

## 2A, 200V-1000V High Efficient Surface Mount Rectifiers

### FEATURES

- Glass passivated junction chip
- Ideal for automated placement
- Low power loss, high efficiency
- Fast switching for high efficiency
- Low profile package
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- Freewheeling application
- Switching mode converters and inverters, computer and telecommunication.

### MECHANICAL DATA

- Case: Thin SMA
- Molding compound meets UL 94V-0 flammability rating
- Moisture sensitivity level: level 1, per J-STD-020
- Terminal: Pure tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 0.029 g (approximately)

| KEY PARAMETERS |            |      |
|----------------|------------|------|
| PARAMETER      | VALUE      | UNIT |
| $I_{F(AV)}$    | 2          | A    |
| $V_{RRM}$      | 200-1000   | V    |
| $I_{FSM}$      | 60         | A    |
| $T_{J\ MAX}$   | 150        | °C   |
| Package        | Thin SMA   |      |
| Configuration  | Single Die |      |



Thin SMA

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)            |                                   |             |        |        |        |        |      |   |
|--|-----------------------------------|-------------|--------|--------|--------|--------|------|---|
| PARAMETER  | SYMBOL                            | HS2DAL      | HS2GAL | HS2JAL | HS2KAL | HS2MAL | UNIT |   |
| Marking code on the device   |                                   | HS2DAL      | HS2GAL | HS2JAL | HS2KAL | HS2MAL |      |   |
| Repetitive peak reverse voltage  | $V_{RRM}$                         | 200         | 400    | 600    | 800    | 1000   | V    |   |
| Reverse voltage, total rms value   | $V_{R(RMS)}$                      | 140         | 280    | 420    | 560    | 700    | V    |   |
| Forward current  | $I_{F(AV)}$                       | 2           |        |        |        |        | A    |   |
| Surge peak forward current, single half sine-wave superimposed on rated load per diode | 8.3ms at $T_A = 25^\circ\text{C}$ | $I_{FSM}$   |        |        |        |        | 60   | A |
|  | 1.0ms at $T_A = 25^\circ\text{C}$ |             |        |        |        |        | 120  | 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>TYP</b> | <b>UNIT</b>          |
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 17         | $^{\circ}\text{C/W}$ |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 53         | $^{\circ}\text{C/W}$ |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 21         | $^{\circ}\text{C/W}$ |

**Thermal Performance Note:** Units mounted on PCB (5mm x 5mm Cu pad test board)

| <b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^{\circ}\text{C}$ 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>  | HS2DAL                         | $I_F = 1.0\text{A}, T_J = 25^{\circ}\text{C}$                 | $V_F$         | 0.81       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 25^{\circ}\text{C}$                 |               | 0.87       | 1.00                       | V             |    |   |    |
|   |                                | $I_F = 1.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 0.67       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 0.74       | 0.82                       | V             |    |   |    |
|   | HS2GAL                         | $I_F = 1.0\text{A}, T_J = 25^{\circ}\text{C}$                 |               | 0.90       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 25^{\circ}\text{C}$                 |               | 0.99       | 1.30                       | V             |    |   |    |
|   |                                | $I_F = 1.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 0.76       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 0.86       | 0.96                       | V             |    |   |    |
|   | HS2JAL                         | $I_F = 1.0\text{A}, T_J = 25^{\circ}\text{C}$                 |               | 1.00       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 25^{\circ}\text{C}$                 |               | 1.10       | 1.70                       | V             |    |   |    |
|   |                                | $I_F = 1.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 0.80       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 0.92       | 1.10                       | V             |    |   |    |
|   | HS2KAL<br>HS2MAL               | $I_F = 1.0\text{A}, T_J = 25^{\circ}\text{C}$                 |               | 1.30       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 25^{\circ}\text{C}$                 |               | 1.48       | 1.70                       | V             |    |   |    |
|   |                                | $I_F = 1.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 0.94       | -                          | V             |    |   |    |
|   |                                | $I_F = 2.0\text{A}, T_J = 125^{\circ}\text{C}$                |               | 1.11       | 1.23                       | V             |    |   |    |
| Reverse current @ rated $V_R$ per diode <sup>(2)</sup>                                |                                | $T_J = 25^{\circ}\text{C}$                                    | $I_R$         | -          | 1                          | $\mu\text{A}$ |    |   |    |
|   |                                | $T_J = 125^{\circ}\text{C}$                                   |               | -          | 80                         | $\mu\text{A}$ |    |   |    |
| Reverse recovery time   | HS2DAL<br>HS2GAL               | $I_F = 0.5\text{A}, I_R = 1.0\text{A}, I_{rr} = 0.25\text{A}$ | $t_{rr}$      | -          | 50                         | ns            |    |   |    |
|   | HS2JAL<br>HS2KAL<br>HS2MAL     |   |               | -          | 75                         | ns            |    |   |    |
|   | Junction capacitance per diode |   |               | HS2DAL     | 1 MHz, $V_R = 4.0\text{V}$ | $C_J$         | 32 | - | pF |
|   |                                |   |               | HS2GAL     |                            |               | 25 | - | pF |
| HS2JAL  |                                | 17  | -             | pF         |                            |               |    |   |    |
| HS2KAL<br>HS2MAL  |                                | 12  | -             | pF         |                            |               |    |   |    |

**Notes:**

(1) Pulse test with PW=0.3 ms

(2) Pulse test with PW=30 ms

| <b>ORDERING INFORMATION</b>        |                |                   |
|------------------------------------|----------------|-------------------|
| <b>ORDERING CODE<sup>(1)</sup></b> | <b>PACKAGE</b> | <b>PACKING</b>    |
| HS2xAL M3G                         | Thin SMA       | 3,500 / 7" reel   |
| HS2xAL M2G                         | Thin SMA       | 14,000 / 13" reel |

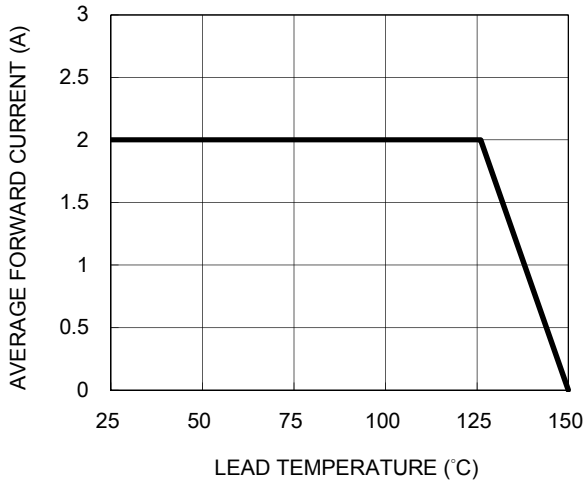
**Notes:**

(1) "x" defines voltage from 200V(HS2DAL) to 1000V(HS2MAL)

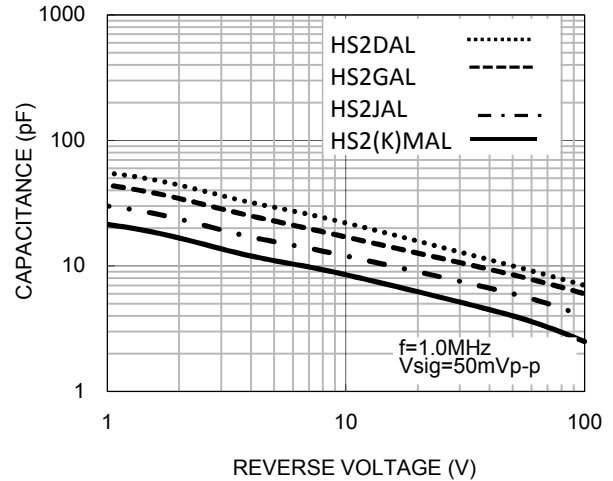
**CHARACTERISTICS CURVES**

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

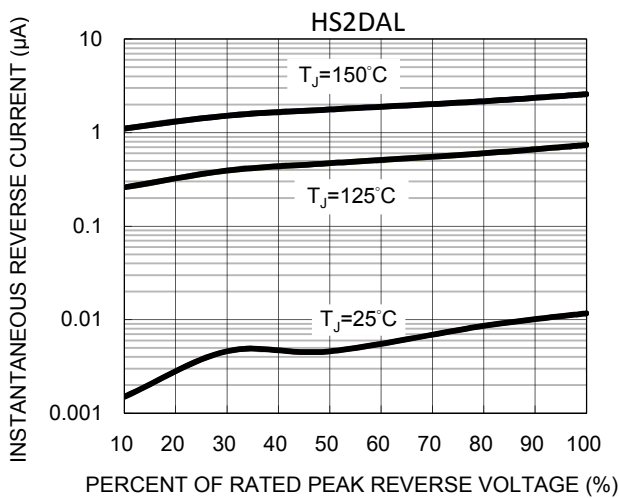
**Fig.1 Forward Current Derating Curve**



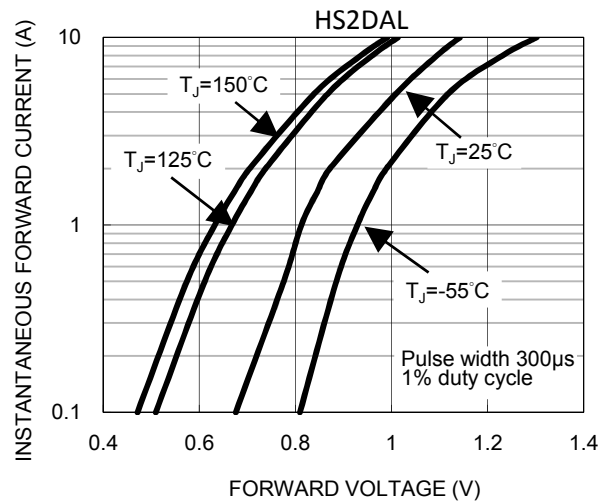
**Fig.2 Typical Junction Capacitance**



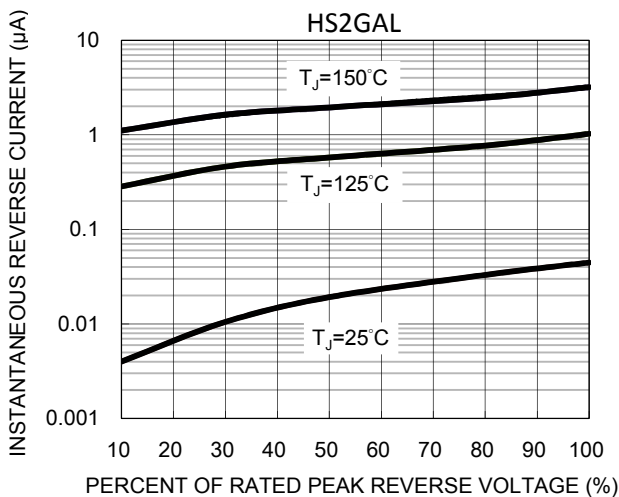
**Fig.3 Typical Reverse Characteristics**



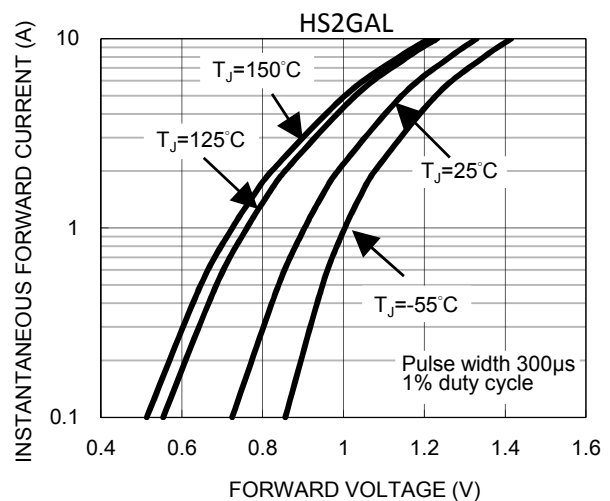
**Fig.4 Typical Forward Characteristics**



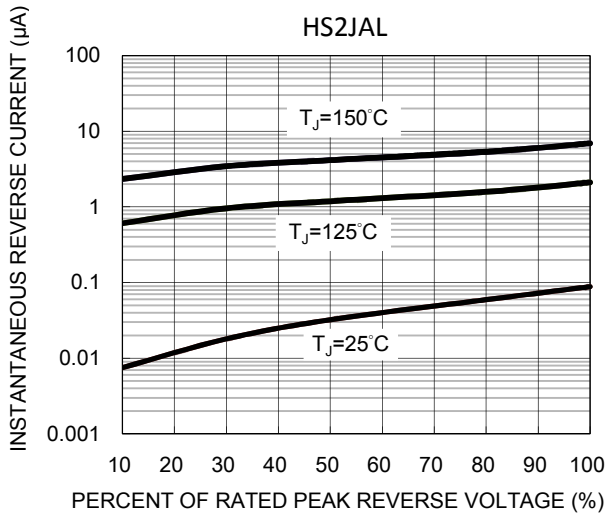
**Fig.5 Typical Reverse Characteristics**



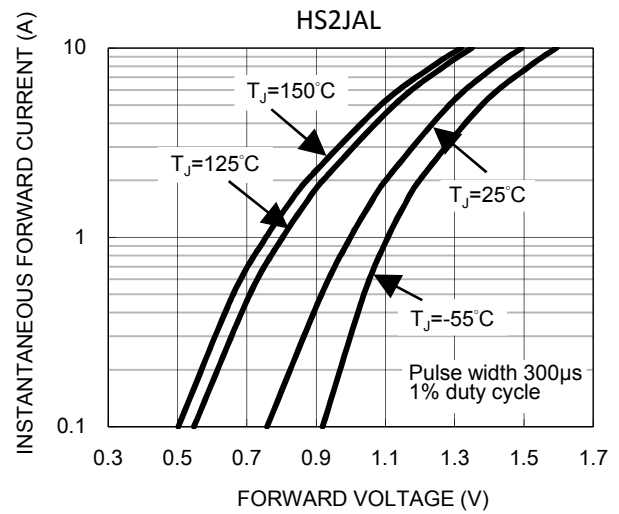
**Fig.6 Typical Forward Characteristics**



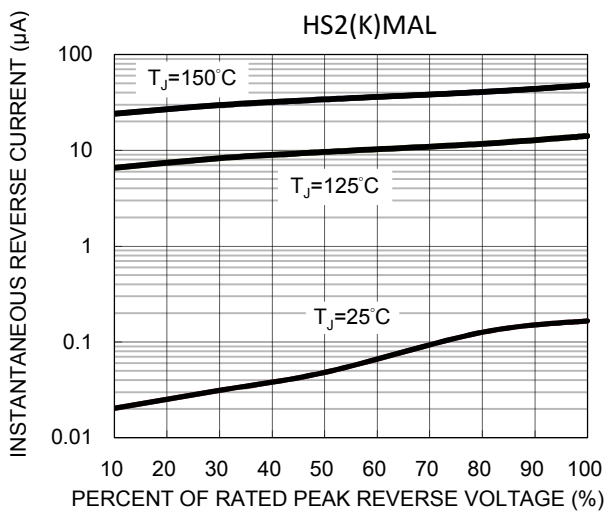
**Fig.7 Typical Reverse Characteristics**



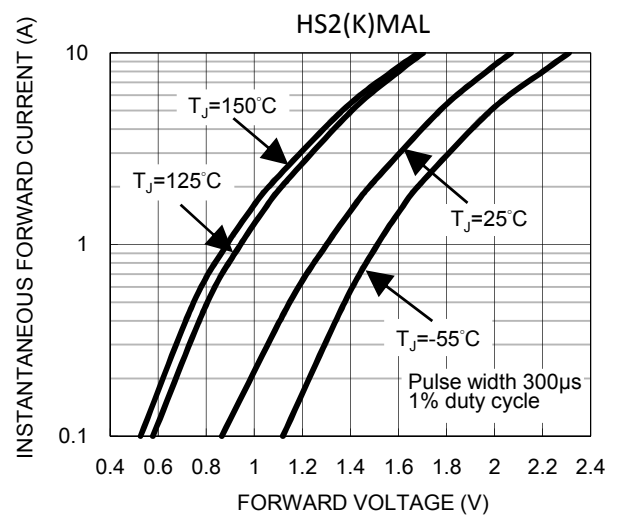
**Fig.8 Typical Forward Characteristics**



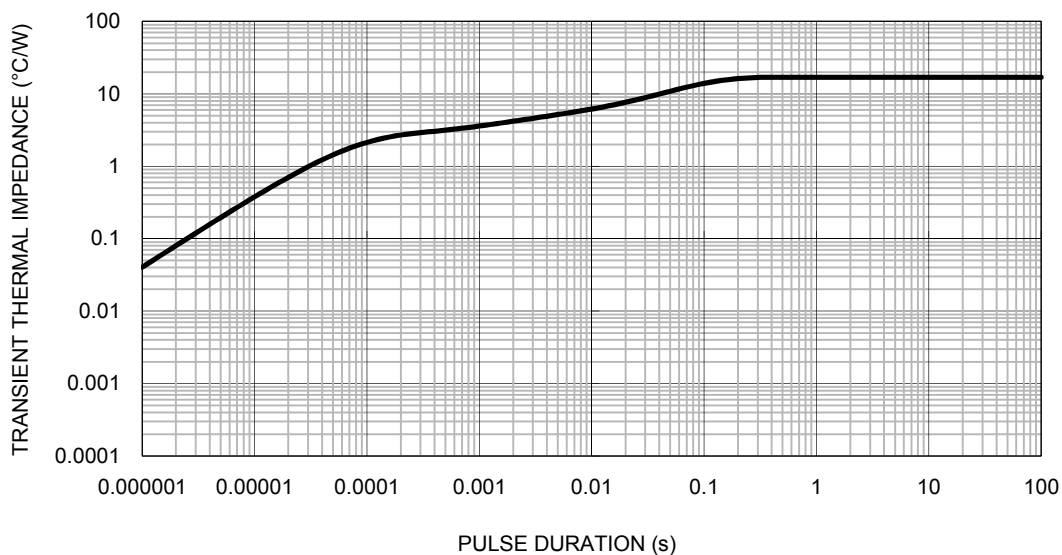
**Fig.9 Typical Reverse Characteristics**



**Fig.10 Typical Forward Characteristics**

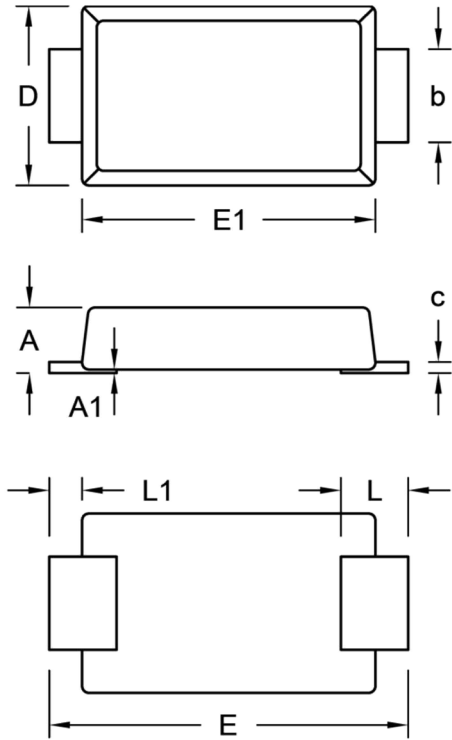


**Fig.11 Typical Transient Thermal Impedance**



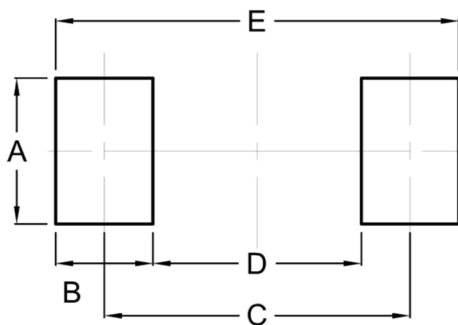
**PACKAGE OUTLINE DIMENSIONS**

Thin SMA



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min.      | Max. | Min.        | Max.  |
| A    | 0.90      | 1.00 | 0.035       | 0.039 |
| A1   | 0.00      | 0.10 | 0.000       | 0.004 |
| b    | 1.25      | 1.45 | 0.049       | 0.057 |
| c    | 0.10      | 0.22 | 0.004       | 0.009 |
| D    | 2.50      | 2.70 | 0.098       | 0.106 |
| E    | 5.05      | 5.35 | 0.199       | 0.211 |
| E1   | 4.15      | 4.35 | 0.163       | 0.171 |
| L    | 0.75      | 1.20 | 0.030       | 0.047 |
| L1   | 0.30      | 0.60 | 0.012       | 0.024 |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 2.10      | 0.083       |
| B      | 1.40      | 0.055       |
| C      | 4.40      | 0.173       |
| D      | 3.00      | 0.118       |
| E      | 5.80      | 0.228       |

**MARKING DIAGRAM**



P/N = Marking Code  
 YW = Date Code  
 F = Factory Code

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