

ESD/Surge Protection Diode Array

Bi-directional ESD Protection for High-Speed Data Line



ON Semiconductor®

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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 μ 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 μ 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

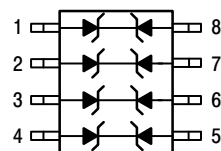
MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Peak Power Dissipation 8 x 20 μ s @ 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 |

1. Non-repetitive current pulse 8 x 20 μ s exponential decay waveform.

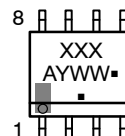
SO-8 ESD AND SURGE PROTECTOR 300 WATTS PEAK POWER

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

SMDA05C Series

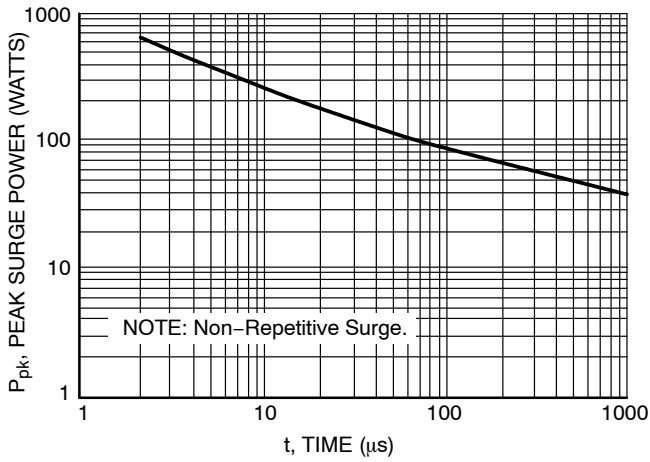


Figure 1. Pulse Width

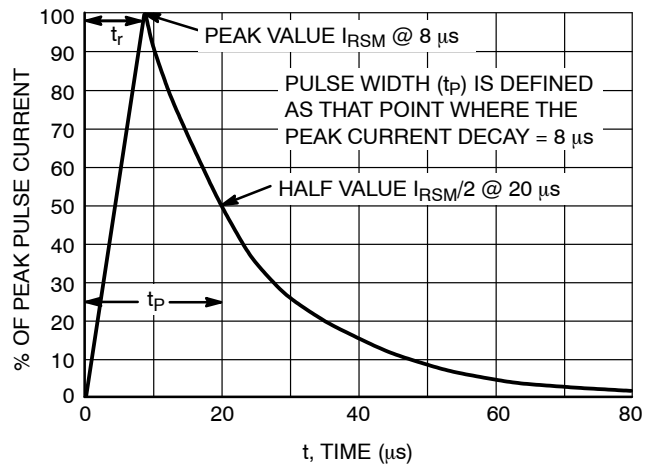


Figure 2. 8 × 20 μs Pulse Waveform

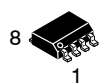
ORDERING INFORMATION

| 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.

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

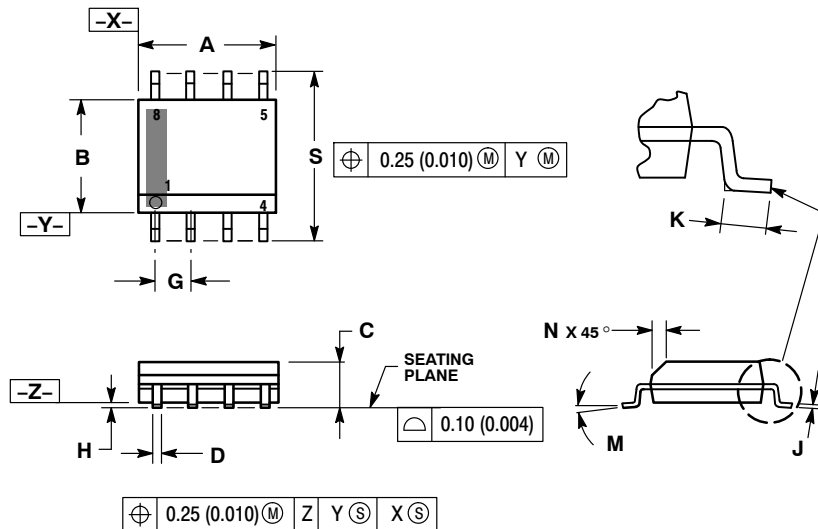
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SCALE 1:1

SOIC-8 NB
CASE 751-07
ISSUE AK

DATE 16 FEB 2011

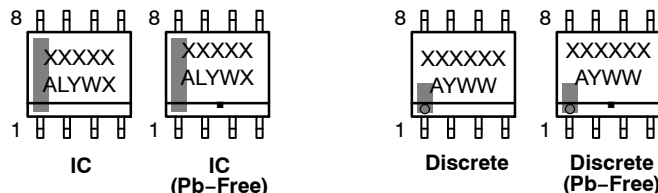
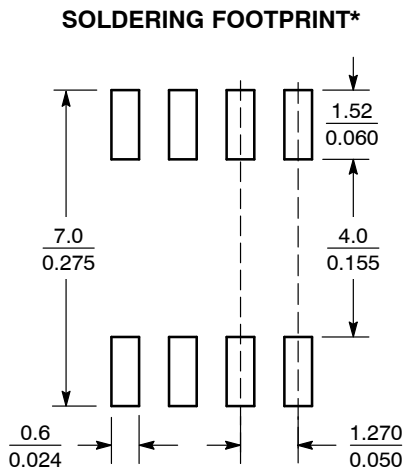


NOTES:

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*



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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SOIC-8 NB
CASE 751-07
ISSUE AK

DATE 16 FEB 2011

- | | | | |
|--|---|---|---|
| <p>STYLE 1: PIN 1. EMITTER 2. COLLECTOR 3. COLLECTOR 4. EMITTER 5. EMITTER 6. BASE 7. BASE 8. EMITTER</p> | <p>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</p> | <p>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</p> | <p>STYLE 4: PIN 1. ANODE 2. ANODE 3. ANODE 4. ANODE 5. ANODE 6. ANODE 7. ANODE 8. COMMON CATHODE</p> |
| <p>STYLE 5: PIN 1. DRAIN 2. DRAIN 3. DRAIN 4. DRAIN 5. GATE 6. GATE 7. SOURCE 8. SOURCE</p> | <p>STYLE 6: PIN 1. SOURCE 2. DRAIN 3. DRAIN 4. SOURCE 5. SOURCE 6. GATE 7. GATE 8. SOURCE</p> | <p>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</p> | <p>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</p> |
| <p>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</p> | <p>STYLE 10: PIN 1. GROUND 2. BIAS 1 3. OUTPUT 4. GROUND 5. GROUND 6. BIAS 2 7. INPUT 8. GROUND</p> | <p>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</p> | <p>STYLE 12: PIN 1. SOURCE 2. SOURCE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. DRAIN 8. DRAIN</p> |
| <p>STYLE 13: PIN 1. N.C. 2. SOURCE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. DRAIN 8. DRAIN</p> | <p>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</p> | <p>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</p> | <p>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</p> |
| <p>STYLE 17: PIN 1. VCC 2. V2OUT 3. V1OUT 4. TXE 5. RXE 6. VEE 7. GND 8. ACC</p> | <p>STYLE 18: PIN 1. ANODE 2. ANODE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. CATHODE 8. CATHODE</p> | <p>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</p> | <p>STYLE 20: PIN 1. SOURCE (N) 2. GATE (N) 3. SOURCE (P) 4. GATE (P) 5. DRAIN 6. DRAIN 7. DRAIN 8. DRAIN</p> |
| <p>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</p> | <p>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</p> | <p>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</p> | <p>STYLE 24: PIN 1. BASE 2. EMITTER 3. COLLECTOR/ANODE 4. COLLECTOR/ANODE 5. CATHODE 6. CATHODE 7. COLLECTOR/ANODE 8. COLLECTOR/ANODE</p> |
| <p>STYLE 25: PIN 1. VIN 2. N/C 3. REXT 4. GND 5. IOUT 6. IOUT 7. IOUT 8. IOUT</p> | <p>STYLE 26: PIN 1. GND 2. dv/dt 3. ENABLE 4. ILIMIT 5. SOURCE 6. SOURCE 7. SOURCE 8. VCC</p> | <p>STYLE 27: PIN 1. ILIMIT 2. OVLO 3. UVLO 4. INPUT+ 5. SOURCE 6. SOURCE 7. SOURCE 8. DRAIN</p> | <p>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</p> |
| <p>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</p> | <p>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</p> | | |

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