



November 2014

# SMBJ5V0(C)A - SMBJ170(C)A

## 600 Watt Transient Voltage Suppressors

### Features

- Glass-Passivated Junction
- 600 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



SMB/DO-214AA

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                                           | 600        | 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> | 100        | A                |
| $T_{STG}$ | Storage Temperature Range                                                                          | -55 to 150 | $^\circ\text{C}$ |
| $T_J$     | Operating Junction Temperature Range                                                               | -55 to 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. |                               |                                                  |                                        |                                                                              |
| SMBJ5V0(C)A                                     | KE                             | 5.0                                              | 6.40                                 | 7.00 | 10                            | 9.2                                              | 65.2                                   | 800                                                                          |
| SMBJ6V0(C)A                                     | KG                             | 6.0                                              | 6.67                                 | 7.37 | 10                            | 10.3                                             | 58.3                                   | 800                                                                          |
| SMBJ6V5(C)A                                     | KK                             | 6.5                                              | 7.22                                 | 7.98 | 10                            | 11.2                                             | 53.6                                   | 500                                                                          |
| SMBJ7V0(C)A                                     | KM                             | 7.0                                              | 7.78                                 | 8.60 | 10                            | 12.0                                             | 50.0                                   | 200                                                                          |
| SMBJ7V5(C)A                                     | KP                             | 7.5                                              | 8.33                                 | 9.21 | 1                             | 12.9                                             | 46.5                                   | 100                                                                          |
| SMBJ8V0(C)A                                     | KR                             | 8.0                                              | 8.89                                 | 9.83 | 1                             | 13.6                                             | 44.1                                   | 50                                                                           |
| SMBJ8V5(C)A                                     | KT                             | 8.5                                              | 9.44                                 | 10.4 | 1                             | 14.4                                             | 41.7                                   | 20                                                                           |
| SMBJ9V0(C)A                                     | KV                             | 9.0                                              | 10.0                                 | 11.1 | 1                             | 15.4                                             | 39.0                                   | 10                                                                           |
| SMBJ10(C)A                                      | KX                             | 10                                               | 11.1                                 | 12.8 | 1                             | 17.0                                             | 35.3                                   | 5                                                                            |
| SMBJ11(C)A                                      | KZ                             | 11                                               | 12.2                                 | 13.5 | 1                             | 18.2                                             | 33.0                                   | 5                                                                            |
| SMBJ12(C)A                                      | LE                             | 12                                               | 13.3                                 | 14.7 | 1                             | 19.9                                             | 30.2                                   | 5                                                                            |
| SMBJ13(C)A                                      | LG                             | 13                                               | 14.4                                 | 15.9 | 1                             | 21.5                                             | 27.9                                   | 5                                                                            |
| SMBJ14(C)A                                      | LK                             | 14                                               | 15.6                                 | 17.2 | 1                             | 23.2                                             | 25.9                                   | 5                                                                            |
| SMBJ15(C)A                                      | LM                             | 15                                               | 16.7                                 | 18.5 | 1                             | 24.4                                             | 24.6                                   | 5                                                                            |
| SMBJ16(C)A                                      | LP                             | 16                                               | 17.8                                 | 19.7 | 1                             | 26.0                                             | 23.1                                   | 5                                                                            |
| SMBJ17(C)A                                      | LR                             | 17                                               | 18.9                                 | 20.9 | 1                             | 27.6                                             | 21.7                                   | 5                                                                            |
| SMBJ18(C)A                                      | LT                             | 18                                               | 20.0                                 | 22.1 | 1                             | 29.2                                             | 20.5                                   | 5                                                                            |
| SMBJ20(C)A                                      | LV                             | 20                                               | 22.2                                 | 24.5 | 1                             | 32.4                                             | 18.5                                   | 5                                                                            |
| SMBJ22(C)A                                      | LX                             | 22                                               | 24.4                                 | 26.9 | 1                             | 35.5                                             | 16.9                                   | 5                                                                            |
| SMBJ24(C)A                                      | LZ                             | 24                                               | 26.7                                 | 29.5 | 1                             | 38.9                                             | 15.4                                   | 5                                                                            |
| SMBJ26(C)A                                      | ME                             | 26                                               | 28.9                                 | 31.9 | 1                             | 42.1                                             | 14.3                                   | 5                                                                            |
| SMBJ28(C)A                                      | MG                             | 28                                               | 31.1                                 | 34.4 | 1                             | 45.4                                             | 13.2                                   | 5                                                                            |
| SMBJ30(C)A                                      | MK                             | 30                                               | 33.3                                 | 36.8 | 1                             | 48.4                                             | 12.4                                   | 5                                                                            |
| SMBJ33(C)A                                      | MM                             | 33                                               | 36.7                                 | 40.6 | 1                             | 53.3                                             | 11.3                                   | 5                                                                            |
| SMBJ36(C)A                                      | MP                             | 36                                               | 40.0                                 | 44.2 | 1                             | 58.1                                             | 10.3                                   | 5                                                                            |
| SMBJ40(C)A                                      | MR                             | 40                                               | 44.4                                 | 49.1 | 1                             | 64.5                                             | 9.3                                    | 5                                                                            |
| SMBJ43(C)A                                      | MT                             | 43                                               | 47.8                                 | 52.8 | 1                             | 69.4                                             | 8.6                                    | 5                                                                            |
| SMBJ45(C)A                                      | MV                             | 45                                               | 50.0                                 | 55.3 | 1                             | 72.7                                             | 8.3                                    | 5                                                                            |
| SMBJ48(C)A                                      | MX                             | 48                                               | 53.3                                 | 58.9 | 1                             | 77.4                                             | 7.8                                    | 5                                                                            |
| SMBJ51(C)A                                      | MZ                             | 51                                               | 56.7                                 | 62.7 | 1                             | 82.4                                             | 7.3                                    | 5                                                                            |
| SMBJ54(C)A                                      | NE                             | 54                                               | 60.0                                 | 66.3 | 1                             | 87.1                                             | 6.9                                    | 5                                                                            |
| SMBJ58(C)A                                      | NG                             | 58                                               | 64.4                                 | 71.2 | 1                             | 93.6                                             | 6.4                                    | 5                                                                            |
| SMBJ60(C)A                                      | NK                             | 60                                               | 66.7                                 | 73.7 | 1                             | 96.8                                             | 6.2                                    | 5                                                                            |
| SMBJ64(C)A                                      | NM                             | 64                                               | 71.1                                 | 78.6 | 1                             | 103.0                                            | 5.8                                    | 5                                                                            |
| SMBJ70(C)A                                      | NP                             | 70                                               | 77.8                                 | 86.0 | 1                             | 113.0                                            | 5.3                                    | 5                                                                            |
| SMBJ75(C)A                                      | NR                             | 75                                               | 83.3                                 | 92.1 | 1                             | 121.0                                            | 5.0                                    | 5                                                                            |
| SMBJ78(C)A                                      | NT                             | 78                                               | 86.7                                 | 95.8 | 1                             | 126.0                                            | 4.8                                    | 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.  |                               |                                                  |                                        |                                                                              |
| SMBJ85(C)A                                      | NV                             | 85                                               | 94.4                                 | 104.0 | 1                             | 137.0                                            | 4.4                                    | 5                                                                            |
| SMBJ90(C)A                                      | NX                             | 90                                               | 100.0                                | 111.0 | 1                             | 146.0                                            | 4.1                                    | 5                                                                            |
| SMBJ100(C)A                                     | NZ                             | 100                                              | 111.0                                | 123.0 | 1                             | 162.0                                            | 3.7                                    | 5                                                                            |
| SMBJ110(C)A                                     | PE                             | 110                                              | 122.0                                | 135.0 | 1                             | 177.0                                            | 3.4                                    | 5                                                                            |
| SMBJ120(C)A                                     | PG                             | 120                                              | 133.0                                | 147.0 | 1                             | 193.0                                            | 3.1                                    | 5                                                                            |
| SMBJ130(C)A                                     | PK                             | 130                                              | 144.0                                | 159.0 | 1                             | 209.0                                            | 2.9                                    | 5                                                                            |
| SMBJ150(C)A                                     | PM                             | 150                                              | 167.0                                | 185.0 | 1                             | 243.0                                            | 2.5                                    | 5                                                                            |
| SMBJ160(C)A                                     | PP                             | 160                                              | 178.0                                | 197.0 | 1                             | 259.0                                            | 2.3                                    | 5                                                                            |
| SMBJ170(C)A                                     | PR                             | 170                                              | 189.0                                | 209.0 | 1                             | 275.0                                            | 2.2                                    | 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



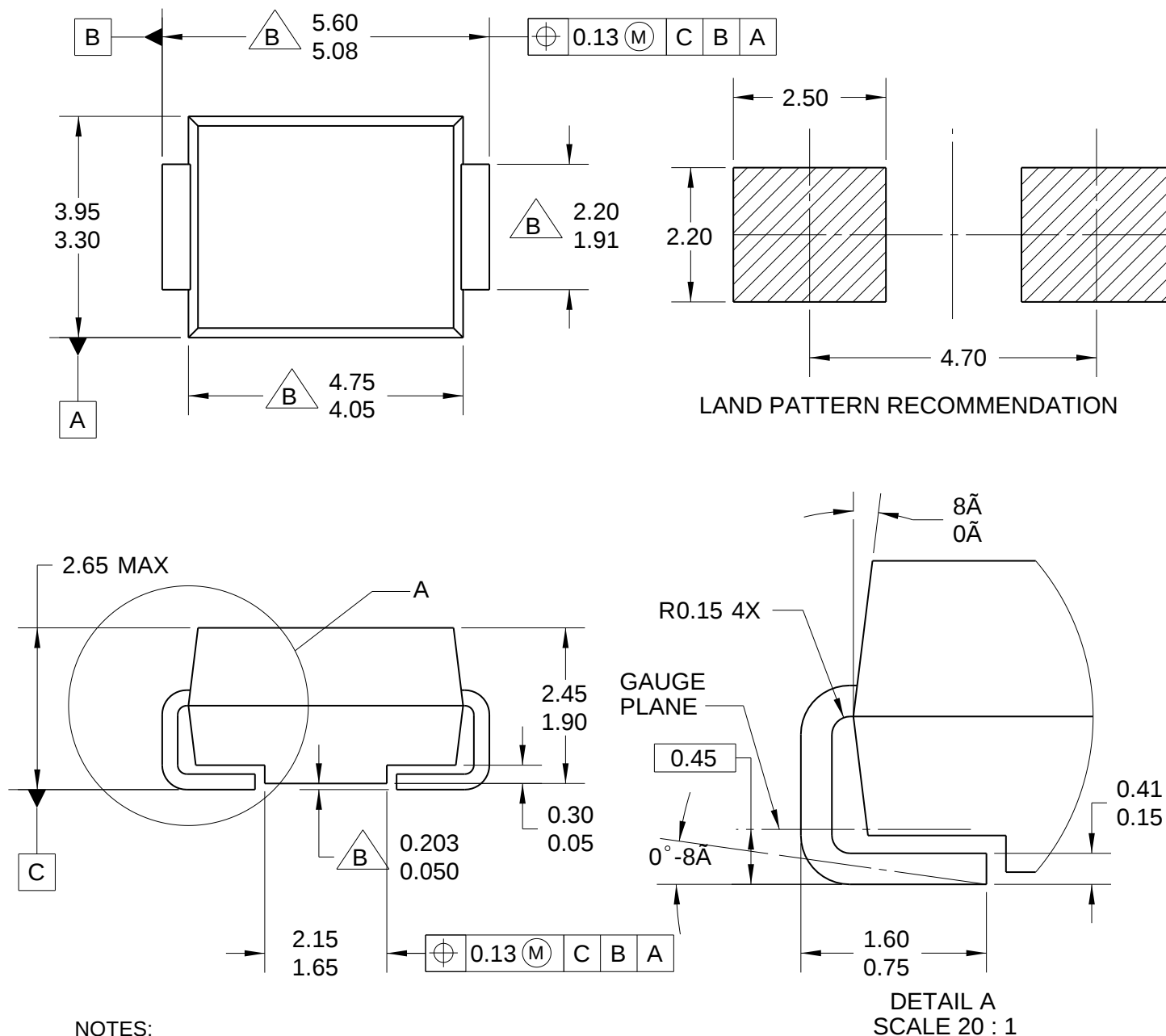
Figure 4. Junction Capacitance



Figure 5. Non-Repetitive Surge Current

# REVISIONS

| NBR | DESCRIPTION     | DATE      | BY/APP'D     |
|-----|-----------------|-----------|--------------|
| 1   | RELEASED TO DCC | 19MAY2008 | SDLEE / FSSZ |



## NOTES:

- EXCEPT WHERE NOTED CONFORMS TO JEDEC DO214 VARIATION AA.
- DOES NOT COMPLY JEDEC STD. VALUE.
- ALL DIMENSIONS ARE IN MILLIMETERS.
- DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- LAND PATTERN STD. DIOM5336X240M.
- DRAWING FILE NAME: DO214AAREV1

| APPROVALS      |              | DATE          |             |
|----------------|--------------|---------------|-------------|
| DRAWN:         | BOBOY MALDO  | 19MAY2008     |             |
| CHECKED:       | SD LEE       |               |             |
| APPROVED:      | FRED REN     |               |             |
| APPROVED:      | HOWARD ALLEN |               |             |
| PROJECTION     |              | [MM] INCH     |             |
| SCALE          |              | 1:1           | N/A         |
| SIZE           |              | N/A           | MKT-DO214AA |
| DRAWING NUMBER |              | 1             | 1           |
| FORMERLY: N/A  |              | SHEET: 1 OF 1 |             |

**FAIRCHILD**  
SEMICONDUCTOR™

2LD, SMB, JEDEC  
DO214 VARIATION AA



## TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

|                                                                                   |                                                |                                                                                   |                                                                                     |
|-----------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| AccuPower™                                                                        | F-PFS™                                         | OPTOPLANAR®                                                                       | SYSTEM GENERAL®*                                                                    |
| 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™                                                                    |
| Dual Cool™                                                                        | MegaBuck™                                      | SignalWise™                                                                       | TRUECURRENT®*                                                                       |
| EcoSPARK®                                                                         | MICROCOUPLER™                                  | SmartMax™                                                                         | μSerDes™                                                                            |
| EfficientMax™                                                                     | MicroFET™                                      | SMART START™                                                                      |  |
| ESBC™                                                                             | MicroPak™                                      | Solutions for Your Success™                                                       | UHC®                                                                                |
|  | MicroPak2™                                     | SPM®                                                                              | Ultra FRFET™                                                                        |
| Fairchild®                                                                        | MillerDrive™                                   | STEALTH™                                                                          | UniFET™                                                                             |
| 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®                                     |                                                                                   |                                                                                     |

\* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT [HTTP://WWW.FAIRCHILDSEMI.COM](http://www.fairchildsemi.com). FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.fairchildsemi.com](http://www.fairchildsemi.com), under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

| Datasheet Identification | Product Status        | Definition                                                                                                                                                                                          |
|--------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advance Information      | Formative / In Design | Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.                                                                       |
| 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. |
| No Identification Needed | Full Production       | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.                                               |
| Obsolete                 | Not In Production     | Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.                                                    |

Rev. I72

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Fairchild Semiconductor:](#)

[SMBJ110CA](#)