

12A, 600V Ultra Fast Surface Mount Rectifier

FEATURES

- Planar technology
- Low power loss, high efficiency
- Ideal for automated placement
- Wettable flank
- 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
- Lighting application
- Snubber
- Freewheeling application

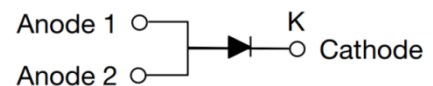
MECHANICAL DATA

- Case: TO-277A (SMPC4.6U)
- 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: 0.107g (approximately)

| KEY PARAMETERS | | |
|----------------|--------------------|------|
| PARAMETER | VALUE | UNIT |
| I_F | 12 | A |
| V_{RRM} | 600 | V |
| I_{FSM} | 160 | A |
| $T_{J\ MAX}$ | 150 | °C |
| Package | TO-277A (SMPC4.6U) | |
| Configuration | Single die | |



TO-277A (SMPC4.6U)



| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | |
|---|--------------------|-------------|------|
| PARAMETER | SYMBOL | PUUP12J | UNIT |
| Marking code on the device | | PUUP12J | |
| Repetitive peak reverse voltage | V_{RRM} | 600 | V |
| Reverse voltage, total rms value | $V_{R(RMS)}$ | 420 | V |
| Forward current | I_F | 12 | A |
| Surge peak forward current single half sine-wave superimposed on rated load | $t = 8.3\text{ms}$ | 160 | A |
| | $t = 1.0\text{ms}$ | 340 | |
| 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 ⁽¹⁾ | $R_{\theta JL}$ | 2.0 | °C/W |
| Junction-to-ambient thermal resistance ⁽²⁾ | $R_{\theta JA}$ | 38.2 | °C/W |
| Junction-to-case thermal resistance ⁽²⁾ | $R_{\theta JC}$ | 5.3 | °C/W |

Thermal Performance Notes:

1. With ideal heat sink
2. Units mounted on PCB (16mm x 16mm Cu pad test board)

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | |
|---|--|---------------|------------|------------|---------------|
| PARAMETER | CONDITIONS | SYMBOL | TYP | MAX | UNIT |
| Forward voltage ⁽¹⁾ | $I_F = 6\text{A}, T_J = 25^\circ\text{C}$ | V_F | 1.63 | - | V |
| | $I_F = 12\text{A}, T_J = 25^\circ\text{C}$ | | 1.94 | 2.1 | V |
| | $I_F = 6\text{A}, T_J = 125^\circ\text{C}$ | | 1.15 | | V |
| | $I_F = 12\text{A}, T_J = 125^\circ\text{C}$ | | 1.41 | - | V |
| Reverse current @ rated V_R ⁽²⁾ | $T_J = 25^\circ\text{C}$ | I_R | - | 5 | μA |
| | $T_J = 125^\circ\text{C}$ | | 10 | - | μA |
| Junction capacitance | 1MHz, $V_R = 4.0\text{V}$ | C_J | 92 | - | pF |
| Reverse recovery time | $I_F = 0.5\text{A}, I_R = 1.0\text{A}, I_{rr} = 0.25\text{A}$ | t_{rr} | - | 25 | ns |
| | $I_F = 1.0\text{A}, di/dt = 50\text{A}/\mu\text{s}, V_R = 30\text{V}$ | | 26 | - | |
| Reverse recovery current | $I_F = 12\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 400\text{V}$ | I_{RM} | 3.4 | - | A |
| Reverse recovery charge | | Q_{rr} | 85 | - | nC |
| Reverse recovery time | | t_{rr} | 48 | - | ns |

Notes:

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

| ORDERING INFORMATION | | |
|-----------------------------|--------------------|---------------------|
| ORDERING CODE | PACKAGE | PACKING |
| PUUP12J | TO-277A (SMPC4.6U) | 6,000 / Tape & Reel |

CHARACTERISTICS CURVES

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

Fig.1 Forward Current Derating Curve

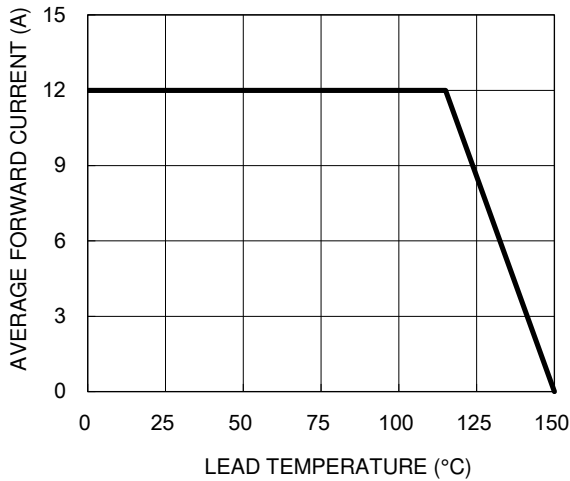


Fig.2 Typical Junction Capacitance

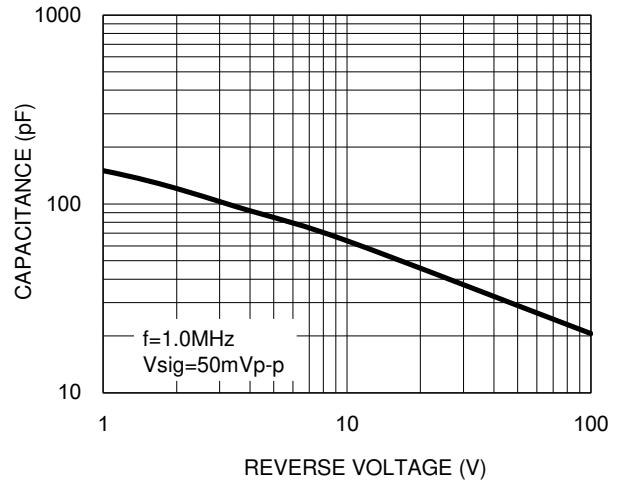


Fig.3 Typical Reverse Characteristics

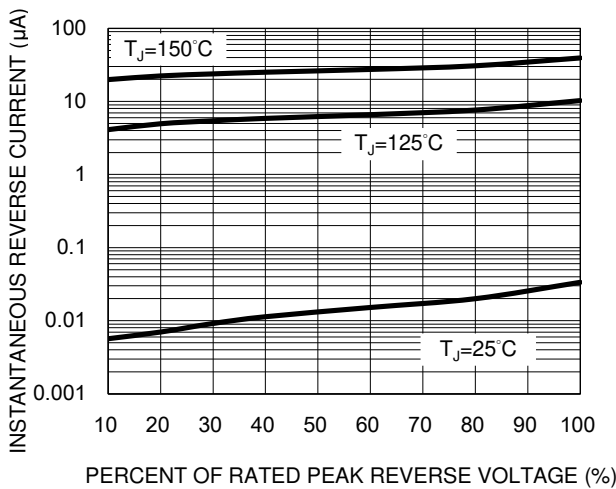


Fig.4 Typical Forward Characteristics

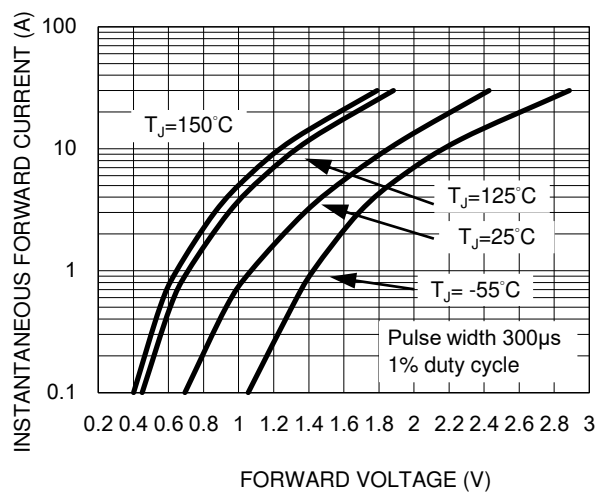
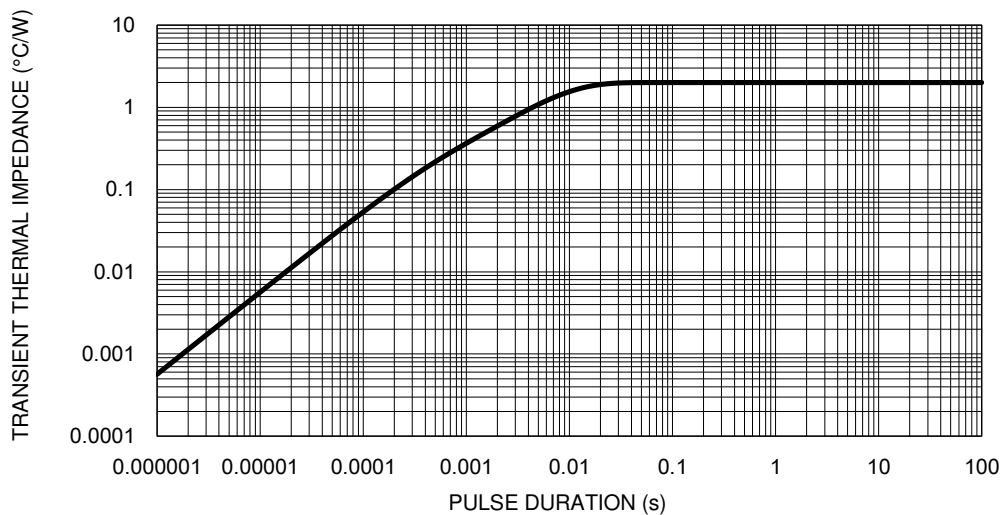
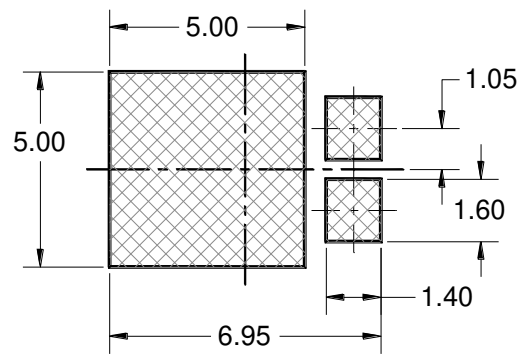
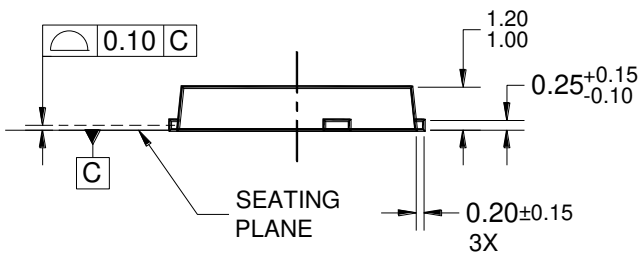
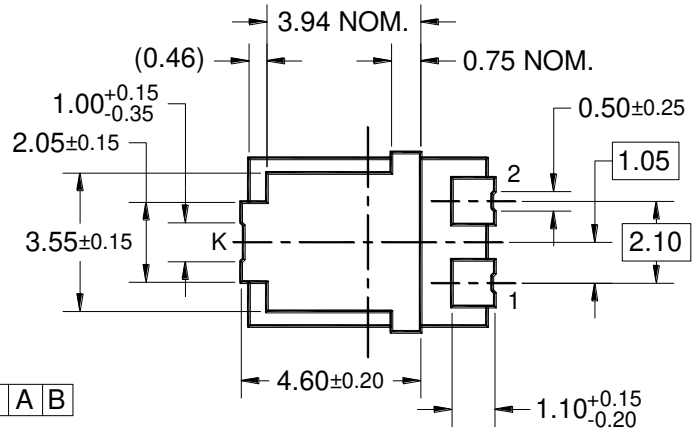
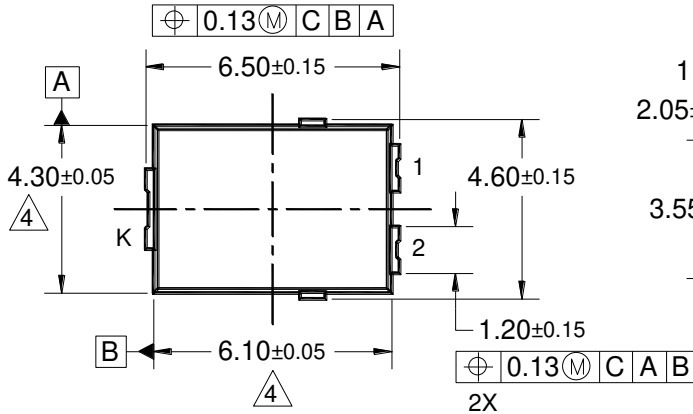


Fig.5 Typical Transient Thermal Impedance

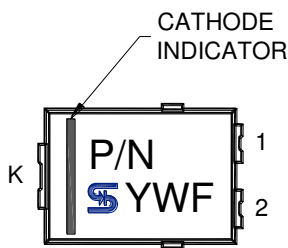


PACKAGE OUTLINE DIMENSIONS

TO-277A (SMPC4.6U)



SUGGESTED PAD LAYOUT



MARKING DIAGRAM

P/N = MARKING CODE
YWF = DATE CODE
F = FACTORY CODE

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEDEC TO-277 ISSUE A.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD LASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-SMPC4.6U-031 REV A.

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