

LOW DROP POWER SCHOTTKY RECTIFIER

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	2 x 20 A
V_{RRM}	45 V
$T_j(\text{max})$	150 °C
$V_F(\text{max})$	0.49 V

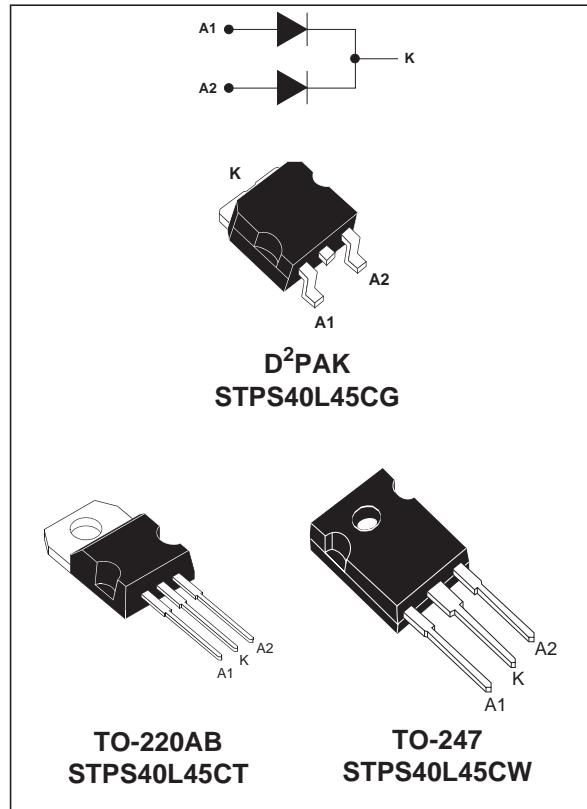
FEATURES AND BENEFITS

- Low forward voltage drop meaning very small conduction losses
- Low switching losses allowing high frequency operation
- Avalanche rated

DESCRIPTION

Dual center tap Schottky barrier rectifier designed for high frequency Switched Mode Power Supplies and DC to DC converters.

Packaged in TO-220AB, TO-247 and D²PAK these devices are 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
$I_{F(\text{RMS})}$	RMS forward current			30	A
$I_{F(\text{AV})}$	Average forward current	$T_c = 130^\circ\text{C}$	Per diode Per device	20 40	A
I_{FSM}	Surge non repetitive forward current			230	A
I_{RRM}	Repetitive peak reverse current	$tp = 2 \mu\text{s}$ square	$F = 1\text{kHz}$	2	A
I_{RSR}	Non repetitive peak reverse current	$tp = 100 \mu\text{s}$ square		3	A
T_{stg}	Storage temperature range			-65 to +150	°C
T_j	Maximum operating junction temperature *			150	°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

STPS40L45CT/CW

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.5 °C/W
		Total	0.8 °C/W
$R_{th(c)}$	Coupling	0.1	°C/W

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	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			0.6	mA
		$T_j = 125^\circ\text{C}$			140	280	mA
V_F^*	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 20 \text{ A}$			0.53	V
		$T_j = 125^\circ\text{C}$	$I_F = 20 \text{ A}$			0.42	
		$T_j = 25^\circ\text{C}$	$I_F = 40 \text{ A}$			0.69	
		$T_j = 125^\circ\text{C}$	$I_F = 40 \text{ A}$			0.6	

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

To evaluate the conduction losses use the following equation :

$$P = 0.28 \times I_{F(AV)} + 0.0105 I_{F(RMS)}^2$$

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

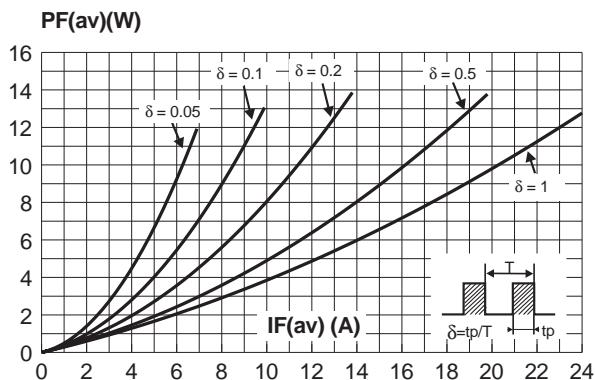


Fig. 2: Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

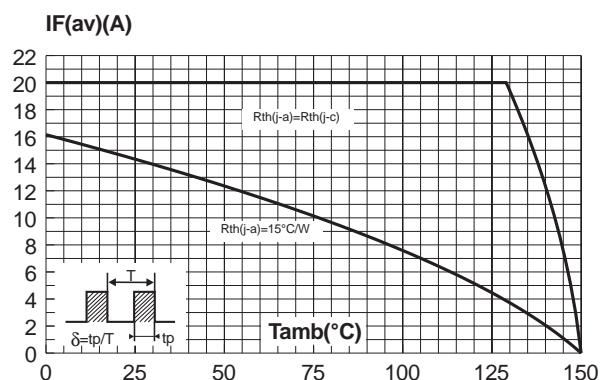


Fig. 3: Non repetitive surge peak forward current versus overload duration (maximum values, per diode).

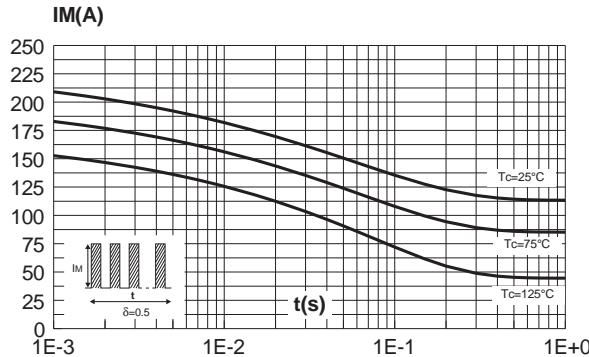


Fig. 5: Reverse leakage current versus reverse voltage applied (typical values, per diode).

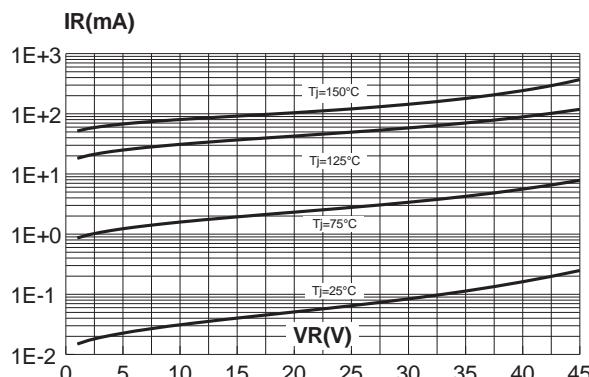


Fig. 7: Forward voltage drop versus forward current (maximum values, per diode).

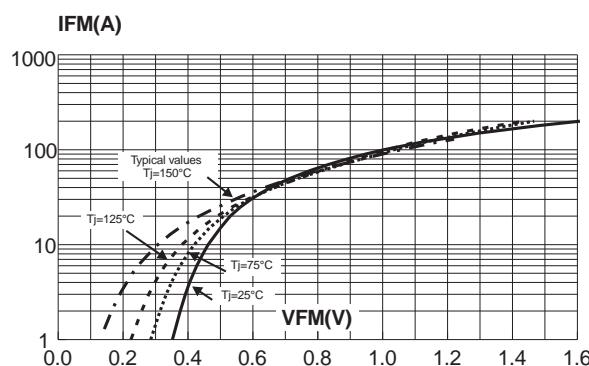


Fig. 4: Relative variation of thermal impedance junction to case versus pulse duration.

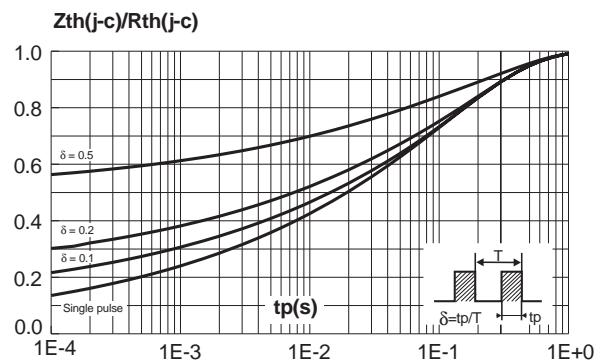


Fig. 6: Junction capacitance versus reverse voltage applied (typical values, per diode).

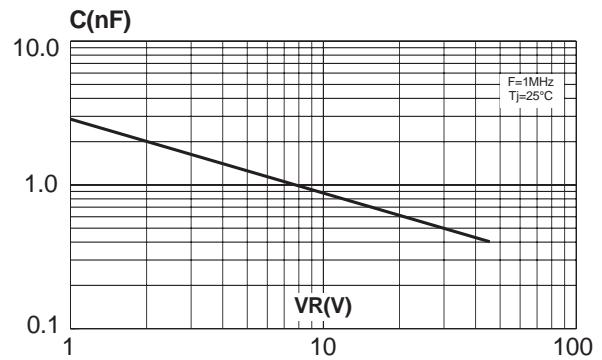
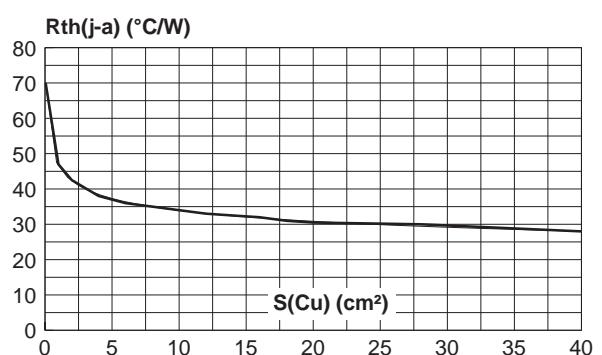


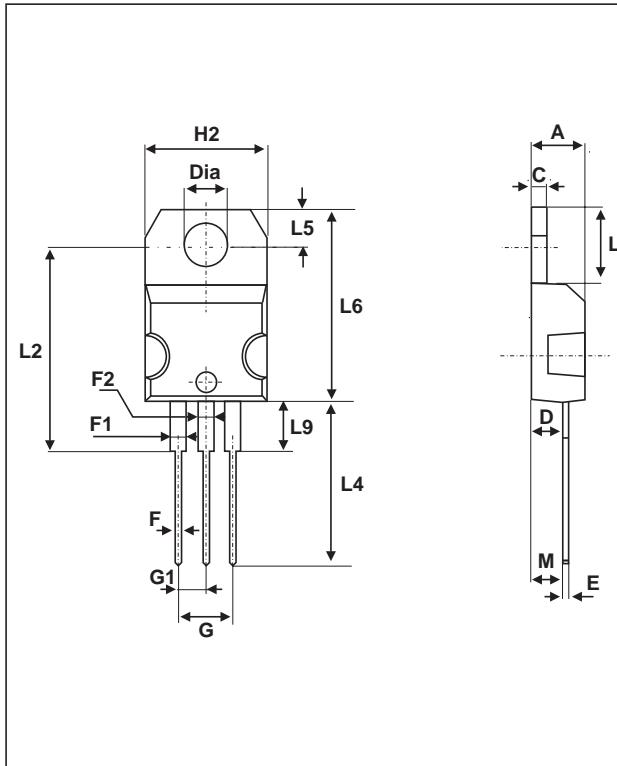
Fig. 8: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: $35\mu\text{m}$) (STPS40L45CG only).



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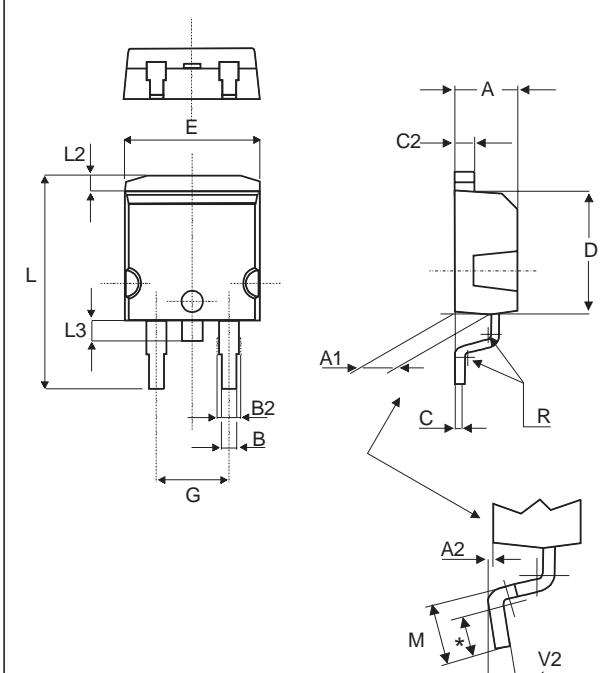
PACKAGE MECHANICAL DATA

TO-220AB



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151

- Cooling method : C
 - Recommended torque value : 0.55m.N
 - Maximum torque value : 0.70 m.N

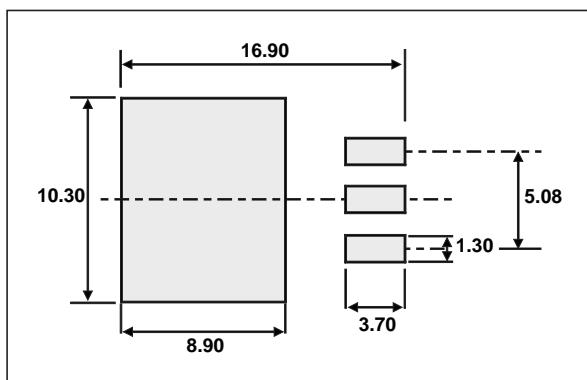
PACKAGE MECHANICAL DATA
D²PAK


The technical drawings provide three views of the package: a top view showing the footprint and lead spacing, a side view showing height dimensions, and a detailed view of the lead showing the lead angle V2.

* FLAT ZONE NO LESS THAN 2mm

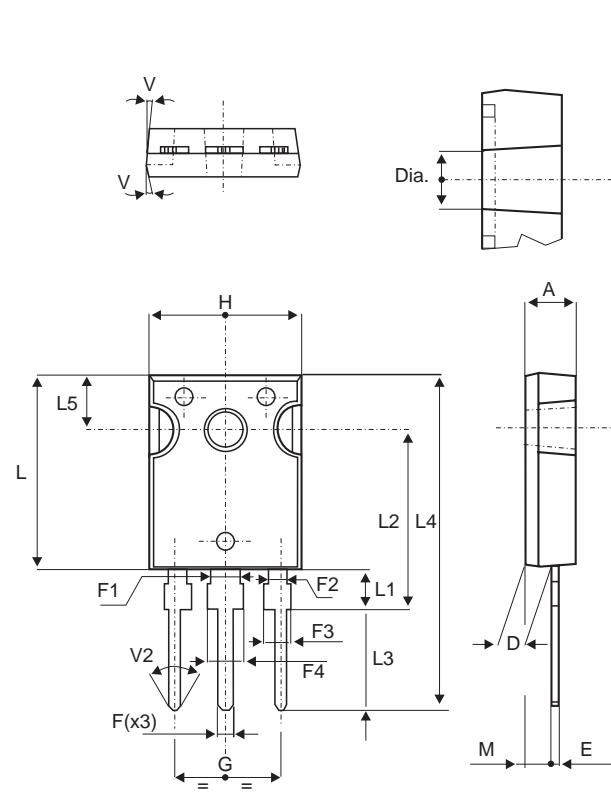
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

- Cooling method : by conduction (method C)

FOOT PRINT (in millimeters)
D²PAK


STPS40L45CT/CW

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

- Cooling method : C
- Recommended torque value : 0.8m.N
- Maximum torque value : 1.0m.N

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS40L45CG	STPS40L45CG	D2PAK	1.8g	500	Tape & Reel
STPS40L45CT	STPS40L45CT	TO-220AB	2g	50	Tube
STPS40L45CW	STPS40L45CW	TO-247	4.4g	30	Tube

- Epoxy meets UL94, VO

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