ESD/Surge Protection Diode Array

Bi-directional ESD Protection for High-Speed Data Line

SMDA05C Series

The SMDA05C surge protection series is designed to protect equipment attached to up to four high speed communication lines from ESD, EFT and surge.

Features

- SO−8 Package
- Peak Power − 300 W 8 x 20 μs
- ESD Rating:
  IEC 61000−4−2 (ESD) ±15 kV (Air) ±8 kV (Contact)
  IEC 61000−4−4 (EFT) 40 A (5/50 ns)
  IEC 61000−4−5 (Surge) 12 A (8/20 μs)
- UL Flammability Rating of 94 V−0
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- High Speed Communication Line Protection
- Data and I/O Lines
- Microprocessor Based Equipment
- LAN/WAN Equipment
- Servers
- Notebook and Desktop PC
- Serial and Parallel Ports
- Peripherals

MAXIMUM RATINGS

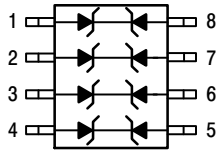
Rating	Sym-bol	Value	Unit
Peak Power Dissipation 8 x 20 μs @ T_A = 25°C (Note 1)	P_{pk}	300	W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C
Lead Solder Temperature − Maximum 10 Seconds Duration	T_L	260	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Non−repetitive current pulse 8 x 20 μs exponential decay waveform.

SO−8
ESD AND SURGE PROTECTOR
300 WATTS PEAK POWER

PIN CONFIGURATION AND SCHEMATIC



SO−8
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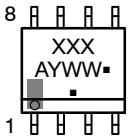
MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 3 of this data sheet.

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SMDA05C ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	–	–	5.0	V
Reverse Breakdown Voltage @ I_t = 1.0 mA	V_{BR}	6.0	–	–	V
Reverse Leakage Current @ V_{RWM} = 5 Volts	I_R	N/A	–	20	μA
Maximum Clamping Voltage @ I_{PP} = 1.0 A, 8 x 20 μs	V_C	N/A	–	9.8	V
Maximum Clamping Voltage @ I_{PP} = 5.0 A, 8 x 20 μs	V_C	N/A	–	11	V
Maximum Peak Pulse Current, 8 x 20 μs	I_{PP}	–	–	17	A
Junction Capacitance @ V_R = 0 V, f = 1 MHz	C_J	–	–	350	pF

SMDA12C ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	–	–	12	V
Reverse Breakdown Voltage @ I_t = 1.0 mA	V_{BR}	13.3	–	–	V
Reverse Leakage Current @ V_{RWM} = 12 Volts	I_R	N/A	–	1.0	μA
Maximum Clamping Voltage @ I_{PP} = 1.0 A, 8 x 20 μs	V_C	N/A	–	19	V
Maximum Clamping Voltage @ I_{PP} = 5.0 A, 8 x 20 μs	V_C	N/A	–	24	V
Maximum Peak Pulse Current, 8 x 20 μs	I_{PP}	–	–	12	A
Junction Capacitance @ V_R = 0 V, f = 1 MHz	C_J	–	–	120	pF

SMDA15C ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	–	–	15	V
Reverse Breakdown Voltage @ I_t = 1.0 mA	V_{BR}	16.7	–	–	V
Reverse Leakage Current @ V_{RWM} = 15 Volts	I_R	N/A	–	1.0	μA
Maximum Clamping Voltage @ I_{PP} = 1.0 A, 8 x 20 μs	V_C	N/A	–	24	V
Maximum Clamping Voltage @ I_{PP} = 5.0 A, 8 x 20 μs	V_C	N/A	–	30	V
Maximum Peak Pulse Current, 8 x 20 μs	I_{PP}	–	–	10	A
Junction Capacitance @ V_R = 0 V, f = 1 MHz	C_J	–	–	75	pF

SMDA24C ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	–	–	24	V
Reverse Breakdown Voltage @ I_t = 1.0 mA	V_{BR}	26.7	–	–	V
Reverse Leakage Current @ V_{RWM} = 24 Volts	I_R	N/A	–	1.0	μA
Maximum Clamping Voltage @ I_{PP} = 1.0 A, 8 x 20 μs	V_C	N/A	–	43	V
Maximum Clamping Voltage @ I_{PP} = 5.0 A, 8 x 20 μs	V_C	N/A	–	55	V
Maximum Peak Pulse Current, 8 x 20 μs	I_{PP}	–	–	5.0	A
Junction Capacitance @ V_R = 0 V, f = 1 MHz	C_J	–	–	50	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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Your Opinion Matters

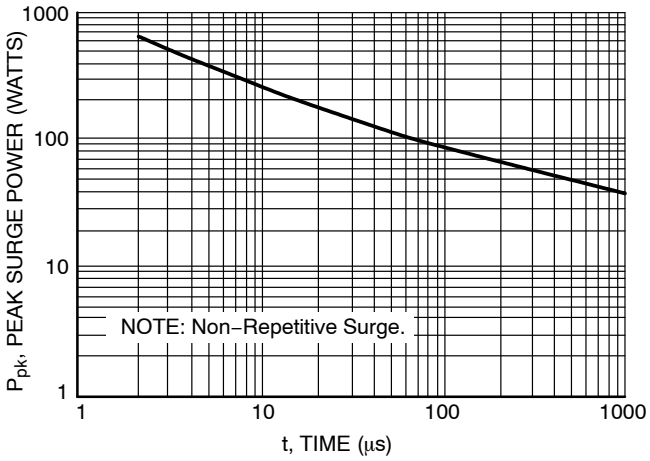

Figure 1. Pulse Width

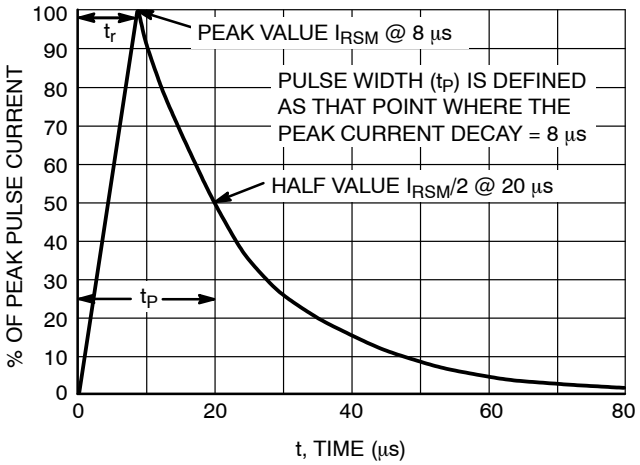

Figure 2. 8 × 20 μs Pulse Waveform

ORDERING INFORMATION

Device	Marking	Package	Shipping†
SMDA05CDR2G	AAA	SO−8 (Pb−Free)	2500 / Tape & Reel
SMDA12CDR2G	AAC	SO−8 (Pb−Free)	2500 / Tape & Reel
SMDA15CDR2G	AAD	SO−8 (Pb−Free)	2500 / Tape & Reel
SMDA24CDR2G	AAE	SO−8 (Pb−Free)	2500 / Tape & Reel

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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SCALE 1:1

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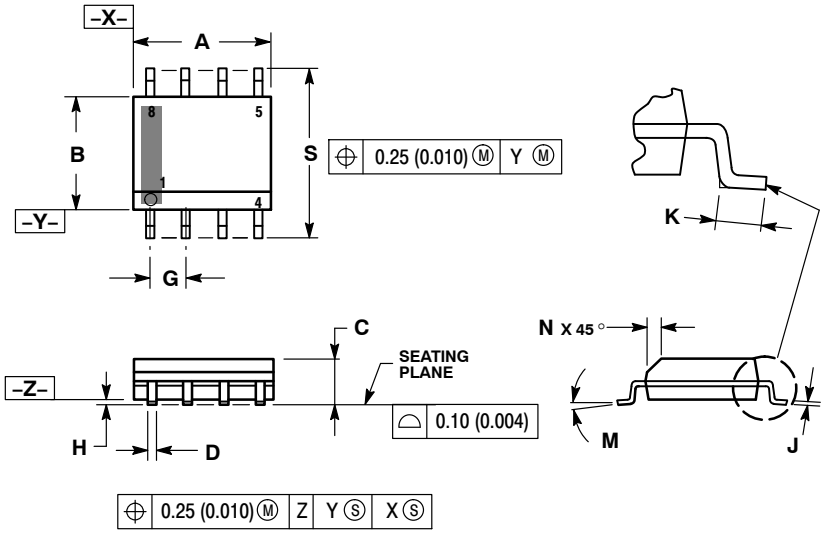
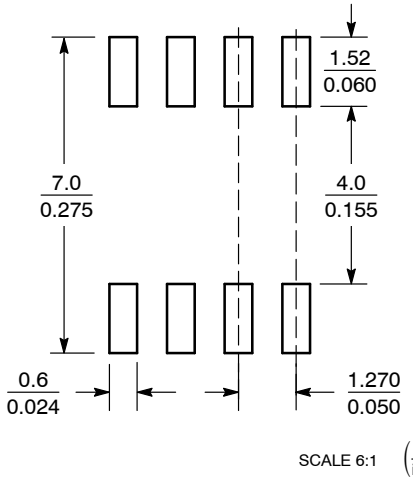


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751−01 THRU 751−06 ARE OBSOLETE. NEW STANDARD IS 751−07.

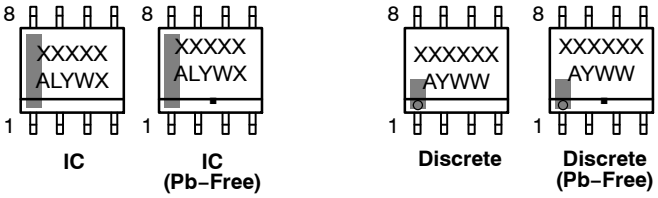
	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb−Free Package

XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLES ON PAGE 2

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ISSUE AK

DATE 16 FEB 2011

STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. COLLECTOR
4. EMITTER
5. EMITTER
6. BASE
7. BASE
8. EMITTER

STYLE 2:
PIN 1. COLLECTOR, DIE, #1
2. COLLECTOR, #1
3. COLLECTOR, #2
4. COLLECTOR, #2
5. BASE, #2
6. EMITTER, #2
7. BASE, #1
8. EMITTER, #1

STYLE 3:
PIN 1. DRAIN, DIE #1
2. DRAIN, #1
3. DRAIN, #2
4. DRAIN, #2
5. GATE, #2
6. SOURCE, #2
7. GATE, #1
8. SOURCE, #1

STYLE 4:
PIN 1. ANODE
2. ANODE
3. ANODE
4. ANODE
5. ANODE
6. ANODE
7. ANODE
8. COMMON CATHODE

STYLE 5:
PIN 1. DRAIN
2. DRAIN
3. DRAIN
4. DRAIN
5. GATE
6. GATE
7. SOURCE
8. SOURCE

STYLE 6:
PIN 1. SOURCE
2. DRAIN
3. DRAIN
4. SOURCE
5. SOURCE
6. GATE
7. GATE
8. SOURCE

STYLE 7:
PIN 1. INPUT
2. EXTERNAL BYPASS
3. THIRD STAGE SOURCE
4. GROUND
5. DRAIN
6. GATE 3
7. SECOND STAGE Vd
8. FIRST STAGE Vd

STYLE 8:
PIN 1. COLLECTOR, DIE #1
2. BASE, #1
3. BASE, #2
4. COLLECTOR, #2
5. COLLECTOR, #2
6. EMITTER, #2
7. EMITTER, #1
8. COLLECTOR, #1

STYLE 9:
PIN 1. EMITTER, COMMON
2. COLLECTOR, DIE #1
3. COLLECTOR, DIE #2
4. EMITTER, COMMON
5. EMITTER, COMMON
6. BASE, DIE #2
7. BASE, DIE #1
8. EMITTER, COMMON

STYLE 10:
PIN 1. GROUND
2. BIAS 1
3. OUTPUT
4. GROUND
5. GROUND
6. BIAS 2
7. INPUT
8. GROUND

STYLE 11:
PIN 1. SOURCE 1
2. GATE 1
3. SOURCE 2
4. GATE 2
5. DRAIN 2
6. DRAIN 2
7. DRAIN 1
8. DRAIN 1

STYLE 12:
PIN 1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN
6. DRAIN
7. DRAIN
8. DRAIN

STYLE 13:
PIN 1. N.C.
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN
6. DRAIN
7. DRAIN
8. DRAIN

STYLE 14:
PIN 1. N−SOURCE
2. N−GATE
3. P−SOURCE
4. P−GATE
5. P−DRAIN
6. P−DRAIN
7. N−DRAIN
8. N−DRAIN

STYLE 15:
PIN 1. ANODE 1
2. ANODE 1
3. ANODE 1
4. ANODE 1
5. CATHODE, COMMON
6. CATHODE, COMMON
7. CATHODE, COMMON
8. CATHODE, COMMON

STYLE 16:
PIN 1. EMITTER, DIE #1
2. BASE, DIE #1
3. EMITTER, DIE #2
4. BASE, DIE #2
5. COLLECTOR, DIE #2
6. COLLECTOR, DIE #2
7. COLLECTOR, DIE #1
8. COLLECTOR, DIE #1

STYLE 17:
PIN 1. VCC
2. V2OUT
3. V1OUT
4. TXE
5. RXE
6. VEE
7. GND
8. ACC

STYLE 18:
PIN 1. ANODE
2. ANODE
3. SOURCE
4. GATE
5. DRAIN
6. DRAIN
7. CATHODE
8. CATHODE

STYLE 19:
PIN 1. SOURCE 1
2. GATE 1
3. SOURCE 2
4. GATE 2
5. DRAIN 2
6. MIRROR 2
7. DRAIN 1
8. MIRROR 1

STYLE 20:
PIN 1. SOURCE (N)
2. GATE (N)
3. SOURCE (P)
4. GATE (P)
5. DRAIN
6. DRAIN
7. DRAIN
8. DRAIN

STYLE 21:
PIN 1. CATHODE 1
2. CATHODE 2
3. CATHODE 3
4. CATHODE 4
5. CATHODE 5
6. COMMON ANODE
7. COMMON ANODE
8. CATHODE 6

STYLE 22:
PIN 1. I/O LINE 1
2. COMMON CATHODE/VCC
3. COMMON CATHODE/VCC
4. I/O LINE 3
5. COMMON ANODE/GND
6. I/O LINE 4
7. I/O LINE 5
8. COMMON ANODE/GND

STYLE 23:
PIN 1. LINE 1 IN
2. COMMON ANODE/GND
3. COMMON ANODE/GND
4. LINE 2 IN
5. LINE 2 OUT
6. COMMON ANODE/GND
7. COMMON ANODE/GND
8. LINE 1 OUT

STYLE 24:
PIN 1. BASE
2. EMITTER
3. COLLECTOR/ANODE
4. COLLECTOR/ANODE
5. CATHODE
6. CATHODE
7. COLLECTOR/ANODE
8. COLLECTOR/ANODE

STYLE 25:
PIN 1. VIN
2. N/C
3. REXT
4. GND
5. IOUT
6. IOUT
7. IOUT
8. IOUT

STYLE 26:
PIN 1. GND
2. dv/dt
3. ENABLE
4. ILIMIT
5. SOURCE
6. SOURCE
7. SOURCE
8. VCC

STYLE 27:
PIN 1. ILIMIT
2. OVLO
3. UVLO
4. INPUT+
5. SOURCE
6. SOURCE
7. SOURCE
8. DRAIN

STYLE 28:
PIN 1. SW_TO_GND
2. DASIC_OFF
3. DASIC_SW_DET
4. GND
5. V_MON
6. VBULK
7. VBULK
8. VIN

STYLE 29:
PIN 1. BASE, DIE #1
2. EMITTER, #1
3. BASE, #2
4. EMITTER, #2
5. COLLECTOR, #2
6. COLLECTOR, #2
7. COLLECTOR, #1
8. COLLECTOR, #1

STYLE 30:
PIN 1. DRAIN 1
2. DRAIN 1
3. GATE 2
4. SOURCE 2
5. SOURCE 1/DRAIN 2
6. SOURCE 1/DRAIN 2
7. SOURCE 1/DRAIN 2
8. GATE 1

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