



# STPS2045CT/CF/CG/CFP/CR

## POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 10 A
$V_{RRM}$	45 V
$T_j(\text{max})$	175 °C
$V_F(\text{max})$	0.57 V

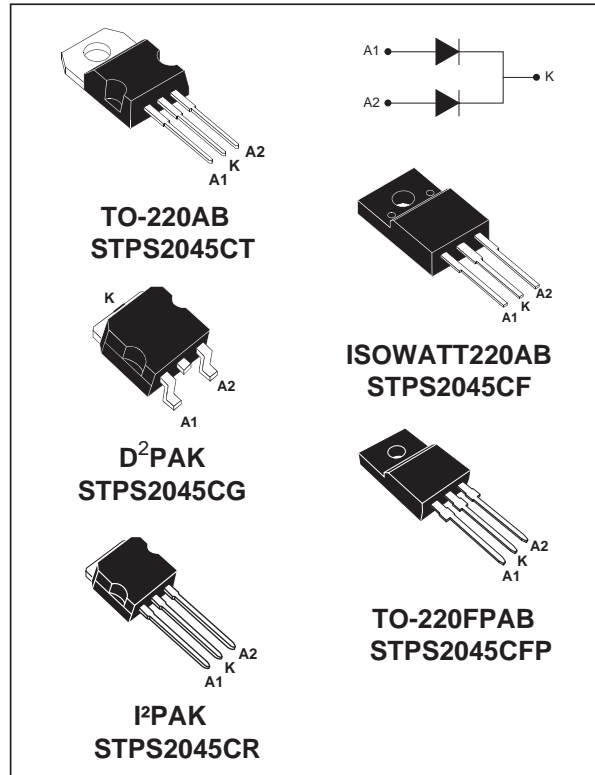
### FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- INSULATED PACKAGE: ISOWATT220AB, TO-220FPAB  
Insulating voltage = 2000V DC  
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 TO-220AB, I<sup>2</sup>PAK, ISOWATT220AB, TO-220FPAB or D<sup>2</sup>PAK, this device is especially 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				30	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB / D <sup>2</sup> PAK / I <sup>2</sup> PAK	$T_c = 155^\circ\text{C}$	Per diode	10	A
		ISOWATT220AB / TO-220FPAB	$T_c = 125^\circ\text{C}$	Per device	20	
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10 \text{ ms}$ sinusoidal		180	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		$t_p = 100 \text{ ms}$ square		2	A
$P_{ARM}$	Repetitive peak avalanche power		$t_p = 1 \mu\text{s}$ $T_j = 25^\circ\text{C}$		4000	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

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**THERMAL RESISTANCES**

Symbol	Parameter		Value	Unit	
R <sub>th(j-c)</sub>	Junction to case	TO-220AB / D <sup>2</sup> PAK I <sup>2</sup> PAK	Per diode Total	2.2 1.3	°C/W
		ISOWATT220AB TO-220FPAB	Per diode Total	4.5 3.5	
R <sub>th(c)</sub>		TO-220AB / D <sup>2</sup> PAK I <sup>2</sup> PAK	Coupling	0.3	
		ISOWATT220AB TO-220FPAB		2.5	

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode 1}) = P (\text{diode1}) \times R_{th(j-c)} (\text{per diode}) + P (\text{diode 2}) \times R_{th(c)}$$

**STATIC ELECTRICAL CHARACTERISTICS (Per diode)**

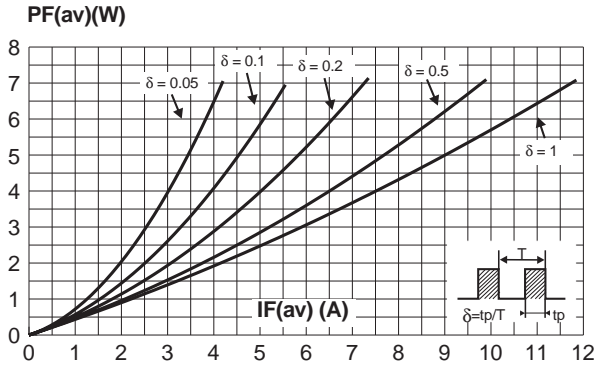
Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> *	Reverse leakage current	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			100	µA
		T <sub>j</sub> = 125°C			7	15	mA
V <sub>F</sub> *	Forward voltage drop	T <sub>j</sub> = 125°C	I <sub>F</sub> = 10 A		0.5	0.57	V
		T <sub>j</sub> = 25°C	I <sub>F</sub> = 20 A			0.84	
		T <sub>j</sub> = 125°C	I <sub>F</sub> = 20 A		0.65	0.72	

Pulse test : \* tp = 380 µs, δ < 2%

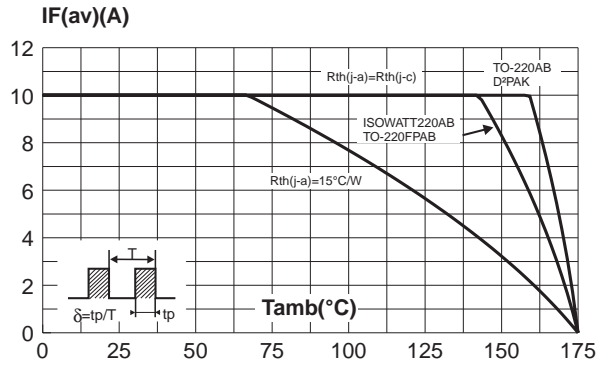
To evaluate the conduction losses use the following equation :

$$P = 0.42 \times I_{F(AV)} + 0.015 \times I_{F(RMS)}^2$$

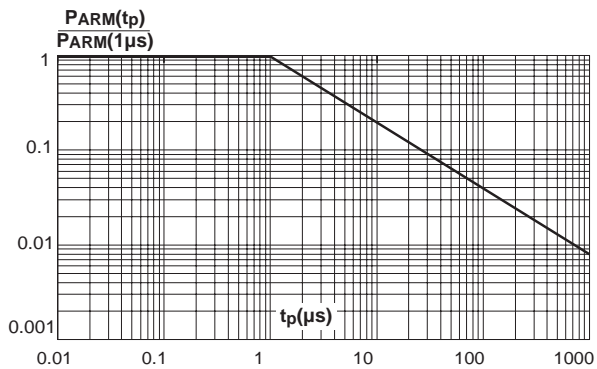
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



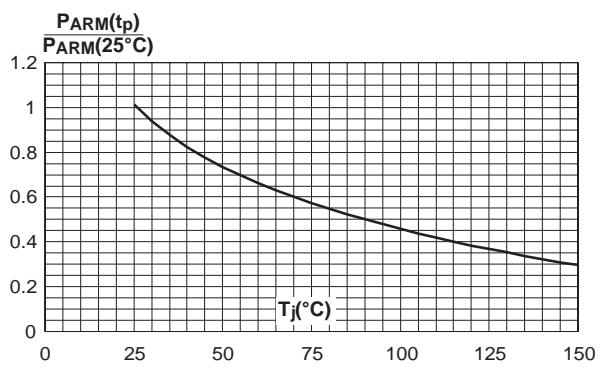
**Fig. 2:** Average current versus ambient temperature ( $\delta=0.5$ , per diode).



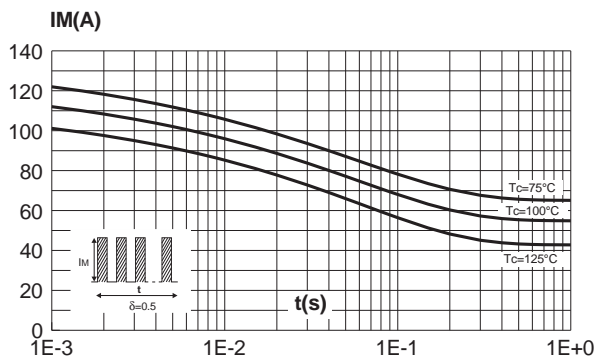
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



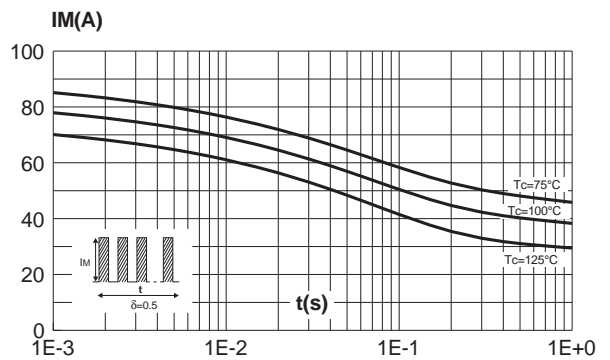
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



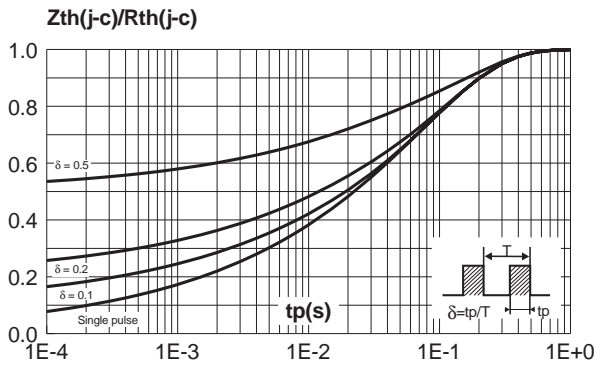
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB, D<sup>2</sup>PAK and I<sup>2</sup>PAK).



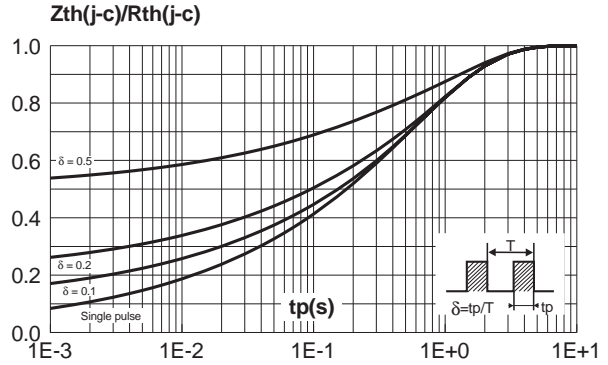
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (ISOWATT220AB, TO-220FPAB).



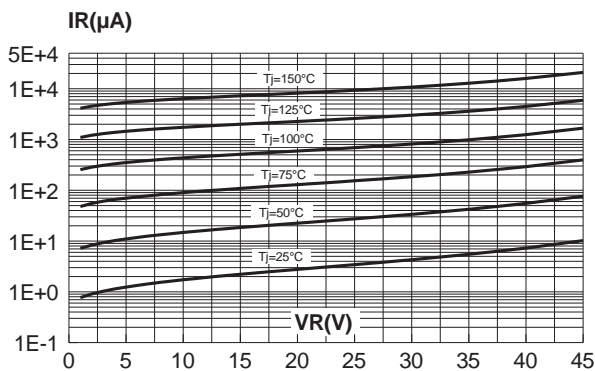
**Fig. 6-1:** Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AB, D<sup>2</sup>PAK and I<sup>2</sup>PAK).



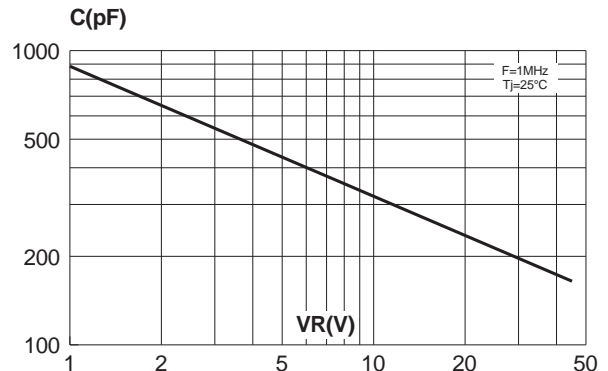
**Fig. 6-2:** Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).



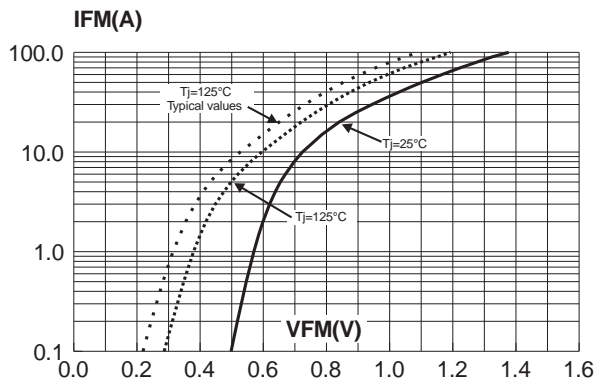
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values, per diode).



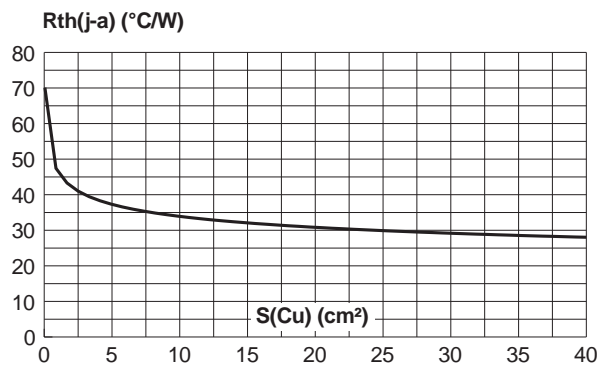
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values, per diode).



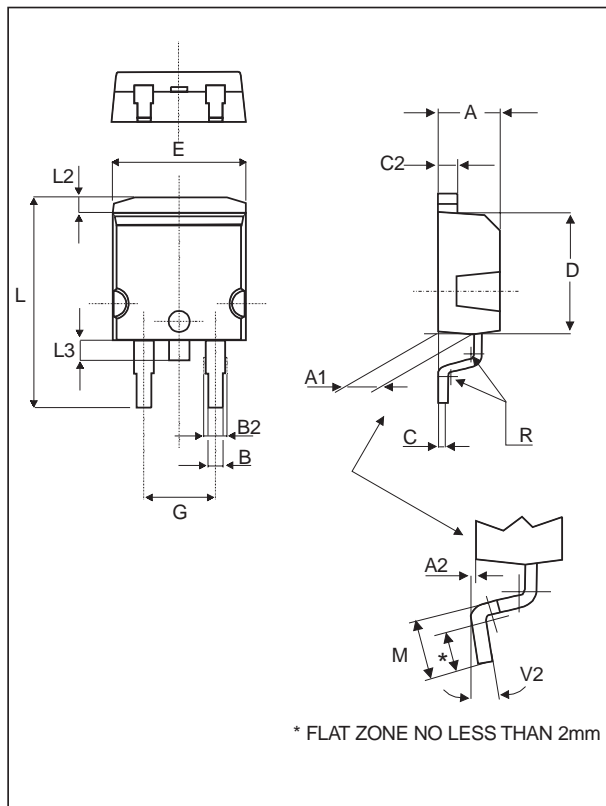
**Fig. 9:** Forward voltage drop versus forward current (maximum values, per diode).



**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board, copper thickness: 35μm).

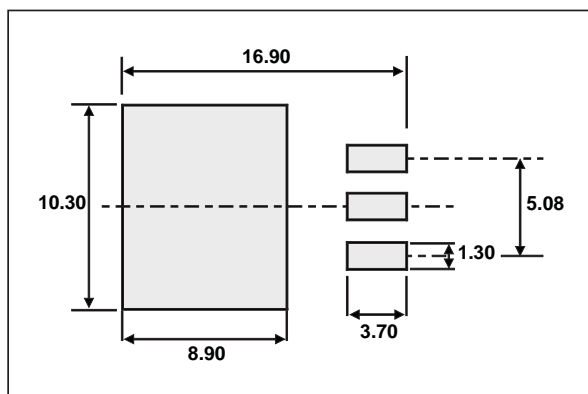


**PACKAGE MECHANICAL DATA**  
D<sup>2</sup>PAK



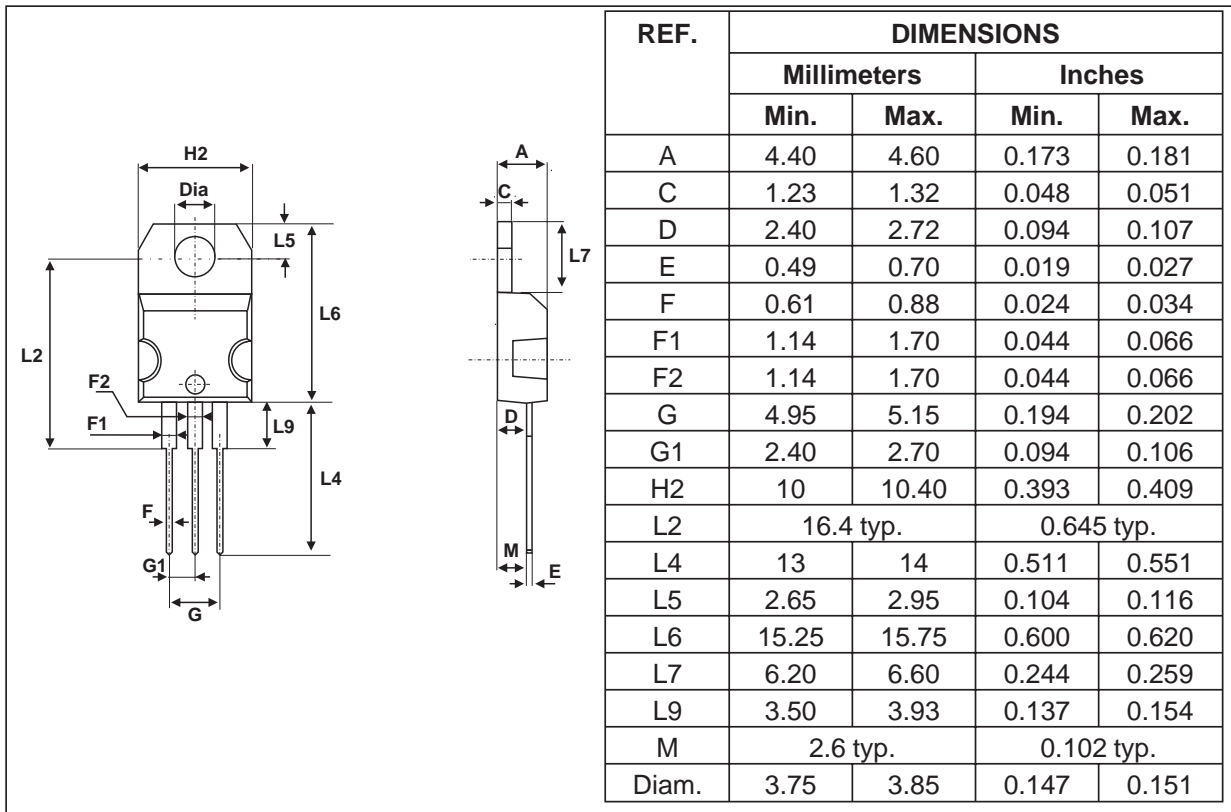
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	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°

**FOOTPRINT DIMENSIONS** (in millimeters)

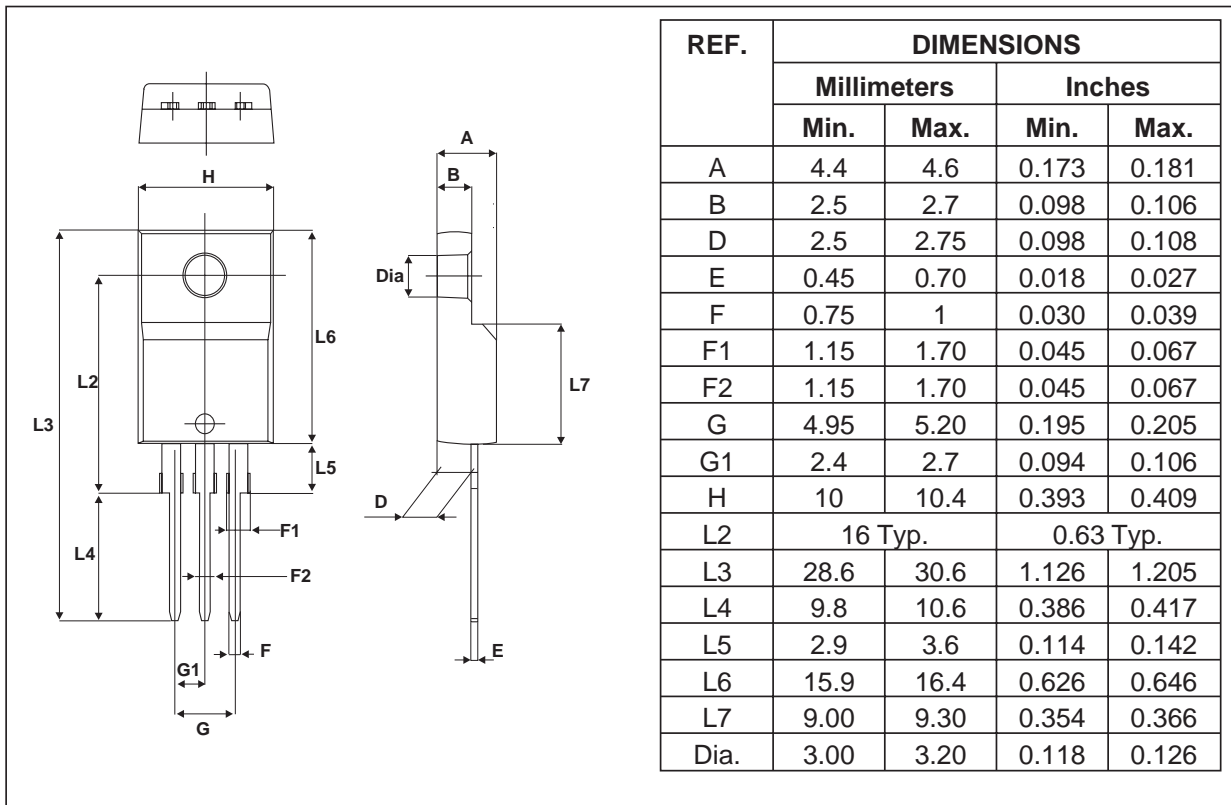


**STPS2045CT/CF/CG/CFP/CR**

**PACKAGE MECHANICAL DATA**  
TO-220AB

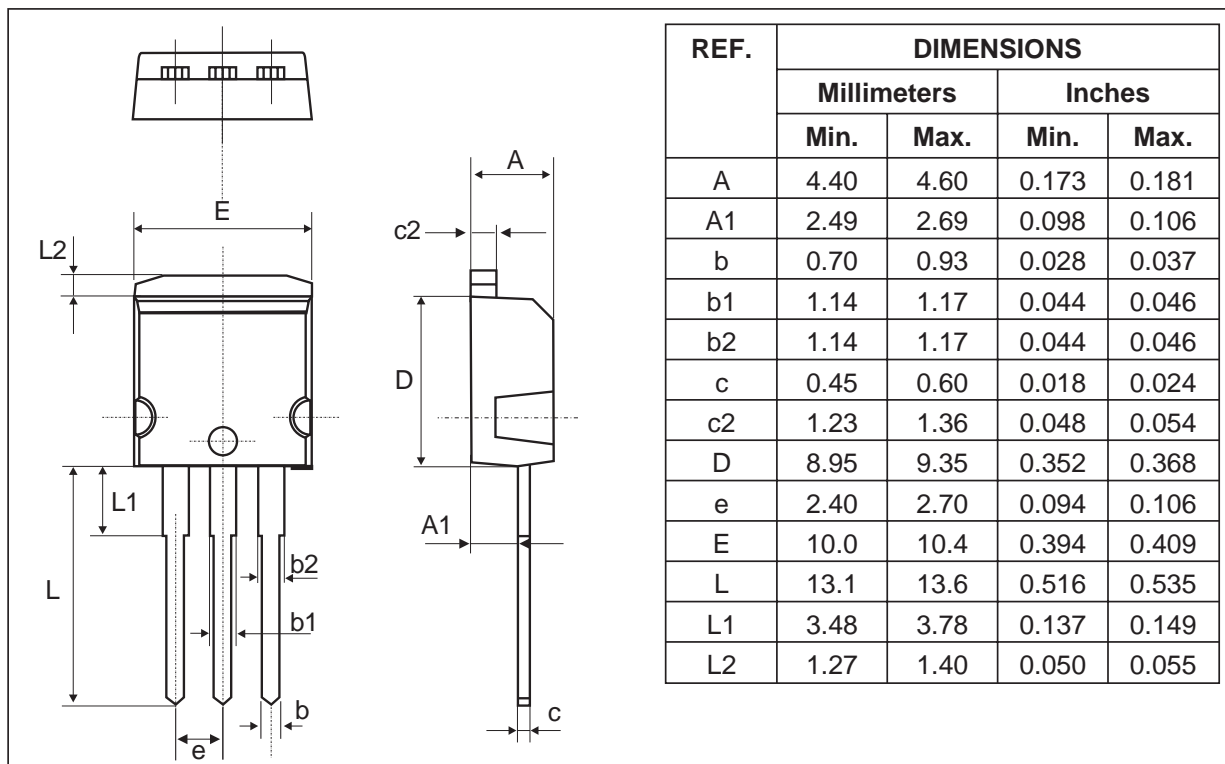


**PACKAGE MECHANICAL DATA**  
TO-220FPAB



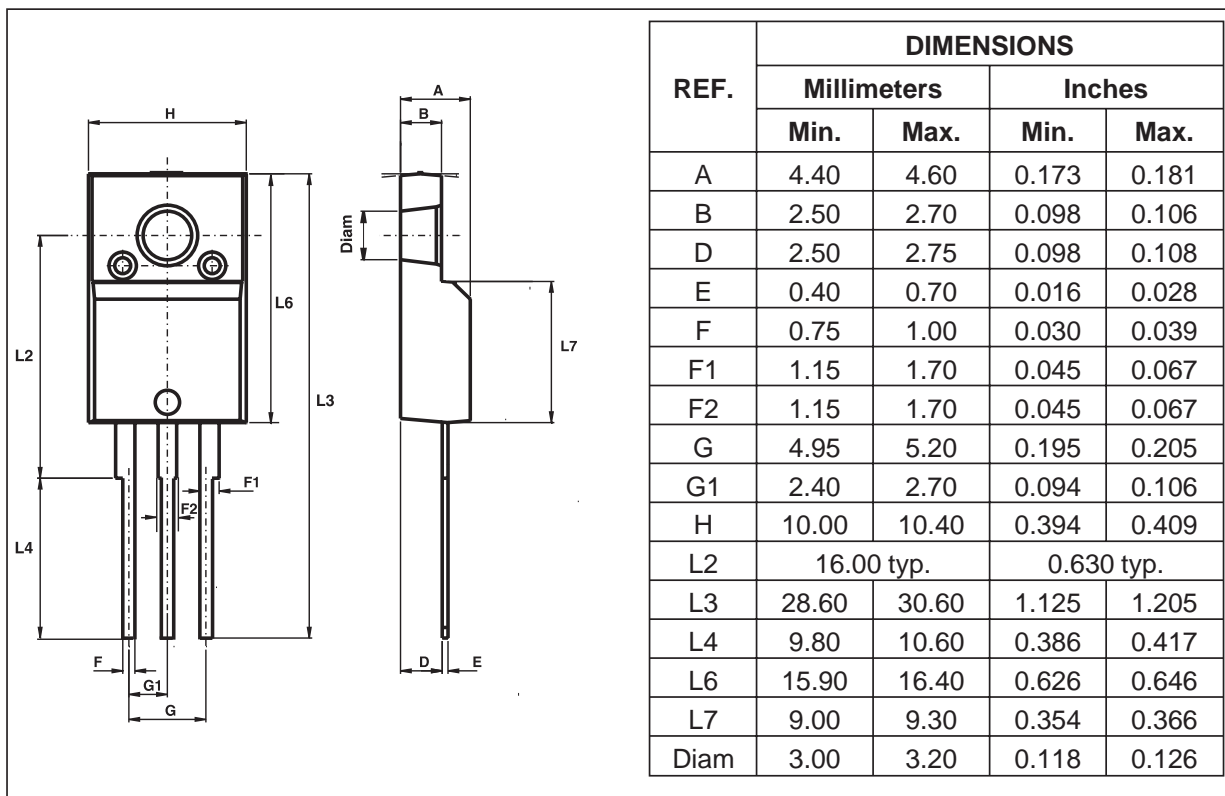
PACKAGE MECHANICAL DATA

I<sup>2</sup>PAK



PACKAGE MECHANICAL DATA

ISOWATT220AB



Type	Marking	Package	Weight	Base qty	Delivery mode
STPS2045CT	STPS2045CT	TO-220AB	2.25 g.	50	Tube
STPS2045CF	STPS2045CF	ISOWATT220AB	2.08 g.	50	Tube
STPS2045CFP	STPS2045CFP	TO-220FPAB	2.0 g	50	Tube
STPS2045CG	STPS2045CG	D <sup>2</sup> PAK	1.48 g.	50	Tube
STPS2045CG-TR	STPS2045CG	D <sup>2</sup> PAK	1.48 g.	1000	Tape & reel
STPS2045CR	STPS2045CR	I <sup>2</sup> PAK	1.49 g.	50	Tube

- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N.m.
- Maximum torque value: 0.7 N.m.
- Epoxy meets UL94,V0

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