Features

- High Bandwidth: 300MHz
- High Speed: Typically 30ns
- Supply Range: +1.8V to +5.5V
- Low ON-State Resistance: 4.5Ω(TYP)
- Break-Before-Make Switching
- Rail-to-Rail Operation
- TTL/CMOS Compatible
- Extended Industrial Temperature Range: -40°C to +125°C

Application

- Wearable Devices
- Battery-Operated Equipment
- Signal Gating, Chopping, Modulation or Demodulation (Modem)
- Portable Computing
- Cell Phones

Description

The RS3SW2157 is a single-pole double-throw (SPDT) analog switch that is designed to operate from 1.8 V to 5.5 V.

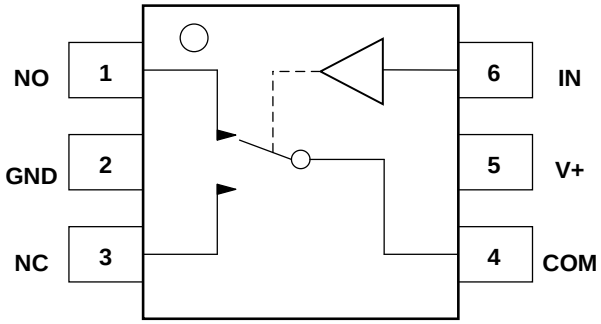
The RS3SW2157 device can handle both analog and digital signals. It features high-bandwidth (300MHz) and low on-resistance (4.5Ω TYP).

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

Ordering Information

Part Number	Package	Description
RS3SW2157T	SOT23-6	2.92mm x 1.62mm

Pin Configuration



RS3SW2157

SOT23-6, Top View

Table 1. Pin Functions: RS3SW2157

NAME	PIN	FUNCTION
	SOT23-6	
NO	1	Normally-Open Terminal
GND	2	Ground
NC	3	Normally-Closed Terminal
COM	4	Common Terminal
V+	5	Power Supply
IN	6	Digital Control Pin

Function Table

LOGIC	NO	NC
0	OFF	ON
1	ON	OFF

Absolute Maximum Ratings

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

SYMBOL	PARAMETER		MIN	MAX	UNIT
V_+	Supply Voltage		-0.3	6.0	V
V_{IN}	Input Voltage(2)		-0.3	6.0	
	Analog, Digital Voltage Range		-0.3	$(V_+)+0.3$	
	Continuous Current NO, NC, or COM		-300	+300	mA
I_{PEAK}	Peak Current NO, NC, or COM		-500	+500	
θ_{JA}	Package thermal impedance (3)	SOT23-6		235	°C/W
T_J	Junction Temperature (4)		-40	150	°C
T_{stg}	Storage temperature		-65	+150	

(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

(2) Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.3V beyond the supply rails should be current-limited to 10mA or less.

(3) The package thermal impedance is calculated in accordance with JESD-51.

(4) The maximum power dissipation is a function of $T_{J(MAX)}$, $R_{\theta JA}$, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{\theta JA}$. All numbers apply for packages soldered directly onto a PCB.

ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

SYMBOL	PARAMETER		VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-Body Model (HBM)	±2000	V
		Charged-Device Model (CDM)	±1000	V

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	MIN	MAX	UNIT
V_{CC}	Supply Voltage	1.8	5.5	V
T_A	Operating temperature	-40	+125	°C

Electrical Characteristics

V+ = 5.0 V, T_A= -40°C to 125°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V+	T_A	MIN(2)	TYP(3)	MAX(2)	UNIT
ANALOG SWITCH								
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}			FULL	0		V+	V
On-Resistance	R_{ON}	V_{NO} or V_{NC} = V+/2, I_{COM} = -10mA, Switch ON, See Figure 1	5V	+25°C		4.5	8	Ω
				FULL			8.5	Ω
			3.3V	+25°C		7	10	Ω
				FULL			10.5	Ω
On-Resistance Match Between Channels	ΔR_{ON}	V_{NO} or V_{NC} = V+/2, I_{COM} = -10mA, Switch ON, See Figure 1	5V	+25°C		0.15	0.3	Ω
				FULL			0.4	Ω
			3.3V	+25°C		0.15	0.3	Ω
				FULL			0.4	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	0 ≤ (V_{NO} or V_{NC}) ≤V+/2, I_{COM} = -10mA, Switch ON, See Figure 1	5V	+25°C		2	3	Ω
				FULL			3.3	Ω
			3.3V	+25°C		3	4	Ω
				FULL			4.3	Ω
NC, NO OFF Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	V_{NO} or V_{NC} = 0.3V, V+/2 V_{COM} = V+/2, 0.3V See Figure 2	1.8 to 5.5V	FULL			1	μA
NC, NO, COM ON Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_{NO} or V_{NC} = 0.3V, Open V_{COM} = Open, 0.3V See Figure 3	1.8 to 5.5V	FULL			1	μA
DIGITAL CONTROL INPUTS (1)								
Input High Voltage	V_{INH}		5V	FULL	1.5			V
			3.3V	FULL	1.3			V
Input Low Voltage	V_{INL}		5V	FULL			0.6	V
			3.3V	FULL			0.5	V
Input Leakage Current	I_{IN}	V_{IN} = V_{IO} or 0	1.8 to 5.5V	FULL			1	μA

(1) All unused digital inputs of the device must be held at V_{IO} or GND to ensure proper device operation.

(2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.

(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

AC Electrical characteristics

V+ = 5.0 V, T_A= -40°C to 125°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS		V_+	T_A	MIN	TYP	MAX	UNIT
DYNAMIC CHARACTERISTICS									
Turn-On Time	t_{ON}	V_{COM} = V+, R_L = 50Ω, C_L = 35pF, See Figure 4		5V	+25°C		30		ns
				3.3V			40		
Turn-Off Time	t_{OFF}	V_{COM} = V+, R_L = 50Ω, C_L = 35pF, See Figure 4		5V	+25°C		25		ns
				3.3V			30		
Break-Before-Make Time Delay	t_{BBM}	V_{NO1} = V_{NC1} = 3V, R_L = 50Ω, C_L = 35pF, See Figure 5		5V	+25°C		5		ns
				3.3V			8		
Off Isolation	O_{ISO}	R_L = 50Ω, Switch OFF, See Figure 6	f = 10MHz		+25°C		-52		dB
			f = 1MHz		+25°C		-71		dB
-3dB Bandwidth	BW	Switch ON, R_L = 50Ω, See Figure 7			+25°C		300		MHz
NC, NO OFF Capacitance	$C_{NC(OFF)}$, $C_{NO(OFF)}$	V_{NC} or V_{NO}=V+/2 or GND, Switch OFF See Figure 8			+25°C		5		pF
NC, NO, COM ON Capacitance	$C_{NC(ON)}$, $C_{NO(ON)}$, $C_{COM(ON)}$	V_{NC} or V_{NO}=V+/2 or GND, Switch ON See Figure 8			+25°C		15		pF
POWER REQUIREMENTS									
Power Supply Range	V_+				FULL	1.8		5.5	V
Power Supply Current	I_+	V_{IN} = GND or V_+		5.5V	FULL			1	μA

Parameter Measurement Information

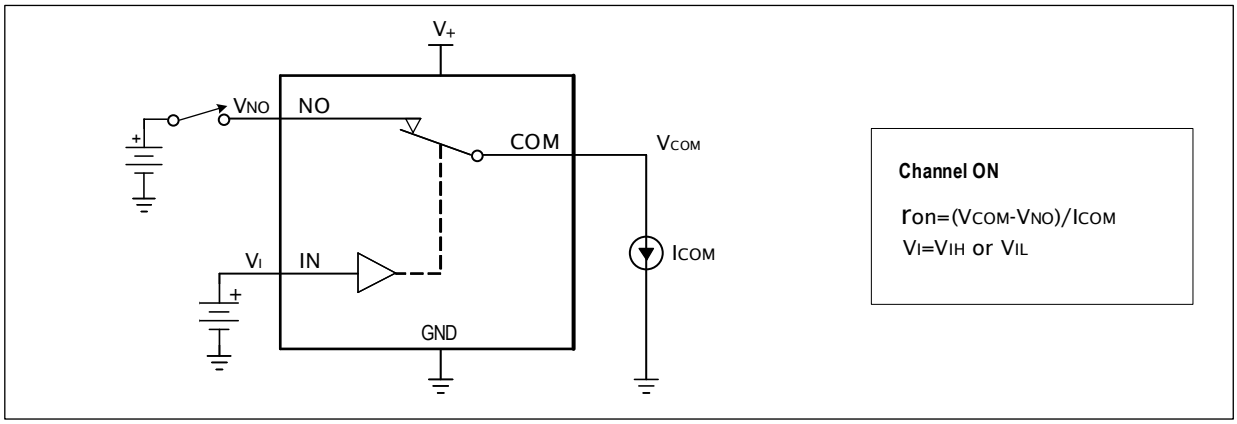


Figure 1、ON-State Resistance (Ron)

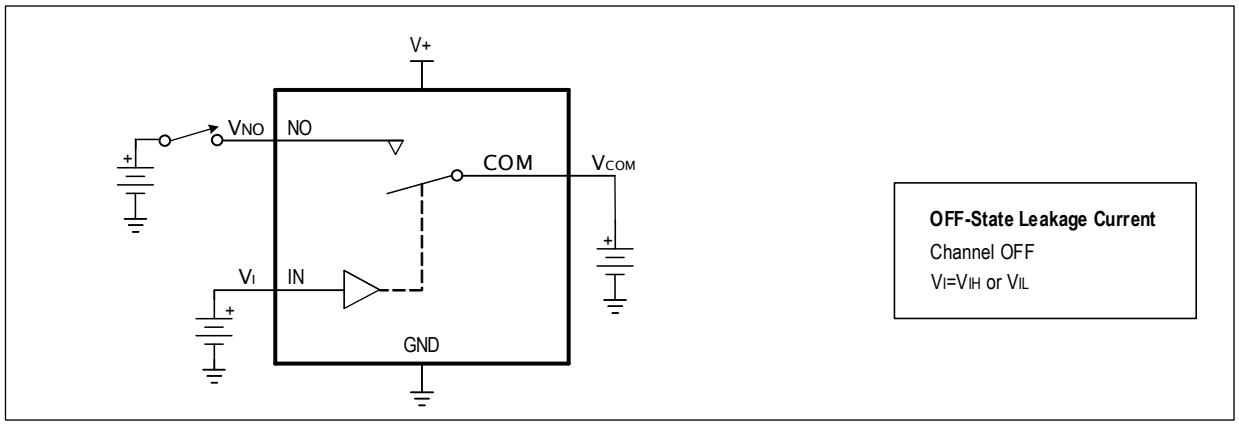


Figure 2、OFF-State Leakage Current ($I_{COM\ (OFF)}$, $I_{NO\ (OFF)}$)

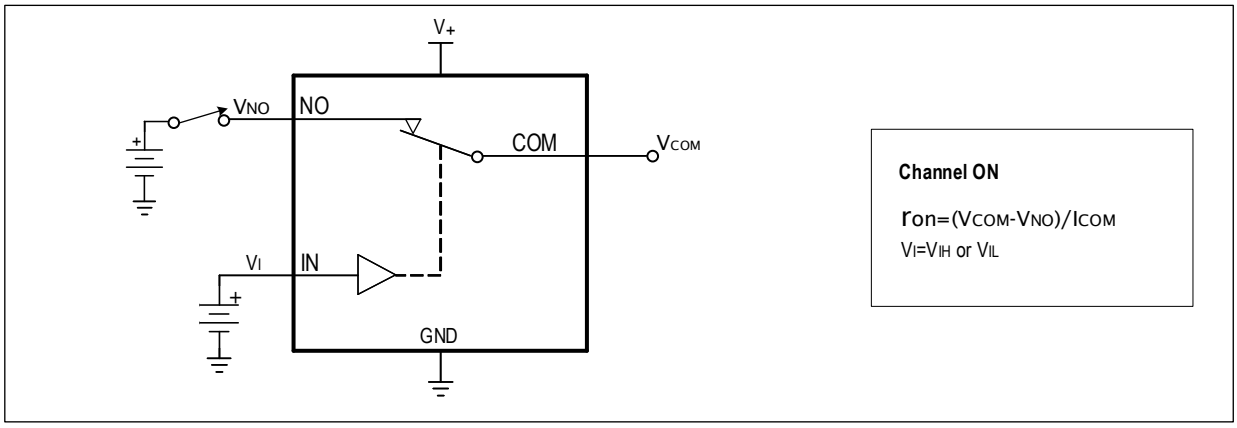


Figure 3、ON-State Leakage Current ($I_{COM\ (ON)}$, $I_{NO\ (ON)}$)

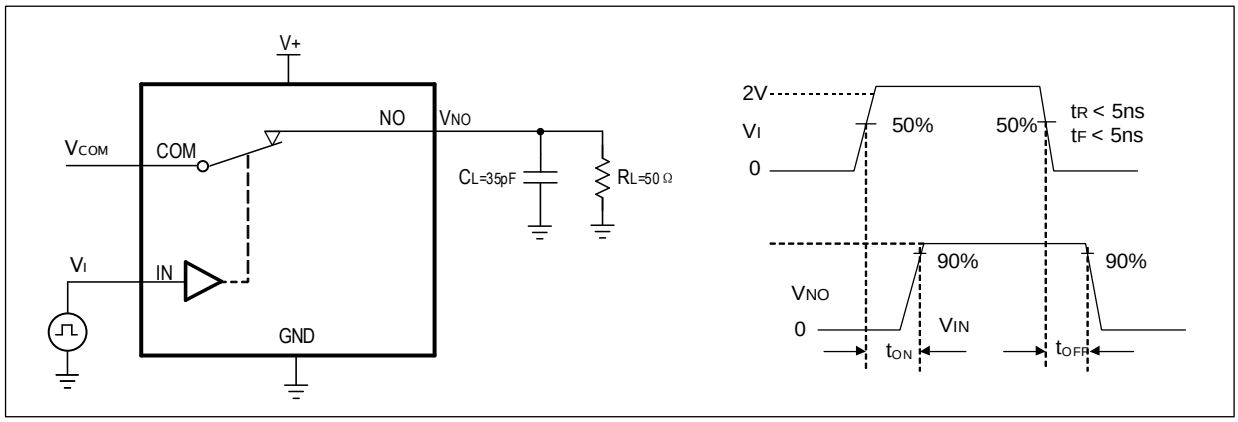


Figure 4、Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

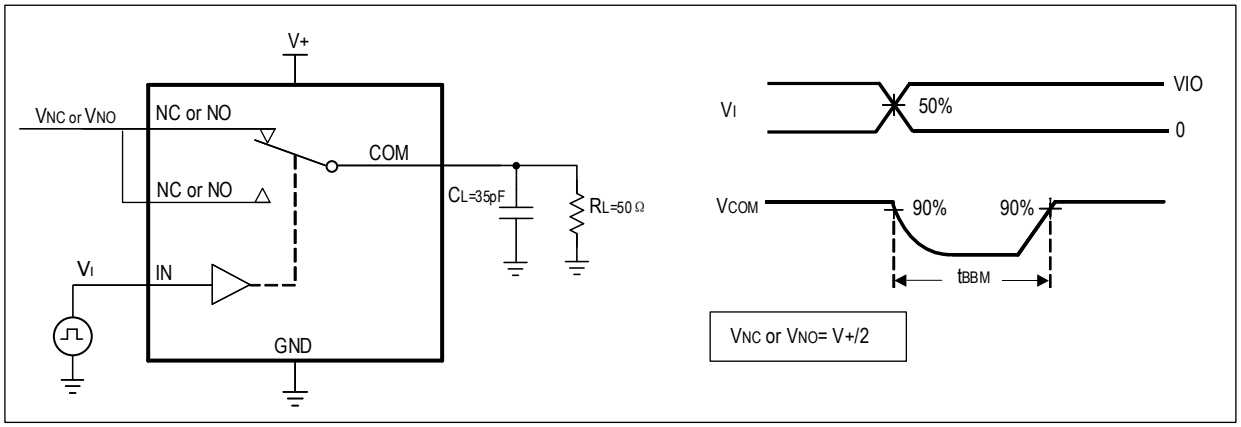


Figure 5、Break-Before-Make Time (t_{BBM})

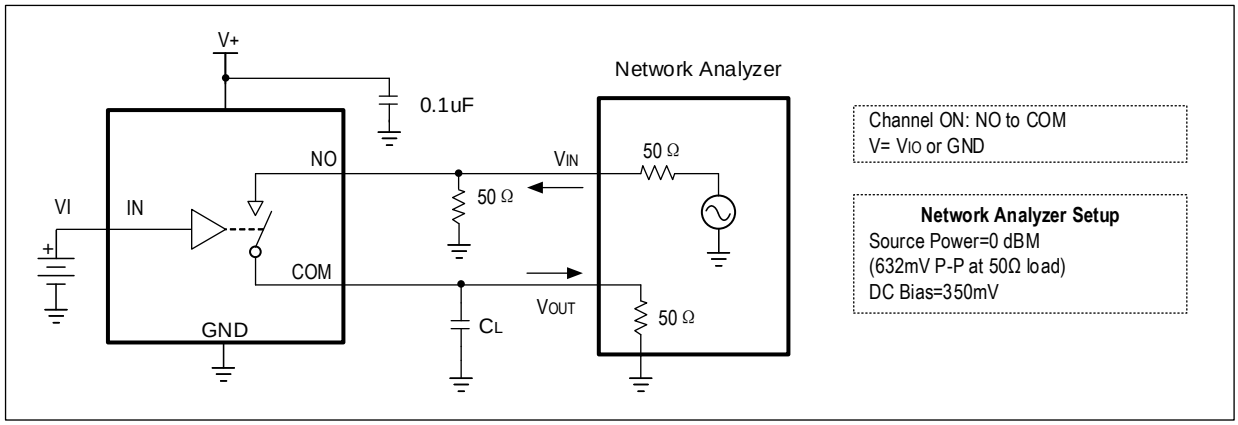


Figure 6、OFF Isolation (OISO)

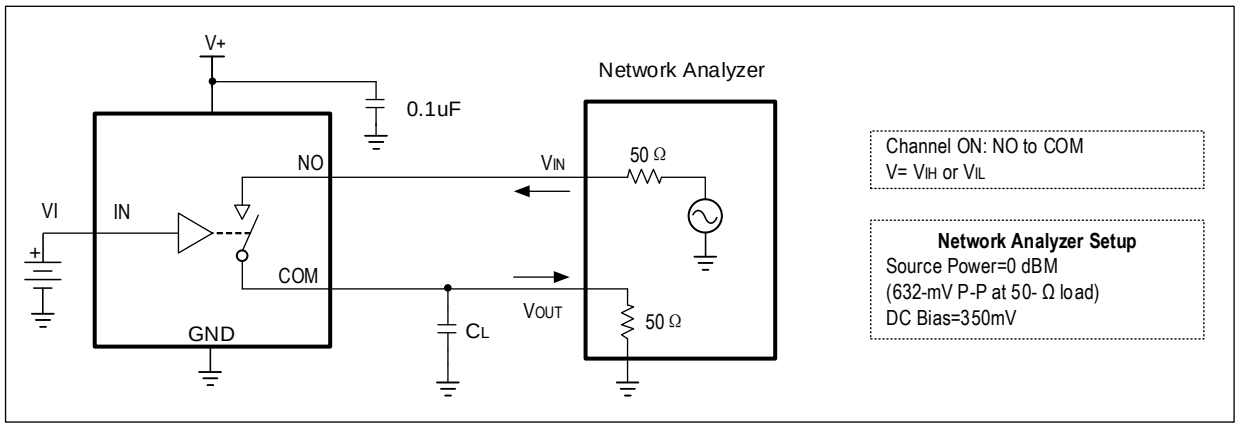


Figure 7、Bandwidth (BW)

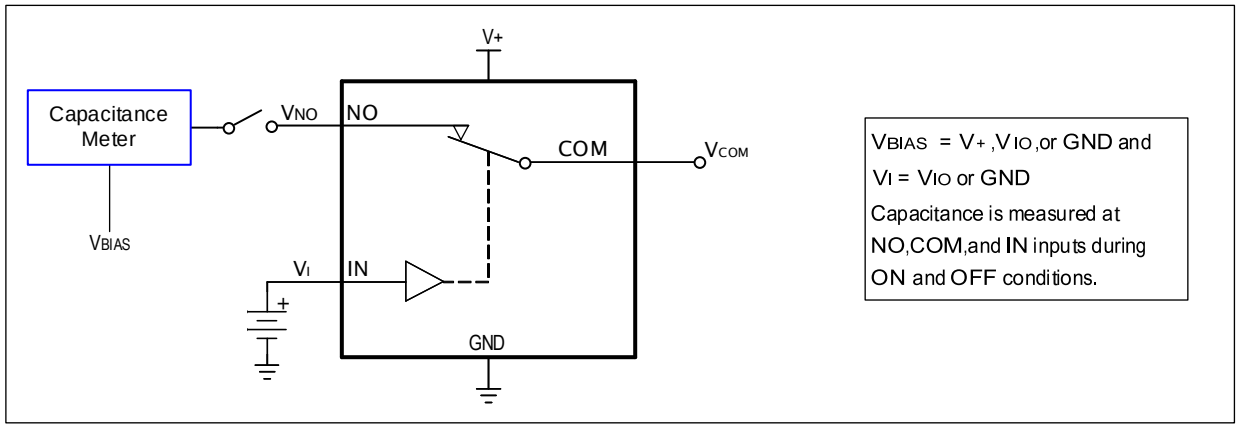
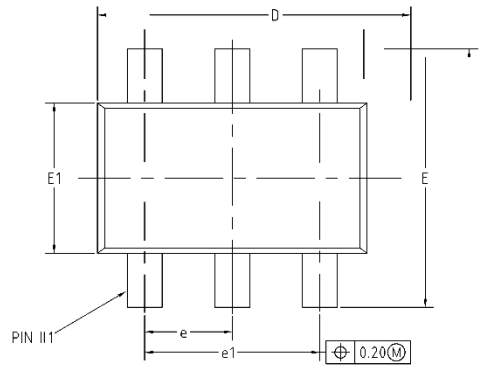
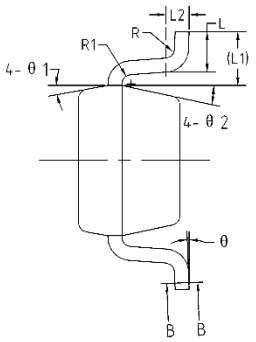


Figure 8、Capacitance (C_I, $C_{COM(OFF)}$, $C_{COM(ON)}$, $C_{NO(OFF)}$, $C_{NO(ON)}$)

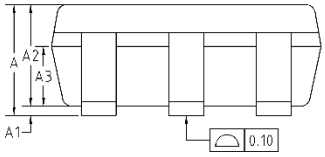
Package Information

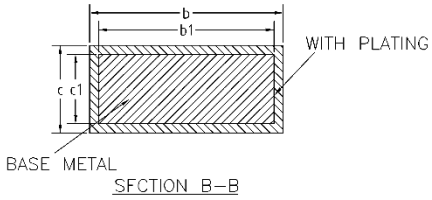
SOT23-6





SYMBOL	MIN	NOM	MAX
A	–	–	1.25
A1	0	–	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.34	–	0.45
b1	0.34	0.38	0.41
c	0.12	–	0.20
c1	0.12	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.700
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.30	0.40	0.60
L1		0.59REF	
L2		0.25BSC	
R	0.05	–	0.20
R1	0.05	–	0.20
θ	0°	–	8°
θ1	8°	10°	12°
θ2	10°	12°	14°





SECTION B–B

Note:
1.All dimensions are in mm. Angles in degrees.
2.Refer Jedec MO-187.
3.Dimensions exclude burrs, mold flash or protrusions.

SOT23-6L POD Rev:0
Raystar Microelectronics Technology Inc.

Revision History

Revision	Description	DATE
V1.0	Initial Release	2025/06/30