

General Description

The AOZ7200CI is a 600V AlphaZBL™ product that control the external N-channel MOSFET to replace a diode when used in AC/DC diode-bridge application. The AOZ7200CI can help to reduce power consumption, heat dissipation.

In diode-bridge application, the AOZ7200CI senses the voltage drop and reduces the forward conduction loss to the minimum value. When the forward current is reversed, the AOZ7200CI will turn-off the external switch and suffers the reverse voltage. In AC/DC application, the AOZ7200CI is self-powered system without extra voltage supply.

The AOZ7200CI is available in a SOT23-5 package and is rated over a -40°C to +125°C ambient temperature range.

Features

- Replaces a power diode in HV bridge rectifier
- Self-powered in AC system
- Low reverse threshold 1mV
- Low quiescent current 5uA

Applications

- AC/DC
- HV bridge rectifier application



Typical Applications

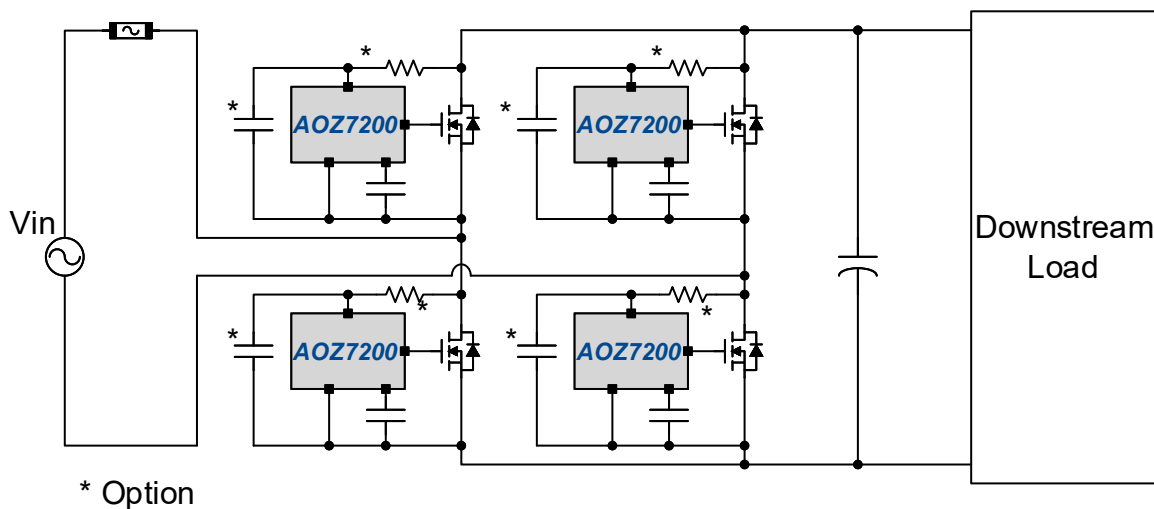


Figure 1. Application Circuit

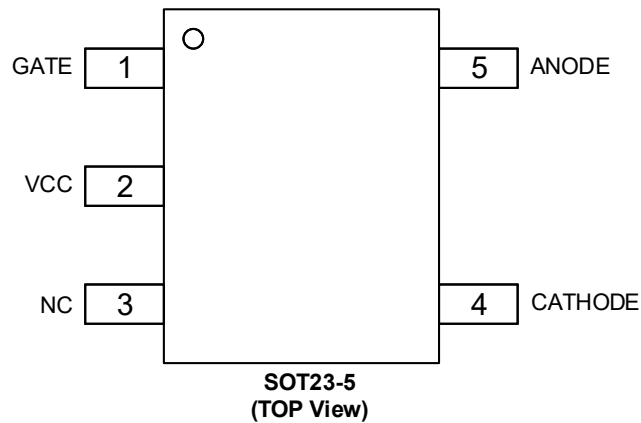
Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ7200CI	-40°C to +125°C	SOT23A-5L	Green Product



AOS Green Products use reduced levels of Halogens, and are also RoHS compliant. Please visit www.aosmd.com/media/AOSGreenPolicy.pdf for additional information.

Pin Configuration



Pin Description

Pin Number	Pin Name	Pin Function
1	GATE	Drive external N-MOSFET, Hi_level=VCC .Low_level=ANODE
2	VCC	Power source for controller
3	NC	No Connection
4	Cathode	Cathode of diode or drain of MOSFET
5	Anode	It is anode of diode or source of MOSFET and is reference ground of controller

Absolute Maximum Ratings⁽²⁾

Exceeding the Absolute Maximum Ratings may damage the device.

Parameter	Rating
V _{CC} to Anode	-0.3V~+24V
Cathode to Anode	-1V to 600V
Junction Temperature (T _J)	+150°C
Storage Temperature (T _S)	-65 °C to +150°C
ESD Rating ⁽¹⁾	1 kV

Note:

1. Devices are inherently ESD sensitive, handling precautions are required.
Human body model rating: 1.5kΩ in series with 100pF.
2. Exceeding the Absolute Maximum ratings may damage the device.
3. The device is not guaranteed to operate beyond the Maximum Operating ratings.

Recommended Operating Ratings⁽³⁾

The device is not guaranteed to operate beyond the Recommended Operating Conditions

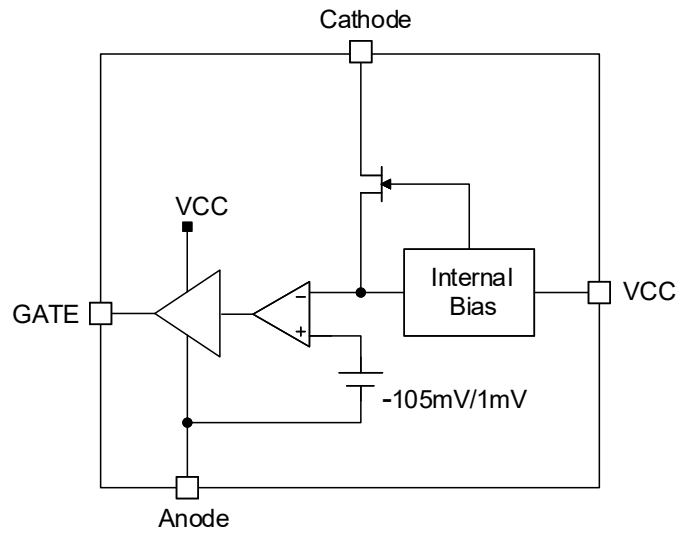
Parameter	Rating
Supply Voltage (V _{CC})	18V
Ambient Temperature (T _A)	-40°C to +125°C
Package Thermal Resistance SOT23-5(θ _{JA})	191°C/W

Electrical Characteristics

T_A = 25°C, V_{CC} = 16V, V_{Anode} = 0V, unless otherwise specified. Specifications in Bold indicate an ambient temperature range of -40°C to +125°C. These specifications are guaranteed by design.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{RRM}	Repetitive peak reverse voltage	V _{CC} =17V, BV _{cathode_anode}	600	810	900	V
V _{CC_UP}	V _{CC} UVLO rising		13.5	15.2	17	V
V _{CC_UVLO}	V _{CC} UVLO falling		11	12.9	14	V
I _{Charge}	Charging for V _{cc}		1	1.25	1.5	mA
I _{OP}	V _{CC} operation current at on-state		10	12	25	μA
I _Q	V _{CC} quiescent current at off-state		3	5	8	μA
V _{CA_ON}	Switch turn-on threshold		-80	-105	-140	mV
V _{CA_OFF}	Switch turn-off threshold		0.1	1	1.9	mV
I _{GATE_source}	Gate pull-hi current	V _{CC} =17V, V _{CA} =-0.2V ,Gate=6V	230	300	390	mA
I _{GATE_sink}	Gate pull-low current	V _{CC} =17V, V _{CA} =0.2V ,Gate=2V	230	300	360	mA

Functioning Block Diagram



Typical Performance Characteristics

$T_A = 25^\circ\text{C}$, $V_{\text{anode}} = 0\text{ V}$, $V_{\text{CC}} = 16\text{ V}$ unless otherwise specified.

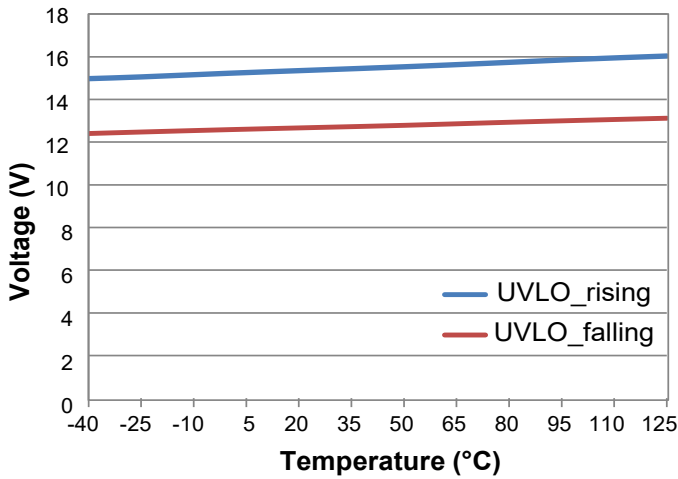


Figure 2. UVLO vs. Temperature

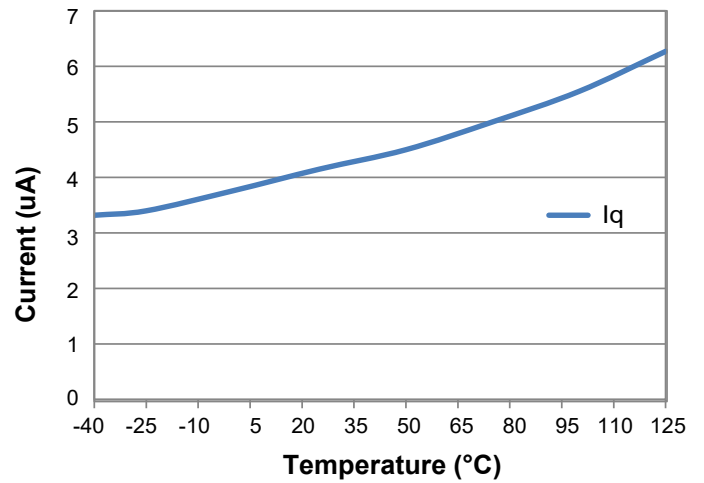


Figure 3. Quiescent Current vs. Temperature

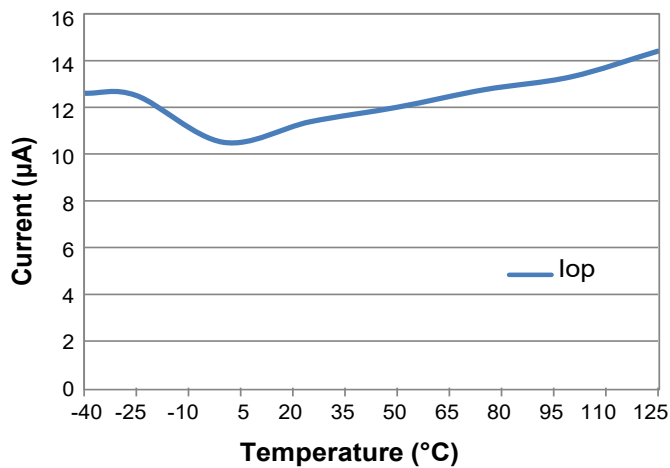


Figure 4. Operation Current vs. Temperature

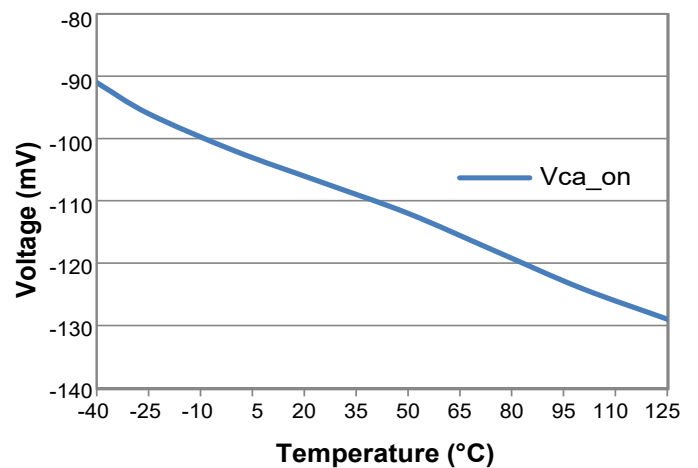


Figure 5. $V_{\text{CA_on}}$ vs. Temperature

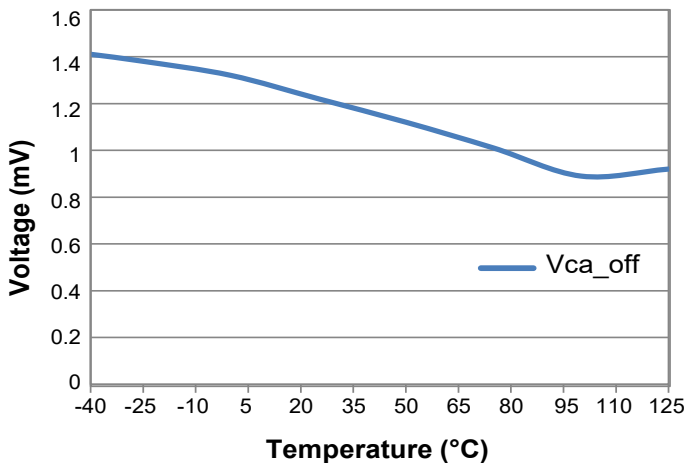


Figure 6. $V_{\text{CA_off}}$ vs. Temperature

Detailed Description

The AOZ7200 with a low-voltage capacitor can drive N-MOSFET to replace each diode in high-voltage bridge rectifier application. In normal operation, after Vcc UVLO AOZ7200 will sense the voltage between Cathode and Anode, if this voltage is less than -105mV, the GATE will turn on internal MOSFET and the conduction loss is reduced. In the switch on-cycle, controller keeps to monitor this voltage, when this voltage is larger than 1mV, the controller will turn-off switch.

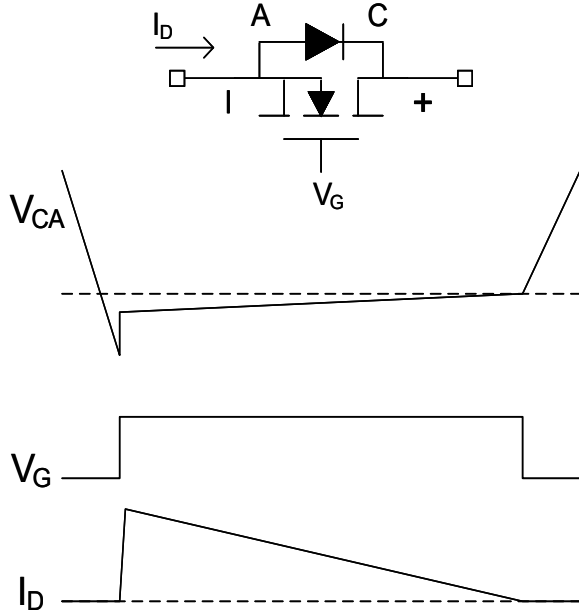


Figure 7. V_{CA} vs. Switch Gate

There is a high voltage depletion MOSFET that could help to charge the Vcc capacitor. In normal operation, the charging procedure happens at lower voltage drop and it helps to reduce the quiescent power. The value of Vcc capacitor is recommended larger than $1\mu F/25V$ for application.

Start with general applications information. For example, create paragraphs describing Input Capacitor, Output Capacitor, and/or Inductor followed by performance-related information. Always include the peculiarities of using the device.

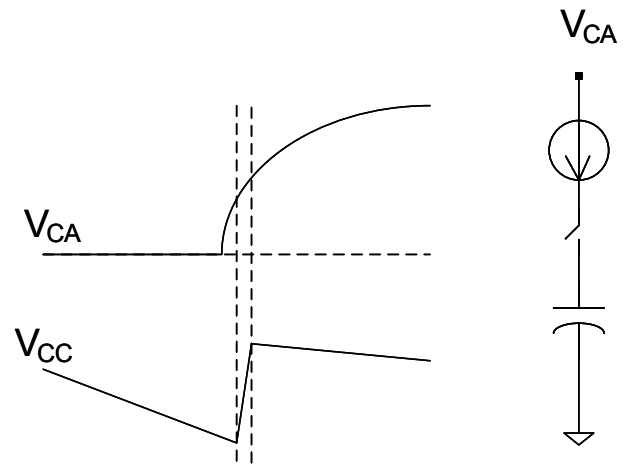
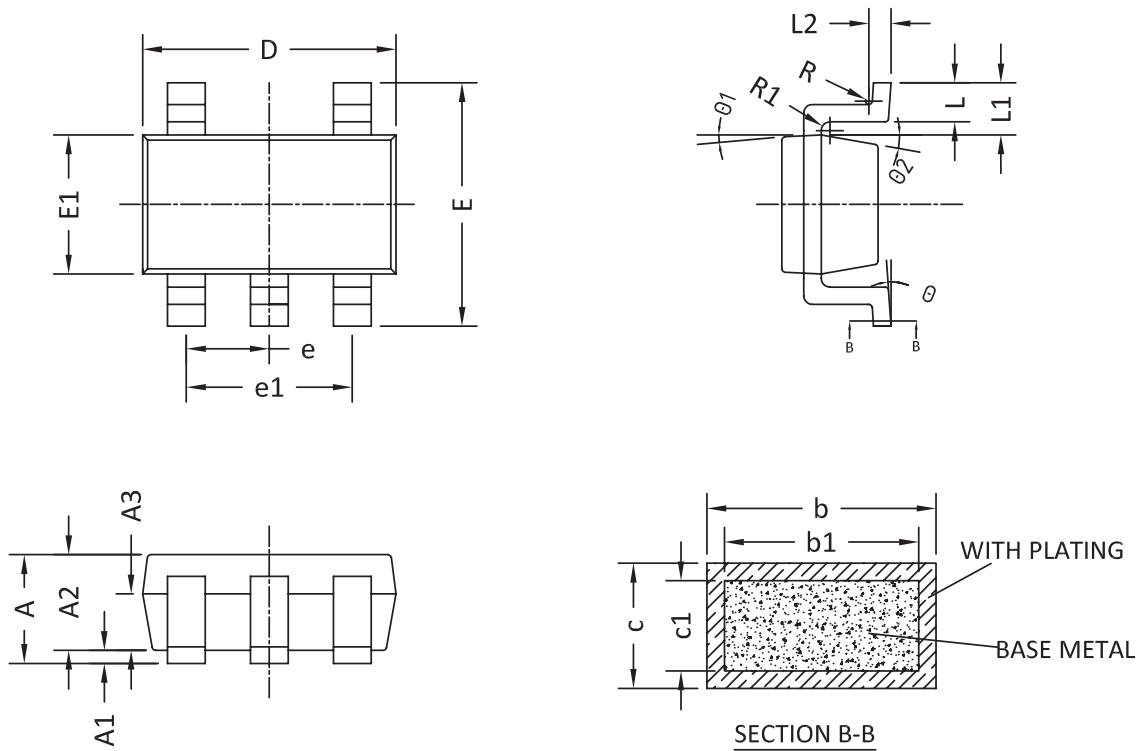
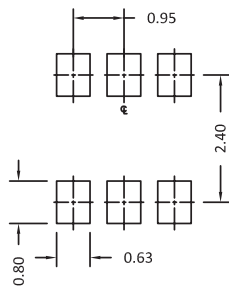


Figure 8. Charging V_{CC}

Package Dimensions, SOT23A-5L



RECOMMENDED LAND PATTERN



UNIT: mm

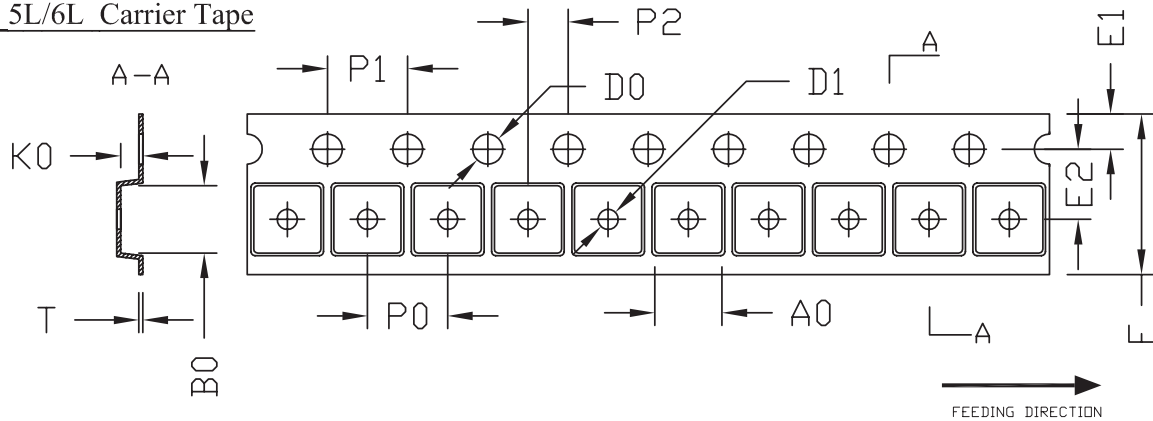
SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.25	----	----	0.049
A1	0.00	---	0.15	0.000	----	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
A3	0.60	0.65	0.70	0.024	0.026	0.028
b	0.36	---	0.50	0.014	----	0.020
b1	0.36	0.38	0.45	0.014	0.015	0.018
c	0.14	---	0.20	0.006	----	0.008
c1	0.14	0.15	0.16	0.006	0.006	0.006
D	2.826	2.926	3.026	0.111	0.115	0.119
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.526	1.626	1.726	0.060	0.064	0.068
e	0.90	0.95	1.00	0.035	0.037	0.039
e1	1.80	1.90	2.00	0.071	0.075	0.079
L	0.35	0.45	0.60	0.014	0.018	0.024
L1	0.59REF			0.023REF		
L2	0.25BSC			0.010BSC		
R	0.05	---	---	0.002	----	----
R1	0.05	---	0.20	0.002	----	0.008
theta	0°	---	8°	0°	----	8°
theta1	3°	5°	7°	3°	5°	7°
theta2	6°	---	14°	6°	----	14°

NOTE

- PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 5 MILS EACH.
- DIMENSION "L" IS MEASURED IN GAUGE PLANE.
- TOLERANCE ±0.100 mm(4 mil) UNLESS OTHERWISE SPECIFIED.
- FOLLOWED FROM JEDEC MO-178C & MO-193C.
- CONTROLLING DIMENSIONS IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

Tape and Reel Dimensions, SOT23A-5L

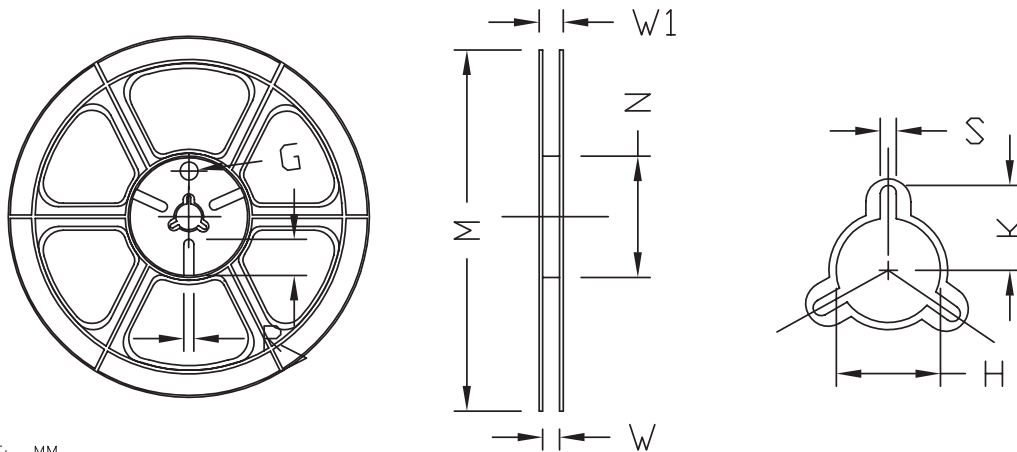
SOT23 5L/6L Carrier Tape



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOT23_5L&6L	3.15 ±0.10	3.20 ±0.10	1.40 ±0.10	1.50 ±0.05	1.00 +0.10 -0.00	8.00 ±0.30	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.23 ±0.03

SOT23 5L/6L REEL



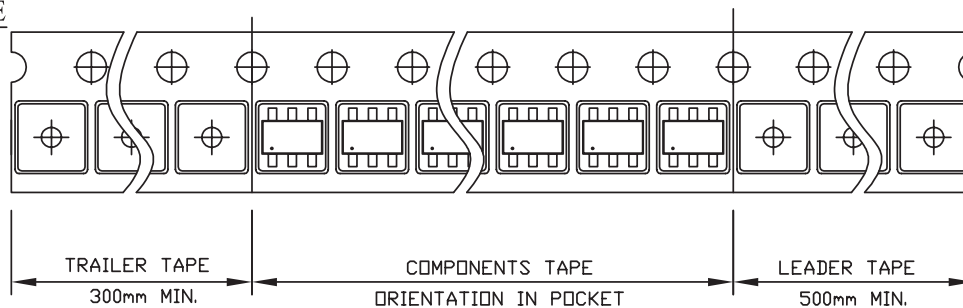
UNIT: MM

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
8 mm	φ178	φ178.00 ±1.00	φ54.00 ±0.50	9.00 ±0.30	11.40 ±1.00	φ13.00 +0.50 -0.20	10.60	2.00 ±0.50	φ9.00	5.00	18.00

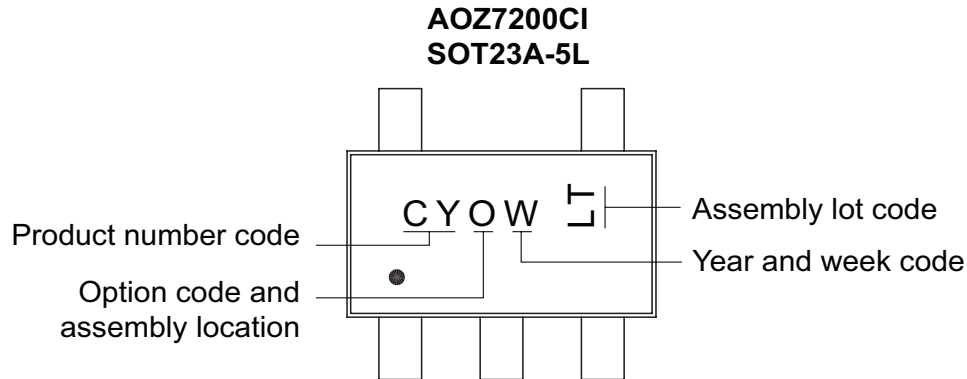
SOT23 5L/6L TAPE

Leader / Trailer
& Orientation

Unit Per Reel:
3000pcs



Part Marking



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2. A critical component in any component of a life support device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.