

## Surface-Mount Ultrafast Plastic Rectifier



**SMC (DO-214AB)**

Cathode  Anode

### LINKS TO ADDITIONAL RESOURCES



[3D Models](#)



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

### 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                    |
| $T_J$ max.            | 150 °C                    |
| Package               | SMC (DO-214AB)            |
| Circuit configuration | Single                    |

### MAXIMUM RATINGS ( $T_A = 25$ °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 $T_L = 100$ °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** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                                               | TEST CONDITIONS                                                                                                    |                                     | SYMBOL               | ES3A | ES3B | ES3C | ES3D | UNIT          |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------|------|------|------|------|---------------|
| Maximum instantaneous forward voltage                   | 3.0 A                                                                                                              |                                     | $V_F$ <sup>(1)</sup> | 0.90 |      |      |      | V             |
| Maximum DC reverse current at rated DC blocking voltage |                                                                                                                    | $T_A = 25\text{ }^{\circ}\text{C}$  | $I_R$                | 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                           | $I_F = 3.0\text{ A}$ , $V_R = 30\text{ V}$ ,<br>$dI/dt = 50\text{ A}/\mu\text{s}$ , $I_{rr} = 10\text{ \% }I_{RM}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | $t_{rr}$             | 30   |      |      |      | ns            |
|                                                         |                                                                                                                    | $T_J = 100\text{ }^{\circ}\text{C}$ |                      | 50   |      |      |      |               |
| Maximum stored charge                                   | $I_F = 3.0\text{ A}$ , $V_R = 30\text{ V}$ ,<br>$dI/dt = 50\text{ A}/\mu\text{s}$ , $I_{rr} = 10\text{ \% }I_{RM}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | $Q_{rr}$             | 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**THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  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**

(1) 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**

(1) AEC-Q101 qualified

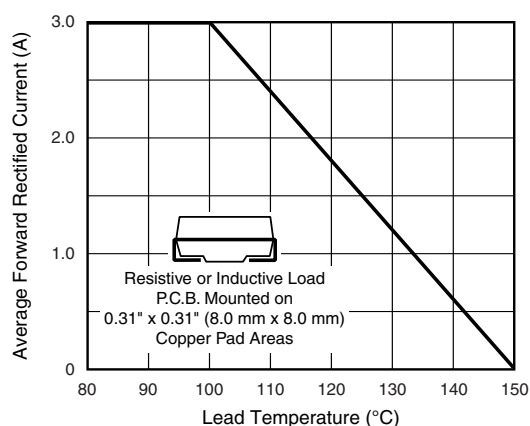
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

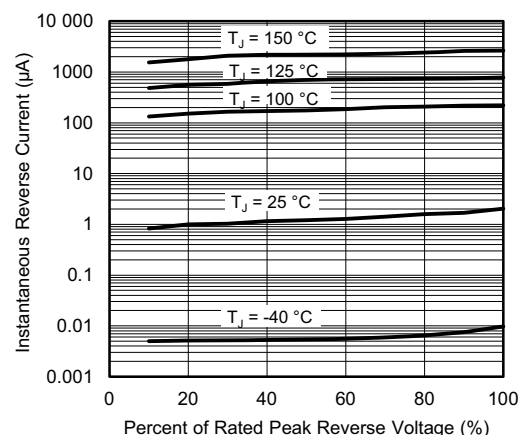


Fig. 4 - Typical Reverse Leakage Characteristics

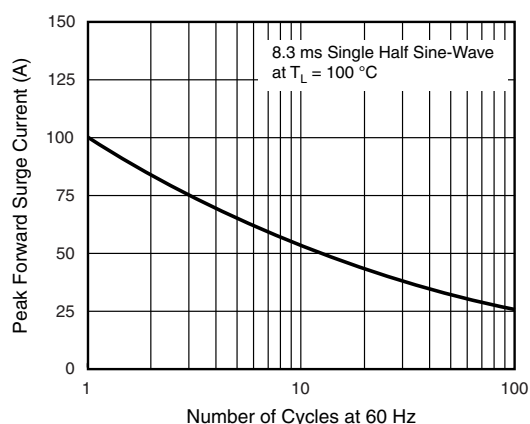


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

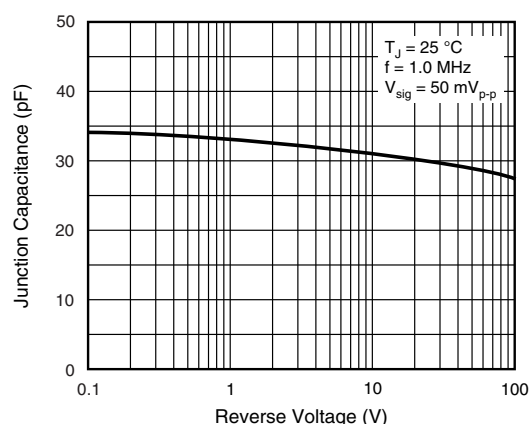


Fig. 5 - Typical Junction Capacitance

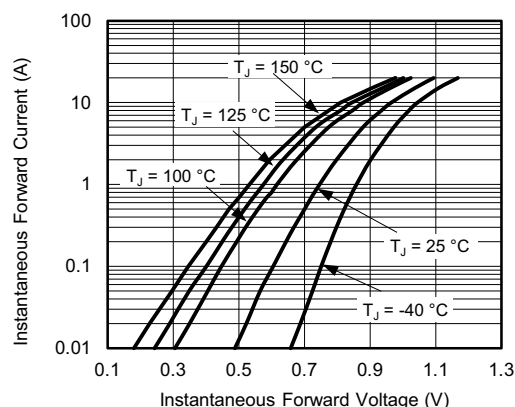
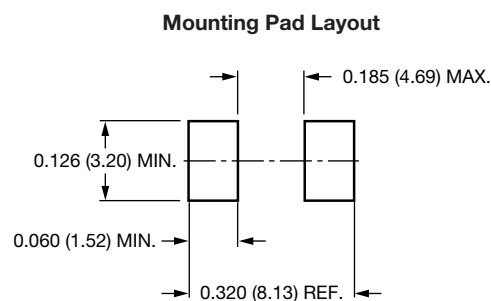
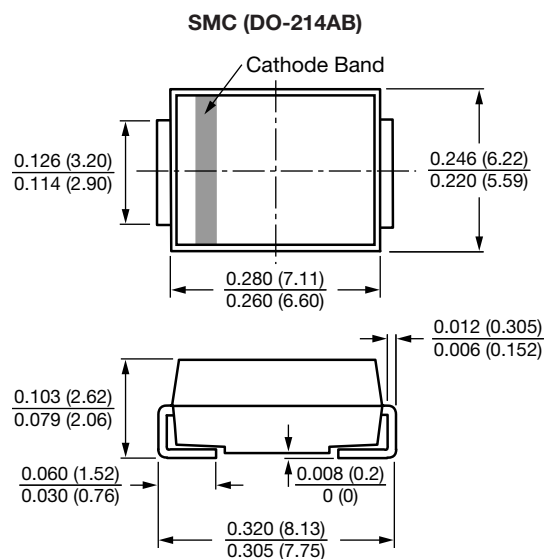


Fig. 3 - Typical Instantaneous Forward Characteristics



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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