



ET3157 Single-Pole Double-Throw Analog Switch

1. General Description

1.1 Description

This single channel single-pole double-throw (SPDT) analog switch is designed for 1.65V to 5.5V VCC operation.

The ET3157 device handles both analog and digital signals. The ET3157 device allows signals with amplitudes of up to VCC (peak) to be transmitted in either direction.

Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

1.2 Features

- Low power consumption
- High transmission speed
- Flip standard CMOS logic level
- High bandwidth, high linearity
- Low output impedance

1.3 Device Information

PART NUMBER	PACKAGE
ET3157	SC70
	SOT23

2. Connection Diagrams and Pin Description

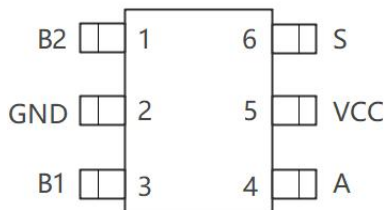


Figure 2.1: Top View

PIN	NAME	I/O	FUNCTION
1	B2	I/O	Switch I/O. Set S high to enable.
2	GND	-	Ground
3	B1	I/O	Switch I/O. Set S low to enable.
4	A	I/O	Common terminal
5	VCC	-	Supply Voltage
6	S	I	Select

3. System Diagram

3.1 Logic Diagram

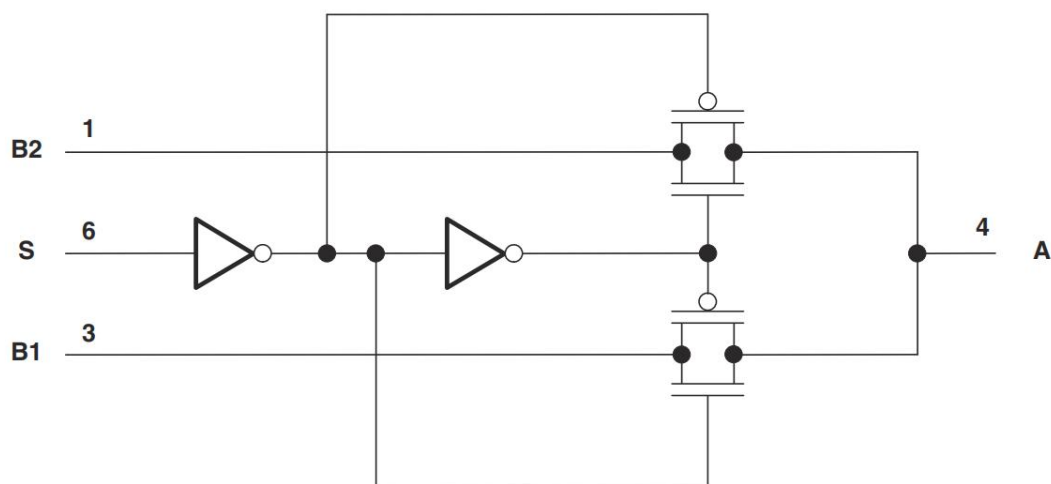


Figure 3.1: ET3157 Logic Diagram

3.2 Function Table

CONTROL INPUTS	ON CHANNEL
0	B1
1	B2

1=High State, 0=Low State



4. Specifications

4.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)(1)

Symbol	Parameter	MIN	MAX	Unit
VCC	Supply Voltage	-0.5	6.5	V
V _I	Input Voltage Range	-0.5	6.5	V
V _{I/O}	Switch I/O voltage(2)(3)(4)	-0.5	VCC + 0.5	V
T _J	Junction Temperature		150	°C
T _{OP}	Operating Temperature	-40	85	°C

Absolute maximum ratings are those values beyond which the device could be permanently damaged. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under normal operating conditions.

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltages are with respect to ground, unless otherwise specified.

(3) The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

(4) This value is limited to 5.5 V maximum.

4.2 Recommended Operating Conditions

(T_a=25°C, voltages are referenced to GND (ground=0V), unless otherwise specified)

Symbol	Parameter		MIN	MAX	Unit
VCC	Supply Voltage		1.65	5.5	V
V _{I/O}	Switch I/O voltage		0	VCC	V
V _{IH}	High-level input voltage, control input	VCC = 1.65 V to 1.95 V	VCC × 0.65		V
		VCC = 2.3 V to 2.8 V	VCC × 0.7		
		VCC = 3 V to 4.2 V	VCC × 0.7		
		VCC = 4.5 V to 5.5 V	VCC × 0.7		
V _{IL}	Low-level input voltage, control input	VCC = 1.65 V to 1.95 V		VCC × 0.35	V
		VCC = 2.3 V to 2.8 V		VCC × 0.3	
		VCC = 3 V to 4.2 V		VCC × 0.3	
		VCC = 4.5 V to 5.5 V		VCC × 0.3	
V _I	Control input voltage		0	5.5	V



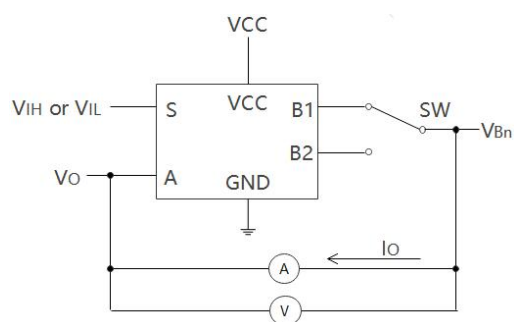
4.3 Electrical Characteristics

4.3.1 DC Specifications

($T_a=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Symbol	Parameter	Test Condition		VCC	MIN	TYP	MAX	Unit
ron	ON-state switch resistance	$I_O = 30\text{mA}$	$B_n = 0\text{V}$	4.5V	--	3	7	Ω
			$B_n = 2.4\text{V}$		--	4	12	
			$B_n = 4.5\text{V}$		--	4	15	
		$I_O = 24\text{mA}$	$B_n = 0\text{V}$	3V	--	3	9	
			$B_n = 3\text{V}$		--	5	20	
		$I_O = 8\text{mA}$	$B_n = 0\text{V}$	2.3V	--	4	12	
			$B_n = 2.3\text{V}$		--	6.5	30	
		$I_O = 4\text{mA}$	$B_n = 0\text{V}$	1.65V	--	6	20	
			$B_n = 1.65\text{V}$		--	10	50	
IS(off)	OFF-state switch leakage current	$V_I = V_{CC}$ and $V_O = \text{GND}$; or $V_I = \text{GND}$ and $V_O = V_{CC}$;		5.5V	--	--	± 1	μA
I_i	Control input current	$V_S = V_{CC}$ or GND		5.5 V	--	--	± 1	μA
I_{CC}	Supply current	$V_S = V_{CC}$ or GND		5.5 V	--	--	10	μA
ΔI_{CC}	Supply current change	$V_S = V_{CC} - 0.6 \text{ V}$		5.5 V	--	--	500	μA
Rrange	Full signal range on	$I_O = 30\text{mA}$	$B_n = 0 \text{ to } V_{CC}$	4.5V	--	--	25	Ω
		$I_O = 24\text{mA}$		3V	--	--	50	
		$I_O = 8\text{mA}$		2.3V	--	--	100	
		$I_O = 4\text{mA}$		1.65V	--	--	300	
ΔR_{on}	On- resistance matching between channels	$I_O = 30\text{mA}$	$B_n = 3.15\text{V}$	4.5V	--	0.2	--	Ω
		$I_O = 24\text{mA}$	$B_n = 2.1\text{V}$	3V	--	0.2	--	
		$I_O = 8\text{mA}$	$B_n = 1.6\text{V}$	2.3V	--	0.2	--	
		$I_O = 4\text{mA}$	$B_n = 1.15\text{V}$	1.65V	--	0.2	--	
Rflat	On- resistance flatness	$I_O = 30\text{mA}$	$B_n = 0 \text{ to } V_{CC}$	4.5V	--	4	--	Ω
		$I_O = 24\text{mA}$		3V	--	10	--	
		$I_O = 8\text{mA}$		2.3V	--	35	--	
		$I_O = 4\text{mA}$		1.65V	--	150	--	

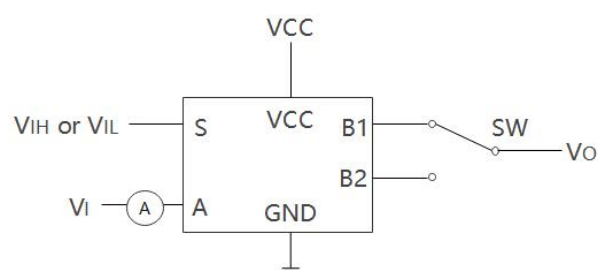
5. Test Circuit



$$R_{on} = (V_{Bn} - V_O) / I_O$$

SW1: $V_S = V_{IL}$; / SW2: $V_S = V_{IH}$;

Figure 5.1: ON-State Resistance



SW1: $V_S = V_{IH}$; / SW2: $V_S = V_{IL}$;

Condition 1: $V_I = GND$, $V_O = VCC$

Condition 2: $V_I = VCC$, $V_O = GND$

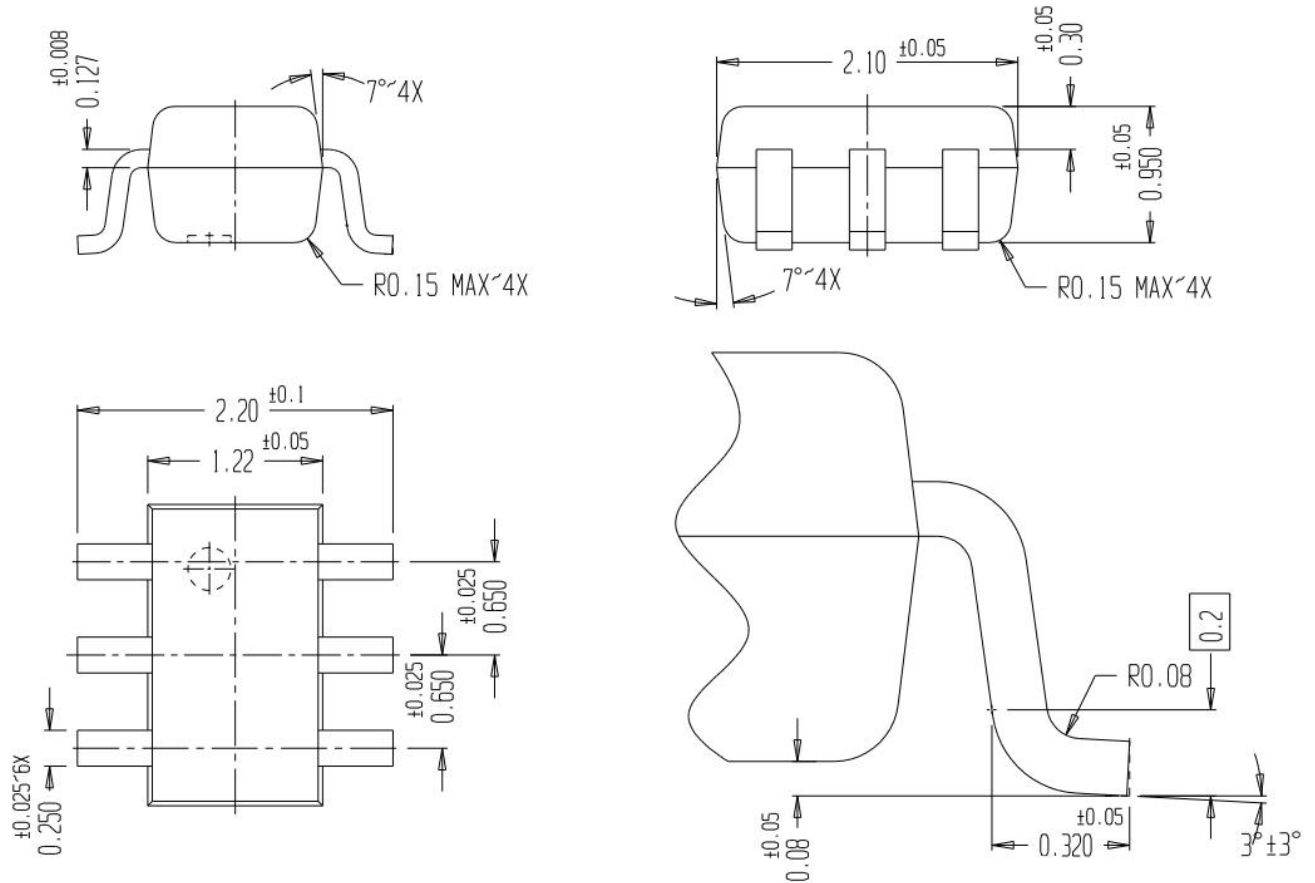
Figure 5.2: OFF-State Switch Leakage Current

6. Ordering Information

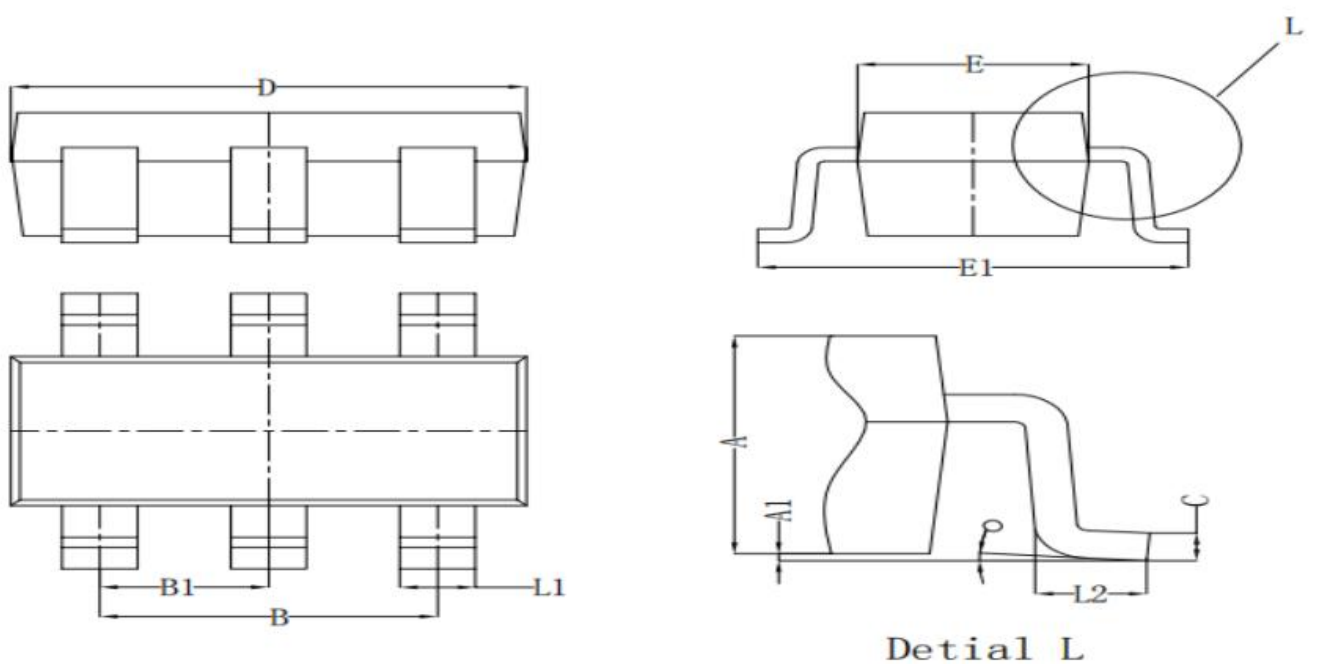
Orderable Device	Package Type	Pins	Packing	Package Qty
ET3157CT06ARCQ	SC70	6	Tape & Reel	3000
ET3157LT06ARCQ	SOT23	6	Tape & Reel	3000

7. Package Information

7.1 SC70-6



7.2 SOT23-6



Detial L

Symbol	Dim in mm		Max
	Min	Nor	
A	1.050	1.100	1.150
A1	0.000	0.050	0.100
L1	0.300	0.400	0.500
C	0.100	0.150	0.200
D	2.820	2.920	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
B	1.800	1.900	2.000
B1	0.950 TYP		
L2	0.300	0.450	0.600
o	0°	4°	8°