Product Specification

RS1185 High Power SP8T

General Description

The RS1185 is a SP8T ,high power, RF reflective switch ,supporting wireless applications up to 2 GHz. It offers maximum power handling of 42 dBm continuous wave (CW). It delivers high linearity and excellent harmonics performance. No blocking capacitors are required if DC voltage is not present on the RF ports.

Applications

- Wireless infrastructure
- Military and high reliability applications
- Test equipment
- Pin diode replacement
- Land Mobile Radio

Features

- Low insertion loss: 0.45 dB typical to 1 GHz
- High linearity: -78dBc harmonics at 42dBm input power
- High power handling at T_{CASE} = 85°C, VDD= 5.0V
  - CW power: 42 dBm
  - Peak power: 45.5 dBm
- High ESD
  - 2kV HBM on all pins
- Single positive supply: 5 V
- Logic select pin provides maximum control logic flexibility
- Positive control, CMOS/TTL compatible
- 32-leads, 5 mm × 5 mm QFN package

Functional Block Diagram

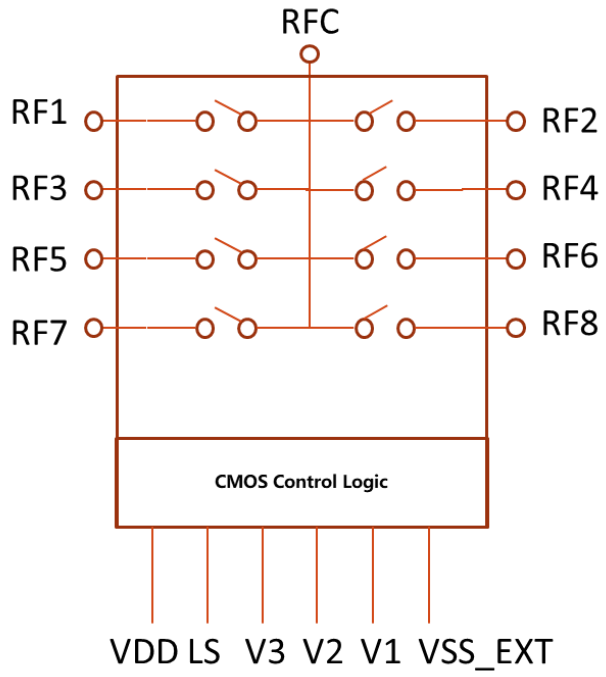


Figure 1

RFone Technology, Inc. www.rfonetech.com All Right Reserved

Absolute Maximum Ratings

Table 1

Parameter	Min	Max	Units
VDD to GND	-0.3	5.5	V
VCTRL to GND	-0.3	5.5	V
VSS_EXT	-3.6	0	V
Maximum Junction Temperature		120	°C
Storage Temperature Range	-65	150	°C
Lead Temperature (soldering, 10s)		260	°C
ESD Voltage– HBM (Per JESD22-A114)		Class 2 (2000V)	
ESD Voltage – CDM (Per JESD22-C101)		Class IV (500V)	

Stresses above those listed above may cause permanent damage to the device. Functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Recommended Operating Conditions

Table 2

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage		3		5.25	V
VSS_EXT***		-3.6		-3.2***	
Operating Temp Range	Case Temperature	-40		85	°C
RF Frequency Range		30		2000	MHz
Input CW Power, TX mode	800MHz, VDD=5.0V			42	dBm
Input pulse Power, TX mode	800MHz,10%Pulse Signal(500us-50us),VDD=5.0V			45	dBm

*Note:****If better spur performance is required, an external negative voltage is recommended to be applied on VSS_EXT pin. Otherwise, VSS_EXT should be connected to ground*

Operation should be restricted to the limits in the Recommended Operating Conditions table. Operation between operating range maximum and absolute maximum for extended periods may reduce reliability.

 All Rights Reserved

Specification

Typical Application Circuit without matching, Normal mode (VDD=5.0V, Vss=0V), TC = +25°C, FRF = 1000MHz, Input power = 0dBm per tone unless otherwise stated. PCB board trace and connector losses are de-embedded unless otherwise noted.

Table 3

Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	30MHz		0.25		dB
	700MHz		0.35		
	2000MHz		0.65		
RFX - RFX Isolation	30MHz		65		dB
	700MHz		40		
	2000MHz		30		
ANT - RFX Isolation	30MHz		65		dB
	700MHz		40		
	2000MHz		35		
Return Loss (RFC)	30MHz – 700MHz		-30		dB
Return Loss (RFX)	30MHz – 700MHz		-30		dB
Input 0.1dB Compression	800MHz		46		dBm
Input IP2	750MHz@30dBm		136		dBm
Input IP3	750MHz@30dBm		78		dBm
2nd and 3rd Harmonic (50ohm load)	43dBm input power @ 700MHz		-78		dBc
Switching Time	50% CTRL to 90% RF		4		us
	50% CTRL to 10% RF		4		
Logic Input High Threshold		1.4		5	V
Logic Input Low Threshold		-0.3		0.6	V
Logic Current	For each control pin		7		μA
DC Current (VDD)	3.3V Logic		85		μA

 All Rights Reserved

Pin Diagram

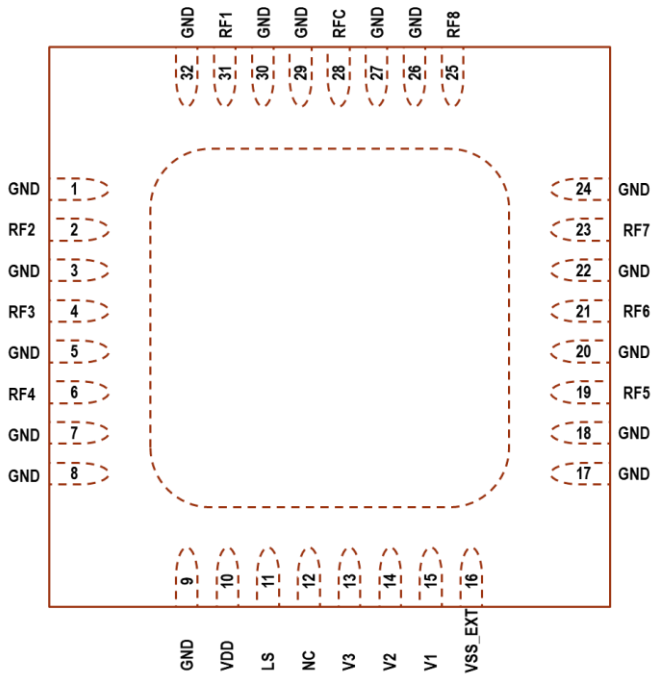


Figure 2

Pin Description

Table 4

Pin No.	Label	Description
1, 3, 5, 7,8, 9, 17,18, 20, 22, 24, 26, 27, 29, 30, 32, EPAD	GND	Ground.
31	RF1	Transmit pin 1
2	RF2	Transmit pin 2
4	RF3	Transmit pin 3
6	RF4	Transmit pin 4
19	RF5	Transmit pin 5
21	RF6	Transmit pin 6
23	RF7	Transmit pin 7
25	RF8	Transmit pin 8
28	RFC	RF common port
10	VDD	Positive power supply voltage.
11	LS	Logic select. Invert logic table when pull high
12	NC	NC, or pull up to VDD by a 10kohm resistance
13	V3	Digital control logic input 3
14	V2	Digital control logic input 2
15	V1	Digital control logic input 1
16****	VSS_EXT****	external VSS negative voltage

*Note:****If better spur performance is required, an external negative voltage is recommended to be applied on VSS_EXT pin. Otherwise, VSS_EXT should be connected to ground*

Control Logic

Table 5

LS	V3	V2	V1	Path
0	0	0	0	RF1
0	0	0	1	RF2
0	0	1	0	RF3
0	0	1	1	RF4
0	1	0	0	RF5
0	1	0	1	RF6
0	1	1	0	RF7
0	1	1	1	RF8
LS	**V3**	**V2**	**V1**	**Path**
1	0	0	0	RF8
1	0	0	1	RF7
1	0	1	0	RF6
1	0	1	1	RF5
1	1	0	0	RF4
1	1	0	1	RF3
1	1	1	0	RF2
1	1	1	1	RF1

Application Information

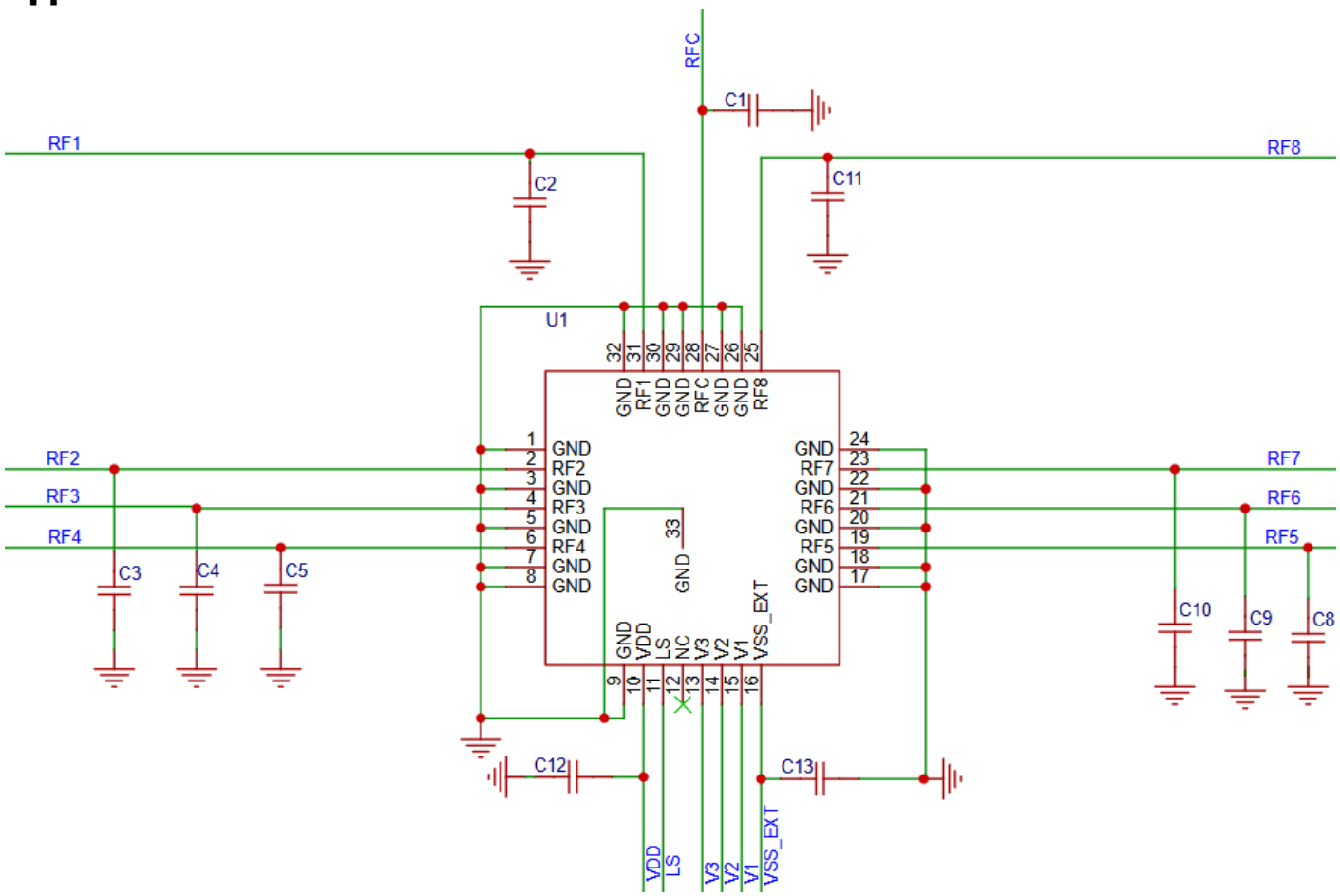


Figure 3

Table 6

Reference Designator	Value	Description
C1,C2,C3,C4,C5,C8,C9,C10,C11,C12,C13	NC	C0402
U1	RS1185	QFN 5*5

Typical Performance Characteristics

Figure 4 Insertion Loss

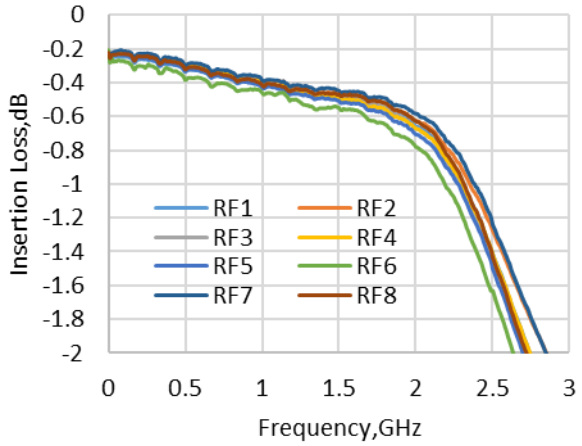


Figure 5 Return Loss

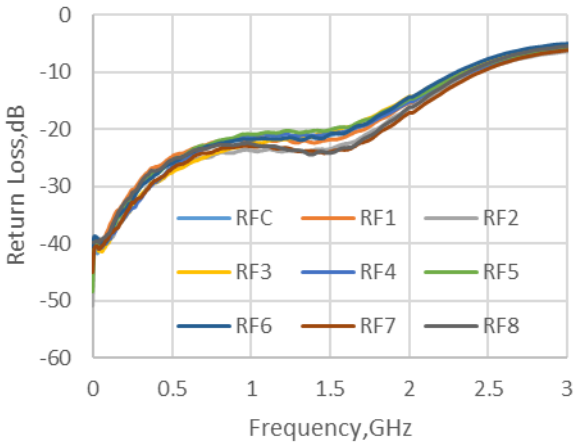


Figure 6 RFC-RFX Isolation

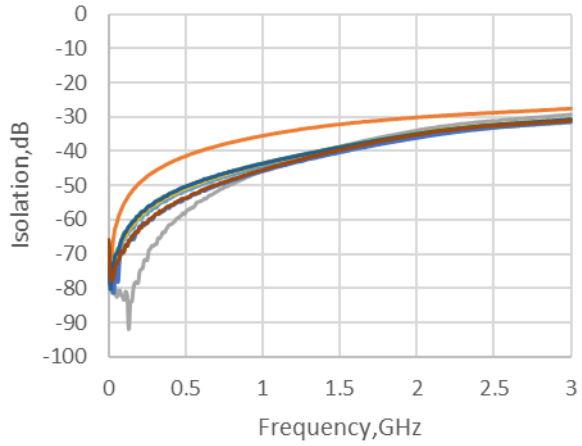


Figure 7 RFX-RFX Isolation

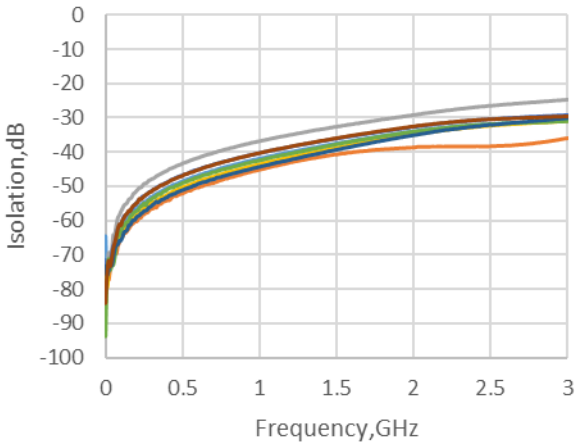


Figure 8 RF1 Insertion Loss

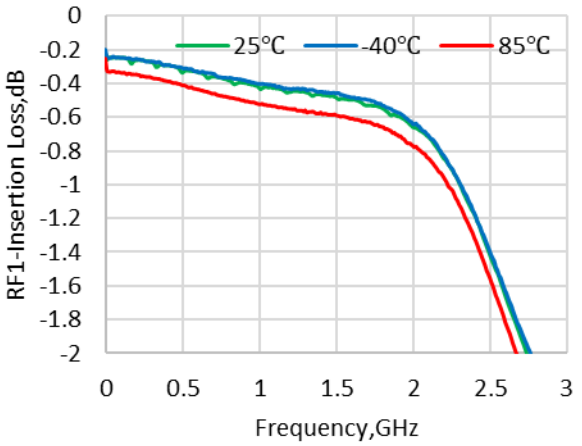
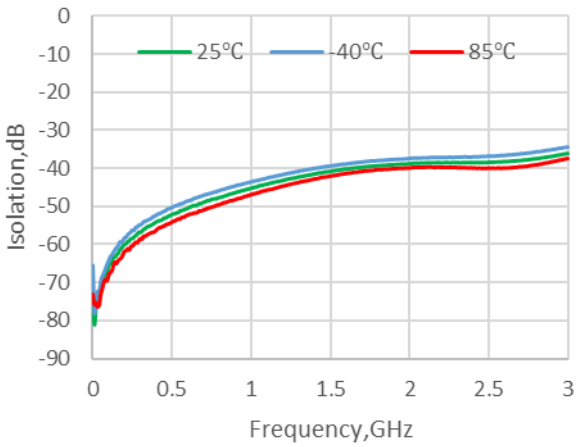
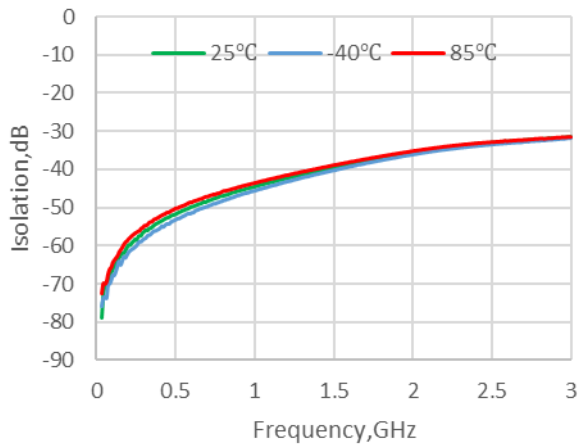


Figure 9 RF2-RF1 Isolation



Typical Performance Characteristics

Figure 10 RFC-RF2 Isolation



Spur in Noise Floor

VDD =5.0V, VSS_EXT=0V@25℃

Figure 11 Spur in noisefloor@0-100MHz

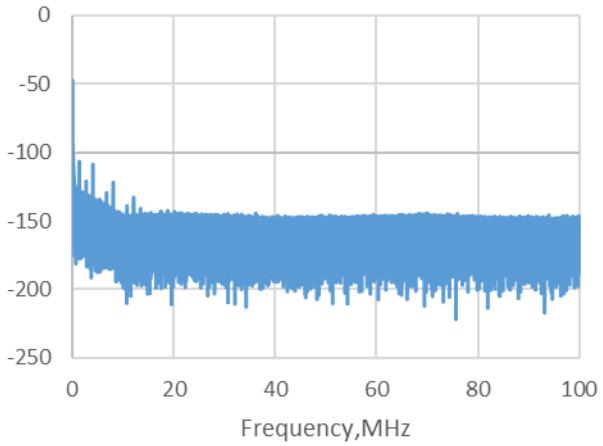
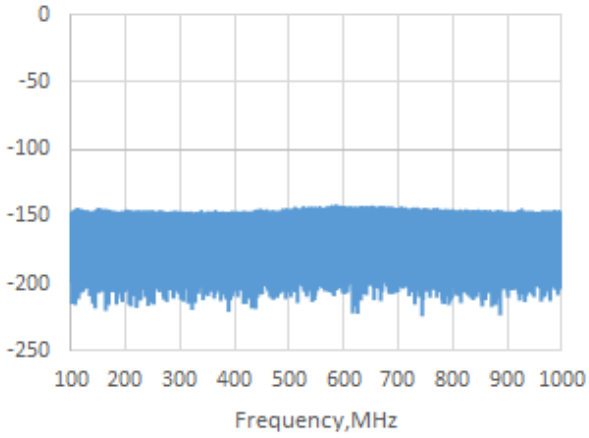


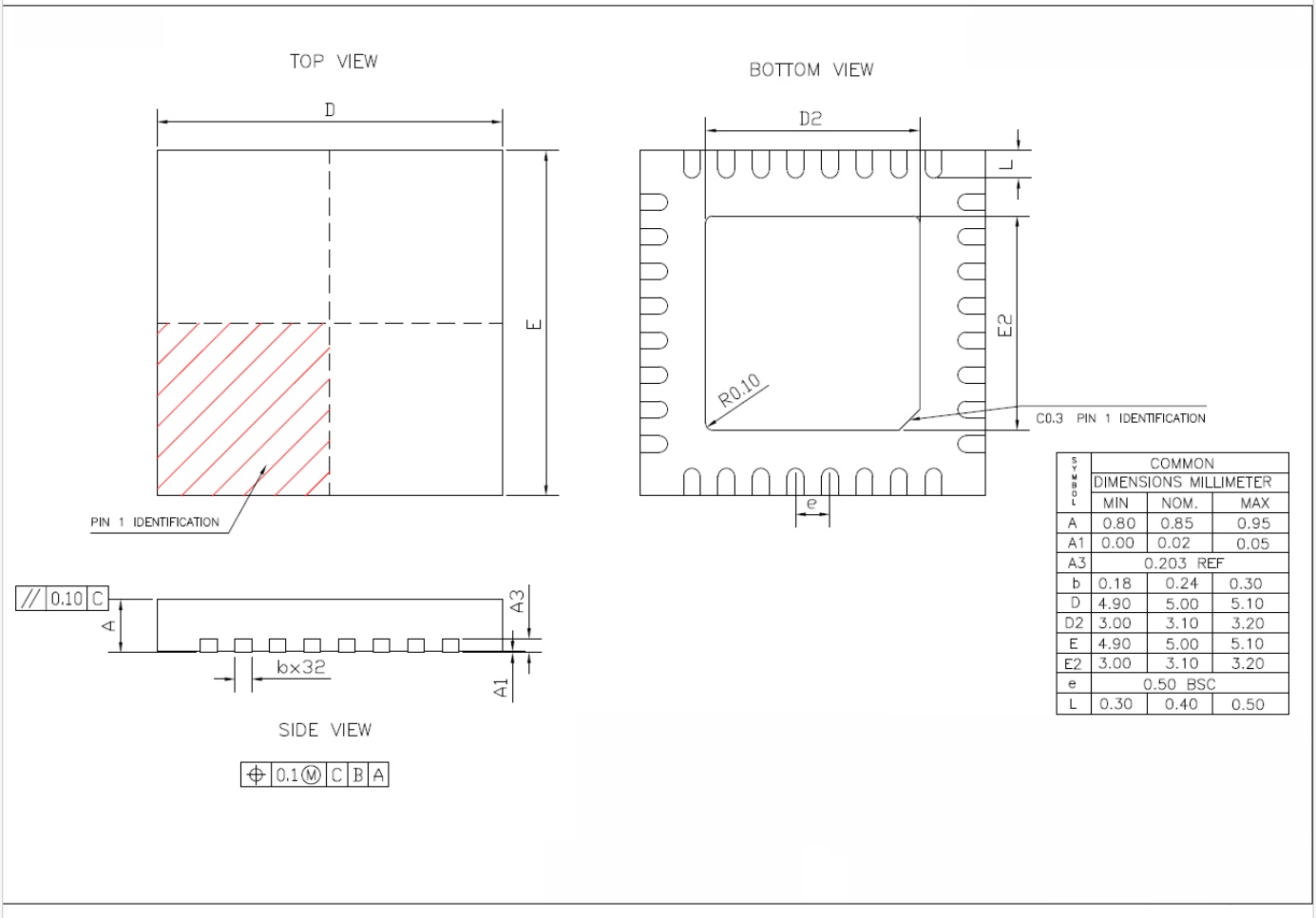
Figure 12 Spur in noisefloor@100-1000MHz



*Note:*** spur's test condition in noise floor:RBW=VBW=100Hz*

 All Rights Reserved

Package Drawing



SYMBOL	COMMON DIMENSIONS MILLIMETER		
	MIN	NOM.	MAX
A	0.80	0.85	0.95
A1	0.00	0.02	0.05
A3		0.203 REF	
b	0.18	0.24	0.30
D	4.90	5.00	5.10
D2	3.00	3.10	3.20
E	4.90	5.00	5.10
E2	3.00	3.10	3.20
e		0.50 BSC	
L	0.30	0.40	0.50

Figure 13

Ordering Information

Table 7

Order Code	Part Marking	Package	Shipping Method
RS1185-250	1185	QFN5X5_32PIN	250 units
RS1185-3000	1185	QFN5X5_32PIN	3000 units

Revision History

Table 8

Revision Number	Revision Date	Description	Modifications
0	2023/3/7	Draft	—
0.1	2023/6/29	Initial release	
1.0	2024/4/6	Released	
1.1	2024/6/6	Update data	
1.2	2024/8/26	Update data	
1.3	2024/9/6	Updata data	
1.4	2024/11/29	Released	Modify Package Drawing
1.5	2025/6/30	Update data	

Document Categories

Advance Information

The product is in a formative or design stage. The datasheet contains design target specifications for product development. Specifications and features may change in any manner without notice.

Preliminary Specification

The datasheet contains preliminary data. Additional data may be added at a later date. RFone Technology reserves the right to change specifications at any time without notice in order to supply the best possible product.

Product Specification

The datasheet contains final data. In the event RFone Technology decides to change the specifications, RFone Technology will notify customers of the intended changes by issuing a CNF (Customer Notification Form).

Sales Contact

For additional information, contact Sales at sales@rfonetech.com.

Disclaimers

The information in this document is believed to be reliable. However, RFone Technology assumes no liability for the use of this information. Use shall be entirely at the user's own risk. No patent rights or licenses to any circuits described in this document are implied or granted to any third party. RFone Technology 's products are not designed or intended for use in devices or systems intended for surgical implant, or in other applications intended to support or sustain life, or in any application in which the failure of the RFone Technology product could create a situation in which personal injury or death might occur. RFone Technology assumes no liability for damages, including consequential or incidental damages, arising out of the use of its products in such applications.

Patent Statement

RFone Technology products are protected under one or more of the following Chinese patents.For details, visit patents.rfonetech.com

Copyright and Trademark

©2019 – 2025, RFone Technology Inc. All rights reserved. The RFone Technology name, logo are registered trademarks.