CAN1326 SP4T Switch

Product Datasheet

Rev 1.2 July, 2018

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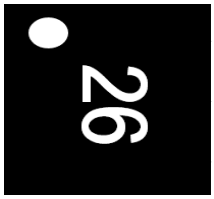
CAN1326

Single Pole Four Throw Switch



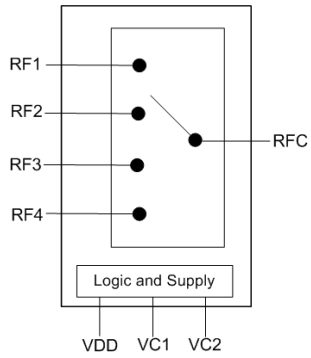
Package

- QFN 9-pin
- 1.1 mm x1.1 mm x 0.55 mm

General Description

The CAN1326 is a single-pole, four-throw (SP4T) switch. No external DC blocking capacitors are required on the RF paths as long as there is no DC voltage on the RF line. The switch can operate over the temperature range of −40℃ to +85℃.

Switching is controlled by two logical control voltage inputs (VC1 and VC2). Depending on the logic voltage level applied to the control pin, the RFC pin is connected to one of the four switched RF outputs (RF1, RF2, RF3, or RF4) by using a low insertion loss path, while the path between the RFC pin and the other RF pins is in isolation.



Functional Block Diagram

Features

- Broadband Frequency Range: 0.1GHz to 2.7 GHz
- Low Insertion Loss: 0.61 dB typical @ 2.7 GHz
- High Isolation: 23dB typical @ 2.7 GHz
- Integrated GPIO Interface.
- No DC Blocking Capacitors Required.
- Lead (Pb)-free and RoHS-compliant.
- Small Size.

Applications

- NB-IOT Applications
- Cellular Systems.
- 3G/4G LTE Systems.
- Pre- and Post- PA Switching.

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Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit	Condition
Supply Voltage	V_{DD}	2.5 to 5.0	V	T = 25 ℃
Control Voltage	V_{CTL}	0 to 3.3	V	T = 25 ℃, V_{CTL} <= V_{DD}
RF Input Power	P_{IN}	+35.4	dBm	Peak power at RFC port, T = 25 ℃; 50Ω
Operating Temperature	T_{OP}	-40 to +85	℃	
Storage Temperature	T_{STG}	-55 to +150	℃	

Note: *Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.*

CAUTION: *Although this device is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.*

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Electrical Specifications

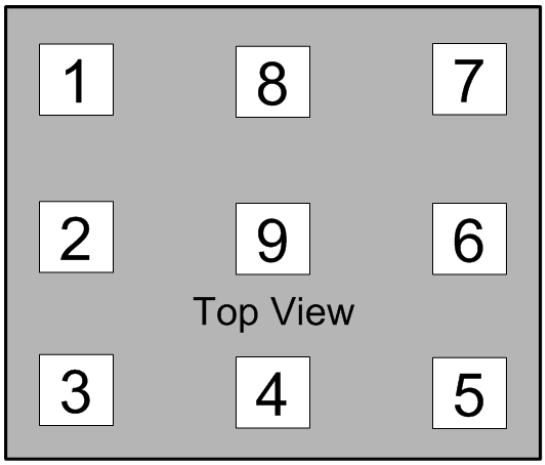
Parameter	Symbol	Specification			Unit	Conditions
		Min	Typ	Max		
V_{DD} = 2.85 V, VC1/ VC2=0/1.65 to 3.0 V, T_{OP} = +25°C, P_{IN}=0 dBm, Characteristic Impedance [Z_0] = 50Ω, Unless Otherwise Noted.						
Small Signal						
Insertion loss (RFC to RF1-RF4)	IL		0.45	0.55	dB	0.10 ~ 0.70 GHz
			0.49	0.60	dB	0.70 ~ 0.96 GHz
			0.57	0.70	dB	1.71 ~ 2.17 GHz
			0.61	0.80	dB	2.17~ 2.69 GHz
Isolation (RFC to RF1-RF4)	Iso		38		dB	0.50 ~ 0.70 GHz
			35		dB	0.7 ~ 0.96 GHz
			26		dB	1.71 ~ 2.17 GHz
			23		dB	2.17~ 2.69 GHz
Return Loss	RL		30		dB	0.50 ~ 0.70 GHz
			28		dB	0.7 ~ 0.96 GHz
			25		dB	1.71 ~ 2.17 GHz
			27		dB	2.17~ 2.69 GHz
0.1 dB Compression Point	P0.1dB		32.4		dBm	0.10 ~ 2.7 GHz
Large Signal						
LTE/WCDMA Harmonic Low Band (RFC to RF1-RF4)	2fo			-67	dBm	fo = 824 to 960 MHz, P_{IN} = +26 dBm, VSWR = 1:1
	3fo			-40	dBm	
	2fo			-65	dBm	fo = 824 to 960 MHz, P_{IN} = +26 dBm, VSWR = 6:1
	3fo			-40	dBm	
LTE/WCDMA Harmonic Mid Band (RFC to RF1-RF4)	2fo			-75	dBm	fo =1710 to 1910 MHz, P_{IN} = +26 dBm, VSWR = 1:1
	3fo			-52	dBm	
	2fo			-70	dBm	fo =1710 to 1910 MHz, P_{IN} = +26 dBm, VSWR = 6:1
	3fo			-50	dBm	
LTE/WCDMA Harmonic High Band (RFC to RF1-RF4)	2fo			-75	dBm	fo =2690 MHz, P_{IN} = +26 dBm, VSWR = 1:1
	3fo			-52	dBm	
	2fo			-70	dBm	fo =2690 MHz, P_{IN} = +26 dBm, VSWR = 6:1
	3fo			-50	dBm	
Band 17 3rd Harmonic (RFC to RF1-RF4)	B17 3fo		-90	-80	dBm	fo =716 MHz, P_{IN} = +25 dBm, VSWR = 1:1
				-75	dBm	fo =716 MHz, P_{IN} = +25 dBm, VSWR = 6:1
Band 17 2nd Harmonic (RFC to RF1-RF4)	B13 2fo		-105	-100	dBm	fo =787 MHz, P_{IN} = +25 dBm, VSWR = 1:1
				-90	dBm	fo =787 MHz, P_{IN} = +25 dBm, VSWR = 6:1
DC Operating						
Supply Voltage	V_{DD}	2.5	2.85	4.5	V	
Control Voltage	V_{CTL_H}	1.65	1.8	3.0	V	
	V_{CTL_L}		0	0.35	V	
Supply Current (active)	I_{DD}		60		μA	Supply Current (any active state), V_{DD} = 2.85 V
Control Current	I_{CTRL}		2	5	μA	Supply Current (any active state), V_{DD} = 2.85 V, V_{CTL} = 1.8 V
DC Supply Turn-on/ Turn-off Time	T_{ON}			20	μs	Measured from 50% of final V_{DD} supply voltage to final RF power ±1 dB.
RF Path Switching Time	T_{SW}		2	5	μs	From one active state to another active state transition, measured from 50% of final V_{CTRL} voltage to final RF power±1 dB.

Logic Truth Table

Path	VDD	VC1	VC2
RFC to RF1	H	L	H
RFC to RF2	H	H	L
RFC to RF3	H	H	H
RFC to RF4	H	L	L

Note: *"H" =+1.65V to +3.0V ; "L" =0V to +0.35V. Any state other than that described in this Table places the switch into an undefined state. An undefined state will not damage the device.*

Pin Out



Pin Names and Descriptions

Pin	Name	Description
1	VC1	Control Voltage 1
2	RF2	RF Input/output Port 2
3	RF1	RF Input/output Port 1
4	RFC	RF Common Port
5	RF3	RF Input/output Port 3
6	RF4	RF Input/output Port 4
7	VDD	Supply Voltage
8	VC2	Control Voltage 2
9	GND	Ground

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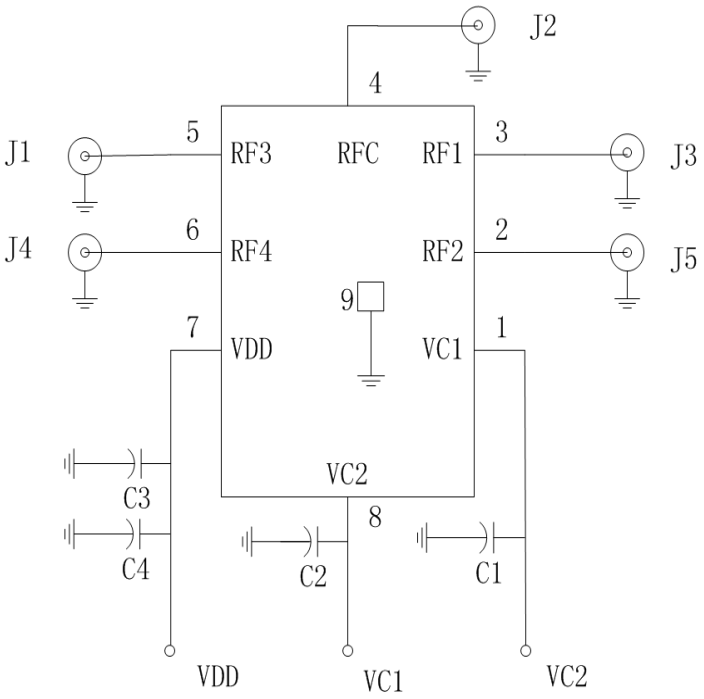
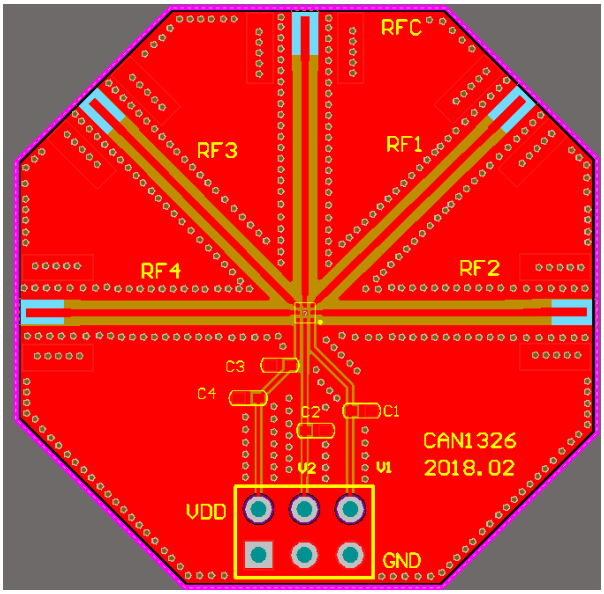
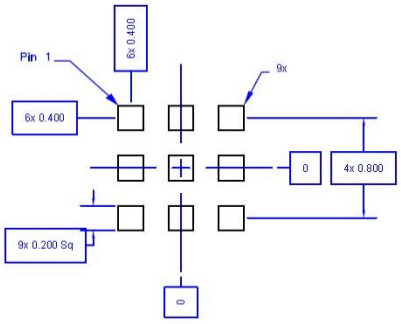
Evaluation Board Schematic



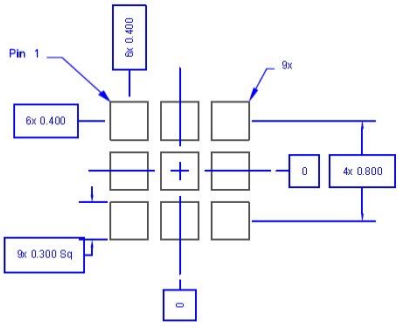
Evaluation Board Assembly Diagram



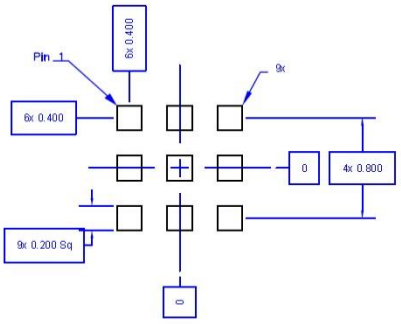
PCB Layout Footprint



PCB METAL TOP VIEW

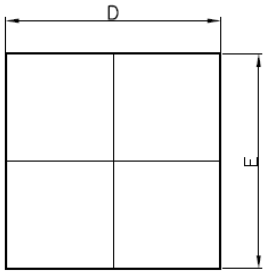


PCB SOLDERMASK TOP VIEW

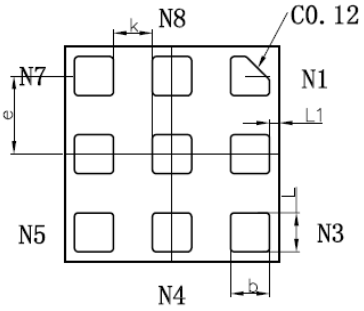


PCB STENCIL TOP VIEW

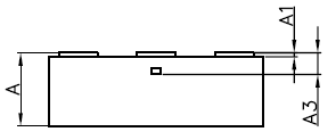
Package Dimensions



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.500	0.600	0.020	0.024
A1	-0.004	0.046	0.000	0.002
A3	0.110REF.		0.004REF.	
D	1.000	1.200	0.039	0.047
E	1.000	1.200	0.039	0.047
k	0.200REF.		0.008REF.	
b	0.150	0.250	0.006	0.010
e	0.400BSC.		0.016BSC.	
L	0.150	0.250	0.006	0.010
L1	0.050REF.		0.002REF.	

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Revision History

Revision	Date of Release	Description
Rev 1.0	2018.03	Initial Version
Rev 1.1	2018.04	Update electric specifications
Rev 1.2	2018.07	Update RF specifications