

## Surface Mount Ultrafast Plastic Rectifier



**SMC (DO-214AB)**

### FEATURES

- Glass passivated pellet chip junction
- Ideal for automated placement
- Ultrafast recovery times for high efficiency
- Low forward voltage, low power losses
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
Available

### TYPICAL APPLICATIONS

For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, and telecommunication.

### MECHANICAL DATA

**Case:** SMC (DO-214AB)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade

Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified

Base P/NHM3\_X - halogen-free, RoHS compliant, and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B, ....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

| PRIMARY CHARACTERISTICS |                           |
|-------------------------|---------------------------|
| $I_{F(AV)}$             | 3.0 A                     |
| $V_{RRM}$               | 50 V, 100 V, 150 V, 200 V |
| $I_{FSM}$               | 100 A                     |
| $t_{rr}$                | 20 ns                     |
| $V_F$                   | 0.90 V                    |
| $T_J \text{ max.}$      | 150 °C                    |
| Package                 | SMC (DO-214AB)            |
| Diode variations        | Single                    |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                     |                |             |      |      |      |      |
|------------------------------------------------------------------------------------|----------------|-------------|------|------|------|------|
| PARAMETER                                                                          | SYMBOL         | ES3A        | ES3B | ES3C | ES3D | UNIT |
| Device marking code                                                                |                | EA          | EB   | EC   | ED   |      |
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 50          | 100  | 150  | 200  | V    |
| Maximum RMS voltage                                                                | $V_{RMS}$      | 35          | 70   | 105  | 140  | V    |
| Maximum DC blocking voltage                                                        | $V_{DC}$       | 50          | 100  | 150  | 200  | V    |
| Maximum average forward rectified current at $T_L = 100\text{ °C}$                 | $I_{F(AV)}$    | 3.0         |      |      |      | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 100         |      |      |      | A    |
| Operating junction and storage temperature range                                   | $T_J, T_{STG}$ | -55 to +150 |      |      |      | °C   |



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                                                                                        |                         |                               |      |      |      |      |      |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------|------|------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                                                        |                         | SYMBOL                        | ES3A | ES3B | ES3C | ES3D | UNIT |
| Maximum instantaneous forward voltage                                      | 3.0 A                                                                                                  |                         | V <sub>F</sub> <sup>(1)</sup> | 0.90 |      |      |      | V    |
| Maximum DC reverse current at rated DC blocking voltage                    |                                                                                                        | T <sub>A</sub> = 25 °C  | I <sub>R</sub>                | 10   |      |      |      | μA   |
|                                                                            |                                                                                                        | T <sub>A</sub> = 100 °C |                               | 500  |      |      |      |      |
| Maximum reverse recovery time                                              | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A                               |                         | t <sub>rr</sub>               | 20   |      |      |      | ns   |
| Maximum reverse recovery time                                              | I <sub>F</sub> = 3.0 A, V <sub>R</sub> = 30 V, dI/dt = 50 A/μs, I <sub>rr</sub> = 10 % I <sub>RM</sub> | T <sub>J</sub> = 25 °C  | t <sub>rr</sub>               | 30   |      |      |      | ns   |
|                                                                            |                                                                                                        | T <sub>J</sub> = 100 °C |                               | 50   |      |      |      |      |
| Maximum stored charge                                                      | I <sub>F</sub> = 3.0 A, V <sub>R</sub> = 30 V, dI/dt = 50 A/μs, I <sub>rr</sub> = 10 % I <sub>RM</sub> | T <sub>J</sub> = 25 °C  | Q <sub>rr</sub>               | 15   |      |      |      | nC   |
|                                                                            |                                                                                                        | T <sub>J</sub> = 100 °C |                               | 35   |      |      |      |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                                                           |                         | C <sub>J</sub>                | 45   |      |      |      | pF   |

**Note**

<sup>(1)</sup> Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                 |      |      |      |      |      |
|-------------------------------------------------------------------------|---------------------------------|------|------|------|------|------|
| PARAMETER                                                               | SYMBOL                          | ES3A | ES3B | ES3C | ES3D | UNIT |
| Typical thermal resistance                                              | R <sub>θJA</sub> <sup>(1)</sup> | 47   |      |      |      | °C/W |
|                                                                         | R <sub>θJL</sub> <sup>(1)</sup> | 12   |      |      |      |      |

**Note**

<sup>(1)</sup> Units mounted on PCB with 0.31" x 0.31" (8.0 mm x 8.0 mm) copper pad areas

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| ES3D-E3/57T                    | 0.211           | 57T                    | 850           | 7" diameter plastic tape and reel  |
| ES3D-E3/9AT                    | 0.211           | 9AT                    | 3500          | 13" diameter plastic tape and reel |
| ES3DHE3_A/H <sup>(1)</sup>     | 0.211           | H                      | 850           | 7" diameter plastic tape and reel  |
| ES3DHE3_A/I <sup>(1)</sup>     | 0.211           | I                      | 3500          | 13" diameter plastic tape and reel |
| ES3D-M3/57T                    | 0.211           | 57T                    | 850           | 7" diameter plastic tape and reel  |
| ES3D-M3/9AT                    | 0.211           | 9AT                    | 3500          | 13" diameter plastic tape and reel |
| ES3DHM3_A/H <sup>(1)</sup>     | 0.211           | H                      | 850           | 7" diameter plastic tape and reel  |
| ES3DHM3_A/I <sup>(1)</sup>     | 0.211           | I                      | 3500          | 13" diameter plastic tape and reel |

**Note**

<sup>(1)</sup> AEC-Q101 qualified

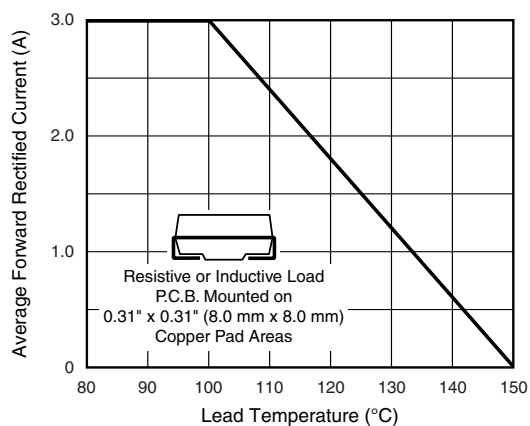
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

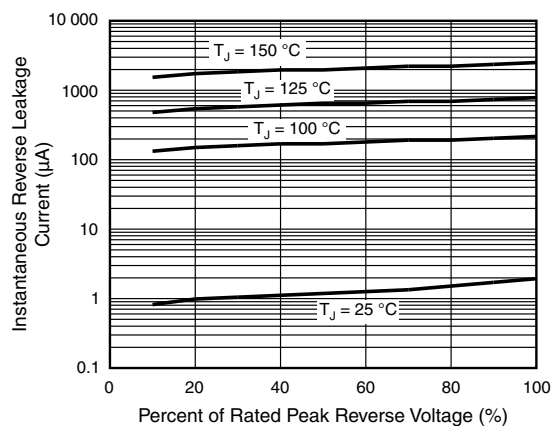


Fig. 4 - Typical Reverse Leakage Characteristics

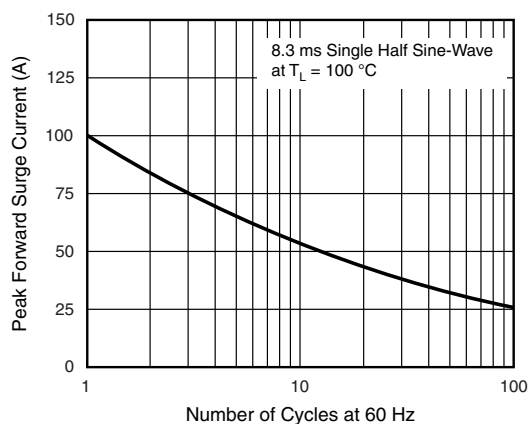


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

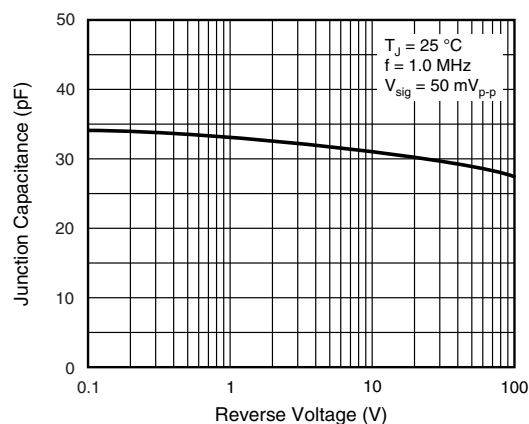


Fig. 5 - Typical Junction Capacitance

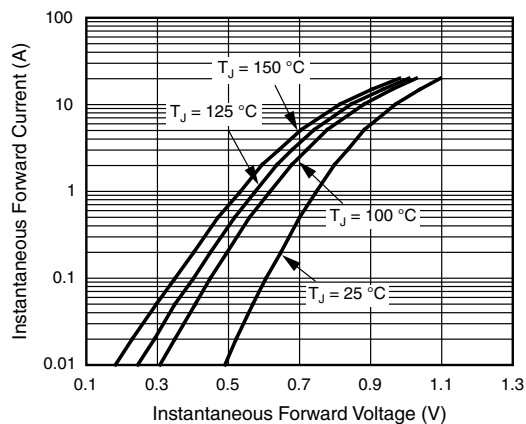
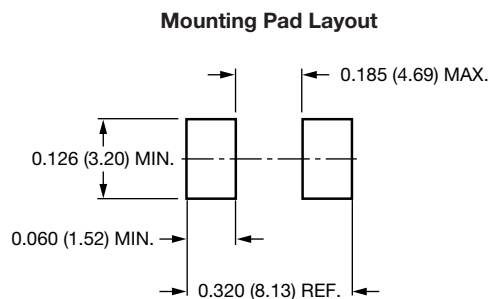
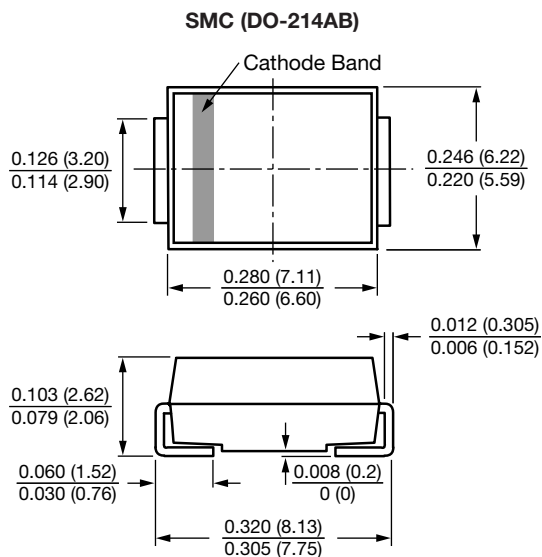


Fig. 3 - Typical Instantaneous Forward Characteristics



**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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