

# SFM61-T7B-Q1 Thru SFM68-T7B-Q1

## List

|                                                         |   |
|---------------------------------------------------------|---|
| List.....                                               | 1 |
| Package outline.....                                    | 2 |
| Features.....                                           | 2 |
| Mechanical data.....                                    | 2 |
| Maximum ratings and electrical characteristics .....    | 2 |
| Rating and characteristic curves.....                   | 3 |
| Pinning information.....                                | 4 |
| Marking.....                                            | 4 |
| Suggested solder pad layout.....                        | 4 |
| Packing information.....                                | 5 |
| Reel packing.....                                       | 6 |
| Suggested thermal profiles for soldering processes..... | 6 |
| High reliability test capabilities.....                 | 7 |

# SFM61-T7B-Q1 Thru SFM68-T7B-Q1

## 6.0A Surface Mount

## Super Fast Rectifiers : 50 ~ 600V

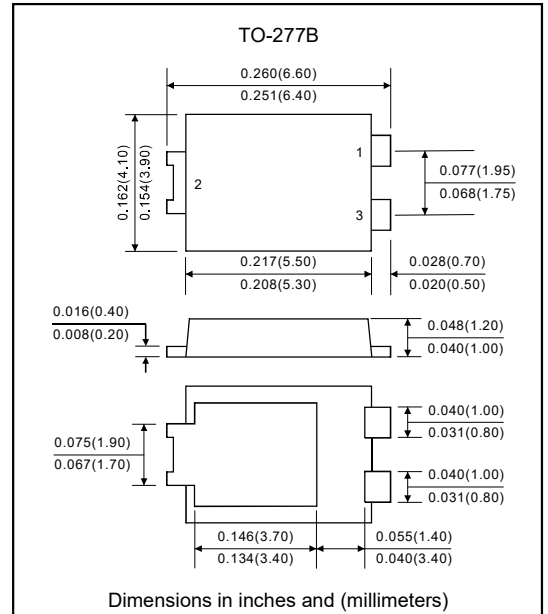
### Features

- The plastic package carries Underwriters Laboratory Flammability Classification 94V-0.
- Idea for printed circuit board .
- Glass passivated junction chip .
- Low reverse leakage.
- High forward surge current capability.
- High temperature soldering guaranteed.
- -Q1 for automotive and other applications requiring unique site an control change requirements; AEC-Q101 qualified and PPAP capable.
- Lead free parts, RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. SFM61-T7B-Q1-H.

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, TO-277B
- Terminals: Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight:0.092 grams(approx.)

### Package outline



### Maximum ratings and electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted)

Rating at  $25^\circ\text{C}$  ambient temperature unless otherwise specified.

Single phase half-wave 60Hz, resistive or inductive load, for capacitive load current derate by 20%.

| Parameter                                                                                       | Symbol            | SFM61-<br>T7B-Q1 | SFM62-<br>T7B-Q1 | SFM63-<br>T7B-Q1 | SFM64-<br>T7B-Q1 | SFM65-<br>T7B-Q1 | SFM66-<br>T7B-Q1 | SFM68-<br>T7B-Q1 | Unit |
|-------------------------------------------------------------------------------------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------|
| Maximum repetitive peak reverse voltage                                                         | V <sub>RRM</sub>  | 50               | 100              | 150              | 200              | 300              | 400              | 600              | V    |
| Maximum RMS voltage                                                                             | V <sub>RMS</sub>  | 35               | 70               | 105              | 140              | 210              | 280              | 420              | V    |
| Maximum DC blocking voltage                                                                     | V <sub>DC</sub>   | 50               | 100              | 150              | 200              | 300              | 400              | 600              | V    |
| Maximum average forward rectified Current at T <sub>L</sub> =100°C                              | I <sub>(AV)</sub> | 6.0              |                  |                  |                  |                  |                  |                  | A    |
| Peak forward surge current 8.3ms single half sinewave superimposed on rated load (JEDEC Method) | I <sub>FSM</sub>  | 150.0            |                  |                  |                  |                  |                  |                  | A    |
| Maximum instantaneous forward voltage per diode at 6.0A                                         | V <sub>F</sub>    | 0.95             |                  |                  |                  | 1.3              |                  | 1.7              | V    |
| Maximum DC reverse current T <sub>A</sub> =25°C                                                 | I <sub>R</sub>    | 2.0              |                  |                  |                  |                  |                  |                  | μA   |
| At rated DC blocking voltage T <sub>A</sub> =125°C                                              |                   | 200              |                  |                  |                  |                  |                  |                  |      |
| Maximum reverse recovery time (Note 1)                                                          | t <sub>rr</sub>   | 35               |                  |                  |                  |                  |                  |                  | ns   |
| Typical junction capacitance (Note 2)                                                           | C <sub>J</sub>    | 82.0             |                  |                  |                  |                  |                  |                  | pF   |
| Typical thermal resistance Junction to ambient                                                  | R <sub>θJA</sub>  | 60.0             |                  |                  |                  |                  |                  |                  | °C/W |
| Operating junction temperature range                                                            | T <sub>J</sub>    | +150             |                  |                  |                  |                  |                  |                  | °C   |
| Storage temperature range                                                                       | T <sub>STG</sub>  | -55 to +150      |                  |                  |                  |                  |                  |                  | °C   |

Note : 1. Reverse recovery time test condition :  $I_F=0.5\text{A}$ ,  $I_R=1.0\text{A}$ ,  $t_{rr}=0.25\text{A}$ .

2. Measured at 1MHz and applied reverse voltage of 4.0V D.C.

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## Rating and characteristic curves

FIG. 1- DERATING CURVE OUTPUT RECTIFIED CURRENT

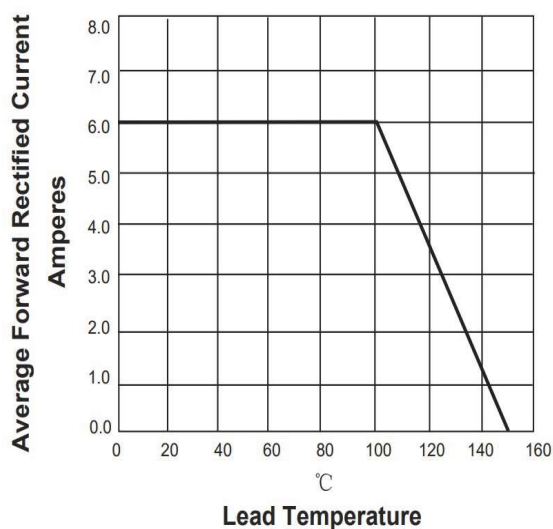


FIG. 2-MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT PER LEG

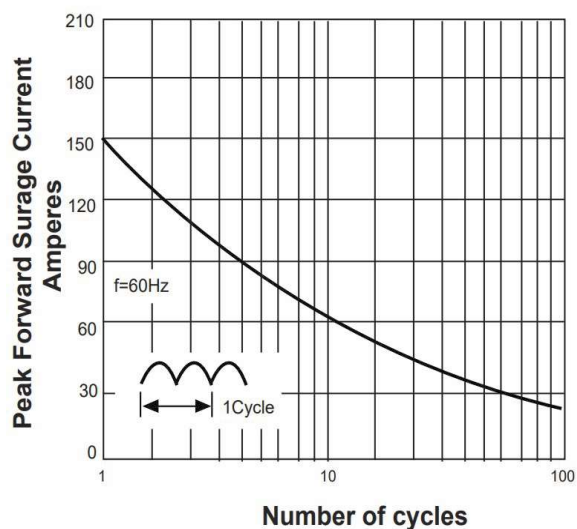


FIG. 3-TYPICAL FORWARD VOLTAGE CHARACTERISTICS

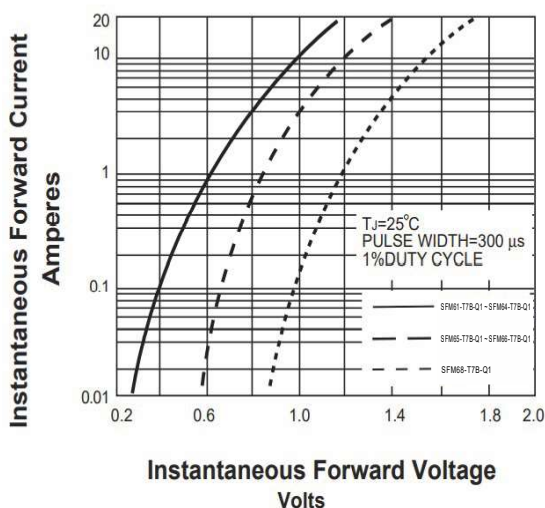
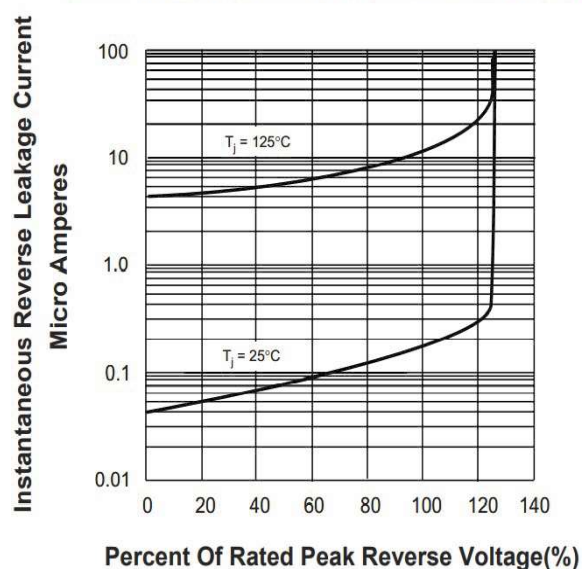
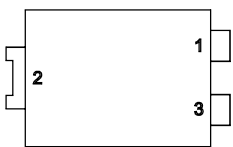
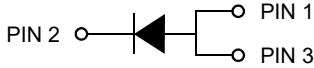


FIG. 4-TYPICAL REVERSE LEAKAGE CHARACTERISTICS



# SFM61-T7B-Q1 Thru SFM68-T7B-Q1

## Pinning information

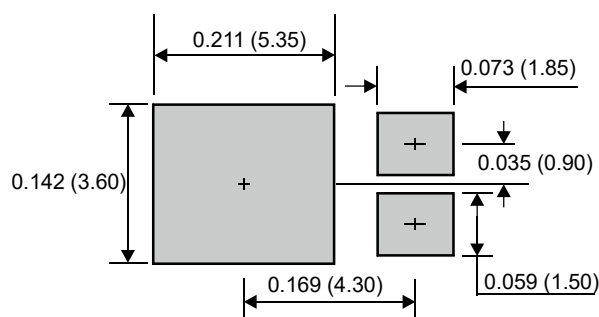
| Pin                                         | Simplified outline                                                                | Symbol                                                                              |
|---------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| PIN 1 Anode<br>PIN 3 Anode<br>PIN 2 Cathode |  |  |

## Marking

| Type Number  | Marking code |
|--------------|--------------|
| SFM61-T7B-Q1 | ES6AV        |
| SFM62-T7B-Q1 | ES6BV        |
| SFM63-T7B-Q1 | ES6CV        |
| SFM64-T7B-Q1 | ES6DV        |
| SFM65-T7B-Q1 | ES6FV        |
| SFM66-T7B-Q1 | ES6GV        |
| SFM68-T7B-Q1 | ES6JV        |

## Suggested solder pad layout

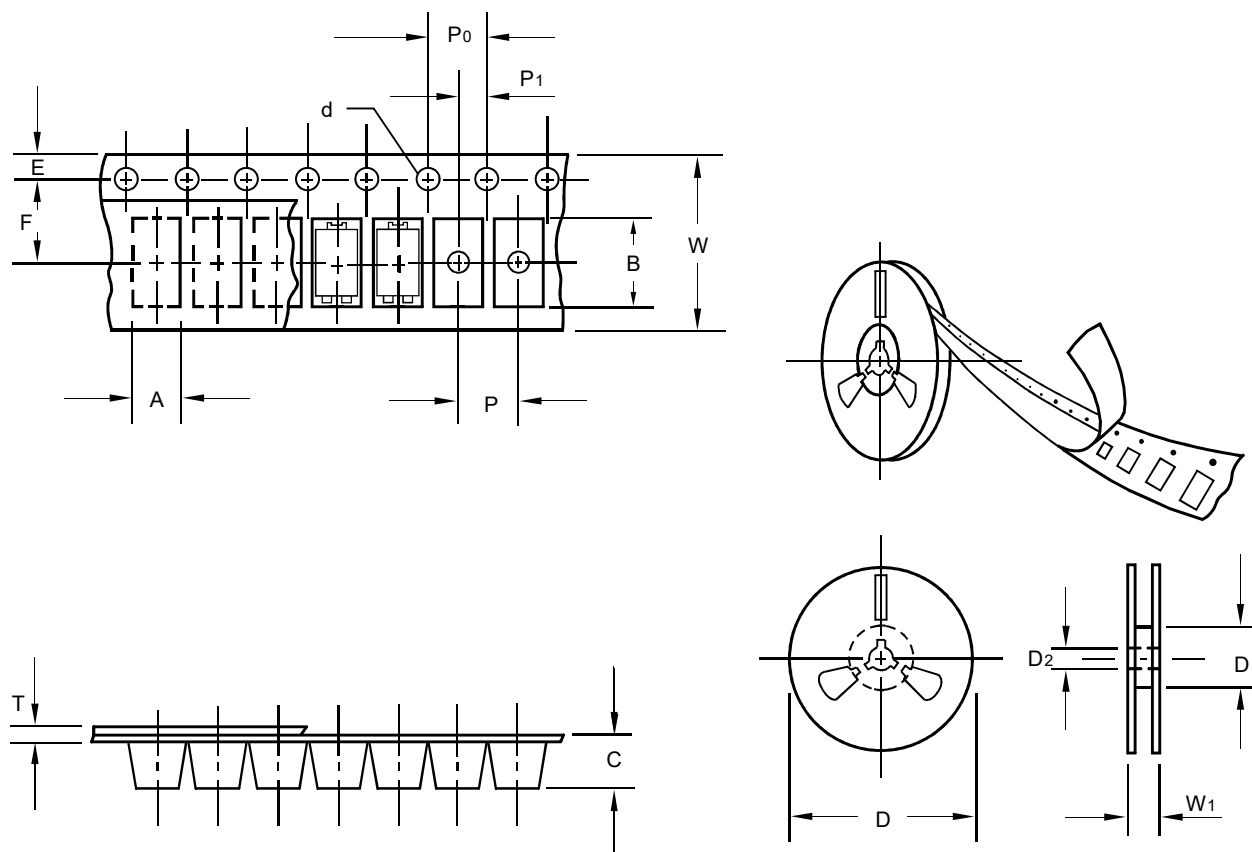
TO-277B



Dimensions in inches and (millimeters)

## SFM61-T7B-Q1 Thru SFM68-T7B-Q1

## Packing information



unit:mm

| Item                      | Symbol         | Tolerance | TO-277B |
|---------------------------|----------------|-----------|---------|
| Carrier width             | A              | 0.1       | 4.40    |
| Carrier length            | B              | 0.1       | 6.90    |
| Carrier depth             | C              | 0.1       | 1.30    |
| Sprocket hole             | d              | 0.1       | 1.55    |
| 13" Reel outside diameter | D              | 2.0       | 330.00  |
| 13" Reel inner diameter   | D <sub>1</sub> | min       | 50.00   |
| 7" Reel outside diameter  | D              | 2.0       | 178.00  |
| 7" Reel inner diameter    | D <sub>1</sub> | min       | 62.00   |
| Feed hole diameter        | D <sub>2</sub> | 0.5       | 13.00   |
| Sprocket hole position    | E              | 0.1       | 1.75    |
| Punch hole position       | F              | 0.1       | 7.50    |
| Punch hole pitch          | P              | 0.1       | 8.00    |
| Sprocket hole pitch       | P <sub>0</sub> | 0.1       | 4.00    |
| Embossment center         | P <sub>1</sub> | 0.1       | 2.00    |
| Overall tape thickness    | T              | 0.1       | 0.25    |
| Tape width                | W              | 0.3       | 12.00   |
| Reel width                | W <sub>1</sub> | 1.0       | 14.00   |

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

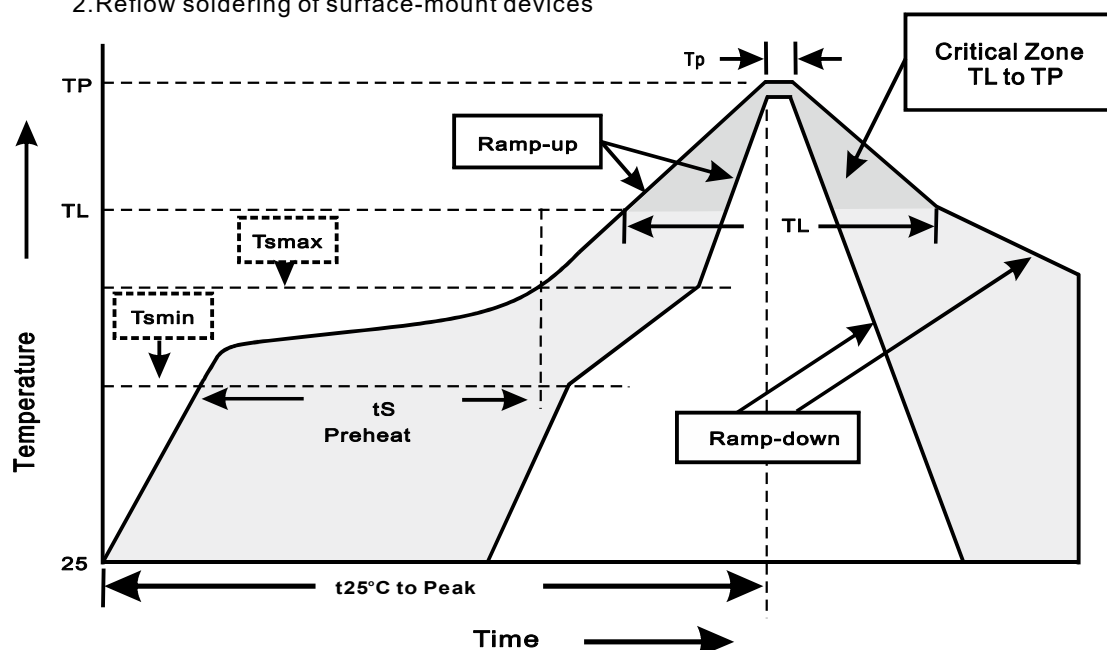
## SFM61-T7B-Q1 Thru SFM68-T7B-Q1

## 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) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| TO-277B | 13"       | 5,000      | 8.0                     | 10,000    | 337*337*37      | 330             | 350*330*360       | 80,000       | 18.0                      |

## 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>smin</sub> )<br>-Temperature Max(T <sub>smax</sub> )<br>-Time(min to max)(t <sub>s</sub> ) | 150°C<br>200°C<br>60~120sec |
| T <sub>smax</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                                                                                                                | <3°C/sec                    |
| Time 25°C to Peak Temperature                                                                                                 | <6minutes                   |

**SFM61-T7B-Q1 Thru SFM68-T7B-Q1****High reliability test capabilities**

| Item Test                         | Conditions                                                                                                                                 | Reference                     |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1. Solder Resistance              | at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$<br>immerse body into solder $1/16" \pm 1/32"$                                     | 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 $T_J = 150^{\circ}\text{C}$ 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            | $-55^{\circ}\text{C}$ 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 $150^{\circ}\text{C}$ for 1000 hrs.                                                                                                     | MIL-STD-750D<br>METHOD-1031   |