

# LFM120-M THRU LFM140-M

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# LFM120-M THRU LFM140-M

## 1.0A Surface Mount Schottky Barrier Rectifiers 20V-40V

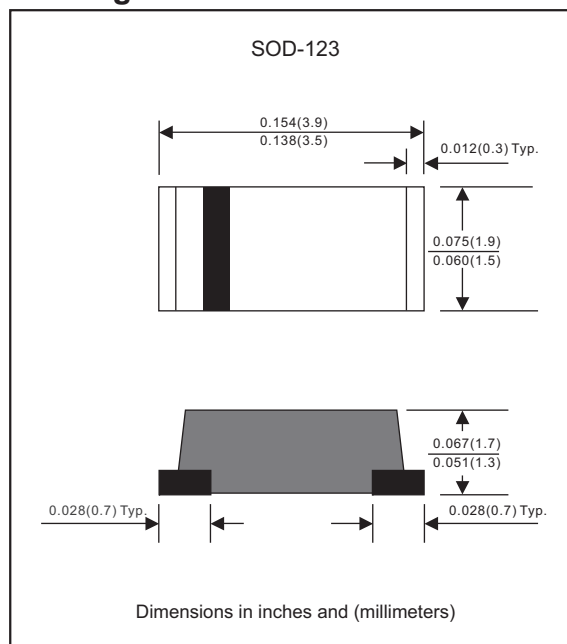
### Features

- 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
- Tiny plastic SMD package
- Low power loss, high efficiency
- High current capability, low forward voltage drop
- High surge capability
- Guardring for overvoltage protection
- Ultra high-speed switching
- Silicon epitaxial planar chip, metal silicon junction.
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. LFM120-M-H

### Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-123 / MINI SMA
- Terminals :Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.018 gram

### Package outline



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

| PARAMETER                                                             | SYMBOLS   | LFM120-M    | LFM130-M | LFM140-M | UNITS              |
|-----------------------------------------------------------------------|-----------|-------------|----------|----------|--------------------|
| Maximum repetitive peak reverse voltage                               | $V_{RRM}$ | 20          | 30       | 40       | Volts              |
| Maximum RMS voltage                                                   | $V_{RMS}$ | 14          | 21       | 28       | Volts              |
| Maximum continuous reverse voltage                                    | $V_R$     | 20          | 30       | 40       | Volts              |
| Maximum average forward rectified current                             | $I_O$     | 1.0         |          |          | Amps               |
| Non-repetitive peak forward surge current 8.3ms single half sine-wave | $I_{FSM}$ | 30          |          |          | Amps               |
| Typical junction capacitance (Note 1)                                 | $C_J$     | 110         |          |          | pF                 |
| Operating junction temperature range                                  | $T_J$     | -55 to +125 |          |          | $^{\circ}\text{C}$ |
| 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 | LFM120-M  | LFM130-M | LFM140-M | UNITS    |
|------------------------------------------------------------------------------------------------------------|---------|-----------|----------|----------|----------|
| Maximum instantaneous forward voltage at $I_F=1.0\text{A}$                                                 | $V_F$   | 0.45      |          |          | Volts    |
| Maximum reverse leakage current<br>$T_J=25^{\circ}\text{C}$<br>at rated $V_R$<br>$T_J=100^{\circ}\text{C}$ | $I_R$   | 0.2<br>10 |          |          | mA<br>mA |

### Thermal characteristics

| PARAMETER                                               | SYMBOLS         | LFM120-M | LFM130-M | LFM140-M | UNITS                         |
|---------------------------------------------------------|-----------------|----------|----------|----------|-------------------------------|
| Typical thermal resistance junction to ambient (Note 2) | $R_{\theta JA}$ | 90       |          |          | $^{\circ}\text{C} / \text{W}$ |
| Typical thermal resistance junction to case (Note 2)    | $R_{\theta JC}$ | 44       |          |          | $^{\circ}\text{C} / \text{W}$ |

Notes1: 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 (LFM120-M THRU LFM140-M)

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

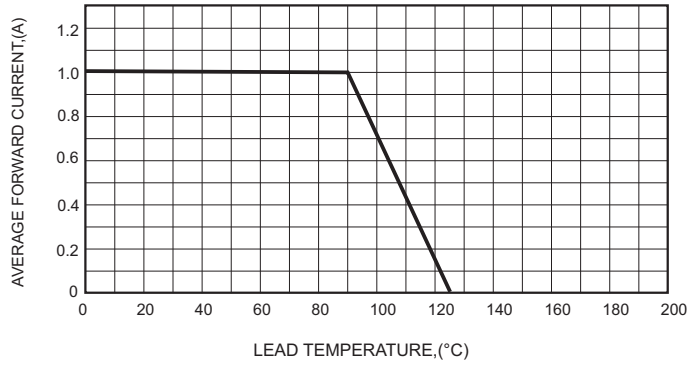


FIG.2-TYPICAL FORWARD CHARACTERISTICS

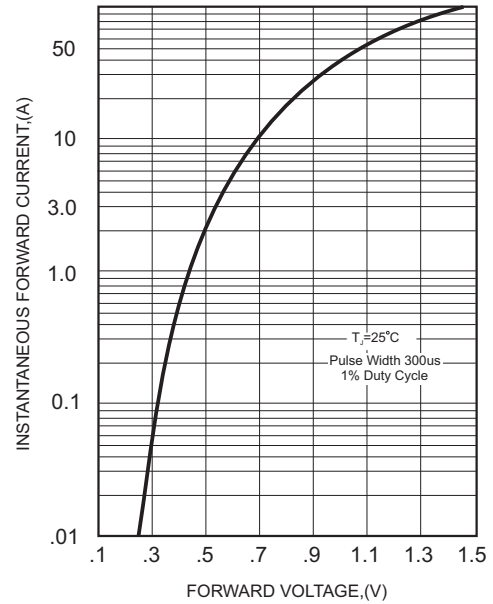


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

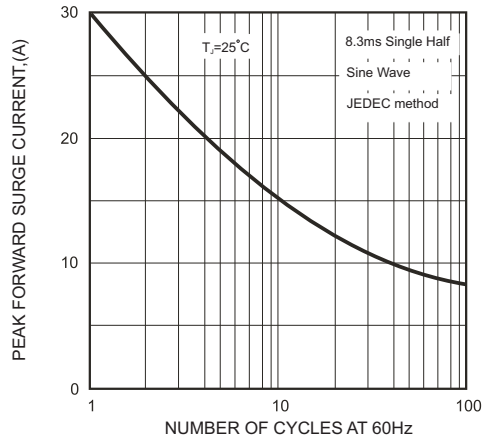


FIG.4-TYPICAL JUNCTION CAPACITANCE

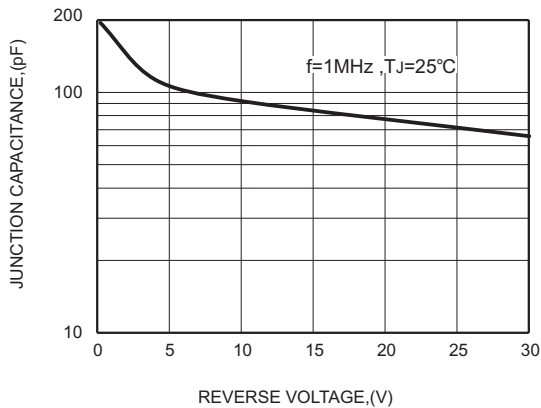
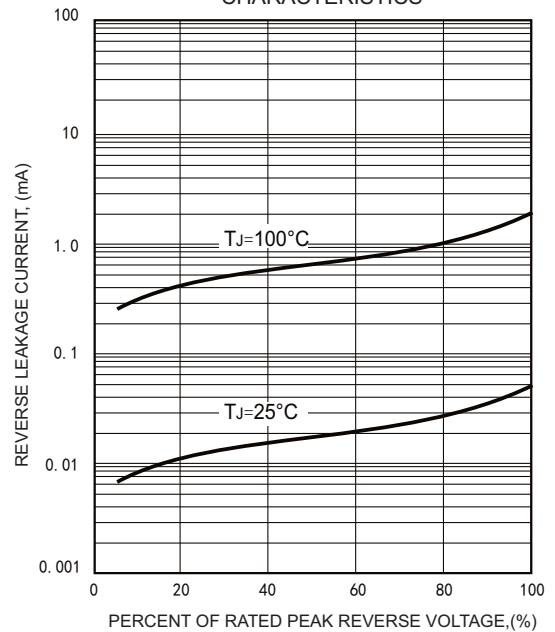


FIG.5 - TYPICAL REVERSE CHARACTERISTICS



# LFM120-M THRU LFM140-M

## Pinning information

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

## Marking

| Type number | Marking code |
|-------------|--------------|
| LFM120-M    | 12L          |
| LFM130-M    | 13L          |
| LFM140-M    | 14L          |

## Suggested solder pad layout



Dimensions in inches and (millimeters)

| PACKAGE | A            | B            | C            |
|---------|--------------|--------------|--------------|
| SOD-123 | 0.075 (1.90) | 0.055 (1.40) | 0.075 (1.90) |

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## Packing information



unit:mm

| Item                      | Symbol | Tolerance | SOD-123 |
|---------------------------|--------|-----------|---------|
| Carrier width             | A      | 0.1       | 1.90    |
| Carrier length            | B      | 0.1       | 3.90    |
| Carrier depth             | C      | 0.1       | 1.68    |
| 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<br>(pcs) | COMPONENT<br>SPACING<br>(m/m) | BOX<br>(pcs) | INNER<br>BOX<br>(m/m) | REEL<br>DIA,<br>(m/m) | CARTON<br>SIZE<br>(m/m) | CARTON<br>(pcs) | APPROX.<br>GROSS WEIGHT<br>(kg) |
|---------|-----------|---------------|-------------------------------|--------------|-----------------------|-----------------------|-------------------------|-----------------|---------------------------------|
| SOD-123 | 7"        | 2,500         | 4.0                           | 25,000       | 183*123*183           | 178                   | 382*257*387             | 200,000         | 10.5                            |

## 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 $T_P$ )                                                                    | $<3^{\circ}\text{C}/\text{sec}$                                          |
| Preheat<br>-Temperature Min( $T_{smin}$ )<br>-Temperature Max( $T_{smax}$ )<br>-Time(min to max)( $t_s$ ) | $150^{\circ}\text{C}$<br>$200^{\circ}\text{C}$<br>$60\sim 120\text{sec}$ |
| $T_{smax}$ to $T_L$<br>-Ramp-upRate                                                                       | $<3^{\circ}\text{C}/\text{sec}$                                          |
| Time maintained above:<br>-Temperature( $T_L$ )<br>-Time( $t_L$ )                                         | $217^{\circ}\text{C}$<br>$60\sim 260\text{sec}$                          |
| Peak Temperature( $T_P$ )                                                                                 | $255^{\circ}\text{C}-0/+5^{\circ}\text{C}$                               |
| Time within $5^{\circ}\text{C}$ of actual Peak Temperature( $t_P$ )                                       | $10\sim 30\text{sec}$                                                    |
| Ramp-down Rate                                                                                            | $<6^{\circ}\text{C}/\text{sec}$                                          |
| Time $25^{\circ}\text{C}$ to Peak Temperature                                                             | $<6\text{minutes}$                                                       |

**LFM120-M THRU LFM140-M****High reliability test capabilities**

| Item Test                         | Conditions                                                                                                                                 | Reference                     |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1. Solder Resistance              | at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$                                                                                   | MIL-STD-750D<br>METHOD-2031   |
| 2. Solderability                  | at $245 \pm 5^{\circ}\text{C}$ for 5 sec.                                                                                                  | MIL-STD-202F<br>METHOD-208    |
| 3. High Temperature Reverse Bias  | $V_R = 80\%$ rate at $T_J = 125^{\circ}\text{C}$ 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            | $-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$ 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 $175^{\circ}\text{C}$ for 1000 hrs.                                                                                                     | MIL-STD-750D<br>METHOD-1031   |