

Description

The ALCDA12C-1 is a low capacitance TVS diode array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting sensitive semiconductor components from damage. The ALCDA12C-1 complies with the IEC 61000-4-2 (ESD) with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a lead-free SOT-143 package. It is designed to protect components which are connected to high speed interfaces and transmission lines from voltage surges.

Features

- 300W peak pulse power (8/20 μs)
- Ultra low leakage: nA level
- Operating voltage: 12V, 15V, 24V
- Low capacitance for high-speed data line
- Low clamping voltage
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$
 - Contact discharge: $\pm 30\text{kV}$
- RoHS Compliant

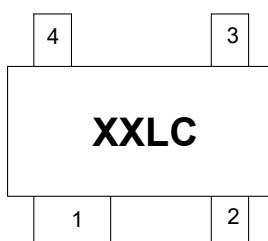
Mechanical Characteristics

- Package: SOT-143
- Lead Finish: Matte Tin
- Case Material: "Green" Molding Compound.
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

- ADSL Interfaces
- Wireless Systems
- Portable Instrumentation
- LAN/WAN equipment
- High-Speed Data Lines
- Multi-Protocol Serial Transceivers
- RS-232, RS-422, V.90 Interfacing

Marking Information

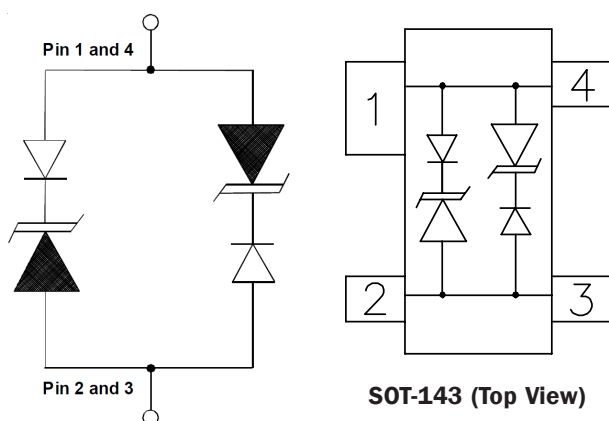


Part Number	Marking
ALCDA12C-1	12LC
ALCDA15C-1	15LC
ALCDA24C-1	24LC

Ordering Information

Part Number	Packaging	Reel Size
ALCDA12C-1	3000/Tape & Reel	7 inch
ALCDA15C-1	3000/Tape & Reel	7 inch
ALCDA24C-1	3000/Tape & Reel	7 inch

Dimensions and Pin Configuration



Circuit Diagram

Pin Schematic

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 μs)	Ppk	300	W
ESD per IEC 61000-4-2 (Air)	VESD	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

ALCDA12C-1						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			12	V	
Breakdown Voltage	VBR	13.3			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 12V
Clamping Voltage	VC			18	V	IPP = 5A (8 x 20 μs pulse)
Clamping Voltage	VC			25	V	IPP = 12A (8 x 20 μs pulse)
Peak Pulse Current	IPP			12	A	tp = 8/20 μs
Junction Capacitance	CJ		8	15	pF	VR = 0V, f = 1MHz, between I/O pins and GND

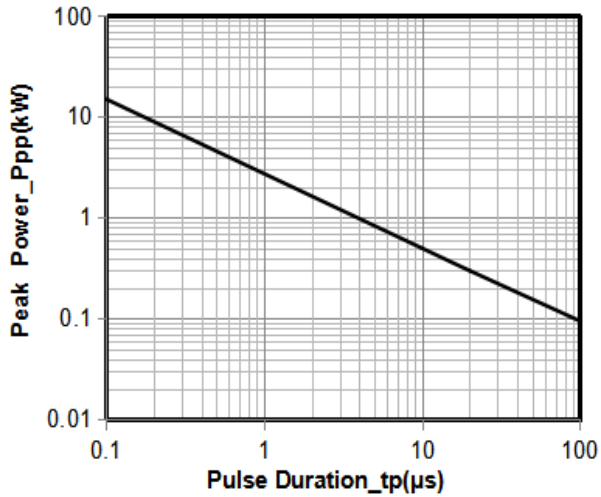
ALCDA15C-1

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			15	V	
Breakdown Voltage	VBR	16.7			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 15V
Clamping Voltage	VC			24	V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC			30	V	I _{PP} = 10A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			10	A	t _p = 8/20μs
Junction Capacitance	C _J		8	15	pF	VR = 0V, f = 1MHz, between I/O pins and GND

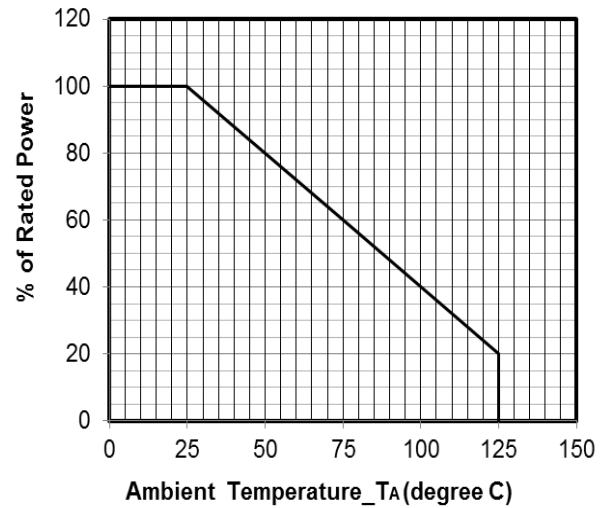
ALCDA24C-1

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			24	V	
Breakdown Voltage	VBR	27			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 24V
Clamping Voltage	VC			38	V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC			60	V	I _{PP} = 5A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			5	A	t _p = 8/20μs
Junction Capacitance	C _J		8	15	pF	VR = 0V, f = 1MHz, between I/O pins and GND

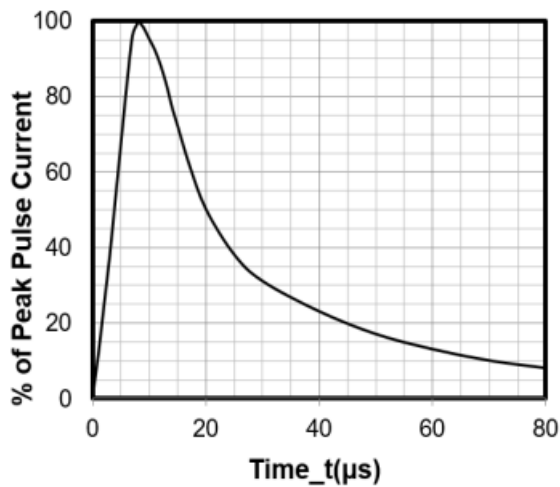
Typical Performance Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise Specified)



Peak Pulse Power vs. Pulse Time



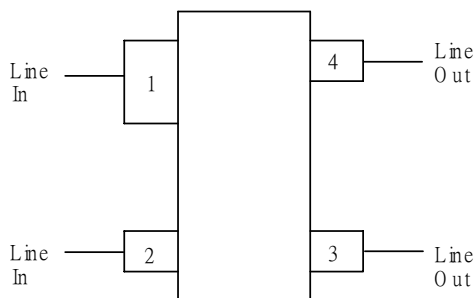
Power Derating Curve



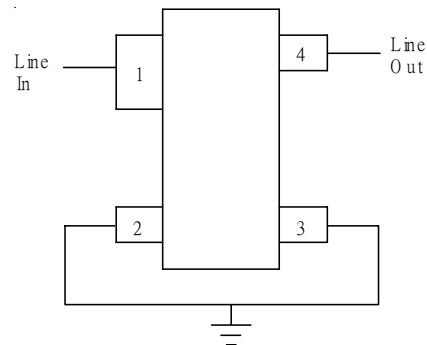
8 X 20 μs Pulse Waveform

Device Connection for Protection of High-Speed Data Line

The ALCDAxxC-1 is designed to protect high-speed data lines from transient over-voltages which result from lightning and ESD. The device is designed to protect one line in common mode (Line-to-Ground) or one line pair in metallic (Line-to-Line) mode. For metallic mode protection, the input of line 1 is connected at pin 1 and the output is connected at pin 4. Likewise, the input of line 2 is connected at pin 2 and the output is connected at pin 3. For common mode protection ground either pins 1 and 4 or pins 2 and 3. The ground connection should be made directly to the ground plane for best results.

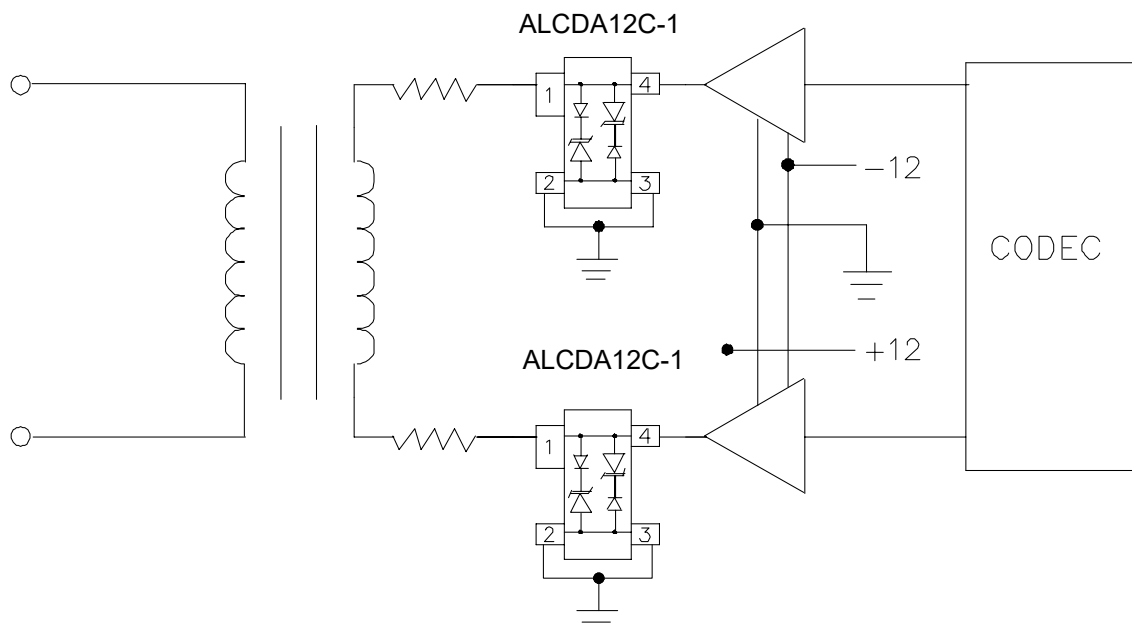


Connection for Differential Protection

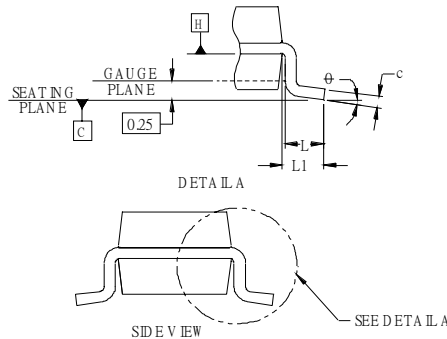
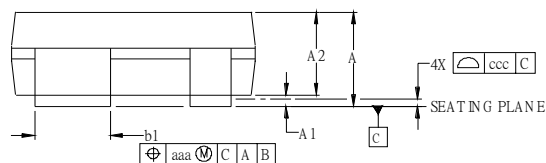
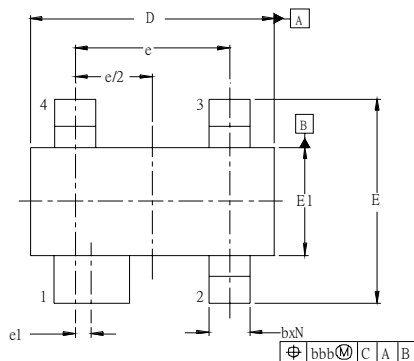


Connection for Common Mode

ALCDA12C-1 on ADSL Application

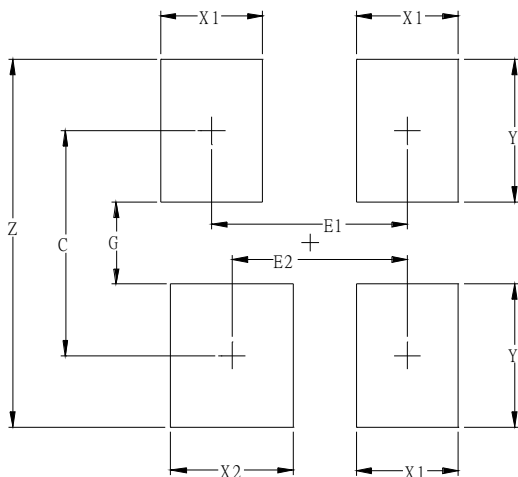


SOT-143 Package Outline Drawing



DIM	INCHES				MILLIMETERS			
	M	N	O	M	M	N	O	M
A	.031	-	.048	0.80	-	1.22	-	-
A1	.000	-	.006	0.013	-	0.15	-	-
A2	.029	.035	.042	0.75	0.90	1.07	-	-
b	.011	-	.020	0.30	-	0.51	-	-
b1	.029	-	.037	0.76	-	0.94	-	-
c	.003	-	.008	0.08	-	0.20	-	-
D	.110	.114	.120	2.80	2.90	3.04	-	-
E	.082	.093	.104	2.10	2.37	2.64	-	-
E1	.047	.051	.055	1.20	1.30	1.40	-	-
e	.075	-	-	1.92 BSC	-	-	-	-
e1	.008	-	-	0.20 BSC	-	-	-	-
L	.015	.020	.024	0.40	0.50	0.60	-	-
L1	(.021)	-	-	(0.54)	-	-	-	-
N	4	-	-	4	-	-	-	-
theta	0°	-	8°	0°	-	8°	-	-
aaa	.006	-	-	0.15	-	-	-	-
bbb	.008	-	-	0.20	-	-	-	-
ccc	.004	-	-	0.10	-	-	-	-

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	2.20	0.087
E1	1.92	0.076
E2	1.72	0.068
G	0.80	0.031
X1	1.00	0.039
X2	1.20	0.047
Y	1.40	0.055
Z	3.60	0.141

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