4.5Ω Single Bilateral SPST Analog Switch

1 FEATURES

- **Bandwidth: 300MHz**
- **High Speed: Typically 30ns**
- **Supply Range: +1.8V to +5.5V**
- **Low ON-State Resistance: 4.5Ω(TYP)**
- **Rail-to-Rail Operation**
- **TTL/CMOS Compatible**
- **Extended Industrial Temperature Range: -40°C to +125°C**
- **Packages: SOT23-5, SC70-5**

2 APPLICATIONS

- **Wireless Devices**
- **Audio and Video Signal Routing**
- **Portable Computing**
- **Wearable Devices**
- **Signal Gating, Chopping, Modulation or Demodulation (Modem)**
- **Cell Phones**

3 DESCRIPTIONS

The RES74LVC1G66 is a bidirectional 1-channel single-pole single-throw (SPST) analog switch, which is designed to operate from 1.8V to 5.5V.

The RES74LVC1G66device can handle both analog and digital signals. It features bandwidth (300MHz) and low on-resistance (4.5Ω TYP).

Each switch section has its own enable-input control (SEL). A high-level voltage applied to SEL turns on the associated switch section.

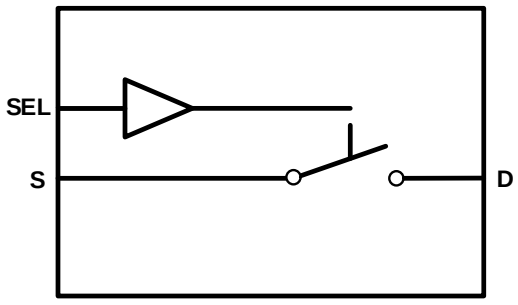
Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE(NOM)
RES74LVC1G66CUR	SOT23-5	2.90mm×1.60mm
RES74LVC1G66CSR	SC70-5	2.00mm×1.25mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

4 FUNCTIONAL DIAGRAMS OF RES74LVC1G66

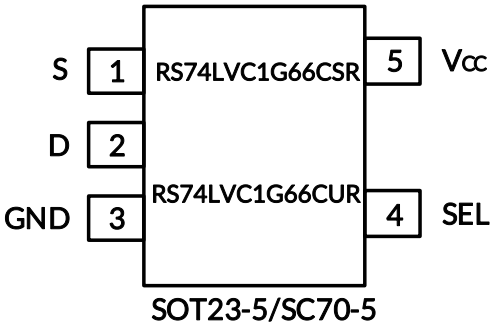


6 PACKAGE/ORDERING INFORMATION (1)

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING (2)	MSL (3)	PACKAGE OPTION
RES74IG66	RES74LVC1G66CUR	-40°C ~+125°C	SOT23-5	RES74LVC1G66CUR	MSL3	Tape and Reel, 3000
	RES74LVC1G66CSR	-40°C ~+125°C	SC70-5 (4)	RES74LVC1G66CSR	MSL3	Tape and Reel, 3000

NOTE:
(1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the right-hand navigation.
(2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.
(3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.
(4) Equivalent to SOT353.

7 PIN CONFIGURATIONS



SOT23-5/SC70-5

7.1 Pin Description

NAME	RS74LVC1G66CS/CUR SOT23-5/SC70-5	I/O	DESCRIPTION
S	1	I/O	Bidirectional signal to be switched
D	2	I/O	Bidirectional signal to be switched
GND	3	-	Ground
SEL	4	I	Controls the switch (L = OFF, H = ON)
V_{CC}	5	-	Power Supply

(1) I = Input, O = Output.

7.2 Function Table

SELECT INPUTS SEL	SWITCH STATUS
High	All Switches ON
Low	All Switches OFF

NOTE: Input and output pins are identical and interchangeable. Any may be considered an input or output; signals pass equally well in both directions.

8 SPECIFICATIONS

8.1 Absolute Maximum Ratings

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

SYMBOL	PARAMETER		MIN	MAX	UNIT
V_{CC}	Supply Voltage (2)		-0.3	6.0	V
V_{IN}	Input Voltage (2) (3)		-0.3	6.0	
V_O	Switch I/O Voltage (2) (3) (4)		-0.3	V_{CC}+0.3	
I_{IK}	Control input clamp current	V_I<0		-50	mA
$I_{I/OK}$	I/O port diode current	$V_{I/O}$ < 0 or $V_{I/O}$ > V_{CC}		-50	
I_T	On-state switch current	V_{IO}=0 to V_{CC}	-50	50	
	Continuous current through V_{CC} or GND		-100	100	
θ_{JA}	Package thermal impedance (5)	SOT23-5		230	°C/W
		SC70-5		380	
T_J	Junction Temperature (6)		-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) 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.
(5) The package thermal impedance is calculated in accordance with JESD-51.
(6) 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.

8.2 ESD Ratings

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

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-Body Model (HBM)	±2000	V
		Machine Model (MM)	±300	V

ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.3 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

8.4 Electrical Characteristics

V_{CC} = 5.0 V or 3.3V, FULL= -40°C to +125°C, Typical values are at T_A = +25°C. (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V_{CC}	T_A	MIN(2)	TYP(3)	MAX(2)	UNIT
ANALOG SWITCH								
Analog Signal Range	V_S, V_D			FULL	0		V_{CC}	V
On-Resistance	R_{ON}	V_S = V_{CC} /2, I_{SD}= -10mA, Switch ON, See Figure 4	5V	+25°C		4.5	8	Ω
				FULL			8.5	Ω
			3.3V	+25°C		7	10	Ω
				FULL			10.5	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	0 ≤ (V_S) ≤V_{CC} /2, I_{SD} = -10mA, Switch ON, See Figure 4	5V	+25°C		2	3	Ω
				FULL			3.3	Ω
			3.3V	+25°C		3	4	Ω
				FULL			4.3	Ω
Source, Drain OFF Leakage Current	$I_{D(OFF)}$, $I_{S(OFF)}$	V_D = 0.3V, V_{CC} /2, V_S = V_{CC} /2, 0.3V See Figure 5	1.8 to 5.5V	FULL			1	μA
Channel ON Leakage Current	$I_{D(ON)}$, $I_{S(ON)}$	V_D = 0.3V, Open V_S = Open, 0.3V See Figure 6	1.8 to 5.5V	FULL			1	μA
DIGITAL CONTROL INPUTS (1)								
Input High Voltage	V_{IH}		5V	FULL	1.5			V
			3.3V	FULL	1.3			V
Input Low Voltage	V_{IL}		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.

Electrical Characteristics (continued)

V_{CC}= 5.0 V or 3.3V, FULL= −40°C to +125°C, Typical values are at T_A = +25°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS		V_{CC}	T_A	MIN	TYP	MAX	UNIT
DYNAMIC CHARACTERISTICS									
Turn-On Time	t_{ON}	V_S = V_{CC}, R_L = 300Ω, C_L = 35pF, See Figure 7		5V	+25°C		30		ns
				3.3V			40		
Turn-Off Time	t_{OFF}	V_S = V_{CC}, R_L = 300Ω, C_L = 35pF, See Figure 7		5V	+25°C		25		ns
				3.3V			30		
-3dB Bandwidth	BW	Switch ON, R_L = 50Ω, See Figure 8			+25°C		300		MHz
Off Isolation	O_{ISO}	R_L = 50Ω, Switch OFF, See Figure 9	f = 10MHz		+25°C		-52		dB
			f = 1MHz		+25°C		-71		dB
Source, Drain OFF Capacitance	$C_{S(OFF)}$, $C_{D(OFF)}$	V_S= V_{CC} /2 or GND, Switch OFF			+25°C		5		pF
Source, Drain ON Capacitance	$C_{S(ON)}$, $C_{D(ON)}$	V_S= V_{CC} /2 or GND, Switch ON			+25°C		15		pF
POWER REQUIREMENTS									
Power Supply Range	V_{CC}				FULL	1.8		5.5	V
Power Supply Current	I_{CC}	V_{IN} = GND or Vcc		5.5V	FULL			1	µA

8.5 Typical Characteristics

NOTE: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only.

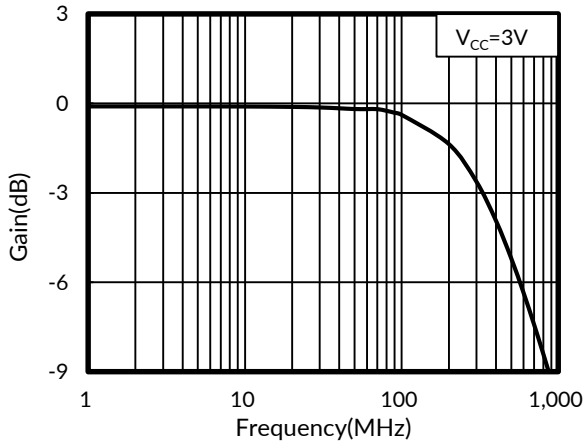


Figure 1. Bandwidth vs Frequency

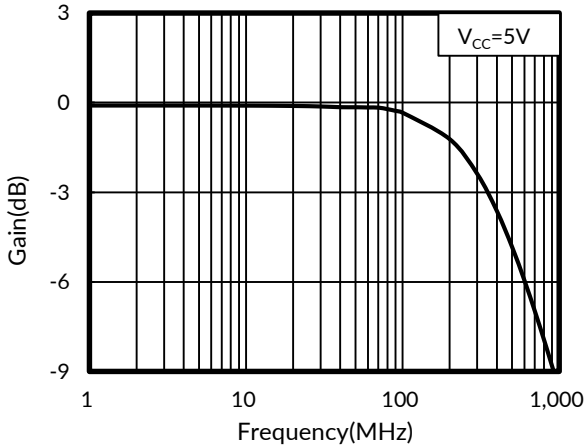


Figure 2. Bandwidth vs Frequency

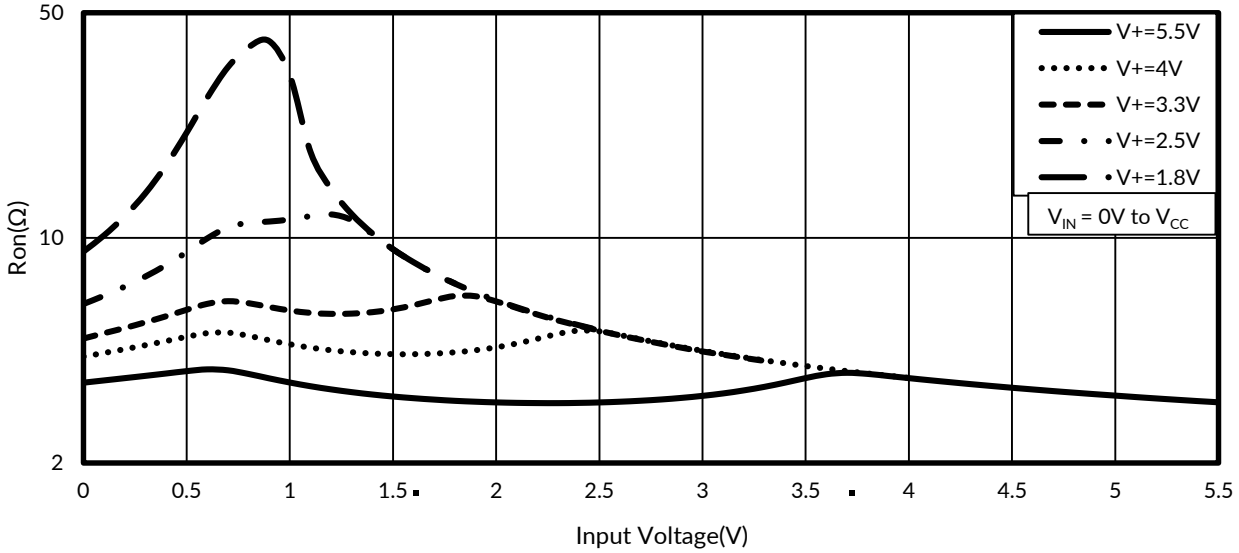


Figure 3. Typical Ron as a Function of Input Voltage

9 PARAMETER MEASUREMENT INFORMATION

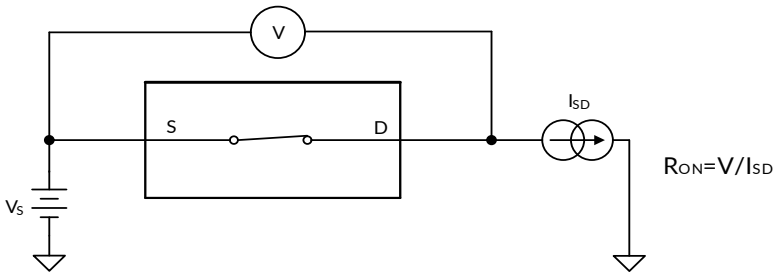


Figure 4. ON-State Resistance (R_{ON})

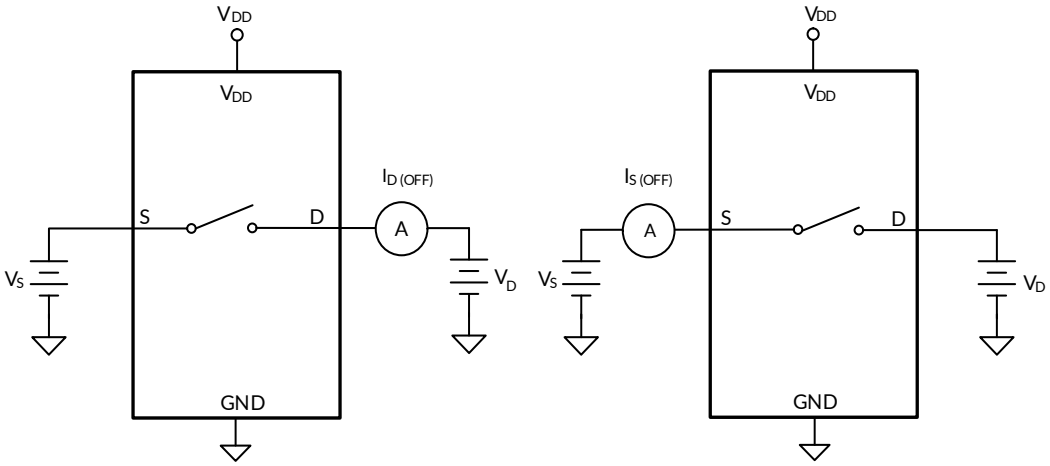


Figure 5. OFF-State Leakage Current ($I_{D\,(OFF)}$, $I_{S\,(OFF)}$)

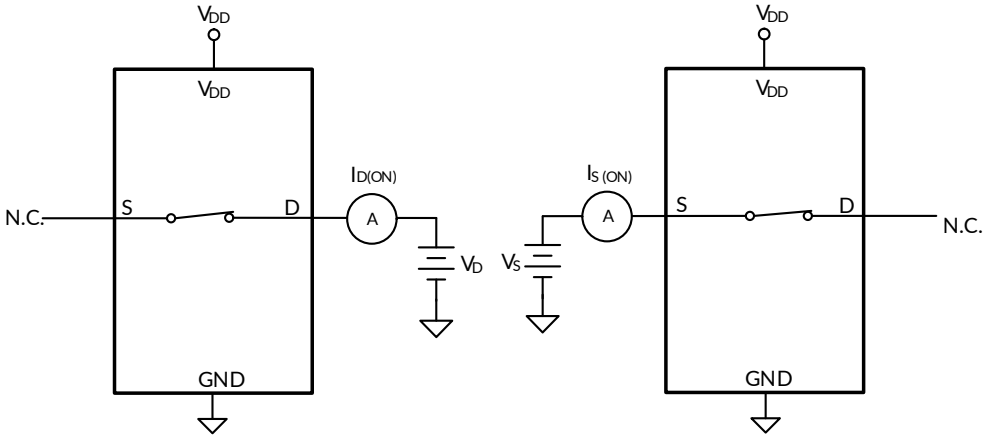


Figure 6. ON-State Leakage Current ($I_{D\,(ON)}$, $I_{S\,(ON)}$)

PARAMETER MEASUREMENT INFORMATION (continued)

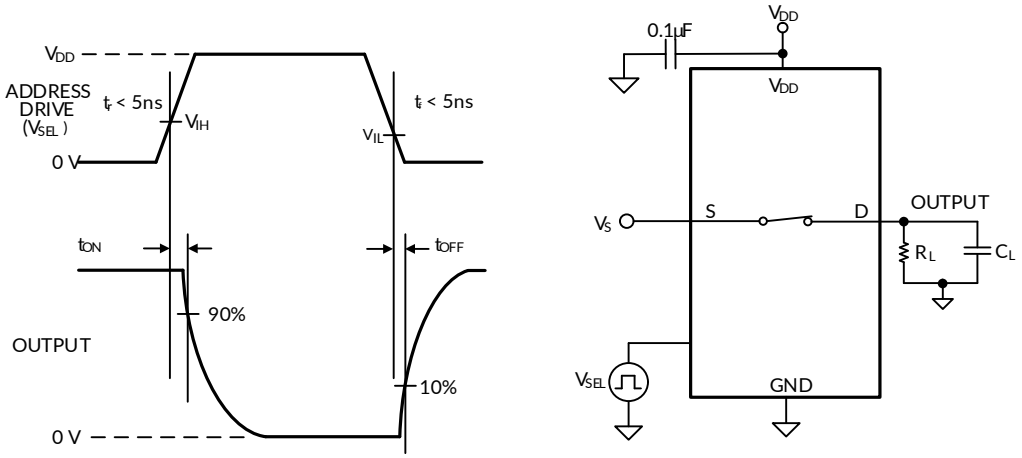


Figure 7. Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

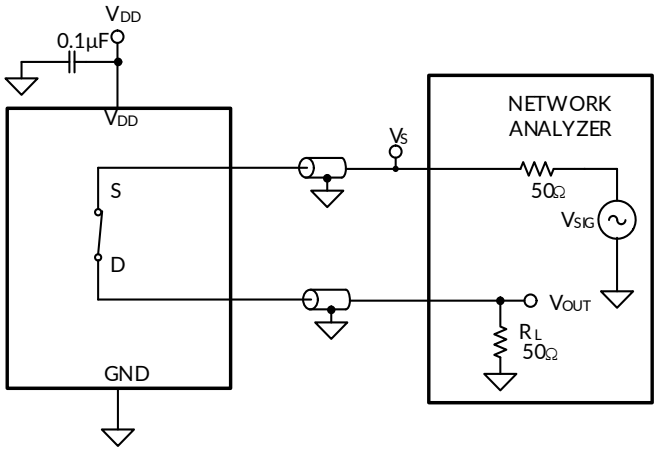


Figure 8. Bandwidth (BW)

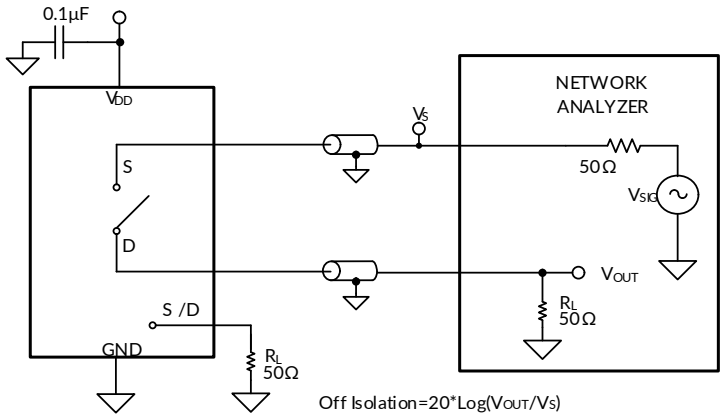


Figure 9. OFF Isolation (O_{ISO})

10 TYPICAL APPLICATION

The RES74LVC1G66 can be used in any situation where an SPST switch would be used a solid-state, voltage-controlled version is preferred. The RS74LVC1G66 allows on and off control of analog and digital signal with a digital control signal. All input signals should remain between 0V and V_{CC} for optimal operation.

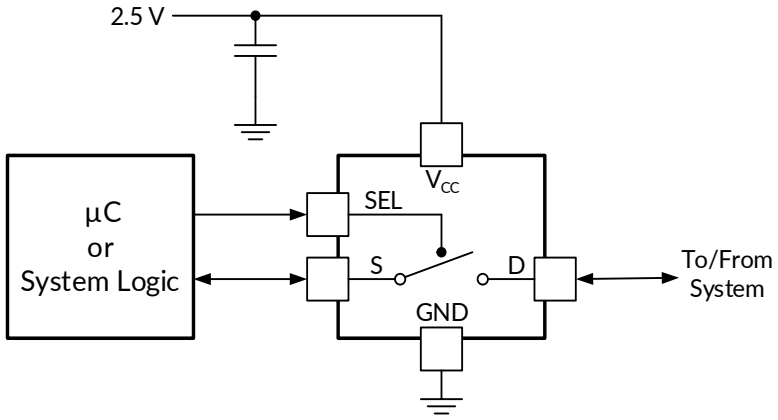
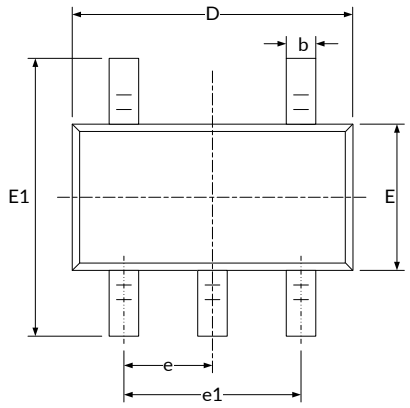
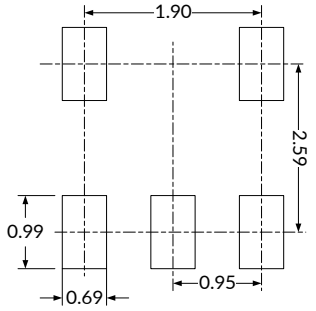


Figure 10. Typical Application Schematic

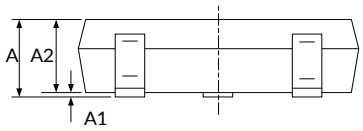
11 PACKAGE OUTLINE DIMENSIONS

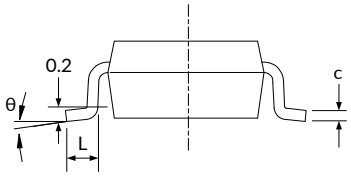
SOT23-5 (3)





RECOMMENDED LAND PATTERN (Unit: mm)



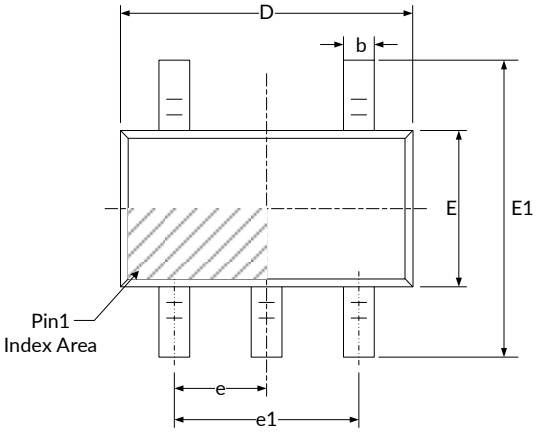


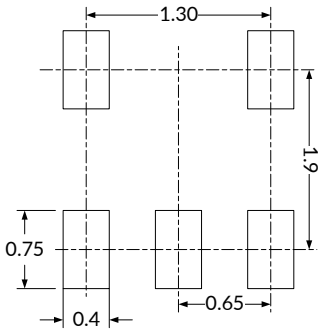
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A (1)	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D (1)	2.820	3.020	0.111	0.119
E (1)	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC) (2)		0.037(BSC) (2)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

NOTE:

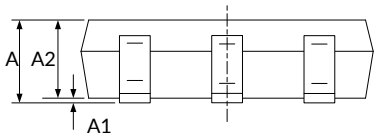
1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

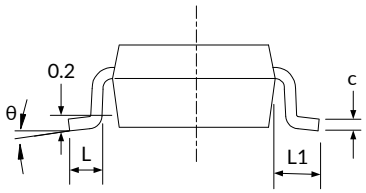
SC70-5 (3)





RECOMMENDED LAND PATTERN (Unit: mm)





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A (1)	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D (1)	2.000	2.200	0.079	0.087
E (1)	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(BSC) (2)		0.026(BSC) (2)	
e1	1.300(BSC) (2)		0.051(BSC) (2)	
L	0.260	0.460	0.010	0.018
L1	0.525		0.021	
θ	0°	8°	0°	8°

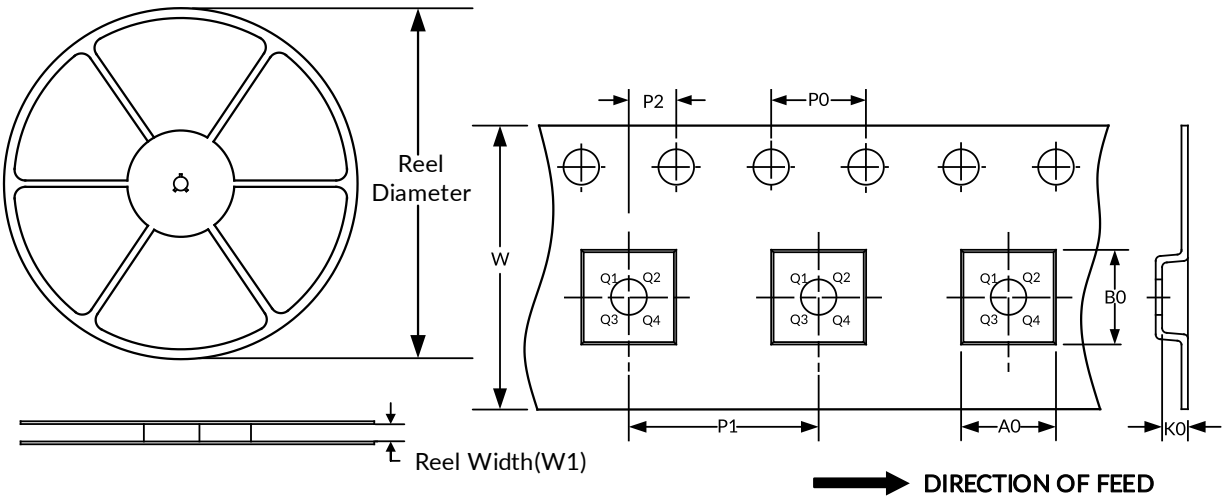
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

12 TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSION



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width(mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT23-5	7''	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
SC70-5	7''	9.5	2.25	2.55	1.20	4.0	4.0	2.0	8.0	Q3

NOTE:
1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.