AOZ6274

0.3Ω Low-Voltage Dual-DPDT Analog Switch

General Description

The AOZ6274 is a dual Double-Pole, Double-Throw (DPDT) analog switch that is designed to operate from a single 1.65V to 4.3V supply. The AOZ6274 features an ultra-low on resistance, excellent total harmonic distortion (THD) performance, and low power consumption. The device also features fast switching and guaranteed Break-Before-Make (BBM) switching, assuring the switches never shorts the driver.

Features

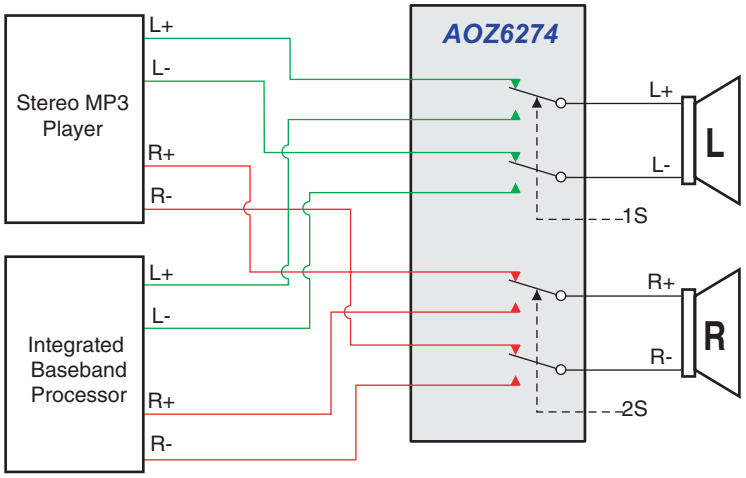
- Low On Resistance (R_{ON}) for +2.7V supply (0.3Ω)
- Low I_{CCT} current when nS input is lower than V_{CC}
- 0.25Ω maximum R_{ON} flatness for +2.7V supply
- Small 3 x 3mm 16-Lead QFN Package
- Broad 1.65V to 4.30V V_{CC} operating range
- Low THD (0.01% typical for 32Ω load)

Applications

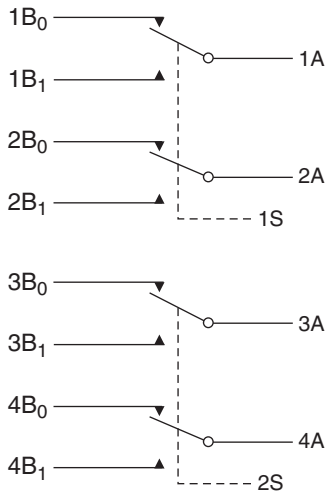
- Cell phone
- PDA
- Portable media player

Green Product

Typical Application



Pin Configuration

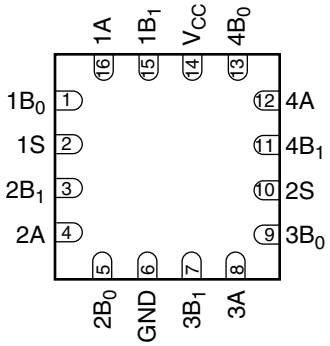


Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ6274QI	-40°C to +85°C	3x3 16-Lead QFN	Green

AOS Green Products use reduced levels of Halogens, and are also RoHS compliant.
Please visit www.aosmd.com/web/quality/rohs_compliant.jsp for additional information.

Pin Configuration



QFN-16
(Top Thru View)

Pin Description

Pin Name	Function
1A, 2A, 3A, 4A, $1B_0$, $1B_1$, $2B_0$, $2B_1$, $3B_0$, $3B_1$, $4B_0$, $4B_1$	Data Ports
1S, 2S	Control Input

Truth Table

Logic Input	Function
0	nB_0 Connected to nA
1	nB_1 Connected to nA

Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	-0.5V to +4.6V
V_S	Switch Voltage	-0.5 to V_{CC} + 0.3V
V_{IN}	Input Voltage	-0.5V to +4.6V
I_{IK}	Minimum Input Diode Current	-50mA
I_{SW}	Switch Current	350mA
I_{SWPEAK}	Peak Switch Current (Pulsed at 1ms duration, <10% Duty Cycle)	500mA
T_{STG}	Storage Temperature Range	-65°C to +150°C
T_J	Maximum Junction Temperature	+150°C
T_L	Lead Temperature (Soldering, 10 seconds)	+260°C
ESD	Human Body Model	6000V

Recommend Operating Ratings

The device is not guaranteed to operate beyond the Maximum Operating Ratings.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	1.65V to 4.3V
V_{IN}	Control Input Voltage(1)	0V to V_{CC}
V_{SW}	Switch Input Voltage	0V to V_{CC}
T_A	Operating Temperature	-40°C to +85°C

Note:
1. Unused inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

Unless otherwise indicated, specifications indicate a temperature range of -40°C to +85°C.
All typical values are at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	Min.	Typ.	Max.	Units
V_{IH}	Input Voltage HIGH		4.3	1.4			V
			2.7 to 3.6	1.3			
			2.3 to 2.7	1.1			
			1.65 to 1.95	0.9			
V_{IL}	Input Voltage LOW		4.3			0.7	V
			2.7 to 3.6			0.5	
			2.3 to 2.7			0.4	
			1.65 to 1.95			0.4	
I_{IN}	Control Input Leakage	V_{IN} = 0V to V_{CC}	1.65 to 4.30	-0.5		0.5	µA
$I_{NO(OFF)}$, $I_{NC(OFF)}$	Off-Leakage Current of Port nB_0 and nB_1	nA = 0.3V, V_{CC}–0.3V, nB_0 or nB_1 = 0.3V, V_{CC}–0.3V or floating	1.95 to 4.30	-50		50	nA
$I_{A(ON)}$	On Leakage Current of Port A	nA = 0.3V, V_{CC}–0.3V, nB_0 or nB_1 = 0.3V, V_{CC}–0.3V or floating	1.95 to 4.30	-60		60	nA
R_{ON}	Switch On Resistance[2]	I_{OUT} = 100mA, nB_0 or nB_1 = 0V, 0.7V, 2.3V, 4.3V	4.3		0.25	0.4	Ω
		I_{OUT} = 100mA, nB_0 or nB_1 = 0V, 0.7V, 2.3V, 3.0V	3.0		0.27	0.4	
		I_{OUT} = 100mA, nB_0 or nB_1 = 0V, 0.7V, 2.0V, 2.7V	2.7		0.3	0.4	
		I_{OUT} = 100mA, nB_0 or nB_1 = 0V, 0.7V, 1.6V, 2.3V	2.3		0.4	0.7	
		I_{OUT} = 100mA, nB_0 or nB_1 = 0V, 1.0V, 1.8V	1.8		0.8	1.8	
ΔR_{ON}	On Resistance Matching Between Channels[3]	I_{OUT} = 100mA, nB_0 or nB_1 = 0.7V	4.3		0.03	0.1	Ω
			3.0		0.03	0.1	
			2.7		0.03	0.1	
			2.3		0.03	0.1	
$R_{FLAT(ON)}$	On Resistance Flatness[4]	I_{OUT} = 100mA, B_0 or nB_1 = 0V to V_{CC}	4.3		0.07	0.2	Ω
			3.0		0.07	0.2	
			2.7		0.09	0.25	
			2.3		0.16	0.3	
I_{CC}	Quiescent Supply Current	V_{IN} = 0V to V_{CC}, I_{OUT} = 0A	4.3	-500		500	nA
I_{CCT}	Increase in I_{CC} per Input Control Voltage	V_{IN} = 1.8V	4.3		26.0	32.0	µA
		V_{IN} = 2.6V			9.0	12.0	

Notes:

2. On resistance is determined by the voltage drop between A and B pins at the indicated current through the switch.

3. $\Delta R_{ON} = R_{ONmax} – R_{ONmin}$ measured at identical V_{CC}, temperature, and voltage.

4. Flatness is defined as the difference between the maximum and minimum value of R_{ON} over the specified range of conditions.

AC Electrical Characteristics

Unless otherwise indicated, specifications indicate a temperature range of -40°C to +85°C.
All typical values are at 25°C unless otherwise specified.

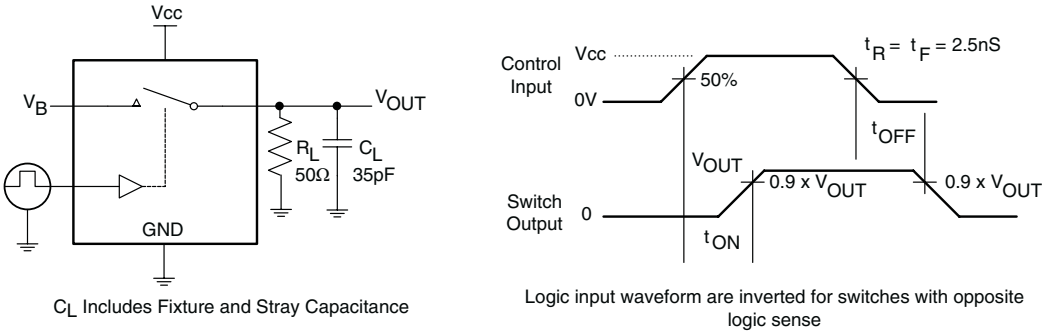
Symbol	Parameter	Conditions	V_{CC} (V)	Min.	Typ.	Max.	Units
t_{ON}	Turn-On Time	nB_0 or nB_1 = 1.5V, R_L = 50Ω, C_L = 35pF	3.6 to 4.3		35	60	ns
			2.7 to 3.6		50	75	
			2.3 to 2.7		75	90	
t_{OFF}	Turn-Off Time	nB_0 or nB_1 = 1.5V, R_L = 50Ω, C_L = 35pF	3.6 to 4.3		25	40	ns
			2.7 to 3.6		30	50	
			2.3 to 2.7		40	60	
t_{BBM}	Break-Before-Make Time	nB_0 or nB_1 = 1.5V, R_L = 50Ω, C_L = 35pF	3.6 to 4.3		20		ns
			2.7 to 3.6		30		
			2.3 to 2.7		40		
Q	Charge Injection	C_L = 100pF, V_{GEN} = 0V, R_{GEN} = 0Ω	3.6 to 4.3		22		pC
			2.7 to 3.6		15		
			2.3 to 2.7		10		
OIRR	Off Isolation	f = 100kHz, R_L = 50Ω, C_L = 5pF	3.6 to 4.3		-70		dB
			2.7 to 3.6		-70		
			2.3 to 2.7		-70		
Xtalk	Crosstalk	f = 100kHz, R_L = 50Ω, C_L = 5pF	3.6 to 4.3		-70		dB
			2.7 to 3.6		-70		
			2.3 to 2.7		-70		
BW	-3dB Bandwidth	R_L = 50Ω	2.3 to 4.3		>55		MHz
THD	Total Harmonic Distortion	R_L = 32Ω, V_{IN} = 2V_{pp}, f = 20Hz to 20kHz	3.6 to 4.3		0.01		%
			2.7 to 3.6		0.01		
			2.3 to 2.7		0.01		

Capacitance

Unless otherwise indicated, specifications indicate a temperature range of -40°C to +85°C.
All typical values are at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	Min.	Typ.	Max.	Units
C_{IN}	Control Pin Input Capacitance	f = 1MHz	0.0		2.0		pF
C_{OFF}	B Port Off Capacitance	f = 1MHz	3.3		16		pF
C_{ON}	A Port On Capacitance	f = 1MHz	3.3		116		pF

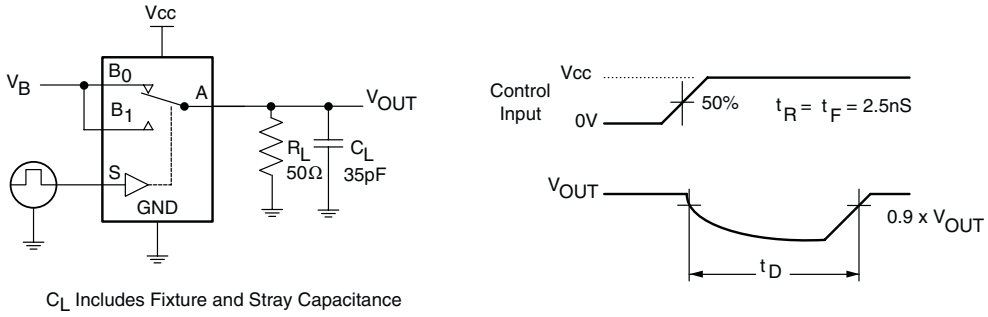
AC Loading and Waveforms



CL Includes Fixture and Stray Capacitance

Logic input waveform are inverted for switches with opposite logic sense

Figure 1. Turn-On/Turn-Off Timing



CL Includes Fixture and Stray Capacitance

Figure 2. Break-Before-Make Timing`

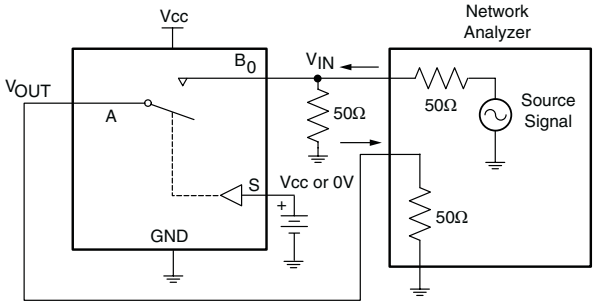


Figure 3. Off Isolation

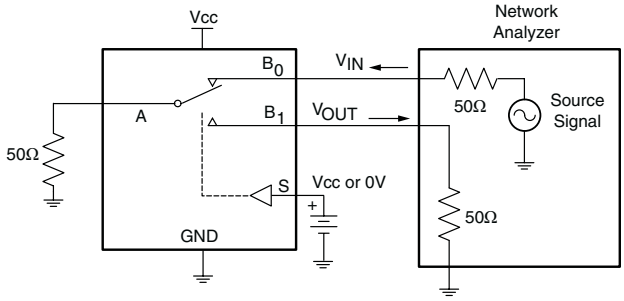


Figure 4. Crosstalk

AC Loading and Waveforms (continued)

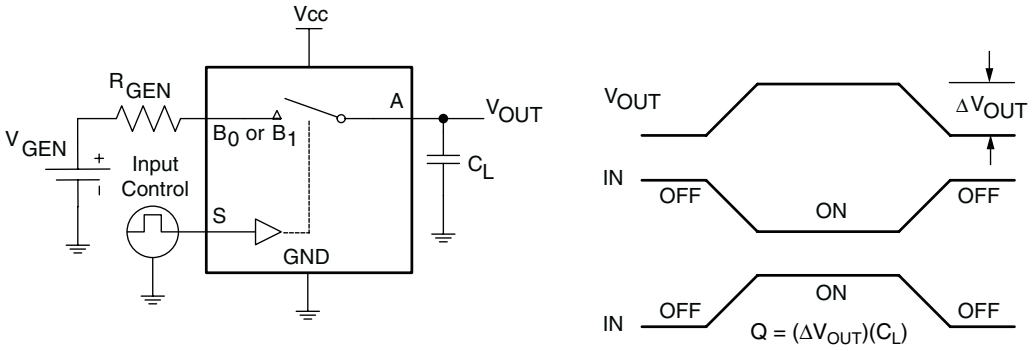


Figure 5. Charge Injection

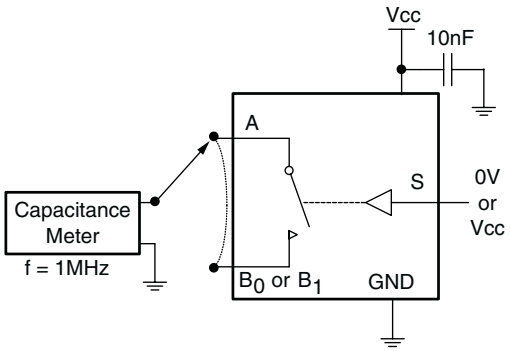


Figure 6. ON/Off Capacitance Measurement

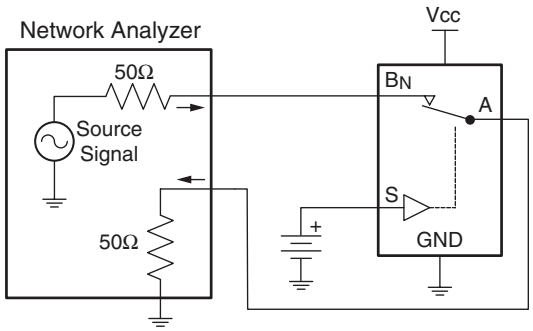


Figure 7. Bandwidth

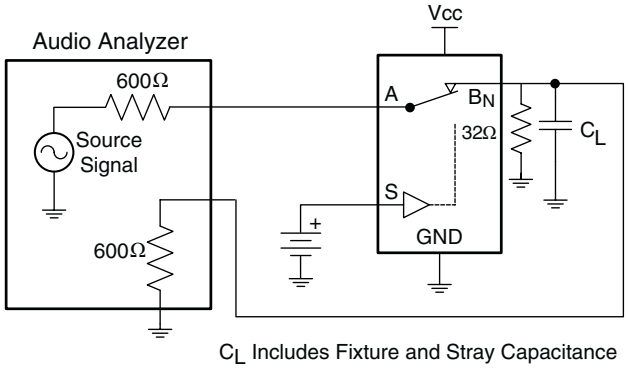
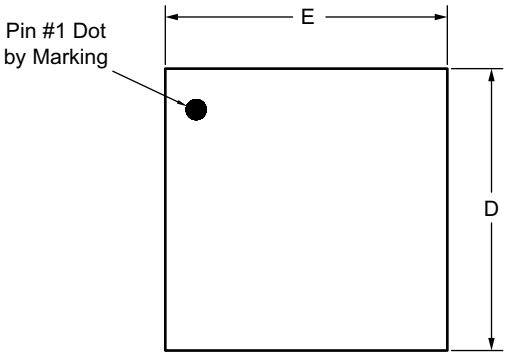
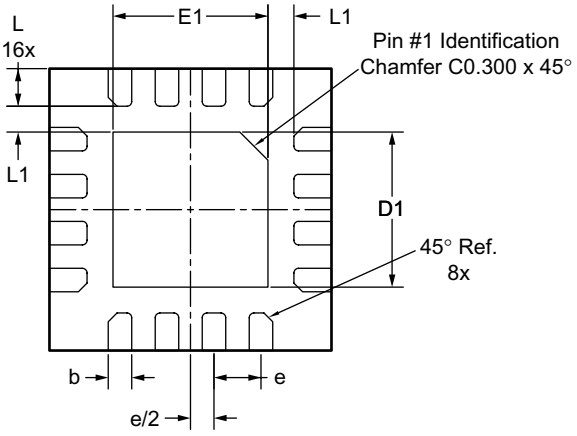


Figure 8. Harmonic Distortion

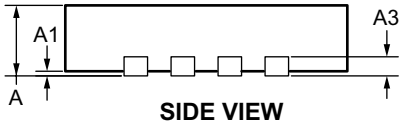
Package Dimensions, QFN 3 x 3



TOP VIEW

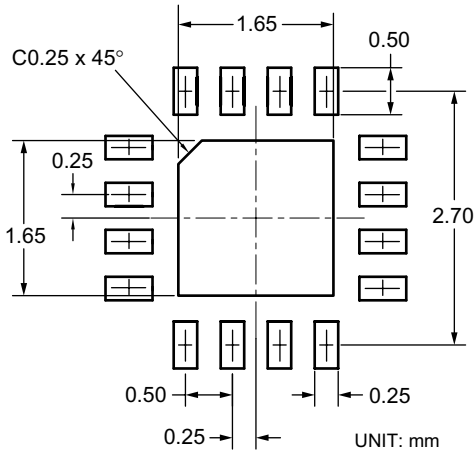


BOTTOM VIEW



SIDE VIEW

RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	0.70	0.75	0.80
A1	0.00	—	0.05
b	0.20	0.25	0.30
A3		0.203 Ref.	
D	2.95	3.00	3.05
E	2.95	3.00	3.05
D1	1.60	1.65	1.70
E1	1.60	1.65	1.70
e		0.50 BSC	
L	0.35	0.40	0.45
L1		0.275 Ref.	

Dimensions in inches

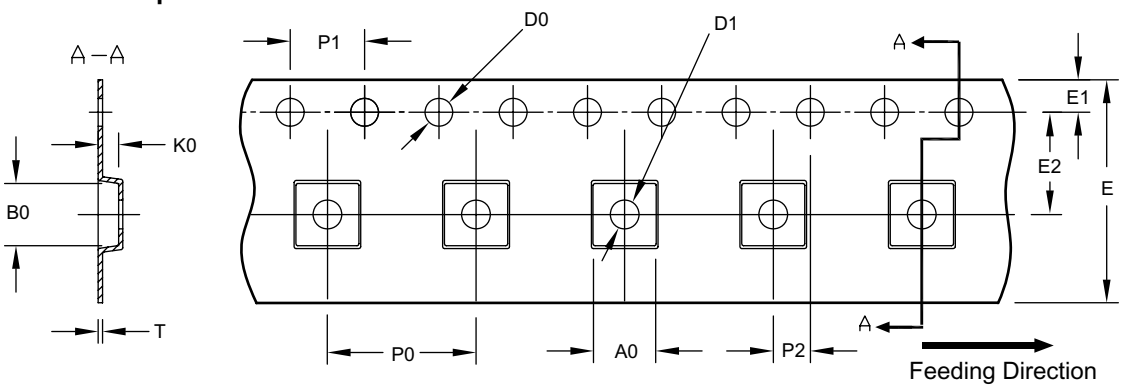
Symbols	Min.	Nom.	Max.
A	0.028	0.0.30	0.032
A1	0.000	—	0.002
b	0.008	0.010	0.012
A3		0.008 Ref.	
D	0.116	0.118	0.120
E	0.116	0.118	0.120
D1	0.063	0.065	0.067
E1	0.063	0.065	0.067
e		0.020 BSC	
L	0.014	0.016	0.018
L1		0.011 Ref.	

Note:

1. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

Tape and Reel Dimensions, QFN 3 x 3

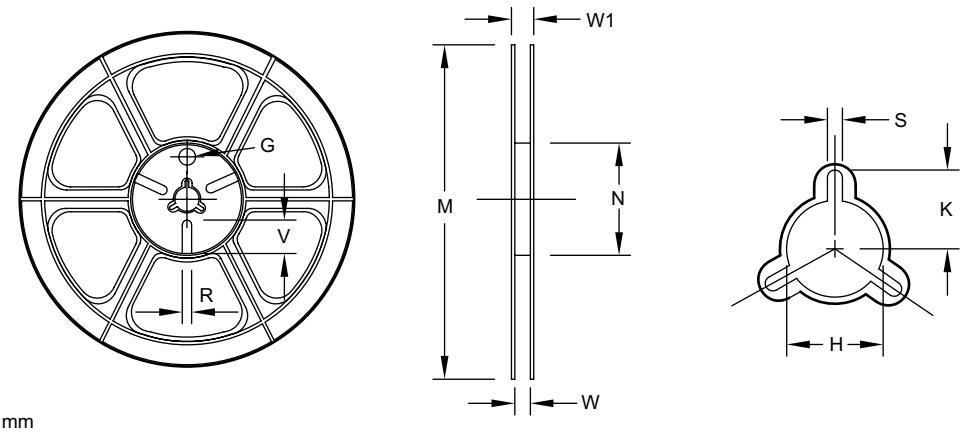
Carrier Tape



UNIT: mm

Package	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
DFN 3x3 EP	3.40 ±0.10	3.35 ±0.10	1.10 ±0.10	1.50 +0.10/-0	1.50 +0.10/-0	12.00 +0.30	1.75 ±0.10	5.50 ±0.05	8.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.30 ±0.05

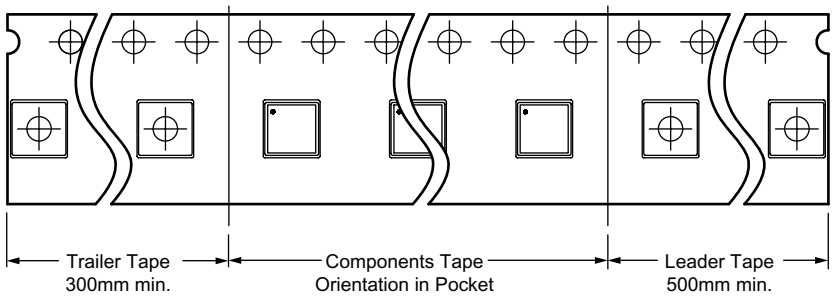
Reel



UNIT: mm

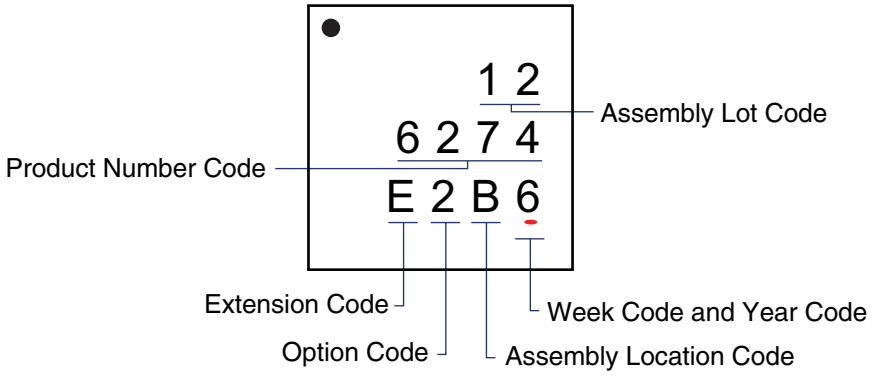
Tape Size	Reel Size	M	N	W	W1	H	K	S	G	R	V
12mm	ø330	ø330.0 ±0.50	ø97.00 ±0.10	13.00 ±0.30	17.40 ±1.00	ø13.0 +0.50/-0.20	10.60	2.00 ±0.50	—	—	—

Leader/Trailer and Orientation



Part Marking

AOZ6274QI
(QFN-16)



This datasheet contains preliminary data; supplementary data may be published at a later date.
Alpha & Omega Semiconductor reserves the right to make changes at any time without notice.

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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.