

## Surface-Mount Ultrafast Plastic Rectifier



**SMC (DO-214AB)**

Cathode  Anode

### LINKS TO ADDITIONAL RESOURCES



### FEATURES

- Glass passivated pellet chip junction
- Ideal for automated placement
- Ultrafast reverse recovery time
- Low switching losses, high efficiency
- 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**

### 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 - haloge-free, RoHS-compliant, and commercial grade

Base P/NHE3\_X - RoHS-compliant, 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 meet JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

| PRIMARY CHARACTERISTICS |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 3.0 A          |
| $V_{RRM}$               | 300 V, 400 V   |
| $I_{FSM}$               | 100 A          |
| $t_{rr}$                | 35 ns          |
| $V_F$ at $I_F$          | 1.1 V          |
| $T_J$ max.              | 150 °C         |
| Package                 | SMC (DO-214AB) |
| Circuit configuration   | Single         |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                     |                |             |      |      |
|------------------------------------------------------------------------------------|----------------|-------------|------|------|
| PARAMETER                                                                          | SYMBOL         | ES3F        | ES3G | UNIT |
| Device marking code                                                                |                | EF          | EG   |      |
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 300         | 400  | V    |
| Working peak reverse voltage                                                       | $V_{RWM}$      | 225         | 300  | V    |
| Maximum RMS voltage                                                                | $V_{RMS}$      | 210         | 280  | V    |
| Maximum average forward rectified current at $T_L = 110\text{ °C}$                 | $I_{F(AV)}$    | 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** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                                                  | TEST CONDITIONS                                                                                                   | SYMBOL      | ES3F | ES3G | UNIT          |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------|------|------|---------------|
| Maximum instantaneous forward voltage                      | 3.0 A                                                                                                             | $V_F^{(1)}$ | 1.1  |      | V             |
| Maximum DC reverse current at working peak reverse voltage | $T_A = 25\text{ }^{\circ}\text{C}$                                                                                | $I_R$       | 10   |      | $\mu\text{A}$ |
|                                                            | $T_A = 100\text{ }^{\circ}\text{C}$                                                                               |             | 350  |      |               |
| Maximum reverse recovery time                              | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ ,<br>$I_{rr} = 0.25\text{ A}$                                         | $t_{rr}$    | 35   |      | ns            |
| Maximum reverse recovery time                              | $I_F = 1.0\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$ ,<br>$V_R = 30\text{ V}$ , $I_{rr} = 0.1\text{ I}_{RM}$ | $t_{rr}$    | 50   |      | ns            |
| Maximum reverse recovery current                           | $I_F = 1.0\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$ ,<br>$V_R = 30\text{ V}$ , $I_{rr} = 0.1\text{ I}_{RM}$ | $I_{RM}$    | 3.0  |      | A             |
| Maximum stored charge                                      | $I_F = 1.0\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$ ,<br>$V_R = 30\text{ V}$ , $I_{rr} = 0.1\text{ I}_{RM}$ | $Q_{rr}$    | 50   |      | nC            |
| Typical junction capacitance                               | 4.0 V, 1 MHz                                                                                                      | $C_J$       | 30   |      | 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                | ES3F | ES3G | UNIT                        |
|----------------------------|-----------------------|------|------|-----------------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 50   |      | $^{\circ}\text{C}/\text{W}$ |
|                            | $R_{\theta JL}^{(1)}$ | 15   |      |                             |

**Note**

(1) Units mounted on PCB 5.0 mm x 5.0 mm (0.013 mm thick) land areas

**ORDERING INFORMATION** (Example)

| PREFERRED P/N              | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|----------------------------|-----------------|------------------------|---------------|------------------------------------|
| ES3G-E3/57T                | 0.211           | 57T                    | 850           | 7" diameter plastic tape and reel  |
| ES3G-E3/9AT                | 0.211           | 9AT                    | 3500          | 13" diameter plastic tape and reel |
| ES3GHE3_A/H <sup>(1)</sup> | 0.211           | H                      | 850           | 7" diameter plastic tape and reel  |
| ES3GHE3_A/I <sup>(1)</sup> | 0.211           | I                      | 3500          | 13" diameter plastic tape and reel |
| ES3G-M3/57T                | 0.211           | 57T                    | 850           | 7" diameter plastic tape and reel  |
| ES3G-M3/9AT                | 0.211           | 9AT                    | 3500          | 13" diameter plastic tape and reel |
| ES3GHM3_A/H <sup>(1)</sup> | 0.211           | H                      | 850           | 7" diameter plastic tape and reel  |
| ES3GHM3_A/I <sup>(1)</sup> | 0.211           | I                      | 3500          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

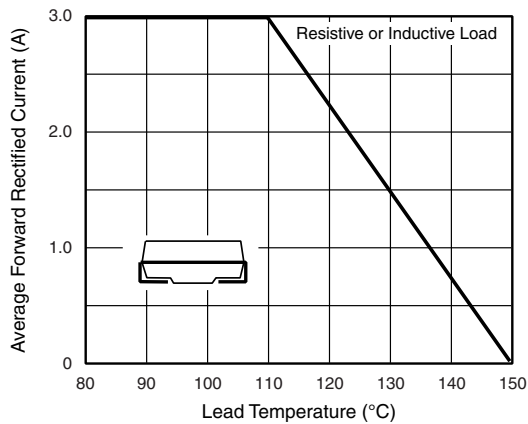
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

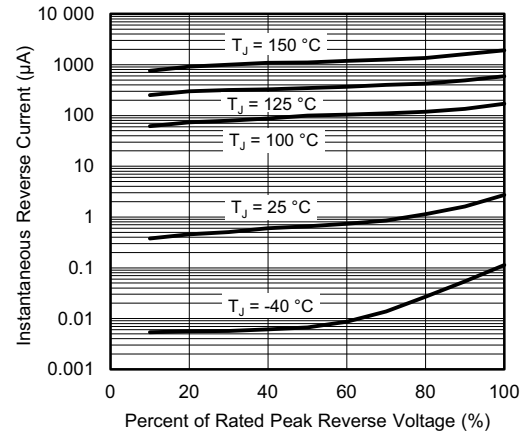


Fig. 4 - Typical Reverse Leakage Characteristics

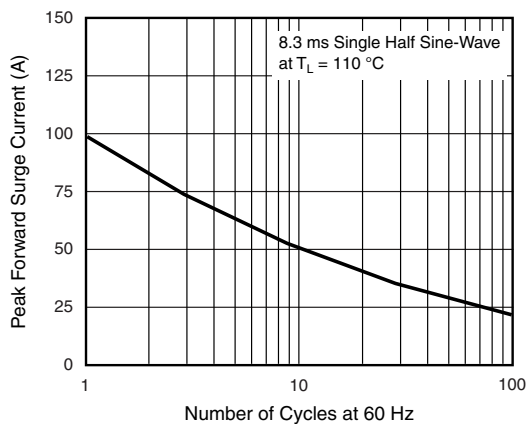


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

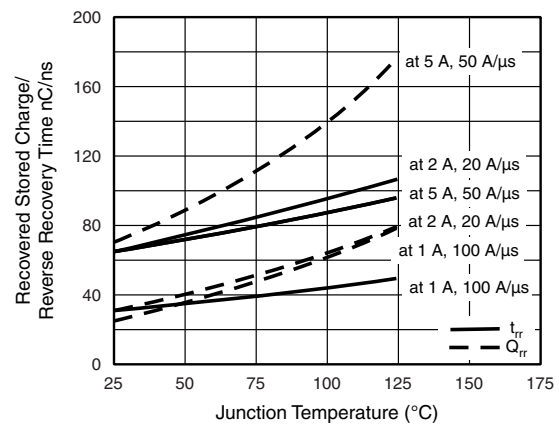


Fig. 5 - Reverse Switching Characteristics

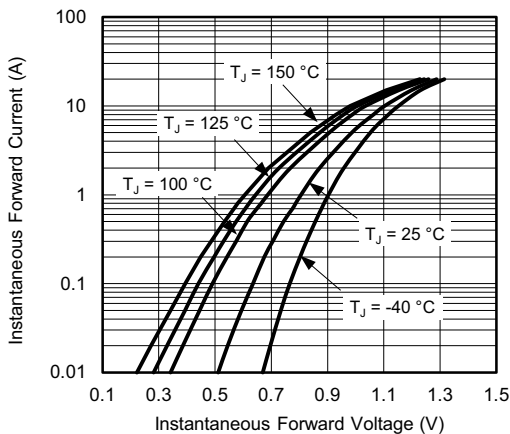


Fig. 3 - Typical Instantaneous Forward Characteristics

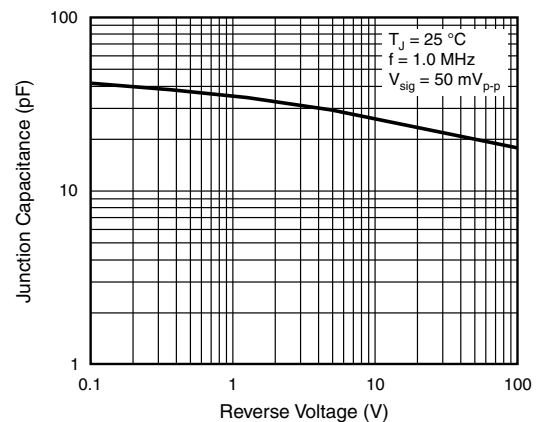


Fig. 6 - Typical Junction Capacitance

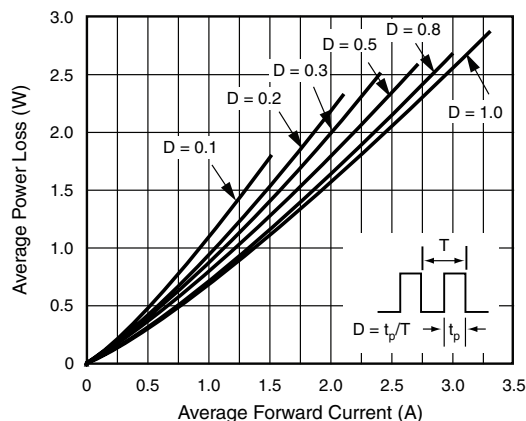
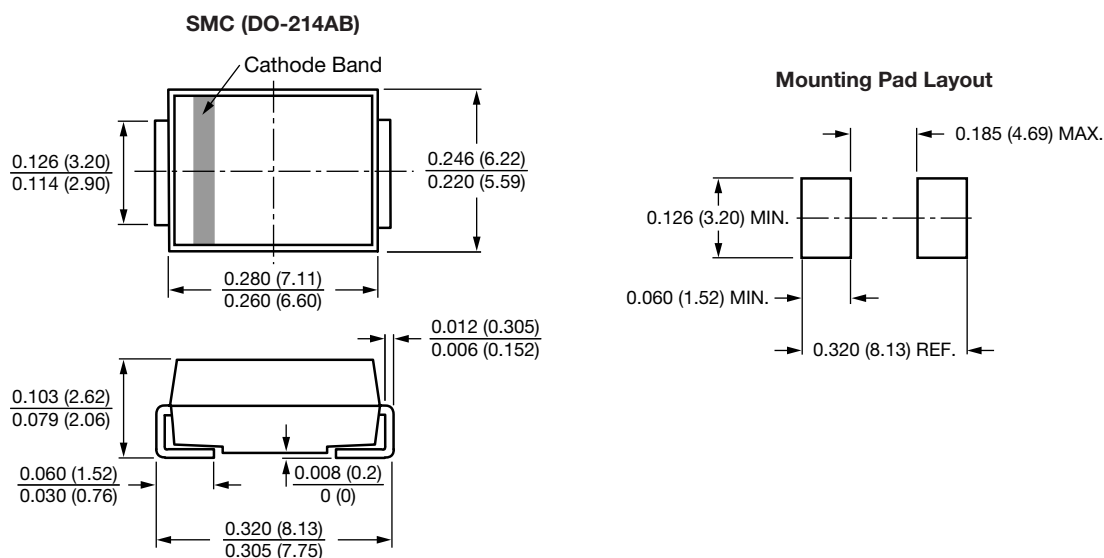


Fig. 7 - Forward Power Loss Characteristics

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




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