



STPS2045CT/CF/CG/CFP/CR

POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

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

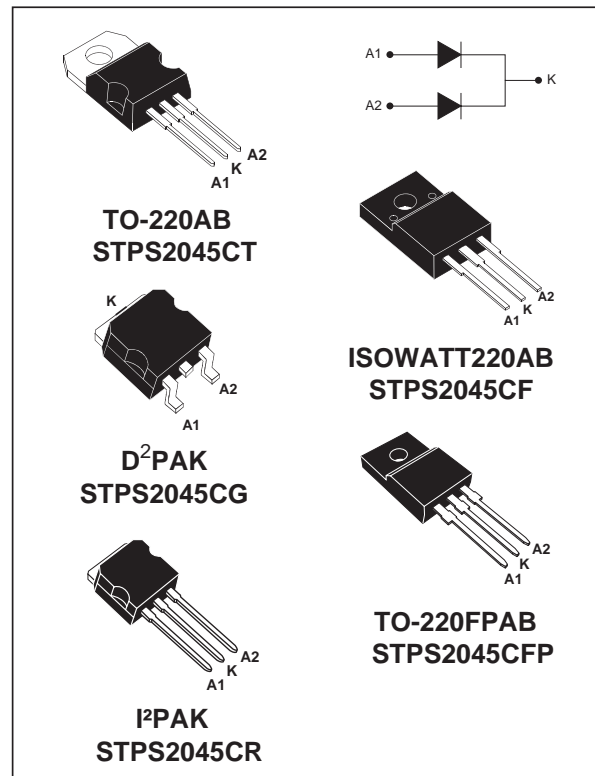
Packaged either in TO-220AB, I²PAK, ISOWATT220AB, TO-220FPAB or D²PAK, this device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

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 ² PAK / I ² 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		$t_p = 10$ ms sinusoidal		180	A
I_{RRM}	Repetitive peak reverse current		$t_p = 2$ μs square $F = 1$ kHz		1	A
I_{RSM}	Non repetitive peak reverse current		$t_p = 100$ ms square		2	A
P_{ARM}	Repetitive peak avalanche power		$t_p = 1$ μs $T_j = 25^\circ\text{C}$		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/ μs

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

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THERMAL RESISTANCES

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

When the diodes 1 and 2 are used simultaneously:

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

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I _R *	Reverse leakage current	T _j = 25°C	V _R = V _{RRM}			100	μA
		T _j = 125°C			7	15	mA
V _F *	Forward voltage drop	T _j = 125°C	I _F = 10 A		0.5	0.57	V
		T _j = 25°C	I _F = 20 A			0.84	
		T _j = 125°C	I _F = 20 A		0.65	0.72	

Pulse test : * t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation :

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

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

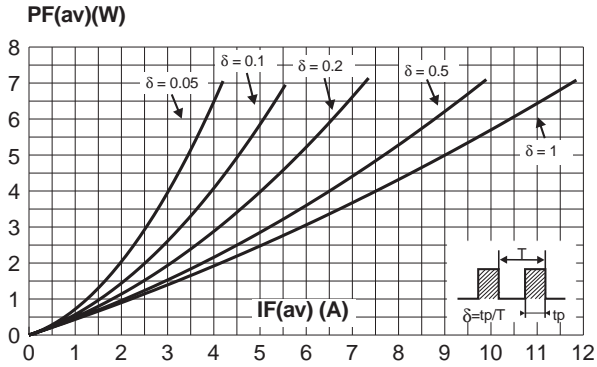


Fig. 2: Average current versus ambient temperature ($\delta=0.5$, per diode).

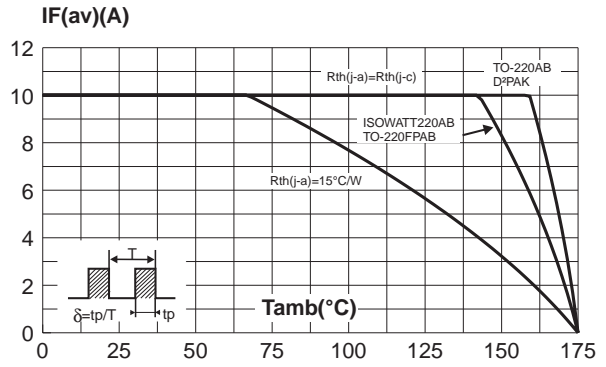


Fig. 3: Normalized avalanche power derating versus pulse duration.

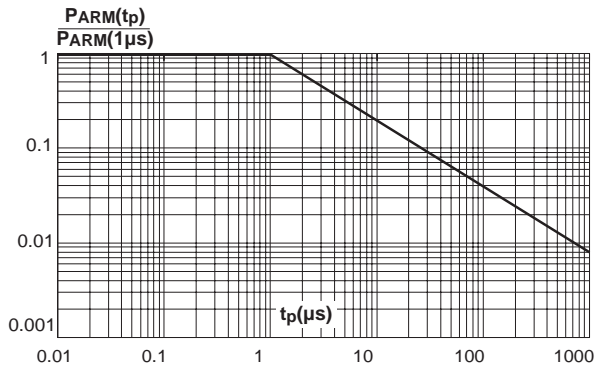


Fig. 4: Normalized avalanche power derating versus junction temperature.

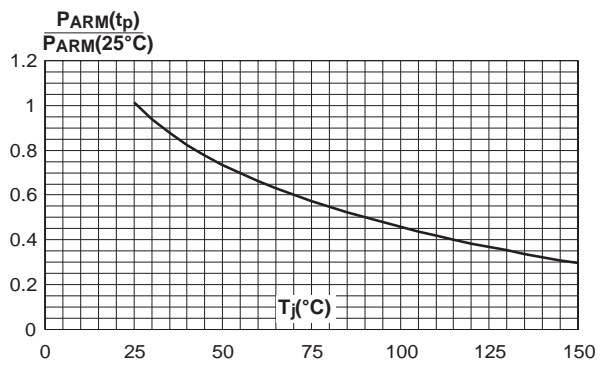


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB, D²PAK and I²PAK).

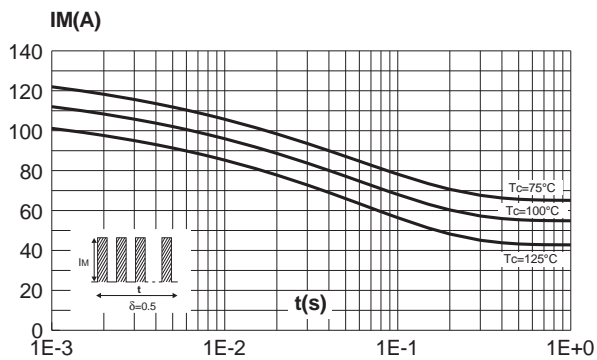


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (ISOWATT220AB, TO-220FPAB).

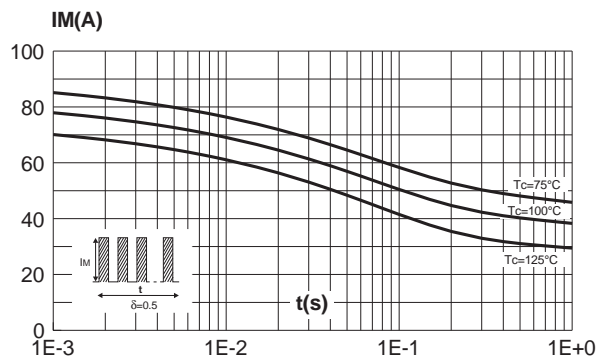


Fig. 6-1: Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AB, D²PAK and I²PAK).

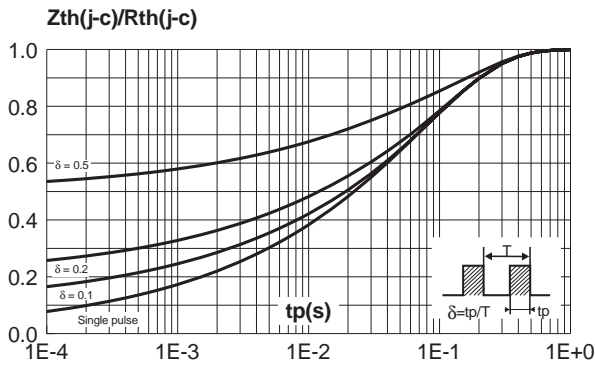


Fig. 6-2: Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).

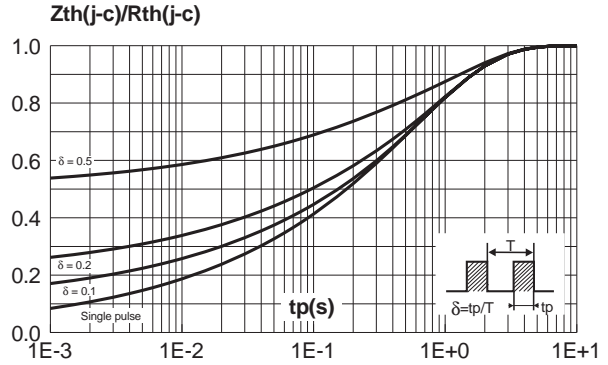


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values, per diode).

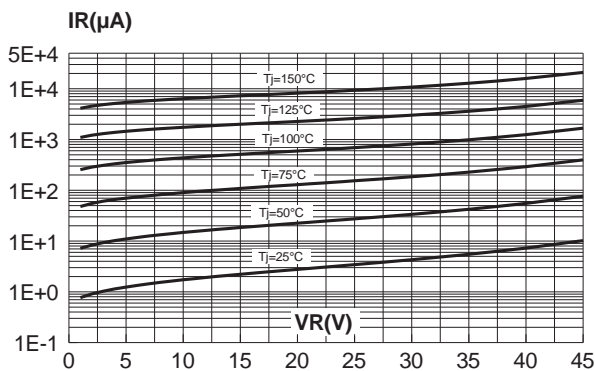


Fig. 8: Junction capacitance versus reverse voltage applied (typical values, per diode).

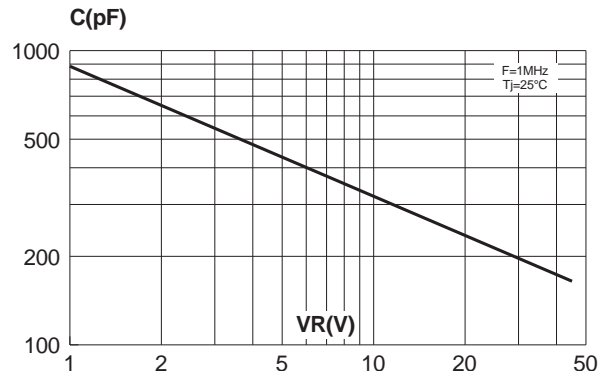


Fig. 9: Forward voltage drop versus forward current (maximum values, per diode).

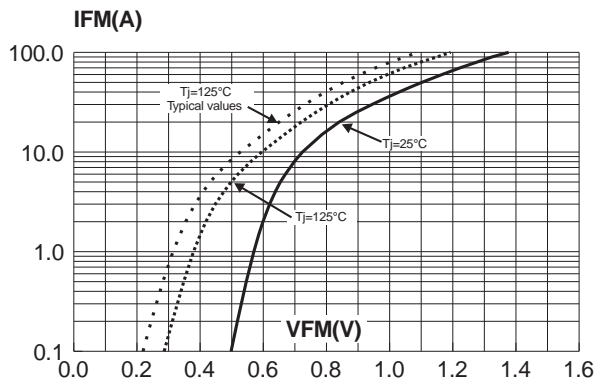
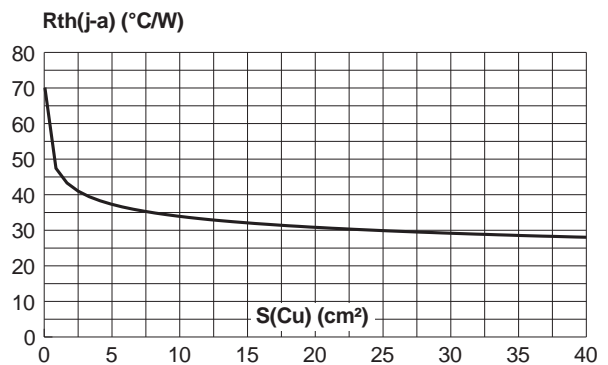
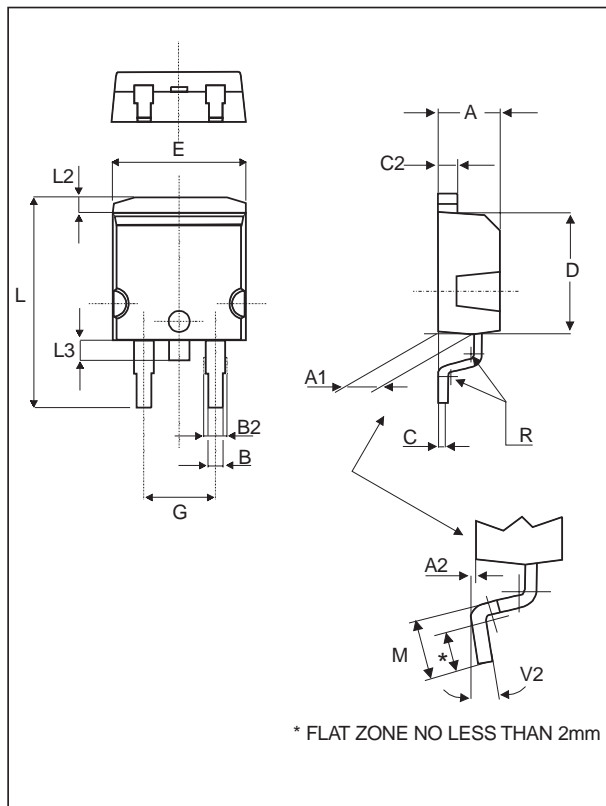


Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board, copper thickness: 35μm).

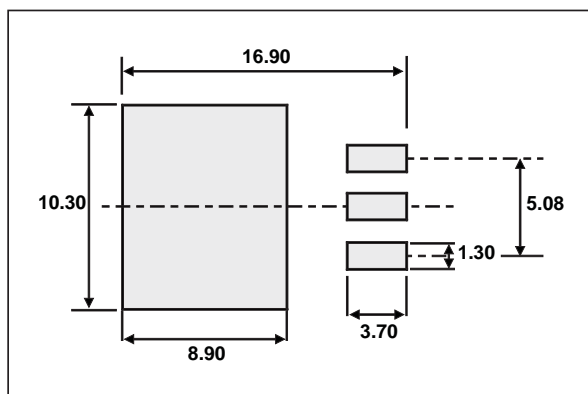


PACKAGE MECHANICAL DATA
D²PAK



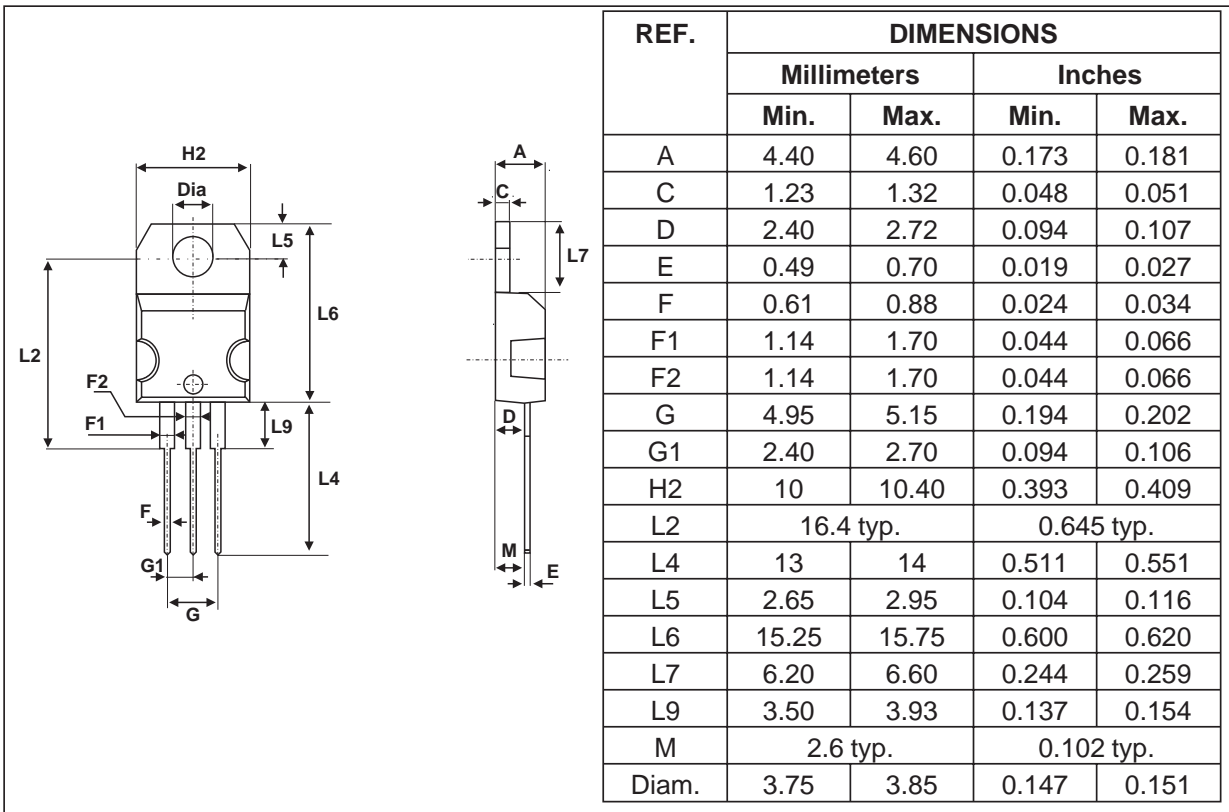
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192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

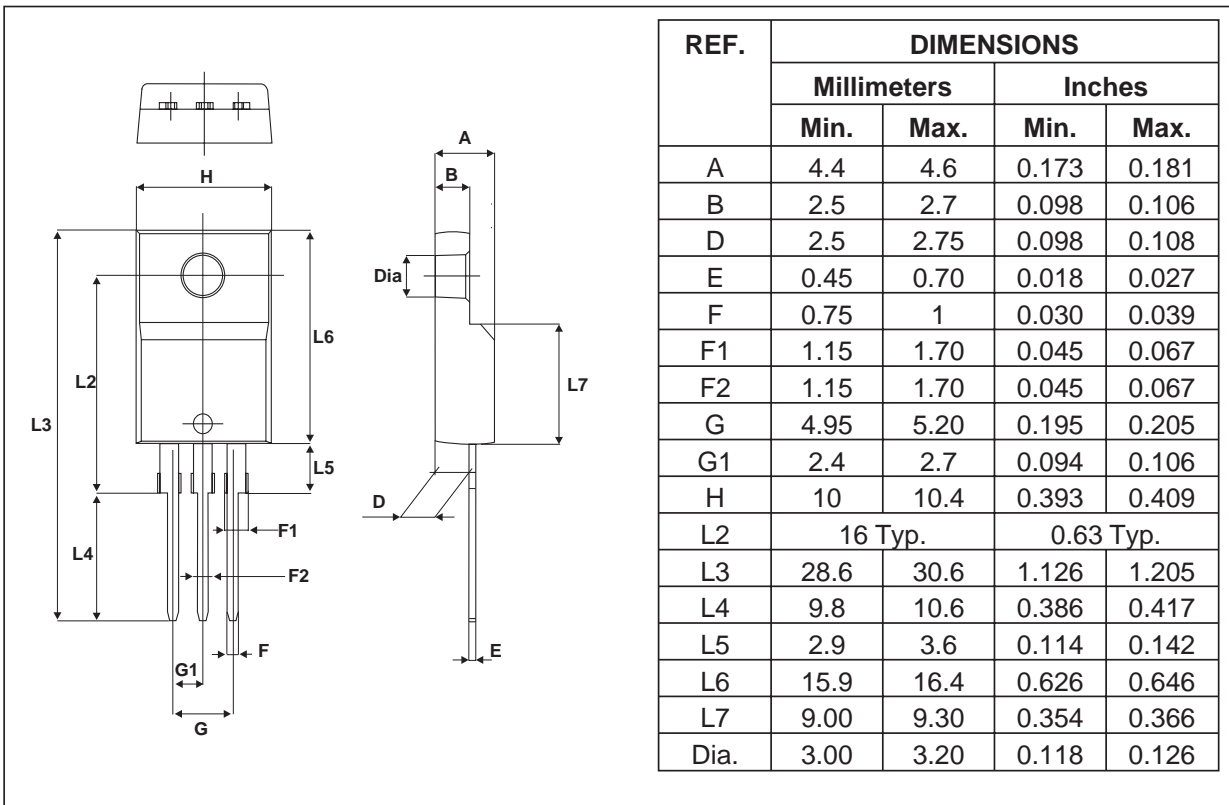


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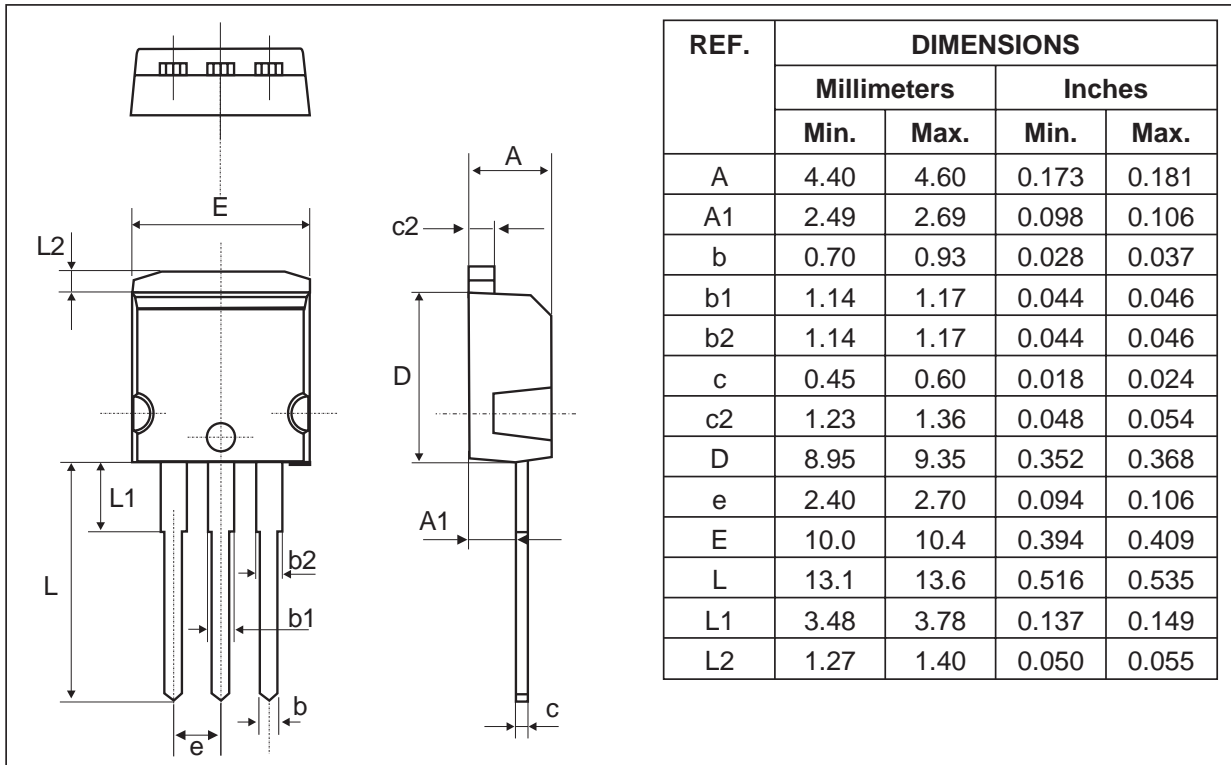
PACKAGE MECHANICAL DATA
TO-220AB



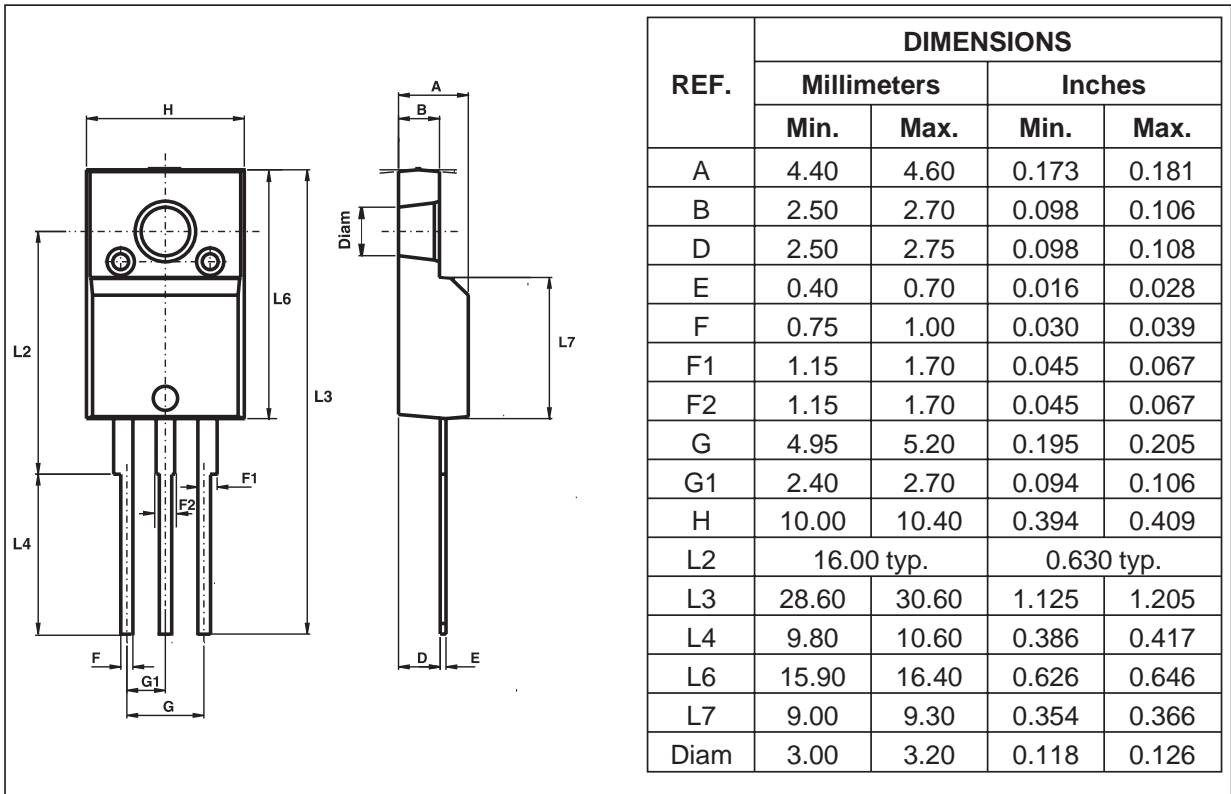
PACKAGE MECHANICAL DATA
TO-220FPAB



PACKAGE MECHANICAL DATA
I²PAK



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 ² PAK	1.48 g.	50	Tube
STPS2045CG-TR	STPS2045CG	D ² PAK	1.48 g.	1000	Tape & reel
STPS2045CR	STPS2045CR	I ² 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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