RTC6608OSP : 0.1 GHz – 6.0 GHz SPDT Switch

Description

The RTC6608OSP is a SPDT antenna switch designed for frequency range from 0.1 GHz up to 6.0 GHz range. The RTC6608OSP is processed in advanced CMOS SOI(silicon-on-insulator) technology featuring low insertion loss, high isolation, high ESD protection level and sustain high linearity at low supply voltage. The excellent performance of RTC6608OSP make it ideal to be applied in wireless application for WLAN, Bluetooth® and IEEE 802.11a/b/g/n/ac transmit / receive function. The RTC6608OSP is housed in a compact 6L QFN1.0x1.0 plastic package.

Feature

- Frequency Range : 0.1 – 6.0 GHz
- Low Control Voltage : 1.8 ~ 3.6 V
- Low Insertion Loss : 0.4 dB @ 2.45 GHz, 0.75 dB @ 5.8 GHz
- High Isolation : 25 dB @ 2.45 GHz, 27 dB @ 5.8 GHz
- High P1dB : +33 dBm @ 2.45 GHz, +32 dBm @ 5.8 GHz
- Excellent ESD Protection : 1000 V HBM and CDM on all pins
- Small and Low Profile Package : Package : 6L QFN 1.0x1.0x0.375(typ) mm^3
- RoHS, Pb-free, Halogen Free Compliant
- Moisture Sensitivity Level : MSL 3

Application

- IEEE 802.11a/b/g/n/ac WLAN Networks
- Mobile Devices

Specifications subject to change without notice
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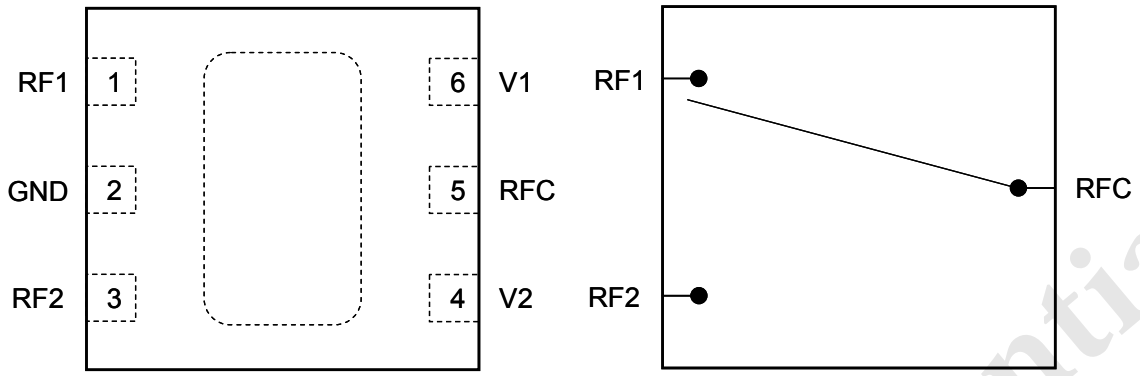
Functional Block Diagram & Pin Out (top view through package)



Pin Function Description

Pin No.	Name	Description	Pin No.	Name	Description
1	RF1	RF Signal, DC blocking needed	4	V2	DC control voltage
2	GND	Ground	5	RFC	RF Signal, DC blocking needed
3	RF2	RF Signal, DC blocking needed	6	V1	DC control voltage
Exposed Pad		Must be connected to GND for best performance			

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Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Control voltage	V1, V2	+5	V
Maximum Input Power	P_{IN}	+33	dBm
Operating Temperature	T_A	-40 ~ +85	℃
Storage Temperature	T_{ST}	-40 ~ +150	℃
ESD (HBM, JESD22-A114, All pin)	ESD_{HBM}	1000	V
ESD (CDM, JESD22-C101, All pin)	ESD_{CDM}	1000	V
Maximum junction temperature	T_J	+125	℃

Note : Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only, functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation between operation range maximum and absolute maximum for extended periods may affect device reliability.

Truth Table

Low Insertion Loss Path	V1	V2
RFC – RF1	L	H
RFC – RF2	H	L

Recommended Operating Range

Parameter	Symbol	Min	Typ	Max	Unit
Operation Frequency	f1	0.1	–	6.0	GHz
Control Voltage (High)	V1, V2	1.8	3.3	3.6	V
Control Voltage (Low)	V1, V2	0	–	0.3	V

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Electrical Specification

T_A = 25 ℃, 50 Ω system with control voltage = 0/3.3 V, P_{IN} = 0 dBm, unless otherwise noted.

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Insertion Loss	IL_1	2.4 – 2.5 GHz	–	0.40	0.60	dB
	IL_2	4.9 – 6.0 GHz	–	0.75	0.95	dB
Isolation (RF1,2 to RFC)	Iso_1	2.4 – 2.5 GHz	22	25	–	dB
	Iso_2	4.9 – 6.0 GHz	23	27	–	dB
Isolation (RF1 to RF2)	Iso_3	2.4 – 2.5 GHz	22	25	–	dB
	Iso_4	4.9 – 6.0 GHz	27	31	–	dB
Return loss (Insertion loss state)	RL_1	2.4 – 2.5 GHz	18	23	–	dB
	RL_2	4.9 – 6.0 GHz	14	19	–	dB
Input power for 1dB compression	P1dB_2.4	@ 2.4 GHz	–	33	–	dBm
	P1dB_5.8	@ 5.8 GHz	–	32	–	dBm
2nd harmonic	2fo	f = 2.45 GHz Pin = +25 dBm	–	73	–	dBc
3rd harmonic	3fo	f = 2.45 GHz Pin = +25 dBm	–	76	–	dBc
Error Vector Magnitude, WLAN	EVM_2.5%	f = 2.45 GHz, WLAN,802.11g,OFDM, 54Mbps, 64QAM, P_{in} for 2.5% error	–	27	–	dBm
Switching rise/fall time	tr	10/90% to 90/10% RF	–	150	–	ns
Switching on/off time	tc	50% Vc to 90/10% RF	–	160	–	ns
Control Current	Ictl	V = 3.3 V, RF none	–	10	–	μA

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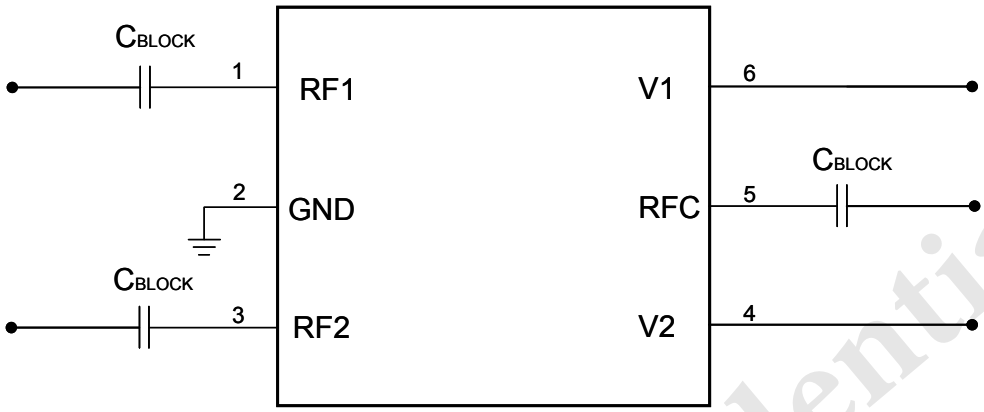
Application Circuit



Note:

1. C_{BLOCK} = 68 pF for operation 0.1 ~ 6.0 GHz are required on all RF ports.
2. Larger Capacitance recommended for lower frequency operation.
3. Exposed paddle in the bottom must be grounded.

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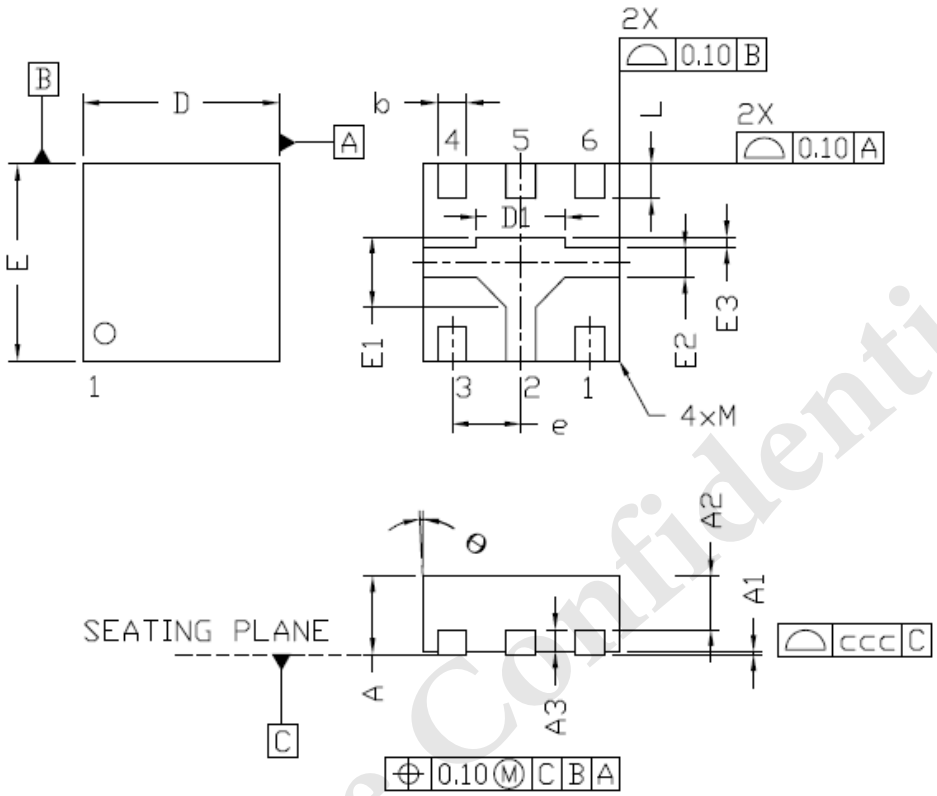
Package Outline Dimension



Symbol	Dimensions In Millmeters		
	MIN	NOM	MAX
A	0.35	---	0.40
A1	0.00	---	0.05
A2	0.223	---	0.273
A3	---	0.127REF	---
b	0.10	0.15	0.20
D	0.95	1.00	1.03
D1	---	0.45BSC	---
E	0.95	1.00	1.03
E1	---	0.36BSC	---
E2	0.10	0.15	0.20
E3	---	0.055BSC	---
e	---	0.35BSC	---
L	0.125	0.175	0.225
θ	-12	---	0
ccc	---	0.05	---
M	---	---	0.05
Burr	0.00	0.03	0.06

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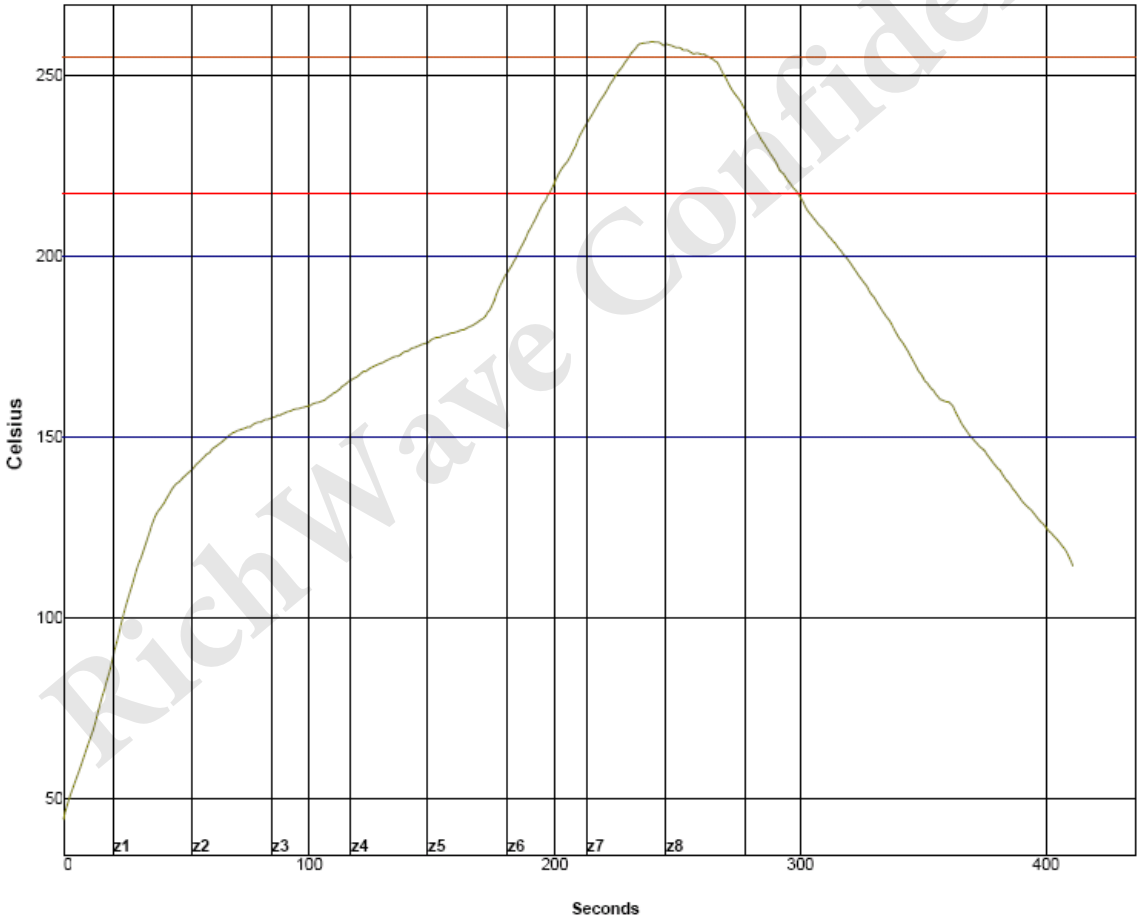
Recommended Solder Reflow Profiles

Average ramp-up rate (200˚C to peak)	3˚C/second max.
Preheat temperature 175 (+/-25) ˚C	60~120secs
Temperature maintained above 217˚C	60~150secs
Time within 5˚C of actual peak temperature	30 seconds min.
Peak temperature range	(260 +2/-2)˚C
Ramp down rate	6˚C/second max.
Time 25˚C to peak temperature	8 minutes max.

* Follow JEDEC spec J-STD-020D



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