Dual 4-Channel Analog Multiplexer/Demultiplexer

Features

- Wide Power Supply Range: 2.5V to 5.5V
- On-Resistance: 42Ω (TYP) at 5.0V
- -3dB Bandwidth: 550MHz
- Break-Before-Make Switching
- Rail-to-Rail Signal Range
- High Off-Isolation: -83dB (f=1MHz)
- Low Crosstalk: -95dB (f=1MHz)
- Operation Temperature Range: -40°C to +125°C
- Available in SOP16 package

Description

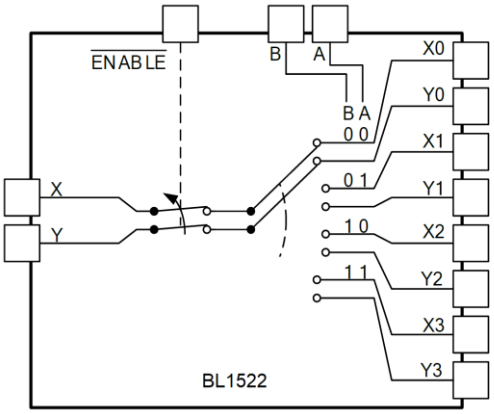
The BL1522 is a dual 4-Channel Analog Multiplexers and Demultiplexers designed for 2.5V to 5.5V V_{CC} operation. It has low on-resistance (42Ω TYP) and very low off-leakage current (1nA TYP). The BL1522 devices handle both analog and digital signals.

The BL1522 is available in SOP16 package.

Applications

- Sensors
- Audio and Video Signal Routing
- Communications Circuits
- Battery-Operated Equipment
- Factory Automation
- Medical instruments

Functional Diagrams of BL1522

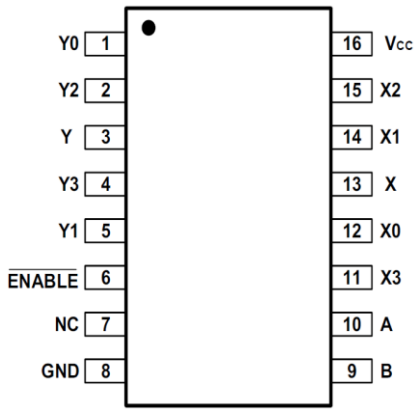


Ordering Information

Order No.	Package	Packing
BL1522SO	SOP16	Tape and Reel, 2500

Pin Configurations

(TOP VIEW)



SOP16

Pin Description

NAME	PIN (SOP16)	FUNCTION
X0 – X3	12,14,15,11	Analog Switch Inputs X0-X3
Y0 – Y3	1,5,2,4	Analog Switch Inputs Y0-Y3
X	13	Analog Switch “X” Output.
Y	3	Analog Switch “Y” Output.
V_{CC}	16	Positive Analog and Digital Supply Voltage Input
A	10	Digital Address “A” Input
B	9	Digital Address “B” Input
GND	8	Ground. Connect to digital ground
NC	7	No Connect.
$\overline{ENABLE}$	6	Digital Enable Input. Normally connected to GND

Function Table

INPUTS			ON CHANNEL
$\overline{ENABLE}$	B	A	
L	L	L	X0, Y0
L	L	H	X1, Y1
L	H	L	X2, Y2
L	H	H	X3, Y3
H	X	X	None

X=Don’t care

ABSOLUTE MAXIMUM RATINGS

Parameter	Min	Max	Units
V_{CC} to GND	-0.3	6	V
Voltage into Any Terminal	-0.3	V_{CC} + 0.3	V
Continuous Current into Any Terminal	-20	+20	mA
Peak Current, X_,Y_ (Pulsed at 1ms, 10% duty cycle)	-40	+40	mA
Operating Temperature	-40	+125	℃
Storage Temperature Range	-65	+150	℃

Notes:

(1) Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

DC ELECTRICAL CHARACTERISTICS

（V_{CC}=5V，Full = -40℃ to +125℃. Typical values are at V_{CC}=+25℃, unless otherwise noted）

PARAMETER	SYMBOL	CONDITIONS	TA	MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Analog Signal Range	$V_{X\_}$, $V_{Y\_}$, V_X, V_Y		Full	GND		V_{CC}	V
On-Resistance	R_{ON}	V_{CC}=5V, I_X ,I_Y=1mA	+25℃		42	58	Ω
			Full			67	
On-Resistance Match Between Channels	ΔR_{ON}	V_{CC}=5V, I_X ,I_Y=1mA	+25℃		1	5	Ω
			Full			5.3	
On-Resistance Flatness	$R_{FLAT(ON)}$	V_{CC}=5V, I_X ,I_Y=1mA	+25℃		9	15	Ω
			Full			20	
X_, Y_ Off Leakage Current	$I_{X\_(OFF)}$, $I_{Y\_(OFF)}$	V_{CC} = 5.0V, $V_{X\_}$, $V_{Y\_}$ = 1V, 4.5V, V_X, V_Y = 4.5V, 1V	+25℃		1	1000	nA
X ,Y Off Leakage Current	$I_{X(OFF)}$, $I_{X(OFF)}$	V_{CC} = 5.0V, $V_{X\_}$, $V_{Y\_}$ = 1V, 4.5V, V_X, V_Y = 4.5V, 1V	+25℃		1	1000	nA
X, Y On Leakage Current	$I_{X(ON)}$, $I_{X(ON)}$	V_{CC} = 5.0V, V_X, V_Y = 4.5V, 1V	+25℃		1	1000	nA
DIGITAL CONTROL INPUTS							
Logic Input Logic Threshold High	V_{AH}, V_{BH}, $V_{\overline{ENABLE}}$		+25℃	1.7			V

Logic Input Logic Threshold Low	V_{AL}, V_{BL}, $V_{\overline{ENABLE}}$		+25℃			0.5	V
Input-Current High	I_{AH}, I_{BH}, $I_{\overline{ENABLE}}$	V_A, V_B, $V_{\overline{ENABLE}}$ = V_{CC}	+25℃		1	1000	nA
Input-Current Low	I_{AL}, I_{BL}, $I_{\overline{ENABLE}}$	V_A, V_B, $V_{\overline{ENABLE}}$ = 0V	+25℃		1	1000	nA
DYNAMIC CHARACTERISTICS							
Address Transition Time	t_{TRANS}	$V_{X\_}$, $V_{Y\_}$ = 3V/0V, R_L = 300Ω, C_L = 35pF, Test Circuit 1	+25℃		100		ns
$\overline{ENABLE}$ Turn-On Time	t_{ON}	$V_{X\_}$ $V_{Y\_}$ = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 2	+25℃		65		ns
$\overline{ENABLE}$ Turn-Off Time	t_{OFF}	$V_{X\_}$ $V_{Y\_}$ = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 2	+25℃		35		ns
Internal A, B Rise Time	t_R		+25℃		65		ns
Internal A, B Fall Time	t_F		+25℃		60		ns
Break-Before-Make Time Delay	t_D	$V_{X\_}$, $V_{Y\_}$ = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 3	+25℃		68		ns
Charge Injection	Q	R_S = 0Ω, CL = 1nF, Test Circuit 4	+25℃		6		pC
Off Isolation	O_{ISO}	f = 1MHz, Test Circuit 5	+25℃		-83		dB
Crosstalk	X_{TALK}	f = 1MHz, Test Circuit 5	+25℃		-95		dB
Input Off-Capacitance	$C_{X\_(OFF)}$, $C_{Y\_(OFF)}$	f = 1MHz, Test Circuit 6	+25℃		6		pF
Output Off-Capacitance	$C_{X(OFF)}$ $C_{Y(OFF)}$	f = 1MHz, Test Circuit 6	+25℃		10		pF
Output On-Capacitance	$C_{X(ON)}$, $C_{Y(ON)}$	f = 1MHz, Test Circuit 6	+25℃		13		pF
-3dB Bandwidth	BW	R_L = 50Ω	+25℃		550		MHz
Total Harmonic Distortion	THD	R_L = 600Ω, $5V_{P-P}$, f = 20Hz to 20kHz	+25℃		0.6		%
POWER REQUIREMENTS							
Power Supply Range	V_{CC}		full	2.5		5.5	V
Power Supply Current	I_{CC}	V_{CC} = 5.5V, V_A, V_B, , $V_{\overline{ENABLE}}$= V_{CC} or 0V	+25℃		0.001	1	uA

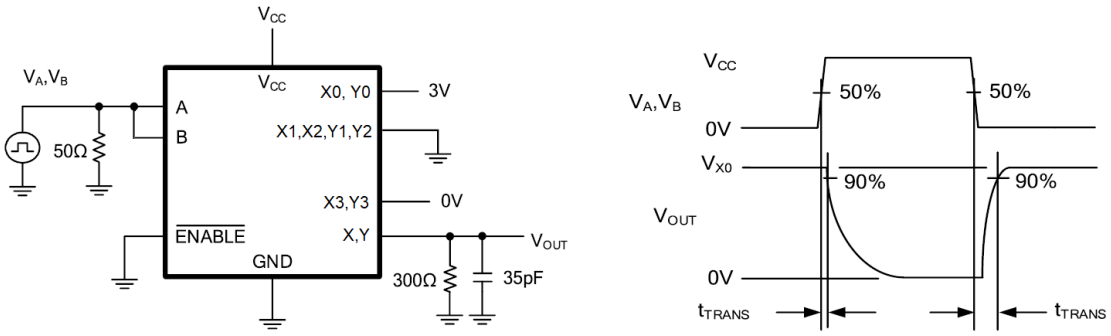
DC ELECTRICAL CHARACTERISTICS

（V_{CC}=3.3V，Full=-40℃ to ＋125℃. Typical values are at V_{CC}= ＋25℃, unless otherwise noted）

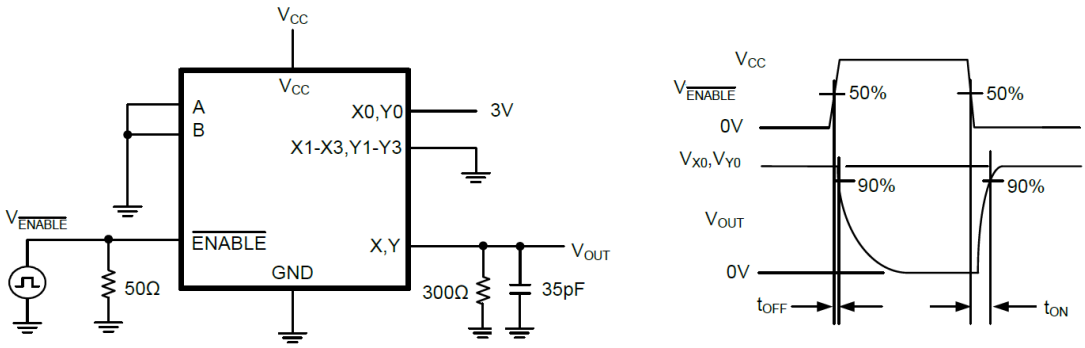
PARAMETER	SYMBOL	CONDITIONS	TA	MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Analog Signal Range	$V_{X\_}$, $V_{Y\_}$, V_X, V_Y		Full	GND		VCC	V

On-Resistance	R_{ON}	Ix, I_Y =1mA	+25℃		70	110	Ω
			Full			116	
X_, Y_ Off Leakage Current	$I_{X\_(OFF)}$, $I_{Y\_(OFF)}$	$V_{X\_}$, $V_{Y\_}$= 1V, 3V , V_X , V_Y= 3V, 1V	+25℃		1	1000	nA
X, Y Off Leakage Current	$I_{X(OFF)}$, $I_{Y(OFF)}$	$V_{X\_}$,$V_{Y\_}$ = 1V, 3V , V_X, V_Y = 3V, 1V	+25℃		1	1000	nA
X, Y On Leakage Current	$I_{X(ON)}$, $I_{Y(ON)}$	V_X, V_Y = 3V, 1V	+25℃		1	1000	nA
DIGITAL CONTROL INPUTS							
Logic Input Logic Threshold High	V_{AH}, V_{BH}, $V_{\overline{ENABLE}}$		25℃	1.7			V
Logic Input Logic Threshold Low	V_{AL}, V_{BL}, $V_{\overline{ENABLE}}$		25℃			0.5	V
Input-Current High	I_{AH}, I_{BH}, $I_{\overline{ENABLE}}$	V_A, V_B, $V_{\overline{ENABLE}}$ = V_{CC}	25℃		1	1000	nA
Input-Current Low	I_{AL}, I_{BL} $I_{\overline{ENABLE}}$	V_A, V_B, $V_{\overline{ENABLE}}$ = 0V	25℃		1	1000	nA
DYNAMIC CHARACTERISTICS							
Address Transition Time	t_{TRANS}	$V_{X\_}$, $V_{Y\_}$ = 3V/0V, R_L = 300Ω, C_L = 35pF, Test Circuit 1	+25℃		135		ns
$\overline{ENABLE}$ Turn-On Time	t_{ON}	$V_{X\_}$, $V_{Y\_}$ = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 2	+25℃		90		ns
$\overline{ENABLE}$ Turn-Off Time	t_{OFF}	$V_{X\_}$, $V_{Y\_}$ = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 2	+25℃		50		ns
Internal A, B Rise Time	t_R		+25℃		85		ns
Internal A, B Fall Time	t_F		+25℃		65		ns
Break-Before-Make Time Delay	t_D	$V_{X\_}$, $V_{Y\_}$ = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 3	+25℃		90		ns
Charge Injection	Q	R_S = 0Ω, C_L = 1nF, Test Circuit 4	+25℃		5		pC
-3dB Bandwidth	BW	R_L = 50Ω	+25℃		500		MHz
POWER REQUIREMENTS							
Power Supply Current	I_{CC}	V_{CC}=3.6V, V_A, V_B, $V_{\overline{ENABLE}}$= V_{CC} or 0V	+25℃		0.001	1	uA

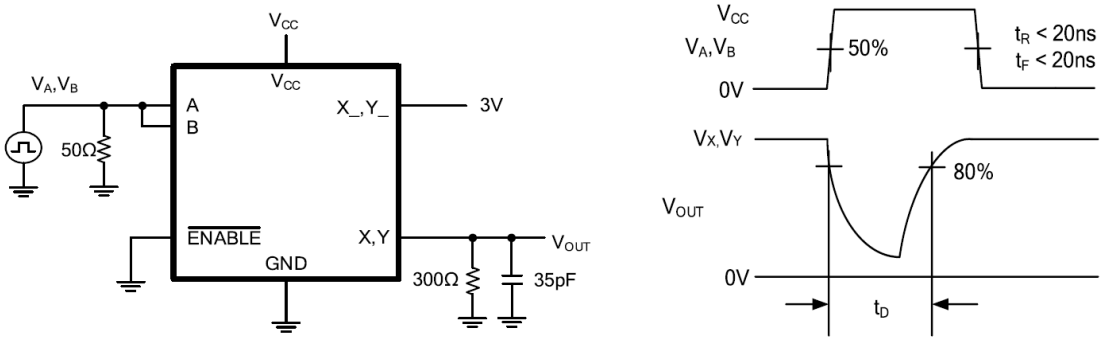
TEST SETUP CIRCUITS



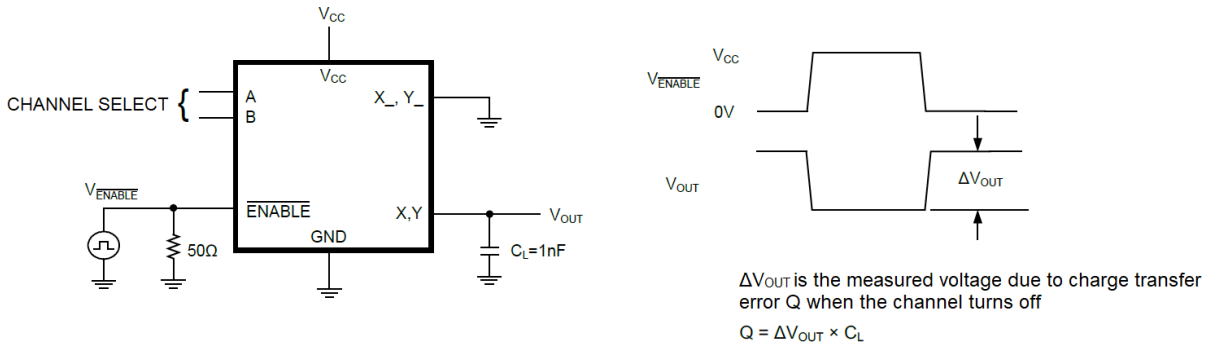
Test Circuit 1. Address Transition Times (t_{TRANS})



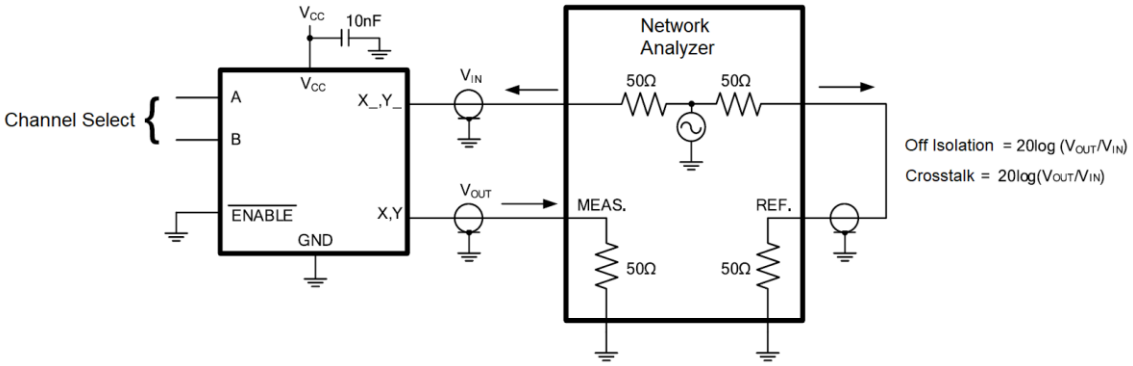
Test Circuit 2. Switching Times (t_{ON}, t_{OFF})



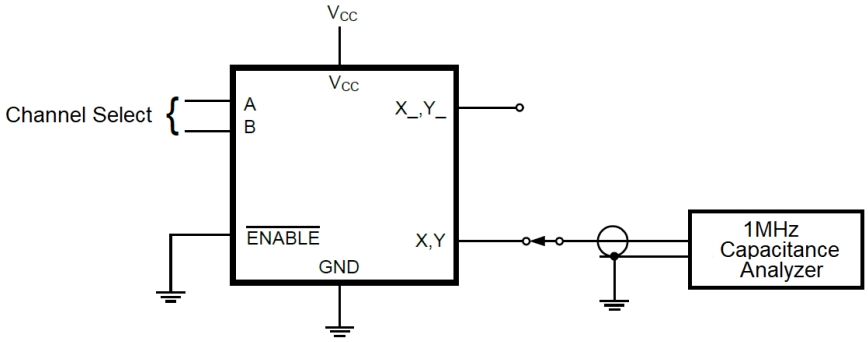
Test Circuit 3. Break-Before-Make Time Delay (t_D)



Test Circuit 4. Charge Injection (Q)



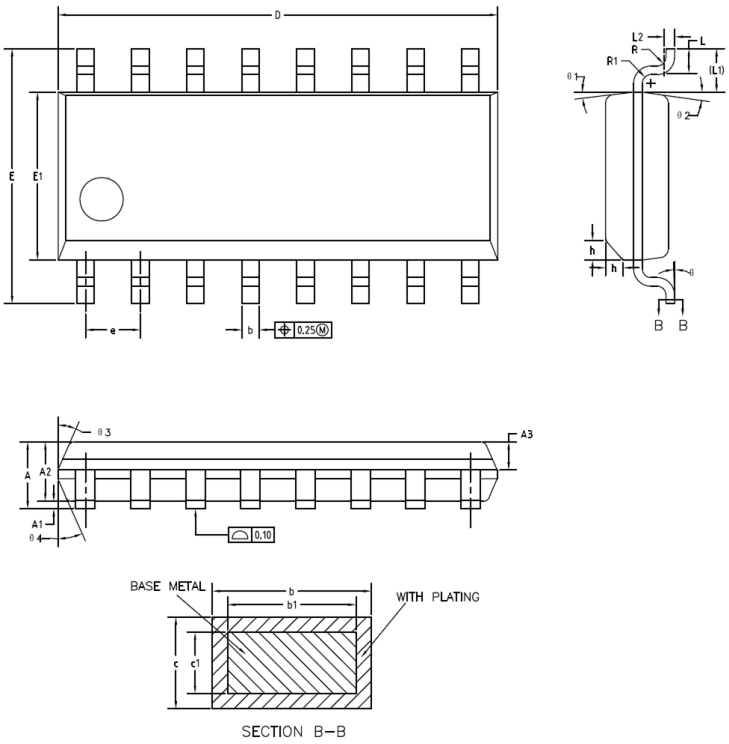
Test Circuit 5. Off Isolation and Crosstalk



Test Circuit 6. Capacitance

PACKAGE OUTLINE DIMENSIONS

SOP16



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	–	–	1.75
A1	0.10	0.15	0.25
A2	1.25	1.45	1.65
A3	0.55	0.65	0.75
b	0.35	–	0.51
b1	0.34	0.40	0.45
c	0.17	–	0.25
c1	0.17	0.20	0.23
D	9.80	10.00	10.20
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27BSC	
L	0.40	0.60	0.80
L1		1.04REF	
L2		0.25BSC	
R	0.07	–	–
R1	0.07	–	–
h	0.30	0.40	0.50
θ	0°	–	8°
θ1	6°	8°	10°
θ2	6°	8°	10°
θ3	5°	7°	9°
θ4	5°	7°	9°