

## 12A, 120V Low $V_F$ Trench Schottky Surface Mount Rectifier

### FEATURES

- Patented Trench Schottky technology
- Excellent high temperature stability
- Low forward voltage
- Low power loss / high efficiency
- High forward surge capability
- Ideal for automated placement
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- DC to DC converters

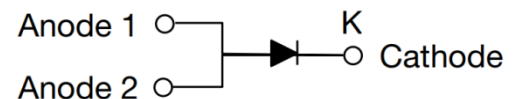
### MECHANICAL DATA

- Case: TO-277A (SMPC)
- 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: 0.095g (approximately)

| KEY PARAMETERS |                |      |
|----------------|----------------|------|
| PARAMETER      | VALUE          | UNIT |
| $I_F$          | 12             | A    |
| $V_{RRM}$      | 120            | V    |
| $I_{FSM}$      | 150            | A    |
| $T_{J\ MAX}$   | 150            | °C   |
| Package        | TO-277A (SMPC) |      |
| Configuration  | Single die     |      |



TO-277A (SMPC)



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)        |              |             |      |
|--|--------------|-------------|------|
| PARAMETER  | SYMBOL       | TSP12U120S  | UNIT |
| Marking code on the device   |              | 12U120      |      |
| Repetitive peak reverse voltage  | $V_{RRM}$    | 120         | V    |
| Reverse voltage, total rms value   | $V_{R(RMS)}$ | 84          | V    |
| Forward current  | $I_F$        | 12          | A    |
| Surge peak forward current, 8.3ms single half sine wave superimposed on rated load | $I_{FSM}$    | 150         | A    |
| Junction temperature   | $T_J$        | -55 to +150 | °C   |
| Storage temperature  | $T_{STG}$    | -55 to +150 | °C   |

| <b>THERMAL PERFORMANCE</b>          |                 |     |      |
|-------------------------------------|-----------------|-----|------|
| PARAMETER                           | SYMBOL          | TYP | UNIT |
| Junction-to-lead thermal resistance | $R_{\theta JL}$ | 6   | °C/W |

| <b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |   |        |      |      |               |
|---|---|--------|------|------|---------------|
| PARAMETER   | CONDITIONS                                  | SYMBOL | TYP  | MAX  | UNIT          |
| Forward voltage <sup>(1)</sup>  | $I_F = 6\text{A}, T_J = 25^\circ\text{C}$   | $V_F$  | 0.56 | -    | V             |
|   | $I_F = 12\text{A}, T_J = 25^\circ\text{C}$  |        | 0.68 | 0.78 | V             |
|   | $I_F = 6\text{A}, T_J = 125^\circ\text{C}$  |        | 0.48 | -    | V             |
|   | $I_F = 12\text{A}, T_J = 125^\circ\text{C}$ |        | 0.58 | 0.68 | V             |
| Reverse current @ rated $V_R$ <sup>(2)</sup>  | $T_J = 25^\circ\text{C}$                    | $I_R$  | -    | 500  | $\mu\text{A}$ |
|   | $T_J = 125^\circ\text{C}$                   |        | -    | 50   | mA            |

**Notes:**

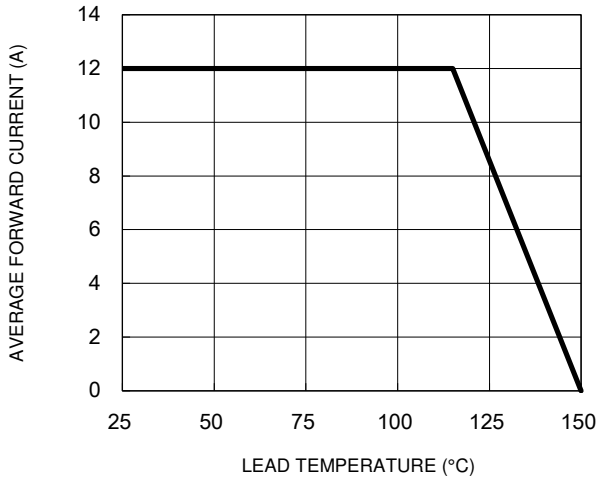
1. Pulse test with PW = 0.3ms
2. Pulse test with PW = 30ms

| <b>ORDERING INFORMATION</b> |                |                     |
|-----------------------------|----------------|---------------------|
| ORDERING CODE               | PACKAGE        | PACKING             |
| TSP12U120S                  | TO-277A (SMPC) | 6,000 / Tape & Reel |

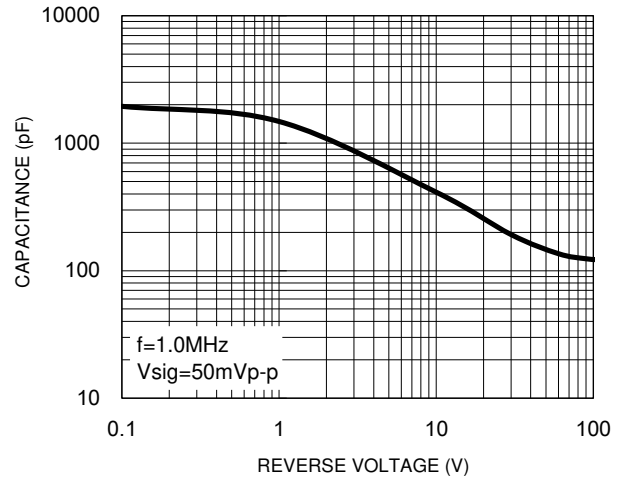
**CHARACTERISTICS CURVES**

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

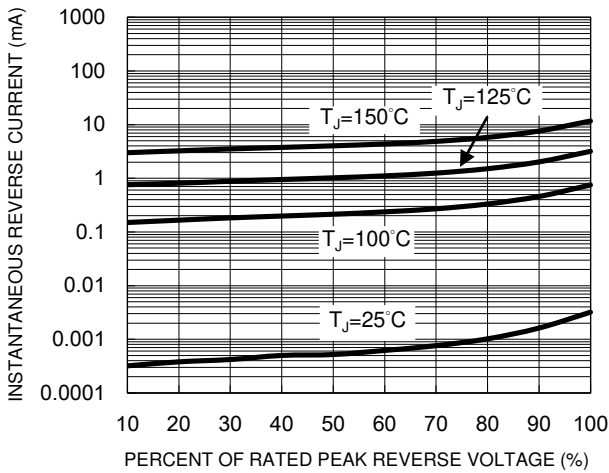
**Fig.1 Forward Current Derating Curve**



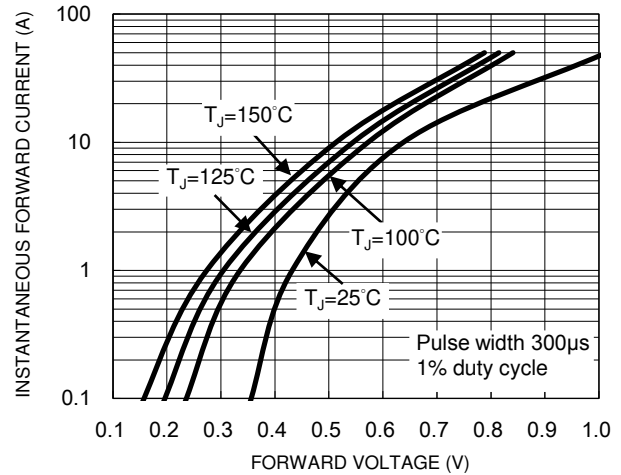
**Fig.2 Typical Junction Capacitance**



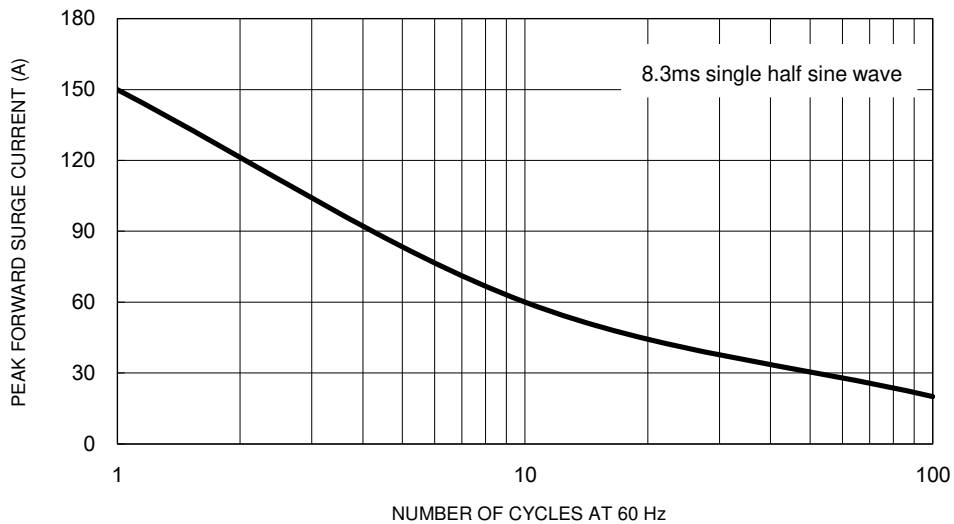
**Fig.3 Typical Reverse Characteristics**



**Fig.4 Typical Forward Characteristics**

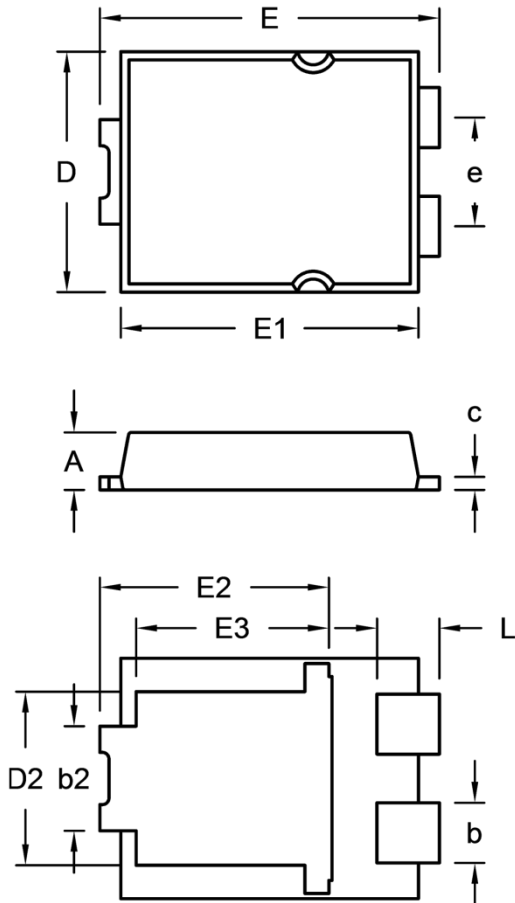


**Fig.5 Maximum Non-Repetitive Forward Surge Current**



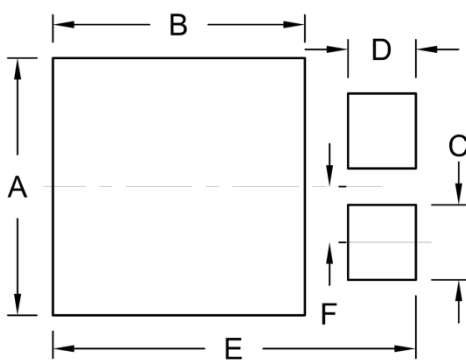
**PACKAGE OUTLINE DIMENSIONS**

TO-277A (SMPC)



| DIM. | Unit (mm) |       | Unit (inch) |       |
|------|-----------|-------|-------------|-------|
|      | Min.      | Max.  | Min.        | Max.  |
| A    | 1.000     | 1.200 | 0.039       | 0.047 |
| b    | 1.000     | 1.300 | 0.039       | 0.051 |
| b2   | 1.850     | 2.150 | 0.073       | 0.085 |
| c    | 0.175     | 0.325 | 0.007       | 0.013 |
| D    | 4.550     | 4.650 | 0.179       | 0.183 |
| D2   | 3.170     | 3.470 | 0.125       | 0.137 |
| E    | 6.350     | 6.650 | 0.250       | 0.262 |
| E1   | 5.650     | 5.750 | 0.222       | 0.226 |
| E2   | 4.235     | 4.535 | 0.167       | 0.179 |
| E3   | 3.540     | 3.840 | 0.139       | 0.151 |
| e    | 1.930     | 2.230 | 0.076       | 0.088 |
| L    | 1.043     | 1.343 | 0.041       | 0.053 |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 4.80      | 0.189       |
| B      | 4.72      | 0.186       |
| C      | 1.40      | 0.055       |
| D      | 1.27      | 0.050       |
| E      | 6.80      | 0.268       |
| F      | 1.04      | 0.041       |

**MARKING DIAGRAM**



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

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