Low Voltage 0.4Ω Quad SPDT Analog Switch

Features

- Wide Power Supply Range:1.6V to 4.2V
- Low On-Resistance: 0.4Ω (V_{DD}=2.7V)
- Low On-Resistance Flatness
- -3dB BandWidth: 42 MHz
- Fast Switching Speed(V_{DD}=3.3V):
  t_{ON}: 20ns
  t_{OFF}: 10ns
- I_{DD} = 300nA @ TA = +25°C
- High Off Isolation: -65dB
- Crosstalk Rejection: -65dB
- Lead(Pb) Free QFN-16 Package(3mmx3mm)

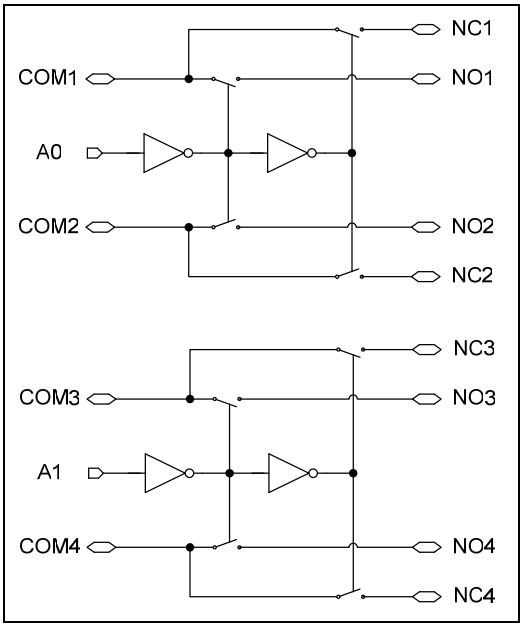
Applications

- Wireless Handsets
- Portable electronic devices
- PDAs
- Audio & Video Switching
- PCMCIA Cards
- Computer Peripherals
- Modems

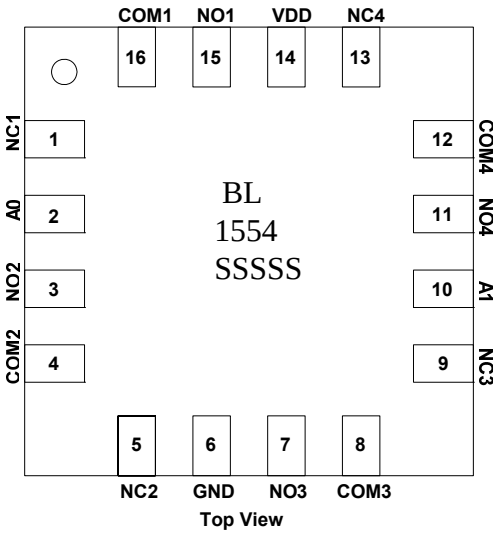
Description

The BL1554 is a quad single-pole double-throw (SPDT) CMOS switch featuring an On-Resistance of 0.4 ohm at V_{DD}=2.7V and wide power supply range from 1.6V to 4.2V. It can be used as an analog switch or low-delay bus switch.

Block Diagram



Pin Configuration



Top View

** "SSSSS" STANDS FOR THE LOT NO.

Function Table

	In	Function
A0	0	NC1(NC2) connect to COM1 (COM2)
	1	NO1(NO2) connect to COM1 (COM2)
A1	0	NC3(NC4) connect to COM3 (COM4)
	1	NO3(NO4) connect to COM3 (COM4)

Pin Description

Pin Name	Type	Description
VDD	PWR	Power Supply
GND	Ground	Ground
COMx	Input/Output	Data Port
NCx	Input/Output	Data Port
NOx	Input/Output	Data Port
Ay	Input	Logic Control Signal

x = 1, 2, 3 or 4; y = 0 or 1

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Units
DC Supply Voltage	V_{DD}	1.5	4.6	V
Signals on NC	V_{NCX}	-0.5	V_{SUP} + 0.3	V
Signals on NO	V_{NOX}	-0.5	V_{SUP} + 0.3	V
Signals On COM	V_{COM}	-0.5	V_{SUP} + 0.3	V
Peak Current(1) （V_{NC}+V_{NO}）	I_{PEAK}	-500	+500	mA

Notes:

(1): Pulsed at 1ms, 10% duty circle

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	V_{DD}	Guaranteed Limit			Unit
				Min.	Typ.(1)	Max.	
DC ELECTRICAL CHARACTERISTICS (Analog Section)							
Input Signal Range(2)	V_{AN}			0		V_{DD}	V
On Resistance(2)	R_{ON}	I_{COM} =100mA ; V_{IN} = 1.5V	4.0 2.7		0.4 0.4	0.6 0.6	Ω
On Resistance Flatness(2, 3)	R_{FLAT}	I_{COM} =100mA ; V_{IN} = 0.8V to 2.0V	4.0 2.7		0.08 0.08	0.12 0.12	Ω
On Resistance Match Between Channels(2, 4)	△R_{ON}	I_{COM} =100mA ; V_{IN} = 1.5V	4.0 2.7		0.08 0.08	0.09 0.09	Ω
NC or NO Off Leakage Current	$I_{NC(OFF)}$ or $I_{NO(OFF)}$	V_{NO} or V_{NC} = 0.3V, 3.3V	4.2 3.6	-500 -400		500 400	nA
COM On Leakage Current	$I_{COM(ON)}$	V_{COMX} = 0.3V, 3.3V	4.2 3.6	-500 -400		500 400	nA
DC ELECTRICAL CHARACTERISTICS (Digital Section)							
Input High Voltage	V_{IH}	Minimum High Level Input Voltage	4.2 3.3	1.6 1.3			V
Input Low Voltage	V_{IL}	Maximum Low Level Input Voltage	4.2 3.3			0.7 0.5	V
Input Current (High Level)	I_{AH}	V_A = 1.4V， Others = 0.5V	4.2 3.3	-1 -1		1 1	uA
Input Current (Low Level)	I_{AL}	V_A = 0.5V， Others = 1.4V	4.2 3.3	-1 -1		1 1	uA

Note:

(1). Typical characteristics are at 25°C

(2). Guaranteed by design. Resistance measurement do not include test circuit or package resistance

(3). Flatness is defined as the difference between the maximum and minimum value of on resistance as measured over the specified analog signal ranges.

(4). △R_{ON}= $R_{ON(MAX)}$ - $R_{ON(MIN)}$ between channels

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	V_{DD}	Guaranteed Limit			Unit
				Min.	Typ. (1)	Max.	
AC ELECTRICAL CHARACTERISTICS							
Turn On Time	t_{ON}	V_{COM} = 2V; R_L = 50Ω; C_L = 35pF	4.2 3.3		20 20	25 25	ns
Turn Off Time	t_{OFF}	V_{COM} = 2V; R_L = 50Ω; C_L = 35pF	4.2 3.3		10 10	15 15	ns
Break Before Make Time	t_{BBM}	VIN = 1.5V; R_L = 50Ω; C_L = 35pF	4.2 3.3		13 13	16 16	ns
NC/NO OFF Capacitance	$C_{NC(OFF)}$ or $C_{NO(OFF)}$	f = 1MHz ,	4.2 3.3		50 50		pF
NC/NO ON Capacitance	$C_{NC(ON)}$ or $C_{NO(ON)}$	f = 1MHz ,	4.2 3.3		135 135		pF
ADDITIONAL APPLICATION CHARACTERISTICS							
3dB Bandwidth	f_{3dB}	V_{IN} Centered Between V_{DD} and GND	4.2 3.3		42 42		MHz
Charge Injection Select Input to Common I/O(2)	Q	V_{GEN} = 0V; R_{GEN} = 0Ω ; C_L = 1nF	4.2 3.3		100 100		pC
Off Isolation(3)	V_{ISO}	f = 100kHz; R_L = 50Ω	4.2 3.3		-65 -65		dB
Cross Talk Between Two Switches(4)	V_{CT}	f = 100kHz; R_L = 50Ω	4.2 3.3		-65 -65		dB
Supply							
Power Supply Range	V_{DD}			1.5		4.4	V
Maximum Quiescent Supply Current	I_{DD}	V_A = V_{DD} or GND	4.2			1.5	uA

Note:

(1). Typical characteristics are at 25°C

(2). Guaranteed by design.

(3). Off Channel Isolation = $20\log_{10}$ [$(V_{NO\backslash NC})/V_{COM}$]

(4). Between any two switches

THERMAL INFORMATION

Continuous Power Dissipation

16-pin QFN (derate 7.1mW/ºC above +70ºC)... ....0.5W

Storage Temperature ....–65ºC to +150ºC

Operating Temperature Range ....–40ºC to +85ºC

TEST SETUP CIRCUITS

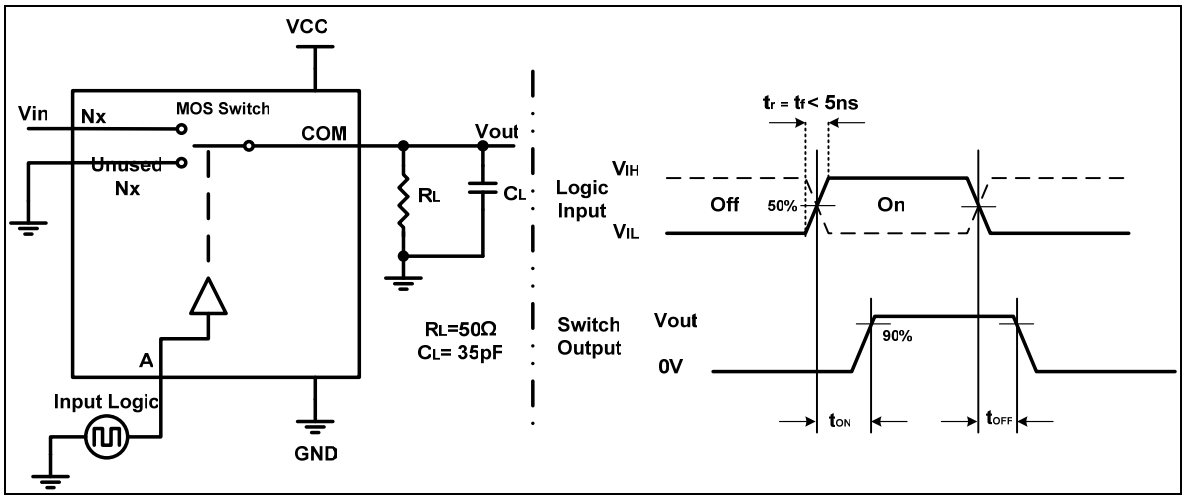


Fig.1 AC Test Circuit & Waveforms

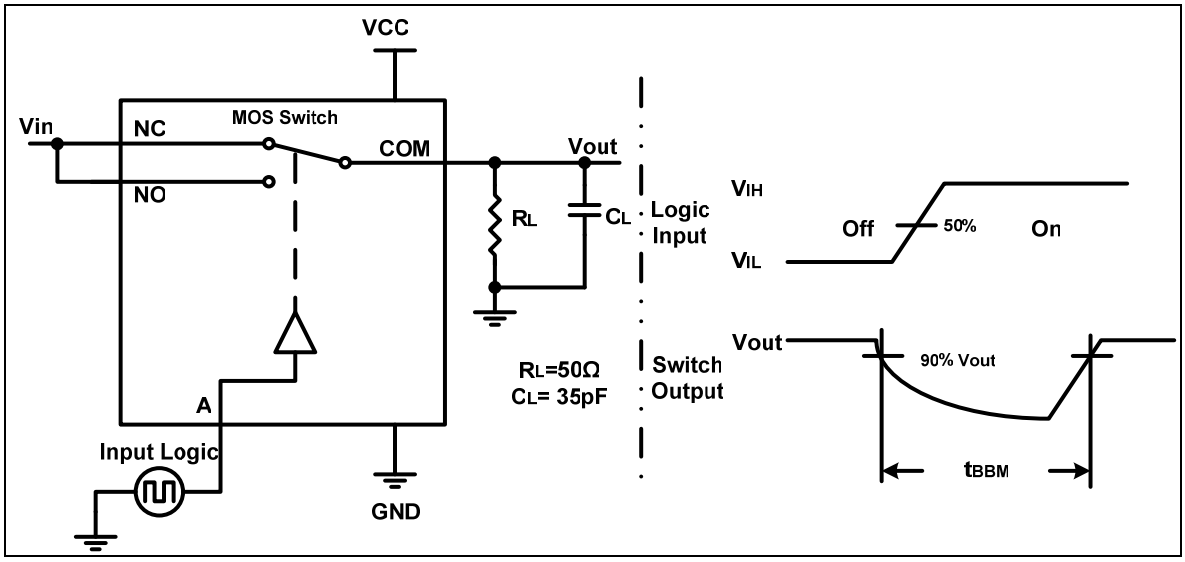


Fig.2 Break Before Make Time (t_{BBM})

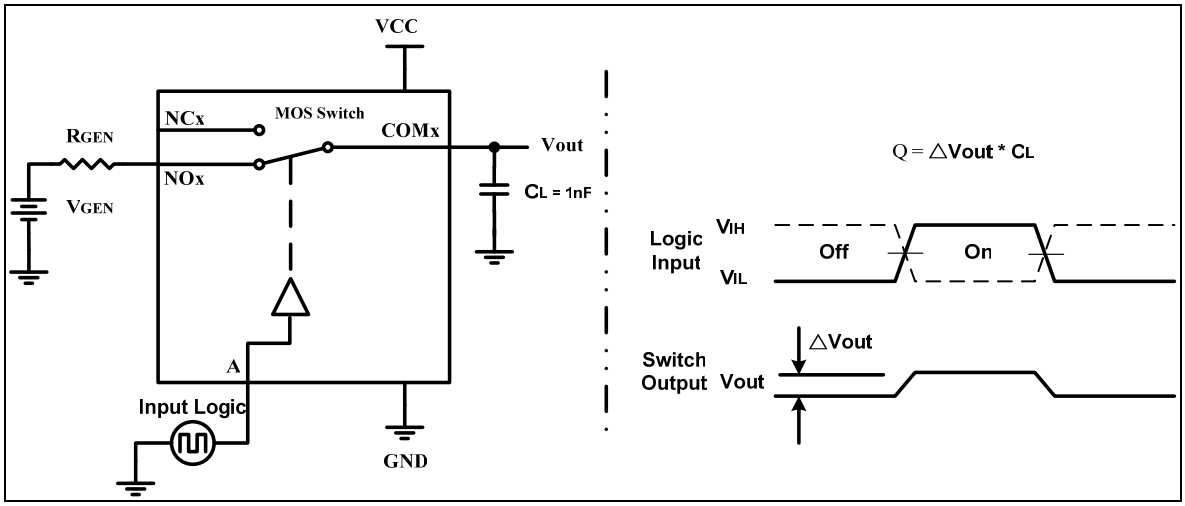


Fig.3 Charge Injection Select Input to Common I/O (Q)

TEST SETUP CIRCUITS

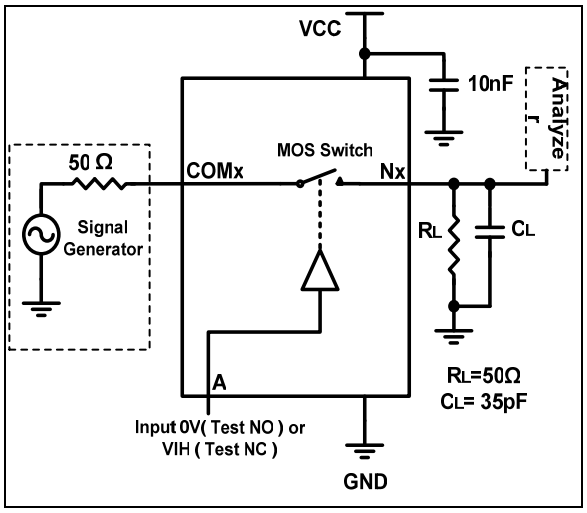


Fig.4 Off Isolation (V_{ISO})

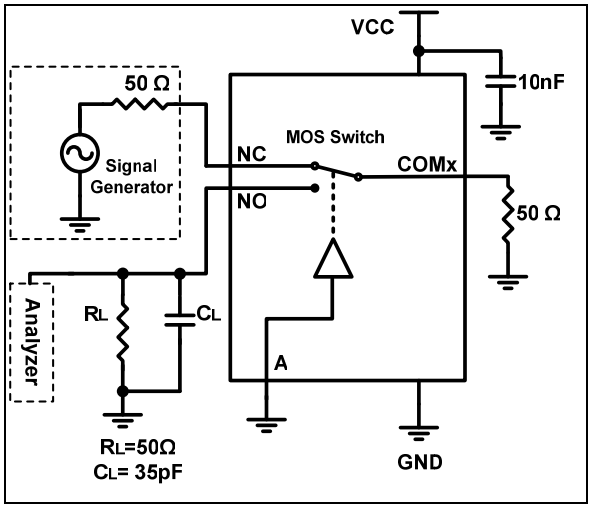


Fig.5 Cross Talk (V_{CT})

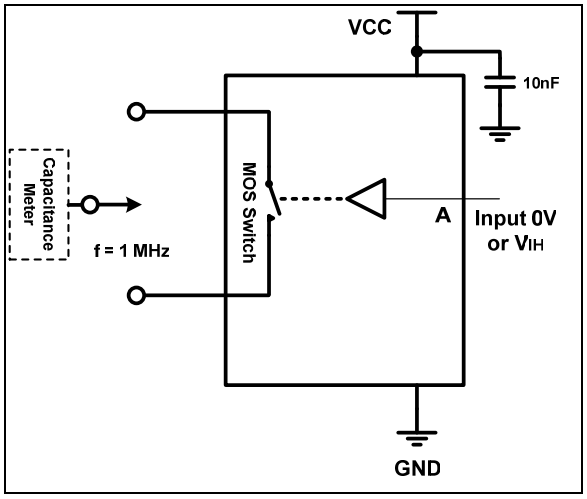


Fig.6 Channel Off Capacitance($C_{NX(OFF)}$)

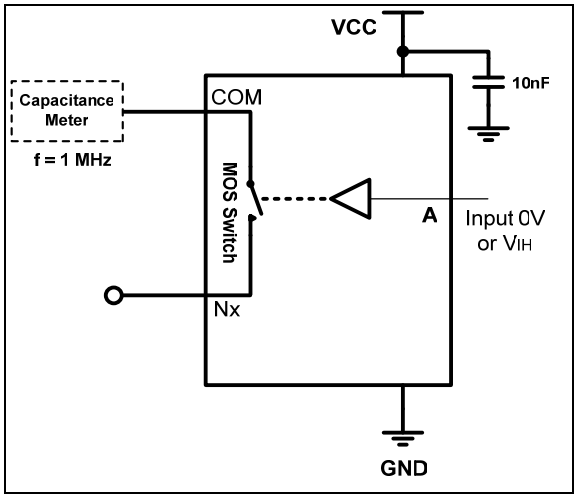


Fig.7 Channel On Capacitance($C_{NX(ON)}$)

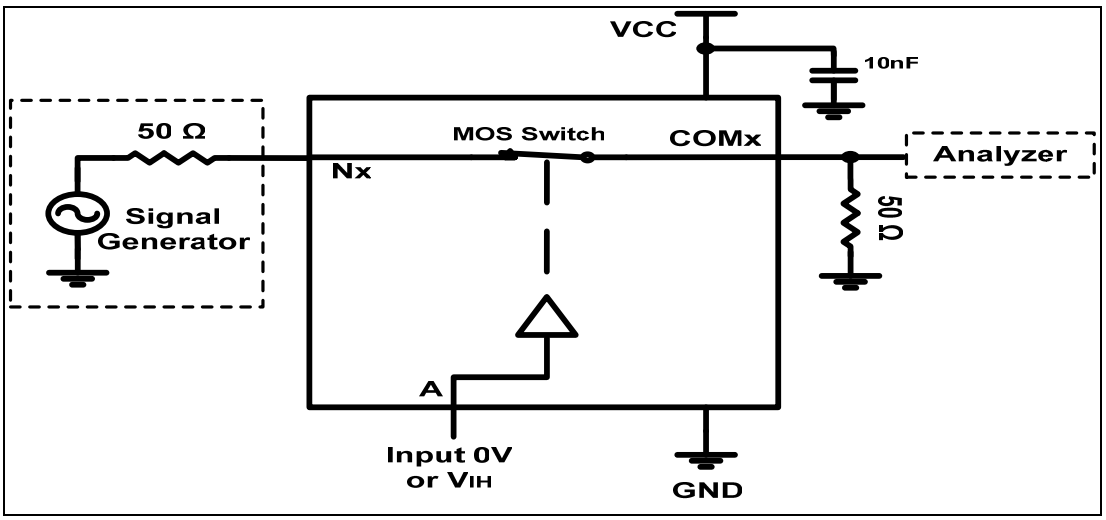
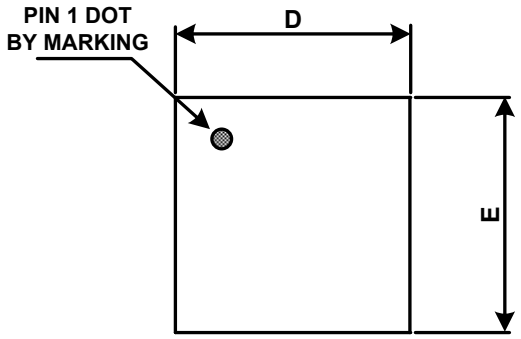


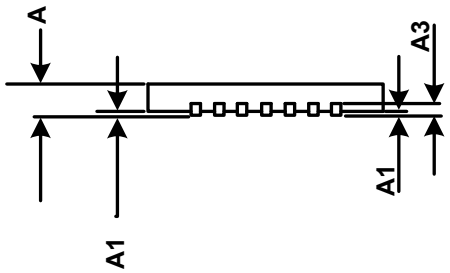
Fig.8 -3dB Bandwidth (f_{3dB})

PACKAGE OUTLINE DIMENSIONS

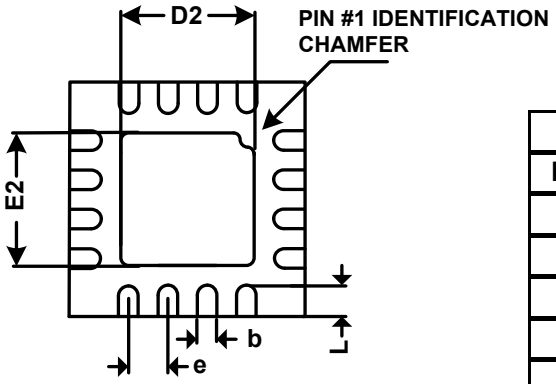
16L QFN 3X3 mm



TOP VIEW



SIDE VIEW



BOTTOM VIEW

COMMON DIMENSIONS (MM)			
PKG.	W: VERY VERY THIN		
REF.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.2 REF.		
D	2.95	3.00	3.05
E	2.95	3.00	3.05
b	0.18	0.25	0.30
L	0.30	0.40	0.50
D2	1.55	1.70	1.80
E2	1.55	1.70	1.80
e	0.5 BSC		