

POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_F(AV)$	2x30 A
V_{RRM}	45 V
$T_j(max)$	175 °C
$V_F(max)$	0.63 V

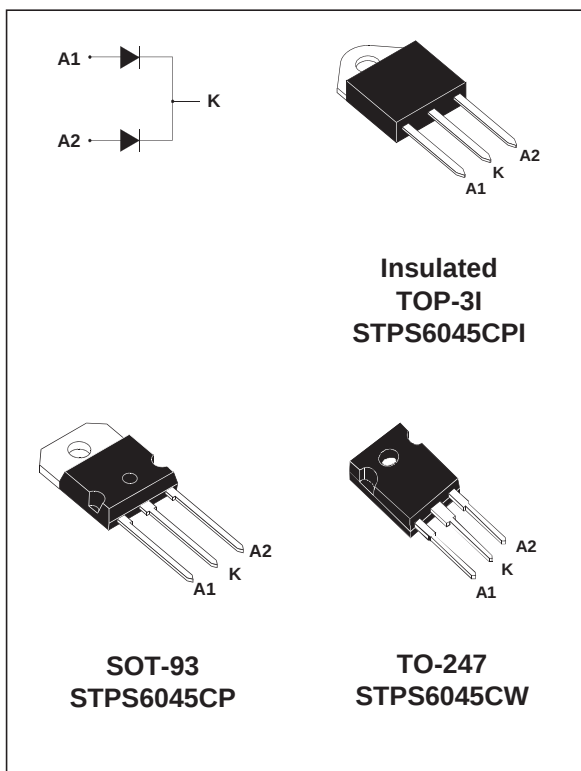
FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREME FAST SWITCHING
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE: TOP-3I
Insulating voltage = 2500V_{RMS}
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 δ = 0.5	SOT-93 TO-247	T _c = 150°C	Per diode	30	A
		TOP-3I	T _c = 130°C	Per device	60	
I _{FSM}	Surge non repetitive forward current		tp = 10 ms sinusoidal		400	A
I _{RRM}	Repetitive Peak reverse current		tp = 2 μs square F = 1kHz		1	A
I _{RSM}	Non repetitive peak reverse current		tp = 100 μs square		3	A
P _{ARM}	Repetitive peak avalanche power		tp = 1μs Tj = 25°C		10600	W
T _{stg}	Storage temperature range				- 65 to + 175	°C
Tj	Maximum operating junction temperature *				175	°C
dV/dt	Critical rate of rise of reverse voltage				10000	V/μs

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

THERMAL RESISTANCES

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	SOT-93 / TO-247	Per diode Total	0.95 0.55	$^{\circ}\text{C/W}$
		TOP-3I	Per diode Total	1.8 1.1	
$R_{th(c)}$		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_R^*	Reverse leakage current	$T_J = 25^{\circ}\text{C}$	$V_R = V_{RRM}$			500	μA
		$T_J = 125^{\circ}\text{C}$			20	80	mA
V_F^*	Forward voltage drop	$T_J = 125^{\circ}\text{C}$	$I_F = 30\text{ A}$		0.53	0.63	V
		$T_J = 25^{\circ}\text{C}$	$I_F = 60\text{ A}$			0.84	
		$T_J = 125^{\circ}\text{C}$	$I_F = 60\text{ A}$		0.68	0.78	

Pulse test : $** t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

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).

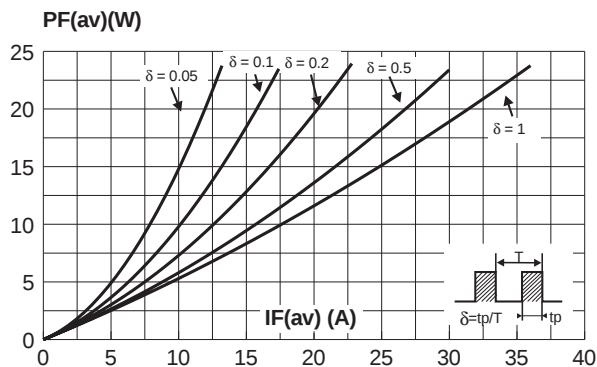


Fig. 3: Normalized avalanche power derating versus pulse duration.

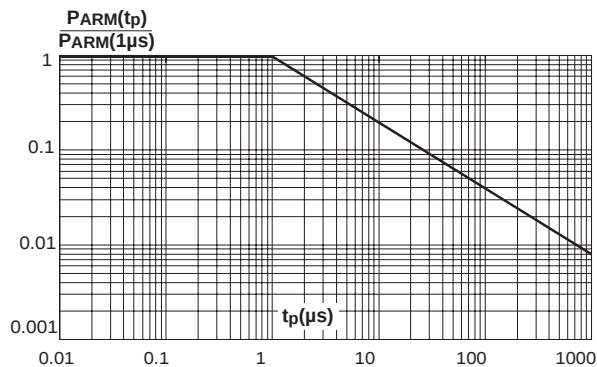


Fig. 2: Average current versus ambient temperature ($\delta=0.5$, per diode).

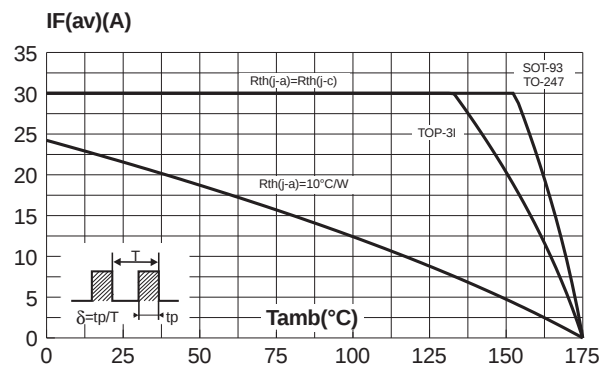


Fig. 4: Normalized avalanche power derating versus junction temperature.

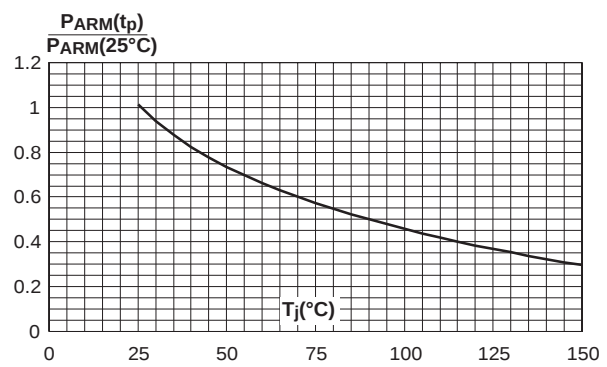


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (SOT-93 and TO-247).

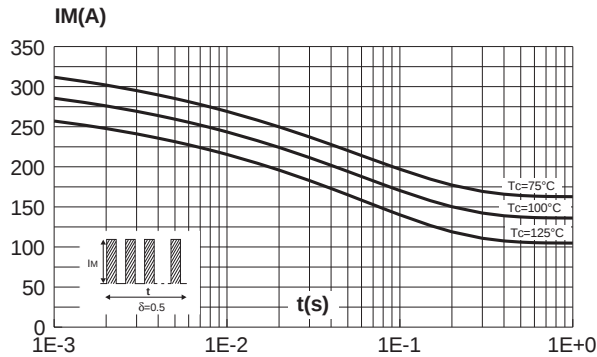


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TOP-3I).

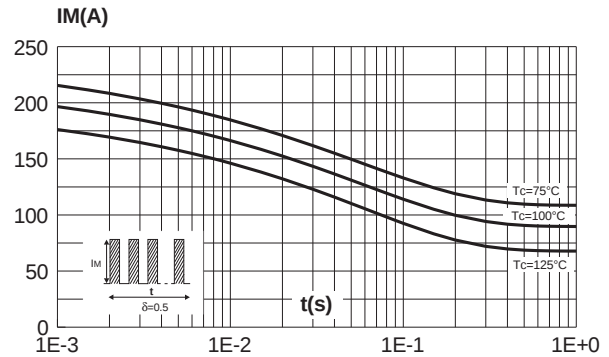


Fig. 6: Relative variation of thermal transient impedance junction to case versus pulse duration.

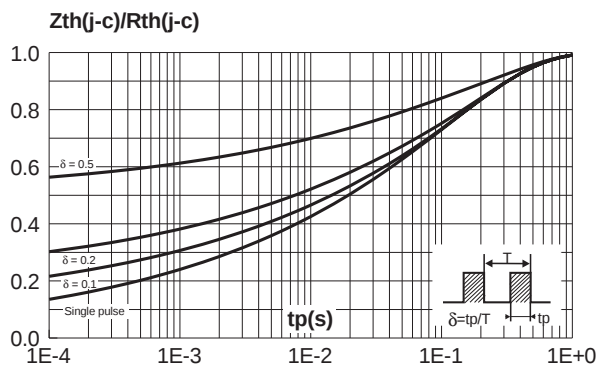


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values, per diode).

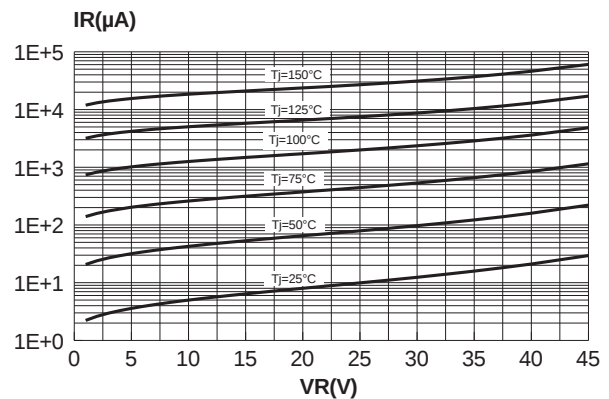


Fig. 8: Junction capacitance versus reverse voltage applied (typical values, per diode).

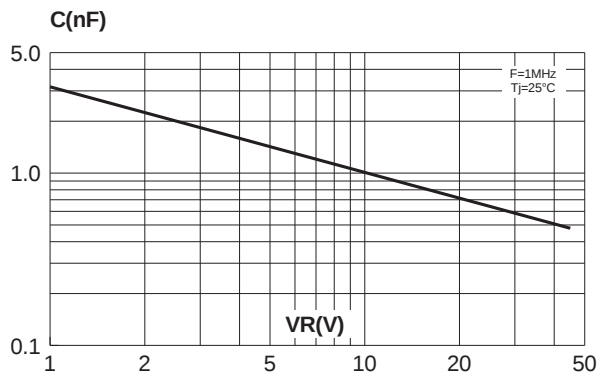
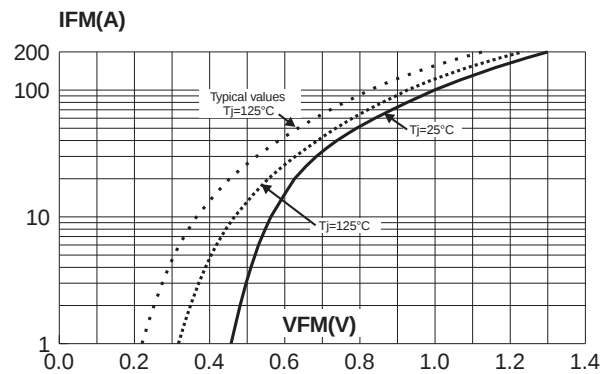
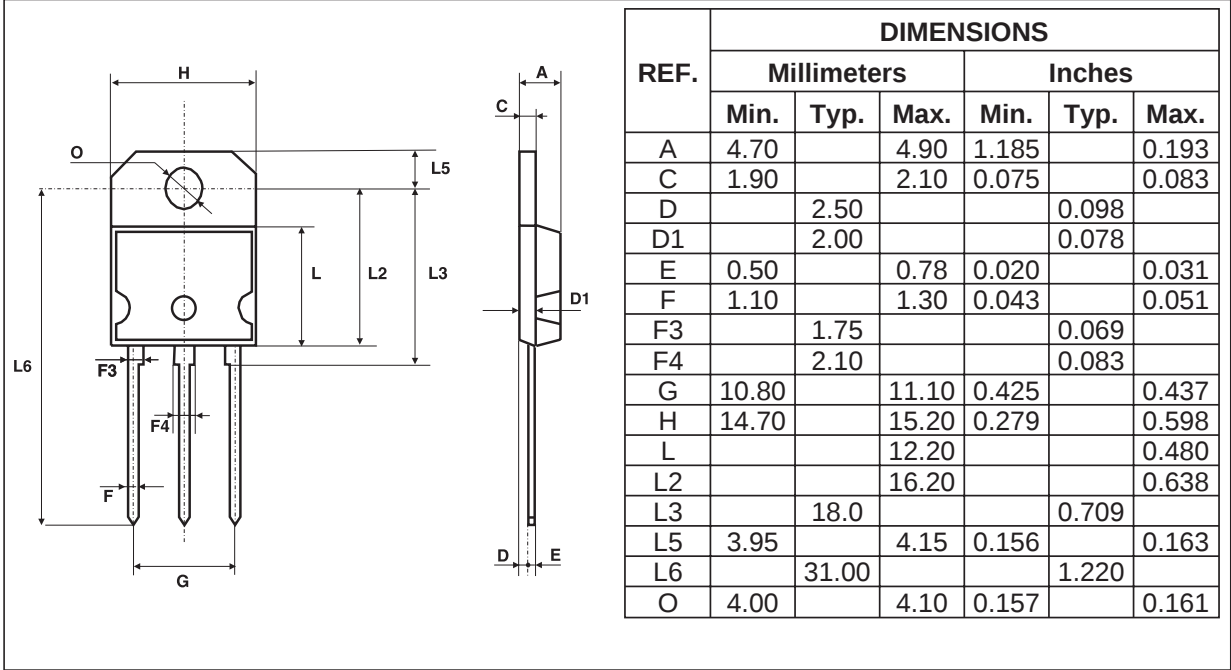


Fig. 9: Forward voltage drop versus forward current (maximum values, per diode).

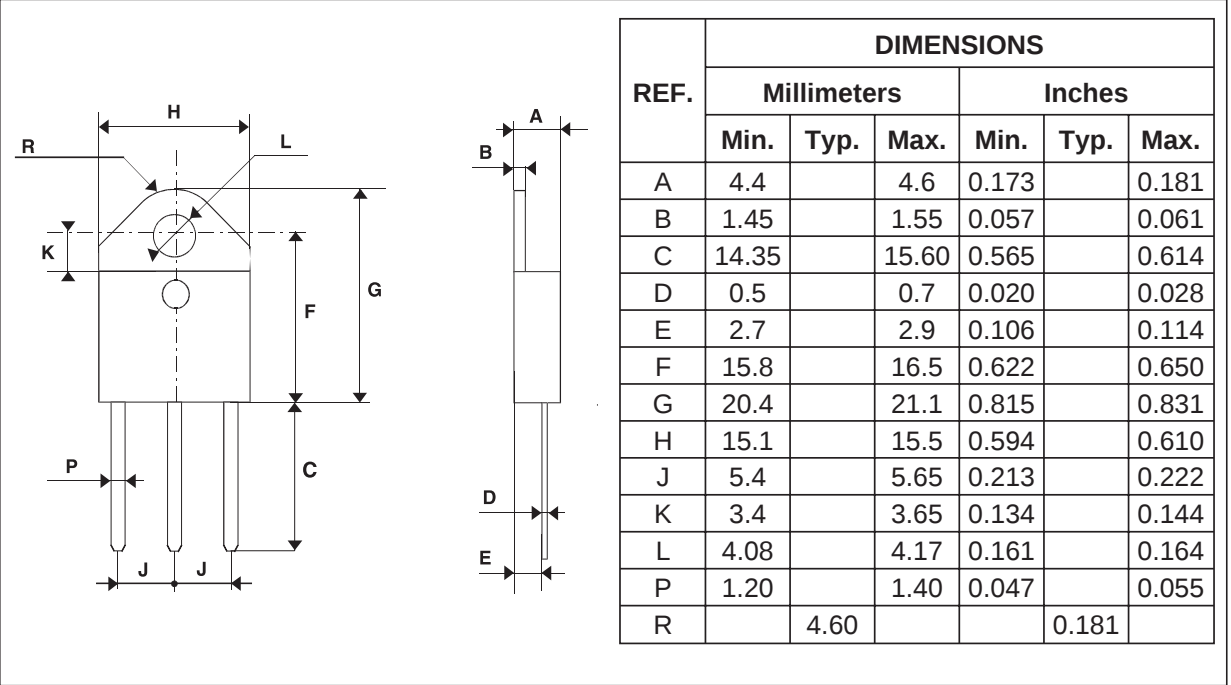


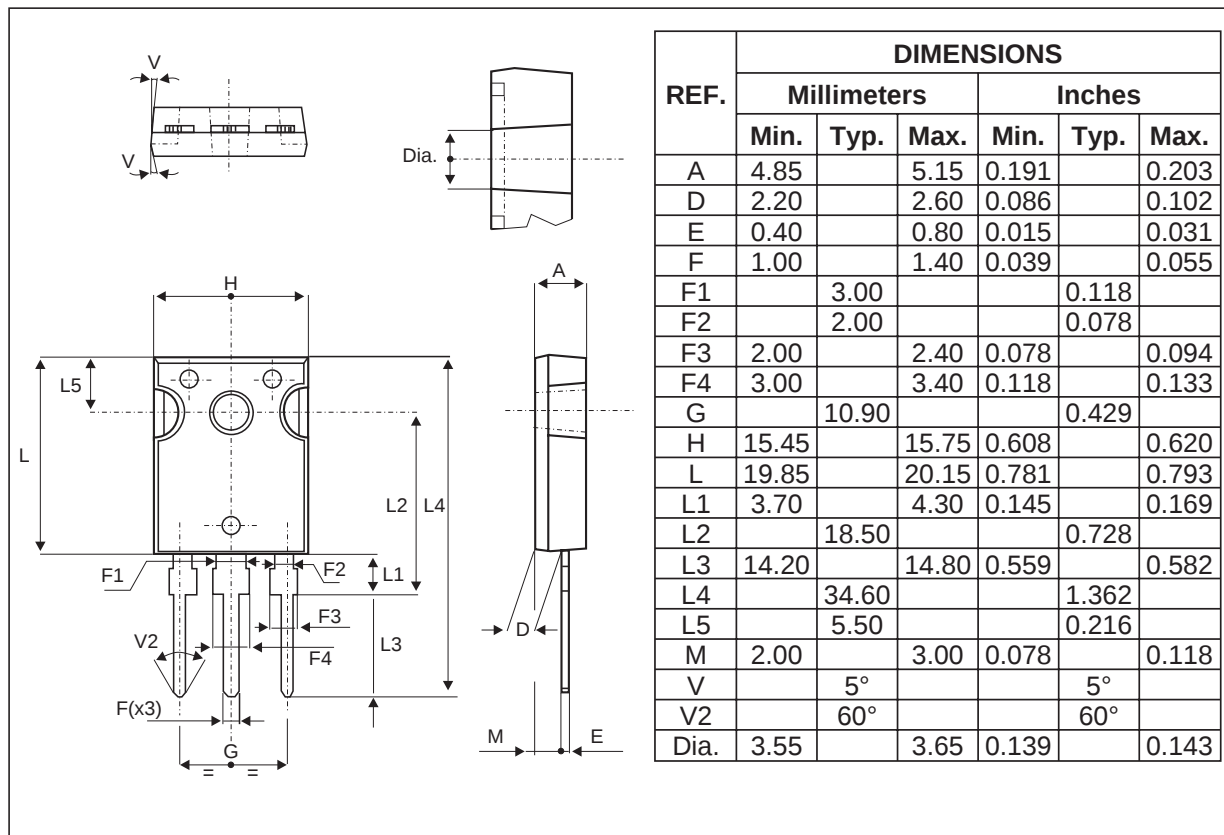
STPS6045CP/CPI/CW

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

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