

# FM120-N THRU FM1100-N

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# FM120-N THRU FM1100-N

## 1.0A Surface Mount Schottky Barrier Rectifiers - 20V-100V

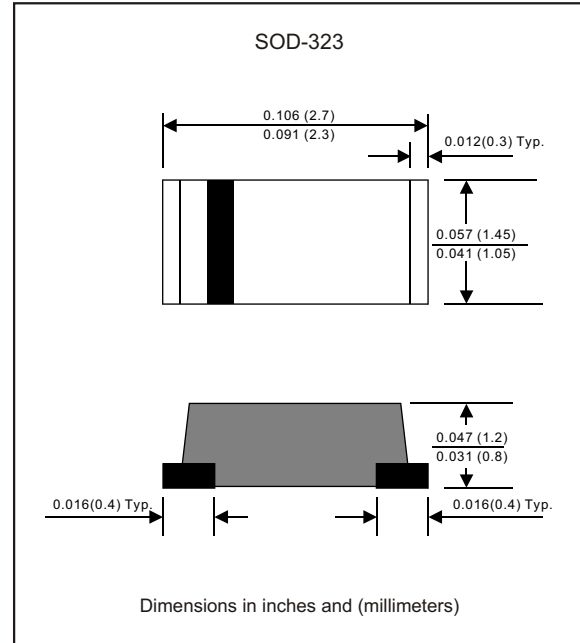
### Features

- 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.
- Low power loss, high efficiency.
- High current capability, low forward voltage drop.
- High surge capability.
- Guardring for overvoltage protection.
- Very tiny plastic SMD package.
- Ultra high-speed switching.
- Silicon epitaxial planar chip, metal silicon junction.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228

### Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-323
- Terminals :Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.008 gram

### Package outline



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

| PARAMETER                  | CONDITIONS  | Symbol          | MIN. | TYP. | MAX. | UNIT                        |
|----------------------------|---|-----------------|------|------|------|-----------------------------|
| Forward rectified current  | See Fig.1   | $I_O$           |      |      | 1.0  | A                           |
| Forward surge current      | 8.3ms single half sine-wave superimposed on rate load (JEDEC methode) | $I_{FSM}$       |      |      | 30   | A                           |
| Reverse current            | $V_R = V_{RRM} \quad T_A = 25^{\circ}\text{C}$                        | $I_R$           |      |      | 0.5  | mA                          |
|                            | $V_R = V_{RRM} \quad T_A = 125^{\circ}\text{C}$                       |                 |      |      | 10   |                             |
| Thermal resistance         | Junction to ambient   | $R_{\theta JA}$ |      | 90   |      | $^{\circ}\text{C}/\text{W}$ |
| Diode junction capacitance | $f=1\text{MHz}$ and applied 4V DC reverse voltage                     | $C_J$           |      | 120  |      | 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>$T_{J1}$ ( $^{\circ}\text{C}$ ) |
|----------|-----------------------|-----------------------|-------------------|-------------------|--|
| FM120-N  | 20                    | 14                    | 20                | 0.55              | -55 to +125  |
| FM130-N  | 30                    | 21                    | 30                |                   |  |
| FM140-N  | 40                    | 28                    | 40                |                   |  |
| FM150-N  | 50                    | 35                    | 50                | 0.70              | -55 to +150  |
| FM160-N  | 60                    | 42                    | 60                |                   |  |
| FM180-N  | 80                    | 56                    | 80                | 0.85              |  |
| FM1100-N | 100                   | 70                    | 100               |                   |  |

\*1 Repetitive peak reverse voltage

\*2 RMS voltage

\*3 Continuous reverse voltage

\*4 Maximum forward voltage

## Rating and characteristic curves (FM120-N THRU FM1100-N)

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

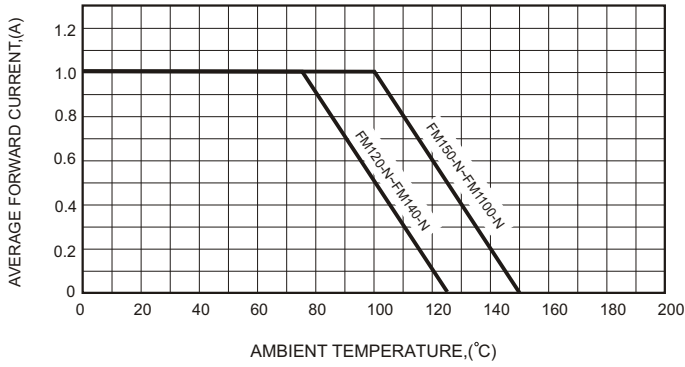


FIG.2-TYPICAL FORWARD CHARACTERISTICS

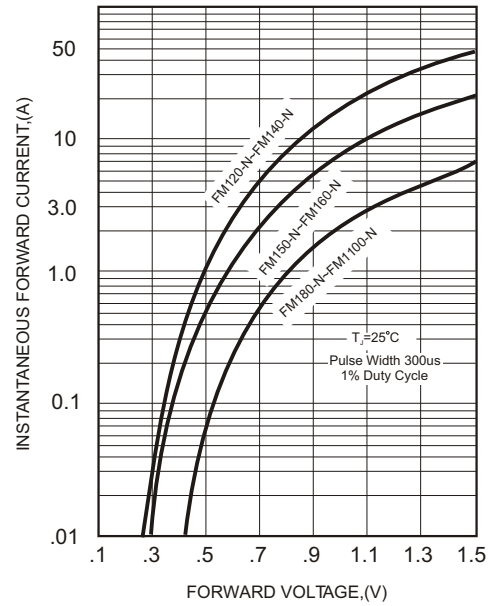


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

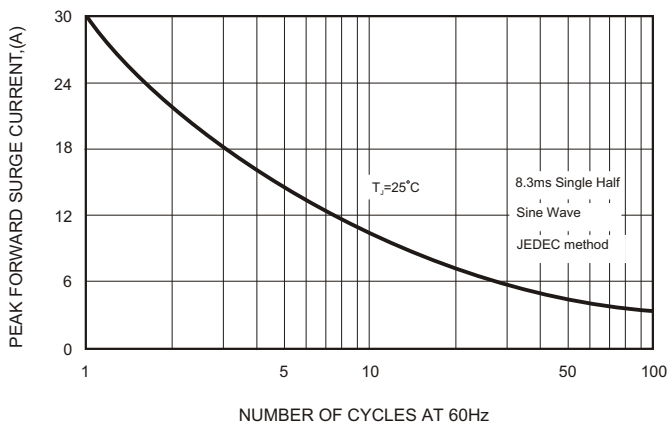


FIG.5 - TYPICAL REVERSE CHARACTERISTICS

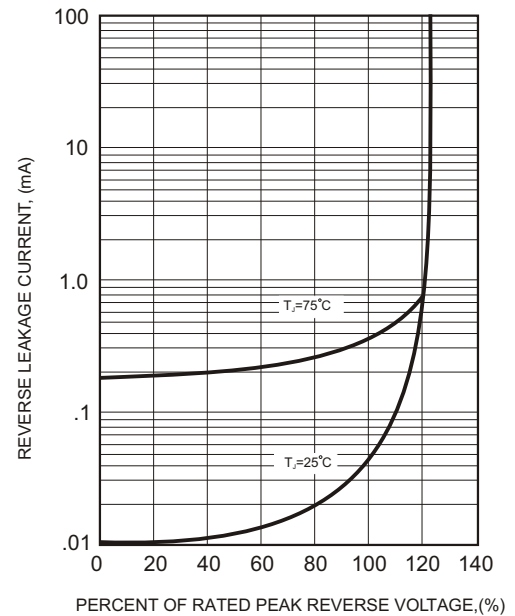
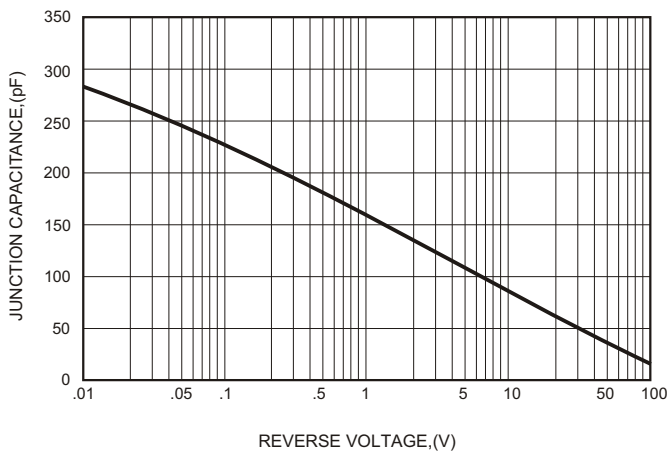




FIG.4-TYPICAL JUNCTION CAPACITANCE



# FM120-N THRU FM1100-N

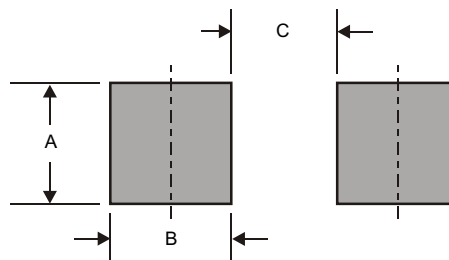
## Pinning information

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

## Marking

| Type number | Marking code |
|-------------|--------------|
| FM120-N     | 12           |
| FM130-N     | 13           |
| FM140-N     | 14           |
| FM150-N     | 15           |
| FM160-N     | 16           |
| FM180-N     | 18           |
| FM1100-N    | 10           |

## Suggested solder pad layout

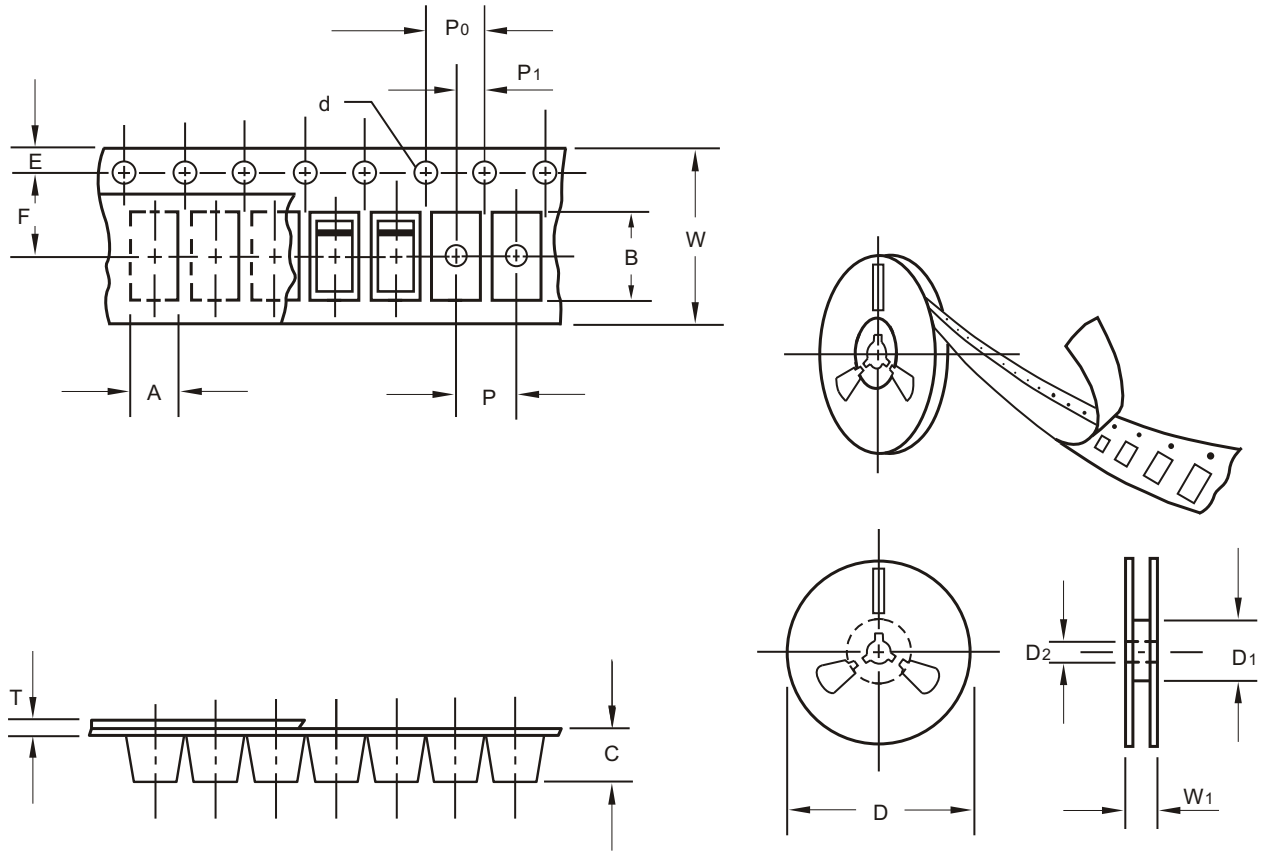


Dimensions in inches and (millimeters)

| PACKAGE | A            | B            | C            |
|---------|--------------|--------------|--------------|
| SOD-323 | 0.059 (1.50) | 0.039 (1.00) | 0.051 (1.30) |

# FM120-N THRU FM1100-N

## Packing information



unit:mm

| Item                      | Symbol | Tolerance | SOD-323 |
|---------------------------|--------|-----------|---------|
| Carrier width             | A      | 0.1       | 1.47    |
| Carrier length            | B      | 0.1       | 2.95    |
| Carrier depth             | C      | 0.1       | 1.15    |
| Sprocket hole             | d      | 0.1       | 1.50    |
| 13" Reel outside diameter | D      | 2.0       | -       |
| 13" Reel inner diameter   | D1     | min       | -       |
| 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       | 3.50    |
| 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       | 8.00    |
| Reel width                | W1     | 1.0       | 11.40   |

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

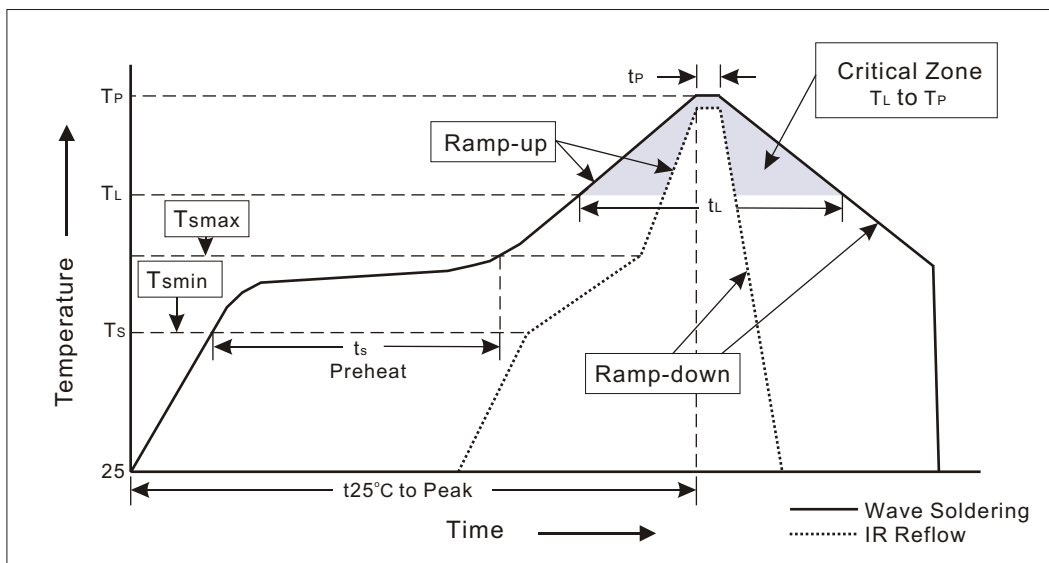
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## Reel packing

| 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) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| SOD-323 | 7"        | 3000       | 4.0                     | 12,000    | 185*185*51      | 178             | 430*190*220       | 96,000       | 4.1                       |

## Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=10°C~35°C Humidity=65%±15%
- 2.Reflow soldering of surface-mount devices



### 3.Flow (wave)soldering (solder dipping)

| Profile Feature   | Soldering Condition         |
|---|-----------------------------|
| Average ramp-up rate( $T_L$ to $T_P$ )  | <3°C/sec                    |
| Preheat<br>-Temperature Min( $T_{Smin}$ )<br>-Temperature Max( $T_{Smax}$ )<br>-Time(min to max)( $t_s$ ) | 100°C<br>150°C<br>60~120sec |
| $T_{Smax}$ to $T_L$<br>-Ramp-upRate   | <3°C/sec                    |
| Time maintained above:<br>-Temperature( $T_L$ )<br>-Time( $t_L$ )   | 183°C<br>60~150sec          |
| 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                   |

**FM120-N THRU FM1100-N****High reliability test capabilities**

| Item Test                         | Conditions   | Reference                     |
|-----------------------------------|--|-------------------------------|
| 1. Solder Resistance              | at 260±5°C for 10±2sec.<br>immerse body into solder 1/16"±1/32"  | 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 $T_A=125^\circ\text{C}$ for 168 hrs.  | MIL-STD-750D<br>METHOD-1026   |
| 4. Forward Operation Life         | Rated average rectifier current at $T=25^\circ\text{C}$ 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 <sub>sig</sub> at $T_A=121^\circ\text{C}$ for 4 hrs.   |                               |
| 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. Thermal Shock                  | 0°C for 5 min. rise to 100°C for 5 min. total 10 cycles.   | MIL-STD-750D<br>METHOD-1056   |
| 9. Forward Surge                  | 8.3ms single half sine-wave superimposed<br>on rated load, one surge.  | MIL-STD-750D<br>METHOD-4066-2 |
| 10. Humidity                      | at $T_A=65^\circ\text{C}$ , RH=98% for 1000hrs.  | MIL-STD-750D<br>METHOD-1038   |
| 11. High Temperature Storage Life | at 175°C for 1000hrs.  | MIL-STD-750D<br>METHOD-1031   |
| 12. Solvent Resistance            | Dip into Freon at 25°C for 1 min.  | MIL-STD-202F<br>METHOD-215    |