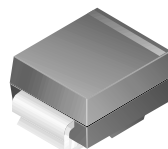




## SMBJ5.0(C)A - SMBJ170(C)A

### Features

- Glass passivated junction.
- 600W 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 volts to BV for unidirectional and 5.0 ns for bidirectional.
- Typical  $I_R$  less than 1.0  $\mu$ A above 10V.



**SMB/DO-214AA**

COLOR BAND DENOTES CATHODE  
ON UNIDIRECTIONAL DEVICES ONLY.  
NO COLOR BAND ON BIDIRECTIONAL  
DEVICES.

### DEVICES FOR BIPOLAR APPLICATIONS

- Bidirectional types use CA suffix.
- Electrical Characteristics apply in both directions.

## 600 Watt Transient Voltage Suppressors

### Absolute Maximum Ratings\*

$T_A = 25^\circ\text{C}$  unless otherwise noted

| Symbol    | Parameter                                                                                       | Value       | Units            |
|-----------|-------------------------------------------------------------------------------------------------|-------------|------------------|
| $P_{PPM}$ | Peak Pulse Power Dissipation on 10/1000 $\mu$ s waveform                                        | minimum 600 | W                |
| $I_{PPM}$ | Peak Pulse Current on 10/1000 $\mu$ s waveform                                                  | see table   | A                |
| $I_{FSM}$ | Non-repetitive Peak Forward Surge Current<br>superimposed on rated load (JEDEC method) (Note 1) | 100         | A                |
| $T_{stg}$ | Storage Temperature Range                                                                       | -55 to +150 | $^\circ\text{C}$ |
| $T_J$     | Operating Junction Temperature                                                                  | -55 to +150 | $^\circ\text{C}$ |

\*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

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

SMBJ5.0(C)A - SMBJ170(C)A

# Transient Voltage Supressors

(continued)

## Electrical Characteristics

T<sub>A</sub> = 25°C unless otherwise noted

| Uni-directional<br>Bi-directional (C)<br>Device | Part<br>Marking* | Reverse<br>Stand-off Voltage<br>V <sub>RWM</sub> (V) | Breakdown Voltage<br>V <sub>BR</sub> (V) |       | Test<br>Current<br>I <sub>T</sub> (mA) | Max Clamping<br>Voltage @1PPM<br>V <sub>C</sub> (V) | Max Peak Pulse<br>Surge Current<br>I <sub>PPM</sub> (A) | Max Reverse<br>Leakage V <sub>RWM</sub><br>I <sub>R</sub> (uA)** |
|-------------------------------------------------|------------------|------------------------------------------------------|------------------------------------------|-------|----------------------------------------|-----------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------|
| SMBJ5.0(C)A                                     | KE               | 5.0                                                  | 6.40                                     | 7.0   | 10                                     | 9.2                                                 | 65.2                                                    | 800                                                              |
| SMBJ6.0(C)A                                     | KG               | 6.0                                                  | 6.67                                     | 7.37  | 10                                     | 10.3                                                | 58.3                                                    | 800                                                              |
| SMBJ6.5(C)A                                     | KK(AK)           | 6.5                                                  | 7.22                                     | 7.98  | 10                                     | 11.2                                                | 53.6                                                    | 500                                                              |
| SMBJ7.0(C)A                                     | KM               | 7.0                                                  | 7.78                                     | 8.60  | 10                                     | 12.0                                                | 50.0                                                    | 200                                                              |
| SMBJ7.5(C)A                                     | KP(AP)           | 7.5                                                  | 8.33                                     | 9.21  | 1                                      | 12.9                                                | 46.5                                                    | 100                                                              |
| SMBJ8.0(C)A                                     | KR(AR)           | 8.0                                                  | 8.89                                     | 9.83  | 1                                      | 13.6                                                | 44.1                                                    | 50                                                               |
| SMBJ8.5(C)A                                     | KT(AT)           | 8.5                                                  | 9.44                                     | 10.4  | 1                                      | 14.4                                                | 41.7                                                    | 20                                                               |
| SMBJ9.0(C)A                                     | KV(AV)           | 9.0                                                  | 10.0                                     | 11.1  | 1                                      | 15.4                                                | 39.0                                                    | 10                                                               |
| SMBJ10(C)A                                      | KX(AX)           | 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(BE)           | 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(BK)           | 14                                                   | 15.6                                     | 17.2  | 1                                      | 23.2                                                | 25.9                                                    | 5                                                                |
| SMBJ15(C)A                                      | LM(BM)           | 15                                                   | 16.7                                     | 18.5  | 1                                      | 24.4                                                | 24.6                                                    | 5                                                                |
| SMBJ16(C)A                                      | LP(LM)           | 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(BT)           | 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(BX)           | 22                                                   | 24.4                                     | 26.9  | 1                                      | 35.5                                                | 16.9                                                    | 5                                                                |
| SMBJ24(C)A                                      | LZ(BZ)           | 24                                                   | 26.7                                     | 29.5  | 1                                      | 38.9                                                | 15.4                                                    | 5                                                                |
| SMBJ26(C)A                                      | ME(CE)           | 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(CK)           | 30                                                   | 33.3                                     | 36.8  | 1                                      | 48.4                                                | 12.4                                                    | 5                                                                |
| SMBJ33(C)A                                      | MM(CM)           | 33                                                   | 36.7                                     | 40.6  | 1                                      | 53.3                                                | 11.3                                                    | 5                                                                |
| SMBJ36(C)A                                      | MP(CP)           | 36                                                   | 40.0                                     | 44.2  | 1                                      | 58.1                                                | 10.3                                                    | 5                                                                |
| SMBJ40(C)A                                      | MR(CR)           | 40                                                   | 44.4                                     | 49.1  | 1                                      | 64.5                                                | 9.3                                                     | 5                                                                |
| SMBJ43(C)A                                      | MT(CT)           | 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                                                                |
| 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                                                                |

\* Color band denotes cathode on unidirectional devices only. No color band on bidirectional devices.

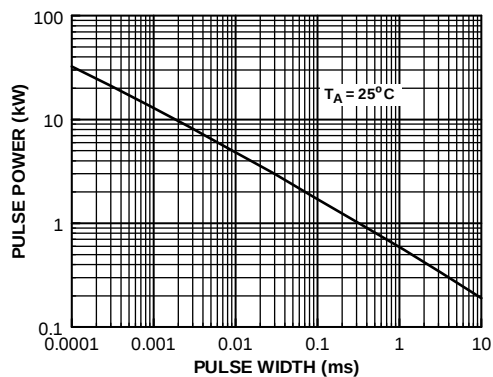
\*\* For bidirectional parts with V<sub>RWM</sub> < 10V, the I<sub>R</sub> max limit is doubled.

# Transient Voltage Suppressors

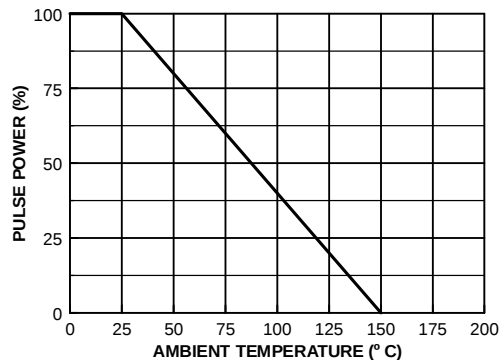
(continued)

## Typical Characteristics

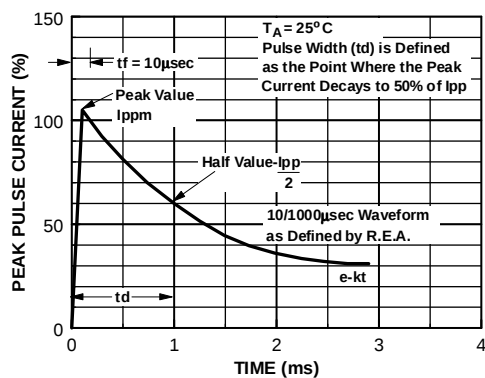
Peak Pulse Power Rating Curve



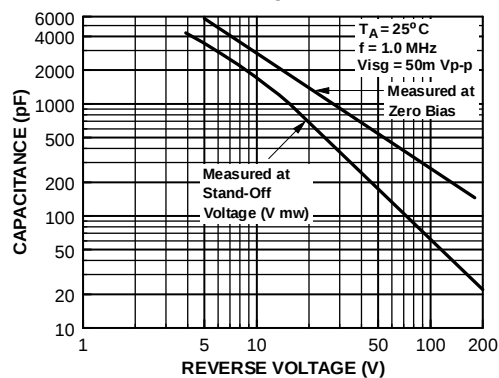
Pulse Derating Curve



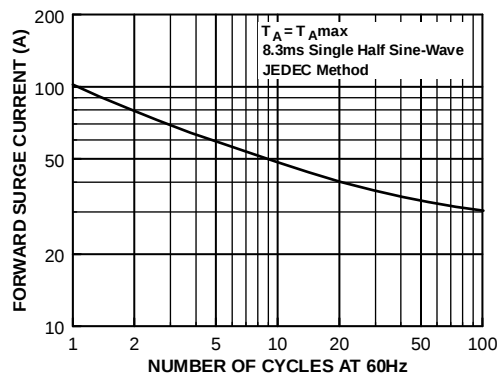
Pulse Waveform



Junction Capacitance



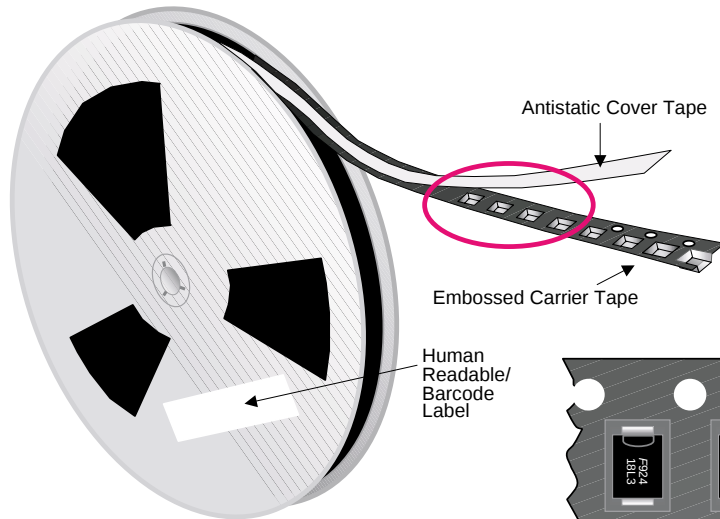
Non-Repetitive Surge Current



## DO-214AA(SMB) Tape and Reel Data

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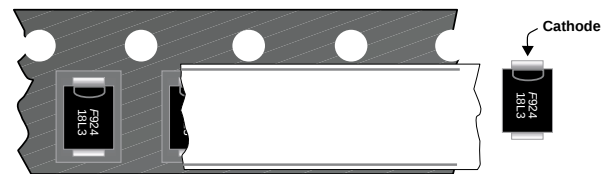
### DO-214AA(SMB) Packaging Configuration: Figure 1.0



#### Packaging Description:

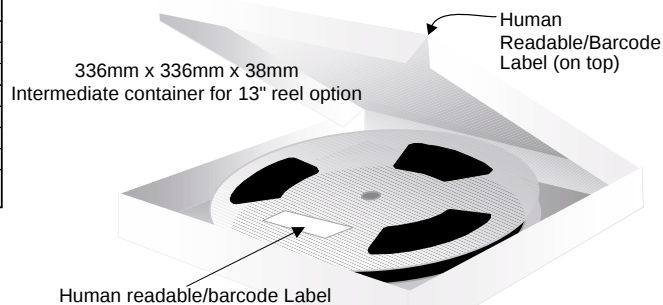
DO-214AA(SMB) parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. Alternate carrier tape is made of anti-static plastic. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 7,500 units per 13" or 330cm diameter reel. The reel comes in plastic or carton which is made of polystyrene plastic (anti-static coated) and thick white paper respectively. Further information is described in the Packaging Information table.

These full reels are individually labeled and placed inside a bleach box (illustrated in figure 1.0) made of recyclable carton paper with a Fairchild logo printing. One box contains two reels maximum. Certain number of these boxes are placed inside shipping box which comes in different sizes depending on the number of parts shipped.



#### DO-214AA(SMB) unit orientation

| DO-214AA(SMB) Packaging Information |                       |                       |
|-------------------------------------|-----------------------|-----------------------|
| Packaging Option                    | Under package code P5 | Under package code MA |
| Packaging type                      | TNR                   | TNR                   |
| Qty per Reel/Tube/Bag               | 3,000                 | 3,000                 |
| Reel Size (inch diameter)           | 13                    | 13                    |
| Box Dimension (mm)                  | 336x336x38            | 336x336x38            |
| Max qty per Box                     | 6,000                 | 6,000                 |
| Weight per unit (gm)                | 0.093                 | 0.093                 |
| Weight per Reel (kg)                | 0.705                 | 0.705                 |
| Note/Comments                       | Human readable label  | Barcode label         |



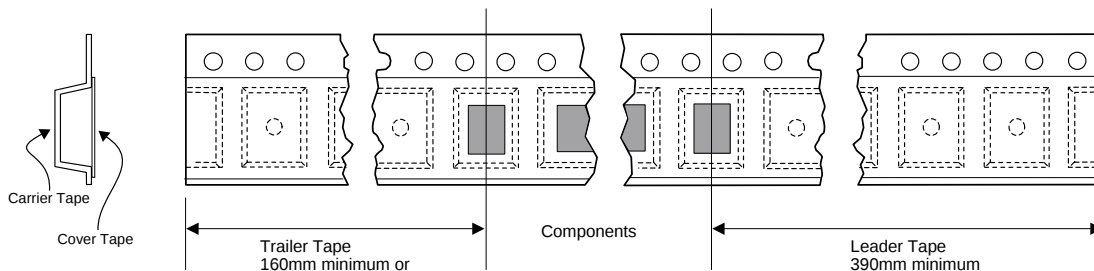
#### Human Readable Label sample



#### F63TNR Label sample

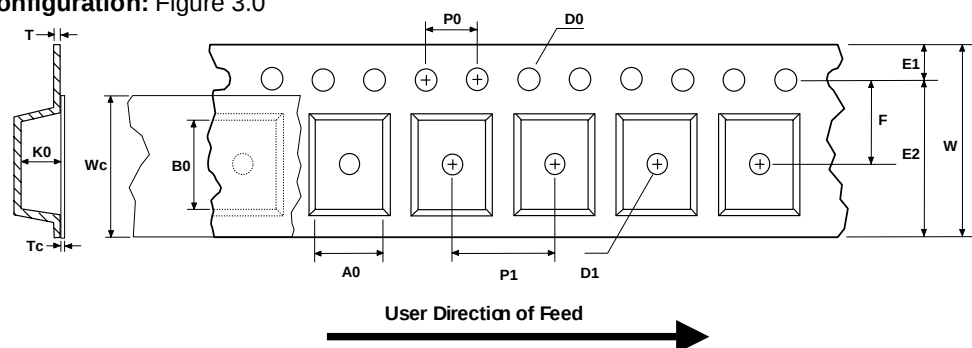


### DO-214AA(SMB) Tape Leader and Trailer Configuration: Figure 2.0



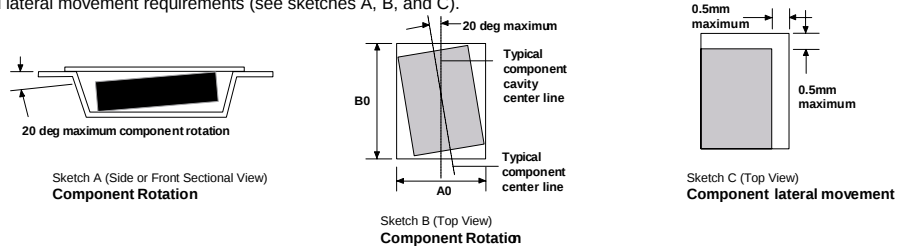
## DO-214AA(SMB) Tape and Reel Data, continued

### DO-214AA(SMB) Embossed Carrier Tape Configuration: Figure 3.0

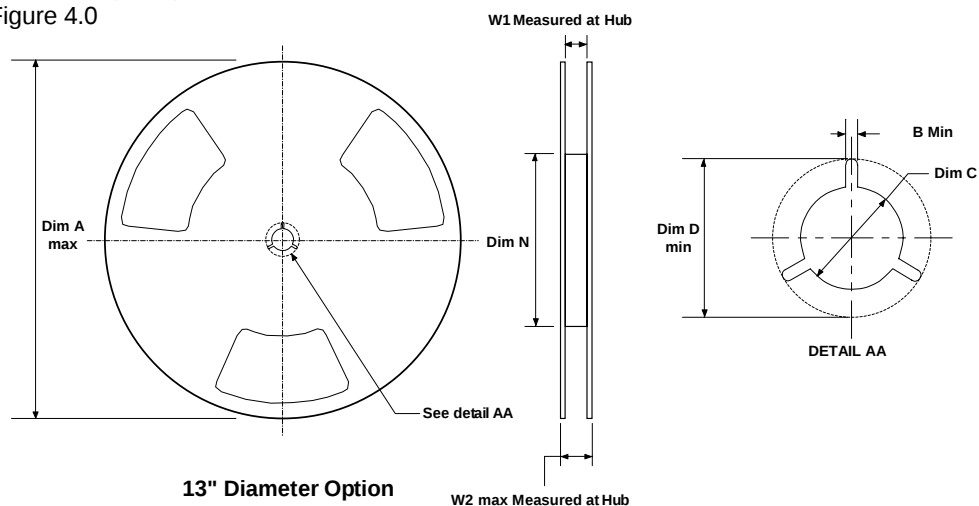


| Dimensions are in millimeter |                 |                 |                |                 |                   |                 |              |                |               |               |                 |                 |                 |                 |
|------------------------------|-----------------|-----------------|----------------|-----------------|-------------------|-----------------|--------------|----------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
| Pkg type                     | A0              | B0              | W              | D0              | D1                | E1              | E2           | F              | P1            | P0            | K0              | T               | Wc              | Tc              |
| DO-214AA(SMB)<br>(12mm)      | 3.79<br>+/-0.15 | 5.72<br>+/-0.15 | 12.0<br>+/-0.3 | 1.55<br>+/-0.05 | 1.125<br>+/-0.125 | 1.75<br>+/-0.10 | 10.25<br>min | 5.5<br>+/-0.05 | 8.0<br>+/-0.1 | 4.0<br>+/-0.1 | 2.46<br>+/-0.30 | 0.25<br>+/-0.10 | 9.3<br>+/-0.025 | 0.06<br>+/-0.02 |

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



### DO-214AA(SMB) Reel Configuration: Figure 4.0

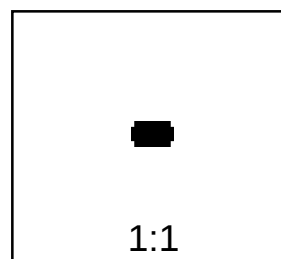
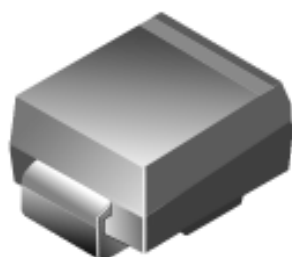


| Dimensions are in inches and millimeters |             |             |              |                                   |               |                |                                   |               |
|------------------------------------------|-------------|-------------|--------------|-----------------------------------|---------------|----------------|-----------------------------------|---------------|
| Tape Size                                | Reel Option | Dim A       | Dim B        | Dim C                             | Dim D         | Dim N          | Dim W1                            | Dim W2        |
| 12mm                                     | 13" Dia     | 13.0<br>330 | 0.059<br>1.5 | 512 +0.020/-0.008<br>13 +0.5/-0.2 | 0.795<br>20.2 | 1.97<br>50 min | 0.488 +0.078/-0.000<br>12.4 +2/-0 | 0.567<br>14.4 |

# DO-214AA(SMB) Package Dimensions



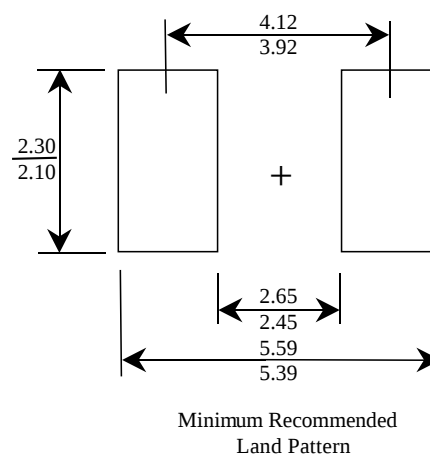
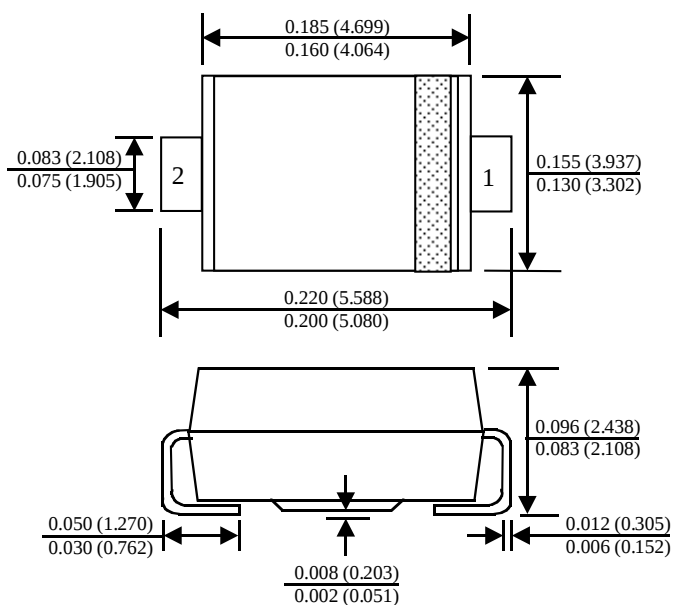
## DO-214AA(SMB) (FS PKG Code P6)



Scale 1:1 on letter size paper

Dimensions shown below are in:  
inches [millimeters]

Part Weight per unit (gram): 0.093



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| Bottomless <sup>™</sup>          | FAST <sup>™</sup>               | POP <sup>™</sup>                | SuperSOT <sup>™</sup> -6 |
| CoolFET <sup>™</sup>             | GlobalOptoisolator <sup>™</sup> | PowerTrench <sup>®</sup>        | SuperSOT <sup>™</sup> -8 |
| CROSSVOLT <sup>™</sup>           | GTO <sup>™</sup>                | QFET <sup>™</sup>               | SyncFET <sup>™</sup>     |
| DenseTrench <sup>™</sup>         | HiSeC <sup>™</sup>              | QS <sup>™</sup>                 | TinyLogic <sup>™</sup>   |
| DOME <sup>™</sup>                | ISOPLANAR <sup>™</sup>          | QT Optoelectronics <sup>™</sup> | UHC <sup>™</sup>         |
| EcoSPARK <sup>™</sup>            | LittleFET <sup>™</sup>          | Quiet Series <sup>™</sup>       | UltraFET <sup>®</sup>    |
| E <sup>2</sup> CMOS <sup>™</sup> | MicroFET <sup>™</sup>           | SILENT SWITCHER <sup>®</sup>    | VCX <sup>™</sup>         |
| EnSigna <sup>™</sup>             | MICROWIRE <sup>™</sup>          | SMART START <sup>™</sup>        |                          |
| FACT <sup>™</sup>                | OPTOLOGIC <sup>™</sup>          | Star* Power <sup>™</sup>        |                          |
| FACT Quiet Series <sup>™</sup>   | OPTOPLANAR <sup>™</sup>         | Stealth <sup>™</sup>            |                          |

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2. A critical component is 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.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

| Datasheet Identification | Product Status         | Definition                                                                                                                                                                                                            |
|--------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advance Information      | Formative or In Design | This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.                                                                                    |
| Preliminary              | First Production       | This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design. |
| No Identification Needed | Full Production        | This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.                                                       |
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