

## 1A, 200V - 600V Surface Mount Super Fast Rectifiers

### FEATURES

- Glass passivated junction chip
- 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-214AC (SMA)
- Molding compound, UL flammability classification rating 94V-0
- Moisture sensitivity level: level 1, per J-STD-020
- Part No. with suffix "H" means AEC-Q101 qualified
- Packing code with suffix "G" means green compound (halogen-free)
- **Terminal:** Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- **Polarity:** Indicated by cathode band
- **Weight:** 0.06 g (approximately)

| KEY PARAMETERS    |                |      |
|-------------------|----------------|------|
| PARAMETER         | VALUE          | UNIT |
| $I_{F(AV)}$       | 1              | A    |
| $V_{RRM}$         | 200-600        | V    |
| $I_{FSM}$         | 30             | A    |
| $V_F$ at $I_F=1A$ | 1.7            | V    |
| $T_{J\ MAX}$      | 150            | °C   |
| Package           | DO-214AC (SMA) |      |
| Configuration     | Single dice    |      |



DO-214AC (SMA)

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)         |                |              |       |       |      |
|-------------------------------------------------------------------------------------|----------------|--------------|-------|-------|------|
| PARAMETER                                                                           | SYMBOL         | ES1LD        | ES1LG | ES1LJ | UNIT |
| Marking code on the device                                                          |                | ES1LD        | ES1LG | ES1LJ |      |
| Maximum repetitive peak reverse voltage                                             | $V_{RRM}$      | 200          | 400   | 600   | V    |
| Maximum RMS voltage                                                                 | $V_{RMS}$      | 140          | 280   | 420   | V    |
| Maximum DC blocking voltage                                                         | $V_{DC}$       | 200          | 400   | 600   | V    |
| Maximum average forward rectified current                                           | $I_{F(AV)}$    | 1            |       |       | A    |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 30           |       |       | A    |
| Operating Junction and Storage Temperature Range                                    | $T_J, T_{STG}$ | - 55 to +150 |       |       | °C   |

**THERMAL PERFORMANCE**

| PARAMETER                              | SYMBOL          | LIMIT | UNIT                 |
|----------------------------------------|-----------------|-------|----------------------|
| Junction to Lead Thermal Resistance    | $R_{\theta JL}$ | 35    | $^{\circ}\text{C/W}$ |
| Junction to Ambient Thermal Resistance | $R_{\theta JA}$ | 80    | $^{\circ}\text{C/W}$ |
| Junction to Case Thermal Resistance    | $R_{\theta JC}$ | 25    | $^{\circ}\text{C/W}$ |

**Thermal Performance Note:** Units mounted on recommended PCB (16mm x 16mm Cu test board)

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

| PARAMETER                                         |       | CONDITIONS                                                            | SYMBOL   | TYP | MAX  | UNIT          |
|---------------------------------------------------|-------|-----------------------------------------------------------------------|----------|-----|------|---------------|
| Maximum instantaneous forward voltage<br>(Note 1) | ES1LD | $I_F = 1\text{A}$<br>$T_J = 25^{\circ}\text{C}$                       | $V_F$    | -   | 0.95 | V             |
|                                                   | ES1LG |                                                                       |          | -   | 1.3  |               |
|                                                   | ES1LJ |                                                                       |          | -   | 1.7  |               |
| Maximum reverse current<br>@ rated $V_R$ (Note 2) |       | $T_J = 25^{\circ}\text{C}$                                            | $I_R$    | -   | 5    | $\mu\text{A}$ |
|                                                   |       | $T_J = 125^{\circ}\text{C}$                                           |          | -   | 100  | $\mu\text{A}$ |
| Junction capacitance                              | ES1LD | 1 MHz,<br>$V_R = 4.0\text{V}$                                         | $C_J$    | 16  | -    | pF            |
|                                                   | ES1LG |                                                                       |          | 18  |      |               |
|                                                   | ES1LJ |                                                                       |          | 18  |      |               |
| Reverse recovery time                             |       | $I_F = 0.5\text{A}$<br>$I_R = 1.0\text{A}$<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                  |
|-------------------|-----------------|--------------|-----------------------|------------|--------------------------|
| ES1Lx<br>(Note 1) | H               | R3           | G                     | SMA        | 1,800 / 7" Plastic reel  |
|                   |                 | R2           |                       |            | 7,500 / 13" Paper reel   |
|                   |                 | M2           |                       |            | 7,500 / 13" Plastic reel |
|                   |                 | F3           |                       | Folded SMA | 1,800 / 7" Plastic reel  |
|                   |                 | F2           |                       |            | 7,500 / 13" Paper reel   |
|                   |                 | F4           |                       |            | 7,500 / 13" Plastic reel |
|                   | N/A             | E3           |                       | Clip SMA   | 1,800 / 7" Plastic reel  |
|                   |                 |              |                       |            | 7,500 / 13" Plastic reel |

Note 1: "x" defines voltage from 200V (ES1LD) to 600V (ES1LJ)

\*: G is optional available.

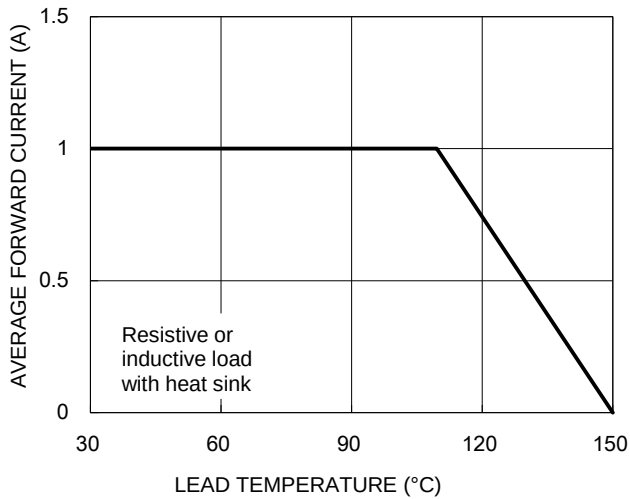
**EXAMPLE:**

| EXAMPLE P/N | PART NO. | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION                          |
|-------------|----------|-----------------|--------------|---------------------|--------------------------------------|
| ES1LDHR3G   | ES1LD    | H               | R3           | G                   | AEC-Q101 qualified<br>Green compound |

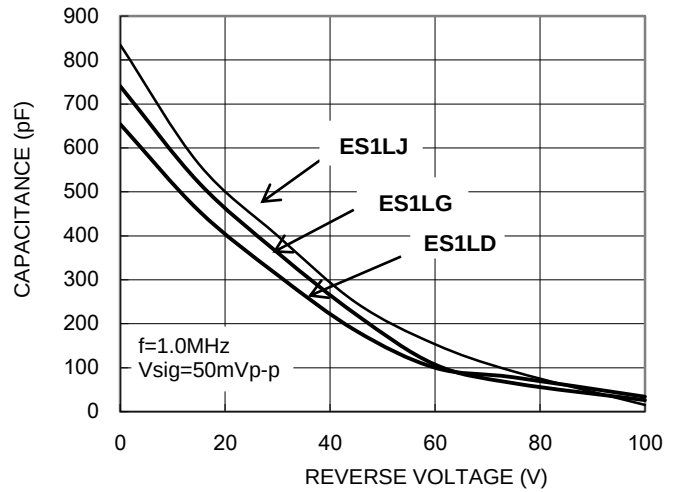
## CHARACTERISTICS CURVES

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

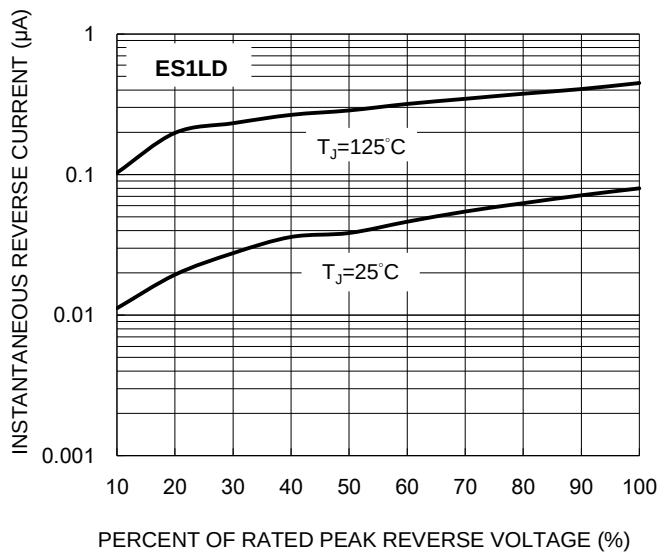
**Forward Current Derating Curve**



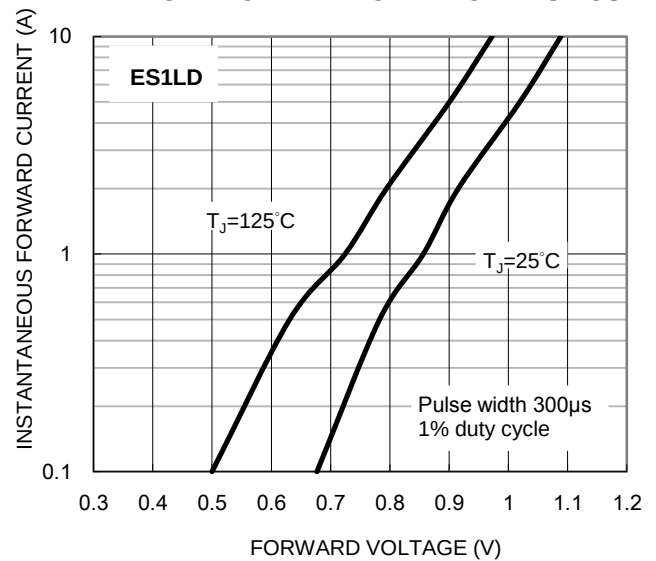
**Typical Junction Capacitance**



**TYPICAL REVERSE CHARACTERISTICS**

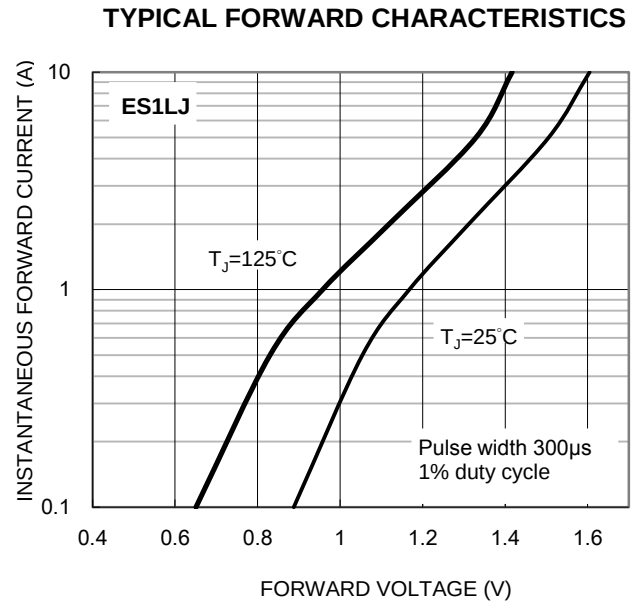
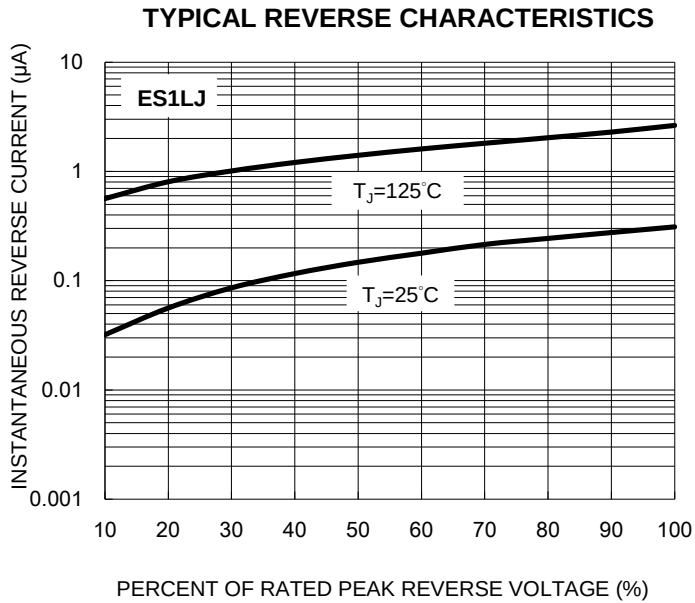
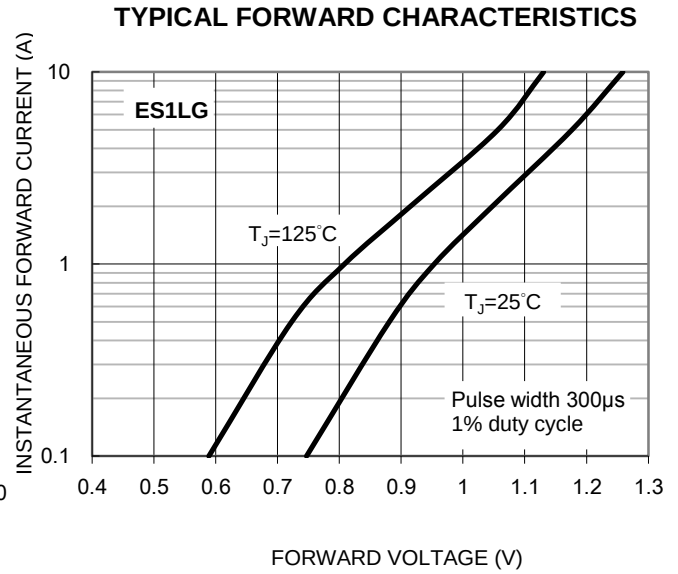
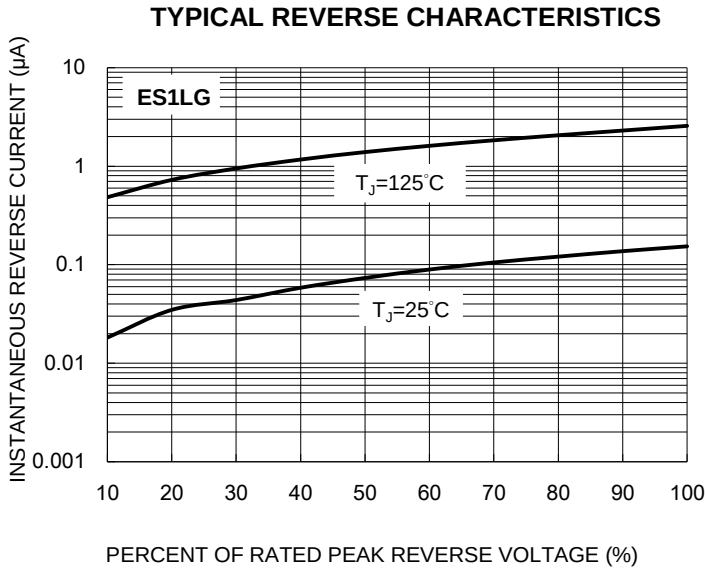


**TYPICAL FORWARD CHARACTERISTICS**



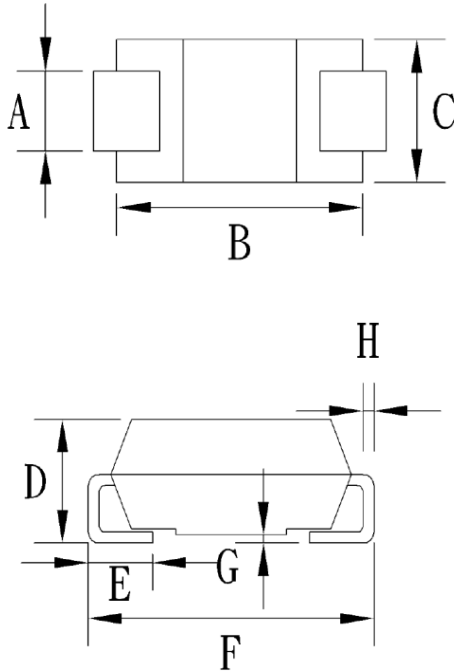
## CHARACTERISTICS CURVES

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



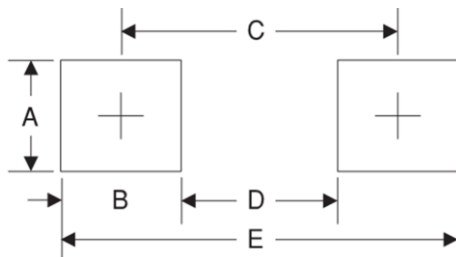
**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

**DO-214AC (SMA)**



| DIM | Unit (mm) |      | Unit (inch) |       |
|-----|-----------|------|-------------|-------|
|     | Min       | Max  | Min         | Max   |
| A   | 1.27      | 1.58 | 0.050       | 0.062 |
| B   | 4.06      | 4.60 | 0.160       | 0.181 |
| C   | 2.29      | 2.83 | 0.090       | 0.111 |
| D   | 1.99      | 2.50 | 0.078       | 0.098 |
| E   | 0.90      | 1.41 | 0.035       | 0.056 |
| F   | 4.95      | 5.33 | 0.195       | 0.210 |
| G   | 0.10      | 0.20 | 0.004       | 0.008 |
| H   | 0.15      | 0.31 | 0.006       | 0.012 |

**SUGGESTED PAD LAYOUT** (Unit: Millimeters)



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 1.68      | 0.066       |
| B      | 1.52      | 0.060       |
| C      | 3.93      | 0.155       |
| D      | 2.41      | 0.095       |
| E      | 5.45      | 0.215       |

**MARKING DIAGRAM**



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

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