

# FM201-BS THRU FM207-BS

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# FM201-BS THRU FM207-BS

## 2.0A Surface Mount General Purpose Rectifiers - 50V-1000V

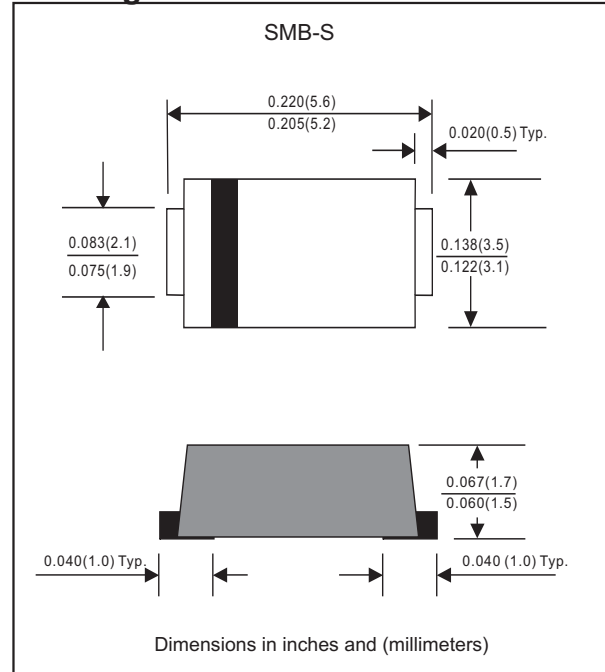
### Features

- Batch process design, excellent power dissipation offers better reverse leakage current and thermal resistance.
- Low profile surface mounted application in order to optimize board space.
- High current capability.
- High surge capability.
- Glass passivated chip junction.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free parts, ex. FM201-BS-H.

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AA/ SMB-S
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.072 gram

### Package outline



### Maximum ratings and Electrical characteristics (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| PARAMETER                  | CONDITIONS                                  | Symbol          | MIN. | TYP. | MAX. | UNIT                 |
|----------------------------|---|-----------------|------|------|------|----------------------|
| Forward rectified current  | See Fig.2                                   | $I_O$           |      |      | 2.0  | A                    |
| Forward surge current      | 8.3ms single half sine-wave (JEDEC methode) | $I_{FSM}$       |      |      | 50   | A                    |
| Reverse current            | $V_R = V_{RRM} T_J = 25^{\circ}\text{C}$    | $I_R$           |      |      | 5.0  | $\mu\text{A}$        |
|                            | $V_R = V_{RRM} T_J = 125^{\circ}\text{C}$   |                 |      |      | 125  |                      |
| Thermal resistance         | Junction to ambient                         | $R_{\theta JA}$ |      | 48   |      | $^{\circ}\text{C/W}$ |
|                            | Junction to case                            | $R_{\theta JC}$ |      | 28   |      |                      |
| Diode junction capacitance | f=1MHz and applied 4V DC reverse voltage    | $C_J$           |      | 30   |      | pF                   |
| Storage temperature        |   | $T_{STG}$       | -65  |      | +175 | $^{\circ}\text{C}$   |

| SYMBOLS  | $V_{RRM}^{*1}$<br>(V) | $V_{RMS}^{*2}$<br>(V) | $V_R^{*3}$<br>(V) | $V_F^{*4}$<br>(V) | Operating temperature<br>$T_J, (^{\circ}\text{C})$ |
|----------|-----------------------|-----------------------|-------------------|-------------------|--|
| FM201-BS | 50                    | 35                    | 50                | 1.10              | -55 to +150  |
| FM202-BS | 100                   | 70                    | 100               |                   |  |
| FM203-BS | 200                   | 140                   | 200               |                   |  |
| FM204-BS | 400                   | 280                   | 400               |                   |  |
| FM205-BS | 600                   | 420                   | 600               |                   |  |
| FM206-BS | 800                   | 560                   | 800               |                   |  |
| FM207-BS | 1000                  | 700                   | 1000              |                   |  |

\*1 Repetitive peak reverse voltage

\*2 RMS voltage

\*3 Continuous reverse voltage

\*4 Maximum forward voltage@ $I_F=2.0\text{A}$

## Rating and characteristic curves (FM201-BS THRU FM207-BS)

FIG.1-TYPICAL FORWARD CHARACTERISTICS

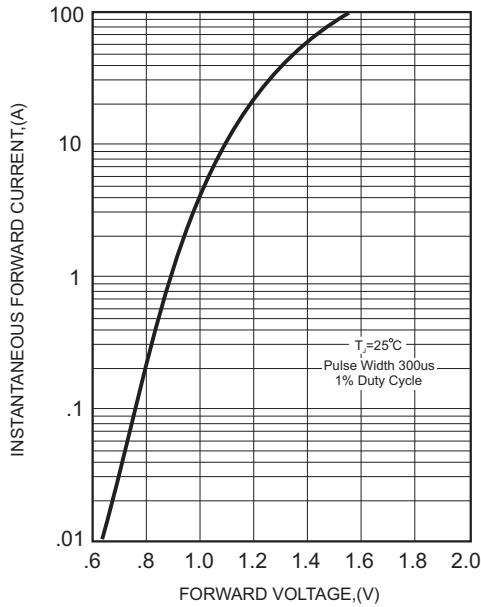


FIG.2-TYPICAL FORWARD CURRENT DERATING CURVE

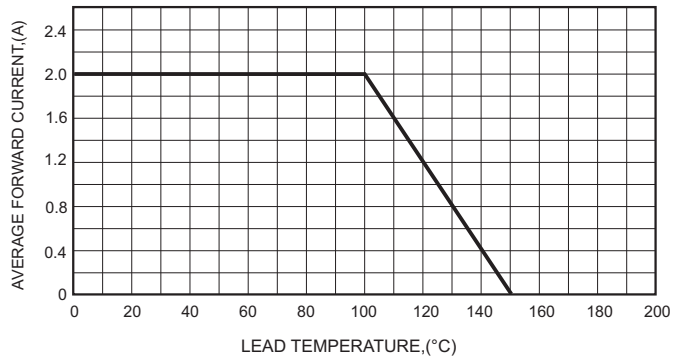


FIG.4-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

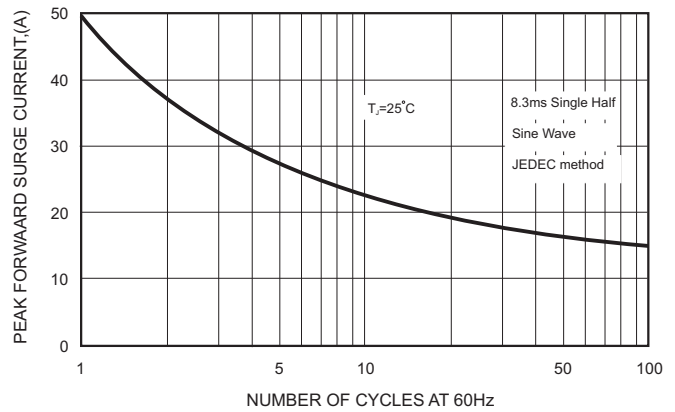


FIG.3 - TYPICAL REVERSE CHARACTERISTICS

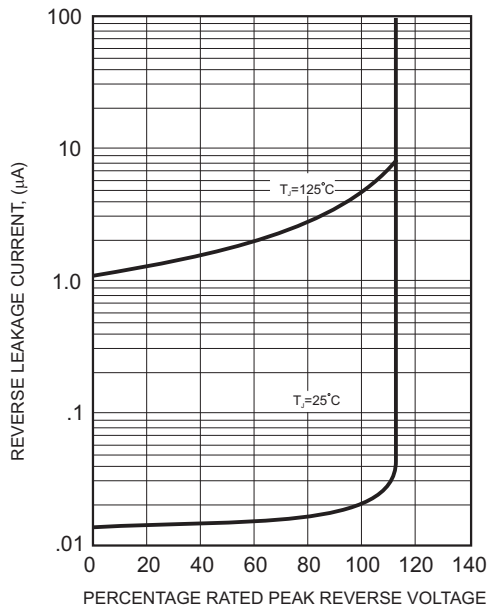
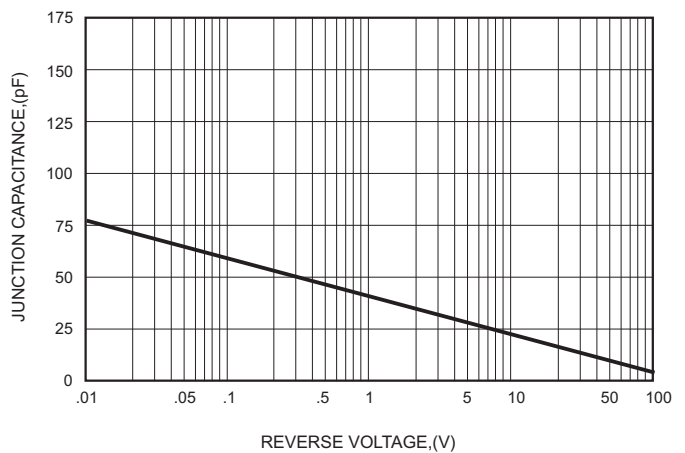




FIG.5-TYPICAL JUNCTION CAPACITANCE



# FM201-BS THRU FM207-BS

## Pinning information

| Pin                        | Simplified outline  | Symbol  |
|----------------------------|---|---|
| Pin1 cathode<br>Pin2 anode |  |  |

## Marking

| Type number | Marking code |
|-------------|--------------|
| FM201-BS    | A21          |
| FM202-BS    | A22          |
| FM203-BS    | A23          |
| FM204-BS    | A24          |
| FM205-BS    | A25          |
| FM206-BS    | A26          |
| FM207-BS    | A27          |

## Suggested solder pad layout

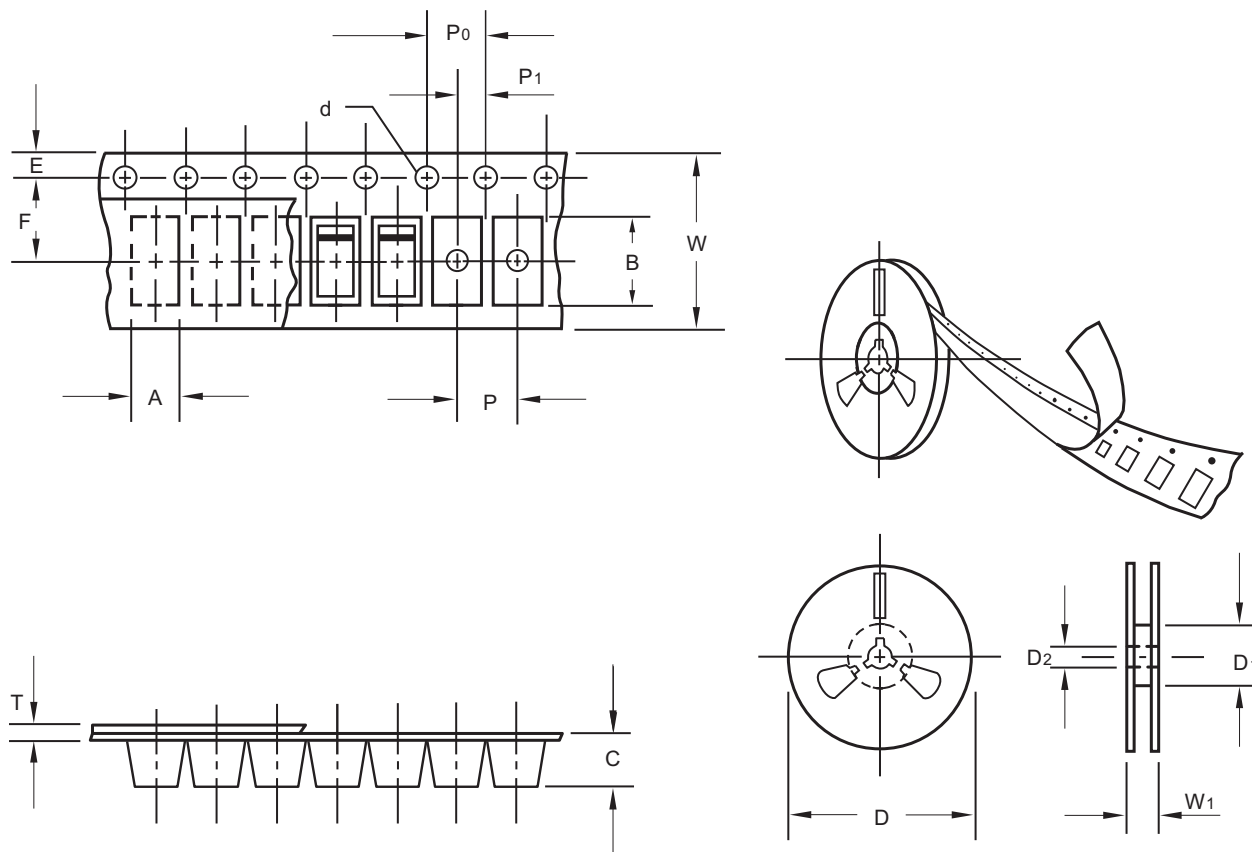


Dimensions in inches and (millimeters)

| PACKAGE | A            | B            | C            |
|---------|--------------|--------------|--------------|
| SMB-S   | 0.078 (2.00) | 0.059 (1.50) | 0.110 (2.80) |

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## Packing information



unit:mm

| Item                      | Symbol | Tolerance | SMB-S  |
|---------------------------|--------|-----------|--------|
| Carrier width             | A      | 0.1       | 3.81   |
| Carrier length            | B      | 0.1       | 5.74   |
| Carrier depth             | C      | 0.1       | 2.24   |
| Sprocket hole             | d      | 0.1       | 1.50   |
| 13" Reel outside diameter | D      | 2.0       | 330.00 |
| 13" Reel inner diameter   | D1     | min       | 50.00  |
| 7" Reel outside diameter  | D      | 2.0       | 178.00 |
| 7" Reel inner diameter    | D1     | min       | 62.00  |
| Feed hole diameter        | D2     | 0.5       | 13.00  |
| Sprocket hole position    | E      | 0.1       | 1.75   |
| Punch hole position       | F      | 0.1       | 5.50   |
| Punch hole pitch          | P      | 0.1       | 8.00   |
| Sprocket hole pitch       | P0     | 0.1       | 4.00   |
| Embossment center         | P1     | 0.1       | 2.00   |
| Overall tape thickness    | T      | 0.1       | 0.23   |
| Tape width                | W      | 0.3       | 12.00  |
| Reel width                | W1     | 1.0       | 18.00  |

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

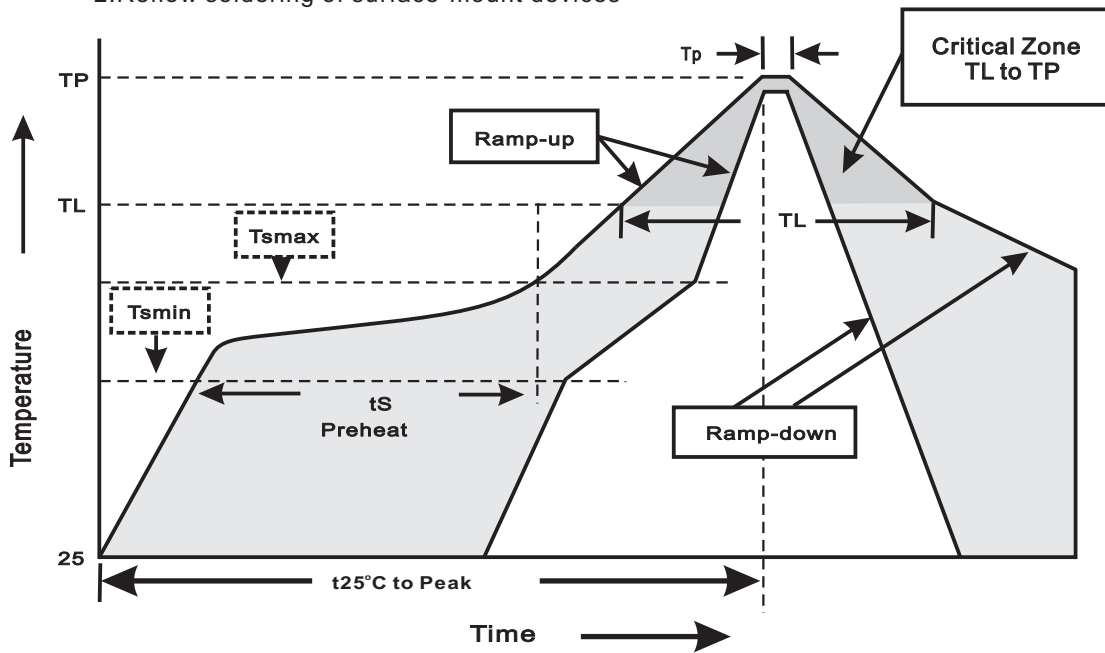
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## Reel packing

| PACKAGE | REEL SIZE | REEL (pcs) | COMPONENT SPACING (m/m) | BOX (pcs) | INNER BOX (m/m) | REEL DIA, (m/m) | CARTON SIZE (m/m) | CARTON (pcs) | APPROX. GROSS WEIGHT (kg) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| SMB-S   | 13"       | 4,000      | 8.0                     | 8,000     | 335*335*38      | 330             | 382*356*392       | 88,000       | 17.0                      |

## Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



### 3.Reflow soldering

| Profile Feature   | Soldering Condition         |
|---|-----------------------------|
| Average ramp-up rate(T <sub>L</sub> to T <sub>P</sub> )   | <3°C/sec                    |
| Preheat<br>-Temperature Min(T <sub>smín</sub> )<br>-Temperature Max(T <sub>smáx</sub> )<br>-Time(min to max)(t <sub>s</sub> ) | 150°C<br>200°C<br>60~120sec |
| T <sub>smáx</sub> to T <sub>L</sub><br>-Ramp-upRate   | <3°C/sec                    |
| Time maintained above:<br>-Temperature(T <sub>L</sub> )<br>-Time(t <sub>L</sub> )   | 217°C<br>60~260sec          |
| Peak Temperature(T <sub>P</sub> )   | 255°C-0/+5°C                |
| Time within 5°C of actual Peak Temperature(t <sub>P</sub> )   | 10~30sec                    |
| Ramp-down Rate  | <6°C/sec                    |
| Time 25°C to Peak Temperature   | <6minutes                   |

**FM201-BS THRU FM207-BS****High reliability test capabilities**

| Item Test                         | Conditions   | Reference                     |
|-----------------------------------|--|-------------------------------|
| 1. Solder Resistance              | at 260±5°C for 10±2sec.  | MIL-STD-750D<br>METHOD-2031   |
| 2. Solderability                  | at 245±5°C for 5 sec.  | MIL-STD-202F<br>METHOD-208    |
| 3. High Temperature Reverse Bias  | $V_R=80\%$ rate at $T_J=150^\circ\text{C}$ for 168 hrs.  | MIL-STD-750D<br>METHOD-1038   |
| 4. Forward Operation Life         | Rated average rectifier current at $T_A=25^\circ\text{C}$ for 500hrs.  | MIL-STD-750D<br>METHOD-1027   |
| 5. Intermittent Operation Life    | $T_A = 25^\circ\text{C}$ , $I_F = I_O$<br>On state: power on for 5 min.<br>off state: power off for 5 min.<br>on and off for 500 cycles. | MIL-STD-750D<br>METHOD-1036   |
| 6. Pressure Cooker                | $15P_{SIG}$ at $T_A=121^\circ\text{C}$ for 4 hrs.  | JESD22-A102                   |
| 7. Temperature Cycling            | -55°C to +125°C dwelled for 30 min.<br>and transferred for 5min. total 10 cycles.  | MIL-STD-750D<br>METHOD-1051   |
| 8. Forward Surge                  | 8.3ms single half sine-wave , one surge.   | MIL-STD-750D<br>METHOD-4066-2 |
| 9. Humidity                       | at $T_A=85^\circ\text{C}$ , RH=85% for 1000hrs.  | MIL-STD-750D<br>METHOD-1021   |
| 10. High Temperature Storage Life | at 175°C for 1000 hrs.   | MIL-STD-750D<br>METHOD-1031   |