

10Ω SPDT Analog Switch

FEATURES

- Low On-Resistance (10Ω)
- Single Supply Operation from 1.65V to 5.5V
- Low Charge Injection
- Low Total Harmonic Distortion (THD)
- Full 0 – V_{CC} Signal Handling Capability
- Excellent On-Resistance Matching
- Control input tolerates voltages up to 7.0V
- Break-Before-Make Enable Circuitry
- 250MHz, -3dB Bandwidth
- Packages: SC70-6, SOT23-6

APPLICATIONS

- Battery-Powered Equipment
- Audio and Video Signal Routing
- Communication Circuits

BLOCK DIAGRAM

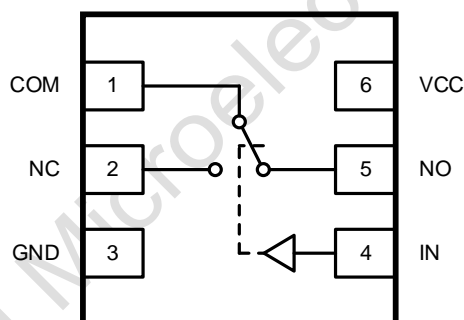


Figure 1, Block Diagram

GENERAL DESCRIPTIONS

The ASW3157 is a Single Pole Double Throw (SPDT) analog switch. It can operate from a single 1.65V to 5.5V power supply. The Control Input tolerates voltages up to 7.0V, independent of the V_{CC} operating range.

The ASW3157 also features guaranteed Break-Before-Make (BBM) switching, assuring the switches never short the driver.

FUNCTION TABLE

IN	NO	NC
0	OFF	ON
1	ON	OFF

Revision History

Note: Page numbers for previous versions may be different from page numbers in the current version.

VERSION	CHANGE DATE	FIXED ITEMS
V01	2020/5	Initial version completed.
V02	2023/7	Updated the Block Diagram.
V03	2023/9	Updated Mark Information.

PIN DIAGRAM

SC70-6/SOT23-6

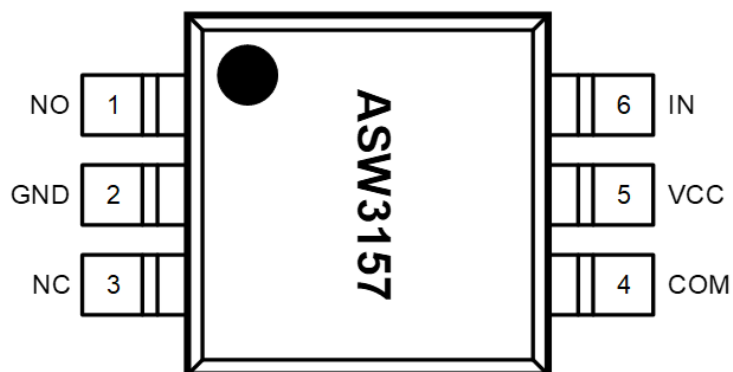


Figure 2, Pin Diagram (Top View)

PIN DESCRIPTIONS

PIN NAME	TYPE	DESCRIPTIONS	
5	VCC	POWER	Power Supply Voltage
1	NO	I/O	Data Path
4	COM	I/O	Common Path
6	IN	I	Input Control
3	NC	I/O	Data Path
2	GND	GROUND	Ground

Absolute Maximum Ratings

Stress exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

SYMBOL	PARAMETER	MIN	MAX	UNIT
V _{CC}	Power Supply Voltage	-0.5	7.0	V
V _{IS}	Analog Input Voltage (NO, NC, COM)	-0.5	V _{CC} + 0.5	V
V _{IN}	Digital Select Input Voltage (IN)	-0.5	7.0	V
I _{IK}	Analog Port Diode Current	±50		mA
I _{SW}	On-State Switch Current	±50		mA
ESD	HBM Model		±2.0	KV
T _{STG}	Storage Temperature	-65	+150	°C

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications.

SYMBOL	PARAMETER	MIN	MAX	UNIT
V _{CC}	Power Supply Voltage	1.65	5.5	V
V _{IN}	Digital Select Input Voltage (IN)	0	V _{CC}	V
V _{IS}	Analog Input Voltage (NC, NO, COM)	0	V _{CC}	V
T _A	Operating Temperature	-40	+125	°C
t _r , t _f	Input Rise or Fall Time,			
	V _{CC} = 1.6V – 2.7V	0	20	ns/V
	V _{CC} = 3.0V – 5.5V	0	5.0	ns/V

DC CHARACTERISTICS

All typical values are at $T_A=25^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	V _{CC} (V)	T _A = 25°C			T _A = -40°C to +85°C		UNIT
				MIN	TYP	MAX	MIN	MAX	
V _{IH}	Control Input Voltage High	IN	1.65 - 1.95				0.75 x V _{CC}		V
			2.3 - 2.8				1.5		
			3.0 - 4.2				2.4		
			4.5 - 5.5				0.60 x V _{CC}		
V _{IL}	Control Input Voltage Low	IN	1.65 - 1.95					0.25 x V _{CC}	V
			2.3 - 2.8				0.4		
			3.0 - 5.5				0.30 x V _{CC}		
I _{IN}	Control Input Leakage Current	0 ≤ V _{IS} ≤ 5.5V	0 - 5.5			±0.1		±1.0	μA
I _{OFF}	Power OFF Leakage Current	0 ≤ V _{IS} ≤ V _{CC}	1.65 - 5.5			±0.1		±1.0	μA
I _{CC} ⁽¹⁾	Maximum Quiescent Supply Current	V _{IS} = V _{CC} or GND, I _{COM} = 0mA	1.65 - 5.5			±1.0		±2.0	μA
	Analog Signal Range		V _{CC}	0		V _{CC}	0	V _{CC}	V
R _{ON} ⁽²⁾	NC/NO Switch On-Resistance, (Figure 3)	I _{COM} = 30mA, V _{IS} = 0V	4.5		3.0			7.0	Ω
		I _{COM} = -30mA, V _{IS} = 2.4V			5.0			12	
		I _{COM} = -30mA, V _{IS} = 4.5V			7.0			15	
		I _{COM} = 24mA, V _{IS} = 0V	3.0		4.0			9.0	
		I _{COM} = -24mA, V _{IS} = 3.0V			10			20	
		I _{COM} = 8mA, V _{IS} = 0V	2.3		5.0			12	
		I _{COM} = -8mA, V _{IS} = 2.3V			13			30	
		I _{COM} = 4mA, V _{IS} = 0V	1.65		6.5			20	
I _{COM} = -4mA, V _{IS} = 1.65V		17				50			
R _{RANGE}	On-Resistance Over Signal Range (Figure 3)	I _{COM} = -30mA, 0 ≤ V _{IS} ≤ V _{CC}	4.5					25	Ω
		I _{COM} = -24mA, 0 ≤ V _{IS} ≤ V _{CC}	3.0					50	
		I _{COM} = -8mA, 0 ≤ V _{IS} ≤ V _{CC}	2.3					100	
		I _{COM} = -4mA, 0 ≤ V _{IS} ≤ V _{CC}	1.65					300	
R _{ONFLAT} ⁽²⁾	NC/NO On-Resistance Flatness (Figure 3)	I _{COM} = -30mA, 0 ≤ V _{IS} ≤ V _{CC}	5.0		6				Ω
		I _{COM} = -24mA, 0 ≤ V _{IS} ≤ V _{CC}	3.3		12				
		I _{COM} = -8mA, 0 ≤ V _{IS} ≤ V _{CC}	2.5		28				
		I _{COM} = -4mA, 0 ≤ V _{IS} ≤ V _{CC}	1.8		125				
ΔR _{ON} ⁽³⁾	On-Resistance match between channels (Figure 3)	I _{COM} = -30mA, V _{IS} = 3.15V	4.5		0.15				Ω
		I _{COM} = -24mA, V _{IS} = 2.10V	3.0		0.20				
		I _{COM} = -8mA, V _{IS} = 1.60V	2.3		0.50				
		I _{COM} = -4mA, V _{IS} = 1.15V	1.65		0.50				

Notes:

- Guaranteed by design.
- Flatness is defined as the difference between the maximum and minimum value of on-resistance as measured over the specified analog signal ranges.
- $\Delta R_{ON} = R_{ON(MAX)} - R_{ON(MIN)}$ between NC and NO.

AC CHARACTERISTICS

All typical values are at $T_A=25^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	V_{CC} (V)	$T_A = 25^\circ\text{C}$			$T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$		UNIT
				MIN	TYP	MAX	MIN	MAX	
t_{ON}	Turn-ON Time (Figure 4)	$V_{IS} = 0.8\text{V}$	1.65 - 1.95	7.0		23.0	7.0	24.0	ns
			2.3 - 2.7	3.5		13.0	3.5	14.0	
		$V_{IS} = 1.5\text{V}$	3.0 - 3.6	2.5		6.9	2.5	7.6	
			4.5 - 5.5	1.7		5.2	1.7	5.7	
t_{OFF}	Turn-OFF Time (Figure 4)	$V_{IS} = 0.8\text{V}$	1.65 - 1.95	3.0		12.5	3.0	13.0	ns
			2.3 - 2.7	2.0		7.0	2.0	7.5	
		$V_{IS} = 1.5\text{V}$	3.0 - 3.6	1.5		5.0	1.5	5.3	
			4.5 - 5.5	0.8		3.5	0.8	3.8	
t_{BBM}	Break-Before-Make Time (Figure 5)	$C_L = 35\text{pF}$ $R_{IS} = 300\Omega$ $V_{IS} = V_{CC}/2$	1.65 - 1.95	0.5			0.5		ns
			2.3 - 2.7	0.5			0.5		
			3.0 - 3.6	0.5			0.5		
			4.5 - 5.5	0.5			0.5		
Q_{INJ}	Charge Injection (Figure 6)	$V_{IS} = 0\text{V}$ or V_{CC} $C_L = 0.1\text{nF}$ $R_{IS} = 0\Omega$	1.65 - 1.95	1					pC
			2.3 - 2.7	2					
			3.0 - 3.6	3.0					
			4.5 - 5.5	7.0					
BW	On-Channel -3dB Bandwidth (Figure 7)	$R_{IS} = 50\Omega$	1.65 - 5.5		350				MHz
O_{ISO}	Off-channel Isolation (Figure 8)	$F_{IS} = 10\text{MHz}$, $R_L = 50\Omega$	1.65 - 5.5		-57				dB
X_{TALK}	Channel-to-channel Crosstalk (Figure 9)	$F_{IS} = 10\text{MHz}$, $R_L = 50\Omega$	1.65 - 5.5		-54				dB
THD	Total Harmonic Distortion (THD) (Figure 10)	$F_{IS} = 20\text{Hz}$ to 20KHz $R_L = 0.6\text{K}\Omega$, $C_L = 50\text{pF}$	5.0		.015				%
C_{IN}	Control Pin Input Capacitance		0		2.3				pF
$C_{NC/NO}$	NC/NO Port Capacitance		5.0		6.5				pF
C_{COM}	COM Port Capacitance when switch is enabled		5.0		18.5				pF

TEST CIRCUITS

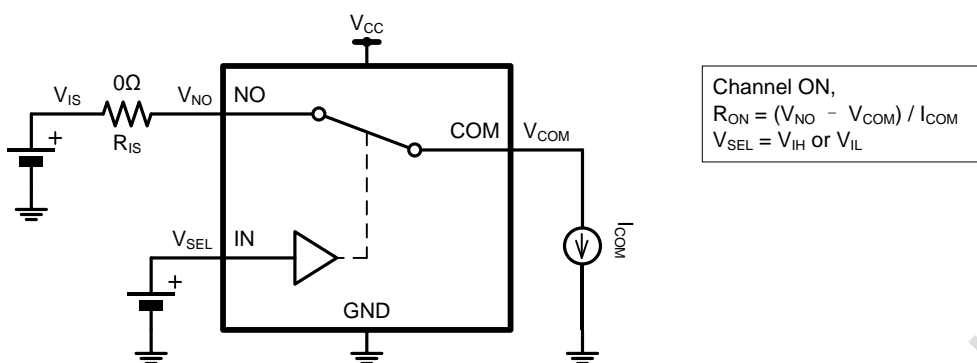


Figure 3, ON Resistance (R_{ON})

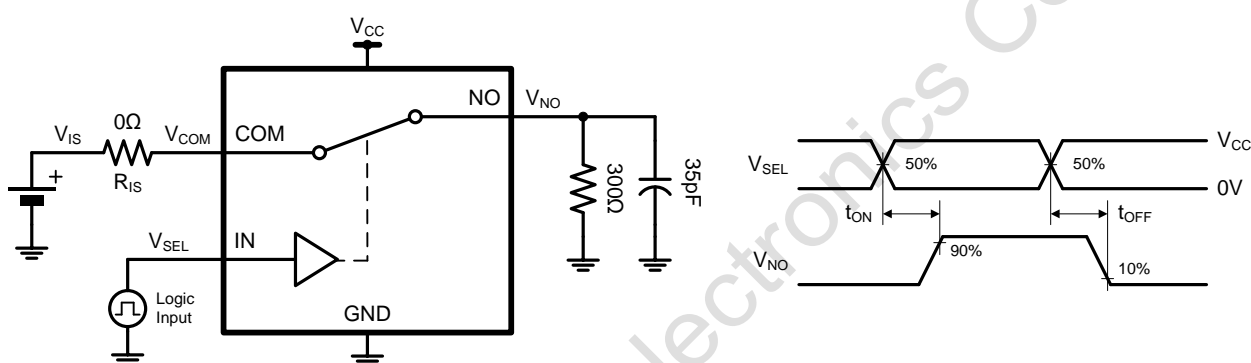


Figure 4, Turn-On and Turn-Off Time (t_{ON}/t_{OFF})

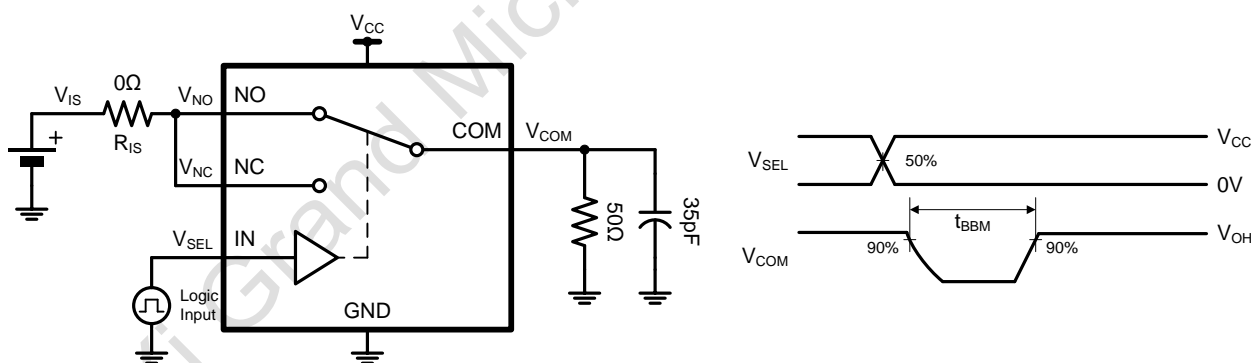


Figure 5, Break-Before-Make Time (t_{BBM})

TEST CIRCUITS (CONTINUED)

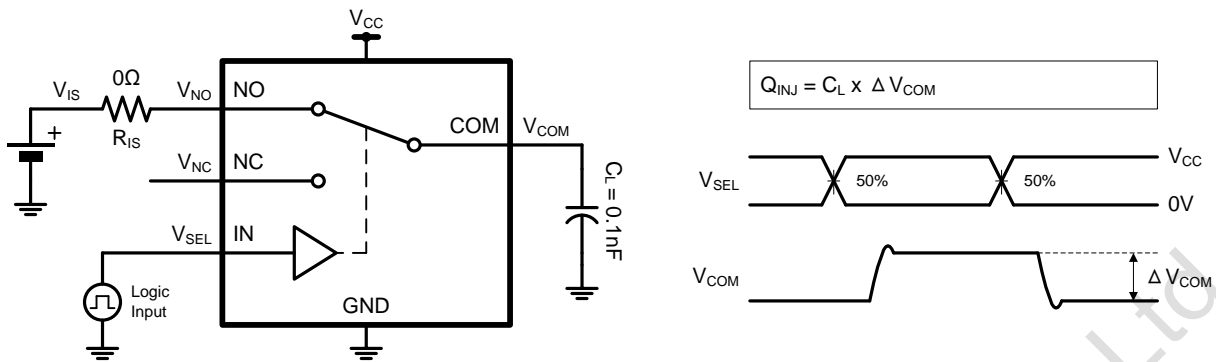


Figure 6, Charge Injection (Q_{INJ})

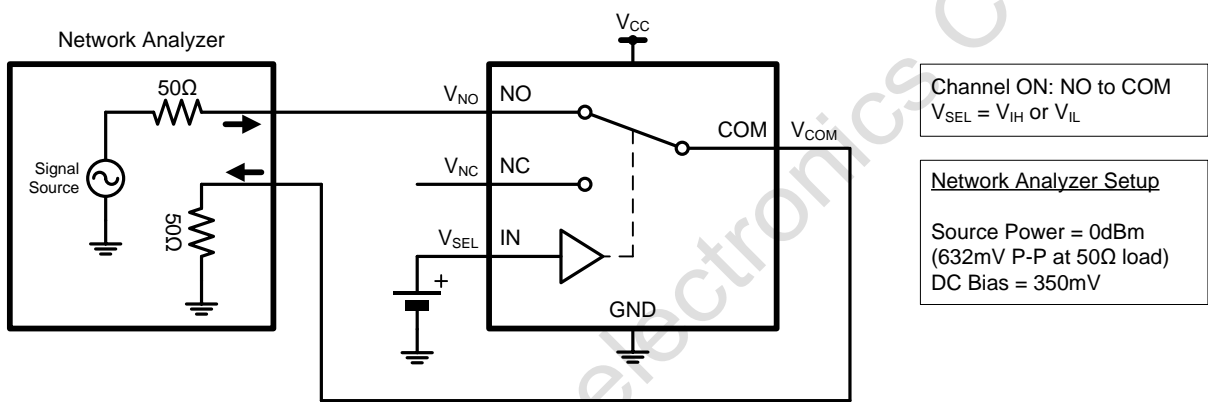


Figure 7, ON Channel -3dB Bandwidth (BW)

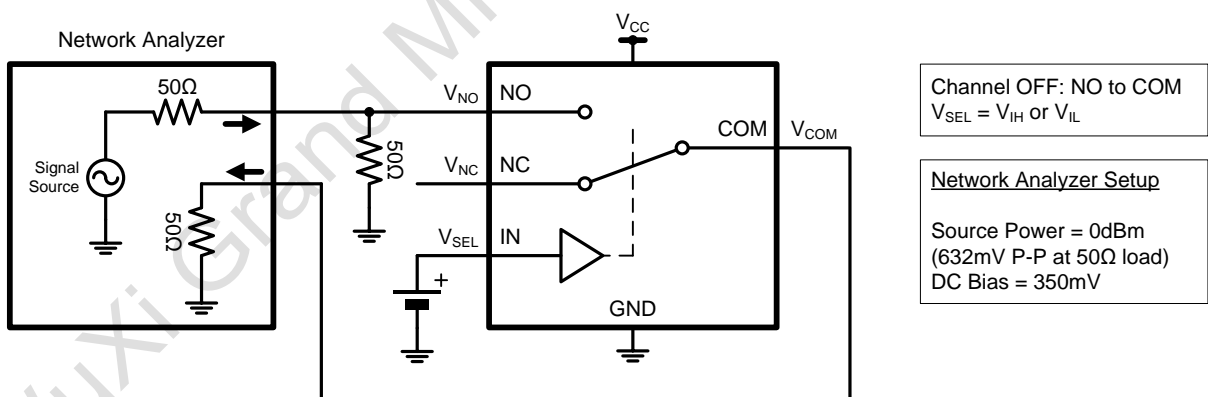


Figure 8, OFF Isolation (O_{Iso})

TEST CIRCUITS (CONTINUED)

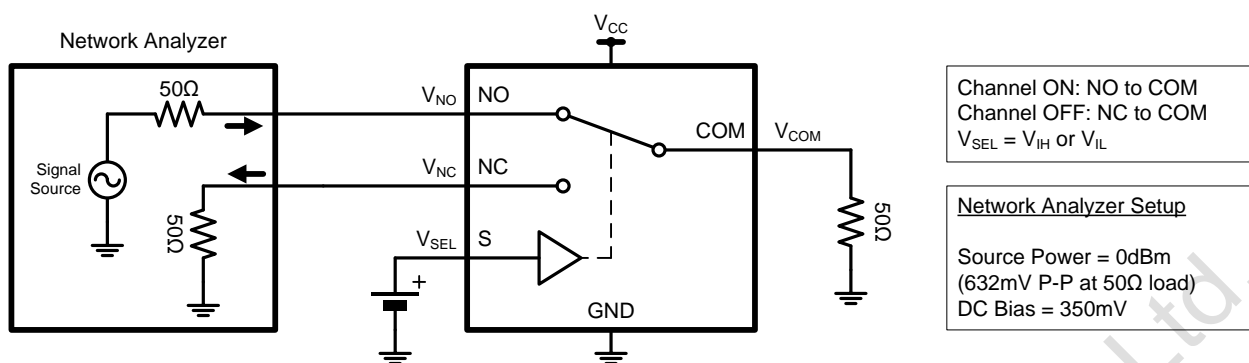


Figure 9, Channel-to-Channel Crosstalk (X_{TALK})

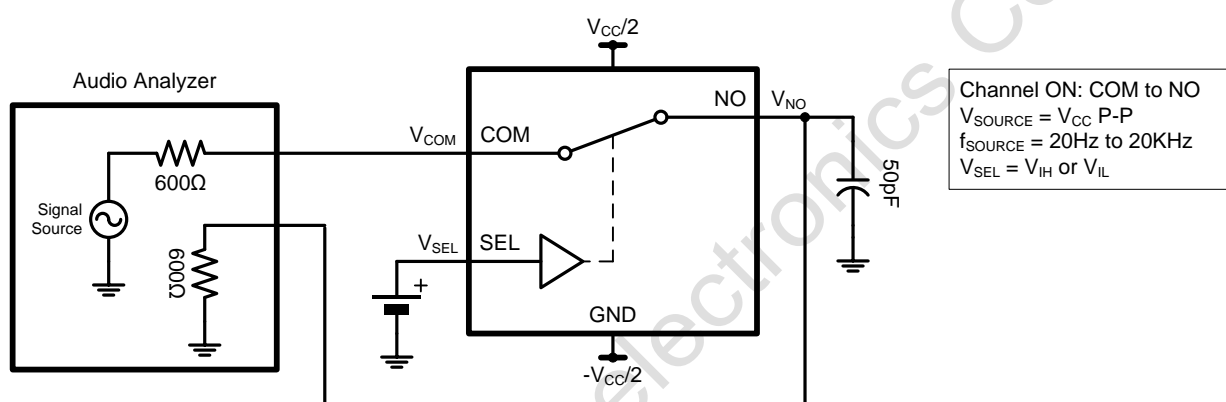
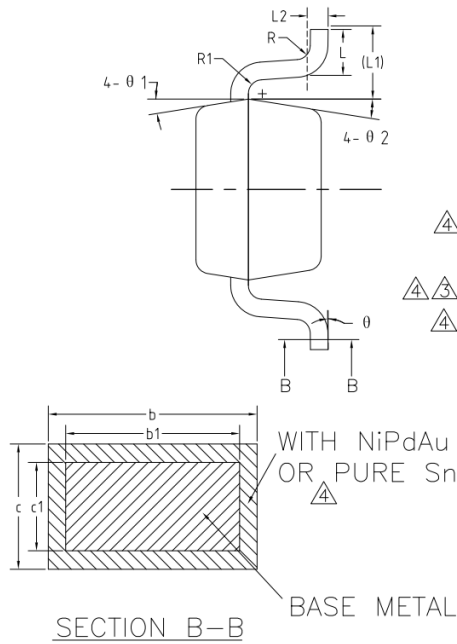
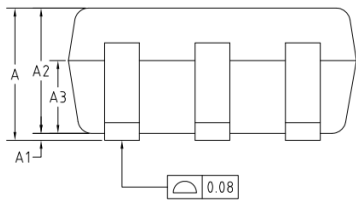
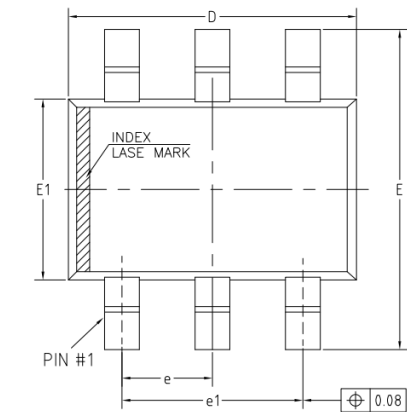


Figure 10, Total Harmonic Distortion (THD)

PACKAGE OUTLINE (SC70-6)



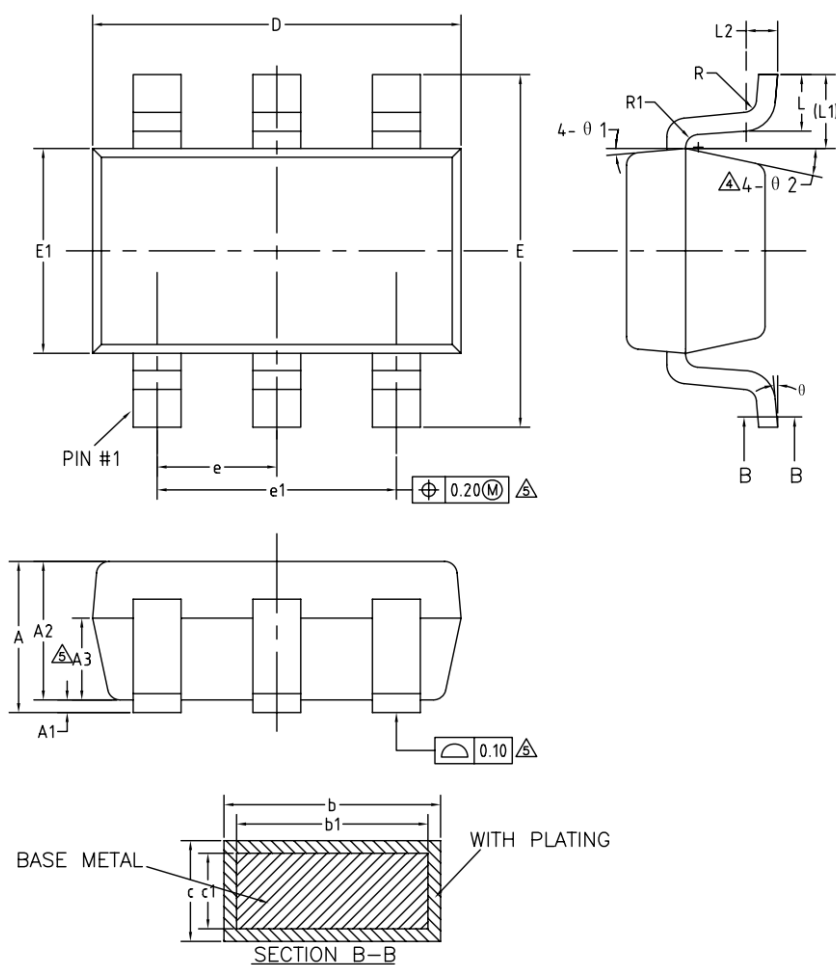
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.85	—	1.05
A1	0	—	0.10
A2	0.80	0.90	1.00
A3	0.47	0.52	0.57
b	NiPdAu PURE Sn	0.22 —	— 0.29
b1		0.23 —	— 0.33
b1		0.22	0.25
c	NiPdAu PURE Sn	0.115 —	— 0.15
c1		0.12 —	— 0.18
c1		0.115	0.13
D		2.02	2.07
E		2.20	2.30
E1		1.25	1.30
e		0.60	0.65
e1		1.20	1.30
L		0.28	0.33
L1		0.50REF	
L2		0.15BSC	
R		0.10	—
R1		0.10	—
θ		0°	—
θ 1		6°	9°
θ 2		6°	9°

NOTES:

ALL DIMENSIONS REFER TO JEDEC STANDARD MO-203 AB
DO NOT INCLUDE MOLD FLASH , PROTRUSIONS OR GATE BURRS.
MOLD FLASH , PROTRUSIONS OR GATE BURRS WILL NOT EXCEED 0.15mm PER SIDE.

PACKAGE OUTLINE (SOT23-6)



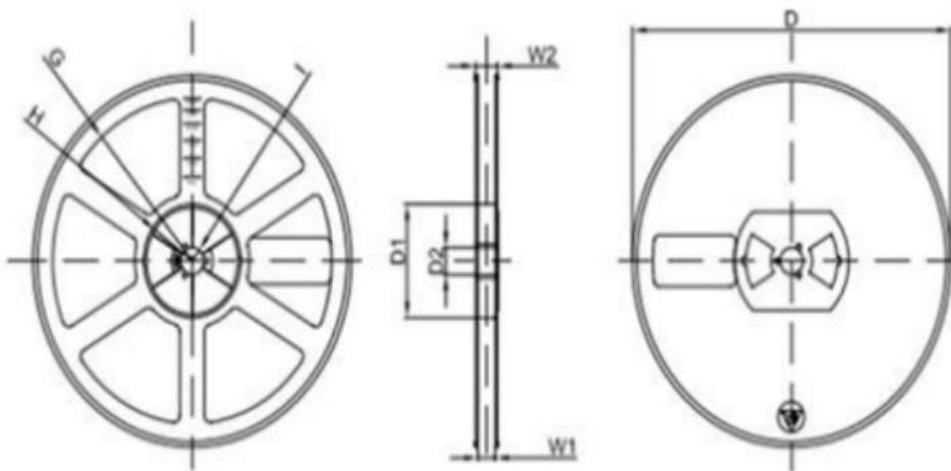
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

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	0.36	—	0.50
b1	0.36	0.38	0.45
c	0.14	—	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	—	—
R1	0.10	—	0.20
theta	0°	—	8°
theta 1	3°	5°	7°
theta 2	6°	—	14°

TAPE AND REEL INFORMATION

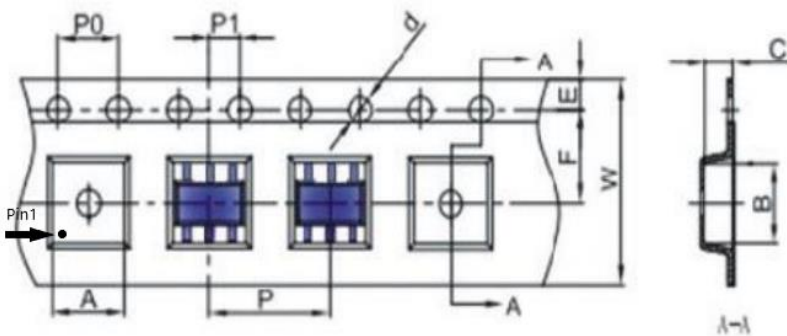
REEL(SOT23-6)

SOT23-3/5/6L卷盘尺寸



项目	D	D1	D2	G	H	I	W1	W2
7寸	∅178.00	54.40	13.00	R78.00	R25.60	R6.50	9.0	11.30
公差	±2	±1	±1	±1	±1	±1	±1	±1

TAPE(SOT23-6)

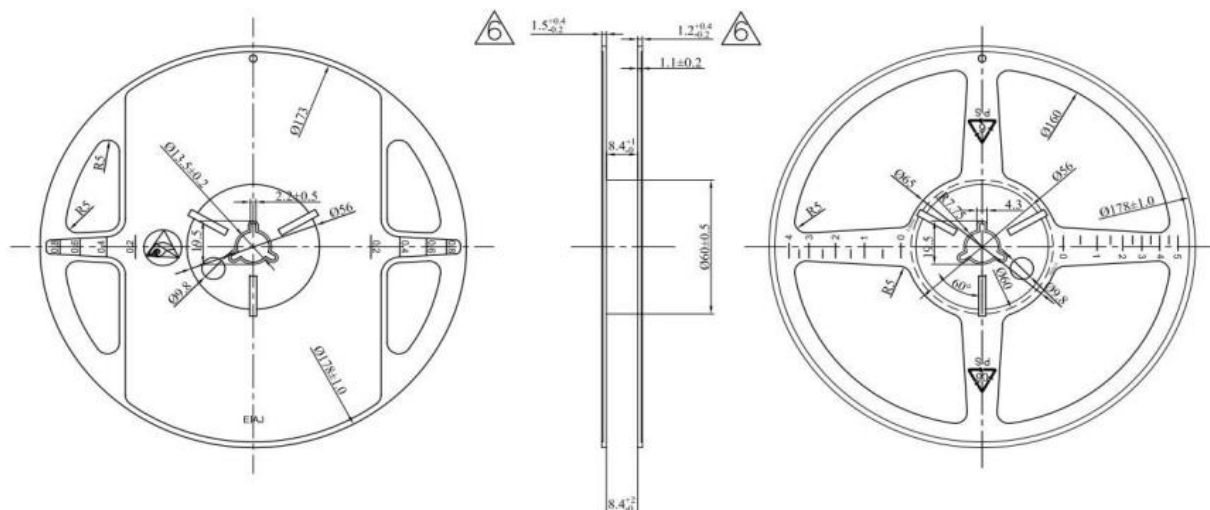


T=0.22±0.05

项目	A	B	C	d	E	F	P0	P	P1	W
SOT23-5/6L	3.20	3.18	1.38	∅1.50	1.75	3.50	4.00	4.00	2.00	8.00
公差	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	+0.3/-0.1

ASW3157

REEL(SC70-6)

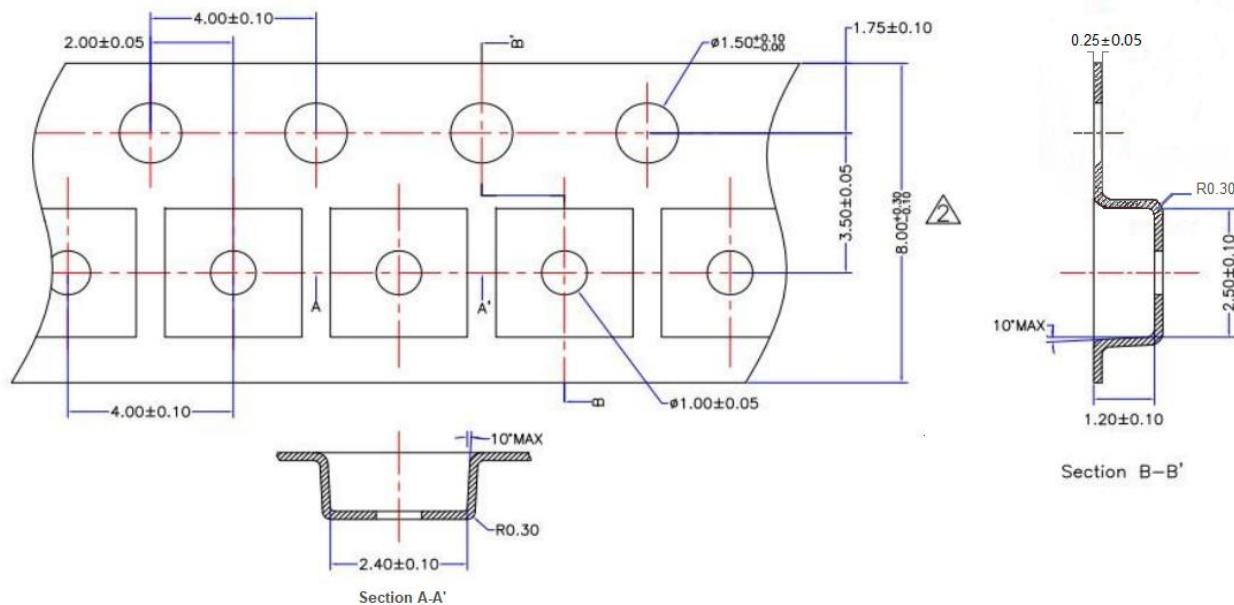


注意：

1. 材料：聚苯乙烯（黑色）；
2. 平整度：最大允许2毫米； $\triangle 4$
3. 所有尺寸为毫米；
4. 表面电阻： 10^5 TO 10^{10} OHMS/SQ.
5. 所有未注公差： ± 0.25 .



TAPE(SC70-6)



PRODUCT ORDERING INFORMATIONS

Part Number	Package Drawing	Operating Temperature	Package Information	Moisture Sensitivity Level	Eco Plan	Package Method
ASW3157SC6	3157x ⁽¹⁾	-40°C to +85°C	SC70-6	MSL-3	RoHS & Green	3000 Per Tape
ASW3157SO6	3157 xxxx ⁽²⁾	-40°C to +85°C	SOT23-6	MSL-3	RoHS & Green	3000 Per Tape

Note:

(1) "xxx" means production information, it's not fixed or variable.

(2) "x" means production information, it's not fixed or variable.

单击下面可查看定价，库存，交付和生命周期等信息

[>>GrandMicro\(有容微\)](#)