

2A, 200V - 1000V High Efficient Surface Mount Rectifier

FEATURES

- Glass passivated chip junction
- Ideal for automated placement
- Low power loss, high efficiency
- Fast switching for high efficiency
- Low profile package
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

APPLICATIONS

- DC to DC converter
- Switching mode converters and inverters
- Freewheeling application

MECHANICAL DATA

- Case: Thin SMA
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: Indicated by cathode band
- Weight: 0.029g (approximately)

| KEY PARAMETERS | | |
|----------------|------------|------|
| PARAMETER | VALUE | UNIT |
| I_F | 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 | 2 | | | | | A |
| Surge peak forward current single half sine wave superimposed on rated load | $t = 8.3\text{ms}$ | 60 | | | | | A |
| | $t = 1.0\text{ms}$ | | | | | | 120 |
| Junction temperature | T_J | -55 to +150 | | | | | °C |
| Storage temperature | T_{STG} | -55 to +150 | | | | | °C |

| THERMAL PERFORMANCE | | | |
|--|-----------------|------------|-------------|
| PARAMETER | SYMBOL | TYP | UNIT |
| Junction-to-lead thermal resistance | $R_{\theta JL}$ | 17 | °C/W |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 53 | °C/W |
| Junction-to-case thermal resistance | $R_{\theta JC}$ | 21 | °C/W |

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

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | | |
|---|----------------------------|--|---------------------------|------------|------------|---------------|----|
| PARAMETER | | CONDITIONS | SYMBOL | TYP | MAX | UNIT | |
| Forward voltage ⁽¹⁾ | HS2DAL | $I_F = 1\text{A}, T_J = 25^\circ\text{C}$ | V_F | 0.81 | - | V | |
| | | $I_F = 2\text{A}, T_J = 25^\circ\text{C}$ | | 0.87 | 1.00 | V | |
| | | $I_F = 1\text{A}, T_J = 125^\circ\text{C}$ | | 0.67 | - | V | |
| | | $I_F = 2\text{A}, T_J = 125^\circ\text{C}$ | | 0.74 | 0.82 | V | |
| | HS2GAL | $I_F = 1\text{A}, T_J = 25^\circ\text{C}$ | | 0.90 | - | V | |
| | | $I_F = 2\text{A}, T_J = 25^\circ\text{C}$ | | 0.99 | 1.30 | V | |
| | | $I_F = 1\text{A}, T_J = 125^\circ\text{C}$ | | 0.76 | - | V | |
| | | $I_F = 2\text{A}, T_J = 125^\circ\text{C}$ | | 0.86 | 0.96 | V | |
| | HS2JAL | $I_F = 1\text{A}, T_J = 25^\circ\text{C}$ | | 1.00 | - | V | |
| | | $I_F = 2\text{A}, T_J = 25^\circ\text{C}$ | | 1.10 | 1.70 | V | |
| | | $I_F = 1\text{A}, T_J = 125^\circ\text{C}$ | | 0.80 | - | V | |
| | | $I_F = 2\text{A}, T_J = 125^\circ\text{C}$ | | 0.92 | 1.10 | V | |
| | HS2KAL HS2MAL | $I_F = 1\text{A}, T_J = 25^\circ\text{C}$ | | 1.30 | - | V | |
| | | $I_F = 2\text{A}, T_J = 25^\circ\text{C}$ | | 1.48 | 1.70 | V | |
| | | $I_F = 1\text{A}, T_J = 125^\circ\text{C}$ | | 0.94 | - | V | |
| | | $I_F = 2\text{A}, T_J = 125^\circ\text{C}$ | | 1.11 | 1.23 | V | |
| Reverse current @ rated V_R ⁽²⁾ | | $T_J = 25^\circ\text{C}$ | I_R | - | 1 | μA | |
| | | $T_J = 125^\circ\text{C}$ | | - | 80 | μA | |
| Reverse recovery time | HS2DAL HS2GAL | $I_F = 0.5\text{A}, I_R = 1.0\text{A},$ $I_{rr} = 0.25\text{A}$ | t_{rr} | - | 50 | ns | |
| | HS2JAL HS2KAL HS2MAL | | | - | 75 | ns | |
| Junction capacitance | HS2DAL | | 1MHz, $V_R = 4.0\text{V}$ | C_J | 32 | - | pF |
| | HS2GAL | | | | 25 | - | pF |
| | HS2JAL | 17 | | | - | pF | |
| | HS2KAL HS2MAL | 12 | | | - | pF | |

Notes:

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

| ORDERING INFORMATION | | |
|------------------------------------|----------------|----------------------|
| ORDERING CODE⁽¹⁾ | PACKAGE | PACKING |
| HS2xAL | Thin SMA | 14,000 / Tape & 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

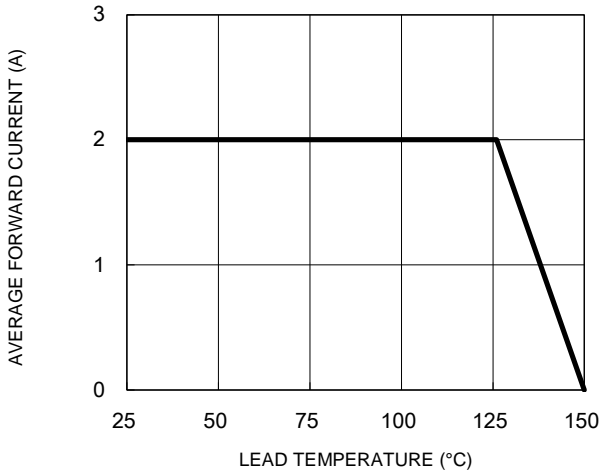


Fig.2 Typical Junction Capacitance

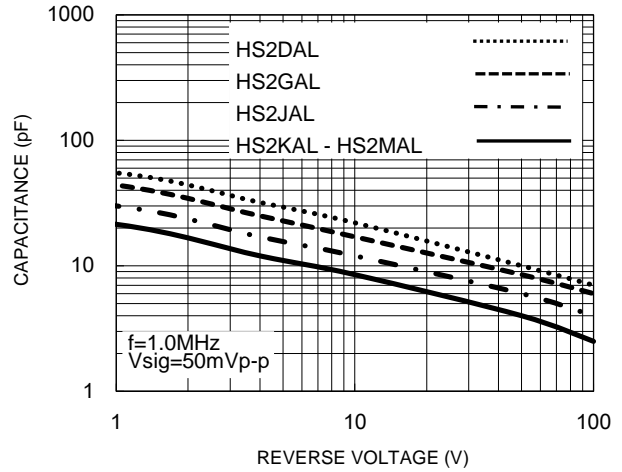


Fig.3 Typical Reverse Characteristics

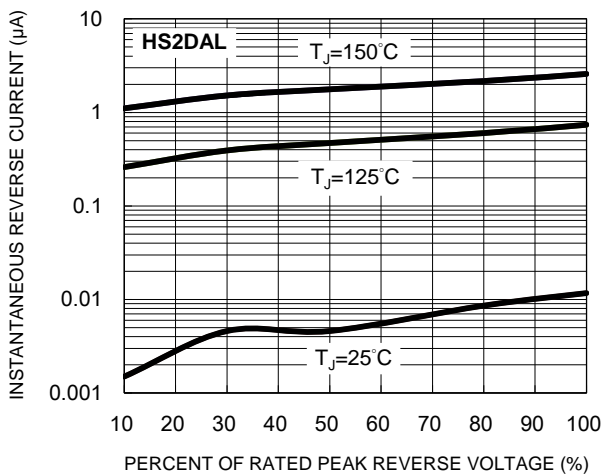


Fig.4 Typical Forward Characteristics

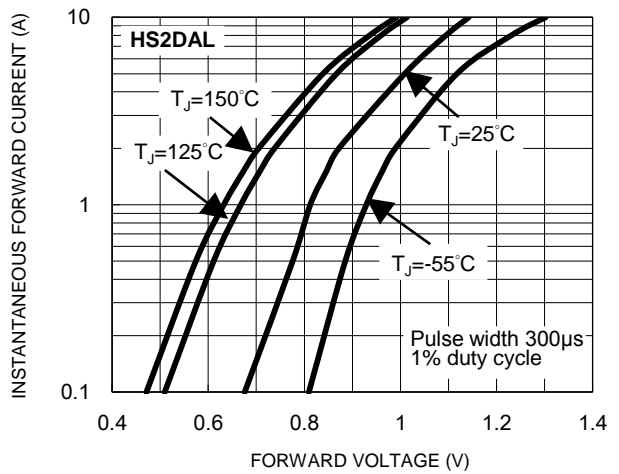


Fig.5 Typical Reverse Characteristics

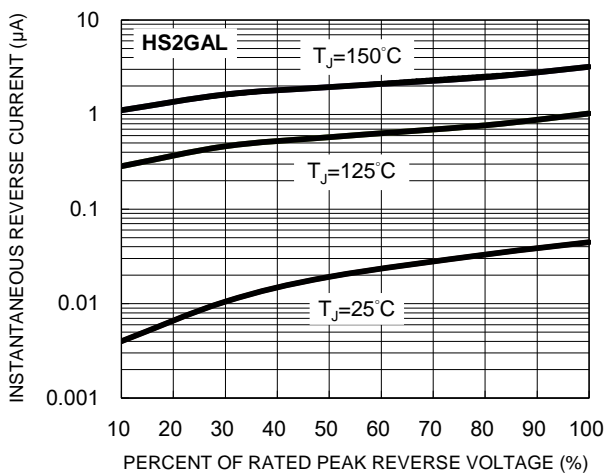
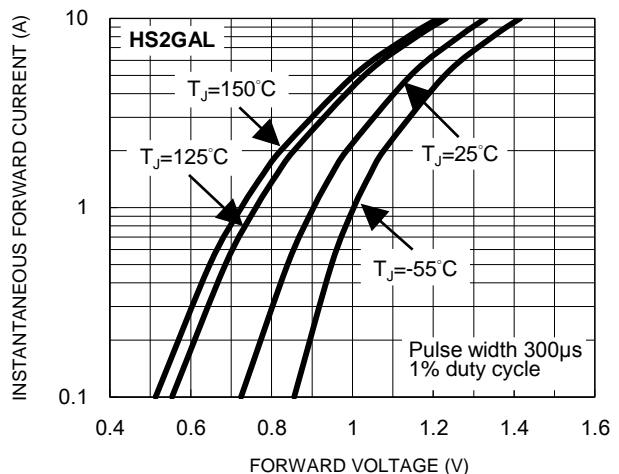


Fig.6 Typical Forward Characteristics



CHARACTERISTICS CURVES

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

Fig.7 Typical Reverse Characteristics

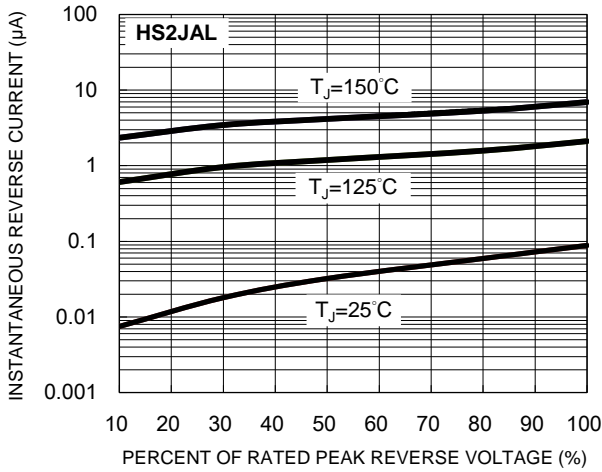


Fig.8 Typical Forward Characteristics

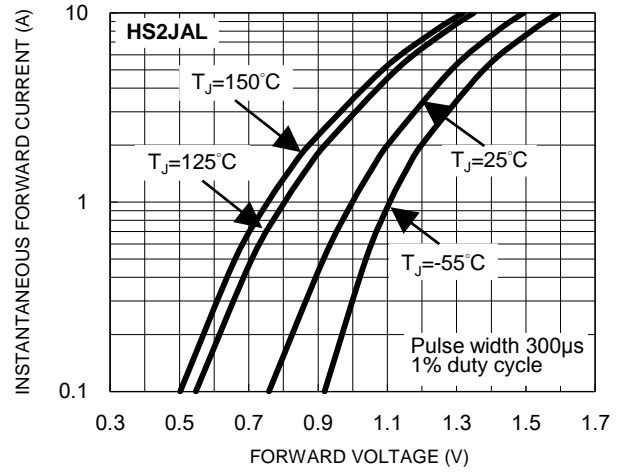


Fig.9 Typical Reverse Characteristics

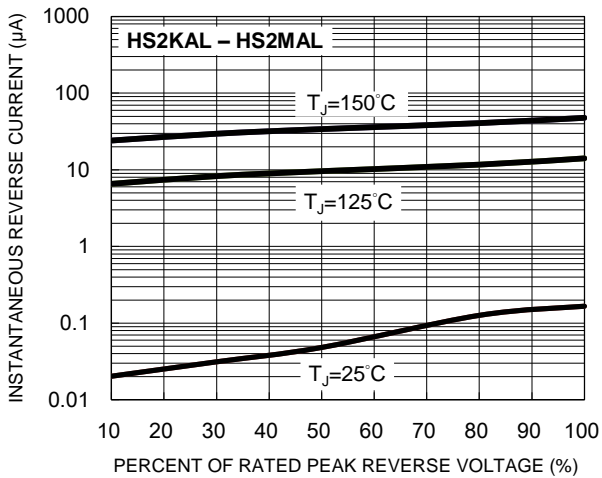


Fig.10 Typical Forward Characteristics

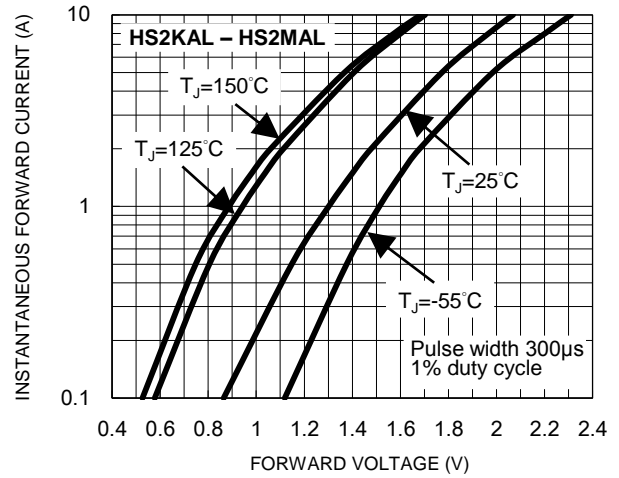
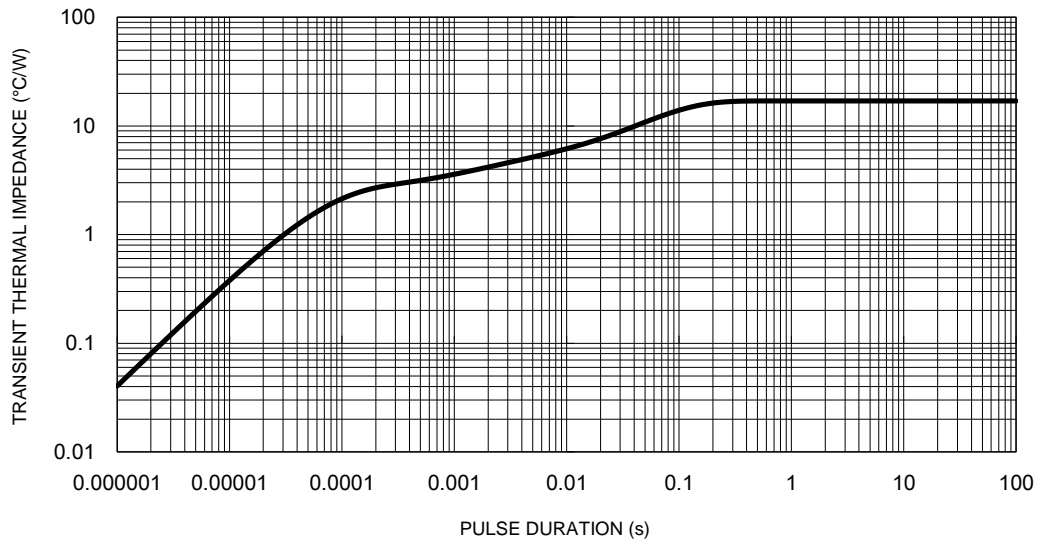
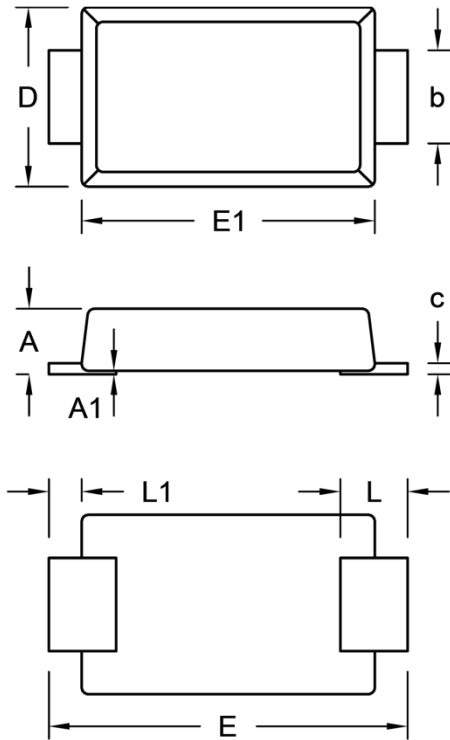


Fig.11 Typical Transient Thermal Impedance



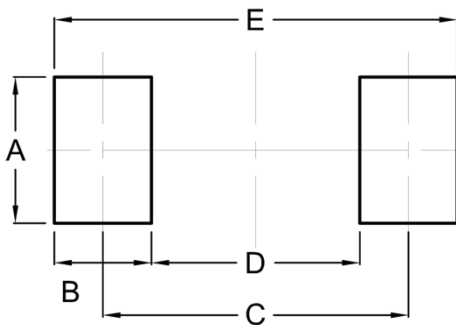
PACKAGE OUTLINE DIMENSIONS

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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