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[Alpha & Omega Semiconductor Inc.](#)  
[AOZ6274QI](#)

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# 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

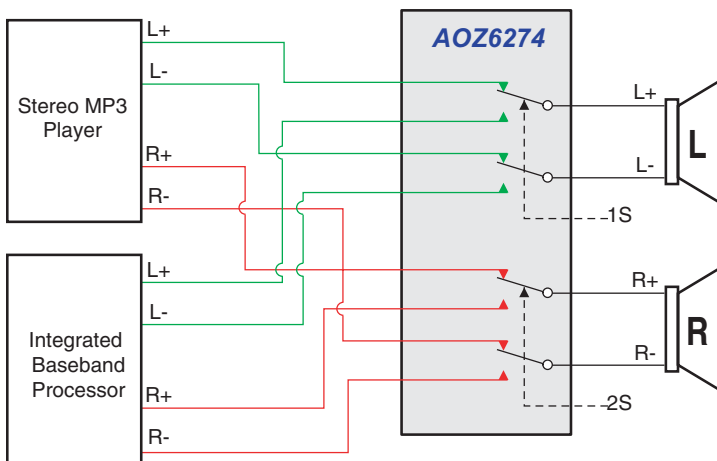
- Low On Resistance ( $R_{ON}$ ) for +2.7V supply (0.3Ω)
- Low  $I_{CCT}$  current when nS input is lower than  $V_{CC}$
- 0.25Ω maximum  $R_{ON}$  flatness for +2.7V supply
- Small 3 x 3mm 16-Lead QFN Package
- Broad 1.65V to 4.30V  $V_{CC}$  operating range
- Low THD (0.01% typical for 32Ω load)

## Applications

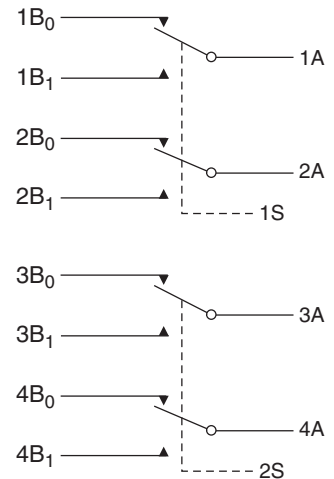
- Cell phone
- PDA
- Portable media player



## Typical Application



## Pin Configuration



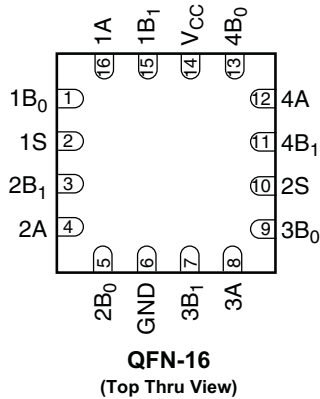
### Ordering Information

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



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 Please visit [www.aosmd.com/web/quality/rohs\\_compliant.jsp](http://www.aosmd.com/web/quality/rohs_compliant.jsp) for additional information.

### Pin Configuration



### Pin Description

Pin Name	Function
1A, 2A, 3A, 4A, 1B <sub>0</sub> , 1B <sub>1</sub> , 2B <sub>0</sub> , 2B <sub>1</sub> , 3B <sub>0</sub> , 3B <sub>1</sub> , 4B <sub>0</sub> , 4B <sub>1</sub>	Data Ports
1S, 2S	Control Input

### Truth Table

Logic Input	Function
0	nB <sub>0</sub> Connected to nA
1	nB <sub>1</sub> Connected to nA

### Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Symbol	Parameter	Rating
V <sub>CC</sub>	Supply Voltage	-0.5V to +4.6V
V <sub>S</sub>	Switch Voltage	-0.5 to V <sub>CC</sub> + 0.3V
V <sub>IN</sub>	Input Voltage	-0.5V to +4.6V
I <sub>IK</sub>	Minimum Input Diode Current	-50mA
I <sub>SW</sub>	Switch Current	350mA
I <sub>SWPEAK</sub>	Peak Switch Current (Pulsed at 1ms duration, <10% Duty Cycle)	500mA
T <sub>STG</sub>	Storage Temperature Range	-65°C to +150°C
T <sub>J</sub>	Maximum Junction Temperature	+150°C
T <sub>L</sub>	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 <sub>CC</sub>	Supply Voltage	1.65V to 4.3V
V <sub>IN</sub>	Control Input Voltage <sup>(1)</sup>	0V to V <sub>CC</sub>
V <sub>SW</sub>	Switch Input Voltage	0V to V <sub>CC</sub>
T <sub>A</sub>	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 <sub>CC</sub> (V)	Min.	Typ.	Max.	Units	
V <sub>IH</sub>	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 <sub>IL</sub>	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 <sub>IN</sub>	Control Input Leakage	V <sub>IN</sub> = 0V to V <sub>CC</sub>	1.65 to 4.30	-0.5		0.5	μA	
I <sub>NO(OFF)</sub> , I <sub>NC(OFF)</sub>	Off-Leakage Current of Port nB <sub>0</sub> and nB <sub>1</sub>	nA = 0.3V, V <sub>CC</sub> -0.3V, nB <sub>0</sub> or nB <sub>1</sub> = 0.3V, V <sub>CC</sub> -0.3V or floating	1.95 to 4.30	-50		50	nA	
I <sub>A(ON)</sub>	On Leakage Current of Port A	nA = 0.3V, V <sub>CC</sub> -0.3V, nB <sub>0</sub> or nB <sub>1</sub> = 0.3V, V <sub>CC</sub> -0.3V or floating	1.95 to 4.30	-60		60	nA	
R <sub>ON</sub>	Switch On Resistance <sup>(2)</sup>	I <sub>OUT</sub> = 100mA, nB <sub>0</sub> or nB <sub>1</sub> = 0V, 0.7V, 2.3V, 4.3V	4.3		0.25	0.4	Ω	
			I <sub>OUT</sub> = 100mA, nB <sub>0</sub> or nB <sub>1</sub> = 0V, 0.7V, 2.3V, 3.0V	3.0		0.27		0.4
			I <sub>OUT</sub> = 100mA, nB <sub>0</sub> or nB <sub>1</sub> = 0V, 0.7V, 2.0V, 2.7V	2.7		0.3		0.4
			I <sub>OUT</sub> = 100mA, nB <sub>0</sub> or nB <sub>1</sub> = 0V, 0.7V, 1.6V, 2.3V	2.3		0.4		0.7
			I <sub>OUT</sub> = 100mA, nB <sub>0</sub> or nB <sub>1</sub> = 0V, 1.0V, 1.8V	1.8		0.8		1.8
ΔR <sub>ON</sub>	On Resistance Matching Between Channels <sup>(3)</sup>	I <sub>OUT</sub> = 100mA, nB <sub>0</sub> or nB <sub>1</sub> = 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 <sub>FLAT(ON)</sub>	On Resistance Flatness <sup>(4)</sup>	I <sub>OUT</sub> = 100mA, B <sub>0</sub> or nB <sub>1</sub> = 0V to V <sub>CC</sub>	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 <sub>CC</sub>	Quiescent Supply Current	V <sub>IN</sub> = 0V to V <sub>CC</sub> , I <sub>OUT</sub> = 0A	4.3	-500		500	nA	
I <sub>CCT</sub>	Increase in I <sub>CC</sub> per Input Control Voltage	V <sub>IN</sub> = 1.8V	4.3		26.0	32.0	μA	
		V <sub>IN</sub> = 2.6V			9.0	12.0		

**Notes:**

- On resistance is determined by the voltage drop between A and B pins at the indicated current through the switch.
- ΔR<sub>ON</sub> = R<sub>ONmax</sub> - R<sub>ONmin</sub> measured at identical V<sub>CC</sub>, temperature, and voltage.
- Flatness is defined as the difference between the maximum and minimum value of R<sub>ON</sub> 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 <sub>CC</sub> (V)	Min.	Typ.	Max.	Units
t <sub>ON</sub>	Turn-On Time	nB <sub>0</sub> or nB <sub>1</sub> = 1.5V, R <sub>L</sub> = 50Ω, C <sub>L</sub> = 35pF	3.6 to 4.3		35	60	ns
			2.7 to 3.6		50	75	
			2.3 to 2.7		75	90	
t <sub>OFF</sub>	Turn-Off Time	nB <sub>0</sub> or nB <sub>1</sub> = 1.5V, R <sub>L</sub> = 50Ω, C <sub>L</sub> = 35pF	3.6 to 4.3		25	40	ns
			2.7 to 3.6		30	50	
			2.3 to 2.7		40	60	
t <sub>BBM</sub>	Break-Before-Make Time	nB <sub>0</sub> or nB <sub>1</sub> = 1.5V, R <sub>L</sub> = 50Ω, C <sub>L</sub> = 35pF	3.6 to 4.3		20		ns
			2.7 to 3.6		30		
			2.3 to 2.7		40		
Q	Charge Injection	C <sub>L</sub> = 100pF, V <sub>GEN</sub> = 0V, R <sub>GEN</sub> = 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 <sub>L</sub> = 50Ω, C <sub>L</sub> = 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 <sub>L</sub> = 50Ω, C <sub>L</sub> = 5pF	3.6 to 4.3		-70		dB
			2.7 to 3.6		-70		
			2.3 to 2.7		-70		
BW	-3dB Bandwidth	R <sub>L</sub> = 50Ω	2.3 to 4.3		>55		MHz
THD	Total Harmonic Distortion	R <sub>L</sub> = 32Ω, V <sub>IN</sub> = 2V <sub>pp</sub> , 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 <sub>CC</sub> (V)	Min.	Typ.	Max.	Units
C <sub>IN</sub>	Control Pin Input Capacitance	f = 1MHz	0.0		2.0		pF
C <sub>OFF</sub>	B Port Off Capacitance	f = 1MHz	3.3		16		pF
C <sub>ON</sub>	A Port On Capacitance	f = 1MHz	3.3		116		pF

### AC Loading and Waveforms

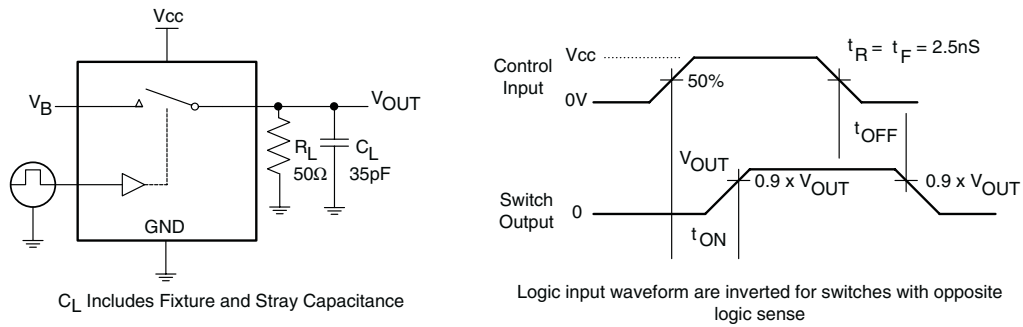


Figure 1. Turn-On/Turn-Off Timing

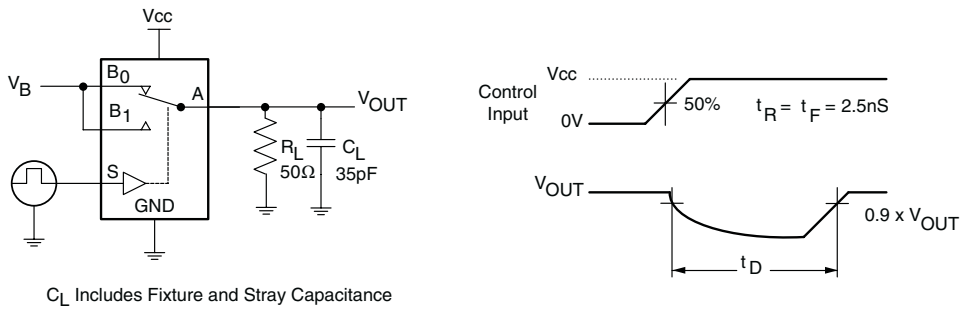


Figure 2. Break-Before-Make Timing

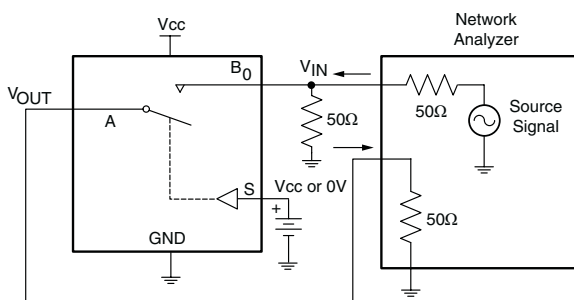


Figure 3. Off Isolation

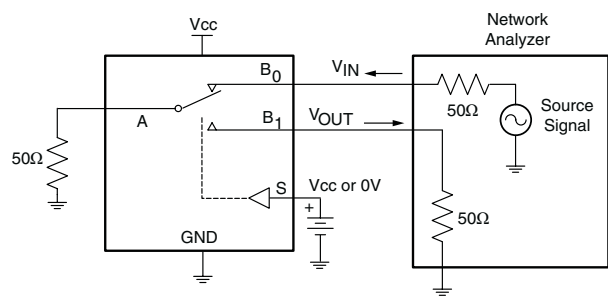


Figure 4. Crosstalk

AC Loading and Waveforms (continued)

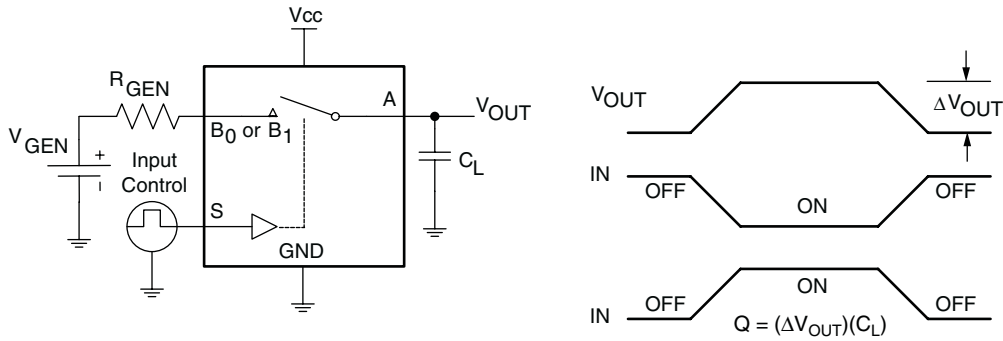


Figure 5. Charge Injection

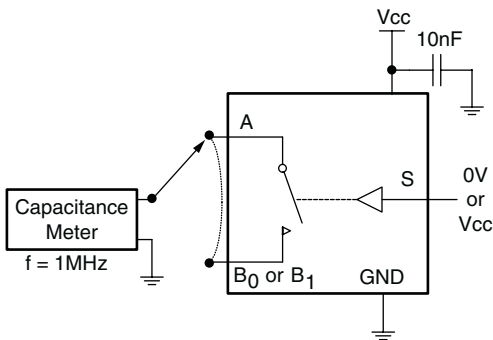


Figure 6. ON/Off Capacitance Measurement

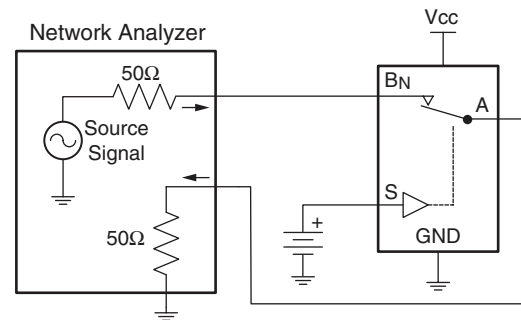
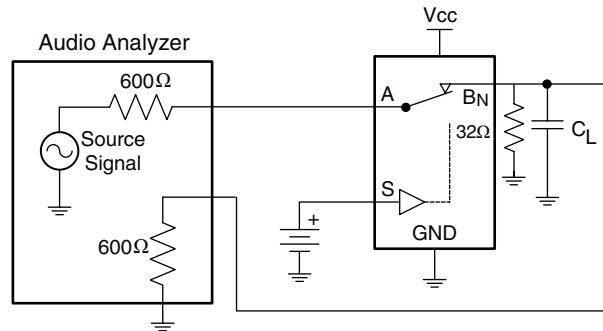


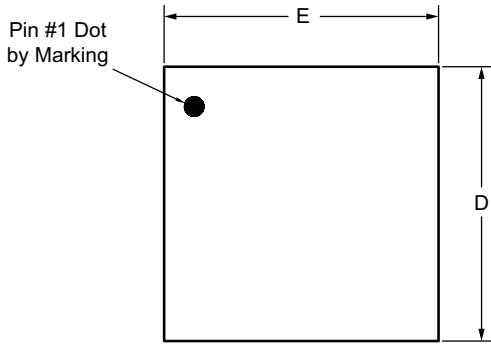
Figure 7. Bandwidth



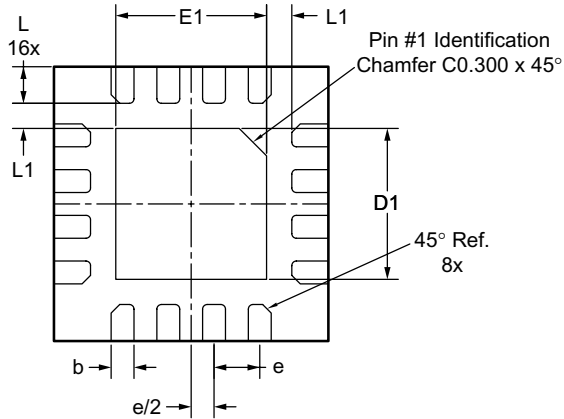
$C_L$  Includes Fixture and Stray Capacitance

Figure 8. Harmonic Distortion

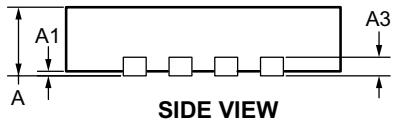
**Package Dimensions, QFN 3 x 3**



**TOP VIEW**

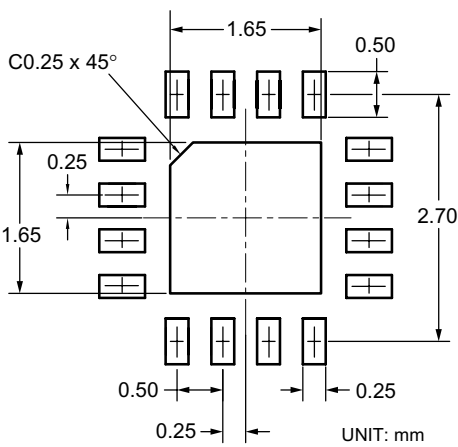


**BOTTOM VIEW**



**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	0.030	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.		

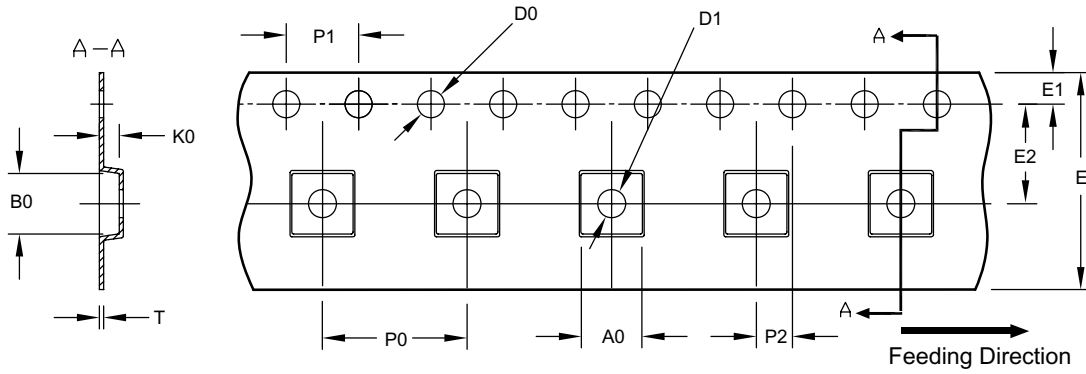
**Note:**

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



**Tape and Reel Dimensions, QFN 3 x 3**

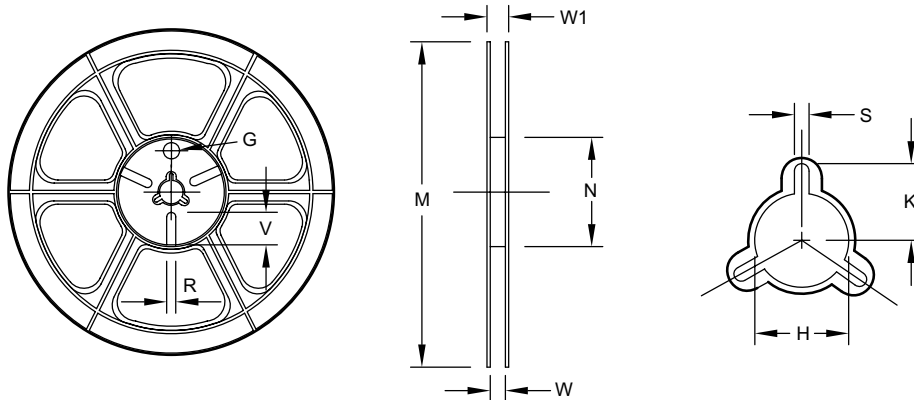
**Carrier Tape**



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

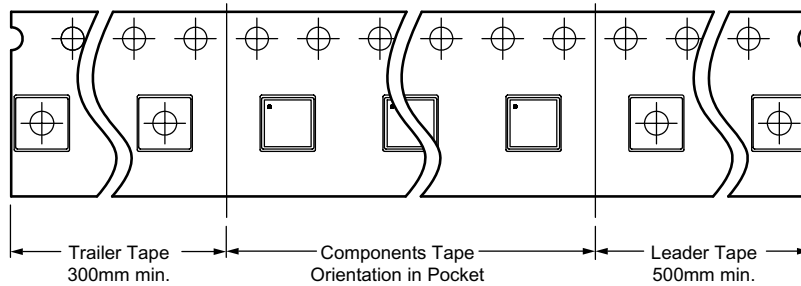
**Reel**



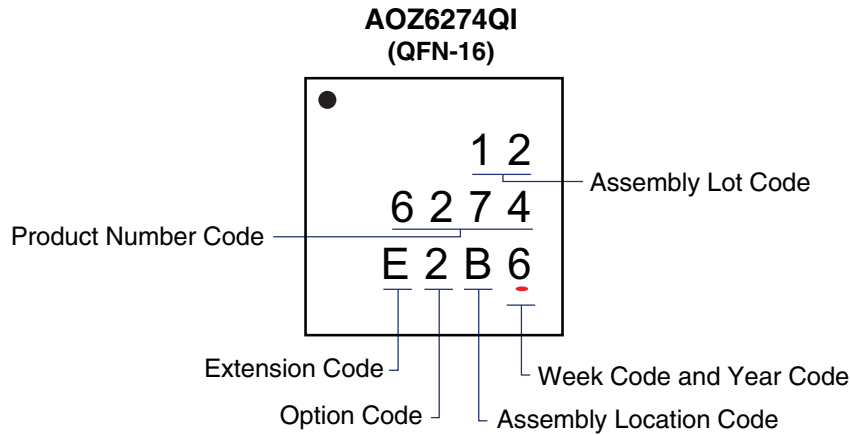
UNIT: mm

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**



**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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