

Features

- On-Resistance: 51Ω (MAX) with ±5V Supplies
84Ω (MAX) with Single +5V Supply
- High Off-Isolation: -70dB ($R_L = 50\Omega$, $f = 1\text{MHz}$)
- Single-Supply Operation: +3.0V ~ +11V
- Dual-Supply Operation: ±1.5V to ±5.5V
- Low On-Resistance Flatness
- Low Off-Leakage Current: 10nA (TYP) at +25°C
- Low On-Leakage Current: 10nA (TYP) at +25°C
- Low Distortion: 0.08% ($R_L = 600\Omega$, $f = 20\text{Hz}$ to 20kHz)
- Rail-to-Rail Input and Output Operation
- TTL/CMOS-Logic Compatible
- -40°C to +85°C Operating Temperature Range
- Available in Green TSSOP-16 and SOP-16 Packages

General Description

The GS4581 is an 8-channel, TTL/CMOS compatible analog multiplexer. It operates from +3.0V to +11V single power supply or ±1.5V to ±5.5V dual power supplies. The GS4581 features high voltage, low on-resistance and low distortion. The high performances make it very suitable for multiple applications, such as cellular phones, audio and video signal routing, etc. TTL/CMOS logic compatibility can be guaranteed when using a single +5V or dual ±5V power supplies because the logic thresholds of all digital inputs are between 0.8V and 2.4V. The GS4581 is available in Green TSSOP-16 and SOP-16 package. It operates over an ambient temperature range of -40°C to +85°C.

Applications

- Battery-Operated Equipment
- Automotive
- Sample-and-Hold Circuits
- Portable Systems
- Audio and Video Signal Routing
- Cell Phones

Pin Configuration

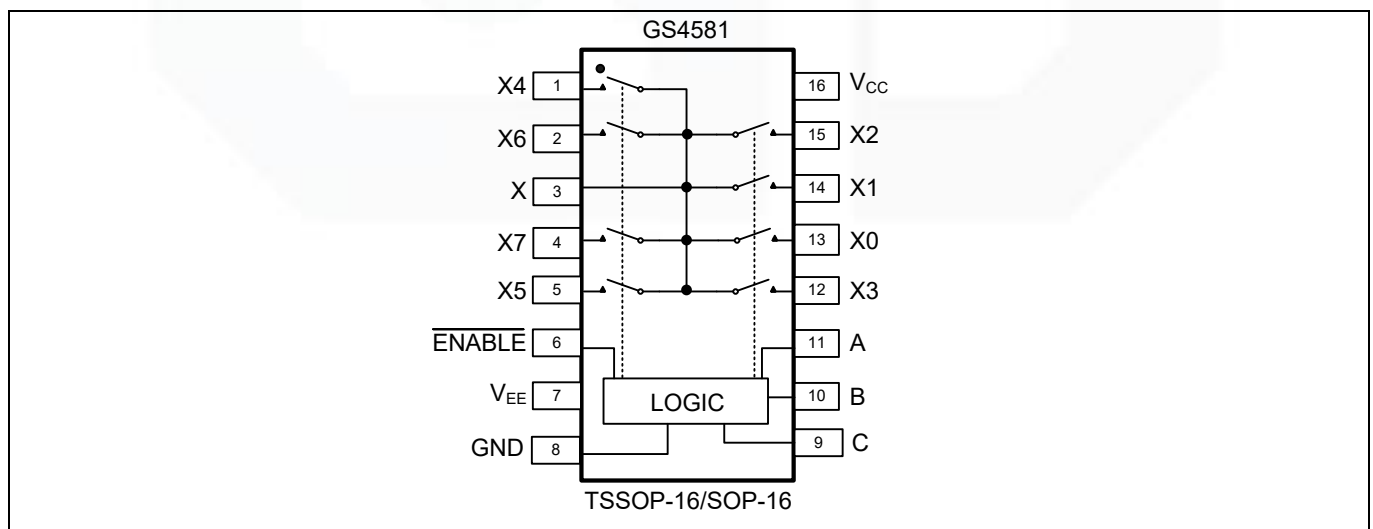


Figure 1. Pin Assignment Diagram

Absolute Maximum Ratings

Condition	Min	Max
Power Supply Voltage (V _{EE} to V _{CC})	-0.3V	+13.2V
Power Supply Voltage (V _{EE} to GND)	-0.3V	+6V
Voltage into Any Terminal ⁽¹⁾	V _{EE} -0.3V	V _{CC} +0.3V
Continuous Current into Any Terminal	± 20mA	
Peak Current, X_ (pulsed at 1ms, 10% duty cycle)	± 40mA	
Operating Temperature Range	-40°C	+85°C
Junction Temperature	+150°C	
Storage Temperature Range	-65°C	+150°C
Lead Temperature (soldering, 10sec)	+260°C	
Package Thermal Resistance (T _A =+25°C)		
Tssop-16, θ _{JA}	190°C/W	
Sop-16, θ _{JA}	180°C/W	
ESD Susceptibility		
HBM	2000V	
CDM	2000V	
Latch up	350mA	

Note1: Voltages exceeding V_{CC} or V_{EE} on any signal terminal are clamped by internal diodes. Limit forward-diode current to maximum current rating.

Package/Ordering Information

Model	Channel	Order Number	Package Description	Package Option	Marking Information
GS4581	Eight	GS4581-TR	TSSOP-16	Tape and Reel,3000	GS4581
	Eight	GS4581-SR	SOP-16	Tape and Reel,2500	GS4581

Function Table

ENABLE INPUT	SELECT INPUTS			ON SWITCHES
	C	B	A	
H	X	X	X	All Switches Open
L	L	L	L	X-X0
L	L	L	H	X-X1
L	L	H	L	X-X2
L	L	H	H	X-X3
L	H	L	L	X-X4
L	H	L	H	X-X5
L	H	H	L	X-X6
L	H	H	H	X-X7

X= Don't care

Electrical Characteristics (Dual Supplies)

(At $V_{CC}=+4.5V$ to $+5.5V$, $V_{EE}=-4.5V$ to $-5.5V$, and $T_A = +25^{\circ}C$, unless otherwise noted.)

Parameter	Symbol	Conditions	GS4581			
ANALOG SWITCH			TYP	MIN	MAX	UNIT
Analog Signal Range	V _X , V _{X-}			V _{EE}	V _{CC}	V
On-Resistance	R _{ON}	V _{CC} = 4.5V, V _{EE} = -4.5V I _X = 1mA	36		51	Ω
On-Resistance Match Between Channels	ΔR _{ON}	V _{CC} = 4.5V, V _{EE} = -4.5V I _X = 1mA	3		11	
On-Resistance Flatness	R _{FLAT(ON)}	V _{CC} = 4.5V, V _{EE} = -4.5V I _X = 1mA	15		25	
X Off Leakage Current	I _{X(OFF))}	V _{CC} = 5.5V, V _{EE} = -4.5V, V _{X-} = -4.5V, 4.5V, V _X = 4.5V,-4.5V			10	nA
X On Leakage Current	I _{X(ON)}	V _{CC} = 5.5V, V _X = -4.5V,4.5V			10	
DIGITAL INPUTS						
Input High Voltage	V _{AH} , V _{BH} , V _{CH} , V _{ENABLEH}	V _{CC} = 5V		2.4		V
Input Low Voltage	V _{AL} , V _{BL} , V _{CL} , V _{ENABLEL}	V _{CC} = 5V			0.8	
Input Leakage Current	I _A , I _B , I _C , I _{ENABLE}	V _{CC} = 5.5V, V _A , V _B , V _C , V _{ENABLE} = 0V or 5.5V			10	nA
Dynamic Characteristics						
Address Transition Time	t _{TRANS}	V _X =3V/3V, R _L =300Ω,C _L =35pF, Test Circuit 1	100			ns
Turn-on Time	t _{ON}	V _X =3V,R _L =300Ω,C _L =35pF, Test Circuit 2	80			
Turn-off Time	t _{OFF}	V _X =3V,R _L =300Ω,C _L =35pF, Test Circuit 2	70			
BBM Time Delay	t _D	V _X =3V,R _L =300Ω,C _L =35pF, Test Circuit 3	40			
-3dB Bandwidth	BW	R _L =50Ω	90			MHz
Charge Injection	Q	R _S =0Ω,C=1nF,V _S =2.5V, Test Circuit 4	2			pC
Power Supply						
Power Supply Range	V _{CC} , V _{EE}			±1.5	±5.5	V

Electrical Characteristics (Single Supply at +5V)

(At $V_{CC} = +4.5V$ to $+5.5V$, $V_{EE} = 0V$, and $T_A = +25^{\circ}C$, unless otherwise noted.)

Parameter	Symbol	Conditions	GS4581			
ANALOG SWITCH			TYP	MIN	MAX	UNIT
Analog Signal Range	V _X , V _{X-}			V _{EE}	V _{CC}	V
On-Resistance	R _{ON}	V _{CC} = 4.5V, I _X = 1mA	62		80	Ω
On-Resistance Match Between Channels	ΔR _{ON}	V _{CC} = 4.5V, I _X = 1mA	3		11	
X Off Leakage Current	I _{X(OFF)}	V _{CC} = 5.5V, V _{X-} = 1.0V, 4.5V, V _X = 4.5V,1.0V			10	nA
X On Leakage Current	I _{X(ON)}	V _{CC} = 5.5V, V _X = 4.5V,1.0V			10	
DIGITAL INPUTS						
Input High Voltage	V _{AH} ,V _{BH} ,V _{CH} ,V _{ENABLEH}	V _{CC} = 5V		2.4		V
Input Low Voltage	V _{AL} ,V _{BL} ,V _{CL} ,V _{ENABLEL}	V _{CC} = 5V			0.8	
Input Leakage Current	I _A ,I _B ,I _C ,I _{ENABLE}	V _{CC} = 5.5V, V _A ,V _B ,V _C ,V _{ENABLE} = 0V or 5.5V			10	nA
Dynamic Characteristics						
Address Transition Time	t _{TRANS}	V _X =3V/0V,R _L =300Ω,C _L =35pF, Test Circuit 1	100			ns
Turn-on Time	t _{ON}	V _X =3V,R _L =300Ω,C _L =35pF, Test Circuit 2	80			
Turn-off Time	t _{OFF}	V _X =3V,R _L =300Ω,C _L =35pF, Test Circuit 2	70			
BBM Time Delay	t _D	V _X =3V,R _L =300Ω,C _L =35pF, Test Circuit 3	40			
-3dB Bandwidth	BW	R _L =50Ω	90			MHz
Charge Injection	Q	R _S =0Ω,C=1nF,V _S =2.5V, Test Circuit 4	2			pC

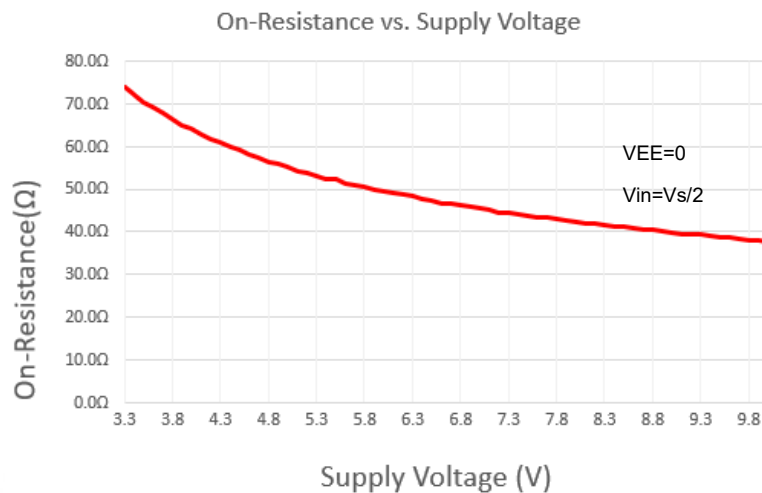
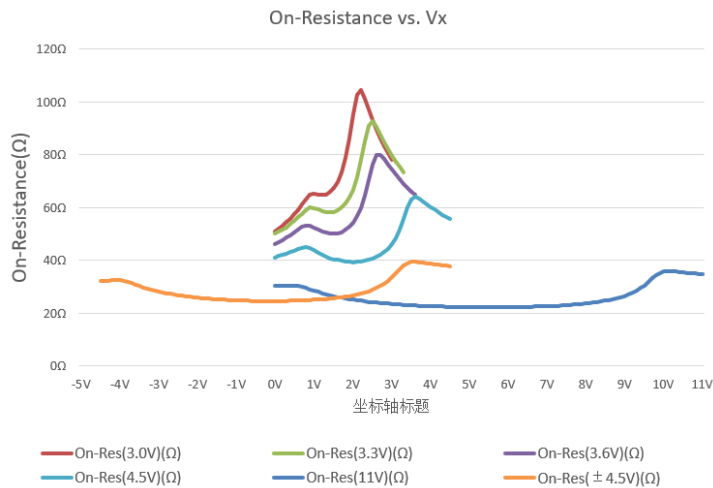
Electrical Characteristics (Single Supply at +3.6V)

 (At $V_{CC}=3.5V$, $V_{EE}=0V$, and $T_A = +25^{\circ}C$, unless otherwise noted.)

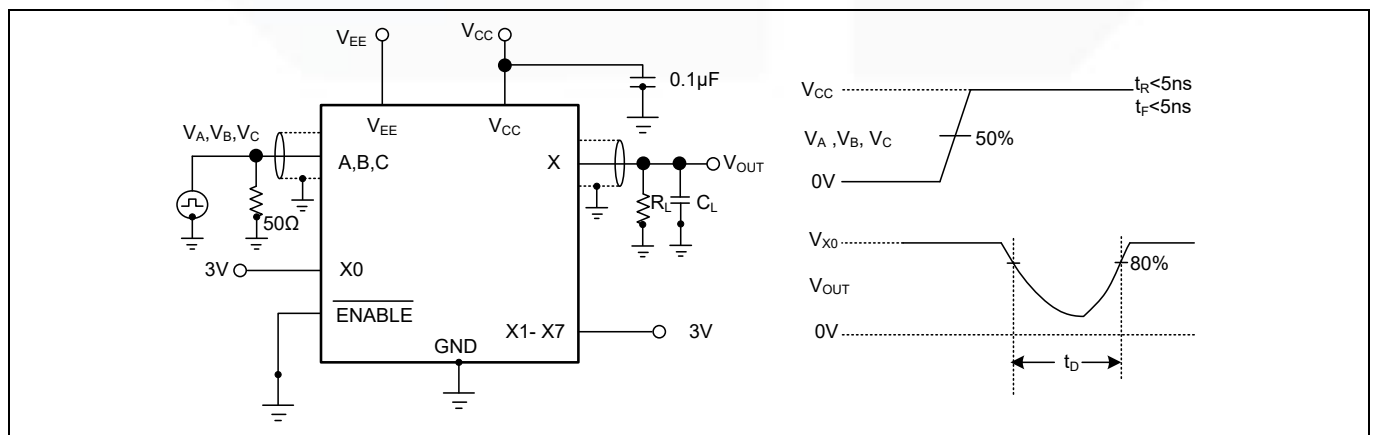
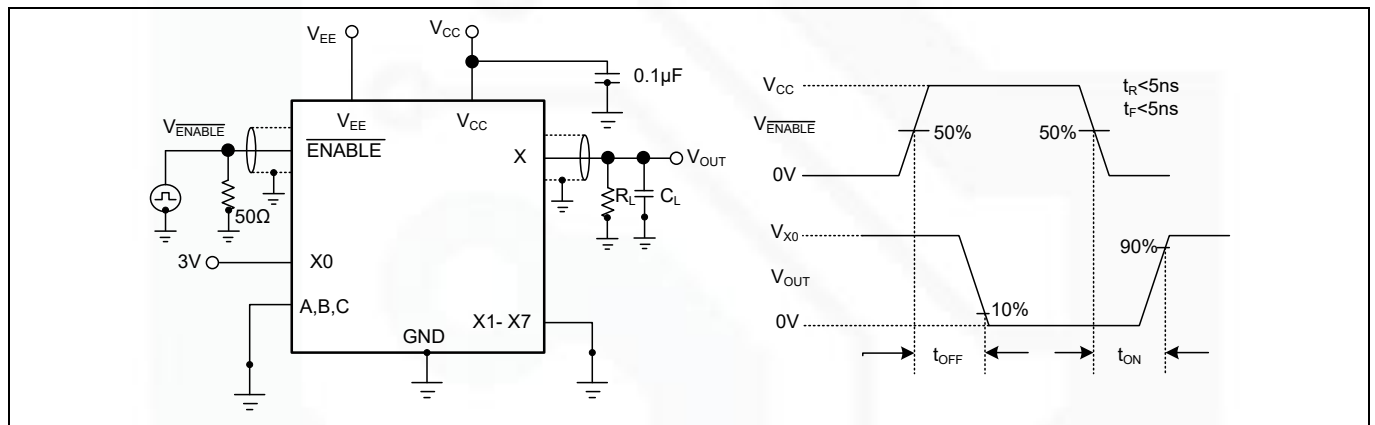
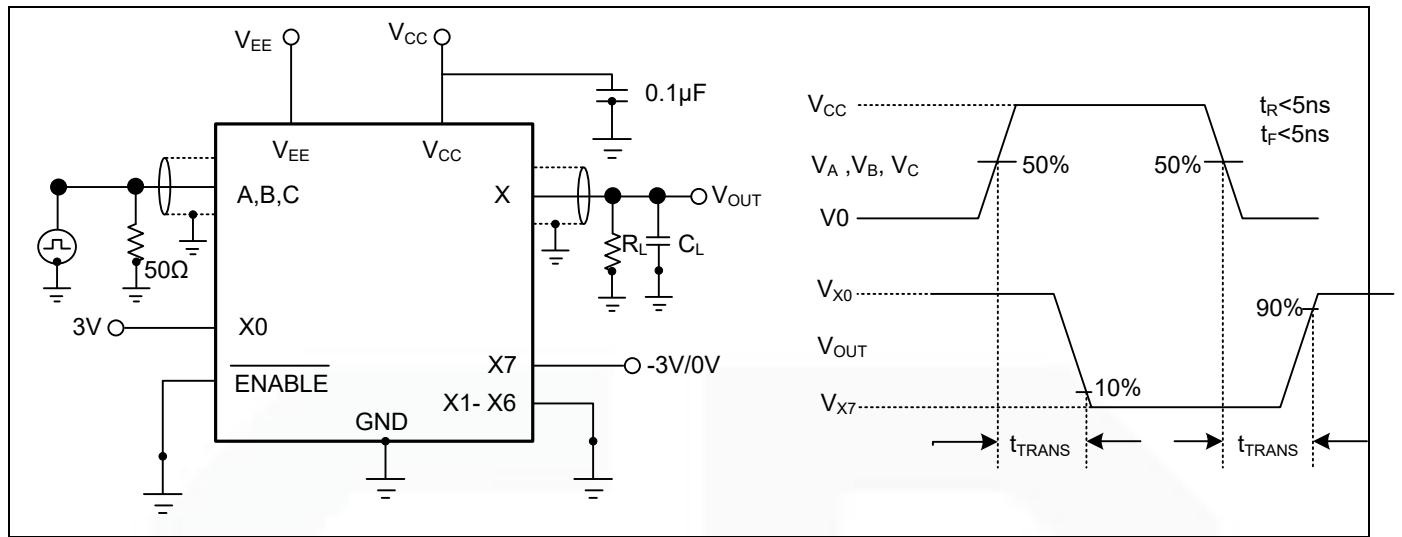
Parameter	Symbol	Conditions	GS4581			
ANALOG SWITCH			TYP	MIN	MAX	UNIT
Analog Signal Range	V _X , V _{X-}			V _{EE}	V _{CC}	V
On-Resistance	R _{ON}	V _{CC} = 4.5V, I _X = 1mA	80		110	Ω
X Off Leakage Current	I _{X(OFF)}	V _{CC} = 5.5V, V _{X-} = 1.0V, 4.5V, V _X = 4.5V,1.0V			10	nA
X On Leakage Current	I _{X(ON)}	V _{CC} = 5.5V, V _X = 4.5V,1.0V			10	
DIGITAL INPUTS						
Input High Voltage	V _{AH} ,V _{BH} ,V _{CH} ,V _{ENABLEH}	V _{CC} = 5V		2.4		V
Input Low Voltage	V _{AL} ,V _{BL} ,V _{CL} ,V _{ENABLEL}	V _{CC} = 5V			0.5	
Input Leakage Current	I _A ,I _B ,I _C ,I _{ENABLE}	V _{CC} = 5.5V, V _A ,V _B ,V _C ,V _{ENABLE} = 0V or 5.5V			10	nA
Dynamic Characteristics						
Address Transition Time	t _{TRANS}	V _{X-} =3V/0V,R _L =300Ω,C _L =35pF, Test Circuit 1	160			ns
Turn-on Time	t _{ON}	V _{X-} =3V,R _L =300Ω,C _L =35pF, Test Circuit 2	130			
Turn-off Time	t _{OFF}	V _{X-} =3V,R _L =300Ω,C _L =35pF, Test Circuit 2	90			
BBM Time Delay	t _D	V _{X-} =3V,R _L =300Ω,C _L =35pF, Test Circuit 3	60			
-3dB Bandwidth	BW	R _L =50Ω	90			MHz
Charge Injection	Q	R _S =0Ω,C=1nF,V _S =2.5V, Test Circuit 4	1			pC

Typical Performance characteristics

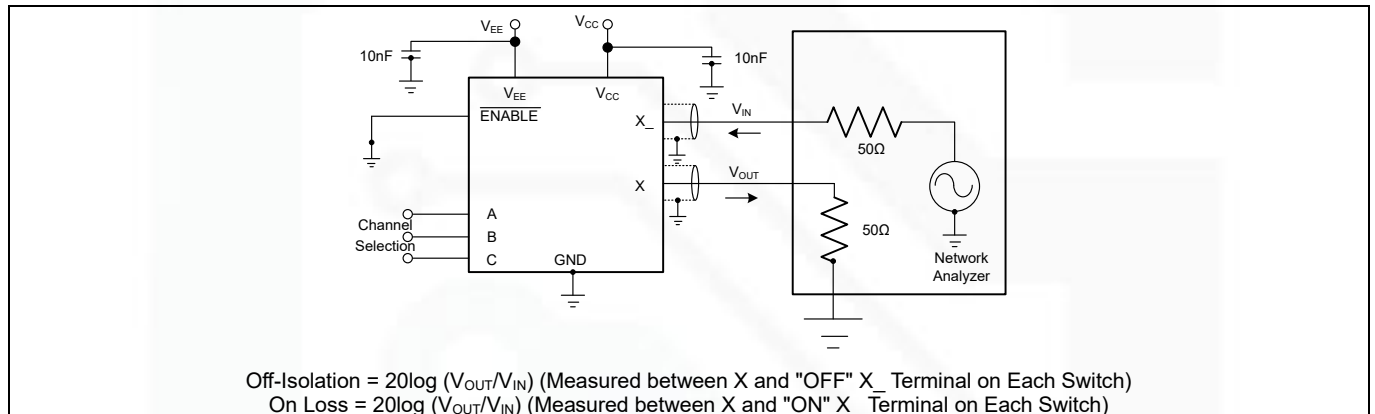
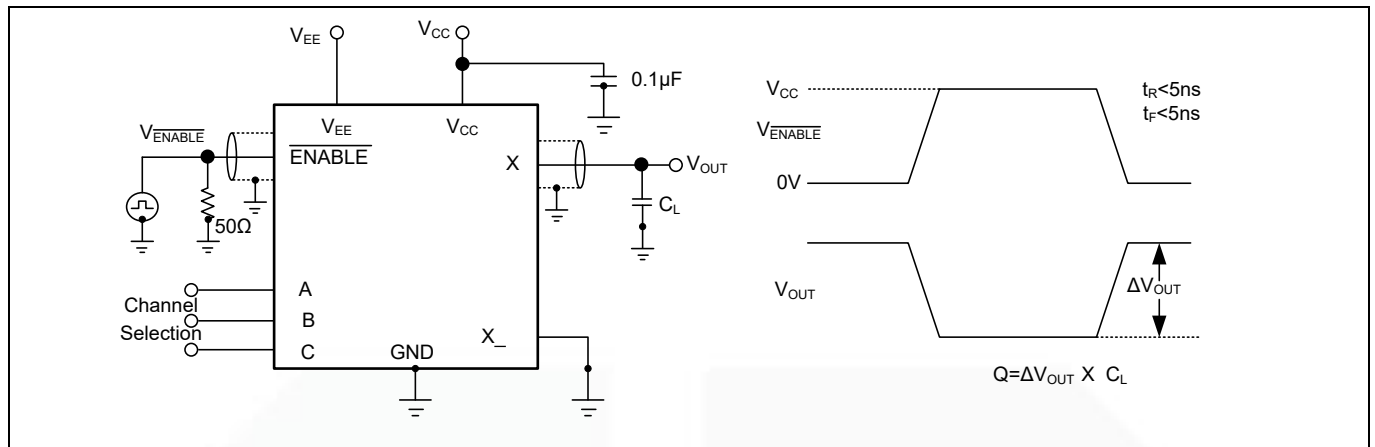
At $T_A=+25^{\circ}\text{C}$, and $V_S=+5\text{V}$, unless otherwise noted.



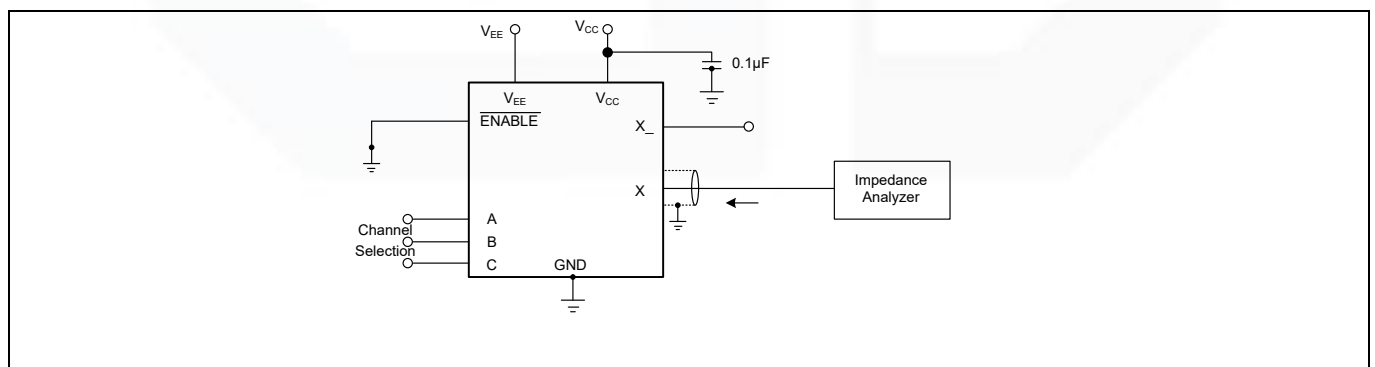
Parameter Measurement Information



Parameter Measurement Information



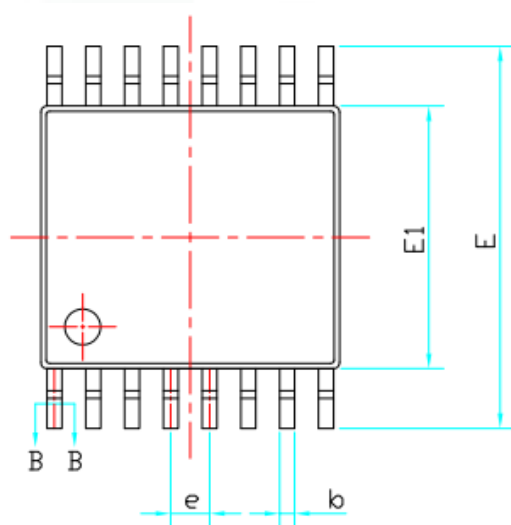
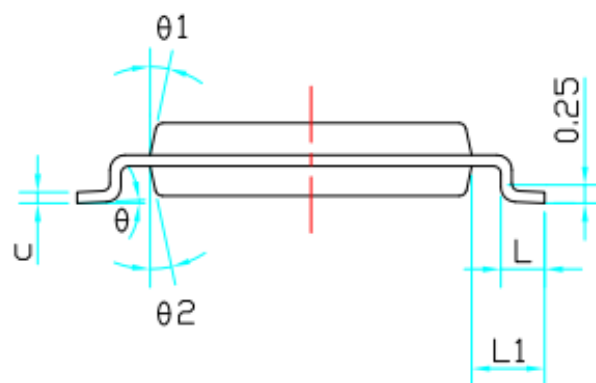
Test Circuit 5. Off Isolation



Test Circuit 6. -3dB Bandwidth

Package Information

TSSOP-16



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	0.08	0.11
A2	0.95	1.00	1.05
A3	0.39	0.44	0.49
b	0.20	—	0.29
c	0.13	—	0.18
D	4.95	5.00	5.05
E1	4.35	4.40	4.45
E	6.35	6.40	6.45
e	0.65BSC		
L	0.55	0.60	0.65
L1	1.00BSC		
θ	2°	—	8°
$\theta 1$	—	13°	—
$\theta 2$	—	12°	—

Package Information

SOP-16

