



**THE DATASHEET OF  
ES3DHE3\_A/H**



## Surface Mount Ultrafast Plastic Rectifier


**SMC (DO-214AB)**

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

### 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)

### 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   |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |  |             |                                   |      |      |      |               |
|--|--|-------------|-----------------------------------|------|------|------|---------------|
| PARAMETER  | TEST CONDITIONS  | SYMBOL      | ES3A                              | ES3B | ES3C | ES3D | UNIT          |
| Maximum instantaneous forward voltage  | 3.0 A  | $V_F^{(1)}$ | 0.90                              |      |      |      | V             |
| Maximum DC reverse current at rated DC blocking voltage                                      |  | $I_R$       | $T_A = 25\text{ }^\circ\text{C}$  |      |      | 10   | $\mu\text{A}$ |
|  |  |             | $T_A = 100\text{ }^\circ\text{C}$ |      |      | 500  |               |
| Maximum reverse recovery time  | $I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$                               | $t_{rr}$    | 20                                |      |      |      | ns            |
| Maximum reverse recovery time  | $I_F = 3.0\text{ A}, V_R = 30\text{ V}, dl/dt = 50\text{ A}/\mu\text{s}, I_{rr} = 10\% I_{RM}$ | $t_{rr}$    | $T_J = 25\text{ }^\circ\text{C}$  |      |      | 30   | ns            |
|  |  |             | $T_J = 100\text{ }^\circ\text{C}$ |      |      | 50   |               |
| Maximum stored charge  | $I_F = 3.0\text{ A}, V_R = 30\text{ V}, dl/dt = 50\text{ A}/\mu\text{s}, I_{rr} = 10\% I_{RM}$ | $Q_{rr}$    | $T_J = 25\text{ }^\circ\text{C}$  |      |      | 15   | nC            |
|  |  |             | $T_J = 100\text{ }^\circ\text{C}$ |      |      | 35   |               |
| Typical junction capacitance   | 4.0 V, 1 MHz   | $C_J$       | 45                                |      |      |      | pF            |

**Note**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                       |      |      |      |      |                           |
|---|-----------------------|------|------|------|------|---------------------------|
| PARAMETER   | SYMBOL                | ES3A | ES3B | ES3C | ES3D | UNIT                      |
| Typical thermal resistance  | $R_{\theta JA}^{(1)}$ | 47   |      |      |      | $^\circ\text{C}/\text{W}$ |
|   | $R_{\theta JL}^{(1)}$ | 12   |      |      |      |                           |

**Note**

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

| <b>ORDERING INFORMATION</b> (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**

(1) AEC-Q101 qualified

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

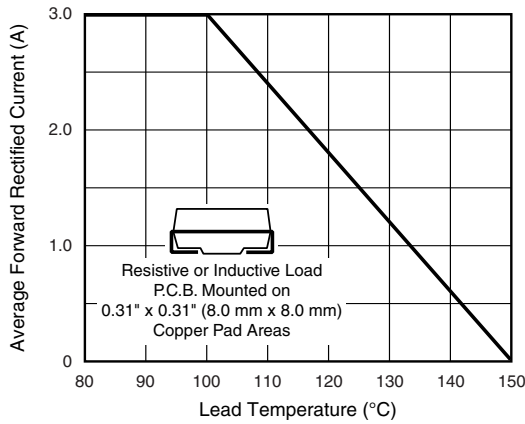


Fig. 1 - Maximum Forward Current Derating Curve

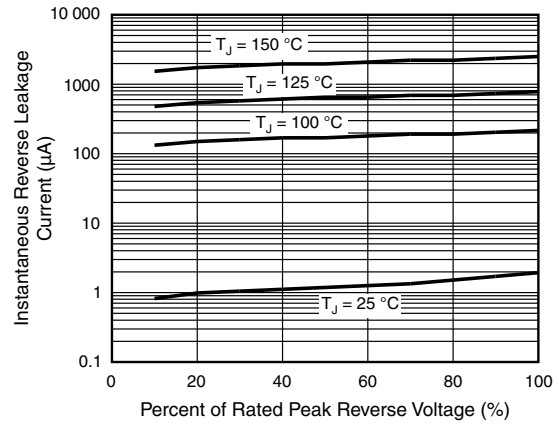


Fig. 4 - Typical Reverse Leakage Characteristics

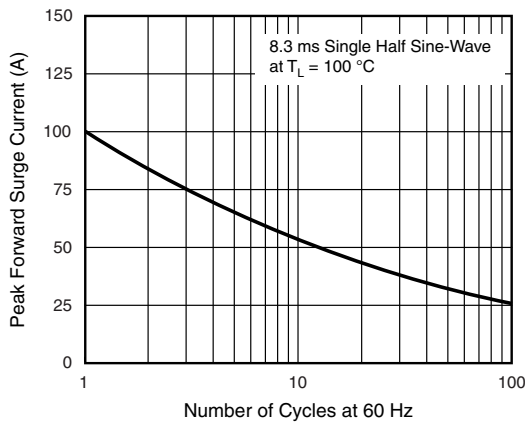


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

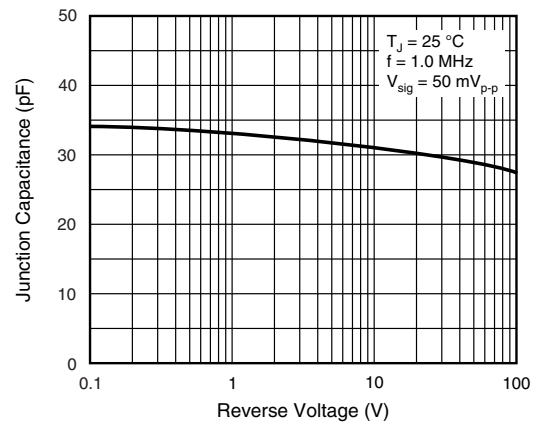


Fig. 5 - Typical Junction Capacitance

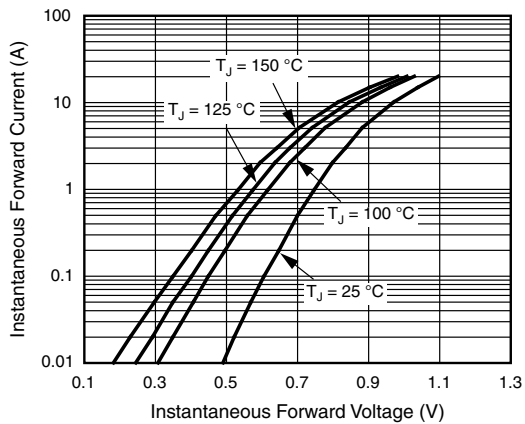
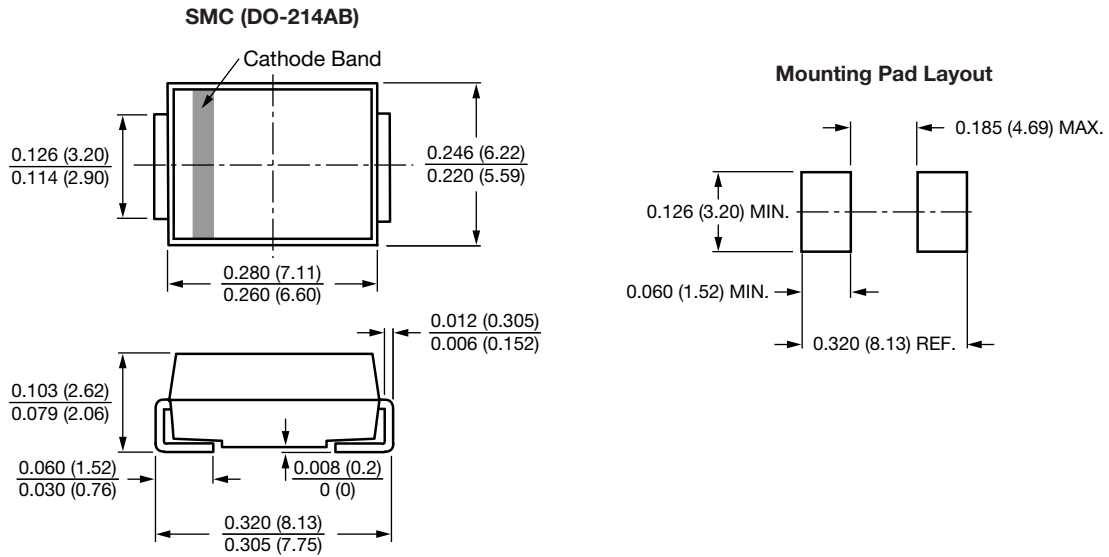


Fig. 3 - Typical Instantaneous Forward Characteristics



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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