

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

### FEATURES

- Glass passivated junction chip
- Ideal for automated placement
- Low profile package
- 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

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- Converter

### MECHANICAL DATA

- Case: DO-214AA (SMB)
- 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: 0.11 g (approximately)

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



**DO-214AA (SMB)**

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)                   |              |              |           |           |           |           |           |           |           |      |
|---|--------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|
| PARAMETER   | SYMBOL       | ES 3AB       | ES 3BB    | ES 3CB    | ES 3DB    | ES 3FB    | ES 3GB    | ES 3HB    | ES 3JB    | UNIT |
| Marking code on the device  |              | ES<br>3AB    | ES<br>3BB | ES<br>3CB | ES<br>3DB | ES<br>3FB | ES<br>3GB | ES<br>3HB | ES<br>3JB |      |
| Repetitive peak reverse voltage   | $V_{RRM}$    | 50           | 100       | 150       | 200       | 300       | 400       | 500       | 600       | V    |
| Reverse voltage, total rms value  | $V_{R(RMS)}$ | 30           | 70        | 105       | 140       | 210       | 280       | 350       | 420       | 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   |

| <b>THERMAL PERFORMANCE</b>             |                 |              |               |
|--|-----------------|--------------|---------------|
| <b>PARAMETER</b>                       | <b>SYMBOL</b>   | <b>LIMIT</b> | <b>UNIT</b>   |
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 24           | $^{\circ}C/W$ |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 84           | $^{\circ}C/W$ |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 26           | $^{\circ}C/W$ |

**Thermal Performance Note:** Units mounted on recommended PCB (10mm x 10mm Cu pad test board)

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

| <b>PARAMETER</b>                                       |  | <b>CONDITIONS</b>                            | <b>SYMBOL</b>                    | <b>TYP</b> | <b>MAX</b> | <b>UNIT</b> |   |
|--|--|--|----------------------------------|------------|------------|-------------|---|
| Forward voltage per diode <sup>(1)</sup>               | ES3AB<br>ES3BB<br>ES3CB<br>ES3DB         | $I_F = 1.5A, T_J = 25^{\circ}C$              | $V_F$                            | 0.80       | 0.92       | V           |   |
|  | ES3FB<br>ES3GB                           |  |                                  | 0.90       | 1.04       | V           |   |
|  | ES3HB<br>ES3JB                           |  |                                  | 1.11       | 1.30       | V           |   |
|  | ES3AB<br>ES3BB<br>ES3CB<br>ES3DB         | $I_F = 3.0A, T_J = 25^{\circ}C$              | $V_F$                            | 0.86       | 1.00       | V           |   |
|  | ES3FB<br>ES3GB                           |  |                                  | 0.98       | 1.13       | V           |   |
|  | ES3HB<br>ES3JB                           |  |                                  | 1.24       | 1.45       | V           |   |
|  | Forward voltage per diode <sup>(1)</sup> | ES3AB<br>ES3BB<br>ES3CB<br>ES3DB             | $I_F = 1.5A, T_J = 125^{\circ}C$ | $V_F$      | 0.66       | 0.75        | V |
|  |  | ES3FB<br>ES3GB                               |                                  |            | 0.73       | 0.85        | V |
|  |  | ES3HB<br>ES3JB                               |                                  |            | 0.85       | 0.98        | V |
|  |  | ES3AB<br>ES3BB<br>ES3CB<br>ES3DB             | $I_F = 3.0A, T_J = 125^{\circ}C$ | $V_F$      | 0.73       | 0.84        | V |
|  |  | ES3FB<br>ES3GB                               |                                  |            | 0.83       | 0.95        | V |
|  |  | ES3HB<br>ES3JB                               |                                  |            | 0.99       | 1.13        | V |
| Reverse current @ rated $V_R$ per diode <sup>(2)</sup> |  | $T_J = 25^{\circ}C$                          | $I_R$                            | -          | 10         | $\mu A$     |   |
|  |  | $T_J = 125^{\circ}C$                         |                                  | -          | 100        | $\mu A$     |   |
| Junction capacitance                                   | ES3AB<br>ES3BB<br>ES3CB<br>ES3DB         | 1 MHz, $V_R = 4.0V$                          | $C_J$                            | 46         | -          | pF          |   |
|  | ES3FB<br>ES3GB                           |  |                                  | 41         | -          | pF          |   |
|  | ES3HB<br>ES3JB                           |  |                                  | 34         | -          | pF          |   |
| Reverse recovery time                                  |  | $I_F = 0.5A, I_R = 1.0A$<br>$I_{RR} = 0.25A$ | $t_{rr}$                         | -          | 35         | ns          |   |

**Notes:**

1. Pulse test with  $PW = 0.3$  ms
2. Pulse test with  $PW = 30$  ms

| <b>ORDERING INFORMATION</b> |                        |                     |                            |                |                          |
|-----------------------------|------------------------|---------------------|----------------------------|----------------|--------------------------|
| <b>PART NO.</b>             | <b>PART NO. SUFFIX</b> | <b>PACKING CODE</b> | <b>PACKING CODE SUFFIX</b> | <b>PACKAGE</b> | <b>PACKING</b>           |
| ES3xB<br>(Note 1, 2)        | H                      | R5                  | G                          | SMB            | 850 / 7" Plastic reel    |
|                             |                        | R4                  |                            | SMB            | 3,000 / 13" Paper reel   |
|                             |                        | M4                  |                            | SMB            | 3,000 / 13" Plastic reel |

**Notes:**

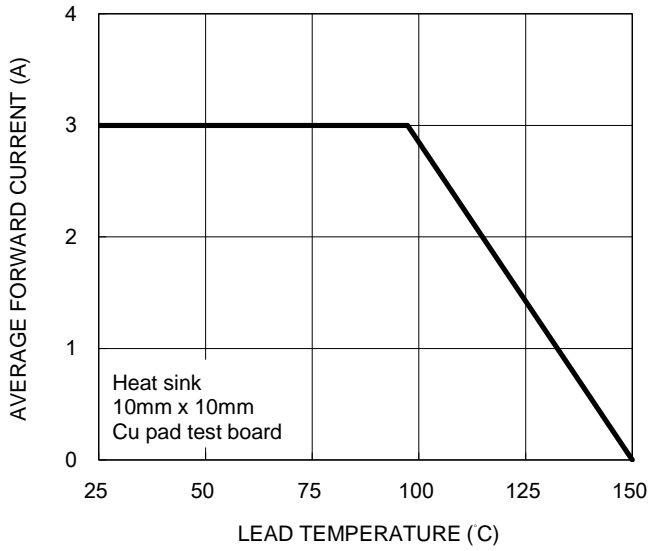
1. "x" defines voltage from 50V (ES3AB) to 600V (ES3JB)
2. Whole series with green compound (halogen-free)

| <b>EXAMPLE P/N</b> |                 |                        |                     |                            |                                      |
|--------------------|-----------------|------------------------|---------------------|----------------------------|--------------------------------------|
| <b>EXAMPLE P/N</b> | <b>PART NO.</b> | <b>PART NO. SUFFIX</b> | <b>PACKING CODE</b> | <b>PACKING CODE SUFFIX</b> | <b>DESCRIPTION</b>                   |
| ES3JBHR5G          | ES3JB           | H                      | R5                  | G                          | AEC-Q101 qualified<br>Green compound |

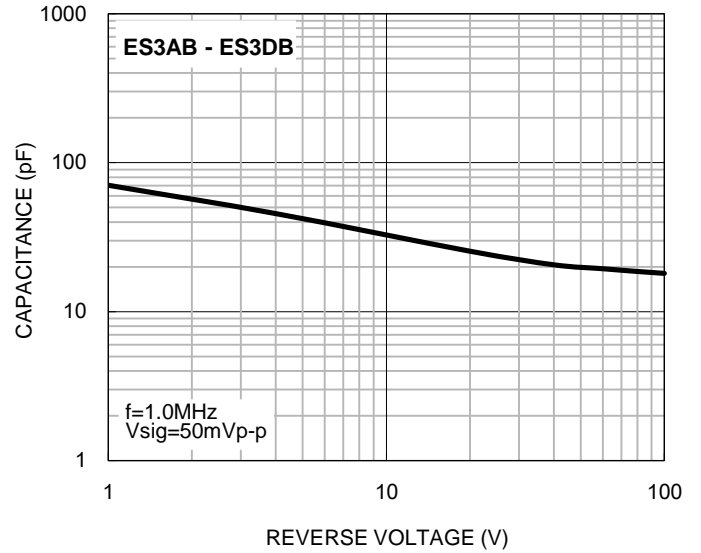
**CHARACTERISTICS CURVES**

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

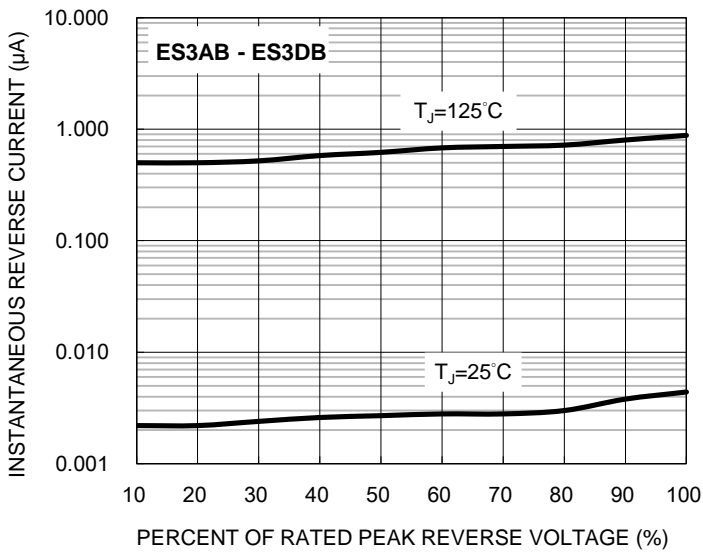
**Fig.1 Forward Current Derating Curve**



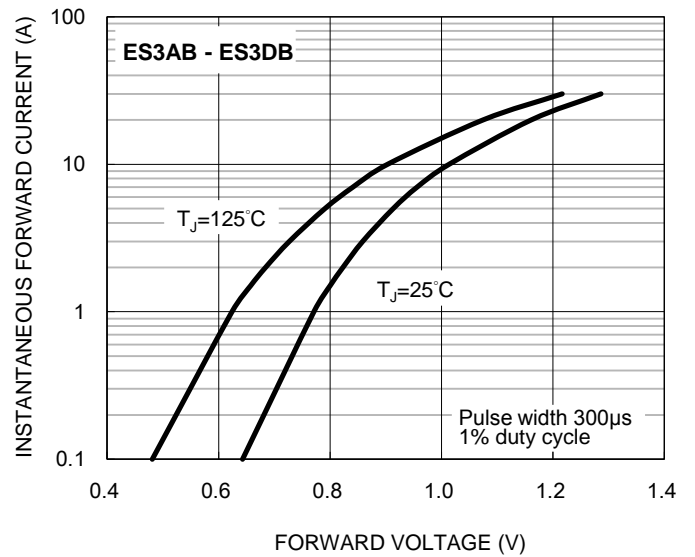
**Fig.2 Typical Junction Capacitance**



**Fig.3 Typical Reverse Characteristics**



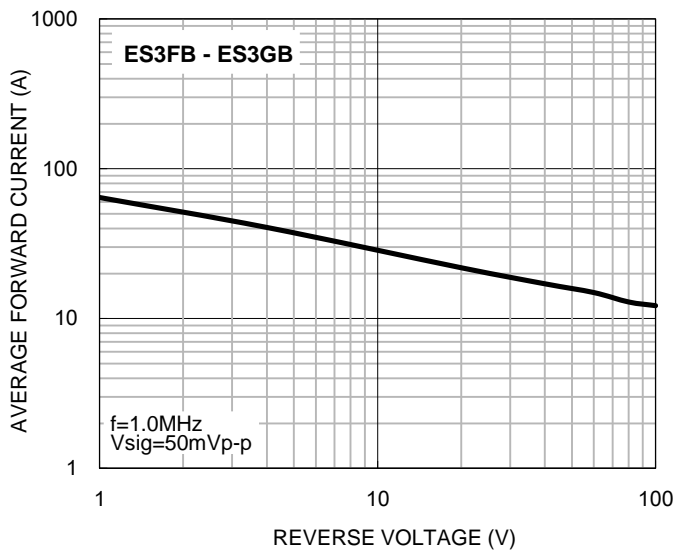
**Fig.4 Typical Forward Characteristics**



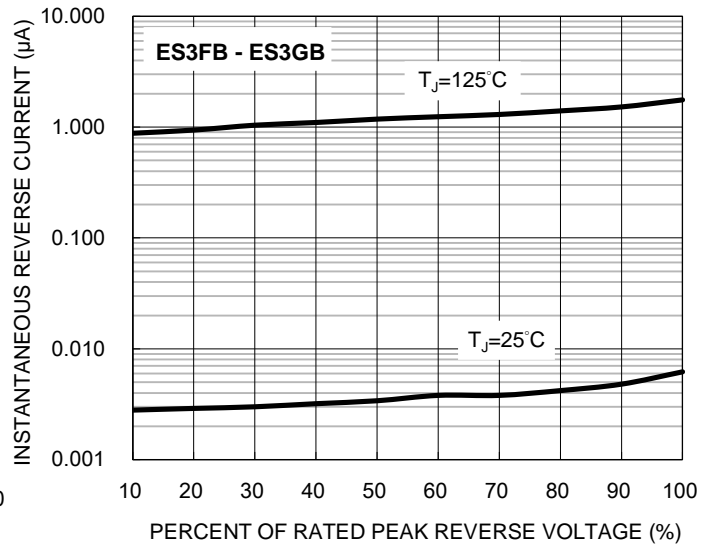
**CHARACTERISTICS CURVES**

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

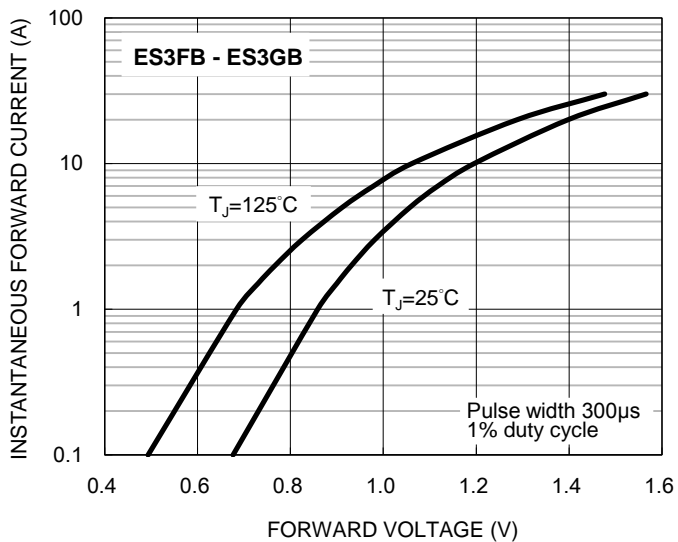
**Fig.5 Typical Junction Capacitance**



**Fig.6 Typical Reverse Characteristics**



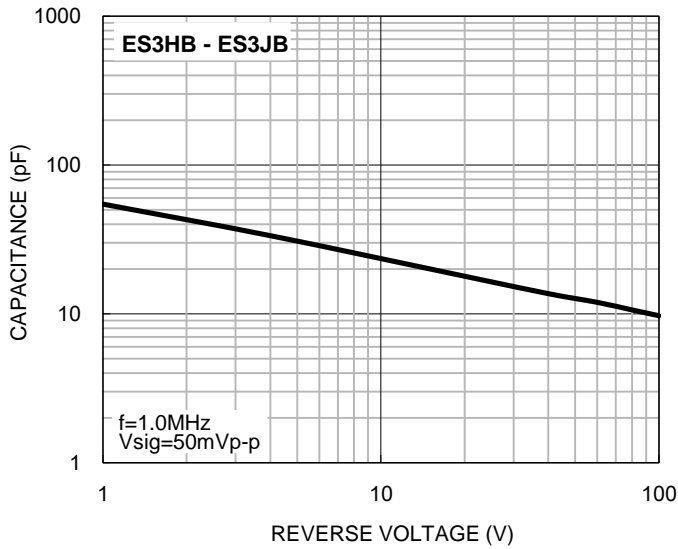
**Fig.7 Typical Forward Characteristics**



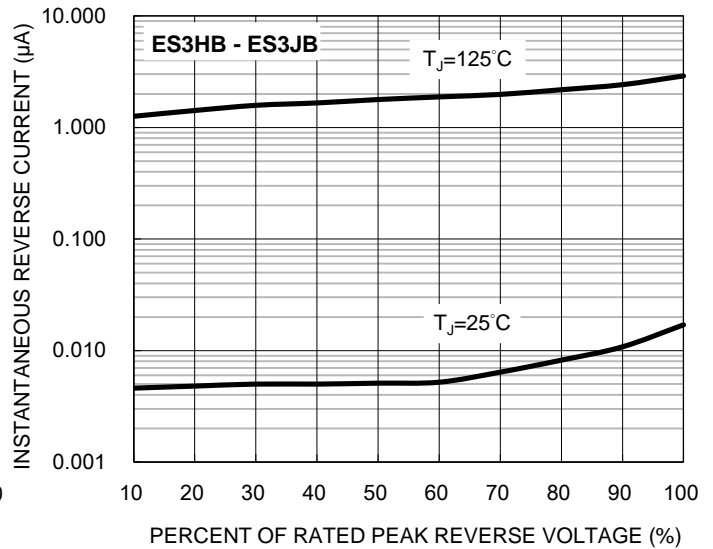
**CHARACTERISTICS CURVES**

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

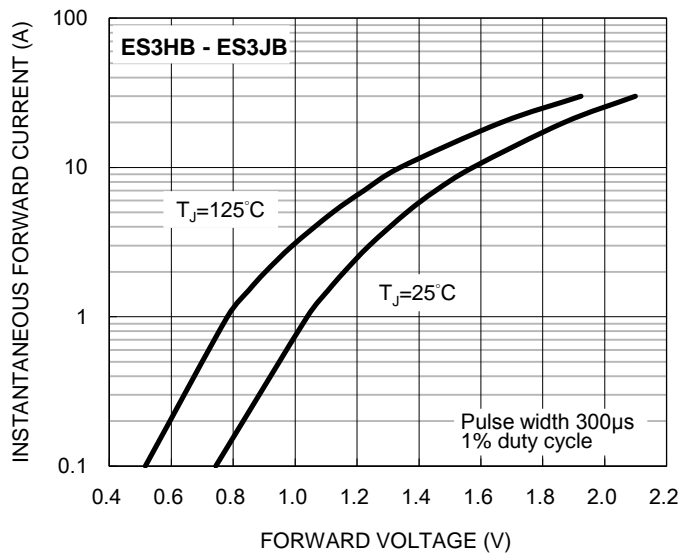
**Fig.8 Typical Junction Capacitance**



**Fig.9 Typical Reverse Characteristics**

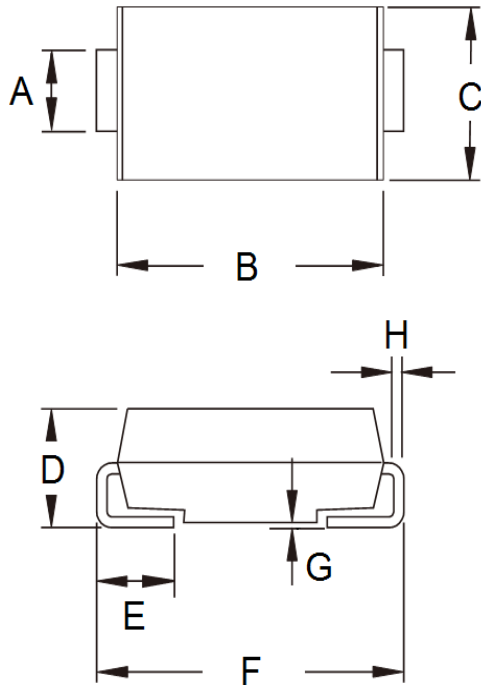


**Fig.10 Typical Forward Characteristics**



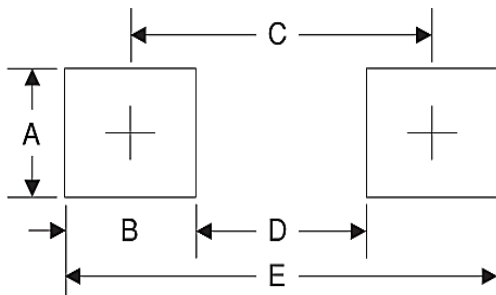
**PACKAGE OUTLINE DIMENSIONS**

DO-214AA (SMB)



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min       | Max  | Min         | Max   |
| A    | 1.95      | 2.20 | 0.077       | 0.087 |
| B    | 4.05      | 4.60 | 0.159       | 0.181 |
| C    | 3.30      | 3.95 | 0.130       | 0.156 |
| D    | 1.95      | 2.65 | 0.077       | 0.104 |
| E    | 0.75      | 1.60 | 0.030       | 0.063 |
| F    | 5.10      | 5.60 | 0.201       | 0.220 |
| G    | 0.05      | 0.20 | 0.002       | 0.008 |
| H    | 0.15      | 0.31 | 0.006       | 0.012 |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 2.3       | 0.091       |
| B      | 2.5       | 0.098       |
| C      | 4.3       | 0.169       |
| D      | 1.8       | 0.071       |
| E      | 6.8       | 0.268       |

**MARKING DIAGRAM**



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

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