

## 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

### APPLICATIONS

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

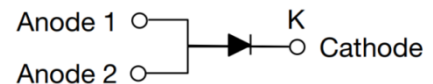
### MECHANICAL DATA

- 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
$T_{J\ MAX}$	175	°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	VALUE	UNIT
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	$I_{FSM}$	$t = 8.3\text{ms}$	160
		$t = 1.0\text{ms}$	340
Junction temperature	$T_J$	-55 to +175	°C
Storage temperature	$T_{STG}$	-55 to +175	°C

<b>THERMAL PERFORMANCE</b>			
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TYP</b>	<b>UNIT</b>
Junction-to-lead thermal resistance <sup>(1)</sup>	$R_{\theta JL}$	2.0	°C/W
Junction-to-ambient thermal resistance <sup>(2)</sup>	$R_{\theta JA}$	38.2	°C/W
Junction-to-case thermal resistance <sup>(2)</sup>	$R_{\theta JC}$	5.3	°C/W

**Thermal Performance Notes:**

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

<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 <sup>(1)</sup>	$I_F = 6\text{A}, T_J = 25^\circ\text{C}$	$V_F$	1.45	-	V
	$I_F = 12\text{A}, T_J = 25^\circ\text{C}$		1.67	1.9	V
	$I_F = 6\text{A}, T_J = 125^\circ\text{C}$		1.06		V
	$I_F = 12\text{A}, T_J = 125^\circ\text{C}$		1.27	-	V
Reverse current @ rated $V_R$ <sup>(2)</sup>	$T_J = 25^\circ\text{C}$	$I_R$	-	5	$\mu\text{A}$
	$T_J = 125^\circ\text{C}$		9	-	$\mu\text{A}$
Junction capacitance	1MHz, $V_R = 4.0\text{V}$	$C_J$	69	-	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
	$I_F = 1.0\text{A}, di/dt = 50\text{A}/\mu\text{s}, V_R = 30\text{V}$		27	-	
Reverse recovery current	$I_F = 12\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 400\text{V}$	$I_{RM}$	2.4	-	A
Reverse recovery charge		$Q_{rr}$	117	-	nC
Reverse recovery time		$t_{rr}$	70	-	ns

**Notes:**

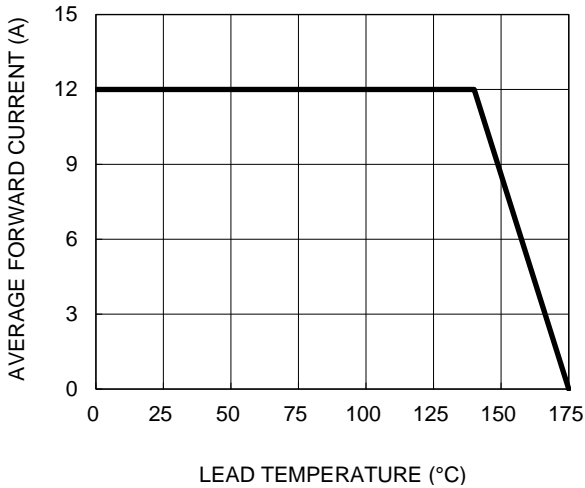
1. Pulse test with  $PW = 0.3\text{ms}$
2. Pulse test with  $PW = 30\text{ms}$

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

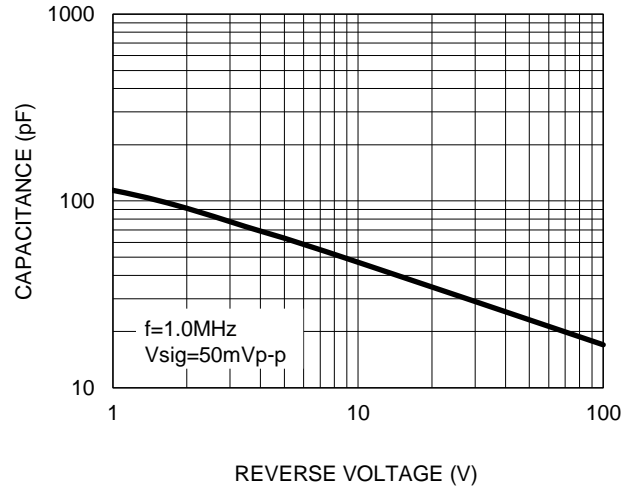
**CHARACTERISTICS CURVES**

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

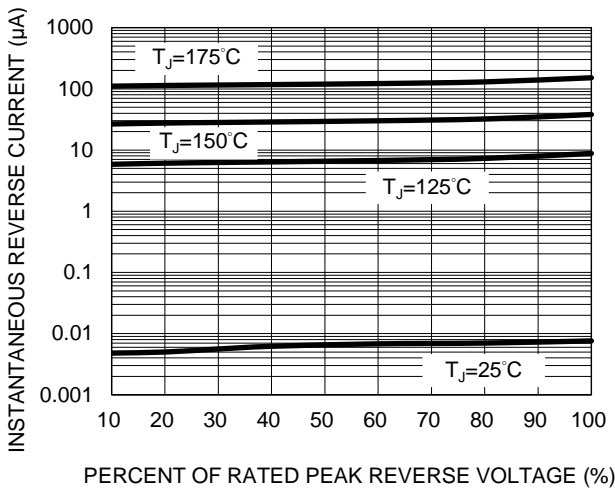
**Fig.1 Forward Current Derating Curve**



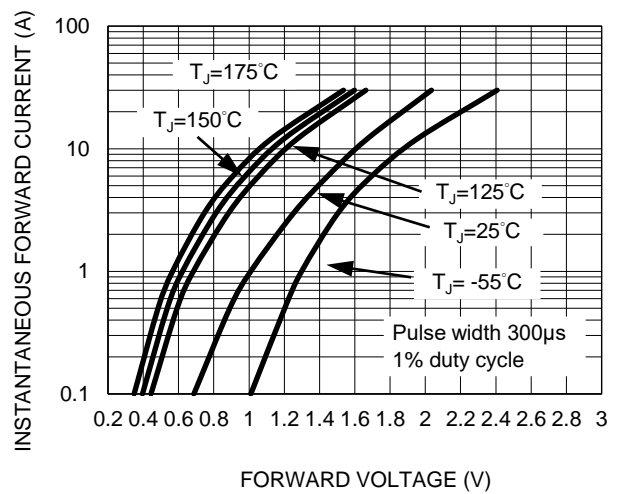
**Fig.2 Typical Junction Capacitance**



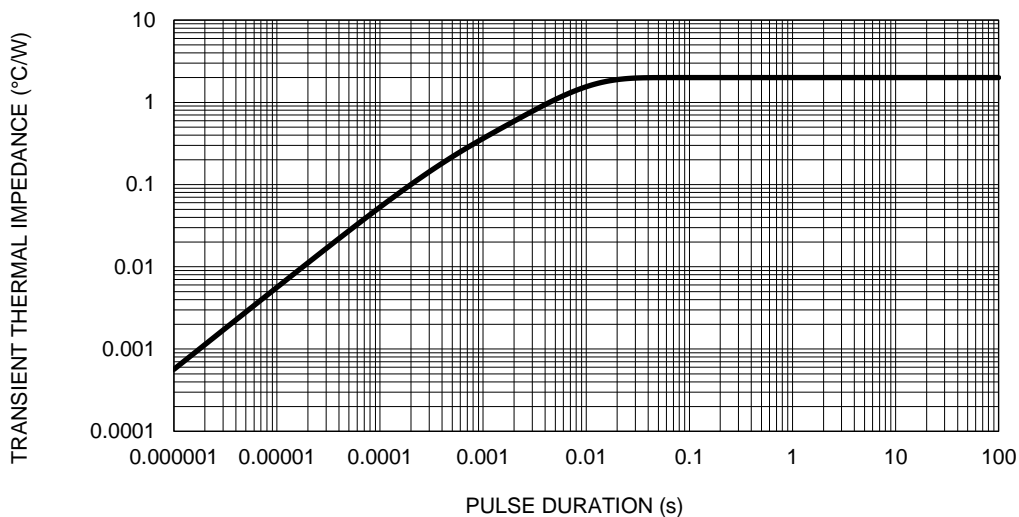
**Fig.3 Typical Reverse Characteristics**



**Fig.4 Typical Forward Characteristics**

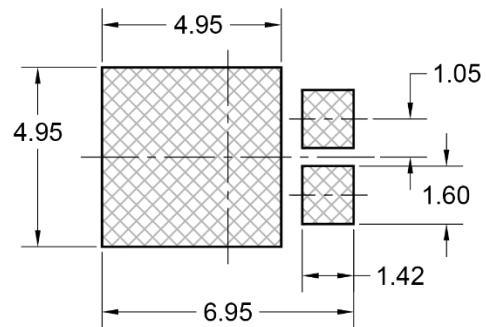
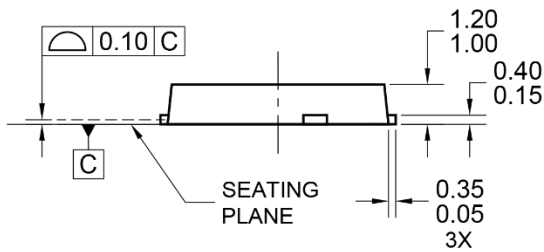
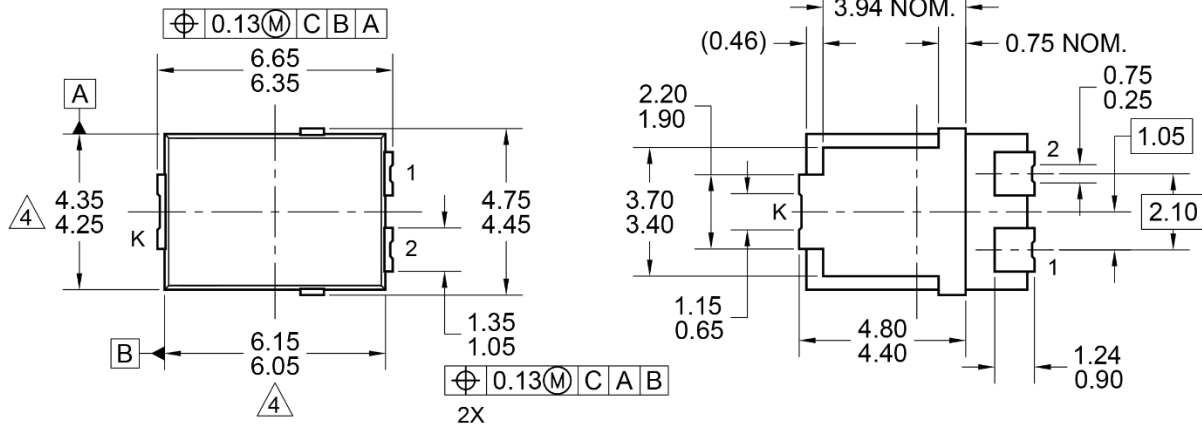


**Fig.5 Typical Transient Thermal Impedance**

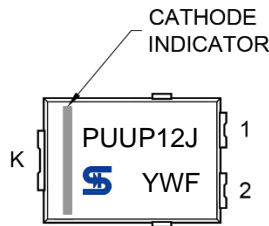


**PACKAGE OUTLINE DIMENSIONS**

**TO-277A (SMPC4.6U)**



**SUGGESTED PAD LAYOUT  
(REFERENCE ONLY)**



**MARKING DIAGRAM**

YW = 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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