

5.5Ω, 400MHz Bandwidth, SPDT Analog Switch

Descriptions

The WAS3157B is a high performance, single pole double throw (SPDT) CMOS analog switch for bus switching or audio switching applications. It features high bandwidth up to 400MHz at -3dB and low on-resistance (5.5Ω Typ.).

The SEL pin has overvoltage protection that allows voltages above VCC, up to 7.0V to be present on the pin without damage or disruption of operation of the part, regardless of the operating voltage. The WAS3157B is also featured with smart circuitry to minimize VCC leakage current even when SEL control voltage is lower than VCC supply voltage. In other word, there is no need of additional device to shift SEL level to be the same as that of VCC in real application.

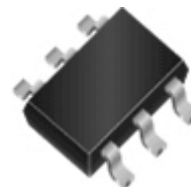
The WAS3157B is available in standard SOT-363(SC-70-6L) package. Standard product is Pb-Free and halogen-Free.

Features

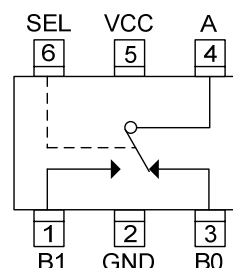
- Supply voltage : 2.3 ~ 5.5V
- On-Resistance : 5.5Ω @ VCC=4.5V
- -3dB Bandwidth : 400MHz @ C_L=5pF
- Off isolation : -69dB @ 10MHz
- Low quiescent current : <1uA
- Break-before-make function
- ESD protection
 - HBM : ±8000V
 - MM : ±600V
- Small package SOT-363

Applications

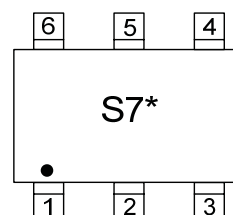
- Cell phones
- MID
- Other portable equipments



SOT-363



Pin configuration (Top view)



Marking

S7 = Device code
***** = Month (A~Z)

Order information

Device	Package	Shipping
WAS3157B-6/TR	SOT-363	3000/Reel&Tape

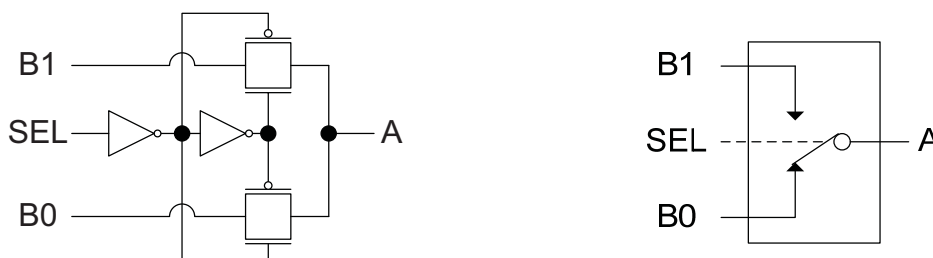
Pin descriptions

Pin Number	Symbol	Descriptions
1	B1	Data 1 terminal, Normally open
2	GND	Ground
3	B0	Data 0 terminal, Normally closed
4	A	Common Data terminal, Connect to B0 or B1 according to SEL logic
5	VCC	Power supply
6	SEL	Switch select pin, Digit logic low or high

Function descriptions

Logic Level (SEL pin, Pin 6)	Function
L	B0 connected to A
H	B1 connected to A

Logic diagram and symbol



Absolute maximum ratings

Parameter	Symbol	Value	Unit
Supply voltage range	VCC	-0.5 ~ 6.5	V
Data input/output voltage range	V_{B0}, V_{B1}, V_A	-0.5 ~ 6.5	V
Select input voltage range	V_{SEL}	-0.5 ~ 6.5	V
Continues current	I_{B0}, I_{B1}, I_A	±50	mA
Junction temperature range	T_J	150	°C
Lead temperature range	T_L	260	°C
Storage temperature range	T_{STG}	-65 ~ 150	°C
Thermal resistance	$R_{\theta JA}$	350	°C/W

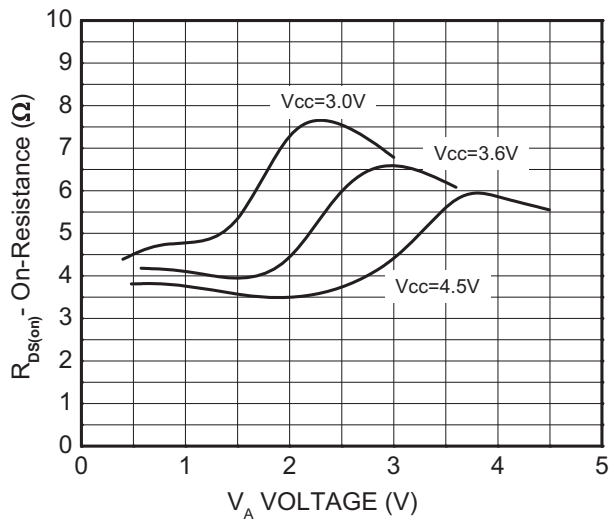
Recommend operating ratings

Parameter	Symbol	Value	Unit
Supply voltage range	VCC	2.3 ~ 4.5	V
Data input/output voltage range	V_{B0}, V_{B1}, V_A	0.0 ~ VCC	V
Select input voltage range	V_I	0.0 ~ VCC	V
Operating temperature range	T_A	-40 ~ 85	°C

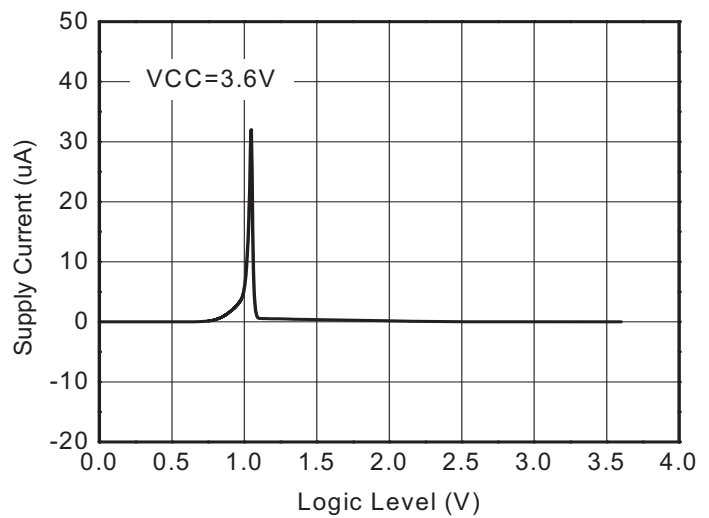
Electronics Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Select logic high level	V_{IH}	VCC=3.0~4.5V	1.7			V
		VCC=2.3~3.0V	1.4			V
Select logic low level	V_{IL}	VCC=3.0~4.5V			0.6	V
		VCC=2.3~3.0V			0.4	V
Quiescent current	I_{CC}	$I_{OUT}=0$			1.0	uA
Select input leakage current	I_{SEL}	$V_{SEL}=0 \sim VCC$			±0.1	uA
Off state switch leakage current	I_{OFF}	See figure 1			±0.1	uA
On state switch leakage current	I_{ON}	See figure 2			±0.1	uA
On-Resistance (Channel B0 and Channel B1)	R_{ON}	VCC=4.5V, $V_A=4.5V$, $I_{OUT}=30mA$, See figure 3		5.5	12	Ω
On-Resistance (Channel B0 or Channel B1)	R_{ON}	VCC=4.5V, $V_A=0V$, $I_{OUT}=30mA$, See figure 3		3.8	7.0	Ω
On-Resistance (Channel B0 or Channel B1)	R_{ON}	VCC=3.6V, $V_A=3.6V$, $I_{OUT}=30mA$, See figure 3		6.5	13	Ω
On-Resistance (Channel B0 or Channel B1)	R_{ON}	VCC=3.6V, $V_A=0V$, $I_{OUT}=30mA$, See figure 3		4.5	9.0	Ω
Propagation delay time (A to Bn or Bn to A)	T_{PLH} / T_{PHL}	$C_L=50pF$ See figure 4, 5		0.3	1.2	ns
Select input to switch on time (A to Bn or Bn to A)	T_{ON}	$C_L=50pF$ See figure 5		80	120	ns
Select input to switch off time (A to Bn or Bn to A)	T_{OFF}	$C_L=50pF$ See figure 5		50	80	ns
Break-Before-Make time	T_{BBM}	Generated by design	0.5			ns
-3dB Bandwidth	BW	$R_L=50\Omega$, $C_L=5pF$		400		MHz
Charge injection	Qg	$C_L=0.1nF$, VCC=5V		10		pC
Off isolation	OIRR	$R_L=50\Omega$, F=10MHz		-69		dB
Crosstalk	Xtalk	$R_L=50\Omega$, F=10MHz		-68		dB
Total harmonic distortion	THD	$R_L=600\Omega$, F=1KHz $V_A=0.5Vp-p$		0.03		%
Select pin input capacitance	C_{IN}	VCC=0V		5.5		pF
B port off capacitance	C_{OFF}			7.5		pF
A port on capacitance	C_{ON}			18.5		pF

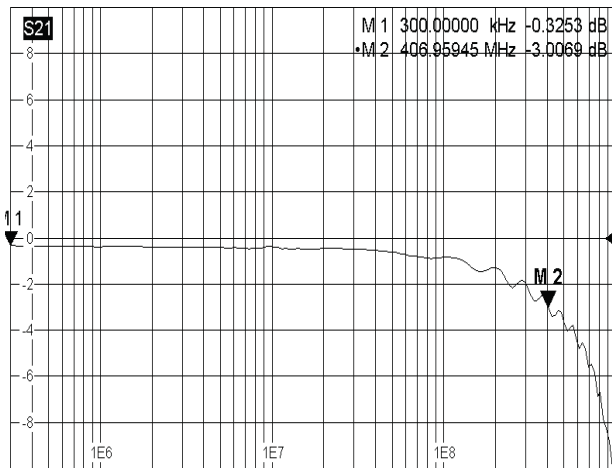
Typical Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)



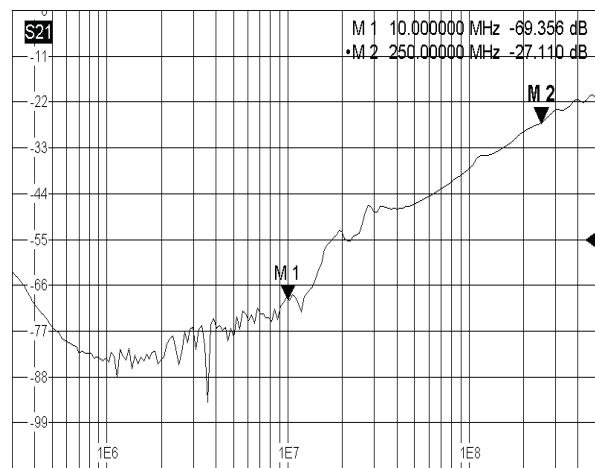
On-Resistance vs. VCC, VA voltage



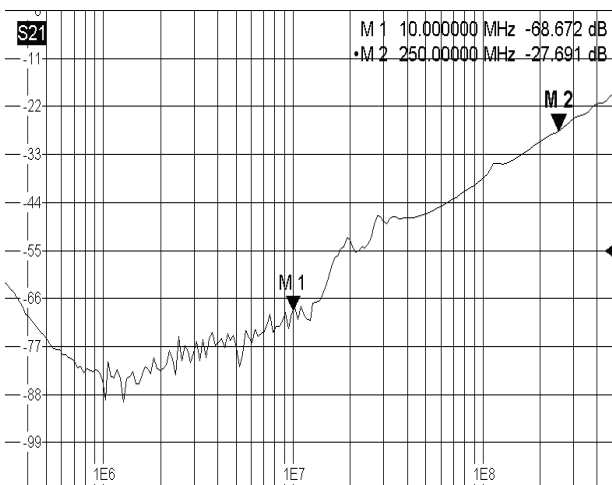
Supply current vs. Select logic level



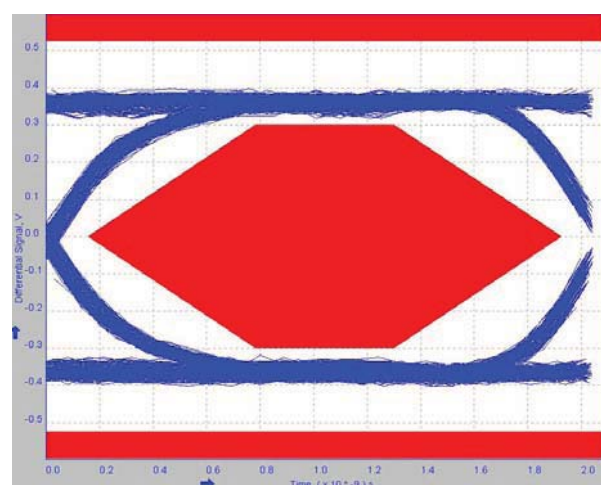
Bandwidth



Off isolation

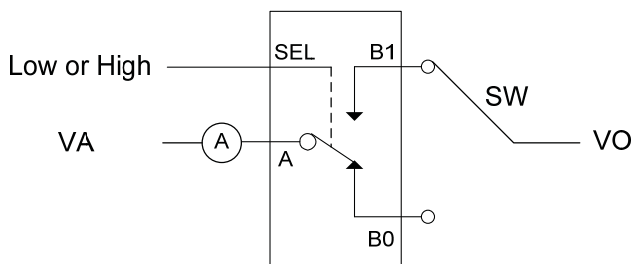


Crosstalk



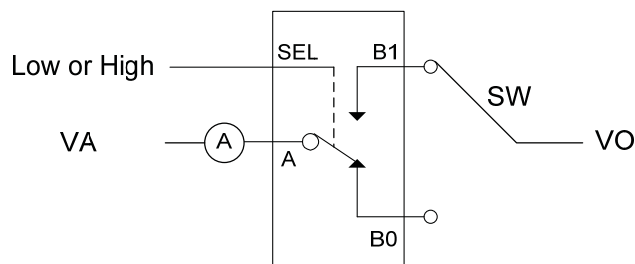
Eye Diagram (480Mbps)

Test Circuit



Conditions:
 1: SEL=Low, SW=B1, VA=5.5V, VO=GND
 3: SEL=High, SW=B0, VA=5.5V, VO=GND

Figure 1: Off state switch leakage current



Conditions:
 1: SEL=Low, SW=B0, VA=5.5V, VO=Open
 3: SEL=High, SW=B1, VA=5.5V, VO=Open

Figure 2: On state switch leakage current

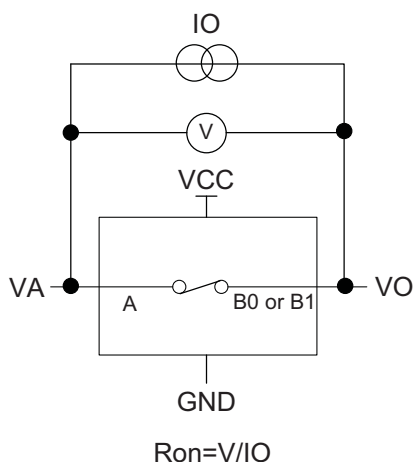


Figure 3: On-Resistance

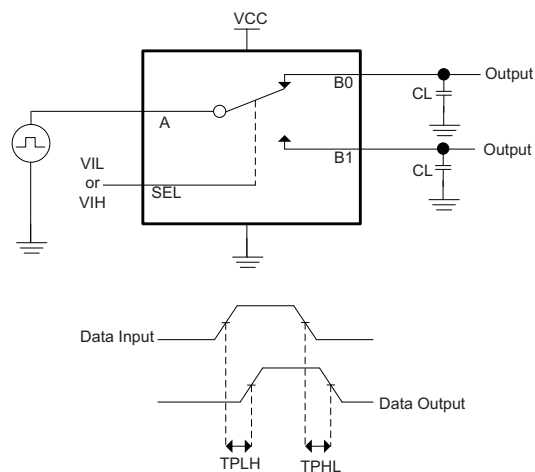


Figure 4: Propagation delay time

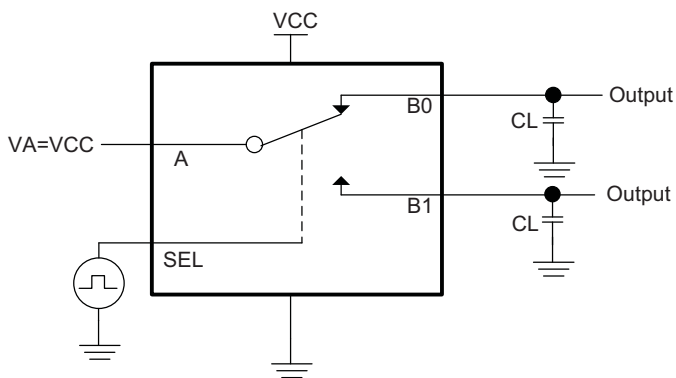
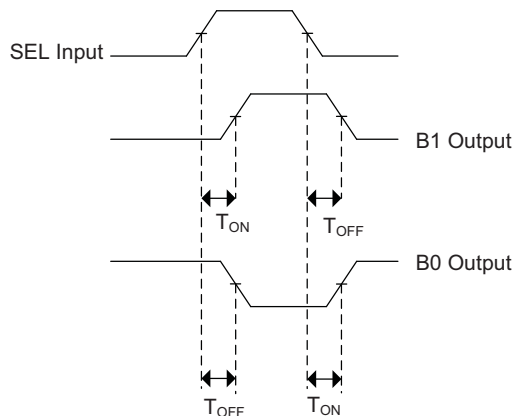
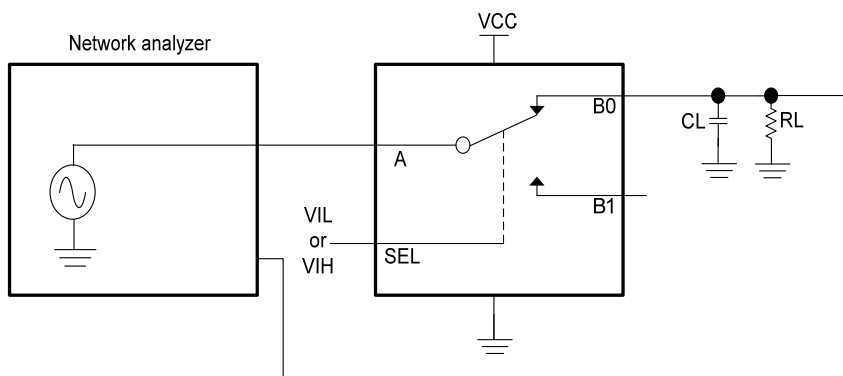
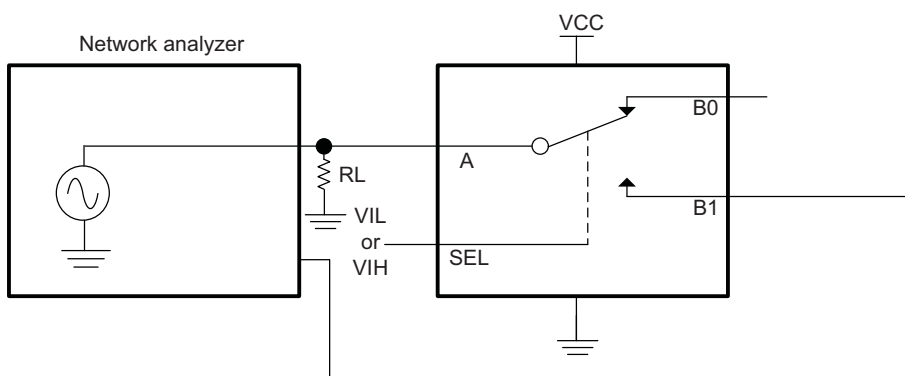


Figure 5: Select input to switch on/off time

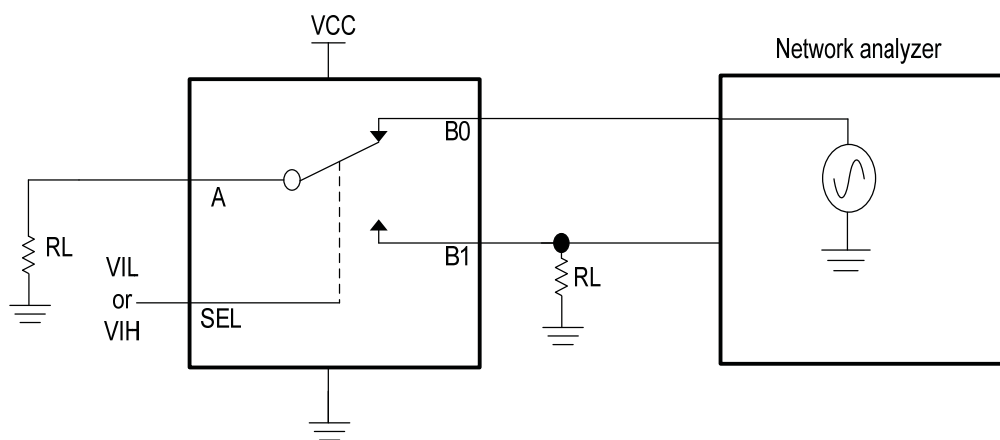




Bandwidth (BW)



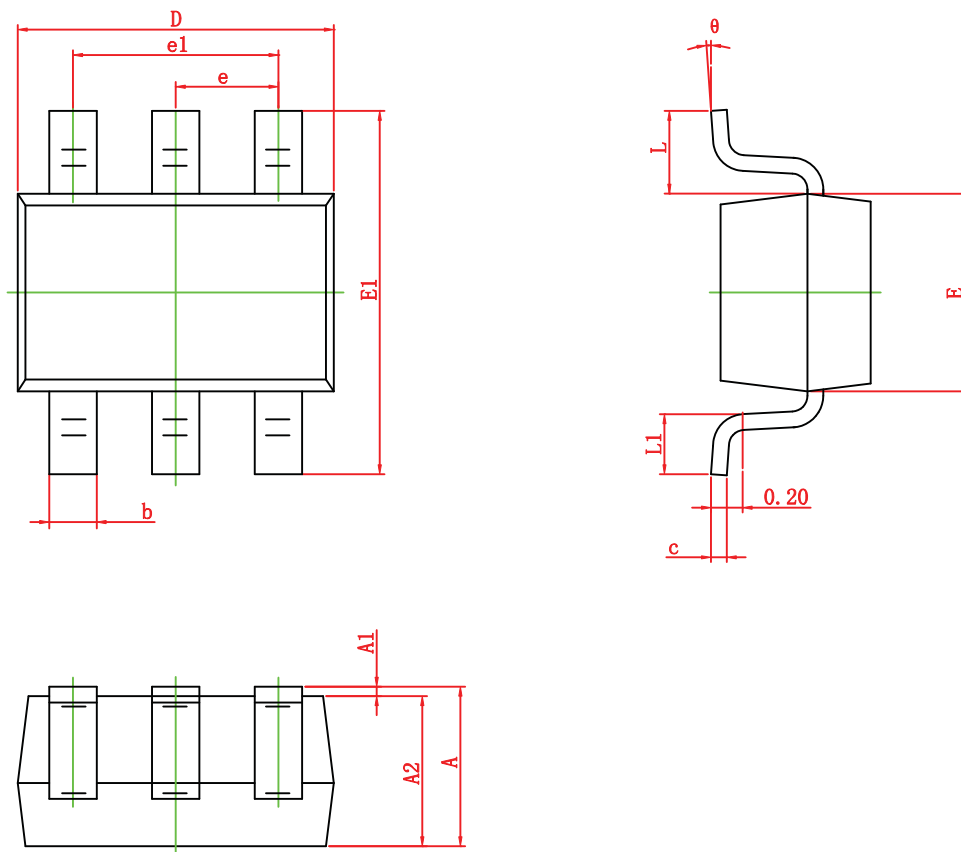
Off isolation (OIRR)



Crosstalk (Xtalk)

Package outline dimensions

SOT-363



Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.080	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.450
e	0.650 TYP	
e1	1.200	1.400
L	0.525 REF	
L1	0.260	0.460
θ	0°	8°