

# 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  $\mu$ s
- ESD Rating:  
IEC 61000-4-2 (ESD)  $\pm 15$  kV (Air)  $\pm 8$  kV (Contact)  
IEC 61000-4-4 (EFT) 40 A (5/50 ns)  
IEC 61000-4-5 (Surge) 12 A (8/20  $\mu$ s)
- 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	Symbol	Value	Unit
Peak Power Dissipation 8 x 20 $\mu$ s @ $T_A = 25^\circ\text{C}$ (Note 1)	$P_{pk}$	300	W
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$
Lead Solder Temperature – Maximum 10 Seconds Duration	$T_L$	260	$^\circ\text{C}$

1. Non-repetitive current pulse 8 x 20  $\mu$ s exponential decay waveform.

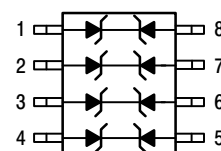


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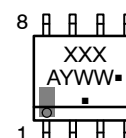
### SO-8 ESD AND SURGE PROTECTOR 300 WATTS PEAK POWER

#### PIN CONFIGURATION AND SCHEMATIC



SO-8  
CASE 751-07

#### 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 in the package dimensions section on page 3 of this data sheet.

## SMDA05C Series

### 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	$\mu$ A
Maximum Clamping Voltage @ $I_{PP} = 1.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	9.8	V
Maximum Clamping Voltage @ $I_{PP} = 5.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	11	V
Maximum Peak Pulse Current, 8 x 20 $\mu$ s	$I_{PP}$	–	–	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	$\mu$ A
Maximum Clamping Voltage @ $I_{PP} = 1.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	19	V
Maximum Clamping Voltage @ $I_{PP} = 5.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	24	V
Maximum Peak Pulse Current, 8 x 20 $\mu$ s	$I_{PP}$	–	–	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	$\mu$ A
Maximum Clamping Voltage @ $I_{PP} = 1.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	24	V
Maximum Clamping Voltage @ $I_{PP} = 5.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	30	V
Maximum Peak Pulse Current, 8 x 20 $\mu$ s	$I_{PP}$	–	–	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	$\mu$ A
Maximum Clamping Voltage @ $I_{PP} = 1.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	43	V
Maximum Clamping Voltage @ $I_{PP} = 5.0$ A, 8 x 20 $\mu$ s	$V_C$	N/A	–	55	V
Maximum Peak Pulse Current, 8 x 20 $\mu$ s	$I_{PP}$	–	–	5.0	A
Junction Capacitance @ $V_R = 0$ V, $f = 1$ MHz	$C_J$	–	–	50	pF

## SMDA05C Series

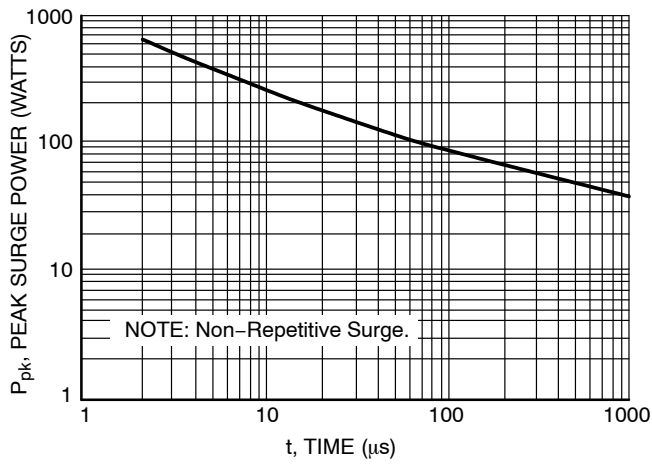


Figure 1. Pulse Width

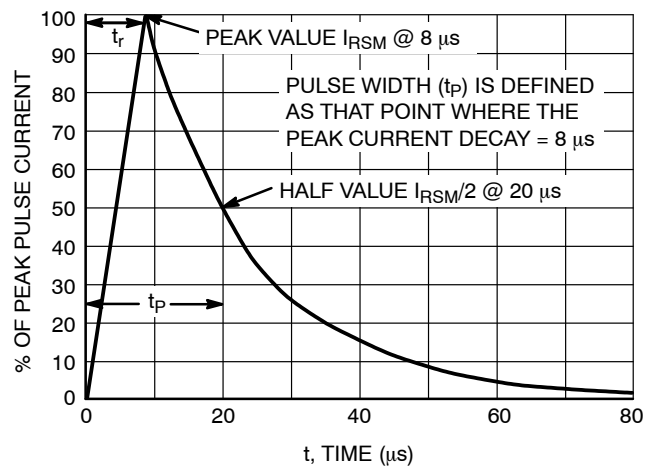


Figure 2. 8  $\times$  20  $\mu s$  Pulse Waveform

### 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.

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 1:1

SOIC-8 NB  
CASE 751-07  
ISSUE AK

DATE 16 FEB 2011



## 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.

DIM	MILLIMETERS		INCHES	
	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

## GENERIC MARKING DIAGRAM\*



SCALE 6:1 (mm/inches)



XXXXXX = 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.

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

## STYLES ON PAGE 2

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**CASE 751-07**  
**ISSUE AK**

DATE 16 FEB 2011

<b>STYLE 1:</b> PIN 1. EMITTER 2. COLLECTOR 3. COLLECTOR 4. EMITTER 5. EMITTER 6. BASE 7. BASE 8. EMITTER	<b>STYLE 2:</b> 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	<b>STYLE 3:</b> 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	<b>STYLE 4:</b> PIN 1. ANODE 2. ANODE 3. ANODE 4. ANODE 5. ANODE 6. ANODE 7. ANODE 8. COMMON CATHODE
<b>STYLE 5:</b> PIN 1. DRAIN 2. DRAIN 3. DRAIN 4. DRAIN 5. GATE 6. GATE 7. SOURCE 8. SOURCE	<b>STYLE 6:</b> PIN 1. SOURCE 2. DRAIN 3. DRAIN 4. SOURCE 5. SOURCE 6. GATE 7. GATE 8. SOURCE	<b>STYLE 7:</b> 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	<b>STYLE 8:</b> 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
<b>STYLE 9:</b> 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	<b>STYLE 10:</b> PIN 1. GROUND 2. BIAS 1 3. OUTPUT 4. GROUND 5. GROUND 6. BIAS 2 7. INPUT 8. GROUND	<b>STYLE 11:</b> 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	<b>STYLE 12:</b> PIN 1. SOURCE 2. SOURCE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. DRAIN 8. DRAIN
<b>STYLE 13:</b> PIN 1. N.C. 2. SOURCE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. DRAIN 8. DRAIN	<b>STYLE 14:</b> 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	<b>STYLE 15:</b> 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	<b>STYLE 16:</b> 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
<b>STYLE 17:</b> PIN 1. VCC 2. V2OUT 3. V1OUT 4. TXE 5. RXE 6. VEE 7. GND 8. ACC	<b>STYLE 18:</b> PIN 1. ANODE 2. ANODE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. CATHODE 8. CATHODE	<b>STYLE 19:</b> 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	<b>STYLE 20:</b> PIN 1. SOURCE (N) 2. GATE (N) 3. SOURCE (P) 4. GATE (P) 5. DRAIN 6. DRAIN 7. DRAIN 8. DRAIN
<b>STYLE 21:</b> 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	<b>STYLE 22:</b> 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	<b>STYLE 23:</b> 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	<b>STYLE 24:</b> PIN 1. BASE 2. EMITTER 3. COLLECTOR/ANODE 4. COLLECTOR/ANODE 5. CATHODE 6. CATHODE 7. COLLECTOR/ANODE 8. COLLECTOR/ANODE
<b>STYLE 25:</b> PIN 1. VIN 2. N/C 3. REXT 4. GND 5. IOUT 6. IOUT 7. IOUT 8. IOUT	<b>STYLE 26:</b> PIN 1. GND 2. dv/dt 3. ENABLE 4. ILIMIT 5. SOURCE 6. SOURCE 7. SOURCE 8. VCC	<b>STYLE 27:</b> PIN 1. ILIMIT 2. OVLO 3. UVLO 4. INPUT+ 5. SOURCE 6. SOURCE 7. SOURCE 8. DRAIN	<b>STYLE 28:</b> PIN 1. SW_TO_GND 2. DASIC_OFF 3. DASIC_SW_DET 4. GND 5. V_MON 6. VBULK 7. VBULK 8. VIN
<b>STYLE 29:</b> 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	<b>STYLE 30:</b> 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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