



# STPS6045CP/CPI/CW

## POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	<b>2x30 A</b>
$V_{RRM}$	<b>45 V</b>
$T_j(max)$	<b>175 °C</b>
$V_F(max)$	<b>0.63 V</b>

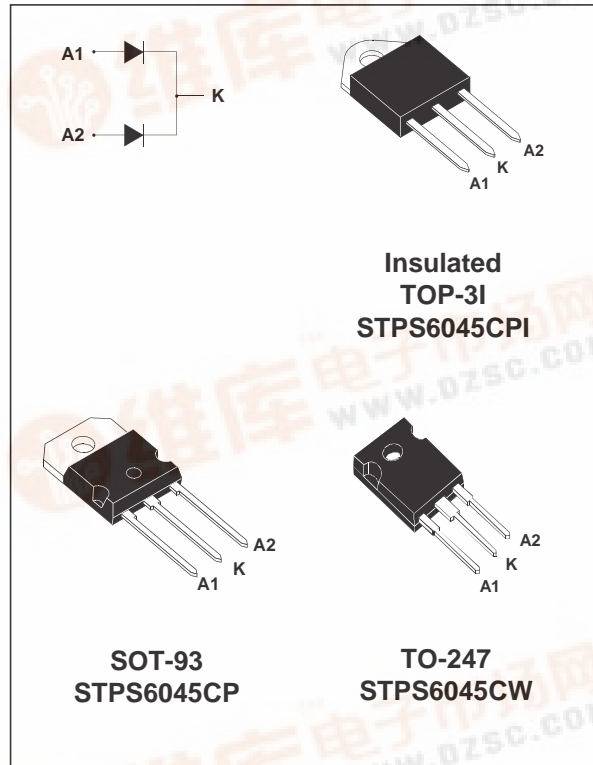
### FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREME FAST SWITCHING
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE: TOP-3I  
Insulating voltage = 2500V<sub>RMS</sub>  
Capacitance = 12pF
- AVALANCHE CAPABILITY SPECIFIED

### DESCRIPTION

Dual center tap Schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged either in SOT-93, TOP-3I or TO-247, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



### ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter			Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage			45	V	
$I_{F(RMS)}$	RMS forward current			60	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	SOT-93 TO-247	$T_c = 150^\circ\text{C}$	Per diode	30	A
		TOP-3I	$T_c = 130^\circ\text{C}$	Per device	60	A
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10 \text{ ms}$ sinusoidal	400	A	
$I_{RRM}$	Repetitive Peak reverse current		$t_p = 2 \mu\text{s}$ square $F = 1\text{kHz}$	1	A	
$I_{RSM}$	Non repetitive peak reverse current		$t_p = 100 \mu\text{s}$ square	3	A	
$P_{ARM}$	Repetitive peak avalanche power		$t_p = 1 \mu\text{s}$ $T_j = 25^\circ\text{C}$	10600	W	
$T_{stg}$	Storage temperature range			- 65 to + 175	°C	
$T_j$	Maximum operating junction temperature *			175	°C	
$dV/dt$	Critical rate of rise of reverse voltage			10000	V/ $\mu\text{s}$	

\* :  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

# STPS6045CP/CPI/CW

## THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	Junction to case	SOT-93 / TO-247	Per diode Total	0.95 0.55
		TOP-3I	Per diode Total	1.8 1.1
		SOT-93 / TO-247	Coupling	0.15
		TOP-3I		0.4

When the diodes 1 and 2 are used simultaneously:  
 $\Delta T_J(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)} (\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$

## STATIC ELECTRICAL CHARACTERISTICS (per diode)

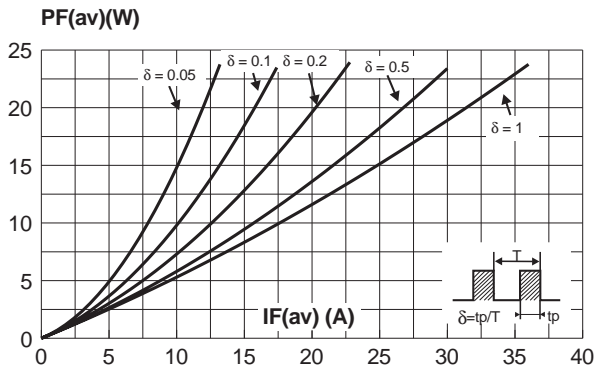
Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> *	Reverse leakage current	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			500	μA
		T <sub>j</sub> = 125°C			20	80	mA
V <sub>F</sub> *	Forward voltage drop	T <sub>j</sub> = 125°C	I <sub>F</sub> = 30 A		0.53	0.63	V
		T <sub>j</sub> = 25°C	I <sub>F</sub> = 60 A			0.84	
		T <sub>j</sub> = 125°C	I <sub>F</sub> = 60 A		0.68	0.78	

Pulse test : \*\* tp = 380 μs, δ < 2%

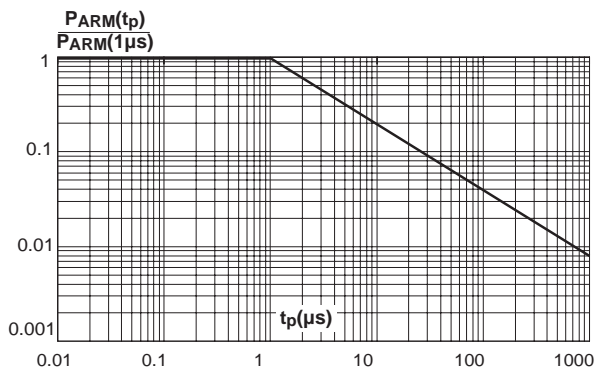
To evaluate the conduction losses use the following equation:

$$P = 0.48 \times I_{F(AV)} + 0.005 I_{F(RMS)}^2$$

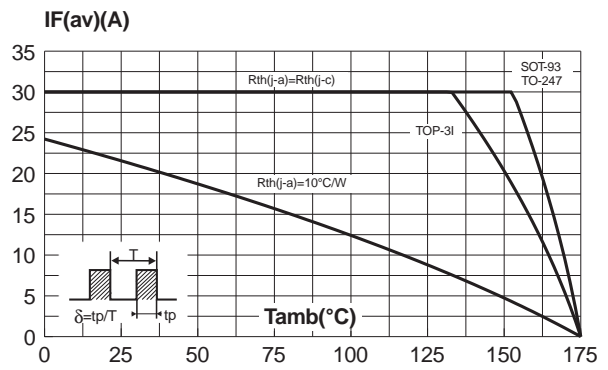
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



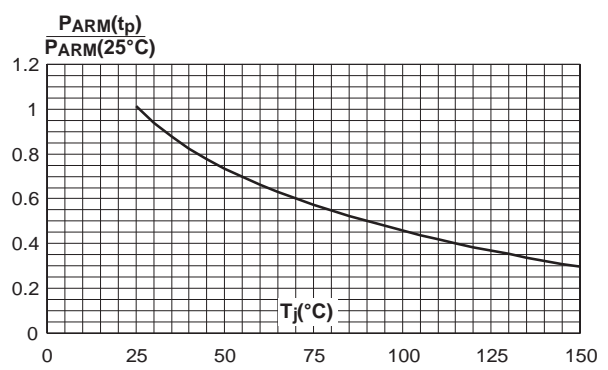
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



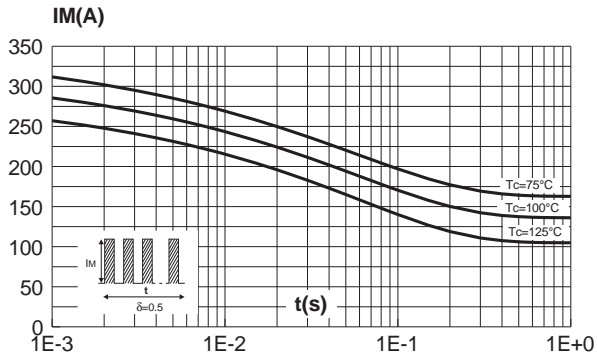
**Fig. 2:** Average current versus ambient temperature (δ=0.5, per diode).



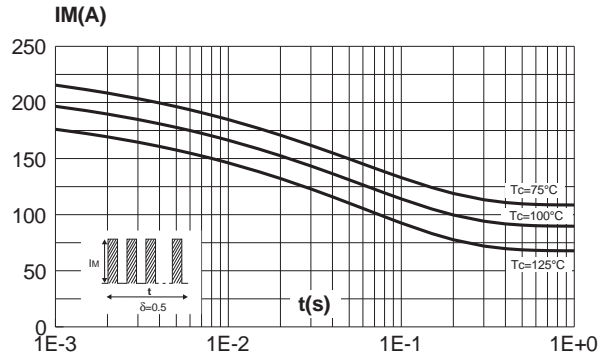
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



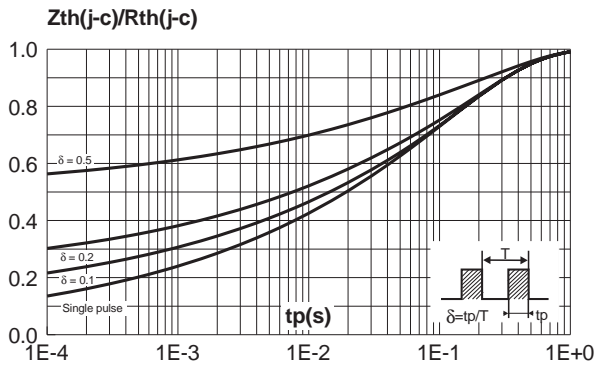
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (SOT-93 and TO-247).



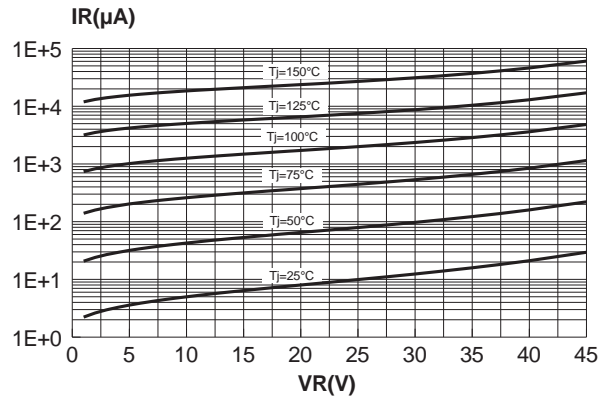
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TOP-3I).



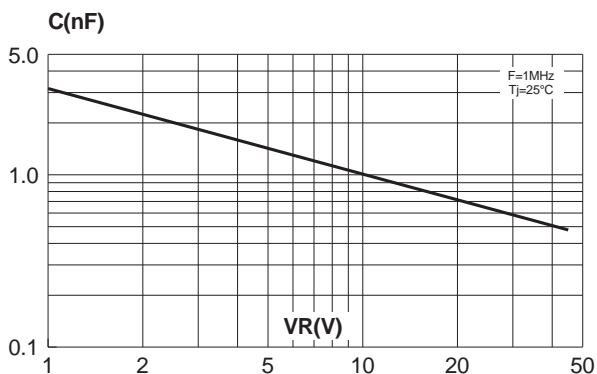
**Fig. 6:** Relative variation of thermal transient impedance junction to case versus pulse duration.



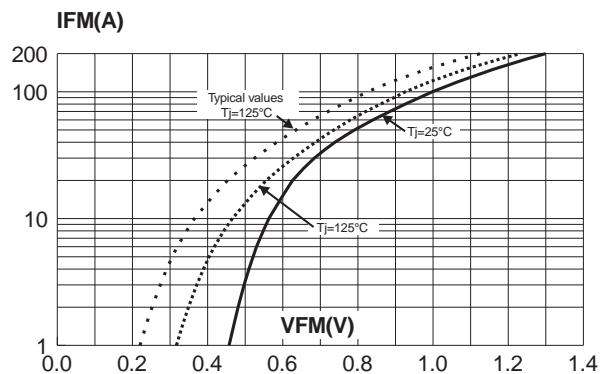
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values, per diode).



**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values, per diode).

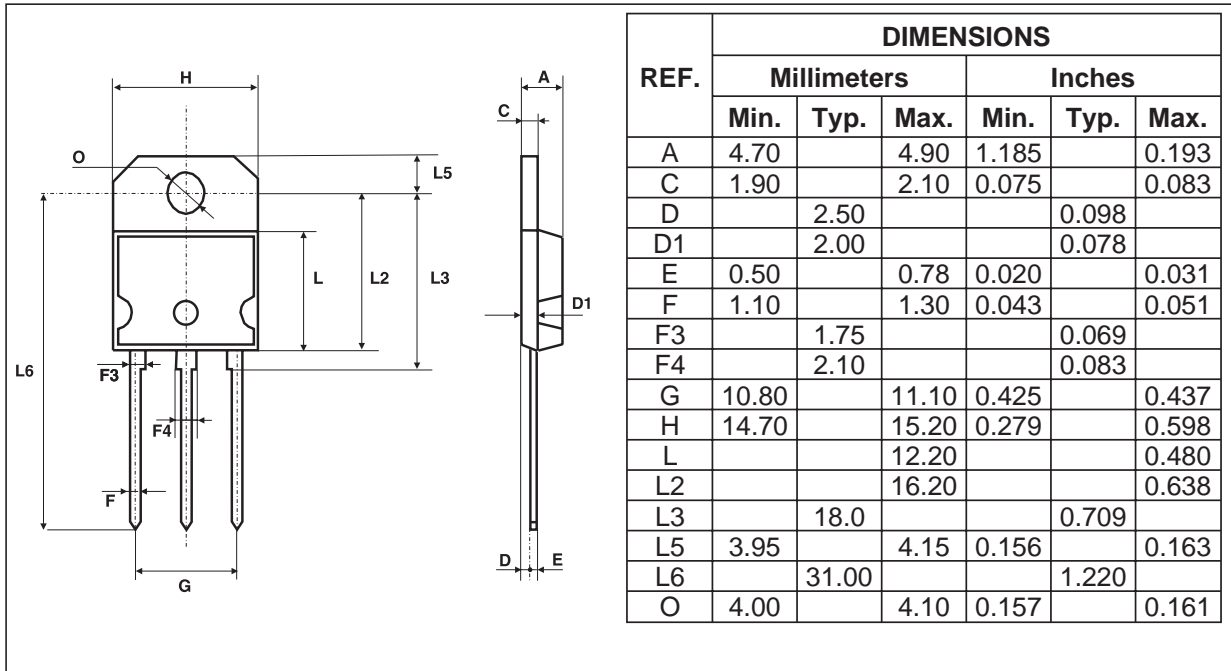


**Fig. 9:** Forward voltage drop versus forward current (maximum values, per diode).

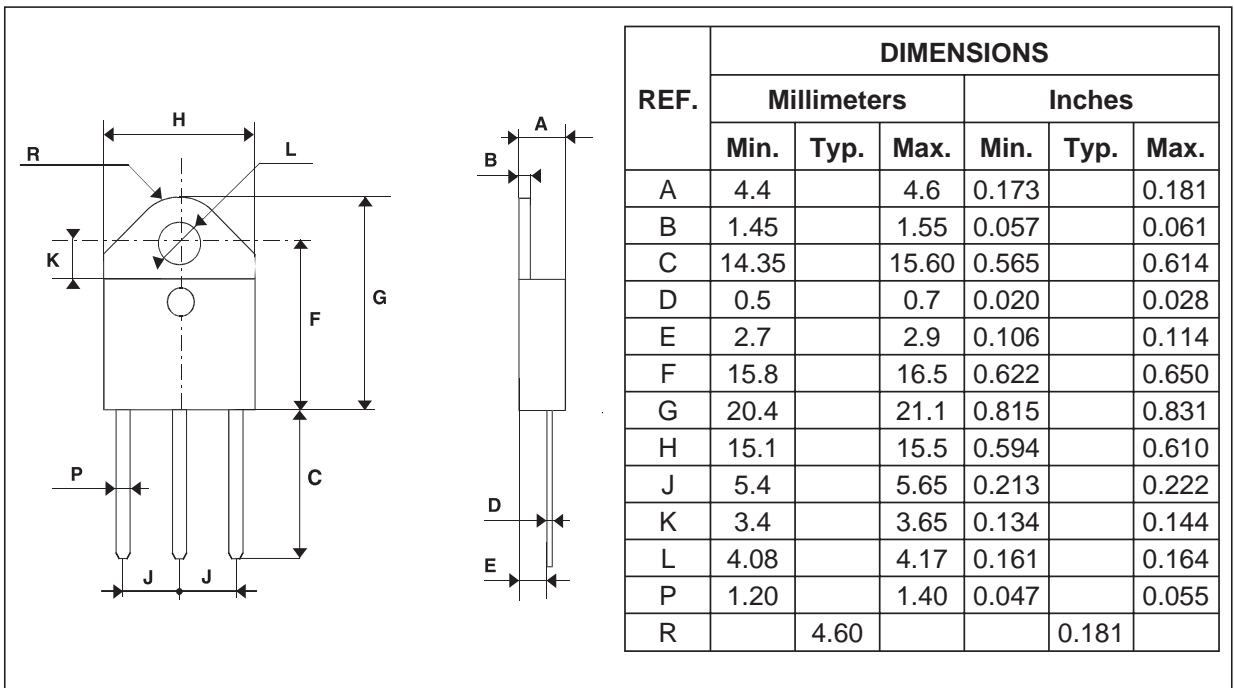


**STPS6045CP/CPI/CW**

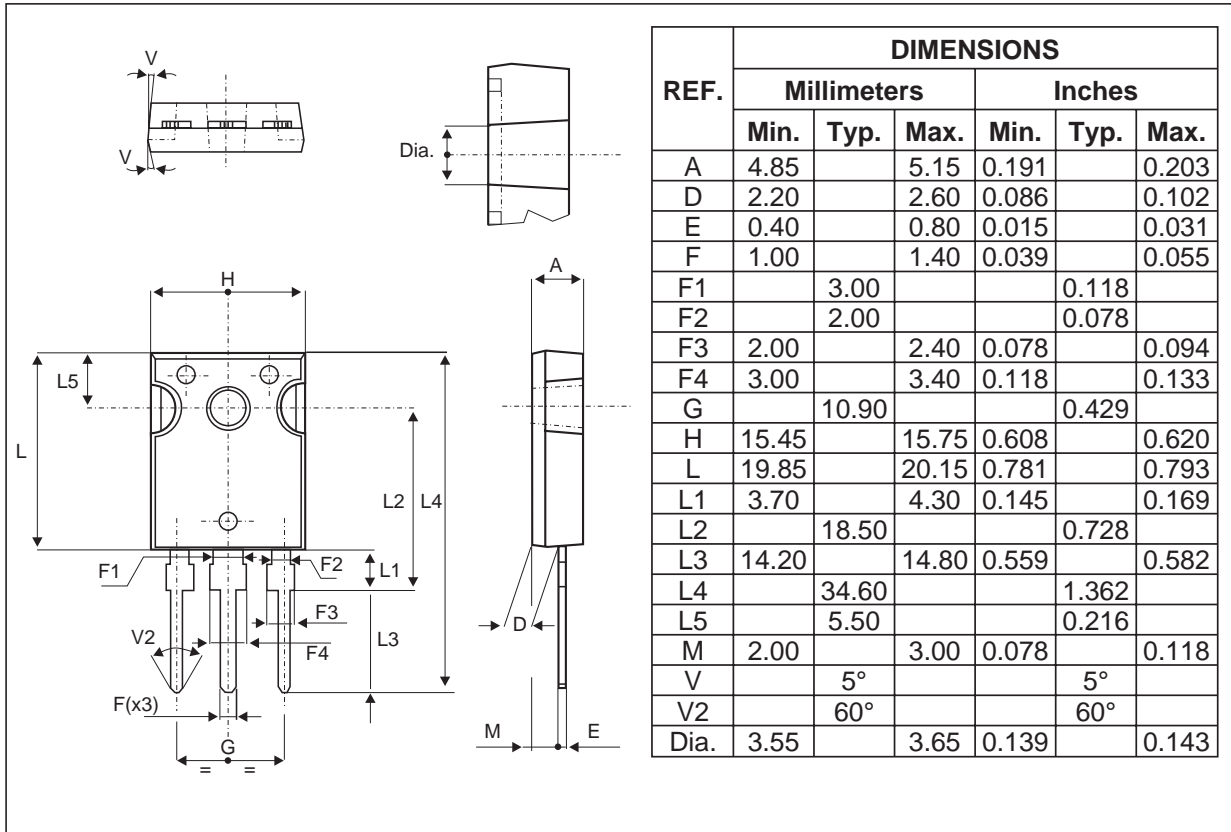
**PACKAGE MECHANICAL DATA**  
SOT-93



**PACKAGE MECHANICAL DATA**  
TOP-3I (isolated)



**PACKAGE MECHANICAL DATA**  
TO-247



Type	Marking	Package	Weight	Base qty	Delivery mode
STPS6045CP	STPS6045CP	SOT-93	3.97 g.	30	Tube
STPS6045CPI	STPS6045CPI	TOP-3I	4.46 g.	120	Bulk
STPS6045CW	STPS6045CW	TO-247	4.36 g.	30	Tube

- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1.0 N.m.
- Epoxy meets UL94,V0

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics  
 © 2003 STMicroelectronics - Printed in Italy - All rights reserved.  
 STMicroelectronics GROUP OF COMPANIES  
 Australia - Brazil - Canada - China - Finland - France - Germany  
 Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore  
 Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>

