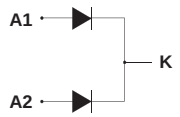
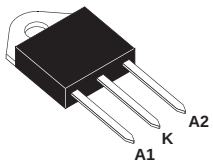
STPS6045CP/CPI/CW

POWER SCHOTTKY RECTIFIER

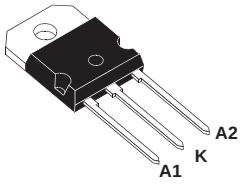
MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2x30 A
V_{RRM}	45 V
Tj (max)	175 °C
V_F (max)	0.63 V

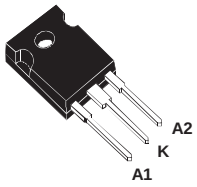




Insulated TOP-3I STPS6045CPI



SOT-93 STPS6045CP



TO-247 STPS6045CW

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 $\delta = 0.5$	SOT-93 TO-247	Tc = 150°C	Per diode	30	A
		TOP-3I	Tc = 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

* : $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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	°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:
ΔT_J(diode 1) = P(diode1) x $R_{th(j-c)}$ (Per diode) + P(diode 2) x $R_{th(c)}$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	Tj = 25°C	$V_R = V_{RRM}$			500	µA
		Tj = 125°C			20	80	mA
V_F *	Forward voltage drop	Tj = 125°C	I_F = 30 A		0.53	0.63	V
		Tj = 25°C	I_F = 60 A			0.84	
		Tj = 125°C	I_F = 60 A		0.68	0.78	

Pulse test : ** tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.48 \times I_{F(AV)} + 0.005\ I_F{}^2{}_{(RMS)}$

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

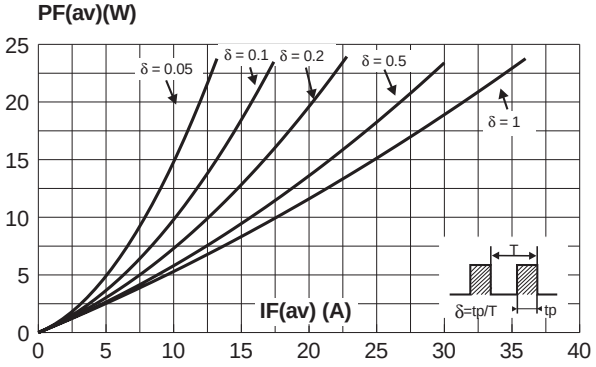


Fig. 2: Average current versus ambient temperature (δ=0.5, per diode).

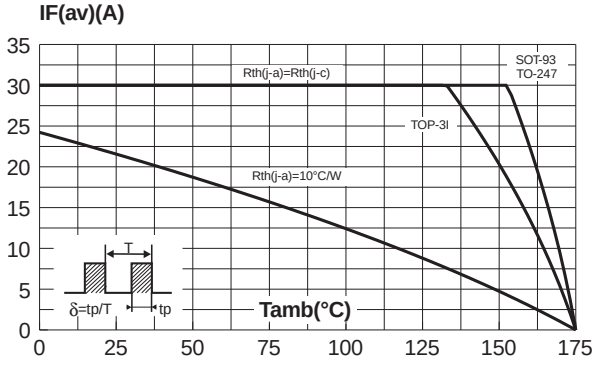


Fig. 3: Normalized avalanche power derating versus pulse duration.

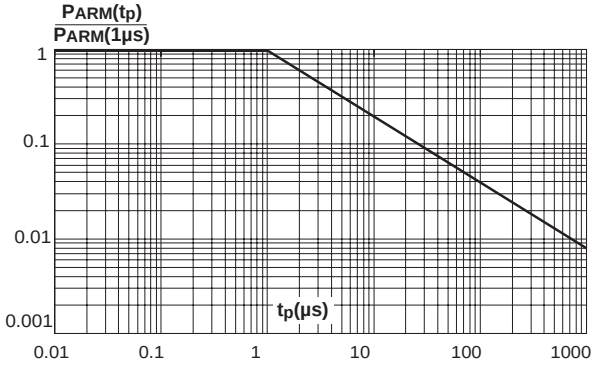


Fig. 4: Normalized avalanche power derating versus junction temperature.

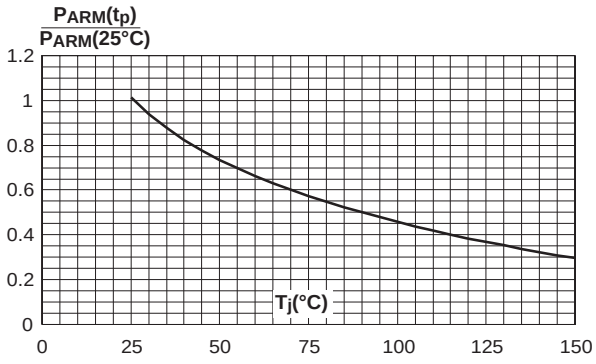


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (SOT-93 and TO-247).

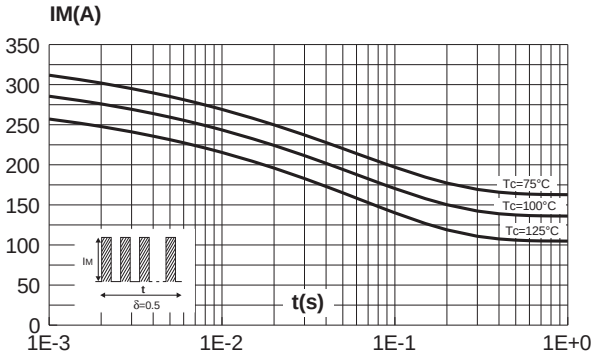


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TOP-3I).

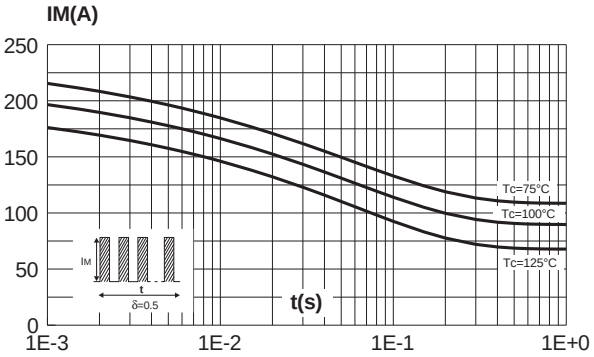


Fig. 6: Relative variation of thermal transient impedance junction to case versus pulse duration.

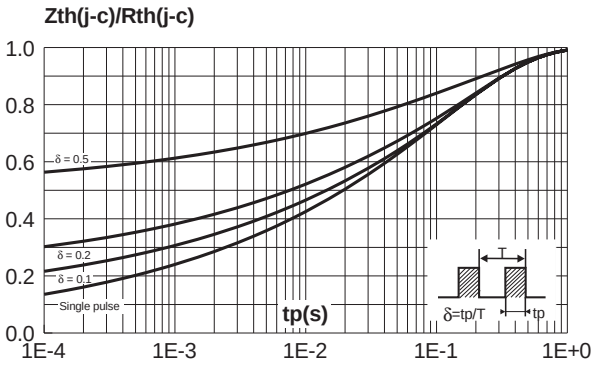


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values, per diode).

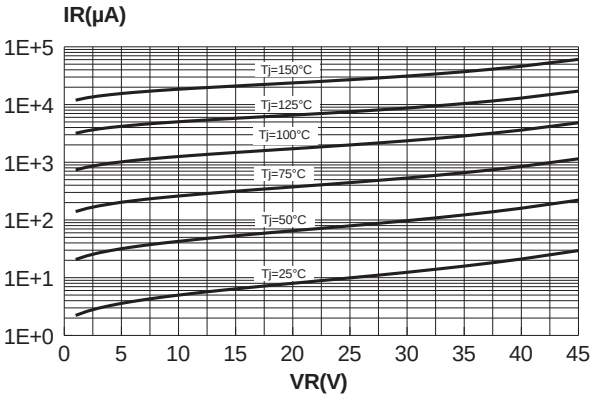


Fig. 8: Junction capacitance versus reverse voltage applied (typical values, per diode).

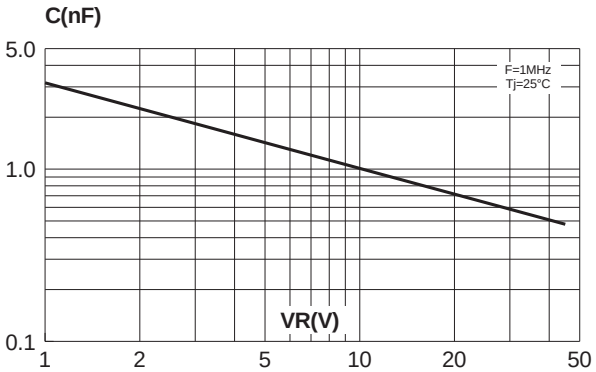
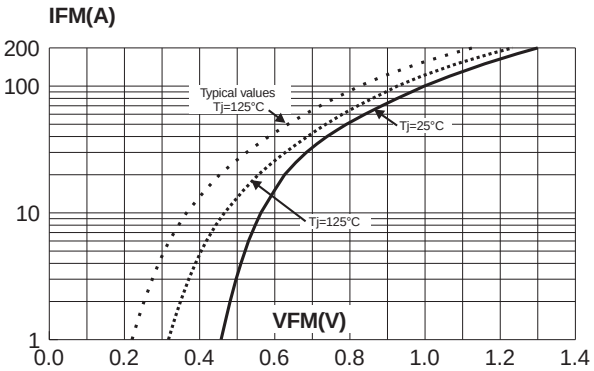
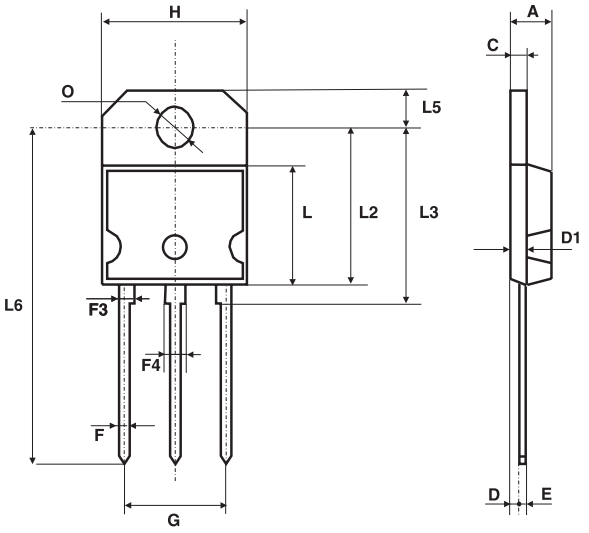


Fig. 9: Forward voltage drop versus forward current (maximum values, per diode).

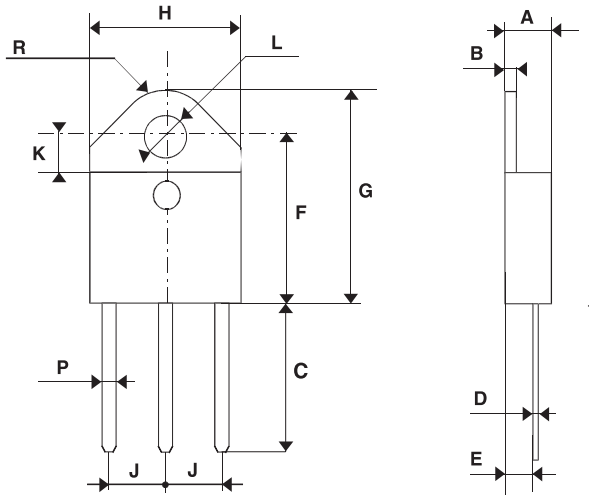


PACKAGE MECHANICAL DATA
SOT-93



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.70		4.90	1.185		0.193
C	1.90		2.10	0.075		0.083
D		2.50			0.098	
D1		2.00			0.078	
E	0.50		0.78	0.020		0.031
F	1.10		1.30	0.043		0.051
F3		1.75			0.069	
F4		2.10			0.083	
G	10.80		11.10	0.425		0.437
H	14.70		15.20	0.279		0.598
L			12.20			0.480
L2			16.20			0.638
L3		18.0			0.709	
L5	3.95		4.15	0.156		0.163
L6		31.00			1.220	
O	4.00		4.10	0.157		0.161

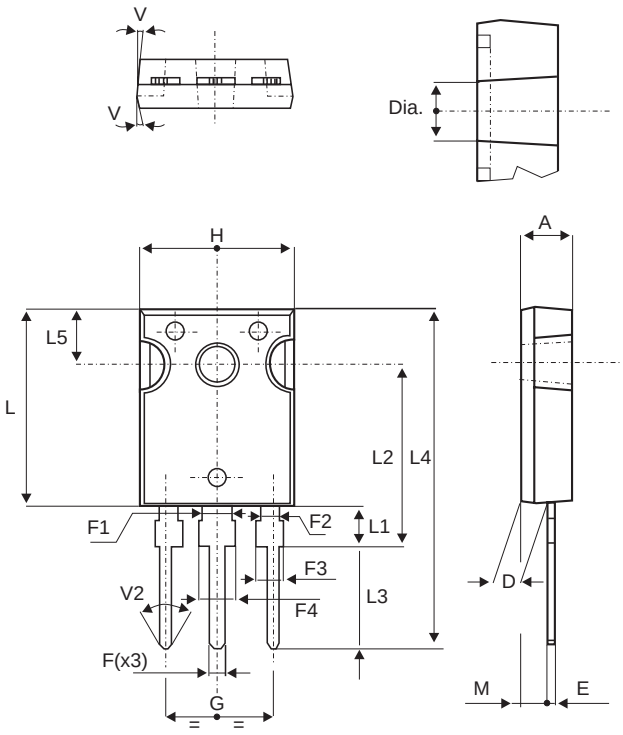
PACKAGE MECHANICAL DATA
TOP-3I (isolated)



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		0.181
B	1.45		1.55	0.057		0.061
C	14.35		15.60	0.565		0.614
D	0.5		0.7	0.020		0.028
E	2.7		2.9	0.106		0.114
F	15.8		16.5	0.622		0.650
G	20.4		21.1	0.815		0.831
H	15.1		15.5	0.594		0.610
J	5.4		5.65	0.213		0.222
K	3.4		3.65	0.134		0.144
L	4.08		4.17	0.161		0.164
P	1.20		1.40	0.047		0.055
R		4.60			0.181	

PACKAGE MECHANICAL DATA

TO-247



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

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