ALPHA & OMEGA SEMICONDUCTOR

AOZ8014

4-Line EMI Filter with Integrated ESD Protection

General Description

The AOZ8014 is an 4-line device integrating EMI filtering with ESD protection for each line. It is designed to suppress unwanted EMI/RFI signals and provide electro-static discharge (ESD) protection in portable electronic equipment. This state-of-the-art device utilizes AOS leading edge Trench Vertical Structure [TVS]^2 ™ technology for superior clamping performance and filter attenuation over the full operating display range. The AOZ8014 has been optimized for protection of color LCD displays and CCD camera lines in cellular phones and other portable consumer electronic devices.

The AOZ8014 consists of four identical circuits comprised of TVS diodes for ESD protection, and a resistor–capacitor network for EMI/RFI filtering. A series resistor value of 100Ω and a capacitance value of 17pF are used to achieve -25dB minimum attenuation from 800MHz to 3.0GHz. The TVS diodes provide effective suppression of ESD voltages in excess of ±17kV (air discharge) and ±17kV (contact discharge). This exceeds IEC 61000-4-2, level 4 ESD immunity test.

The AOZ8014 comes in an RoHS compliant, 2.0mm x 2.0mm DFN package and is rated over a -40°C to +85°C ambient temperature range.

Features

- 4 lines for EMI filtering and ESD protection:
  - Exceeds IEC 61000-4-2, level 4 (ESD) immunity test
  - ±17kV (air discharge) and ±17kV (contact discharge)
- Trench Vertical Structure [TVS]^2 ™ based technology used to achieve excellent ESD clamping & filter performance over the full operating display range
- Filter performance: -25db attenuation from 800MHz to 3.0GHz
- Low operating voltage: 5.0V
- Capacitance stability over wide range of voltages and temperatures
- DFN package, 2.0 x 2.0 mm
- 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

RoHS Compliant

Electrical Schematic (each channel)

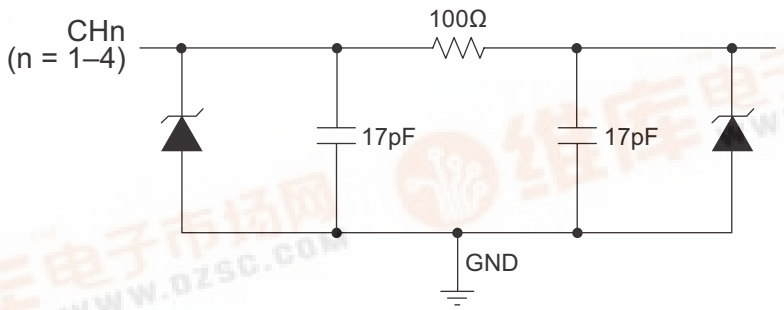


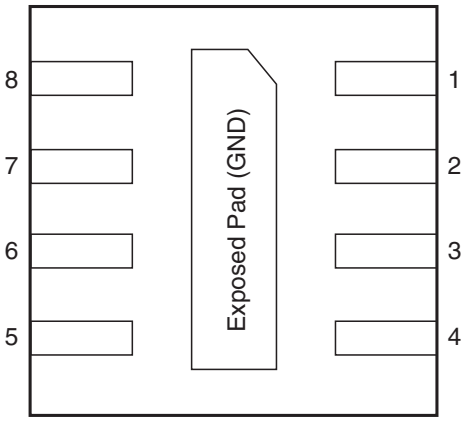
Figure 1.

Ordering Information

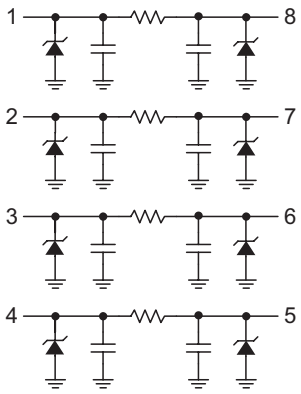
Part Number	Ambient Temperature Range	Package	Environmental
AOZ8014DI	-40°C to +85°C	DFN-8	RoHS Compliant

All AOS products are offered in packages with Pb-free plating and compliant to RoHS standards.
Parts marked as Green Products (with "L" suffix) 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



DFN-8
(Bottom View)



Top View

Pin Description

Pin Number	Pin Name	Pin Function
1, 8	CH 1	Channel 1 Connections
2, 7	CH 2	Channel 2 Connections
3, 6	CH 3	Channel 3 Connections
4, 5	CH 4	Channel 4 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(1)	±17kV
ESD Rating per IEC61000-4-2, air(1)	±17kV
ESD Rating per Human Body Model(2)	±30kV

Notes:

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

Electrical Characteristics

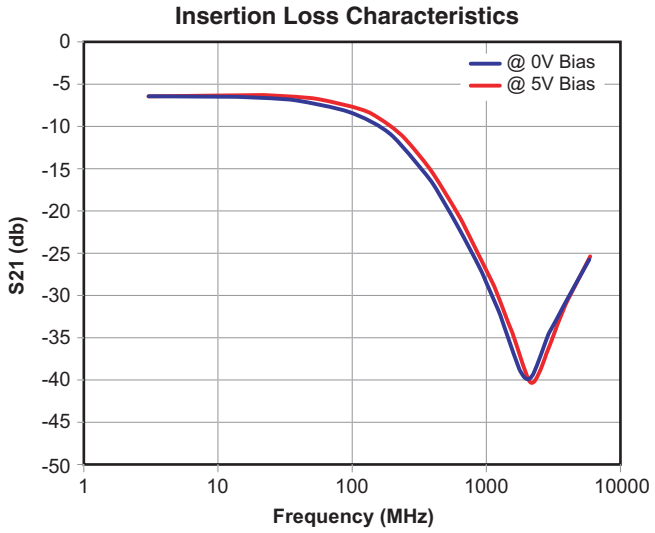
T_A = 25°C unless otherwise specified.

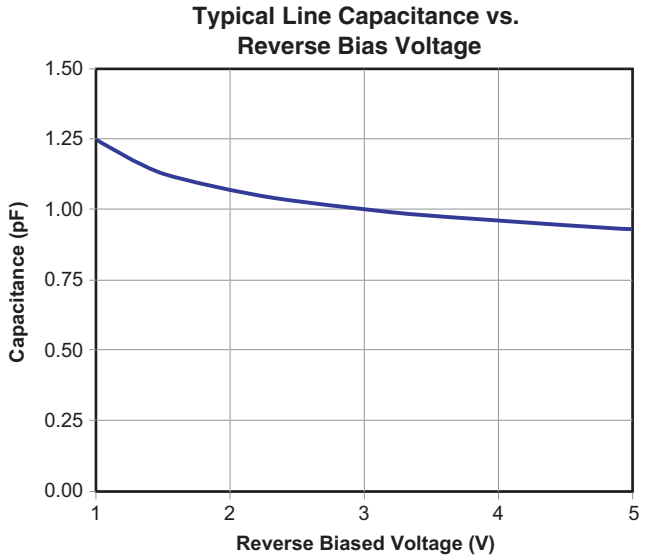
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{RWM}	Reverse Working Voltage	(3)(8)			5.0	V
V_{BR}	Reverse Breakdown Voltage	I_T = 1mA(4)	6	7	8	V
I_R	Reverse Leakage Current	V_{RWM} = 3.3V			0.1	µA
V_{CL}	Signal Clamp Voltage	I_{LOAD} = 12A, positive clamp(5)(8) I_{LOAD} = 12A, negative clamp(5)(8)		7.5 -6.5	8.5 -7.5	V
R_{CH}	Total Series Resistance	I_R = 20mA	85	100	115	Ω
C_{CH}	Channel Capacitance	Input to Ground(6)(7)(8)	15	17	19	pF
f_C	Cut-off Frequency	Measured with 50Ω source and 50Ω load termination		125		MHz
	Attenuation from 800MHz to 3.0GHz	Measured with 50Ω source and 50Ω load termination		-25		dB

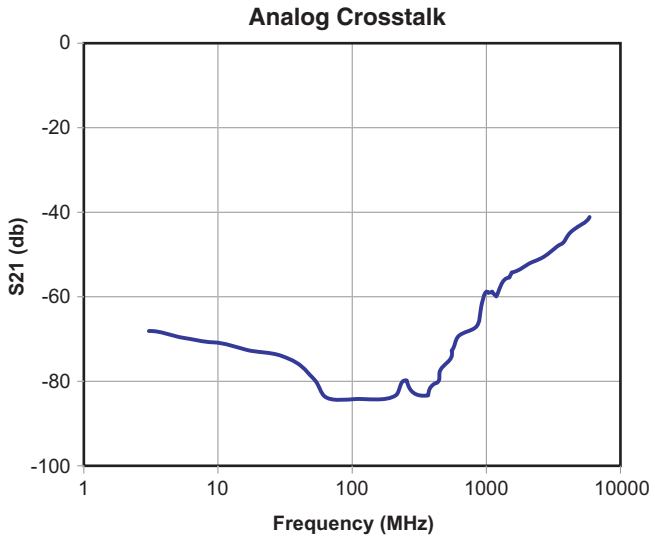
Notes:

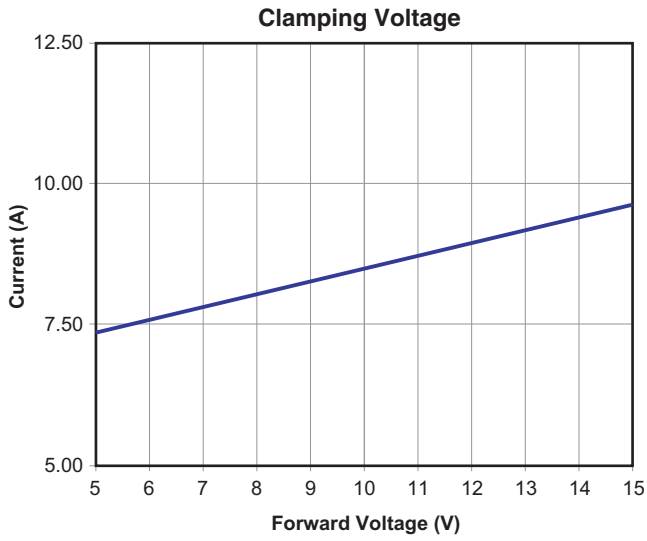
3. The working peak reverse voltage, V_{RWM}, should be equal to or greater than the DC or continuous peak operating voltage level.
4. V_{BR} is measured at the pulse test current I_T.
5. Measurements performed using a 100ns Transmission Line Pulse (TLP) system.
6. Total capacitance is equal to 2 x C_{CH}.
7. Measured at 25°C, V_R = 2.5V, f = 1.0MHz.
8. Guaranteed by design.

Typical Performance Characteristics

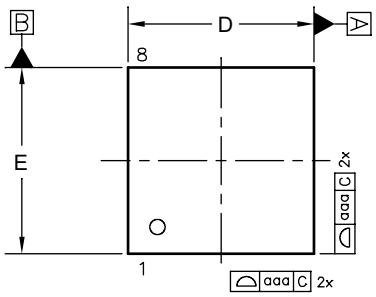




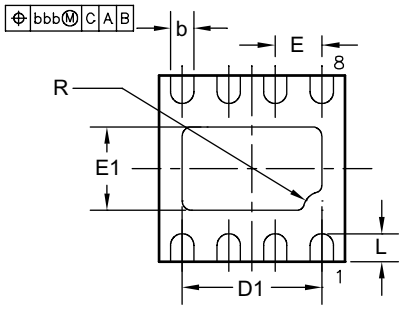




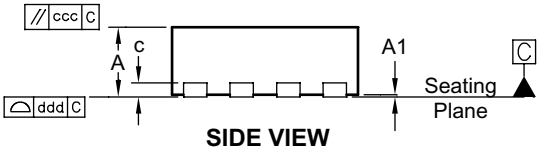
Package Dimensions, DFN 2.0 x 2.0 8L



TOP VIEW

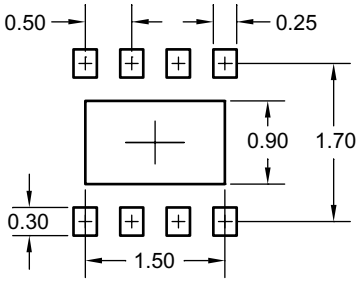


BOTTOM VIEW



SIDE VIEW

RECOMMENDED LAND PATTERN



UNIT: mm

Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
b	0.18	0.25	0.30
c	0.15	0.20	0.25
D		2.00 BSC	
D1	1.35	1.50	1.60
E		2.00 BSC	
E1	0.75	0.90	1.00
e		0.50 BSC	
L	0.20	0.30	0.40
R		0.20	
aaa		0.15	
bbb		0.10	
ccc		0.10	
ddd		0.08	

Dimensions in inches

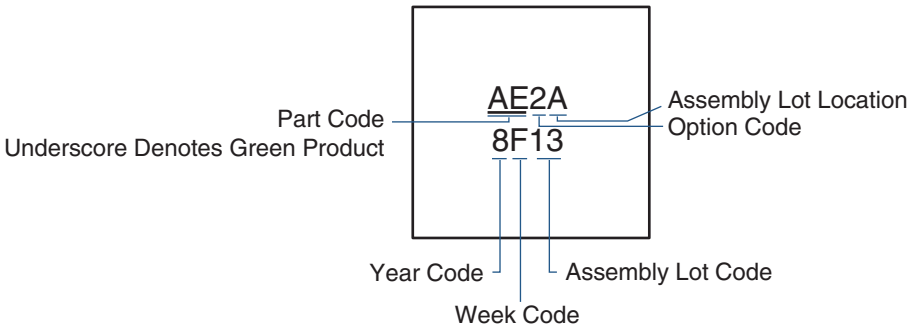
Symbols	Min.	Nom.	Max.
A	0.028	0.030	0.031
A1	0.000	0.001	0.002
b	0.007	0.010	0.012
c	0.006	0.008	0.010
D		0.079 BSC	
D1	0.053	0.059	0.063
E		0.079 BSC	
E1	0.030	0.035	0.039
e		0.020 BSC	
L	0.008	0.012	0.016
R		0.008	
aaa		0.006	
bbb		0.004	
ccc		0.004	
ddd		0.003	

Notes:

1. Dimensions and tolerances conform to ASME Y14.5M-1994.
2. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.
3. Dimension b applied to metallized terminal and is measured between 0.10mm and 0.30mm from the terminal tip. If the terminal has the optional radius on the other end of the terminal, dimension b should not be measured in that radius area.
4. Coplanarity ddd applies to the terminals and all other bottom surface metallization.

Part Marking

AOZ8014DI
(DFN-8)



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.