AXSW71717

2.5Ω 400MHz Dual SPDT Analog Switch with Negative Swing Audio Capability

Datasheet ─ Feb 2022

Description

The AXSW71717 is a dual, bi-directional, single-pole-double-throw (SPDT) CMOS analog switch designed to operate from a single 2.5V to 5.5V supply. It features high bandwidth of 400MHz and low switch on-resistance of 2.5Ω typically. It also features on-resistance matching of 0.1Ω typically between switches as well as low distortion when switching the audio signals. The AXSW71717 consists of 2 Normally Open (NO) switches and 2 Normally Close (NC) switches. It can be used as a dual 2-to-1 multiplexer.

Features

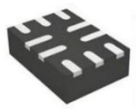
- Supply voltage range: 2.5V to 5.5V
- -2.0V to V+ signal passing ability
- Switch on-resistance: 2.5Ω (typ)
- Bandwidth: 400MHz
- Switching Times: Ton 25ns, Toff 15ns
- Break before make switching
- Off-isolation: -50dB at 10MHz
- Crosstalk: -52dB at 10MHz
- -40℃ to 85℃

Applications

- Infotainment system
- Mobile phone
- Notebook
- Tablet
- Monitor
- TV
- STB

Table 1 Device Summary

Order code	Package	Packing
AXSW71717A	QFN10	Reel
AXSW71717B	MSOP10	Reel



QFN10

MSOP10

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1 Block Diagram

Figure 1 Block Diagram

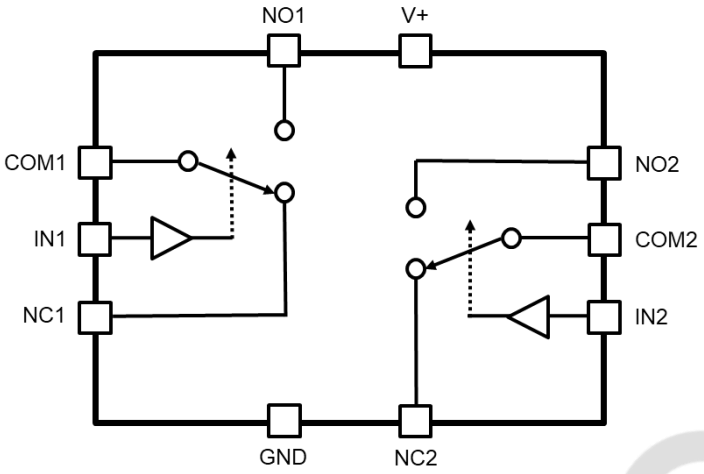
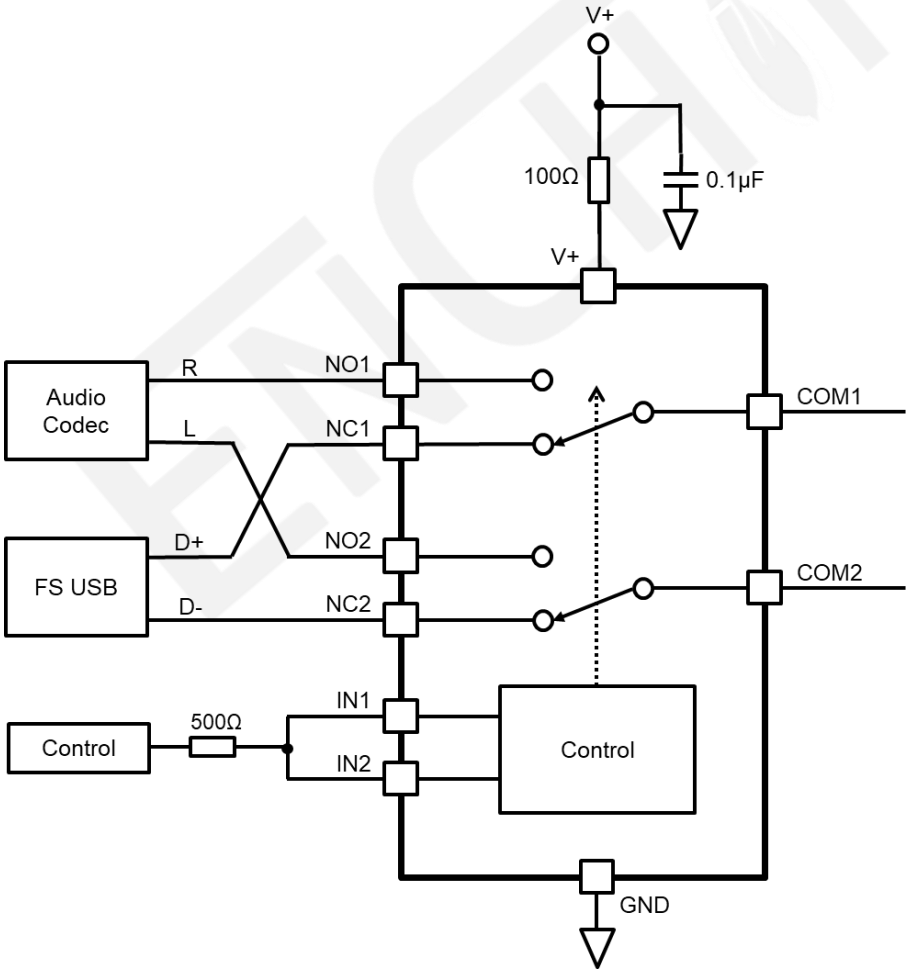


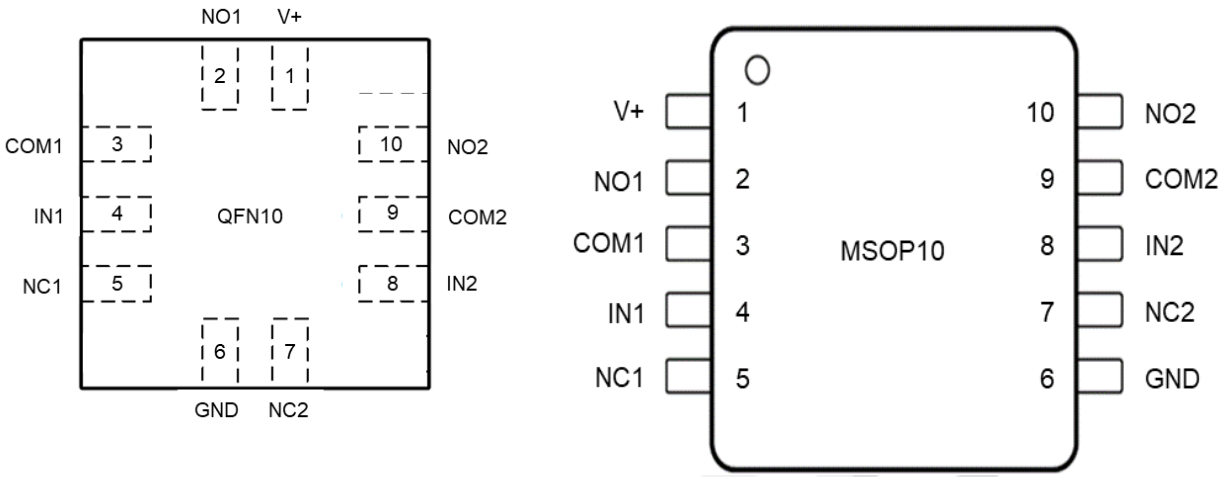
Figure 2 Application Circuit



2 Pin Description

2.1 AXSW71717 Pin Names

Figure 3 AXSW71717 Pin Connection



2.2 AXSW71717 Pin Functions

Table 2 AXSW71717 Pin Functions

Pin number	Pin name	Description
1	V+	Power supply
2	NO1	Data port, normally open
3	COM1	Common data port 1
4	IN1	Switch select 1
5	NC1	Data port, normally close
6	GND	Ground
7	NC2	Data port, normally close
8	IN2	Switch select 2
9	COM2	Common data port 2
10	NO2	Data port, normally open

3 Electrical Specifications

3.1 Absolute Maximum Ratings

Table 3 Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V+	Supply voltage	-0.3 to +6	V
NO, NC, COM	I/O pin voltage	-2 to V+	V
IN	Control pin voltage	-0.5 to (V+)+0.3	V
I	I/O continuous current	±50	mA
Tj	Junction temperature	150	°C
Tstg	Storage temperature	-55 to +150	°C

3.2 Thermal Data

Table 4 Thermal Data

Package	Rth j-amb	Rth j-case	Unit
QFN10	TBC	TBC	°C/W
MSOP10	TBC	TBC	°C/W

3.3 ESD and Latch Up

Table 5 ESD and Latch up

Symbol	Parameter	Value	Unit
All pins	ESD (HBM), I/O to GND ESD (CDM)	±8,000 ±500	V V
All pins	Latch Up JESD78, Class A	≥ 100	mA

3.4 Truth Table

Table 6 Truth Table

Logic IN	NC	NO
0	“on”	“off”
1	“off”	“on”

3.5 Electrical Characteristics

V+ = 2.5V to 5.5V, Ta = 25°C, unless otherwise noted.

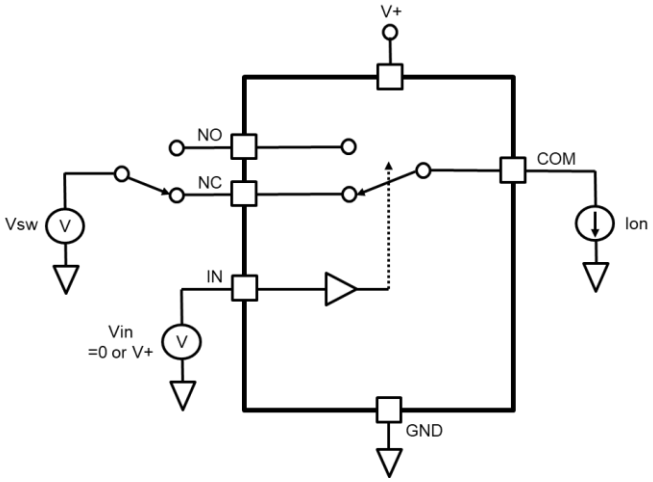
Table 7 Electrical Characteristics

Symbol	Parameter	Test condition	Min	Typ	Max	Unit
V+	Supply voltage		2.5		5.5	V
Ta	Operating ambient temperature		-40		85	°C
Power Supply						
Iq	Quiescent supply current	VIN=0V or V+, all temp			1	μA
Switch						
Vno, Vnc, Vcom	Analog signal range		-2		V+	V
Ron	Switch on-resistance	V+=4.5V, (Vno or Vnc)=2.5V, Icom=-10mA		2.5		Ω
		V+=2.7V, (Vno or Vnc)=1.5V, Icom=-10mA		4.5		
ΔRon	Switch on-resistance matching between channels	V+=4.5V, (Vno or Vnc)=2.5V, Icom=-10mA		0.05		Ω
		V+=2.7V, (Vno or Vnc)=1.5V, Icom=-10mA		0.15		Ω
Ron,flat	Switch on-resistance flatness	V+=4.5V, 0V≤ (Vno or Vnc) ≤V+, Icom=-10m		1.0		Ω
		V+=2.7V, 0V≤ (Vno or Vnc) ≤V+, Icom=-10m		2.0		
Ioff	(NO or NC) Source off leakage current	(Vno or Vnc)=0.3V, 3.3V, Vcom=3.3V, 0.3V		0.01		μA
Ion	Channel on leakage current	(Vno or Vnc)=0.3V, 3.3V, or floating Vcom=0.3V, 3.3V		0.01		μA
Ioff,pwr	Power off leakage current	V+=0V, NO/NC floating, Vcom=3V		0.01		μA
Digital Input						
Vih	Input voltage high		1.5			V
Vil	Input voltage low				0.5	V

Iin	Input leakage current	Vin=0V or 3.6V		0.01		µA
Dynamic Characteristics						
Ton	Turn on time	(Vno or Vnc)=1.5V, Vih=1.8V, Vil=0V, RL=300Ω, CL=35pF		25		ns
Toff	Turn off time			15		ns
Tbbm	Break before make time	(Vno1 or Vnc1)=1.5V, (Vno2 or Vnc2)=1.5V, RL=300Ω, CL=35pF		10		ns
Oiso	Off isolation	Signal=0dBm, RL=50Ω, CL=5pF, F=10MHz		-50		dB
		Signal=0dBm, RL=50Ω, CL=5pF, F=1MHz		-70		dB
Xtalk	Crosstalk	Signal=0dBm, RL=50Ω, CL=5pF, F=10MHz		-50		dB
		Signal=0dBm, RL=50Ω, CL=5pF, F=1MHz		-70		dB
BW	-3dB Bandwidth	Signal=0dBm, RL=50Ω, CL=5pF		400		MHz
Coff	Off capacitance			9		pF
Con	On capacitance			24		pF
THD	Total harmonic distortion	(Vno or Vnc)=2Vpp, f=20Hz to 20kHz, RL=32Ω		0.05		%
SNR	Signal to Noise Ratio	f=20Hz to 20kHz, A-weighted filter, Inputs grounded, RL=50Ω		125		dBV

4 Test Diagrams

Figure 4 Switch On-resistance Ron



Ron = Vsw / Ion

Figure 5 Switch Off Leakage

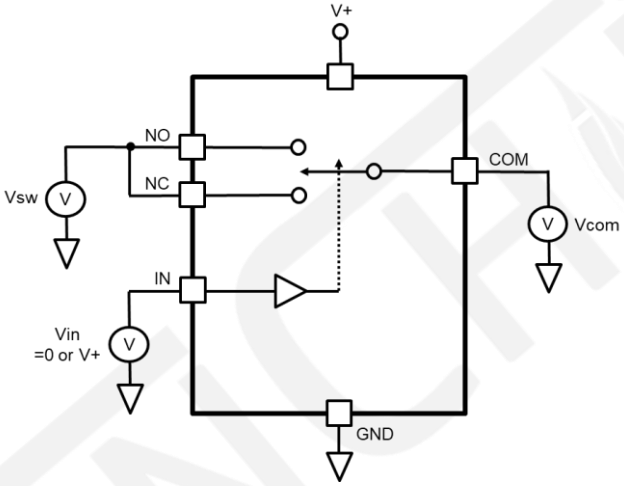


Figure 6 On Capacitance / Off Capacitance

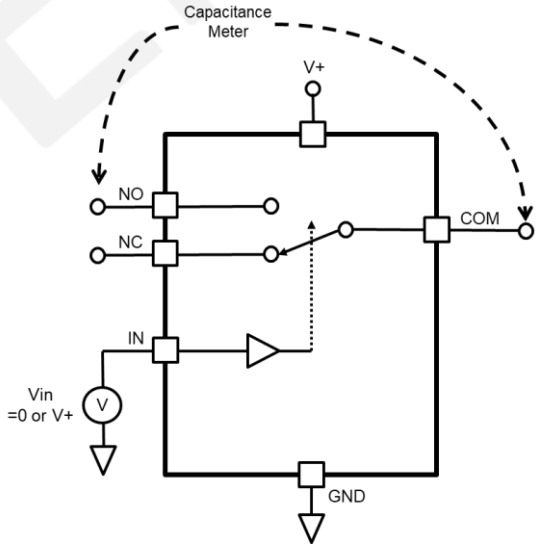


Figure 7 Bandwidth

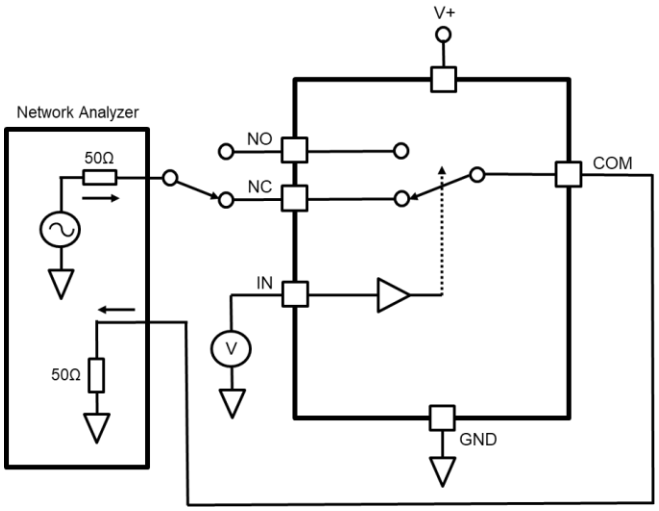


Figure 8 Crosstalk

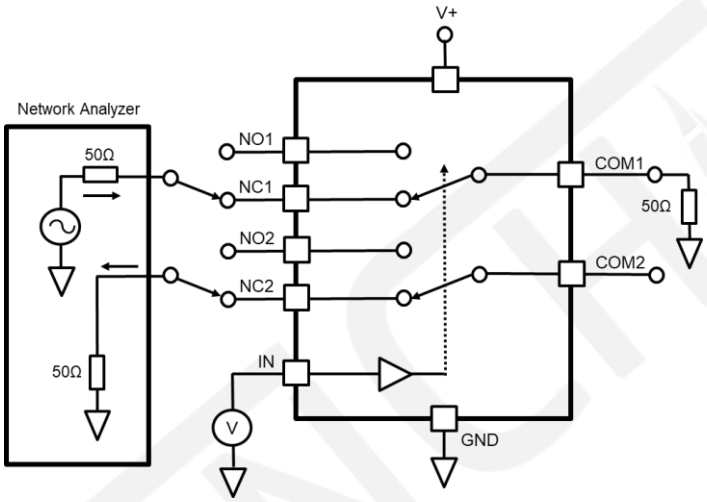


Figure 9 Off Isolation

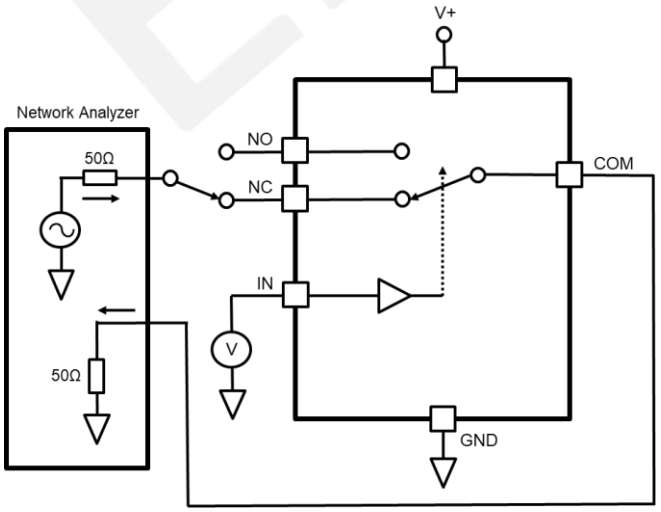


Figure 10 Break-before-make

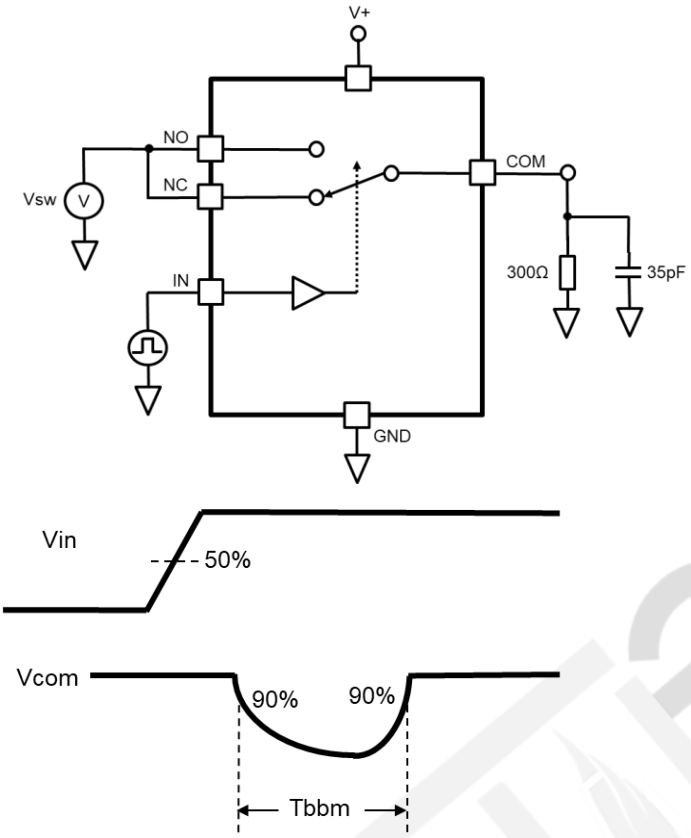
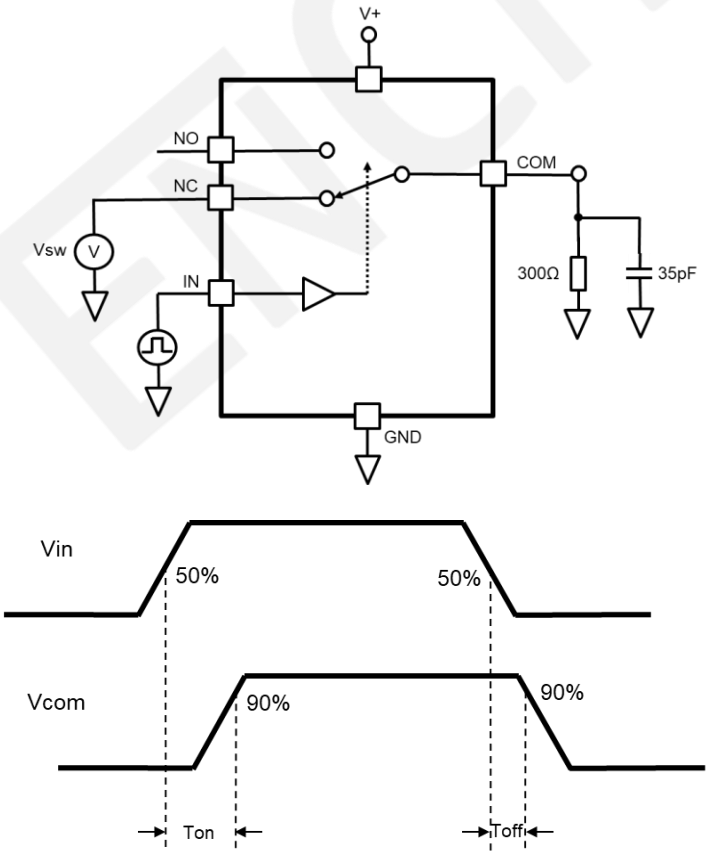


Figure 11 Turn-on / Turn-off Time



5 Package Information

5.1 Package Dimensions

Figure 12 QFN10 Mechanical Data and Package Dimensions

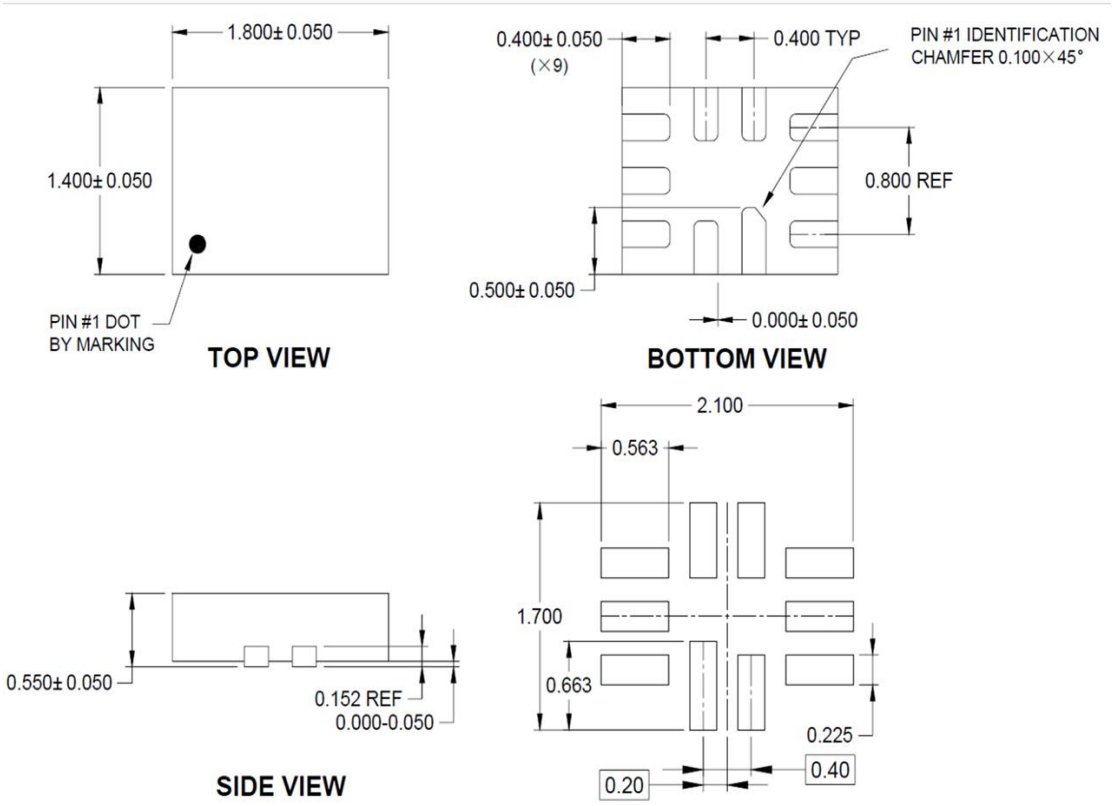
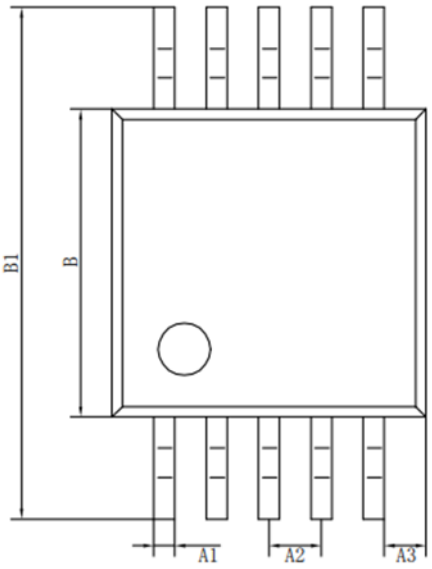
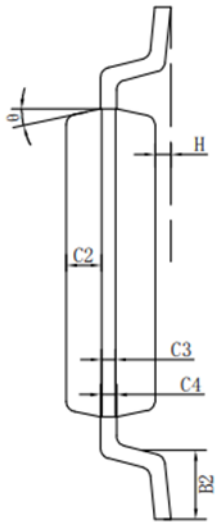
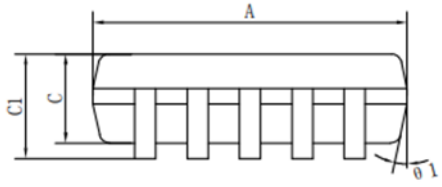


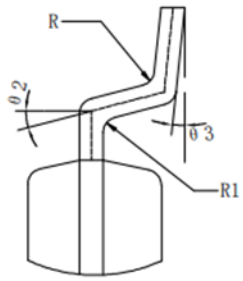
Figure 13 MSOP10 Mechanical Data and Package Dimensions

	Min (mm)	Max (mm)		Min (mm)	Max (mm)
A	2.90	3.10	C3	0.152	
A1	0.18	0.25	C4	0.15	0.23
A2	0.50TYP		H	0.00	0.09
A3	0.40TYP		θ	15° TYP4	
B	2.90	3.10	θ1	12° TYP4	
B1	4.70	5.10	θ2	14° TYP	
B2	0.45	0.75	θ3	0° ～ 6°	
C	0.75	0.95	R	0.15TYP	
C1	--	1.10	R1	0.15TYP	
C2	0.328TYP				





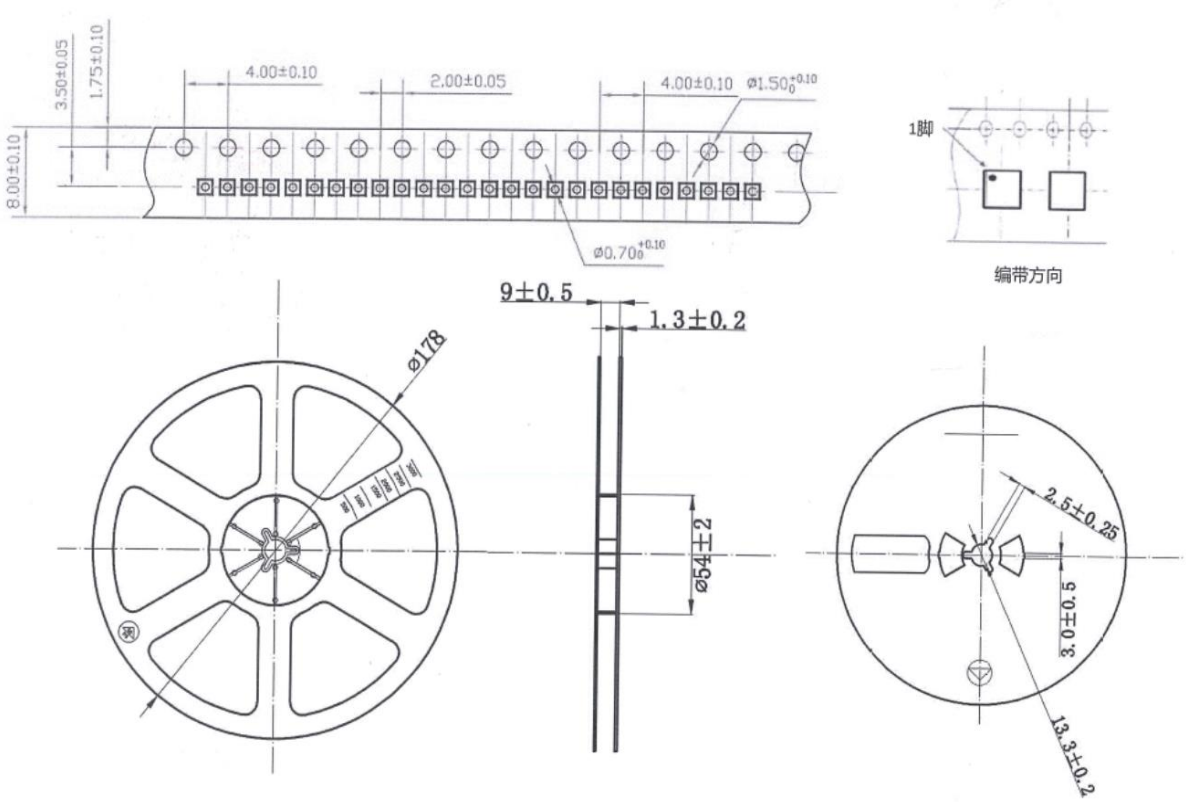




5.2 Marking Information

6 Packing Information

Figure 14 Reel Packing Information



7 Revision History

Table 8 Document Revision History

Date	Version	Description
Feb 2022	Draft	Preliminary version.