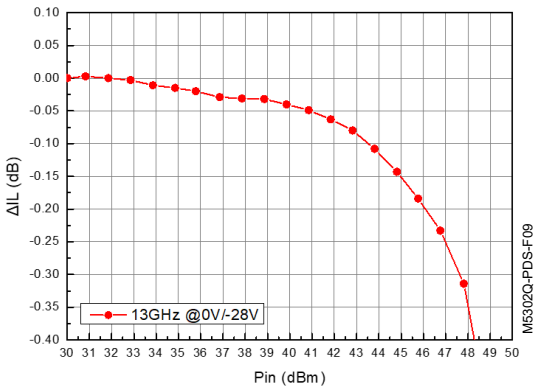
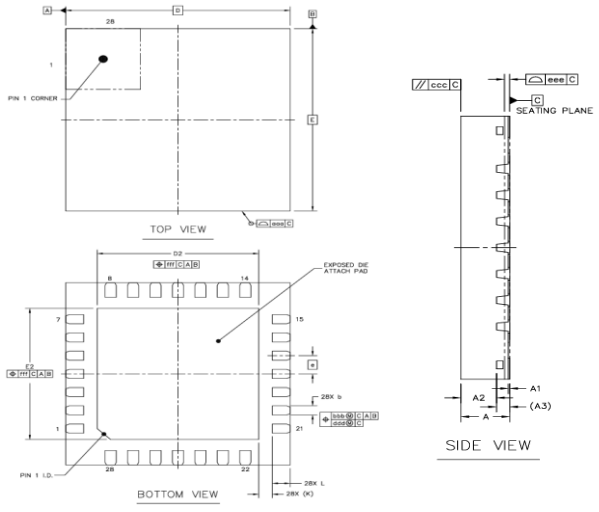


Figure 9. Delta IL vs. P_{in} Characteristics

8. Package Outline



		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.7	0.75	0.8
STAND OFF		A1	0	0.02	0.05
MOLD THICKNESS		A2	---	0.55	---
L/F THICKNESS		A3		0.203 REF	
LEAD WIDTH		b	0.2	0.25	0.3
BODY SIZE	X	D		5 BSC	
	Y	E		5 BSC	
LEAD PITCH		e		0.5 BSC	
EP SIZE	X	D2	3.5	3.6	3.7
	Y	E2	3.5	3.6	3.7
LEAD LENGTH		L	0.3	0.4	0.5
LEAD TIP TO EXPOSED PAD EDGE		K		0.3 REF	
PACKAGE EDGE TOLERANCE		aaa		0.1	
MOLD FLATNESS		ccc		0.1	
COPLANARITY		eee		0.08	
LEAD OFFSET		bbb		0.1	
		ddd		0.05	
EXPOSED PAD OFFSET		fff		0.1	

M5302Q-PDS-F010

Figure 10. M5302Q Outline Dimensions

Table 4. Package Outline Dimensions(mm)

D Body Size X	E Body Size Y	A Total Thickness	D2 EP Size X	E2 EP Size Y	L Lead Length	B Lead Width	E Lead Pitch
5	5	0.75	3.6	3.6	0.4	0.25	0.5

Table 5. PIN Description

PIN	Symbol	Description
12 / 14 / 17 / 19 / 22 / 24	GND	RF Ground
18	RFC	RF Input
23	RF1	RF Output 1
13	RF2	RF Output 2
2	VC1	Control Voltage
3	VC2	Control Voltage

9. Application Circuit

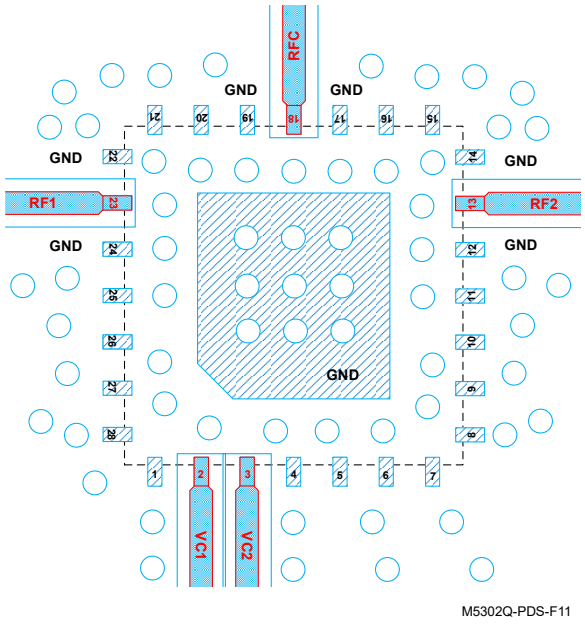


Figure 11. M5302Q Application Diagram

Table 6. Truth Table

VC1	VC2	RFC to RF1	RFC to RF2
-28V/-40V	0V	ON	OFF
0V	-28V/-40V	OFF	ON

10. Recommended Solder Temperature Profile

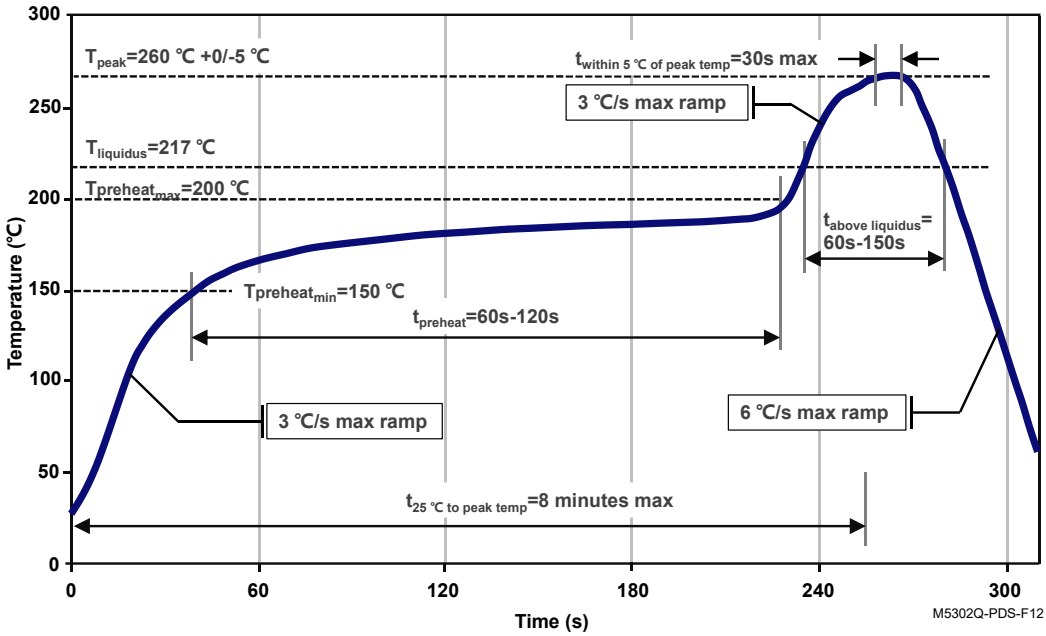


Figure 12. Recommended Solder Temperature Profile

11. Handling Precautions

- **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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