

# FM3L40-BS-Q1 THRU FM3L100-BS-Q1

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# FM3L40-BS-Q1 THRU FM3L100-BS-Q1

## 3.0A Low VF Surface Mount Schottky Barrier Rectifiers - 40V-100V

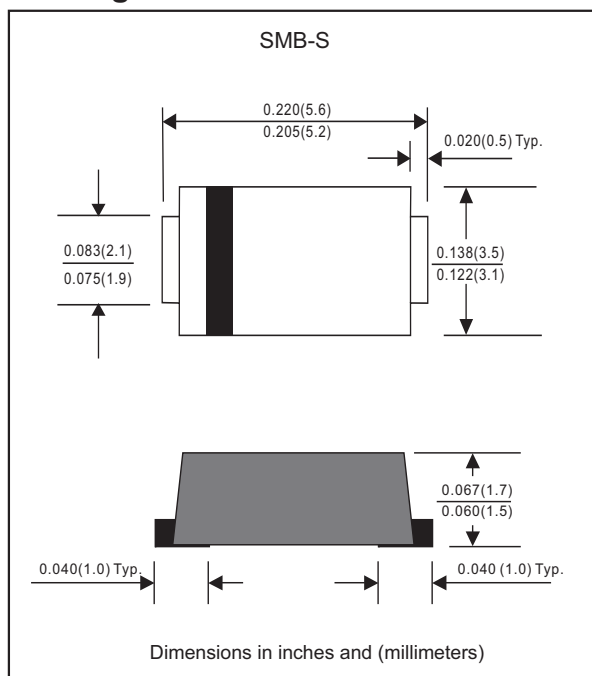
### Features

- High current density schottky
- 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
- Lead-free parts meet RoHS requirements
- Qualified to AEC-Q101 standards for high reliability
- Suffix "-H" indicates Halogen free parts, ex. FM3L40-BS-Q1-H

### Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AA/SMB-S
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.072 gram

### Package outline



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

| PARAMETER                                                   | SYMBOLS | FM3L40-BS-Q1 | FM3L45-BS-Q1 | FM3L60-BS-Q1 | FM3L100-BS-Q1 | UNITS |
|-------------------------------------------------------------|---------|--------------|--------------|--------------|---------------|-------|
| Maximum repetitive peak reverse voltage                     | VRRM    | 40           | 45           | 60           | 100           | Volts |
| Maximum RMS voltage                                         | VRMS    | 28           | 31.5         | 42           | 70            | Volts |
| Maximum continuous reverse voltage                          | VR      | 40           | 45           | 60           | 100           | Volts |
| Maximum average forward rectified current                   | IO      | 3.0          |              |              |               | Amps  |
| Non-repetitive peak forward surge current 1.0ms square-wave | IFSM    | 80           |              |              |               | Amps  |
| Operating junction temperature range                        | TJ      | -55 to +125  |              | -55 to +150  |               | °C    |
| Storage temperature range                                   | TSTG    | -65 to +175  |              |              |               | °C    |

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

| PARAMETER                                                                                            | SYMBOLS | FM3L40-BS-Q1 | FM3L45-BS-Q1 | FM3L60-BS-Q1 | FM3L100-BS-Q1 | UNITS    |
|------------------------------------------------------------------------------------------------------|---------|--------------|--------------|--------------|---------------|----------|
| Maximum instantaneous forward voltage at $I_F=3.0\text{A}$                                           | $V_F$   | 0.45         | 0.45         | 0.55         | 0.75          | Volts    |
| Maximum reverse leakage current $T_J=25^{\circ}\text{C}$<br>at rated $V_R$ $T_J=100^{\circ}\text{C}$ | $I_R$   | 0.5<br>20    |              |              |               | mA<br>mA |

### Thermal characteristics

| PARAMETER                                               | SYMBOLS         | FM3L40-BS-Q1 | FM3L45-BS-Q1 | FM3L60-BS-Q1 | FM3L100-BS-Q1 | UNITS                         |
|---------------------------------------------------------|-----------------|--------------|--------------|--------------|---------------|-------------------------------|
| Typical thermal resistance junction to ambient (Note 1) | $R_{\theta JA}$ | 61           |              |              |               | $^{\circ}\text{C} / \text{W}$ |
| Typical thermal resistance junction to case (Note 1)    | $R_{\theta JC}$ | 31           |              |              |               | $^{\circ}\text{C} / \text{W}$ |

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

## Rating and characteristic curves (FM3L40-BS-Q1 THRU FM3L100-BS-Q1)

FIG.1-TYPICAL FORWARD CURRENT DERATING CURVE

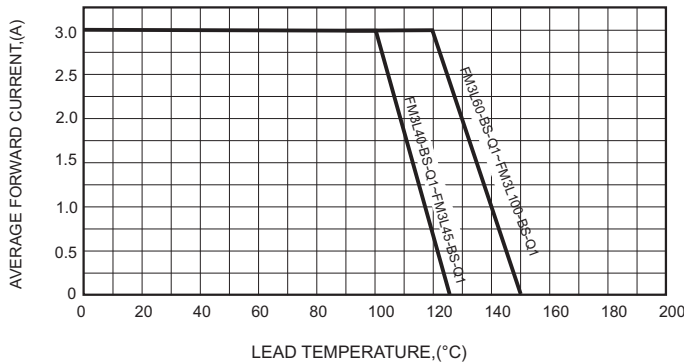


FIG.2-TYPICAL FORWARD CHARACTERISTICS

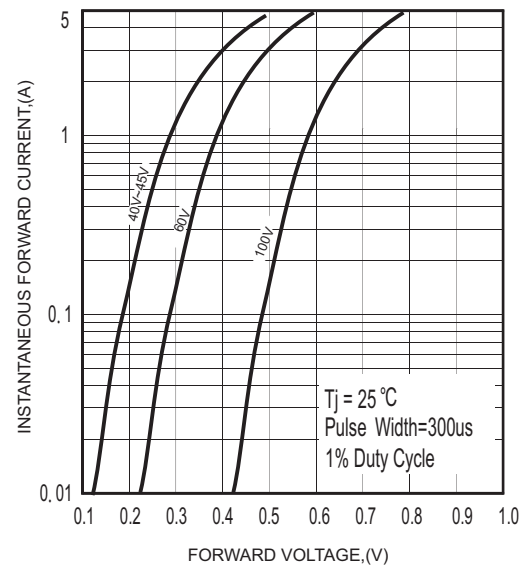


FIG.3-MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

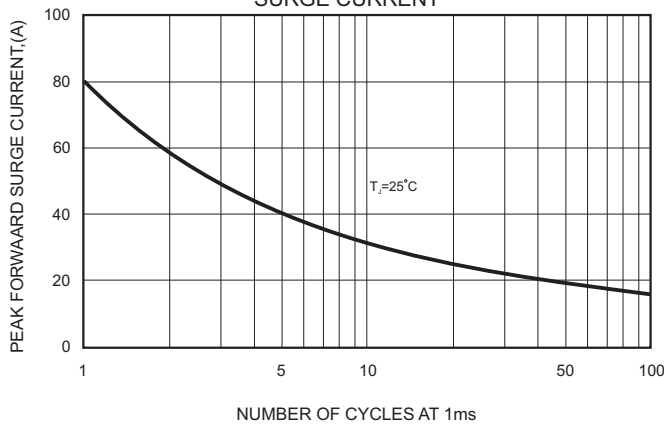


FIG.4-TYPICAL JUNCTION CAPACITANCE

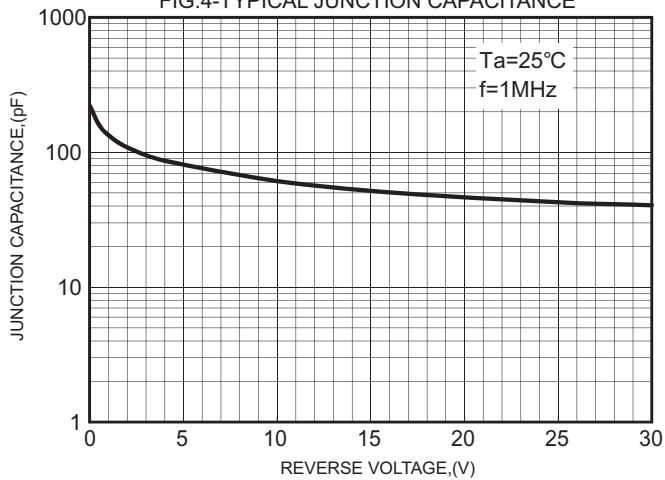
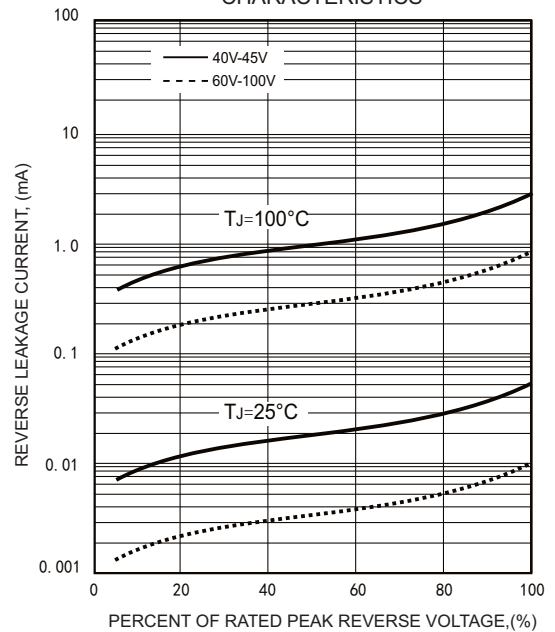


FIG.5 - TYPICAL REVERSE CHARACTERISTICS

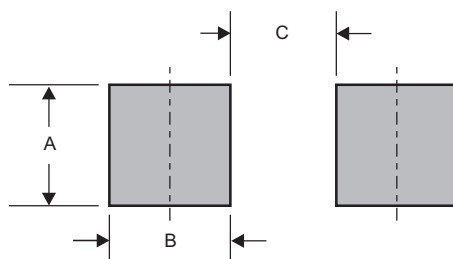


**FM3L40-BS-Q1 THRU FM3L100-BS-Q1****Pinning information**

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

**Marking**

| Type number   | Marking code |
|---------------|--------------|
| FM3L40-BS-Q1  | 3L40         |
| FM3L45-BS-Q1  | 3L45         |
| FM3L60-BS-Q1  | 3L60         |
| FM3L100-BS-Q1 | 3L100        |

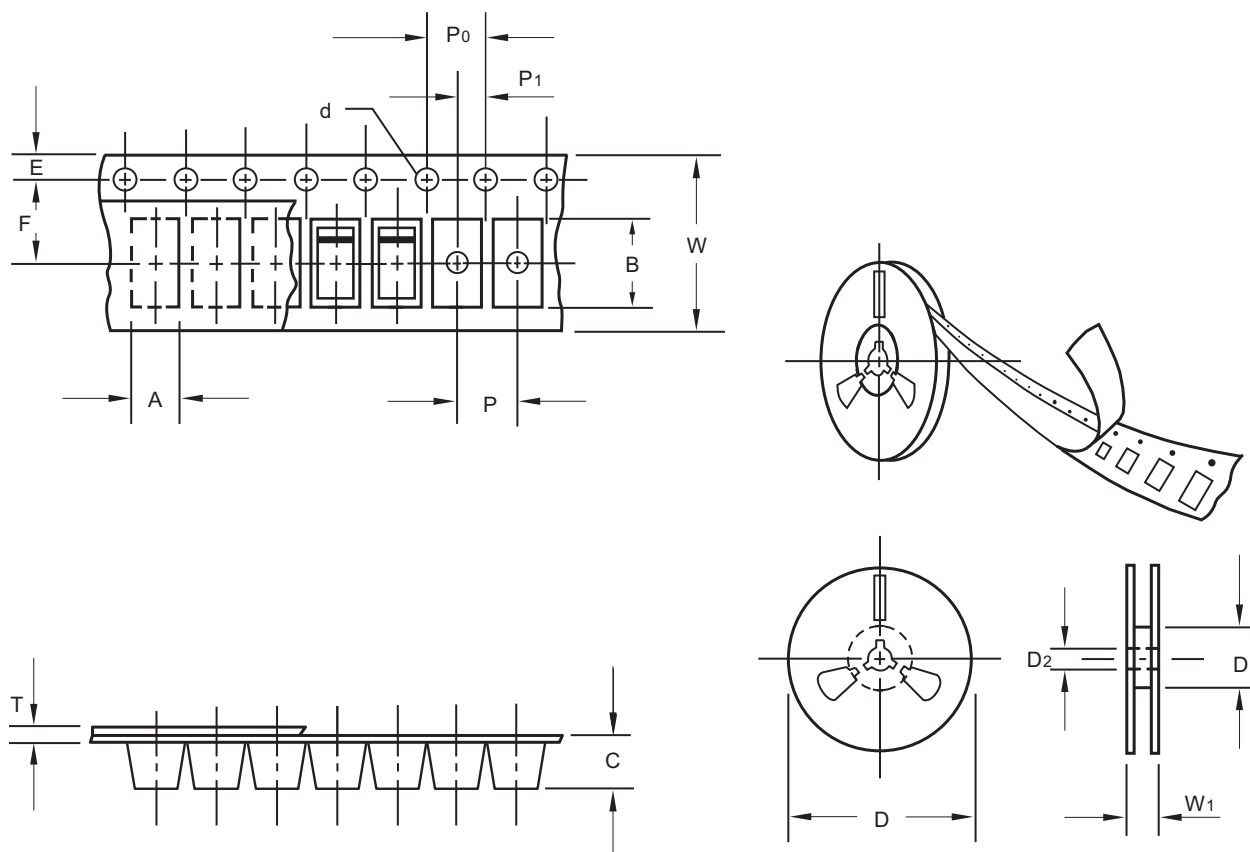
**Suggested solder pad layout**

Dimensions in inches and (millimeters)

| PACKAGE | A            | B            | C            |
|---------|--------------|--------------|--------------|
| SMB-S   | 0.096 (2.45) | 0.063 (1.60) | 0.130 (3.30) |

## FM3L40-BS-Q1 THRU FM3L100-BS-Q1

## Packing information



unit:mm

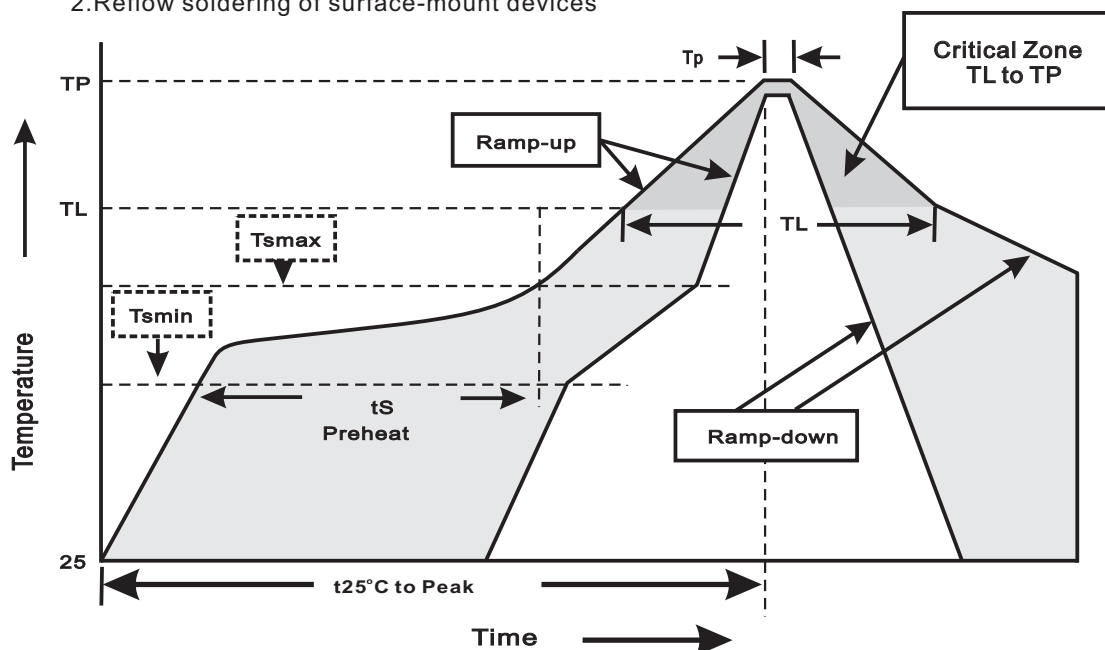
| Item                      | Symbol | Tolerance | SMB-S  |
|---------------------------|--------|-----------|--------|
| Carrier width             | A      | 0.1       | 3.81   |
| Carrier length            | B      | 0.1       | 5.74   |
| Carrier depth             | C      | 0.1       | 2.24   |
| 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       | 8.00   |
| 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.

## 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) |
|---------|-----------|---------------|-------------------------------|--------------|-----------------------|-----------------------|-------------------------|-----------------|---------------------------------|
| SMB-S   | 13"       | 4,000         | 8.0                           | 8,000        | 335*335*38            | 330                   | 350*330*360             | 64,000          | 13.0                            |

1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%  
2.Reflow soldering of surface-mount devices



| Profile Feature                                                                                                       | Soldering Condition                                                      |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Average ramp-up rate( $T_L$ to $T_P$ )                                                                                | $<3^{\circ}\text{C}/\text{sec}$                                          |
| Preheat<br>-Temperature Min( $T_{\text{min}}$ )<br>-Temperature Max( $T_{\text{max}}$ )<br>-Time(min to max)( $t_s$ ) | $150^{\circ}\text{C}$<br>$200^{\circ}\text{C}$<br>$60\sim 120\text{sec}$ |
| $T_{\text{max}}$ 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                                                                         | $<6\text{minutes}$                                                       |

**FM3L40-BS-Q1 THRU FM3L100-BS-Q1****High reliability test capabilities**

| Item Test                                       | Conditions                                                                                                                                      | Reference                     |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1. MSL Preconditioning                          | 24hr bake@125°C+168hrs@85°C<br>/85%RH+3xIR@260°C+1flux<br>immersion+alcohol+DI H2O rinse                                                        | JESD22-A113                   |
| 2. Operation Life                               | Ta=25°C, Rated Current (Io=Io max.) Test Duration: 1000hrs                                                                                      | MIL-STD-750E<br>METHOD 1027.3 |
| 3. High Temperature Reverse Bias                | 80% Rated VR (Tj=Tj max.) Test Duration: 1000hrs                                                                                                | JESD22-A108                   |
| 4. High Temperature Storage Life                | Ta=125°C Test Duration: 1000hrs                                                                                                                 | JESD22 A-103                  |
| 5. Temperature Cycle                            | -55°C(15min) to 150°C(15min) Test Cycles: 1000cycles                                                                                            | JESD22 A-104                  |
| 6. Autoclave                                    | P=2atm Ta=121°C RH=100% Test Duration: 96hrs                                                                                                    | JESD22 A-102                  |
| 7. Intermittent Operational Life                | Ta=25°C, On/lo Max. 2min, Off/2min,<br>Test Cycles: 15000cycles                                                                                 | MIL-STD-750E<br>METHOD 1037   |
| 8. Solderability                                | 245±5°C for 5sec                                                                                                                                | J-STD-002                     |
| 9. Moisture Resistance                          | Ta=85°C/85% Relative humidity Test Duration: 1000hrs                                                                                            | MIL-STD-750E<br>METHOD 1021.2 |
| 10. Resistance To Solder Heat                   | 260±5°C for 10sec                                                                                                                               | JESD22 B-106                  |
| 11. High Temperature High Humidity Reverse Bias | Ta=85°C, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration: 1000hrs | JESD22-A101                   |