SGM48756XN
3.5Ω, Low Voltage SPDT Analog Switch

GENERAL DESCRIPTION

The SGM48756XN is a bidirectional, SPDT (single-pole/double-throw), CMOS analog switch. It operates from a 1.8V to 5.5V single power supply.

The SGM48756XN features low on-resistance, low voltage and high bandwidth. These high performances make it very suitable for multiple applications, such as portable equipment, audio and video signal routing, etc. Low power consumption is also one of the important reasons that make it a good choice for applications.

The SGM48756XN is available in a Green SOT-23-6 package. It operates -40℃ to +125℃ operating temperature range.

FEATURES

- **Single Supply Voltage Range: 1.8V to 5.5V**
- **Low On-Resistance: 3.5Ω (TYP) at V_+ = 5V**
- **Fast Switching Times:**
  - **t_{ON}: 40ns (TYP) at V_+ = 5V**
  - **t_{OFF}: 30ns (TYP) at V_+ = 5V**
- **Low On-Resistance Flatness**
- **-3dB Bandwidth: 245MHz (TYP) at V_+ = 5V**
- **High Off-Isolation: -50dB (TYP) at 10MHz**
- **TTL/CMOS Compatible**
- **Rail-to-Rail Input and Output Operation**
- **Break-Before-Make Switching**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in a Green SOT-23-6 Package**

APPLICATIONS

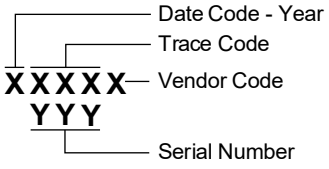
Cellular Phones
Portable Equipment
Computer Peripherals
Sample-and-Hold Circuits
Personal Digital Assistants
Battery-Powered Systems
Audio and Video Signal Routing

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM48756XN	SOT-23-6	-40℃ to +125℃	SGM48756XN6G/TR	XXXXX 3CJ	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

V+, IN to GND ..... -0.3V to 6V
Analog Voltage Range (1) ..... -0.3V to (V_+ + 0.3V)
Continuous Current, NO, NC, or COM ..... ±50mA
Peak Current, NO, NC, or COM ..... ±80mA
Package Thermal Resistance
SOT-23-6, θ_{JA} ..... 157.4℃/W
SOT-23-6, θ_{JB} ..... 53.8℃/W
SOT-23-6, θ_{JC} ..... 101.9℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility (2) (3)
HBM ..... ±4000V
CDM ..... ±1000V

NOTES:

1. Internal diodes will clamp voltages on NC, NO, or COM that exceed V_+. Limit the current through the forward diode to the maximum ratings.

2. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.

3. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range ..... -40℃ to +125℃

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

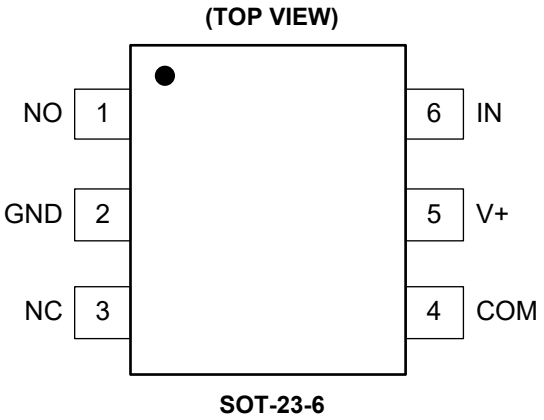
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATION



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	NO	Normally Open Pin.
2	GND	Ground.
3	NC	Normally Closed Pin.
4	COM	Common Pin.
5	V+	Positive Power Supply Pin.
6	IN	Digital Control Pin to Connect the COM Pin to the NO or NC Pins.

NOTE: NO, NC and COM pins may be an input or output.

FUNCTION TABLE

IN	NO	NC
0	OFF	COM = NC
1	COM = NO	OFF

DC ELECTRICAL CHARACTERISTICS (V_+ = 4.5V to 5.5V)

(Full = -40℃ to +125℃, typical values are at V_+ = 5V, T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Analog Switch							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}		Full	0		V_+	V
On-Resistance	R_{ON}	V_+ = 4.5V, V_{NO} or V_{NC} = 0V to 4.5V, I_{COM} = -10mA, Test Circuit 1	+25℃		3.5	5.5	Ω
			Full			6.5	
On-Resistance Match between Channels	ΔR_{ON}	V_+ = 4.5V, V_{NO} or V_{NC} = 0V to 4.5V, I_{COM} = -10mA, Test Circuit 1	+25℃		0.02	0.25	Ω
			Full			0.35	
On-Resistance Flatness	$R_{FLAT(ON)}$	V_+ = 4.5V, V_{NO} or V_{NC} = 0V to 4.5V, I_{COM} = -10mA, Test Circuit 1	+25℃		1.1	2.5	Ω
			Full			3	
Source Off Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	V_+ = 5.5V, V_{NO} or V_{NC} = 1V, 4.5V, V_{COM} = 4.5V, 1V	Full		±0.1	±1	μA
Channel On Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_+ = 5.5V, V_{COM} = 1V, 4.5V, V_{NO} or V_{NC} = floating	Full		±0.1	±1	μA
Digital Inputs							
Input High Voltage	V_{IH}		Full	1.8			V
Input Low Voltage	V_{IL}		Full			0.4	V
Input Leakage Current	I_{IN}	V_+ = 5.5V, V_{IN} = 0V or 5.5V	Full		±0.1	±1.5	μA
Power Requirements							
Power Supply Range	V_+		Full	1.8		5.5	V
Power Supply Current	I_+	V_+ = 5.5V, V_{IN} = 0V or V_+	Full		0.1	1	μA

AC ELECTRICAL CHARACTERISTICS (V_+ = 4.5V to 5.5V)

(Full = -40℃ to +125℃, typical values are at V_+ = 5V, T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN (1)	TYP	MAX(1)	UNITS
Dynamic Characteristics								
Turn-On Time	t_{ON}	V_{NO} or V_{NC} = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		Full	2	40	56	ns
Turn-Off Time	t_{OFF}	V_{NO} or V_{NC} = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		Full	1	30	40	ns
Break-Before-Make Delay Time	t_D	V_{NC} = V_{NO} = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 3		Full	1	10	19	ns
Propagation Delay Time (Signal Input to Output)	t_{PD}	R_S = 39Ω, C_L = 50pF, Test Circuit 4		Full	1	5.5	7.1	ns
Off-Isolation	O_{ISO}	Signal = 0dBm, R_L = 50Ω, C_L = 5pF, Test Circuit 5	f = 10MHz	+25℃		-50		dB
			f = 1MHz	+25℃		-70		dB
-3dB Bandwidth	BW	Signal = 0dBm, R_L = 50Ω, C_L = 5pF, Test Circuit 6		+25℃		245		MHz
Source Off Capacitance	$C_{NC(OFF)}$, $C_{NO(OFF)}$	f = 1MHz		Full	3	10	13.5	pF
Channel On Capacitance	$C_{NC(ON)}$, $C_{NO(ON)}$, $C_{COM(ON)}$	f = 1MHz		Full	10	28	39	pF

NOTE:

1. Specified by design and characterization, not production tested.

DC ELECTRICAL CHARACTERISTICS (V_+ = 2.7V to 3.6V)

(Full = -40℃ to +125℃, typical values are at V_+ = 3.0V, T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Analog Switch							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}		Full	0		V_+	V
On-Resistance	R_{ON}	V_+ = 2.7V, V_{NO} or V_{NC} = 0V to 2.7V, I_{COM} = -10mA, Test Circuit 1	+25℃		6.6	11.5	Ω
			Full			12	
On-Resistance Match between Channels	ΔR_{ON}	V_+ = 2.7V, V_{NO} or V_{NC} = 0V to 2.7V, I_{COM} = -10mA, Test Circuit 1	+25℃		0.03	0.9	Ω
			Full			0.95	
On-Resistance Flatness	$R_{FLAT(ON)}$	V_+ = 2.7V, V_{NO} or V_{NC} = 0V to 2.7V, I_{COM} = -10mA, Test Circuit 1	+25℃		3.2	6.5	Ω
			Full			7.5	
Source Off Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	V_+ = 3.6V, V_{NO} or V_{NC} = 0.3V, 3.3V, V_{COM} = 3.3V, 0.3V	Full		±0.1	±1	μA
Channel On Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_+ = 3.6V, V_{COM} = 0.3V, 3.3V, V_{NO} or V_{NC} = floating	Full		±0.1	±1	μA
Digital Inputs							
Input High Voltage	V_{IH}		Full	1.6			V
Input Low Voltage	V_{IL}		Full			0.3	V
Input Leakage Current	I_{IN}	V_+ = 3.6V, V_{IN} = 0V or 3.6V	Full		±0.1	±1.5	μA
Power Requirements							
Power Supply Current	I_+	V_+ = 3.6V, V_{IN} = 0V or V_+	Full		0.1	1	μA

AC ELECTRICAL CHARACTERISTICS (V_+ = 2.7V to 3.6V)

(Full = -40℃ to +125℃, typical values are at V_+ = 3.0V, T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN (1)	TYP	MAX (1)	UNITS
Dynamic Characteristics								
Turn-On Time	t_{ON}	V_{NO} or V_{NC} = 1.5V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		Full	4	55	84	ns
Turn-Off Time	t_{OFF}	V_{NO} or V_{NC} = 1.5V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		Full	3	45	68	ns
Break-Before-Make Delay Time	t_D	V_{NC} = V_{NO} = 3V, R_L = 300Ω, C_L = 35pF, Test Circuit 3		Full	2	16	31	ns
Propagation Delay Time (Signal Input to Output)	t_{PD}	R_S = 39Ω, C_L = 50pF, Test Circuit 4		Full	1	5.5	7.4	ns
Off-Isolation	O_{ISO}	Signal = 0dBm, R_L = 50Ω, C_L = 5pF, Test Circuit 5	f = 10MHz	+25℃		-50		dB
			f = 1MHz	+25℃		-70		dB
-3dB Bandwidth	BW	Signal = 0dBm, R_L = 50Ω, C_L = 5pF, Test Circuit 6		+25℃		235		MHz
Source Off Capacitance	$C_{NC(OFF)}$, $C_{NO(OFF)}$	f = 1MHz		Full	3	10	13.9	pF
Channel On Capacitance	$C_{NC(ON)}$, $C_{NO(ON)}$, $C_{COM(ON)}$	f = 1MHz		Full	10	28	40	pF

NOTE:

1. Specified by design and characterization, not production tested.

DC ELECTRICAL CHARACTERISTICS (V_+ = 1.8V)

(Full = -40℃ to +125℃, typical values are at V_+ = 1.8V, T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Analog Switch							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}		Full	0		V_+	V
On-Resistance	R_{ON}	V_+ = 1.8V, V_{NO} or V_{NC} = 0V to 1.8V, I_{COM} = -10mA, Test Circuit 1	+25℃		35	65	Ω
			Full			75	
On-Resistance Match between Channels	ΔR_{ON}	V_+ = 1.8V, V_{NO} or V_{NC} = 0V to 1.8V, I_{COM} = -10mA, Test Circuit 1	+25℃		0.2	5.5	Ω
			Full			5.6	
On-Resistance Flatness	$R_{FLAT(ON)}$	V_+ = 1.8V, V_{NO} or V_{NC} = 0V to 1.8V, I_{COM} = -10mA, Test Circuit 1	+25℃		30	60	Ω
			Full			70	
Source Off Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	V_+ = 1.8V, V_{NO} or V_{NC} = 0V, 1.8V, V_{COM} = 1.8V, 0V	Full		±0.1	±1	μA
Channel On Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_+ = 1.8V, V_{COM} = 0V, 1.8V, V_{NO} or V_{NC} = floating	Full		±0.1	±1	μA
Digital Inputs							
Input High Voltage	V_{IH}		Full	1.4			V
Input Low Voltage	V_{IL}		Full			0.3	V
Input Leakage Current	I_{IN}	V_+ = 1.8V, V_{IN} = 0V or 1.8V	Full		±0.1	±1.5	μA
Power Requirements							
Power Supply Current	I_+	V_+ = 1.8V, V_{IN} = 0V or V_+	Full		0.1	1	μA

AC ELECTRICAL CHARACTERISTICS (V_+ = 1.8V)

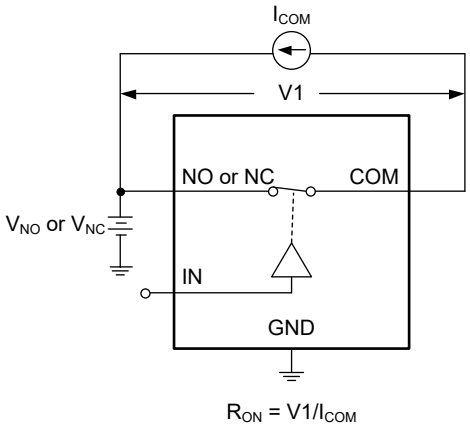
(Full = -40℃ to +125℃, typical values are at V_+ = 1.8V, T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN (1)	TYP	MAX (1)	UNITS
Dynamic Characteristics								
Turn-On Time	t_{ON}	V_{NO} or V_{NC} = 1.5V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		Full	8	105	228	ns
Turn-Off Time	t_{OFF}	V_{NO} or V_{NC} = 1.5V, R_L = 300Ω, C_L = 35pF, Test Circuit 2		Full	5	95	153	ns
Break-Before-Make Delay Time	t_D	V_{NC} = V_{NO} = 1.8V, R_L = 300Ω, C_L = 35pF, Test Circuit 3		Full	1	35	111	ns
Propagation Delay Time (Signal Input to Output)	t_{PD}	R_S = 39Ω, C_L = 50pF, Test Circuit 4		Full	0.5	7	9.5	ns
Off-Isolation	O_{ISO}	Signal = 0dBm, R_L = 50Ω, C_L = 5pF, Test Circuit 5	f = 10MHz	+25℃		-50		dB
			f = 1MHz	+25℃		-70		dB
-3dB Bandwidth	BW	Signal = 0dBm, R_L = 50Ω, C_L = 5pF, Test Circuit 6		+25℃		235		MHz
Source Off Capacitance	$C_{NC(OFF)}$, $C_{NO(OFF)}$	f = 1MHz		Full	3	10.5	14	pF
Channel On Capacitance	$C_{NC(ON)}$, $C_{NO(ON)}$, $C_{COM(ON)}$	f = 1MHz		Full	2	30	41	pF

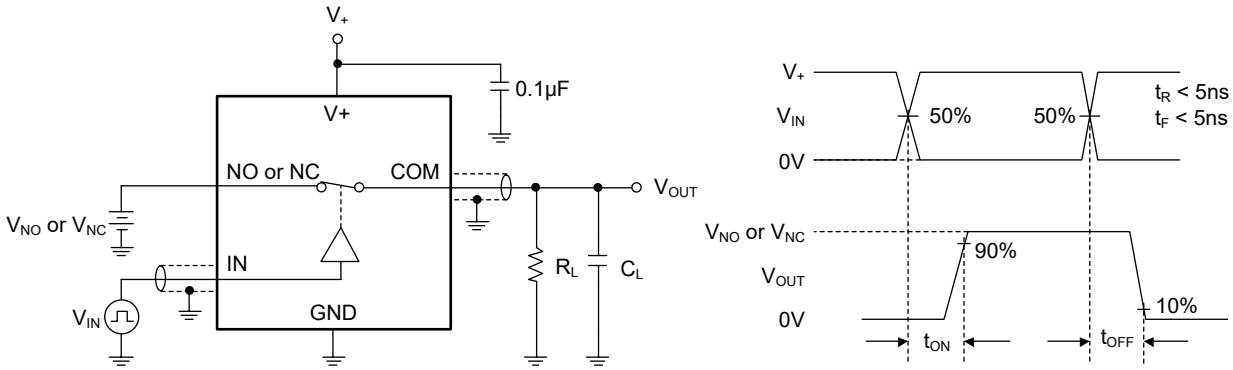
NOTE:

1. Specified by design and characterization, not production tested.

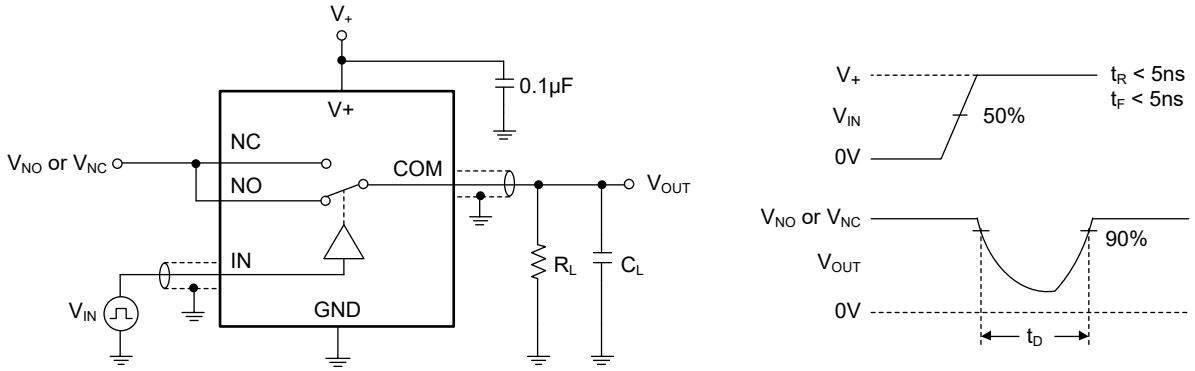
TEST CIRCUITS



Test Circuit 1. On-Resistance

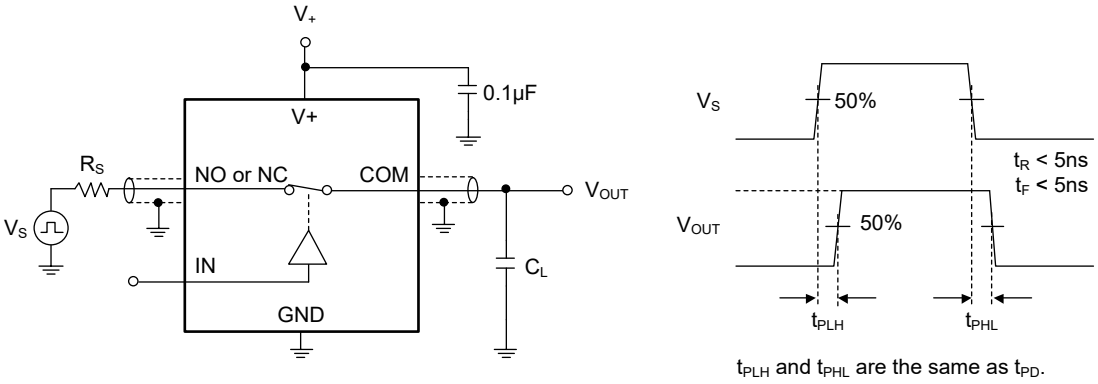


Test Circuit 2. Switching Times (t_{ON}, t_{OFF})

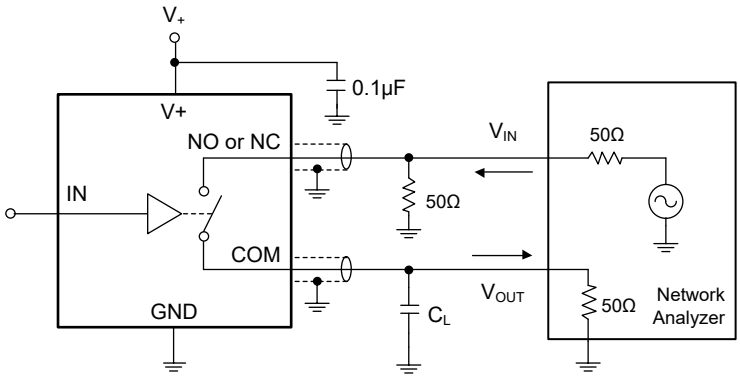


Test Circuit 3. Break-Before-Make Delay Time (t_D)

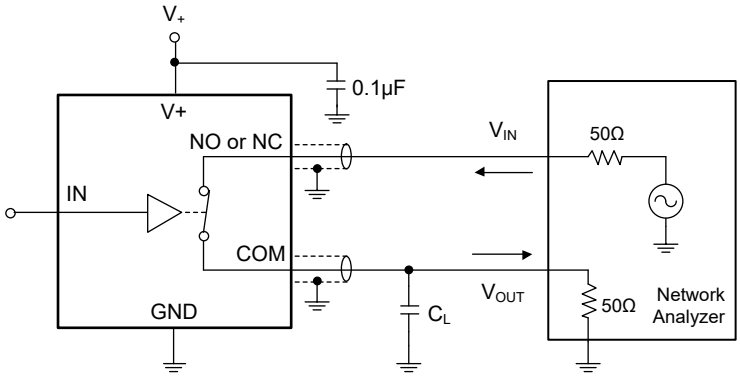
TEST CIRCUITS (continued)



Test Circuit 4. Propagation Delay Time (t_{PD})



Test Circuit 5. Off-Isolation



Test Circuit 6. -3dB Bandwidth

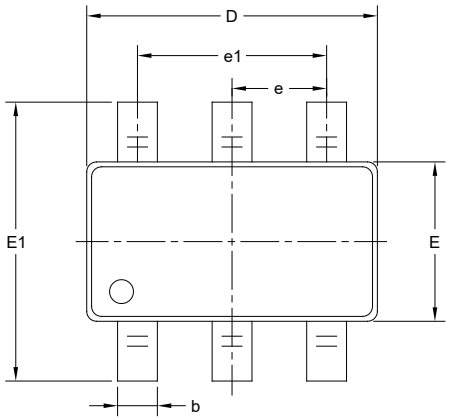
REVISION HISTORY

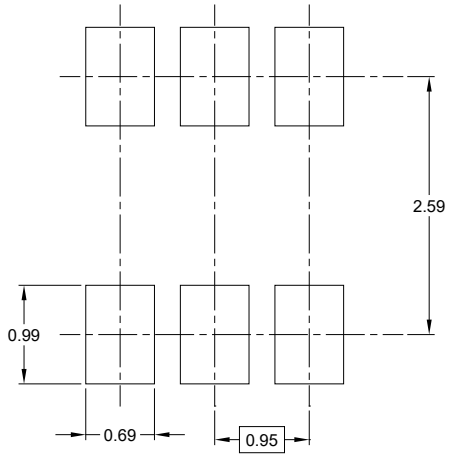
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original to REV.A (NOVEMBER 2026)	Page
Changed from product preview to production data	All

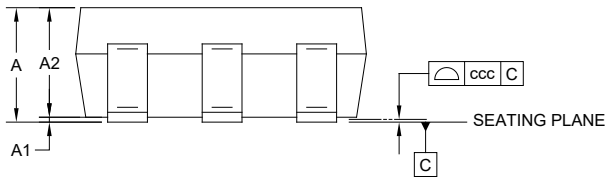
PACKAGE OUTLINE DIMENSIONS

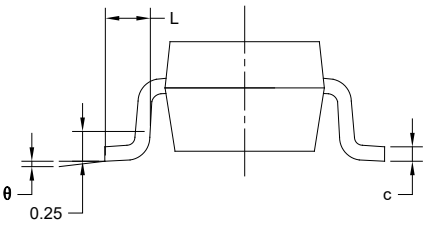
SOT-23-6





RECOMMENDED LAND PATTERN (Unit: mm)



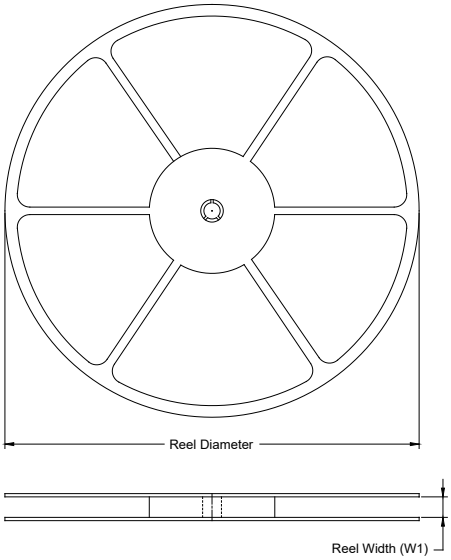


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

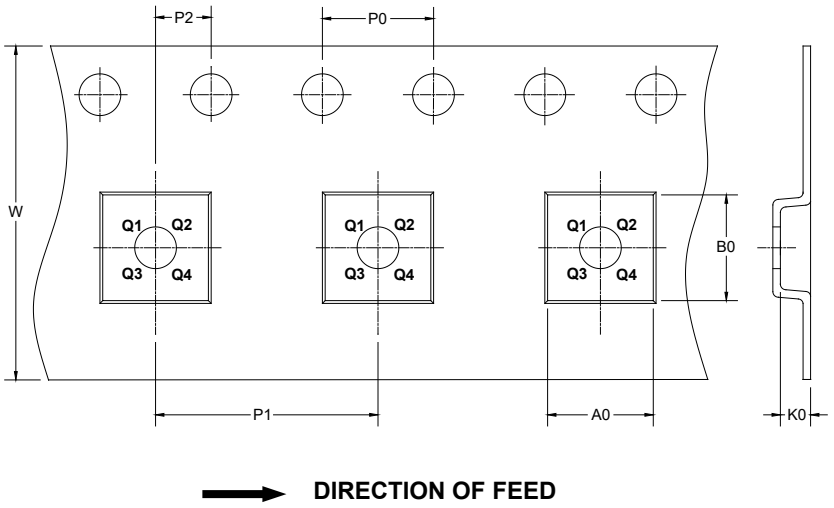
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



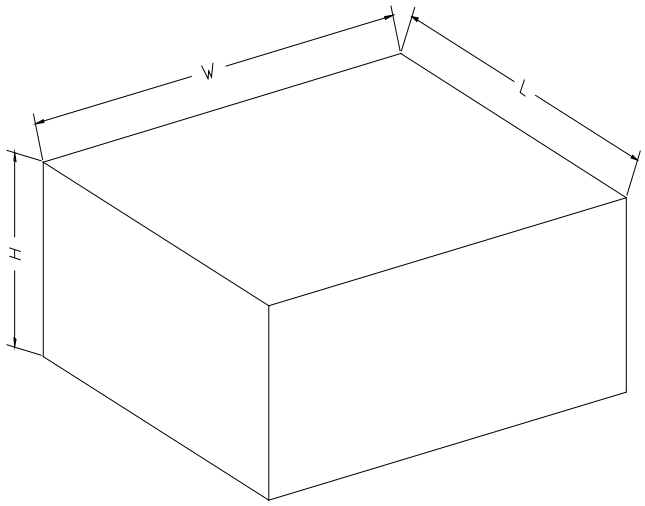
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT-23-6	7"	9.5	3.23	3.17	1.37	4.0	4.0	2.0	8.0	Q3

DD0001

CARTON BOX DIMENSIONS



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

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7″ (Option)	368	227	224	8
7″	442	410	224	18

DD0002