

### General Description

The AOZ8535 is a 6-line device integrating EMI filtering with ESD protection for each line. It is designed to suppress unwanted EMI/RFI signals and provide electrostatic discharge (ESD) protection in portable electronic equipment. This state-of-the-art device utilizes AOS leading edge Trench Vertical Structure [TVS]<sup>2</sup>™ technology for superior clamping performance and filter attenuation over the full operating display range. The AOZ8535 has been optimized for protection of color LCD displays and CCD camera lines in cellular phones and other portable consumer electronic devices.

The AOZ8535 consists of six identical circuits comprised of TVS diodes for ESD protection, and a inductor–capacitor network for EMI/RFI filtering providing a cutoff frequency at 450MHz for high speed data lines. An inductor value of 17nH and a capacitance value of 16pF are used to achieve greater than -30dB attenuation at 1.0GHz. The TVS diodes provide effective suppression of ESD voltages in excess of  $\pm 30\text{kV}$  (air discharge) and  $\pm 24\text{kV}$  (contact discharge). This exceeds IEC 61000-4-2, level 4 ESD immunity test.

The AOZ8535 comes in an RoHS compliant, 1.35mm x 3.0mm DFN package and is rated over a -40°C to +85°C ambient temperature range.

### Features

- 6 lines for EMI filtering and ESD protection:
  - Exceeds IEC 61000-4-2, level 4 (ESD) immunity test
  - $\pm 30\text{kV}$  (air discharge) and  $\pm 24\text{kV}$  (contact discharge)
- Trench Vertical Structure [TVS]<sup>2</sup>™ based technology used to achieve excellent ESD clamping & filter performance over the full operating display range
- Cutoff frequency: 450MHz
- Filter performance:
  - -30dB attenuation at 1.0GHz
  - -25dB attenuation from 800MHz to 5.0GHz
- Low operating voltage: 5.0V
- Capacitance stability over wide range of voltages and temperatures
- DFN package 1.35mm x 3.0mm
- Pb-Free device

### Applications

- EMI filtering and ESD protection for data lines
- LCD displays, camera interface, I/O interface
- Portable handheld devices, cell phones, PDA phones



### Electrical Schematic (each channel)

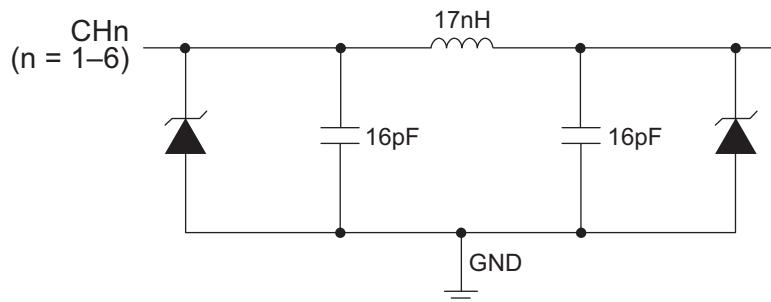


Figure 1.

## Ordering Information

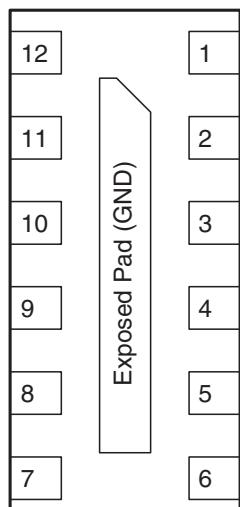
Part Number	Ambient Temperature Range	Package	Environmental
AOZ8535DI	-40°C to +85°C	DFN-12	RoHS Compliant Green Product



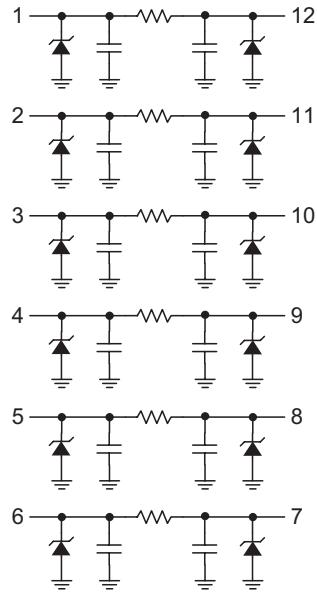
AOS Green Products use reduced levels of Halogens, and are also RoHS compliant.

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

## Pin Configuration



**DFN-12**  
(Bottom View)



**Top View**

## Pin Description

Pin Number	Pin Name	Pin Function
1,12	CH 1	Channel 1 Connections
2, 11	CH 2	Channel 2 Connections
3, 10	CH 3	Channel 3 Connections
4, 9	CH 4	Channel 4 Connections
5, 8	CH 5	Channel 5 Connections
6, 7	CH 6	Channel 6 Connections
Exposed Pad	GND	Common Ground Connection

## Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Parameter	Rating
Storage Temperature ( $T_S$ )	-65°C to +150°C
ESD Rating per IEC61000-4-2, contact <sup>(1)</sup>	±24kV
ESD Rating per IEC61000-4-2, air <sup>(1)</sup>	±30kV
ESD Rating per Human Body Model <sup>(2)</sup>	±30kV

**Notes:**

1. IEC 61000-4-2 discharge with  $C_{\text{Discharge}} = 150\text{pF}$ ,  $R_{\text{Discharge}} = 330\Omega$ .
2. Human Body Discharge per MIL-STD-883, Method 3015  $C_{\text{Discharge}} = 100\text{pF}$ ,  $R_{\text{Discharge}} = 1.5\text{k}\Omega$ .

## Electrical Characteristics

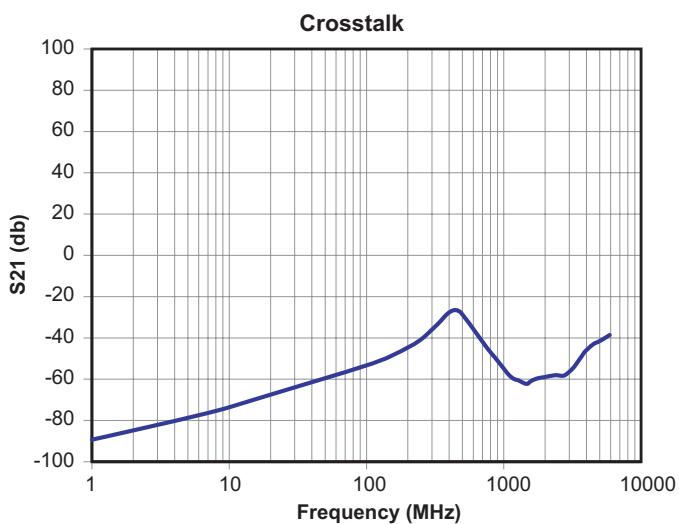
$T_A = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$V_{\text{RWM}}$	Reverse Working Voltage	(3)			5.0	V
$V_{\text{BR}}$	Reverse Breakdown Voltage	$I_T = 1\text{mA}$ <sup>(4)</sup>	6	7	8	V
$I_R$	Reverse Leakage Current	$V_{\text{RWM}} = 3.3\text{V}$			0.1	$\mu\text{A}$
$V_{\text{CL}}$	Signal Clamp Voltage	$I_{\text{LOAD}} = 1\text{A}$ , positive clamp <sup>(5)(6)</sup>			10.0	V
		$I_{\text{LOAD}} = 1\text{A}$ , negative clamp <sup>(5)(6)</sup>			-2	
		$I_{\text{LOAD}} = 5\text{A}$ , positive clamp <sup>(5)(6)</sup>			11.0	
		$I_{\text{LOAD}} = 5\text{A}$ , negative clamp <sup>(5)(6)</sup>			-2.5	
$L_{\text{CH}}$	Inductance	$I_{\text{LOAD}} = 12\text{A}$ , positive clamp <sup>(5)(6)</sup>			12.0	nH
		$I_{\text{LOAD}} = 12\text{A}$ , negative clamp <sup>(5)(6)</sup>			-2.75	
$C_{\text{CH}}$	Capacitance	$C1, C2$ <sup>(6)</sup>		16	18	pF
$f_C$	Cut-off Frequency	Measured with $50\Omega$ source and $50\Omega$ load termination at -6dB		450		MHz
	Attenuation from 800MHz to 5.0GHz	$V_R = 0\text{V}$ Measured with $50\Omega$ source and $50\Omega$ load termination		-25		dB

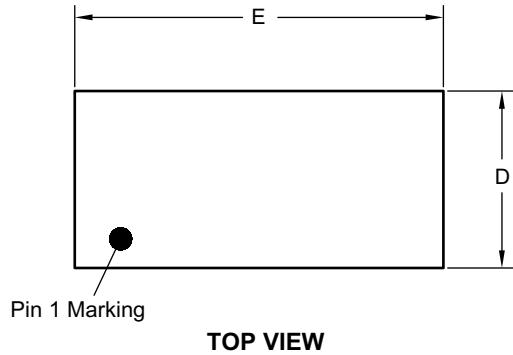
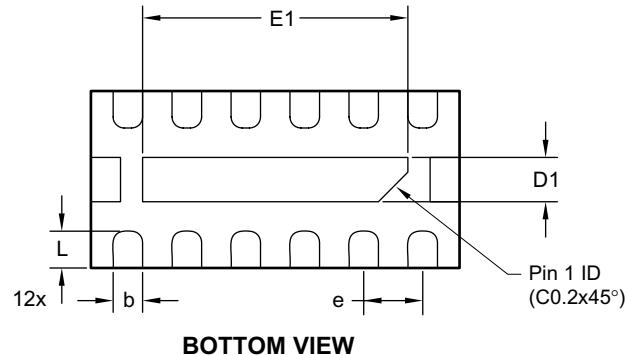
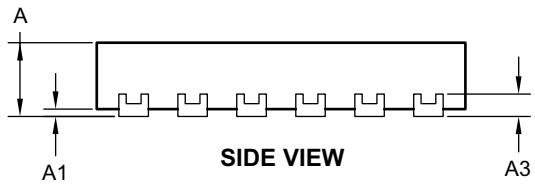
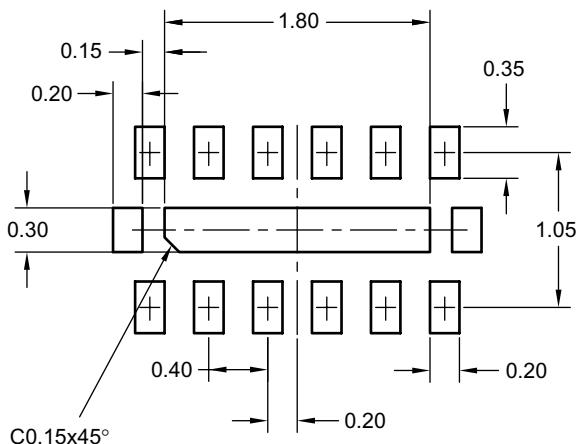
**Notes:**

3. The working peak reverse voltage,  $V_{\text{RWM}}$ , should be equal to or greater than the DC or continuous peak operating voltage level.
4.  $V_{\text{BR}}$  is measured at the pulse test current  $I_T$ .
5. Measurements performed using a 100ns Transmission Line Pulse (TLP) system.
6. Guaranteed by design. Not 100% tested in production.

## Typical Performance Characteristics



## Package Dimensions, DFN 2.5 x 1.2, 12L EP1 S


**TOP VIEW**

**BOTTOM VIEW**

**RECOMMENDED LAND PATTERN**


UNIT: mm

**Dimensions in millimeters**

Symbols	Min.	Nom.	Max.
A	0.50	0.55	0.60
A1	0.00	—	0.05
b	0.15	0.20	0.25
A3 0.152 REF			
D	1.15	1.20	1.25
E	2.45	2.50	2.55
D1	0.25	0.30	0.35
D1	1.75	1.80	1.85
e	0.40 BSC		
L	0.20	0.24	0.30

**Dimensions in inches**

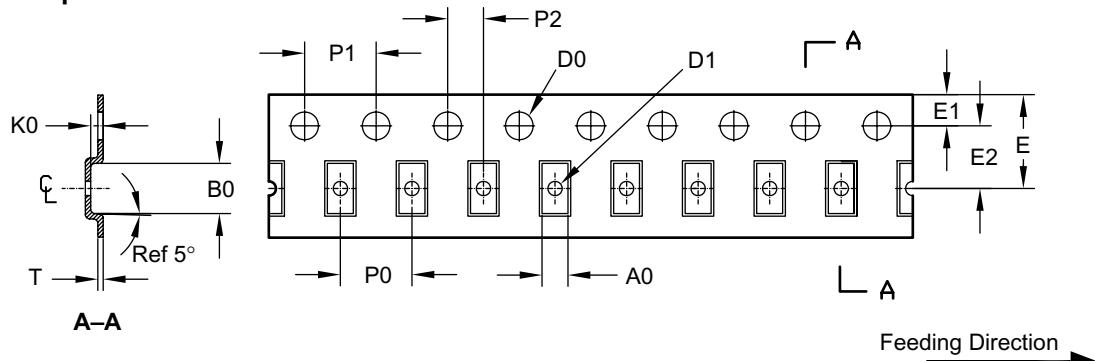
Symbols	Min.	Nom.	Max.
A	0.020	0.022	0.024
A1	0.000	—	0.002
b	0.006	0.008	0.010
A3 0.006 REF			
D	0.045	0.047	0.049
E	0.096	0.098	0.100
D1	0.010	0.012	0.014
D1	0.069	0.071	0.073
e	0.016 BSC		
L	0.008	0.010	0.012

**Notes:**

1. All dimensions are in millimeters. Converted inch dimensions are not necessarily exact.

## Tape and Dimensions, DFN 2.5 x 1.2

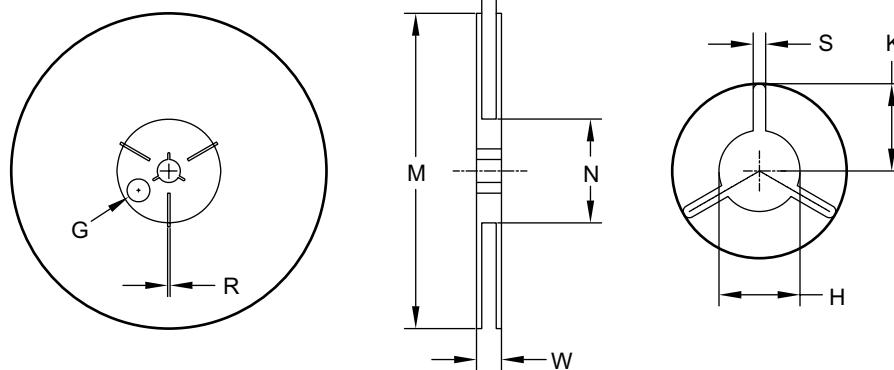
### Carrier Tape



UNIT: mm

Package	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
DFN 2.5x1.2	1.45 ±0.05	2.80 ±0.05	0.70 ±0.05	ø1.55 ±0.05	ø0.80 ±0.05	8.00 ±0.03	1.75 ±0.1	3.50 ±0.05	4.00 ±0.10	4.0 ±0.10	2.0 ±0.05	0.30 ±0.05

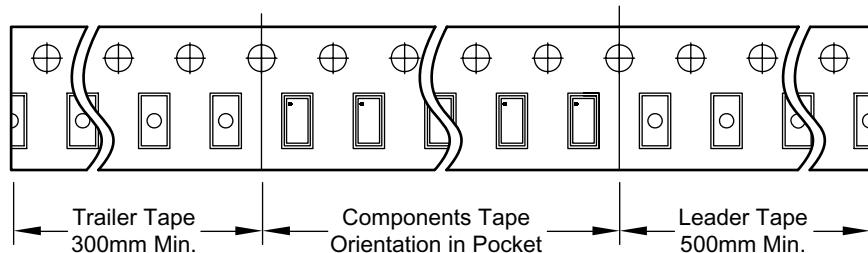
### Reel



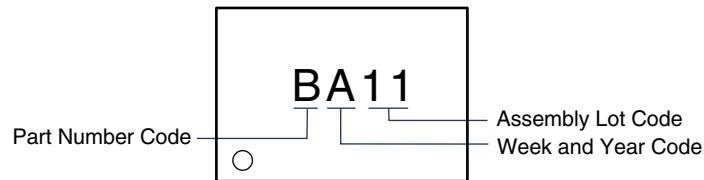
UNIT: mm

Tape Size	Reel Size	M	N	W	W1	H	S	K	E
8mm	ø178	ø178.0 ±1.0	ø60.0 ±0.5	11.80 ±0.5	9.0 ±0.5	ø13.0 +0.5 / -0.2	2.40 ±0.1	10.25 ±0.2	ø9.8

### Leader / Trailer & Orientation



## Package Marking



**This data sheet 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.