

FM201-S THRU FM207-S

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FM201-S THRU FM207-S

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

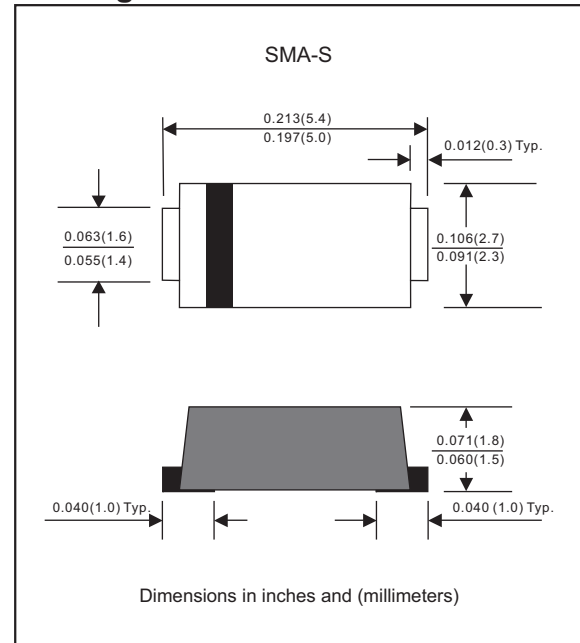
Features

- 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 RoHS requirements
- Suffix "-H" indicates Halogen-free parts, ex. FM201-S-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SMA-S
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.05 gram

Package outline



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

| PARAMETER | SYMBOLS | FM201-S | FM202-S | FM203-S | FM204-S | FM205-S | FM206-S | FM207-S | UNIT |
|---|-----------|-------------|---------|---------|---------|---------|---------|---------|--------------------|
| Maximum repetitive peak reverse voltage | V_{RRM} | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V |
| Maximum RMS voltage | V_{RMS} | 35 | 70 | 140 | 280 | 420 | 560 | 700 | V |
| Maximum continuous reverse voltage | V_R | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V |
| Maximum average forward rectified current | I_o | 2.0 | | | | | | | A |
| Non-repetitive peak forward surge current 8.3ms single half sine-wave (JEDEC methode) | I_{FSM} | 50 | | | | | | | A |
| Typical junction capacitance, Note1 | C_J | 30 | | | | | | | pF |
| Operating junction temperature range | T_J | -55 to +150 | | | | | | | $^{\circ}\text{C}$ |
| Storage temperature range | T_{STG} | -65 to +175 | | | | | | | $^{\circ}\text{C}$ |

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

| PARAMETER | SYMBOLS | FM201-S | FM202-S | FM203-S | FM204-S | FM205-S | FM206-S | FM207-S | UNIT |
|---|---------|------------|---------|---------|---------|---------|---------|---------|--------------------------------|
| Maximum instantaneous forward voltage at $I_F=2.0A$ | V_F | 1.1 | | | | | | | V |
| Maximum reverse leakage current at rated V_R | I_R | 5.0 125 | | | | | | | μA μA |

Thermal characteristics

| PARAMETER | SYMBOLS | FM201-S | FM202-S | FM203-S | FM204-S | FM205-S | FM206-S | FM207-S | UNIT |
|---|-----------------|---------|---------|---------|---------|---------|---------|---------|-----------------------------|
| Typical thermal resistance junction to ambient, Note2 | $R_{\theta JA}$ | 53 | | | | | | | $^{\circ}\text{C}/\text{W}$ |
| Typical thermal resistance junction to case, Note2 | $R_{\theta JC}$ | 33 | | | | | | | $^{\circ}\text{C}/\text{W}$ |

Notes 1: Measured at 1MHz and applied reverse voltage of 4.0V D.C
 2: Mounted on FR-4 PCB copper, minimum recommended pad layout

Rating and characteristic curves (FM201-S THRU FM207-S)

FIG.1-TYPICAL FORWARD CHARACTERISTICS

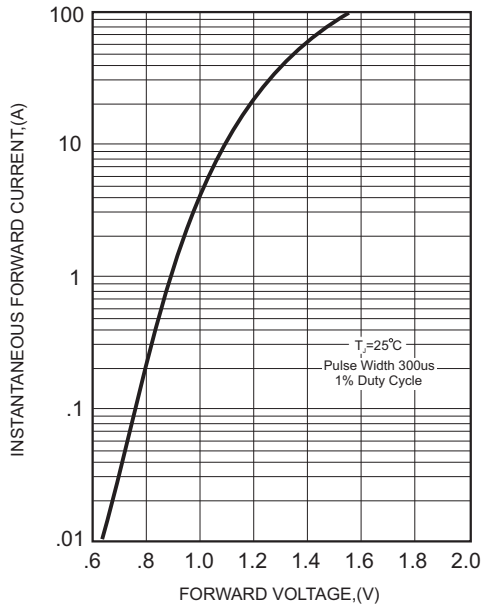


FIG.2-TYPICAL FORWARD CURRENT DERATING CURVE

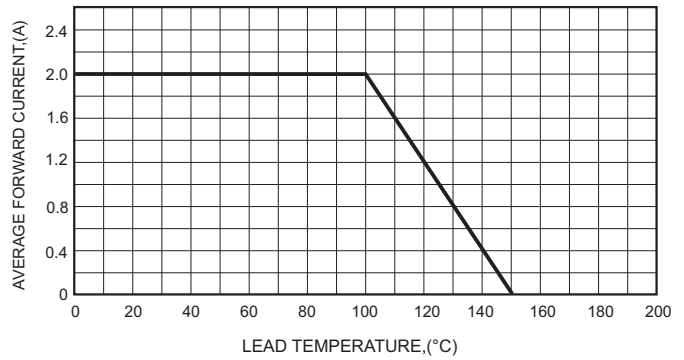


FIG.4-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

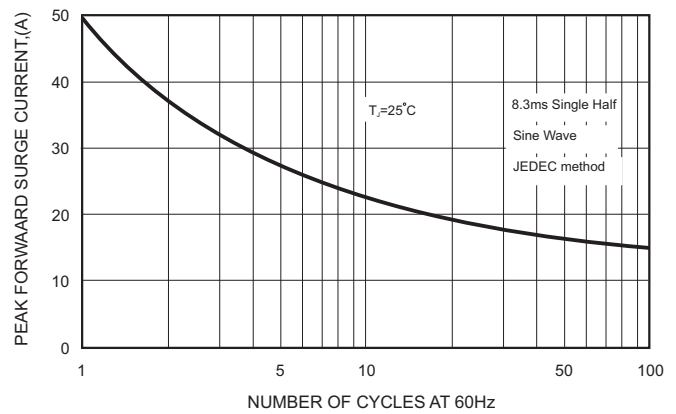


FIG.3 - TYPICAL REVERSE CHARACTERISTICS

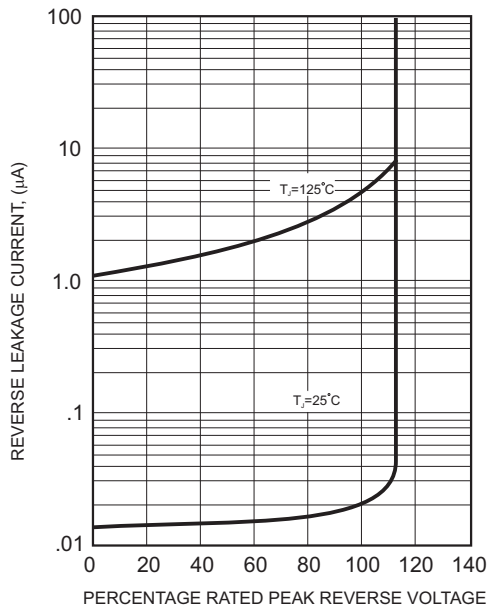
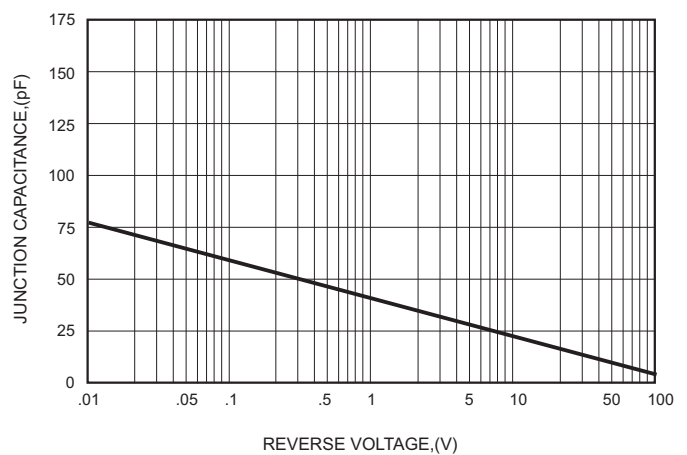




FIG.5-TYPICAL JUNCTION CAPACITANCE



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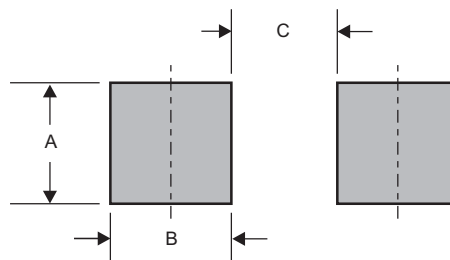
Pinning information

| Pin | Simplified outline | Symbol |
|----------------------------|--|---|
| Pin1 cathode Pin2 anode |  |  |

Marking

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

Suggested solder pad layout

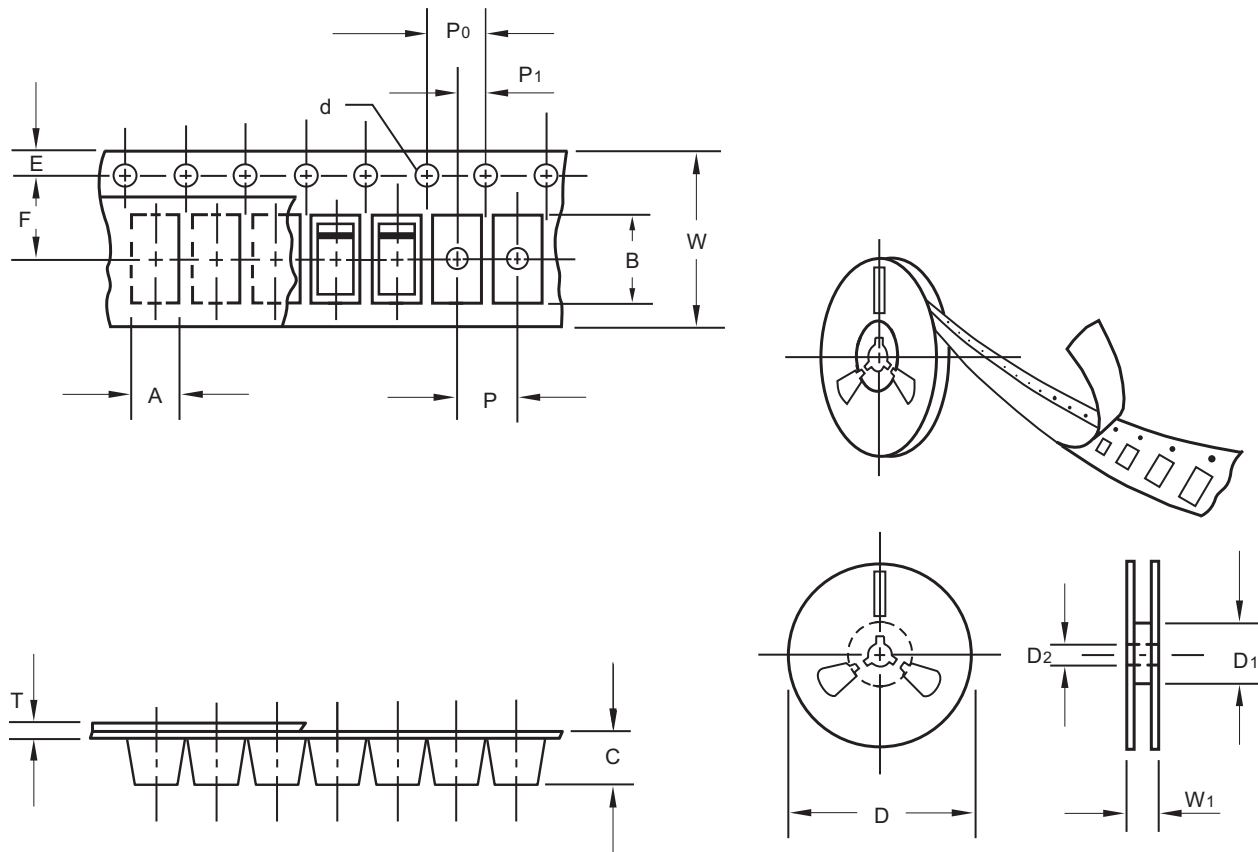


Dimensions in inches and (millimeters)

| PACKAGE | A | B | C |
|---------|--------------|--------------|--------------|
| SMA-S | 0.063 (1.60) | 0.059 (1.50) | 0.110 (2.80) |

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Packing information



unit:mm

| Item | Symbol | Tolerance | SMA-S |
|---------------------------|--------|-----------|--------|
| Carrier width | A | 0.1 | 2.90 |
| Carrier length | B | 0.1 | 5.50 |
| Carrier depth | C | 0.1 | 2.10 |
| 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 | 4.00 |
| 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.

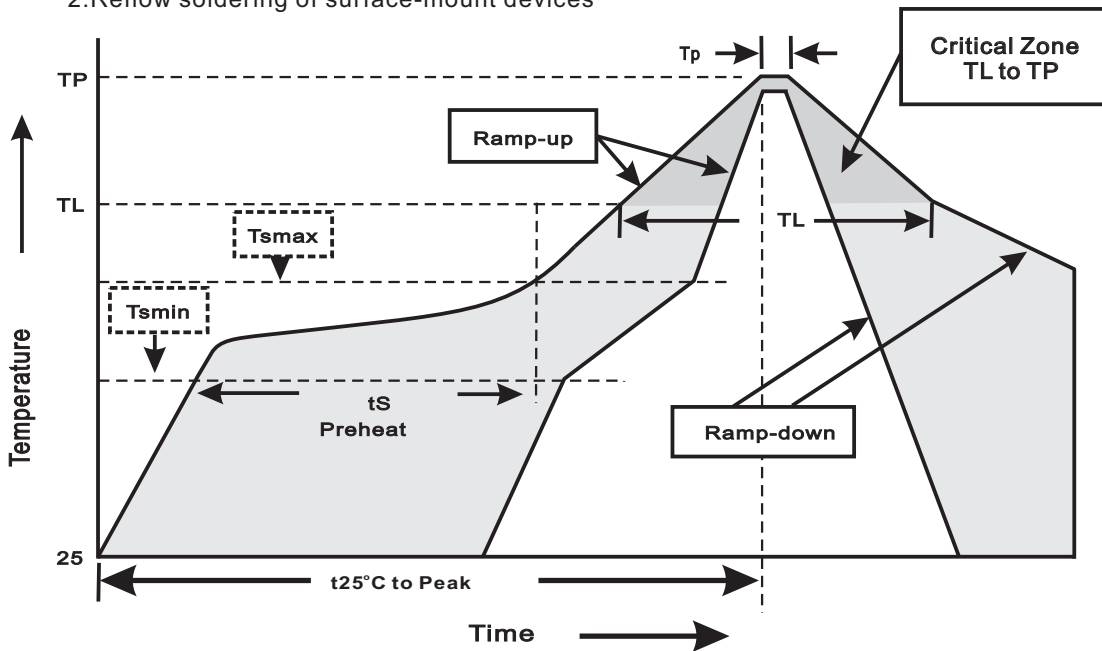
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Reel packing

| 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) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| SMA-S | 7" | 2,000 | 4.0 | 20,000 | 183*155*183 | 178 | 382*356*392 | 160,000 | 15.0 |
| | 13" | 7,500 | 4.0 | 15,000 | 335*335*38 | 330 | 350*330*360 | 120,000 | 14.5 |

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 _L to T _P) | <3°C/sec |
| Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s) | 150°C 200°C 60~120sec |
| T _{smmax} to T _L -Ramp-upRate | <3°C/sec |
| Time maintained above: -Temperature(T _L) -Time(t _L) | 217°C 60~260sec |
| Peak Temperature(T _P) | 255°C-0/+5°C |
| Time within 5°C of actual Peak Temperature(t _P) | 10~30sec |
| Ramp-down Rate | <6°C/sec |
| Time 25°C to Peak Temperature | <6minutes |

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

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