

DESCRIPTION

The RTC56151 is a symmetric, single-pole four-throw (SP4T) antenna switch module (ASM). All inputs and outputs are internally matched to 50Ω and the DC block capacitors at antenna and each RF ports are not necessary. This feature reduces the parts count, shrinks the circuit size, widens the operating bandwidth, and cuts down the manufacturing costs. Low-loss, high power and high linearity make the SP4T ASM suitable for multimode and multiband applications such as GSM/WCDMA/EDGE. A decoder with low current consumption is included in the device, which uses only two DC voltages to control switch operations. At each RF port to the antenna-path, the typical insertion loss is 0.7 dB from 0.5 to 2.5 GHz. The isolation between each RF port is higher than 20 dB. The device can be operated at 1.8 to 3V wide supply range. These characteristics make RTC56151 SP4T ASM very useful in various applications, such as hand-held device and battery-powered equipment.

The RTC56151 is packaged in a very compact industry-standard 16-lead surface mount package QFN 3mm X 3 mm with lead-free RoHS compliant.

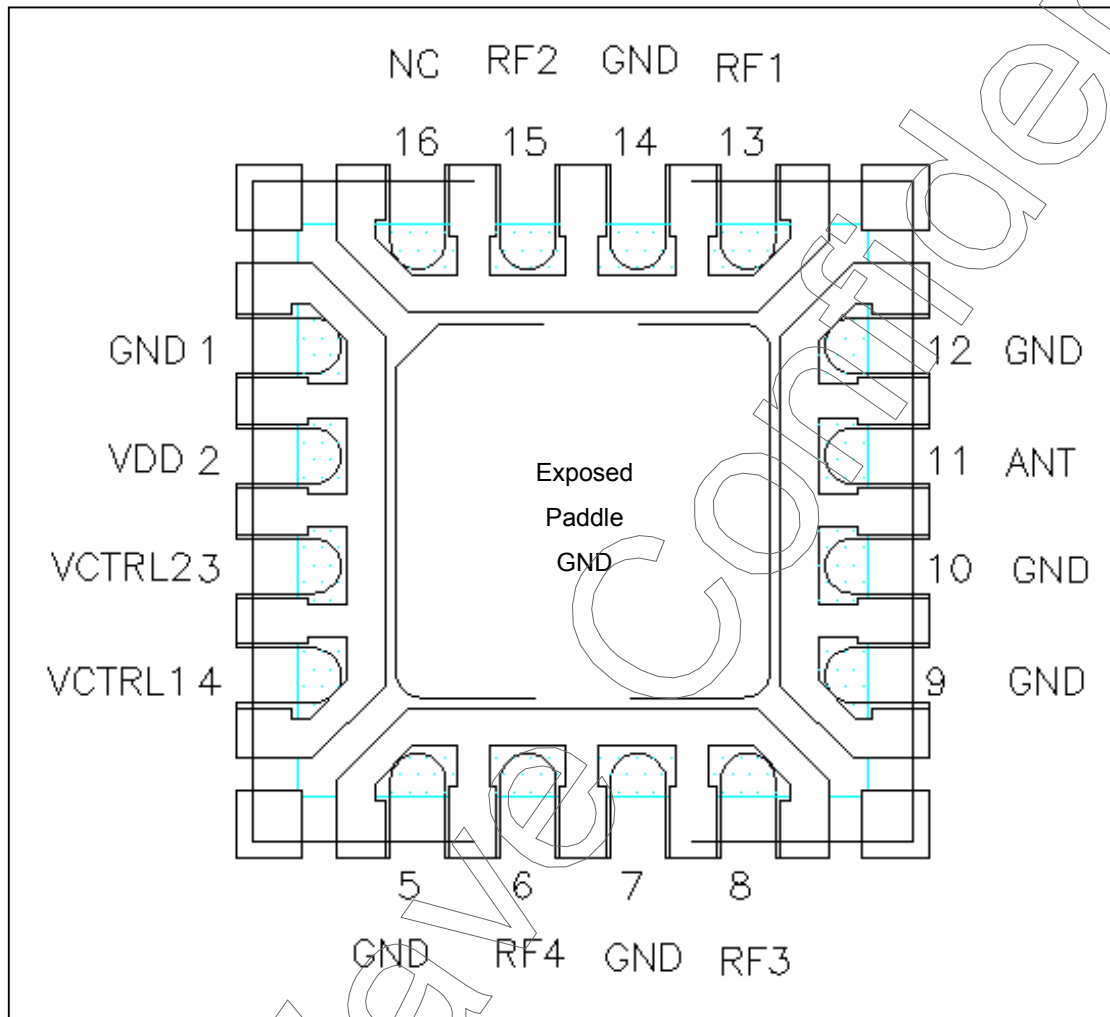
FEATURE

- ◆ Broadband frequency range (0.5-2.5GHz)
- ◆ Low insertion loss(0.4dB@1GHz, 0.5dB@2GHz) & high isolation(28.5dB@1GHz)
- ◆ Wide supply range $V_{DD}=1.8$ to 3 V
- ◆ High linearity IMD3 < -105dBm
- ◆ Good spurious harmonic performance -70dBc @900MHz, +34.5dBm input power
- ◆ Low logic control voltage V_{CTRL} down to 1.8V
- ◆ 16L QFN3 X 3 X 0.75 mm package
- ◆ Lead(Pb) free, RoHS compliant

APPLICATION

- ◆ Mobile Handset System Application
- ◆ Data Card Application
- ◆ Multi-Mode GSM/GPRS/WCDMA Application

PIN OUT (top view)



PIN FUNCTION DESCRIPTION

Pin	Function	Description
1,5,7,9,10,12,14	GND	Ground connection
2	V _{DD}	Supply voltage for switch operation
3	V _{CTRL2}	Control voltage 2.
4	V _{CTRL1}	Control voltage 1
6	RF4	RF output 4
8	RF3	RF output 3
11	ANT	Antenna port
13	RF1	RF output 1
15	RF2	RF output 2
16	NC	No connection

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Supply Voltage (V_{DD})	5	V
TX Input Power	36	dBm
Control Voltage (V_{CTRL})	5	V
Operating Temperature	-30 to +85	°C
Storage Temperature	-50 to +100	°C

Note : Exceeding these ranges might cause damage to the device

LOGIC TABLE

State	V_{CTRL1}	V_{CTRL2}	RF Path
1	0	0	ANT to RF1
2	0	1	ANT to RF2
3	1	0	ANT to RF3
4	1	1	ANT to RF4

"1" = +1.8V to + V_{DD} "0" = 0V to +0.3V

DC/CONTROL SPECIFICATIONS

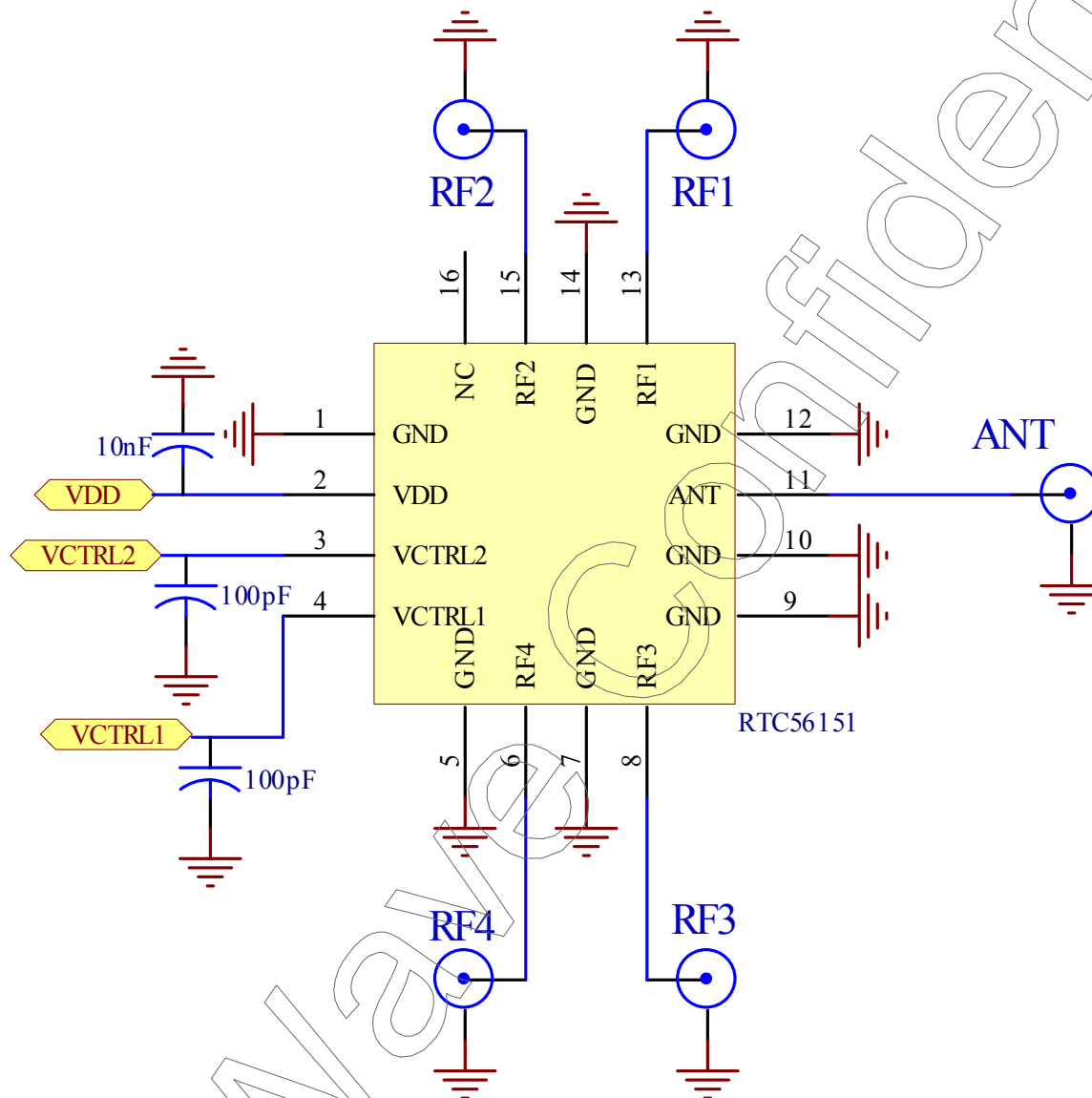
State	Conditions	Min	Typ	Max	Unit
Switched supply voltage(V_{DD})		1.8		3	V
Switched supply current(I_{DD})			0.3		mA
Control voltage	V_{HIGH} V_{LOW}	1.8	2.65 0	3 0.3	V V
Control current	I_{HIGH} I_{LOW}		0.1 0.1		μ A μ A

AC ELECTRICAL CHARACTERISTICS

$T_A = 25^\circ\text{C}$, $V_{DD} = 2.65\text{ V}$, $V_{CTRL1} = V_{CTRL2} = V_{DD}$, all unused RF ports are terminated in a $50\ \Omega$ load, unless otherwise noted

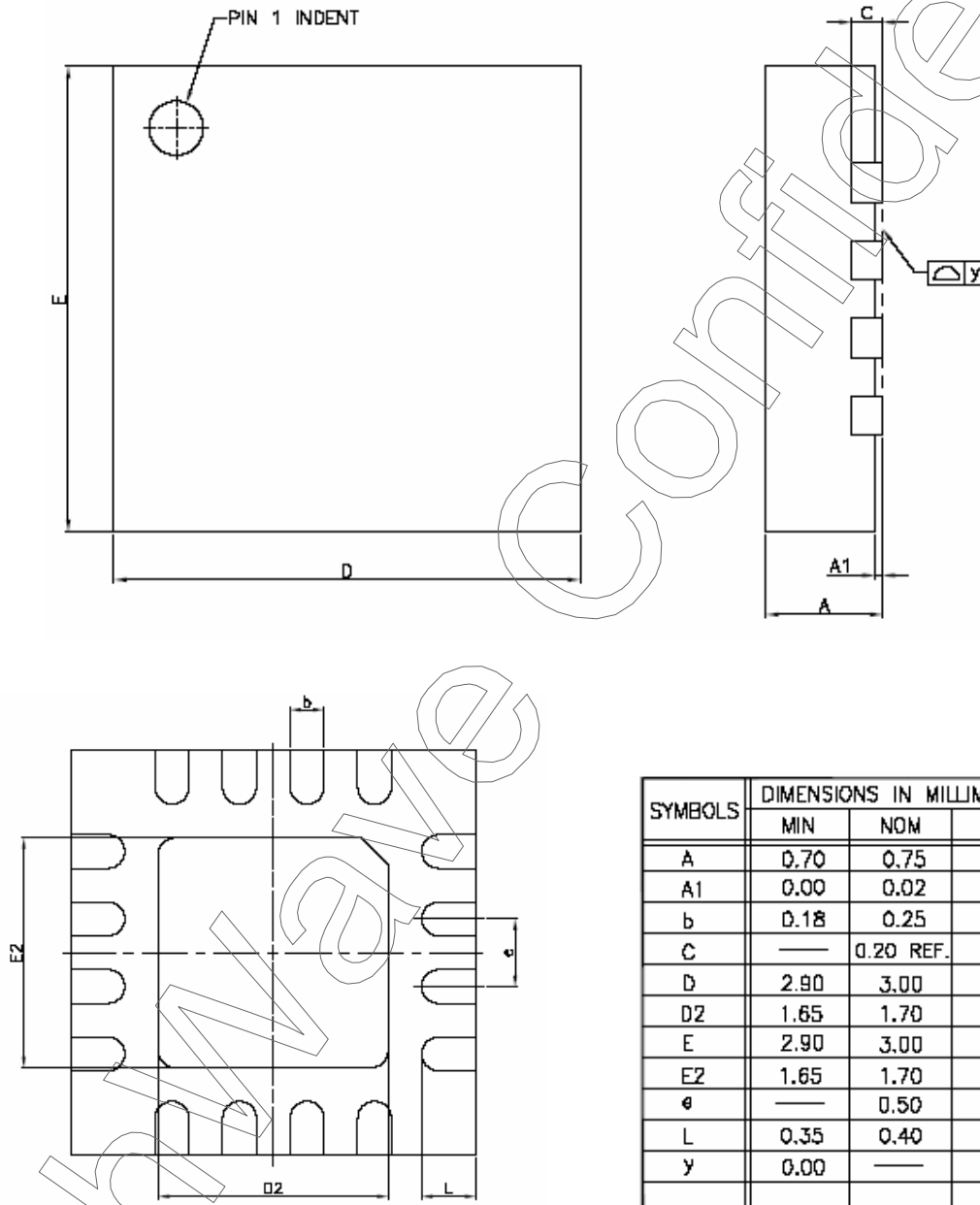
Parameter	Conditions	Min	Typ	Max	Unit
Insertion loss	0.5 to 1.0 GHz		0.40		dB
	1.0 to 2.0 GHz		0.50		dB
	2.0 to 2.1 GHz		0.50		dB
	2.5 GHz		0.7		dB
Isolation	0.5 to 1.0 GHz		28.5		dB
	1.0 to 2.0 GHz		22.0		dB
	2.0 to 2.1 GHz		21.5		dB
	2.5 GHz		19.0		dB
Return loss	0.50 to 2.5 GHz, all RF ports, insertion loss state		20		dB
Second harmonic($2f_0$)	Fundamental Frequency 900 MHz, $P_{IN} = +34.5\text{ dBm}$		-75		dBc
	Fundamental Frequency 1.8 GHz, $P_{IN} = +31.5\text{ dBm}$		-70		dBc
Third harmonic($3f_0$)	Fundamental Frequency 900 MHz, $P_{IN} = +34.5\text{ dBm}$		-70		dBc
	Fundamental Frequency 1.8 GHz, $P_{IN} = +31.5\text{ dBm}$		-70		dBc
Input 0.1 dB compression point($P_{0.1dB}$)	@ 900 MHz		35		dBm
	@ 1.8 GHz		35		dBm
3rd Order Intermodulation Distortion(IMD3)	$f_{FUND} = 1.95\text{ GHz @ }+20\text{ dBm}$, $f_{BLK} = 1.76\text{ GHz @ }-15\text{ dBm}$, $f_{RX} = 2.14\text{ GHz}$, worst case over phase.		-105		dBm
Power handling under mismatch	@ 900 MHz, VSWR = 20:1		34.5		dBm
	@ 1.8 GHz, VSWR = 20:1		31.5		dBm
2nd Order Input Intercept Point	$f_0 = 836.61\text{ MHz @ }+26\text{ dBm}$, $f_2 = 1718.22\text{ MHz @ }-20\text{ dBm}$, measured @ 881.61 MHz		110		dBm
Switching speed	10%/90% RF rise/fall time		0.27		μs
Startup time	Wait time required when V_{DD} is applied until control voltage can be applied		25		μs

APPLICATION CIRCUIT :



PACKAGE DRAWING

16L QFN-3mm X 3mm X 0.75mm



射频和天线设计培训课程推荐

易迪拓培训(www.edatop.com)由数名来自于研发第一线的资深工程师发起成立,致力并专注于微波、射频、天线设计研发人才的培养;我们于 2006 年整合合并微波 EDA 网(www.mweda.com),现已发展成为国内最大的微波射频和天线设计人才培养基地,成功推出多套微波射频以及天线设计经典培训课程和 ADS、HFSS 等专业软件使用培训课程,广受客户好评;并先后与人民邮电出版社、电子工业出版社合作出版了多本专业图书,帮助数万名工程师提升了专业技术能力。客户遍布中兴通讯、研通高频、埃威航电、国人通信等多家国内知名公司,以及台湾工业技术研究院、永业科技、全一电子等多家台湾地区企业。

易迪拓培训课程列表: <http://www.edatop.com/peixun/rfe/129.html>



射频工程师养成培训课程套装

该套装精选了射频专业基础培训课程、射频仿真设计培训课程和射频电路测量培训课程三个类别共 30 门视频培训课程和 3 本图书教材;旨在引领学员全面学习一个射频工程师需要熟悉、理解和掌握的专业知识和研发设计能力。通过套装的学习,能够让学员完全达到和胜任一个合格的射频工程师的要求...

课程网址: <http://www.edatop.com/peixun/rfe/110.html>

ADS 学习培训课程套装

该套装是迄今国内最全面、最权威的 ADS 培训教程,共包含 10 门 ADS 学习培训课程。课程是由具有多年 ADS 使用经验的微波射频与通信系统设计领域资深专家讲解,并多结合设计实例,由浅入深、详细而又全面地讲解了 ADS 在微波射频电路设计、通信系统设计和电磁仿真设计方面的内容。能让您在最短的时间内学会使用 ADS,迅速提升个人技术能力,把 ADS 真正应用到实际研发工作中去,成为 ADS 设计专家...

课程网址: <http://www.edatop.com/peixun/ads/13.html>



HFSS 学习培训课程套装



该套课程套装包含了本站全部 HFSS 培训课程,是迄今国内最全面、最专业的 HFSS 培训教程套装,可以帮助您从零开始,全面深入学习 HFSS 的各项功能和在多个方面的工程应用。购买套装,更可超值赠送 3 个月免费学习答疑,随时解答您学习过程中遇到的棘手问题,让您的 HFSS 学习更加轻松顺畅...

课程网址: <http://www.edatop.com/peixun/hfss/11.html>

CST 学习培训课程套装

该培训套装由易迪拓培训联合微波 EDA 网共同推出,是最全面、系统、专业的 CST 微波工作室培训课程套装,所有课程都由经验丰富的专家授课,视频教学,可以帮助您从零开始,全面系统地学习 CST 微波工作的各项功能及其在微波射频、天线设计等领域的设计应用。且购买该套装,还可超值赠送 3 个月免费学习答疑...

课程网址: <http://www.edatop.com/peixun/cst/24.html>



HFSS 天线设计培训课程套装

套装包含 6 门视频课程和 1 本图书,课程从基础讲起,内容由浅入深,理论介绍和实际操作讲解相结合,全面系统的讲解了 HFSS 天线设计的全过程。是国内最全面、最专业的 HFSS 天线设计课程,可以帮助您快速学习掌握如何使用 HFSS 设计天线,让天线设计不再难...

课程网址: <http://www.edatop.com/peixun/hfss/122.html>

13.56MHz NFC/RFID 线圈天线设计培训课程套装

套装包含 4 门视频培训课程,培训将 13.56MHz 线圈天线设计原理和仿真设计实践相结合,全面系统地讲解了 13.56MHz 线圈天线的工作原理、设计方法、设计考量以及使用 HFSS 和 CST 仿真分析线圈天线的具体操作,同时还介绍了 13.56MHz 线圈天线匹配电路的设计和调试。通过该套课程的学习,可以帮助您快速学习掌握 13.56MHz 线圈天线及其匹配电路的原理、设计和调试...

详情浏览: <http://www.edatop.com/peixun/antenna/116.html>



我们的课程优势:

- ※ 成立于 2004 年,10 多年丰富的行业经验,
- ※ 一直致力并专注于微波射频和天线设计工程师的培养,更了解该行业对人才的要求
- ※ 经验丰富的一线资深工程师讲授,结合实际工程案例,直观、实用、易学

联系我们:

- ※ 易迪拓培训官网: <http://www.edatop.com>
- ※ 微波 EDA 网: <http://www.mweda.com>
- ※ 官方淘宝店: <http://shop36920890.taobao.com>