



November 2014

# SMCJ5V0(C)A - SMCJ170(C)A 1500 Watt Transient Voltage Suppressors

## Features

- Glass-Passivated Junction
- 1500 W Peak Pulse Power Capability on 10/1000  $\mu$ s Waveform.
- Excellent Clamping Capability
- Low-Incremental Surge Resistance
- Fast Response Time: Typically Less than 1.0 ps from 0 V to BV Minimum for Unidirectional and 5.0 ns for Bidirectional
- Typical  $I_R$  Less than 1.0  $\mu$ A Above 10 V
- UL Certificate #E258596
- UL94V-0 Flammability Classification



SMC/DO-214AB

Band denotes cathode on unidirectional devices only. No band on bi-directional devices. Bi-directional types have CA suffix where electrical characteristics apply in both directions suitable for bi-directional applications.

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol    | Parameter                                                                                          | Value      | Unit             |
|-----------|----------------------------------------------------------------------------------------------------|------------|------------------|
| $P_{PPM}$ | Peak Pulse Power Dissipation on 10/1000 $\mu$ s Waveform                                           | 1500       | W                |
| $I_{PPM}$ | Peak Pulse Current on 10/1000 $\mu$ s Waveform                                                     | See table  | A                |
| $I_{FSM}$ | Non-Repetitive Peak Forward Surge Current Superimposed on Rated Load (JEDEC Method) <sup>(1)</sup> | 200        | A                |
| $T_{STG}$ | Storage Temperature Range                                                                          | -55 to 150 | $^\circ\text{C}$ |
| $T_J$     | Operating Junction Temperature                                                                     | 150        | $^\circ\text{C}$ |

### Note:

1. Measured on 8.3 ms single half-sine wave or equivalent square wave: duty cycle = 4 pulses per minute maximum.

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Uni-Directional<br>Bi-Directional (C)<br>Device | Part<br>Marking <sup>(2)</sup> | Reverse<br>Stand-Off<br>Voltage<br>$V_{RWM}$ (V) | Breakdown<br>Voltage<br>$V_{BR}$ (V) |      | Test<br>Current<br>$I_T$ (mA) | Clamping<br>Voltage<br>at $I_{PPM}$<br>$V_C$ (V) | Peak Pulse<br>Current<br>$I_{PPM}$ (A) | Reverse<br>Leakage<br>at $V_{RWM}$<br>$I_R$ ( $\mu\text{A}$ ) <sup>(3)</sup> |
|-------------------------------------------------|--------------------------------|--------------------------------------------------|--------------------------------------|------|-------------------------------|--------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------|
|                                                 |                                |                                                  | Min.                                 | Max. |                               |                                                  |                                        |                                                                              |
| SMCJ5V0(C)A                                     | GDE                            | 5.0                                              | 6.40                                 | 7.00 | 10                            | 9.2                                              | 163.0                                  | 1000                                                                         |
| SMCJ6V0(C)A                                     | GDG                            | 6.0                                              | 6.67                                 | 7.37 | 10                            | 10.3                                             | 145.6                                  | 1000                                                                         |
| SMCJ6V5(C)A                                     | GDK                            | 6.5                                              | 7.22                                 | 7.98 | 10                            | 11.2                                             | 133.9                                  | 500                                                                          |
| SMCJ7V0(C)A                                     | GDM                            | 7.0                                              | 7.78                                 | 8.60 | 10                            | 12.0                                             | 125.0                                  | 200                                                                          |
| SMCJ7V5(C)A                                     | GDP                            | 7.5                                              | 8.33                                 | 9.21 | 1                             | 12.9                                             | 116.3                                  | 100                                                                          |
| SMCJ8V0(C)A                                     | GDR                            | 8.0                                              | 8.89                                 | 9.83 | 1                             | 13.6                                             | 110.3                                  | 50                                                                           |
| SMCJ8V5(C)A                                     | GDT                            | 8.5                                              | 9.44                                 | 10.4 | 1                             | 14.4                                             | 104.2                                  | 20                                                                           |
| SMCJ9V0(C)A                                     | GDV                            | 9.0                                              | 10.0                                 | 11.1 | 1                             | 15.4                                             | 97.4                                   | 10                                                                           |
| SMCJ10(C)A                                      | GDX                            | 10                                               | 11.1                                 | 12.3 | 1                             | 17.0                                             | 88.2                                   | 5                                                                            |
| SMCJ11(C)A                                      | GDZ                            | 11                                               | 12.2                                 | 13.5 | 1                             | 18.2                                             | 82.4                                   | 5                                                                            |
| SMCJ12(C)A                                      | GEE                            | 12                                               | 13.3                                 | 14.7 | 1                             | 19.9                                             | 75.3                                   | 5                                                                            |
| SMCJ13(C)A                                      | GEG                            | 13                                               | 14.4                                 | 15.9 | 1                             | 21.5                                             | 69.8                                   | 5                                                                            |
| SMCJ14(C)A                                      | GEK                            | 14                                               | 15.6                                 | 17.2 | 1                             | 23.2                                             | 64.7                                   | 5                                                                            |
| SMCJ15(C)A                                      | GEM                            | 15                                               | 16.7                                 | 18.5 | 1                             | 24.4                                             | 61.5                                   | 5                                                                            |
| SMCJ16(C)A                                      | GEP                            | 16                                               | 17.8                                 | 19.7 | 1                             | 26.0                                             | 57.7                                   | 5                                                                            |
| SMCJ17(C)A                                      | GER                            | 17                                               | 18.9                                 | 20.9 | 1                             | 27.6                                             | 54.3                                   | 5                                                                            |
| SMCJ18(C)A                                      | GET                            | 18                                               | 20.0                                 | 22.1 | 1                             | 29.2                                             | 51.4                                   | 5                                                                            |
| SMCJ20(C)A                                      | GEV                            | 20                                               | 22.2                                 | 24.5 | 1                             | 32.4                                             | 46.3                                   | 5                                                                            |
| SMCJ22(C)A                                      | GEX                            | 22                                               | 24.4                                 | 26.9 | 1                             | 35.5                                             | 42.3                                   | 5                                                                            |
| SMCJ24(C)A                                      | GEZ                            | 24                                               | 26.7                                 | 29.5 | 1                             | 38.9                                             | 38.6                                   | 5                                                                            |
| SMCJ26(C)A                                      | GFE                            | 26                                               | 28.9                                 | 31.9 | 1                             | 42.1                                             | 35.6                                   | 5                                                                            |
| SMCJ28(C)A                                      | GFG                            | 28                                               | 31.1                                 | 34.4 | 1                             | 45.4                                             | 33.0                                   | 5                                                                            |
| SMCJ30(C)A                                      | GFK                            | 30                                               | 33.3                                 | 36.8 | 1                             | 48.4                                             | 31.0                                   | 5                                                                            |
| SMCJ33(C)A                                      | GFM                            | 33                                               | 36.7                                 | 40.6 | 1                             | 53.3                                             | 28.1                                   | 5                                                                            |
| SMCJ36(C)A                                      | GFP                            | 36                                               | 40.0                                 | 44.2 | 1                             | 58.1                                             | 25.8                                   | 5                                                                            |
| SMCJ40(C)A                                      | GFR                            | 40                                               | 44.4                                 | 49.1 | 1                             | 64.5                                             | 23.3                                   | 5                                                                            |
| SMCJ43(C)A                                      | GFT                            | 43                                               | 47.8                                 | 52.8 | 1                             | 69.4                                             | 21.6                                   | 5                                                                            |
| SMCJ45(C)A                                      | GFV                            | 45                                               | 50.0                                 | 55.3 | 1                             | 72.7                                             | 20.6                                   | 5                                                                            |
| SMCJ48(C)A                                      | GFX                            | 48                                               | 53.3                                 | 58.9 | 1                             | 77.4                                             | 19.4                                   | 5                                                                            |
| SMCJ51(C)A                                      | GFZ                            | 51                                               | 56.7                                 | 62.7 | 1                             | 82.4                                             | 18.2                                   | 5                                                                            |
| SMCJ54(C)A                                      | GGE                            | 54                                               | 60.0                                 | 66.3 | 1                             | 87.1                                             | 17.2                                   | 5                                                                            |
| SMCJ58(C)A                                      | GGG                            | 58                                               | 64.4                                 | 71.2 | 1                             | 93.6                                             | 16.0                                   | 5                                                                            |
| SMCJ60(C)A                                      | GGK                            | 60                                               | 66.7                                 | 73.7 | 1                             | 96.8                                             | 15.5                                   | 5                                                                            |
| SMCJ64(C)A                                      | GGM                            | 64                                               | 71.1                                 | 78.6 | 1                             | 103.0                                            | 14.6                                   | 5                                                                            |
| SMCJ70(C)A                                      | GGP                            | 70                                               | 77.8                                 | 86.0 | 1                             | 113.0                                            | 13.3                                   | 5                                                                            |
| SMCJ75(C)A                                      | GGR                            | 75                                               | 83.3                                 | 92.1 | 1                             | 121.0                                            | 12.4                                   | 5                                                                            |
| SMCJ78(C)A                                      | GGT                            | 78                                               | 86.7                                 | 95.8 | 1                             | 126.0                                            | 11.9                                   | 5                                                                            |

### Notes:

2. Color band denotes cathode on unidirectional devices only. No color band on bidirectional devices.
3. For bidirectional parts with  $V_{RWM} < 10\text{ V}$ , the  $I_R$  max limit is doubled.

**Electrical Characteristics** (Continued)Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Uni-Directional<br>Bi-Directional (C)<br>Device | Part<br>Marking <sup>(2)</sup> | Reverse<br>Stand-Off<br>Voltage<br>$V_{RWM}$ (V) | Breakdown<br>Voltage<br>$V_{BR}$ (V) |       | Test<br>Current<br>$I_T$ (mA) | Clamping<br>Voltage<br>at $I_{PPM}$<br>$V_C$ (V) | Peak Pulse<br>Current<br>$I_{PPM}$ (A) | Reverse<br>Leakage<br>at $V_{RWM}$<br>$I_R$ ( $\mu\text{A}$ ) <sup>(3)</sup> |
|-------------------------------------------------|--------------------------------|--------------------------------------------------|--------------------------------------|-------|-------------------------------|--------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------|
|                                                 |                                |                                                  | Min.                                 | Max.  |                               |                                                  |                                        |                                                                              |
| SMCJ85(C)A                                      | GGV                            | 85                                               | 94.4                                 | 104.0 | 1                             | 137.0                                            | 10.9                                   | 5                                                                            |
| SMCJ90(C)A                                      | GGX                            | 90                                               | 100.0                                | 111.0 | 1                             | 146.0                                            | 10.3                                   | 5                                                                            |
| SMCJ100(C)A                                     | GGZ                            | 100                                              | 111.0                                | 123.0 | 1                             | 162.0                                            | 9.3                                    | 5                                                                            |
| SMCJ110(C)A                                     | GHE                            | 110                                              | 122.0                                | 135.0 | 1                             | 177.0                                            | 8.5                                    | 5                                                                            |
| SMCJ120(C)A                                     | GHG                            | 120                                              | 133.0                                | 147.0 | 1                             | 193.0                                            | 7.8                                    | 5                                                                            |
| SMCJ130(C)A                                     | GHK                            | 130                                              | 144.0                                | 159.0 | 1                             | 209.0                                            | 7.2                                    | 5                                                                            |
| SMCJ150(C)A                                     | GHM                            | 150                                              | 167.0                                | 185.0 | 1                             | 243.0                                            | 6.2                                    | 5                                                                            |
| SMCJ160(C)A                                     | GHP                            | 160                                              | 178.0                                | 197.0 | 1                             | 259.0                                            | 5.8                                    | 5                                                                            |
| SMCJ170(C)A                                     | GHR                            | 170                                              | 189.0                                | 209.0 | 1                             | 275.0                                            | 5.5                                    | 5                                                                            |

**Notes:**

2. Color band denotes cathode on unidirectional devices only. No color band on bidirectional devices.
3. For bidirectional parts with  $V_{RWM} < 10$  V, the  $I_R$  max limit is doubled.

## Typical Performance Characteristics



Figure 1. Peak Pulse Power Rating Curve



Figure 2. Pulse Derating Curve



Figure 3. Pulse Waveform

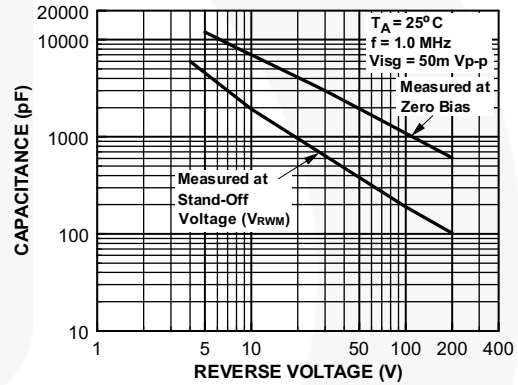
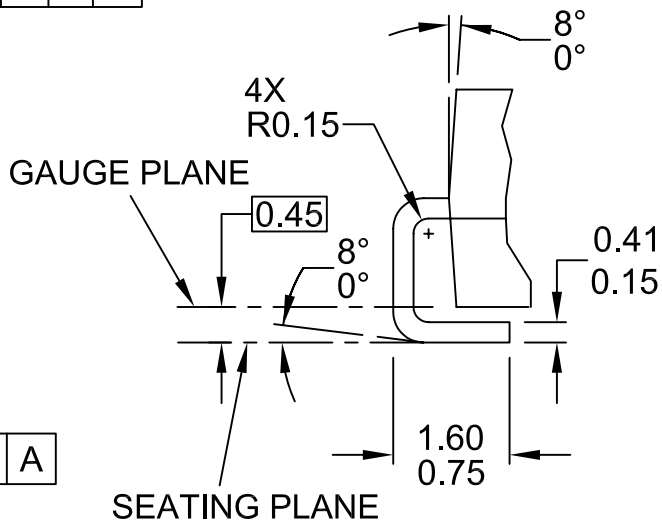
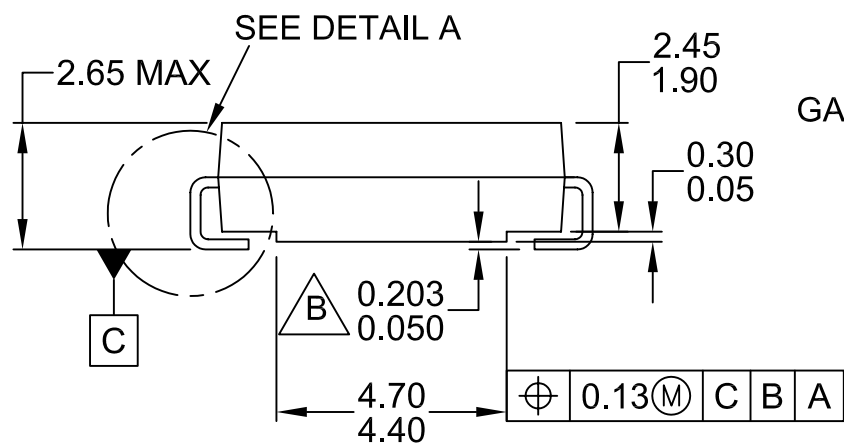
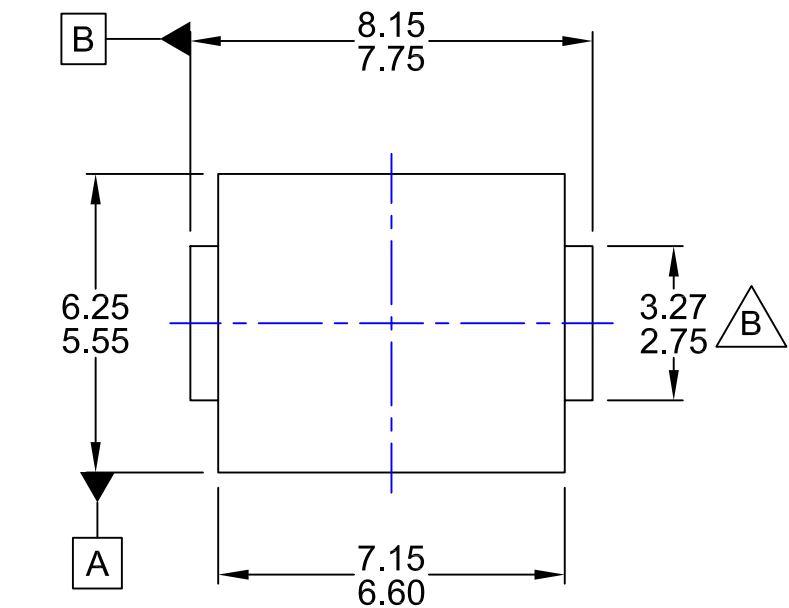


Figure 4. Junction Capacitance



Figure 5. Non-Repetitive Surge Current

| REVISIONS |                             |           |             |
|-----------|-----------------------------|-----------|-------------|
| LTR       | DESCRIPTION                 | DATE      | DRAWN/SITE  |
| 1         | RELEASE TO DOCUMENT CONTROL | 29 APR 08 | SD LEE/FSSZ |



#### NOTES:

A. EXCEPT WHERE NOTED CONFORMS TO JEDEC DO-214, VARIATION AB.

B. DOES NOT COMPLY TO JEDEC STD. VALUE.

C. ALL DIMENSIONS ARE IN MILLIMETERS.

D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR PROTRUSIONS.

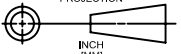
E. DIMENSIONS AND TOLERANCING AS PER ASME Y14.5M-1994

F. LAND PATTERN STANDARD: DIOM7957X241M

G. DRAWING FILE NAME: DO214ABREV1

#### DETAIL A

SCALE: 2:1

|                                                                                      |  |               |                                                                                                   |                |
|--------------------------------------------------------------------------------------|--|---------------|---------------------------------------------------------------------------------------------------|----------------|
| APPROVALS                                                                            |  | DATE          | <b>FAIRCHILD</b><br><b>SEMICONDUCTOR™</b><br><b>2LD, SMC, JEDEC</b><br><b>DO-214 VARIATION AB</b> |                |
| DRAWN:                                                                               |  | BOBOY MALDO   |                                                                                                   |                |
| CHECKED:                                                                             |  | SANGDO LEE    |                                                                                                   |                |
| APPROVED:                                                                            |  | LITO GALERA   |                                                                                                   |                |
| HOWARD ALLEN                                                                         |  |               |                                                                                                   |                |
|  |  | SCALE         | SIZE                                                                                              | DRAWING NUMBER |
|                                                                                      |  | 1:1           | NA                                                                                                | MKT-DO214AB    |
|                                                                                      |  | FORMERLY: N/A |                                                                                                   | SHEET: 1 OF 1  |



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| Awinda®                                                                           | FRFET®                                         |  | TinyBoost®                                                                          |
| AX-CAP®*                                                                          | Global Power Resource™                         | PowerTrench®                                                                      | TinyBuck®                                                                           |
| BitSiC™                                                                           | GreenBridge™                                   | PowerXS™                                                                          | TinyCalc™                                                                           |
| Build it Now™                                                                     | Green FPS™                                     | Programmable Active Droop™                                                        | TinyLogic®                                                                          |
| CorePLUS™                                                                         | Green FPS™ e-Series™                           | QFET®                                                                             | TINYOPTO™                                                                           |
| CorePOWER™                                                                        | Gmax™                                          | QS™                                                                               | TinyPower™                                                                          |
| CROSSVOLT™                                                                        | GTO™                                           | Quiet Series™                                                                     | TinyPWM™                                                                            |
| CTL™                                                                              | IntelliMAX™                                    | RapidConfigure™                                                                   | TinyWire™                                                                           |
| Current Transfer Logic™                                                           | ISOPLANAR™                                     |  | TranSiC™                                                                            |
| DEUXPEED®                                                                         | Making Small Speakers Sound Louder and Better™ | Saving our world, 1mW/W/kW at a time™                                             | TriFault Detect™                                                                    |
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| Fairchild Semiconductor®                                                          | MotionMax™                                     | SuperFET®                                                                         | VCX™                                                                                |
| FACT Quiet Series™                                                                | MotionGrid®                                    | SuperSOT™-3                                                                       | VisualMax™                                                                          |
| FACT®                                                                             | MTi®                                           | SuperSOT™-6                                                                       | VoltagePlus™                                                                        |
| FAST®                                                                             | MTx®                                           | SuperSOT™-8                                                                       | XS™                                                                                 |
| FastvCore™                                                                        | MVN®                                           | SupreMOS®                                                                         | Xsens™                                                                              |
| FETBench™                                                                         | mWSaver®                                       | SyncFET™                                                                          | 仙童™                                                                                 |
| FPS™                                                                              | OptoHit™                                       | Sync-Lock™                                                                        |                                                                                     |
|                                                                                   | OPTOLOGIC®                                     |                                                                                   |                                                                                     |

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|--------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| Preliminary              | First Production      | Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design. |
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Rev. I72

# AMEYA360

Components Supply Platform

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