

# KLFM120-S THRU KLFM140-S

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# KLFM120-S THRU KLFM140-S

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

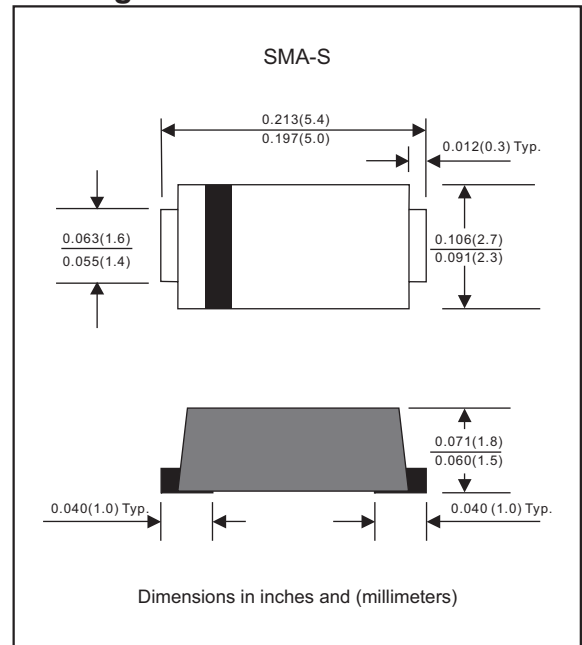
### Features

- Low profile surface mounted application in order to optimize board space
- Extra low reverse leakage current
- High surge capability
- Guardring for overvoltage protection
- Silicon epitaxial planar chip, metal silicon junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free parts, ex. KLFM120-S-H

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AC / 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   | KLFM120-S   | KLFM130-S | KLFM140-S | 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<br>8.3ms single half sine-wave (JEDEC Method) | $I_{FSM}$ | 30          |           |           | Amps               |
| 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 | KLFM120-S                 | KLFM130-S | KLFM140-S | UNITS       |
|---|---------|---------------------------|-----------|-----------|-------------|
| Maximum instantaneous forward voltage at $I_F=1.0A$ | $V_F$   | 0.5                       |           |           | Volts       |
| Maximum reverse leakage current<br>at rated $V_R$   | $I_R$   | $T_J=25^{\circ}\text{C}$  | 0.05      |           | $\text{mA}$ |
|   |         | $T_J=125^{\circ}\text{C}$ | 10        |           | $\text{mA}$ |

### Thermal characteristics

| PARAMETER   | SYMBOLS         | KLFM120-S | KLFM130-S | KLFM140-S | UNITS                         |
|---|-----------------|-----------|-----------|-----------|-------------------------------|
| Typical thermal resistance junction to ambient (Note 1) | $R_{\theta JA}$ | 72        |           |           | $^{\circ}\text{C} / \text{W}$ |
| Typical thermal resistance junction to case (Note 1)    | $R_{\theta JC}$ | 36        |           |           | $^{\circ}\text{C} / \text{W}$ |

Note 1: Mounted on FR-4 PCB Copper, minimum recommended pad layout.

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

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

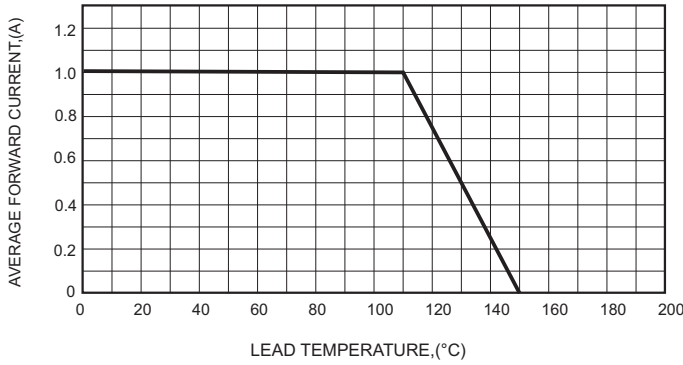


FIG.2-TYPICAL FORWARD CHARACTERISTICS

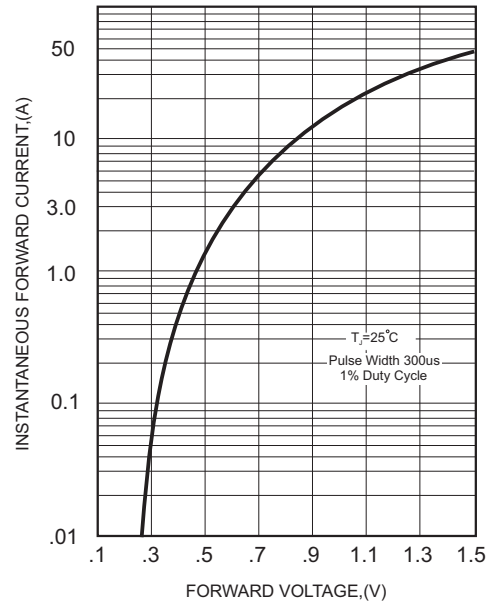


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

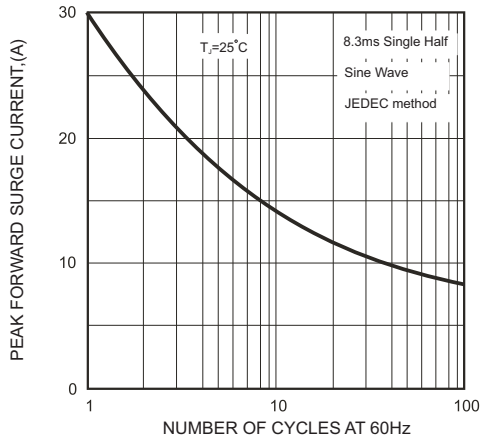


FIG.4-TYPICAL DIODE CAPACITANCE

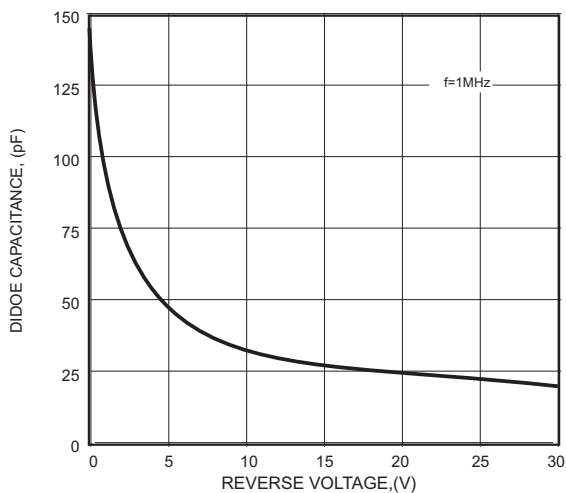
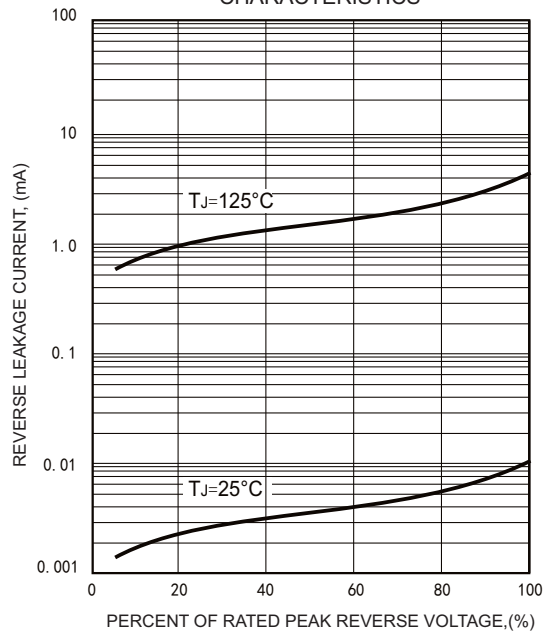




FIG.5 - TYPICAL REVERSE CHARACTERISTICS



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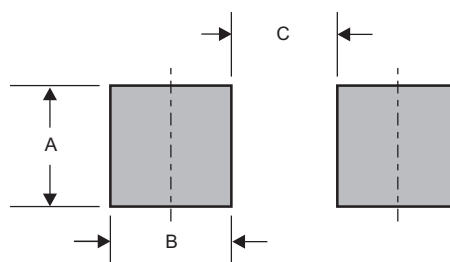
## Pinning information

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

## Marking

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

## Suggested solder pad layout

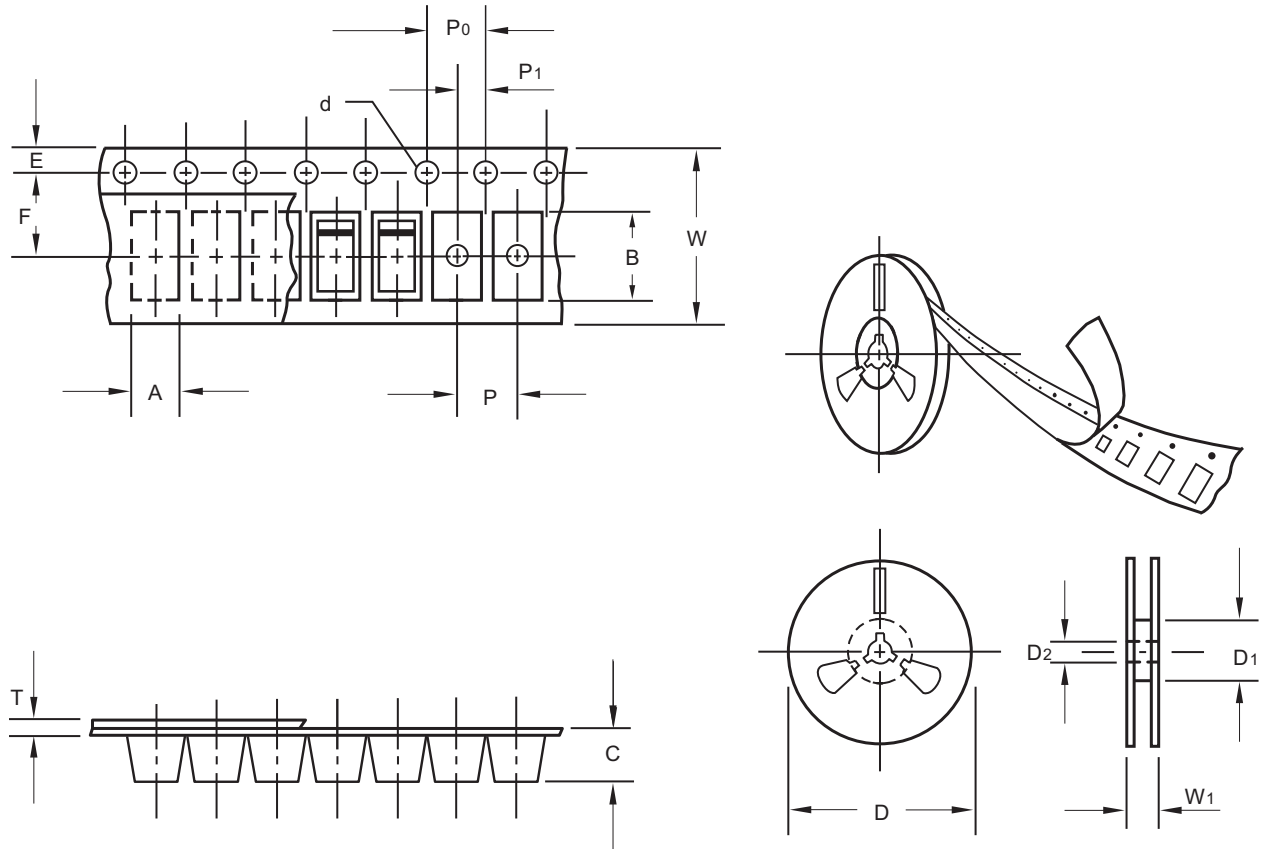


Dimensions in inches and (millimeters)

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

# KLFM120-S THRU KLFM140-S

## 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.

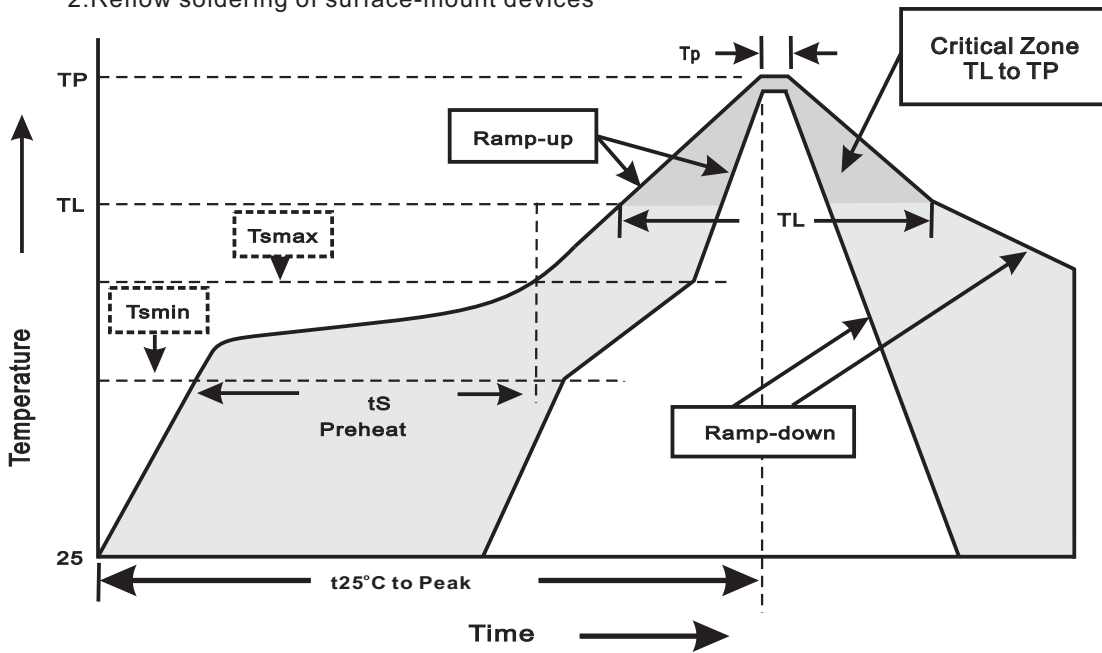
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## Reel packing

| 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(TL to TP)   | <3°C/sec                    |
| Preheat<br>-Temperature Min(Tsmin)<br>-Temperature Max(Tsmax)<br>-Time(min to max)(ts) | 150°C<br>200°C<br>60~120sec |
| Tsmax to TL<br>-Ramp-upRate  | <3°C/sec                    |
| Time maintained above:<br>-Temperature(TL)<br>-Time(tL)                                | 217°C<br>60~260sec          |
| Peak Temperature(TP)   | 255°C-0/+5°C                |
| Time within 5°C of actual Peak Temperature(tp)   | 10~30sec                    |
| Ramp-down Rate   | <6°C/sec                    |
| Time 25°C to Peak Temperature  | <6minutes                   |

# KLFM120-S THRU KLFM140-S

## 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 <sub>SIG</sub> 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   |