Product Specification

RS4910 Power Amplifier

General Description

The RS4910 is a 2 W, RF power amplifier that operates from 0.05GHZ to 20 GHz. The RF input and output are internally-matched and DC-coupled. The RS4910 includes an integrated temperature-compensated RF power detector and an integrated temperature sensor.

The RS4910 amplifier provides a gain of 13 dB, an output power for 1 dB compression (OP1dB) of 30.1 dBm, and an output third-order intercept (OIP3) of 36 dBm from 2 GHz to 16 GHz. The amplifier operates from a typical supply voltage of 12 V and has a 500 mA typical quiescent bias current, which is adjustable.

The RS4910 is fabricated on a gallium arsenide (GaAs), pseudomorphic high electron mobility transistor (pHEMT) process. The amplifier is housed in an RoHS-compliant, 32-Lead, 5 mm × 5 mm, lead frame chip scale package, premolded cavity [LFCSP_CAV] and is specified for operation from −40°C to +85°C.

Applications

- Electronic warfare
- Radar
- Test and measurement equipment

Features

- **Wideband and Robust**
  - Wideband, internally-matched, RF power amplifier
  - DC-coupled input and output
  - Integrated RF power detector
  - Integrated temperature sensor
- **Outstanding performance in small package**
  - Gain: 13 dB typical at 1 GHz to 20 GHz
  - OP1dB: 30.1 dBm typical at 1 GHz to 20 GHz
  - PSAT: 30.5 dBm typical at 1 GHz to 20 GHz
  - OIP3: 36 dBm typical at 1 GHz to 20 GHz
  - 32-Lead, 5.00 mm × 5.00 mm, LFCSP_CAV package
- **ESD protection on all pins (HBM > 500V)**

Functional Diagram/Application Circuit

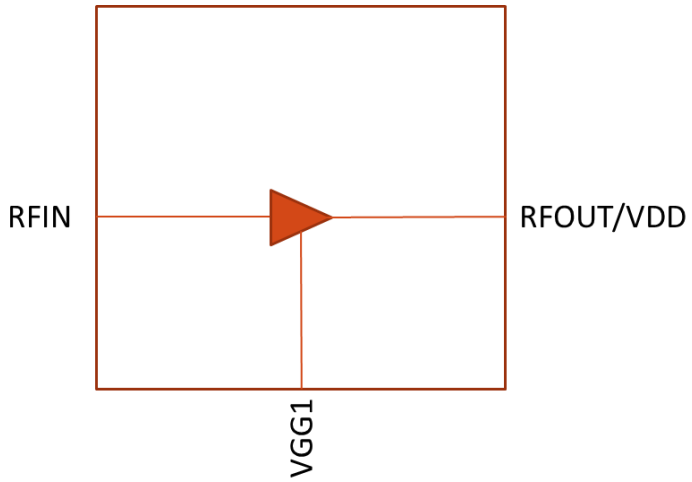


Figure 1

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Absolute Maximum Ratings

Table 1

Parameter	Min	Rating	Max	Units
VDD		12		V
RF Input Power (RFIN)		27		dBm
Continuous Power Dissipation (PDISS), TCASE = 85°C,(Derate 135 mW/°C above 85°C)		8		W
Temperature				
Maximum Channel		175		°C
Quiescent Channel (TCASE = 85°C, VDD = 12 V), IDQ= 500 mA, and Input Power (PIN) = Off		140.5		°C
Storage Range	-65		150	°C
Operating Range	-40		85	°C
ESD Voltage– HBM (Per JESD22-A114)		Class 1B (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.

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Recommended Operating Conditions

Table 2

Parameter	Min	Typical	Max	Unit
VDD		12		V
Operating Temp Range	-40	25	85	°C
VGG1	0	0.6	0.8	V
Input Power, pulse signal			TBD	dBm

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.

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Specification

Typical Application Circuit, VDD=12V, 500mA IDD, TB = +25°C（Board Temperature）, PCB board trace and connector losses are de-embedded unless otherwise noted.

Table 3

Parameters	Conditions	Min	Typ	Max	Units
Operational Frequency Range		0.05		20	GHz
Gain		10		14	dB
Flatness			±1.05		dB
Variation over Temperature			0.02		dB/°C
Noise Figure			4		dB
Input Return Loss	0.05-2GHZ		-20		dBm
	2-16GHZ		-17		
	16-20GHZ		-15		
Output Return Loss	0.05-2GHZ		-15		dBm
	2-16GHZ		-12		
	16-20GHZ		-10		
OP1dB			30.1		dBm
Saturated Output Power (PSAT)			30.5		dBm
OIP3	Output power (POUT) per tone = 16 dBm with 1 MHz tone spacing		36		dBm
IDQ	Adjust VGG1 to achieve IDQ = 500 mA typical		500		mA

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Pin Diagram

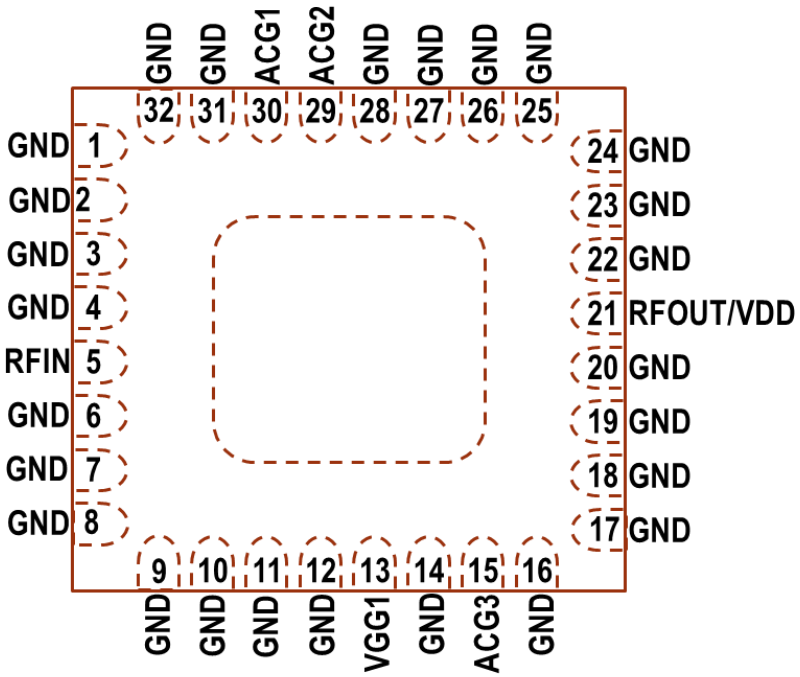


Figure 2

Pin Description

Table 4

Pad No.	Label	Description
1, 2,3,4, 6, 7,8, 9,10, 11,12,14,16, 17, 18,19,20, 22, 23,24, 25,26,27,28,31,32	GND	The GND pins must be connected to the RF and the DC ground. See Figure 3 for the interface schematic
5	RFIN	RF Input of the Amplifier.The RFIN pin is DC-coupled and matched to 50 Ω.
13	VGG1	Gate Control for the Amplifier. Attach bypass capacitors per the Applications Information section. See the Power-Up Sequence and Power-Down Sequence for additional information.
15	ACG3	Low Frequency Termination. Attach bypass capacitors per the Applications Information section.
21	RFOUT/VDD	RF Output of the Amplifier. Connect the RFOUT/VDD pin to the DC bias (VDD) network to provide drain current (IDD). See Applications Information section.
29	ACG2	Low Frequency Termination. Attach bypass capacitors per the Applications Information section.
30	ACG1	Low Frequency Termination. Attach bypass capacitor per the Applications Information section.
33	EPAD	Exposed Pad. The exposed pad must be connected to the RF and the DC ground.

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Application Information

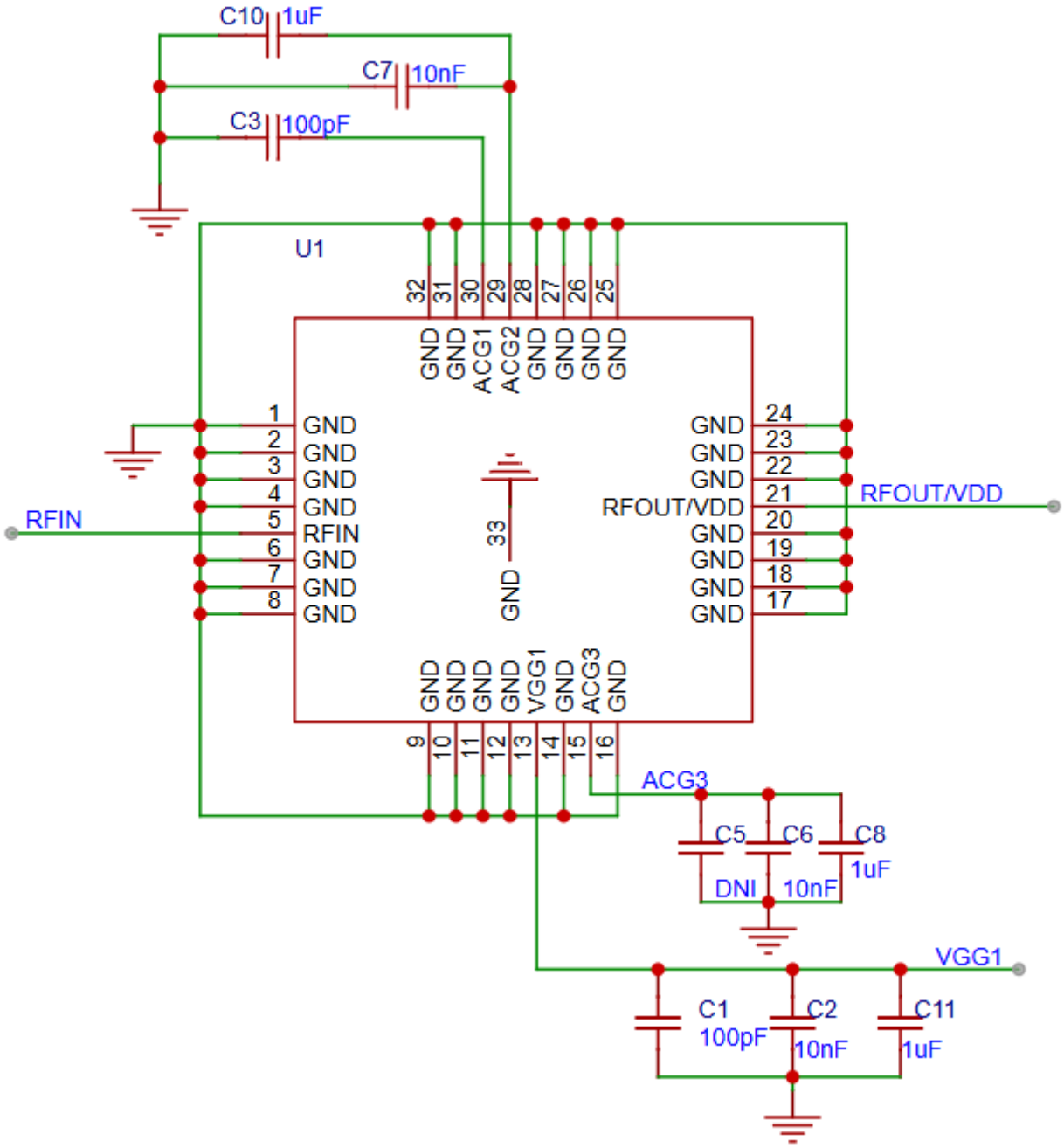


Figure 3

Table 5

Item	Quantity	Reference	Part	Footprint
1	2	C1,C3	100pF	C0402
2	3	C2,C6,C7	10nF	C0402
3	1	C5	DNI	C0402
4	3	C8,C10,C11	1uF	C0402
5	1	U1	RS4910	RS4910-QFN-32_L5.0-W5.0-P0.50-BL-EP3.4

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Typical Performance Characteristics(12V 500mA)

Figure 4. Gain

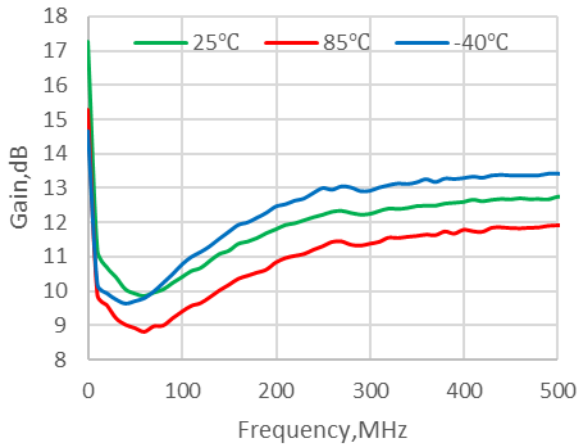


Figure 5. Gain

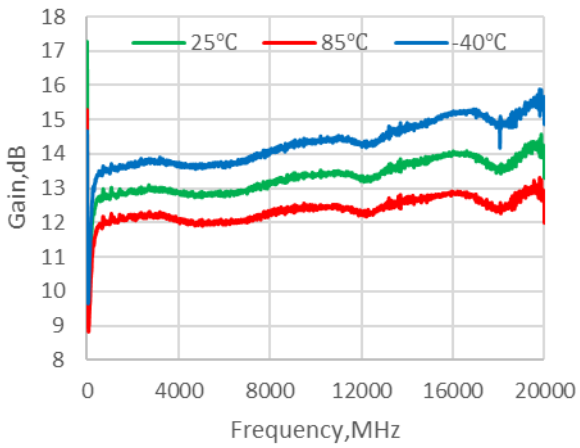


Figure 6. Input Return Loss

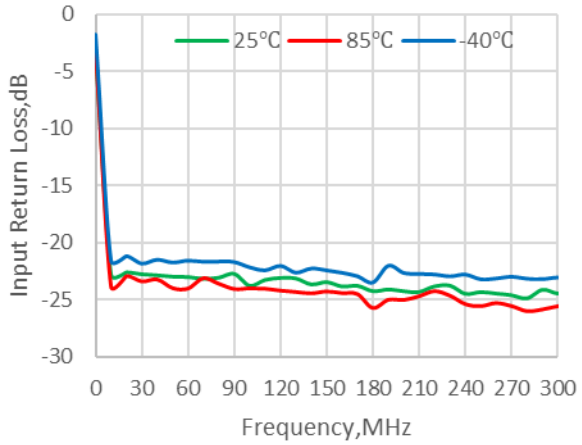


Figure 7. Input Return Loss

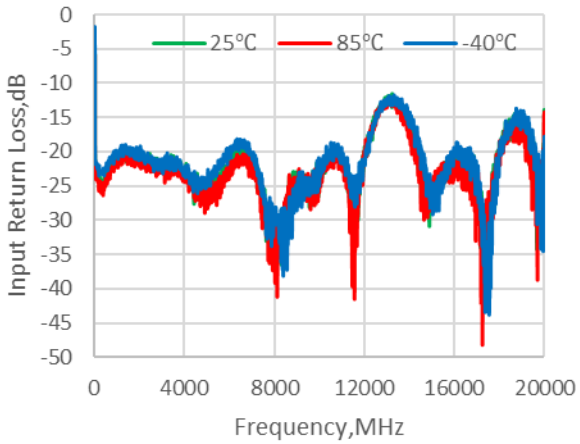


Figure 8. Output Return Loss

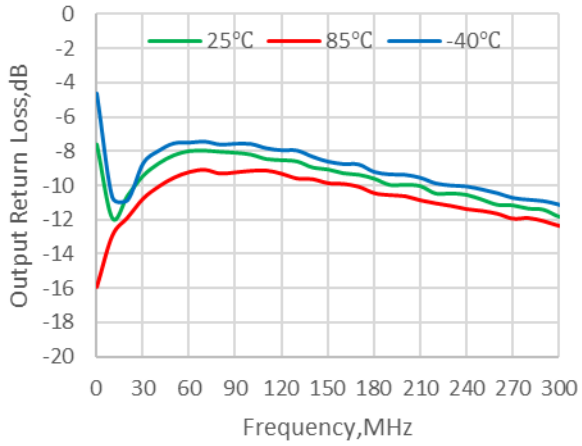
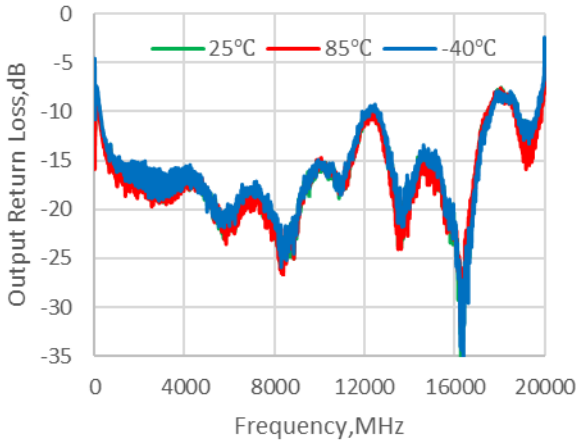


Figure 9. Output Return Loss



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Typical Performance Characteristics(12V 500mA)

Figure 10. Noise Figure

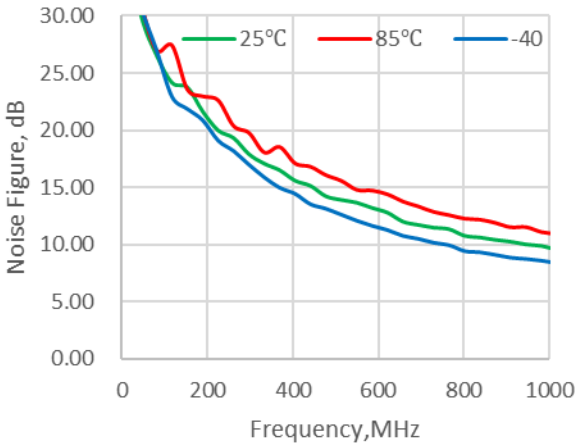


Figure 11. Noise Figure

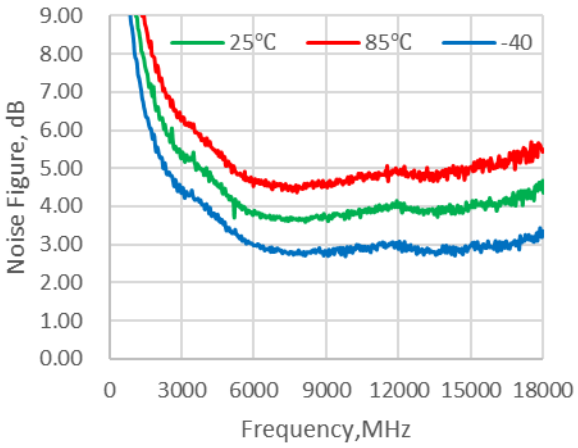


Figure 12. Output P1dB

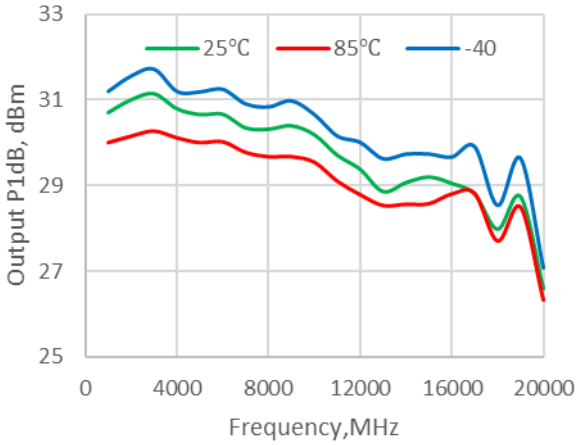


Figure 13. Output IP3dB

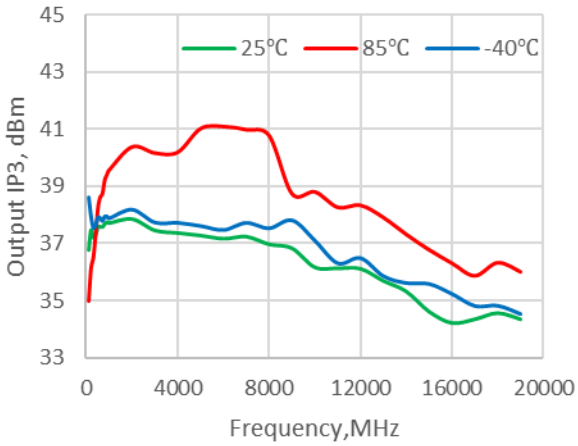
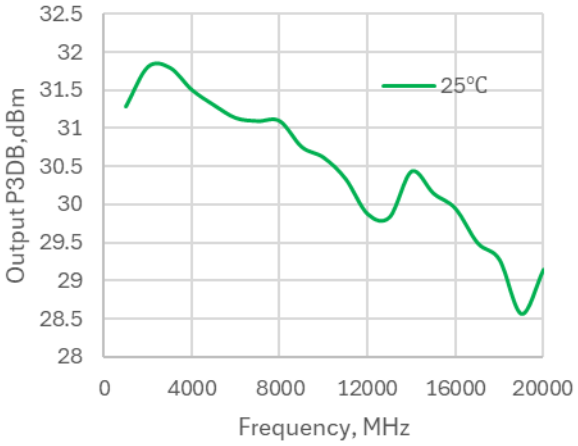
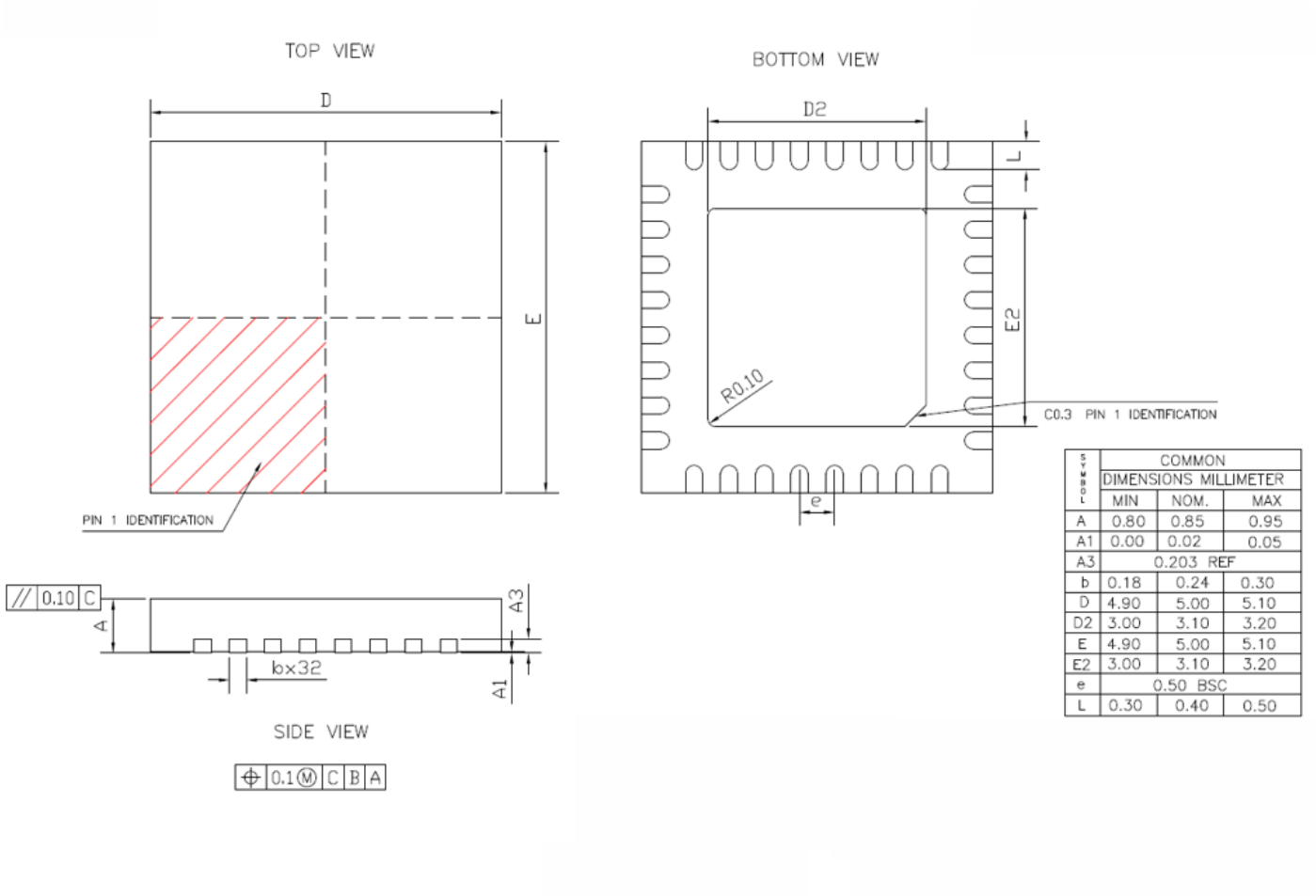


Figure 14. Output P3dB



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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 15

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Revision History

Table 6

Revision Number	Revision Date	Description	Modifications
0.1	2025/08/11	Draft	—

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.

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