

## 3A, 50V - 600V Surface Mount Super Fast Rectifier

### FEATURES

- Glass passivated chip junction
- Ideal for automated placement
- Super fast recovery time for high efficiency
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- High frequency rectification
- Freewheeling application
- Switching mode converters and inverters in computer, automotive and telecommunication.

### MECHANICAL DATA

- Case: DO-214AB (SMC)
- Molding compound meets UL 94V-0 flammability rating
- Part no. with suffix "H" means AEC-Q101 qualified
- Packing code with suffix "G" means green compound (halogen-free)
- Moisture sensitivity level: level 1, per J-STD-020
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.21 g (approximately)

| KEY PARAMETERS |                |      |
|----------------|----------------|------|
| PARAMETER      | VALUE          | UNIT |
| $I_{F(AV)}$    | 3              | A    |
| $V_{RRM}$      | 50 - 600       | V    |
| $I_{FSM}$      | 100            | A    |
| $T_{J\ MAX}$   | 150            | °C   |
| Package        | DO-214AB (SMC) |      |
| Configuration  | Single die     |      |



**DO-214AB (SMC)**

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)                   |              |              |      |      |      |      |      |      |      |      |
|-----------------------------------------------------------------------------------------------|--------------|--------------|------|------|------|------|------|------|------|------|
| PARAMETER                                                                                     | SYMBOL       | ES3A         | ES3B | ES3C | ES3D | ES3F | ES3G | ES3H | ES3J | UNIT |
| Marking code on the device                                                                    |              | ES3A         | ES3B | ES3C | ES3D | ES3F | ES3G | ES3H | ES3J |      |
| Repetitive peak reverse voltage                                                               | $V_{RRM}$    | 50           | 100  | 150  | 200  | 300  | 400  | 500  | 600  | V    |
| Reverse voltage, total rms value                                                              | $V_{R(RMS)}$ | 35           | 70   | 105  | 140  | 210  | 280  | 350  | 420  | V    |
| Maximum DC blocking voltage                                                                   | $V_{DC}$     | 50           | 100  | 150  | 200  | 300  | 400  | 500  | 600  | V    |
| Forward current                                                                               | $I_{F(AV)}$  | 3            |      |      |      |      |      |      |      | A    |
| Surge peak forward current, 8.3 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$    | 100          |      |      |      |      |      |      |      | A    |
| Junction temperature                                                                          | $T_J$        | - 55 to +150 |      |      |      |      |      |      |      | °C   |
| Storage temperature                                                                           | $T_{STG}$    | - 55 to +150 |      |      |      |      |      |      |      | °C   |

**THERMAL PERFORMANCE**

| PARAMETER                                        | SYMBOL          | LIMIT | UNIT |
|--------------------------------------------------|-----------------|-------|------|
| Junction-to-lead thermal resistance per diode    | $R_{\theta JL}$ | 12    | °C/W |
| Junction-to-ambient thermal resistance per diode | $R_{\theta JA}$ | 47    | °C/W |

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| PARAMETER                                              |                              | CONDITIONS                                                        | SYMBOL   | TYP. | MAX. | UNIT          |
|--------------------------------------------------------|------------------------------|-------------------------------------------------------------------|----------|------|------|---------------|
| Forward voltage per diode <sup>(1)</sup>               | ES3A<br>ES3B<br>ES3C<br>ES3D | $I_F = 3\text{A}, T_J = 25^\circ\text{C}$                         | $V_F$    | -    | 0.95 | V             |
|                                                        | ES3F<br>ES3G                 |                                                                   |          | -    | 1.30 | V             |
|                                                        | ES3H<br>ES3J                 |                                                                   |          | -    | 1.70 | V             |
|                                                        |                              |                                                                   |          |      |      |               |
| Reverse current @ rated $V_R$ per diode <sup>(2)</sup> |                              | $T_J = 25^\circ\text{C}$                                          | $I_R$    | -    | 10   | $\mu\text{A}$ |
|                                                        |                              | $T_J = 100^\circ\text{C}$                                         |          | -    | 500  | $\mu\text{A}$ |
| Junction capacitance                                   | ES3A<br>ES3B<br>ES3C<br>ES3D | 1 MHz, $V_R = 4.0\text{V}$                                        | $C_J$    | 45   | -    | pF            |
|                                                        | ES3F<br>ES3G<br>ES3H<br>ES3J |                                                                   |          | 30   | -    | pF            |
| 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            |

**Notes:**

1. Pulse test with  $PW = 0.3\text{ ms}$
2. Pulse test with  $PW = 30\text{ ms}$

**ORDERING INFORMATION**

| PART NO.         | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | PACKAGE    | PACKING                  |
|------------------|-----------------|--------------|---------------------|------------|--------------------------|
| ES3x<br>(Note 1) | H               | R7           | G                   | SMC        | 850 / 7" Plastic reel    |
|                  |                 | R6           |                     | SMC        | 3,000 / 13" Paper reel   |
|                  |                 | M6           |                     | SMC        | 3,000 / 13" Plastic reel |
|                  |                 | V7           |                     | Matrix SMC | 850 / 7" Plastic reel    |
|                  |                 | V6           |                     | Matrix SMC | 3,000 / 13" Plastic reel |

**Note :**

- "x" defines voltage from 50V (ES3A) to 600V (ES3J)

**EXAMPLE**

| EXAMPLE P/N | PART NO. | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION                          |
|-------------|----------|-----------------|--------------|---------------------|--------------------------------------|
| ES3AHR7G    | ES3A     | H               | R7           | G                   | AEC-Q101 qualified<br>Green compound |

## CHARACTERISTICS CURVES

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

**Fig.1 Forward Current Derating Curve**

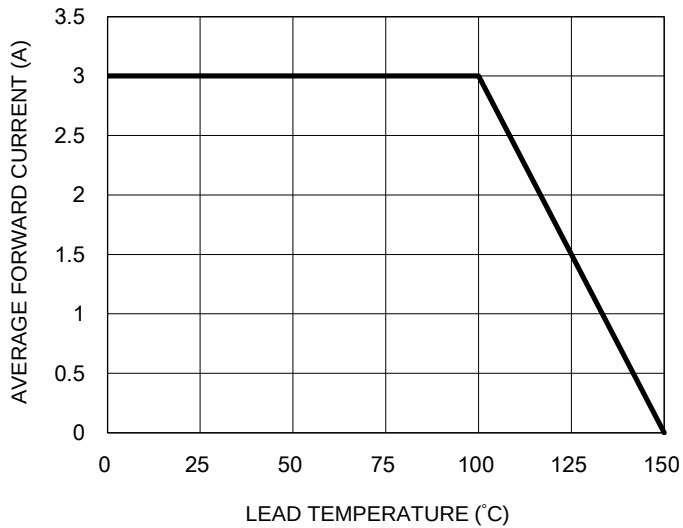


**Fig.2 Typical Junction Capacitance**

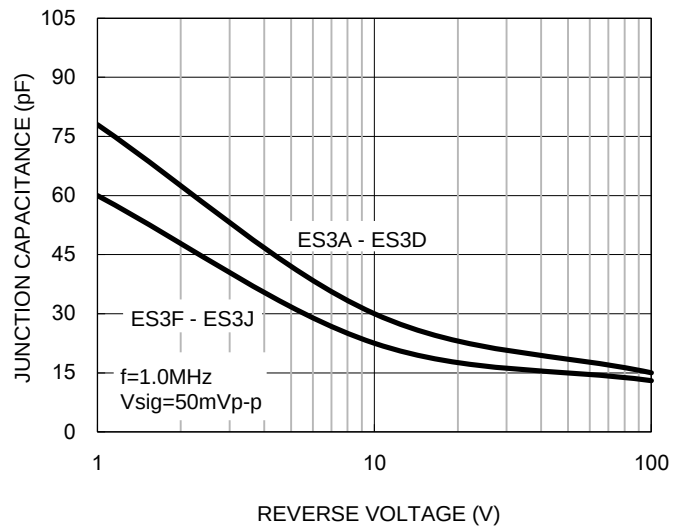


**Fig.3 Typical Reverse Characteristics**

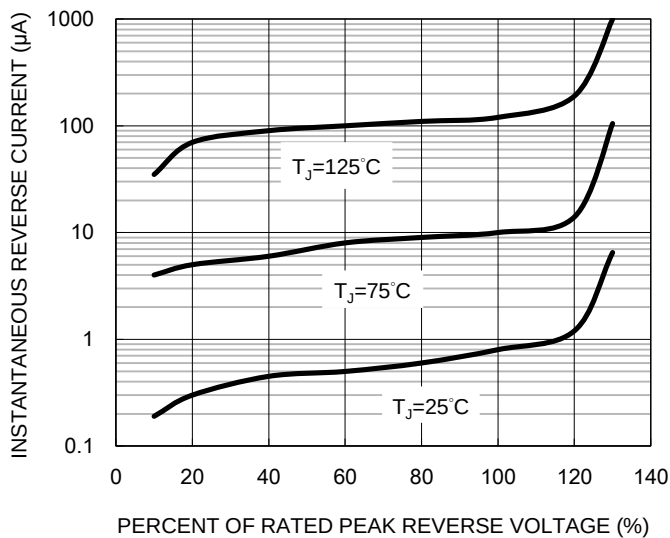
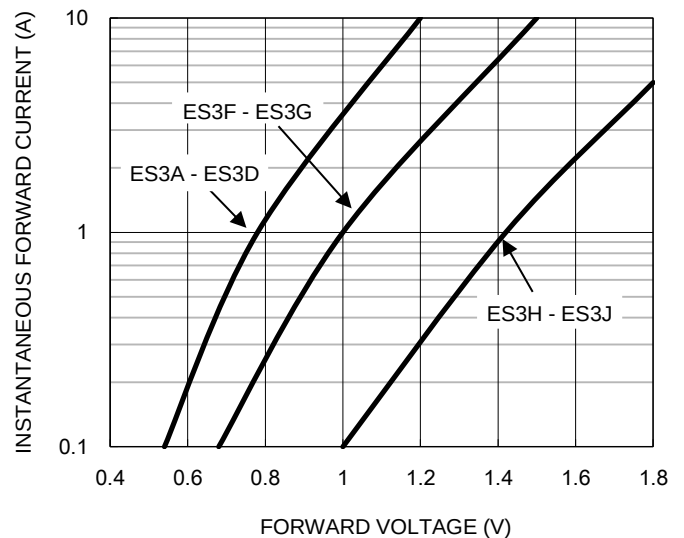


**Fig.4 Typical Forward Characteristics**



## CHARACTERISTICS CURVES

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

**Fig.5 Maximum Non-repetitive Forward Surge Current**

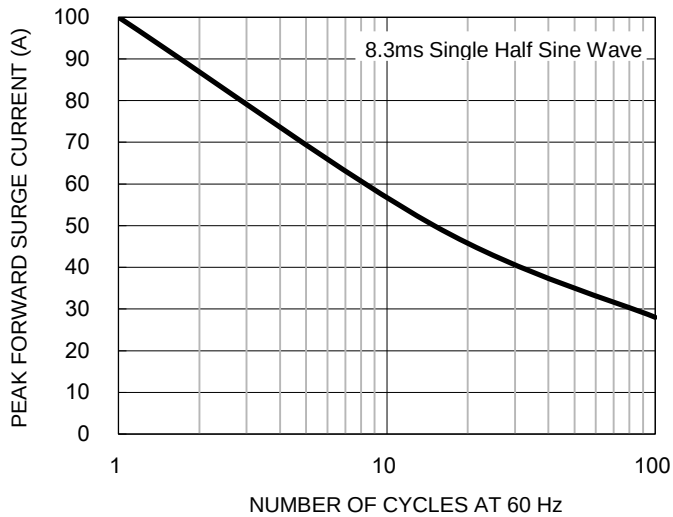


**Fig.6 Typical Transient Thermal Characteristics**

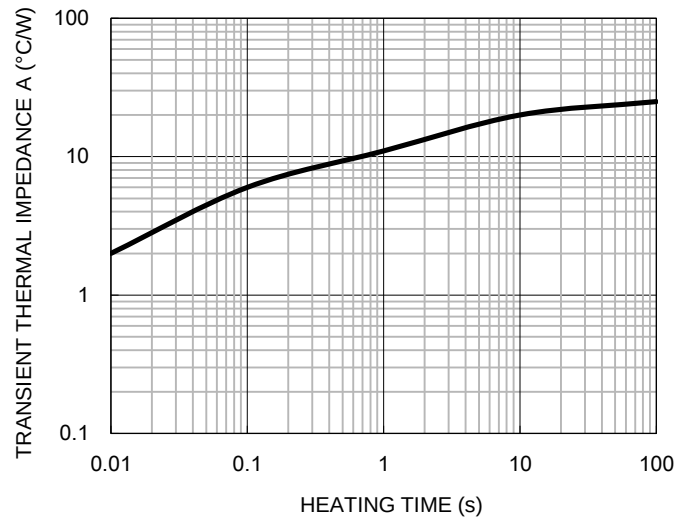
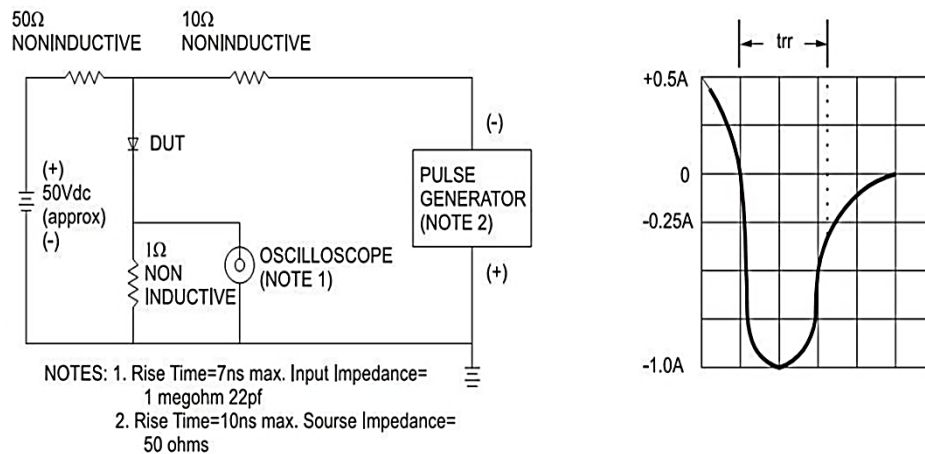
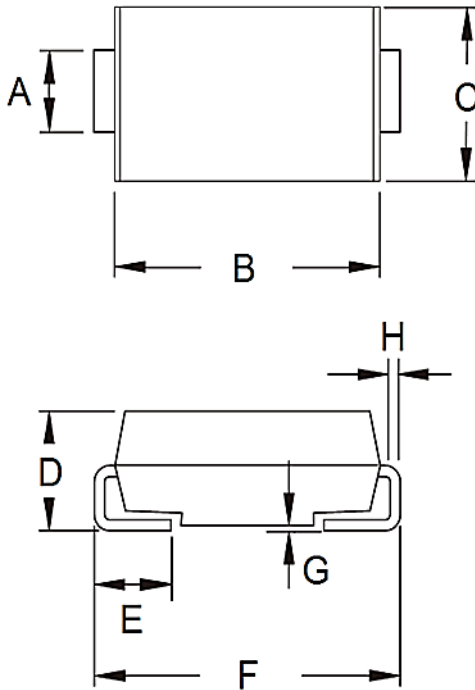


**Fig.7 Reverse Recovery Time Characteristic And Test Circuit Diagram**



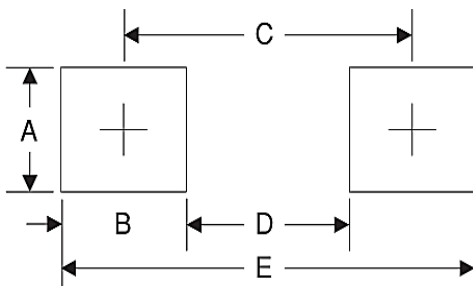
## PACKAGE OUTLINE DIMENSIONS

DO-214AB (SMC)



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min.      | Max. | Min.        | Max.  |
| A    | 2.90      | 3.20 | 0.114       | 0.126 |
| B    | 6.60      | 7.11 | 0.260       | 0.280 |
| C    | 5.59      | 6.22 | 0.220       | 0.245 |
| D    | 2.00      | 2.62 | 0.079       | 0.103 |
| E    | 1.00      | 1.60 | 0.039       | 0.063 |
| F    | 7.75      | 8.13 | 0.305       | 0.320 |
| G    | 0.10      | 0.20 | 0.004       | 0.008 |
| H    | 0.15      | 0.31 | 0.006       | 0.012 |

## SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 3.30      | 0.130       |
| B      | 2.50      | 0.098       |
| C      | 6.80      | 0.268       |
| D      | 4.40      | 0.173       |
| E      | 9.40      | 0.370       |

## MARKING DIAGRAM



P/N =Marking Code  
G =Green Compound  
YW =Date Code  
F =Factory Code

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