

# KLFM120-MH1 THRU KLFM140-MH1

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# KLFM120-MH1 THRU KLFM140-MH1

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

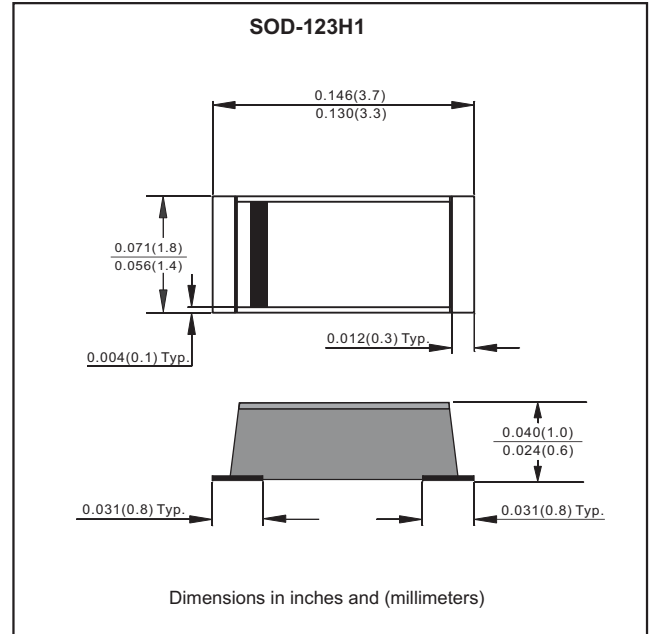
### Features

- 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.
- Extra low reverse leakage current
- 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
- Suffix "-H" indicates Halogen free parts, ex. KLFM120-MH1-H.

### Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-123H1
- Terminals :Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.0103 gram

### Package outline



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

| PARAMETER   | SYMBOLS   | KLFM120-MH1 | KLFM130-MH1 | KLFM140-MH1 | UNITS              |
|---|-----------|-------------|-------------|-------------|--------------------|
| Maximum repetitive peak reverse voltage                               | $V_{RRM}$ | 20          | 30          | 40          | Volts              |
| Maximum RMS voltage   | $V_{RMS}$ | 14          | 21          | 28          | Volts              |
| Maximum DC blocking voltage   | $V_{DC}$  | 20          | 30          | 40          | Volts              |
| Maximum average forward rectified current                             | $I_O$     | 1.0         |             |             | Amps               |
| Peak forward surge current 8.3ms single half sine-wave (JEDEC Method) | $I_{FSM}$ | 25          |             |             | Amps               |
| Typical junction capacitance (Note 1)                                 | $C_J$     | 32          |             |             | 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  | Test Conditions                           | Symbol | MIN.           | TYP. | MAX. | Unit |
|--|---|--------|----------------|------|------|------|
| Reverse Breakdown Voltage<br>KLFM120-MH1<br>KLFM130-MH1<br>KLFM140-MH1 | $I_R=100\mu\text{A}$                      | $V_B$  | 20<br>30<br>40 | -    | -    | V    |
| Forward voltage  | $I_F=1.0\text{A}, T_J=25^{\circ}\text{C}$ | $V_F$  | -              | -    | 0.50 | V    |
| Reverse current  | $V_R=V_{RRM}, T_J=25^{\circ}\text{C}$     | $I_R$  | -              | -    | 0.05 | mA   |

Notes 1: Measured at 1.0 MHz and applied reverse voltage of 10.0 Volts

## Rating and characteristic curves (KLFM120-MH1 THRU KLFM140-MH1)

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

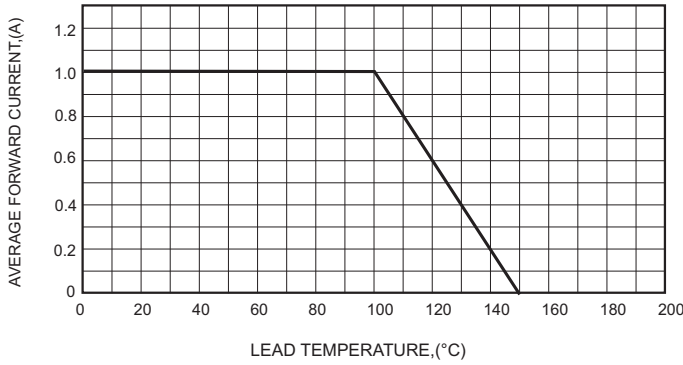


FIG.2-TYPICAL FORWARD CHARACTERISTICS

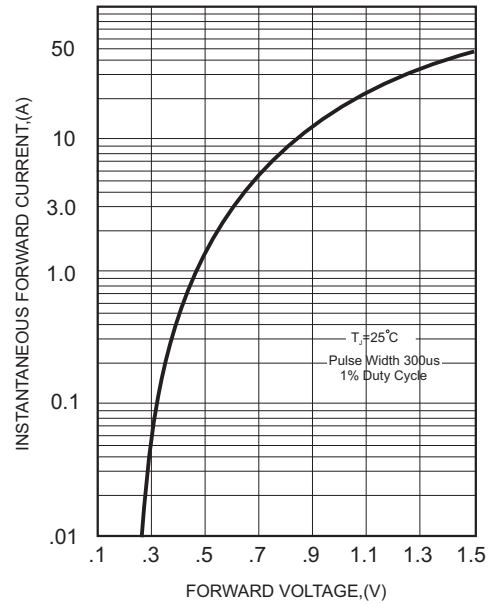


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

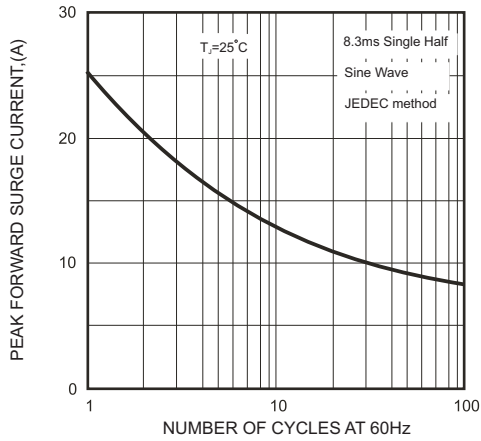


FIG.4-TYPICAL DIODE CAPACITANCE

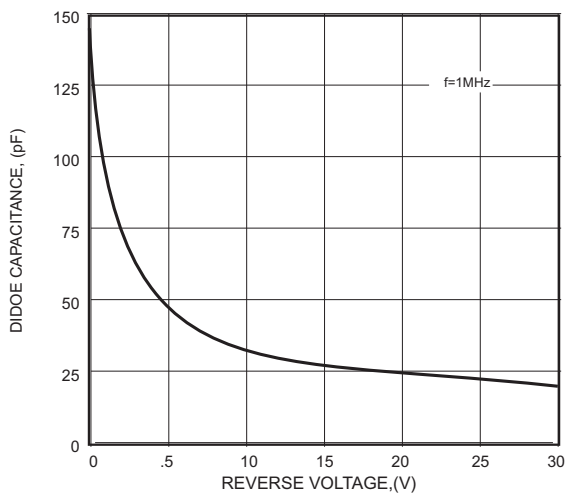
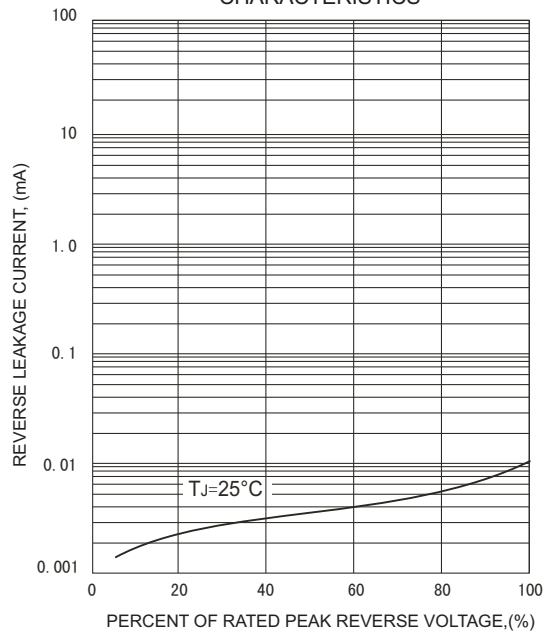


FIG.5 - TYPICAL REVERSE CHARACTERISTICS



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## Pinning information

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

## Marking

| Type number | Marking code |
|-------------|--------------|
| KLFM120-MH1 | K12          |
| KLFM130-MH1 | K13          |
| KLFM140-MH1 | K14          |

## Suggested solder pad layout

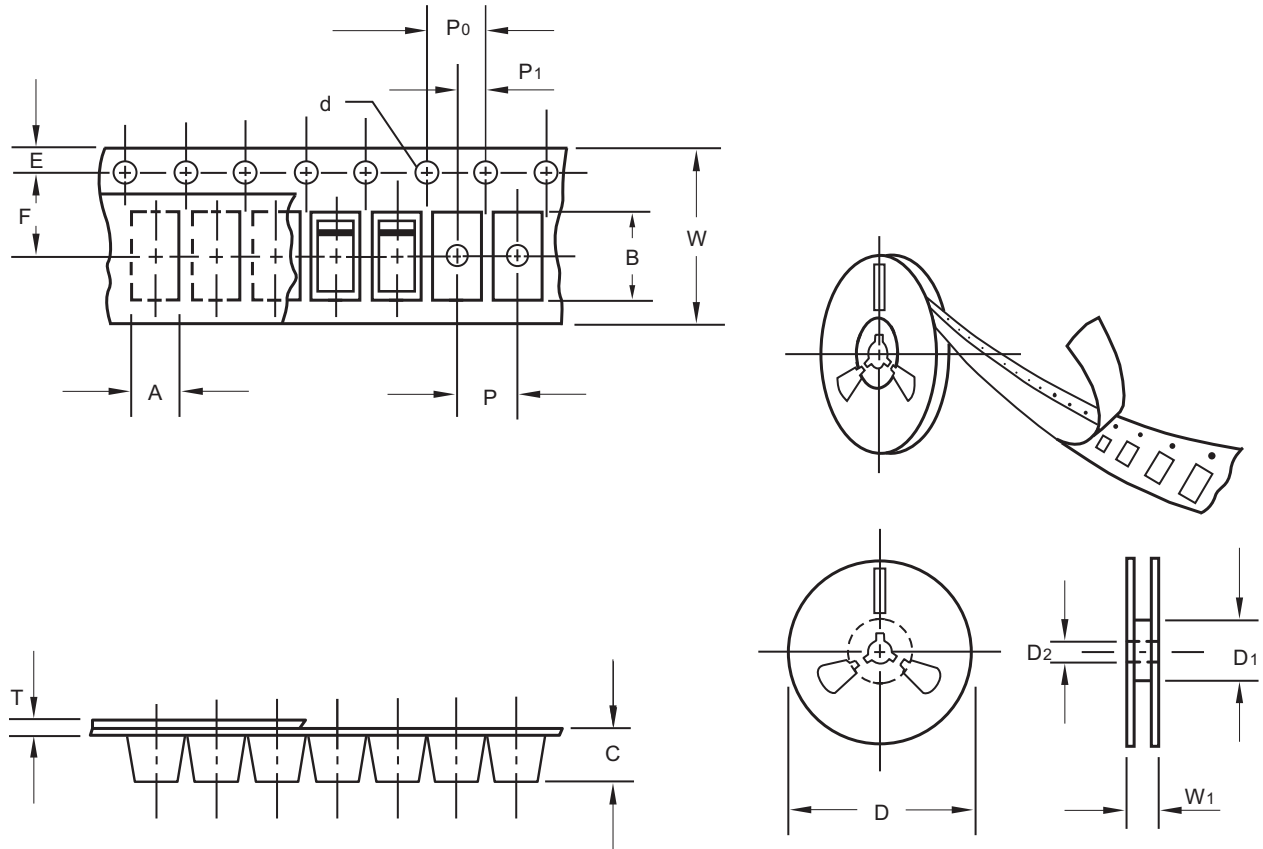


Dimensions in inches and (millimeters)

| PACKAGE   | A            | B            | C            |
|-----------|--------------|--------------|--------------|
| SOD-123H1 | 0.071 (1.80) | 0.051 (1.30) | 0.067 (1.70) |

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## Packing information



unit:mm

| Item                      | Symbol | Tolerance | SOD-123H1 |
|---------------------------|--------|-----------|-----------|
| Carrier width             | A      | 0.1       | 2.00      |
| Carrier length            | B      | 0.1       | 3.85      |
| Carrier depth             | C      | 0.1       | 1.10      |
| 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.

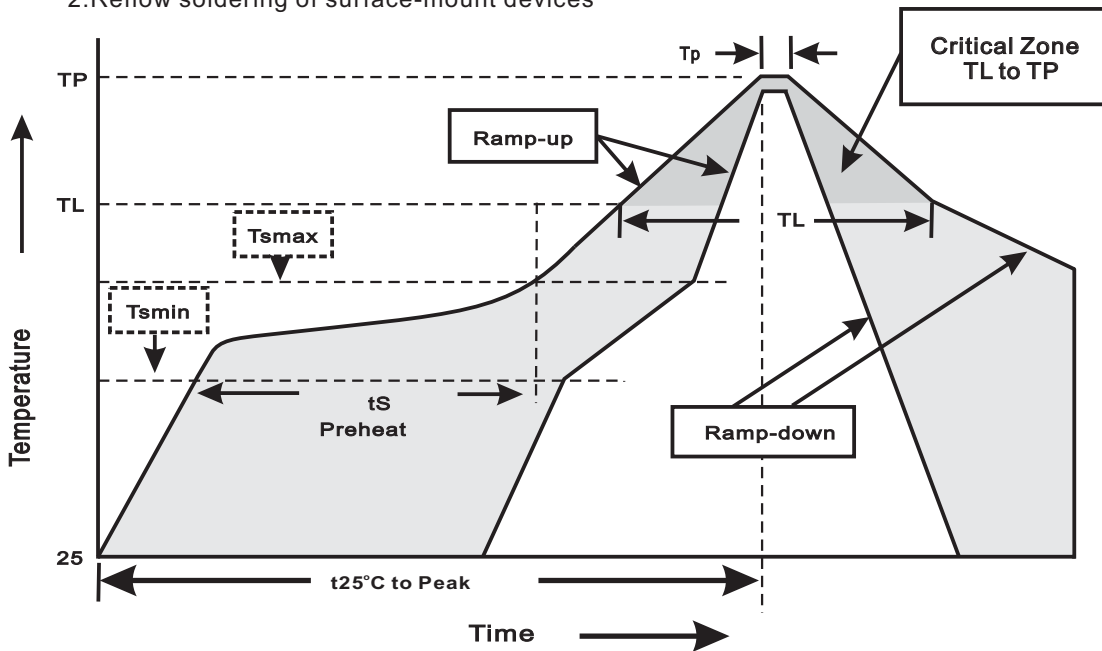
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## Reel packing

| 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-123H1 | 7"        | 3,000      | 4.0                     | 30,000    | 183*123*183     | 178             | 382*257*387       | 240,000      | 9.0                       |

## 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>smmin</sub> )<br>-Temperature Max(T <sub>smmax</sub> )<br>-Time(min to max)(t <sub>s</sub> ) | 150°C<br>200°C<br>60~120sec |
| T <sub>smmax</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                   |

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## 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   |