



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

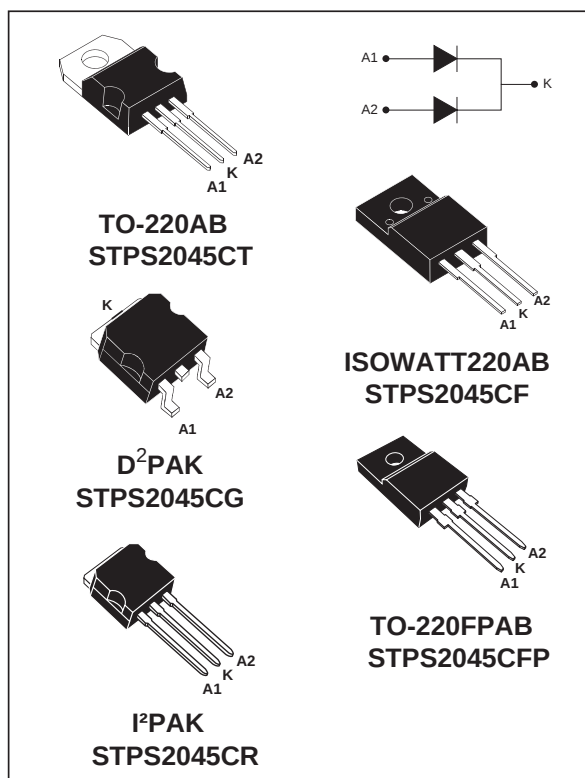
FEATURES AND BENEFITS

- 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°C	Per diode	10	A
		ISOWATT220AB TO-220FPAB	T _c = 125°C	Per device	20	
I _{FSM}	Surge non repetitive forward current		tp = 10 ms sinusoidal		180	A
I _{RRM}	Repetitive peak reverse current		tp = 2 μs square F = 1kHz		1	A
I _{RSM}	Non repetitive peak reverse current		tp = 100 ms square		2	A
P _{ARM}	Repetitive peak avalanche power		tp = 1μs Tj = 25°C		4000	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	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:

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

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			100	μA
		$T_j = 125^\circ\text{C}$			7	15	mA
V_F^*	Forward voltage drop	$T_j = 125^\circ\text{C}$	$I_F = 10 \text{ A}$		0.5	0.57	V
		$T_j = 25^\circ\text{C}$	$I_F = 20 \text{ A}$			0.84	
		$T_j = 125^\circ\text{C}$	$I_F = 20 \text{ A}$		0.65	0.72	

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

To evaluate the conduction losses use the following equation :

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

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

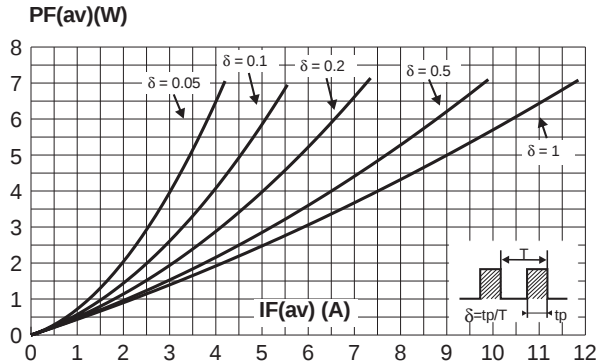


Fig. 2: Average current versus ambient temperature ($\delta=0.5$, per diode).

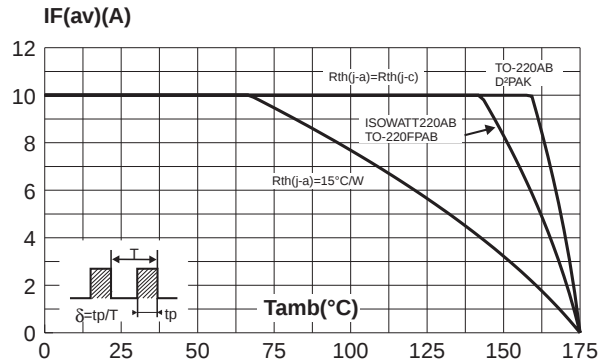


Fig. 3: Normalized avalanche power derating versus pulse duration.

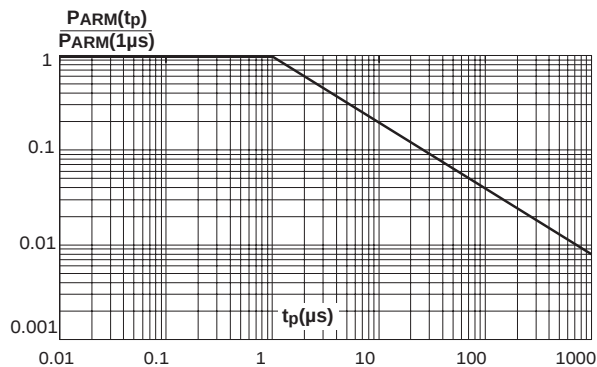


Fig. 4: Normalized avalanche power derating versus junction temperature.

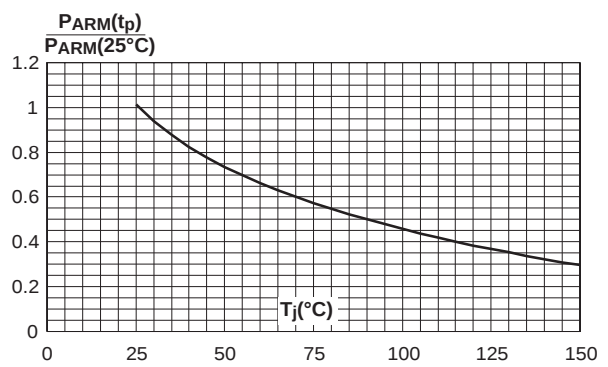


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB, D²PAK and I²PAK).

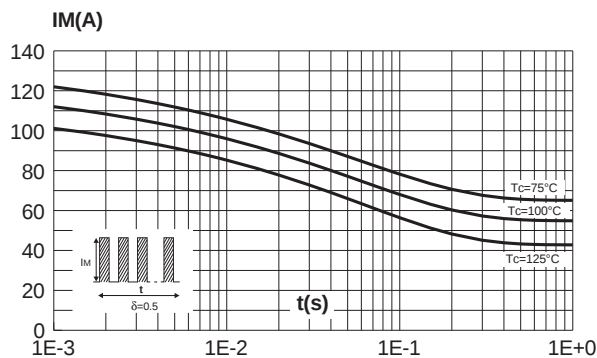


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (ISOWATT220AB, TO-220FPAB).

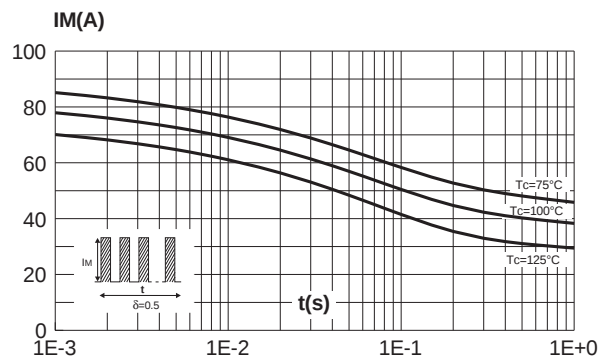


Fig. 6-1: Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AB, D²PAK and I²PAK).

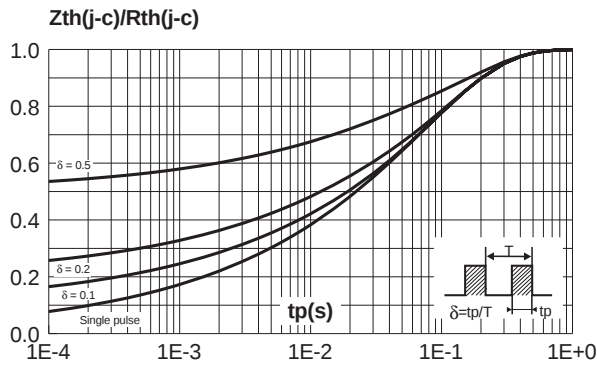


Fig. 6-2: Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).

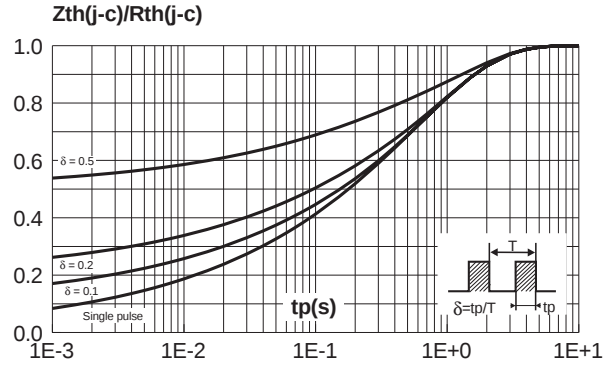


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values, per diode).

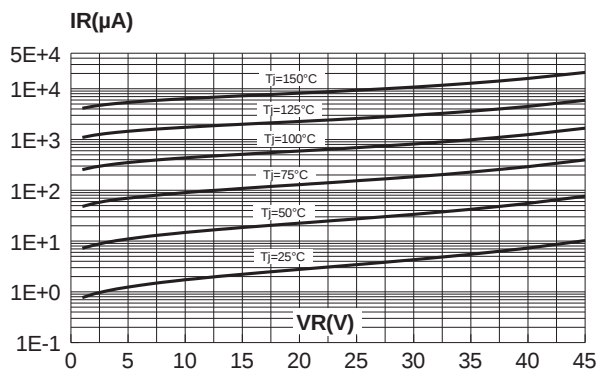


Fig. 8: Junction capacitance versus reverse voltage applied (typical values, per diode).

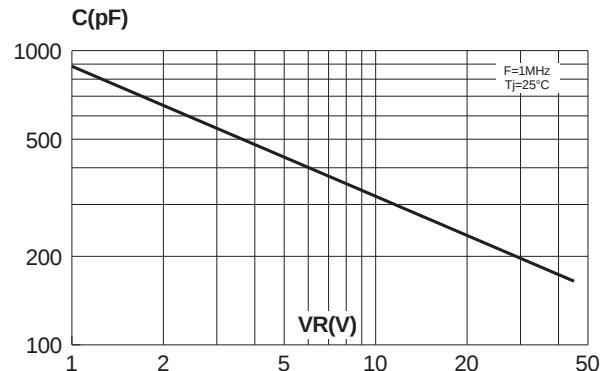


Fig. 9: Forward voltage drop versus forward current (maximum values, per diode).

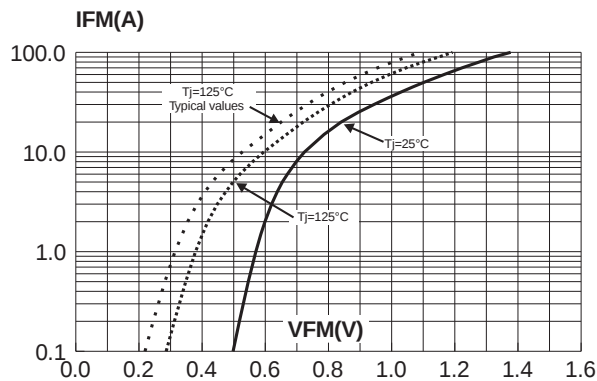
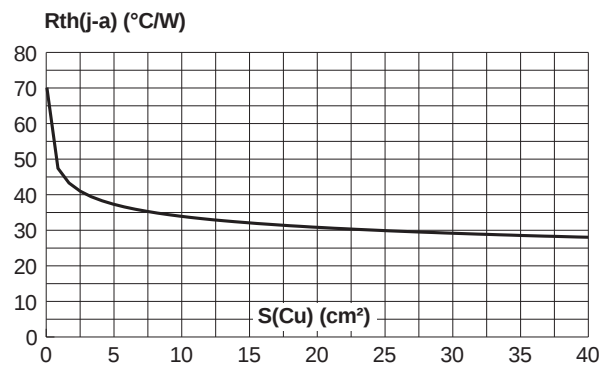
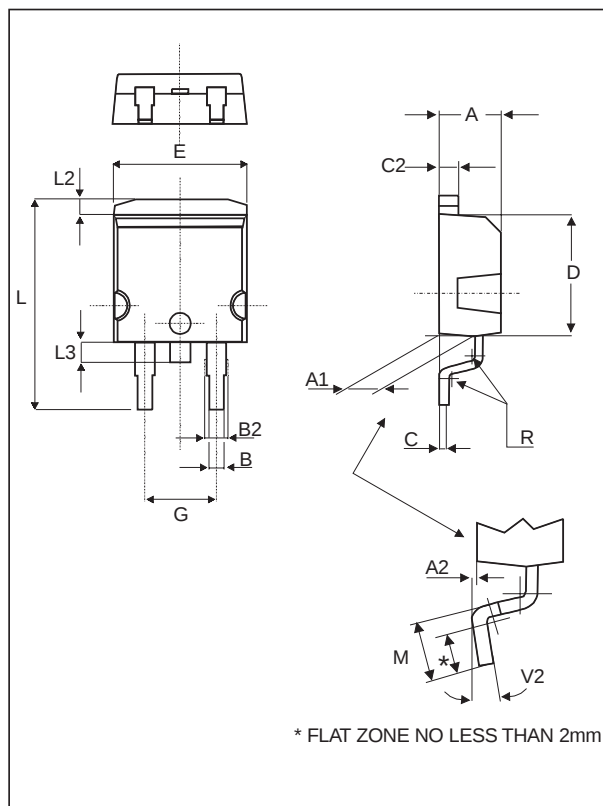
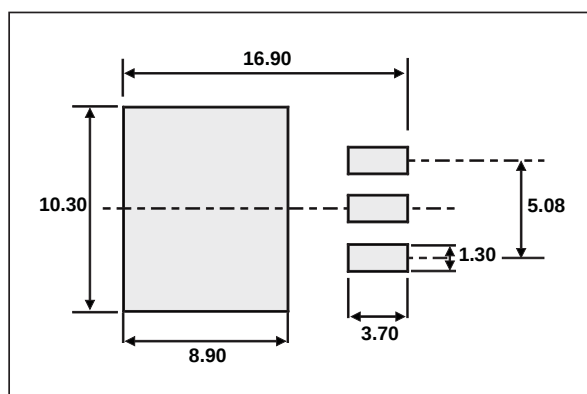


Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board, copper thickness: 35 μm).

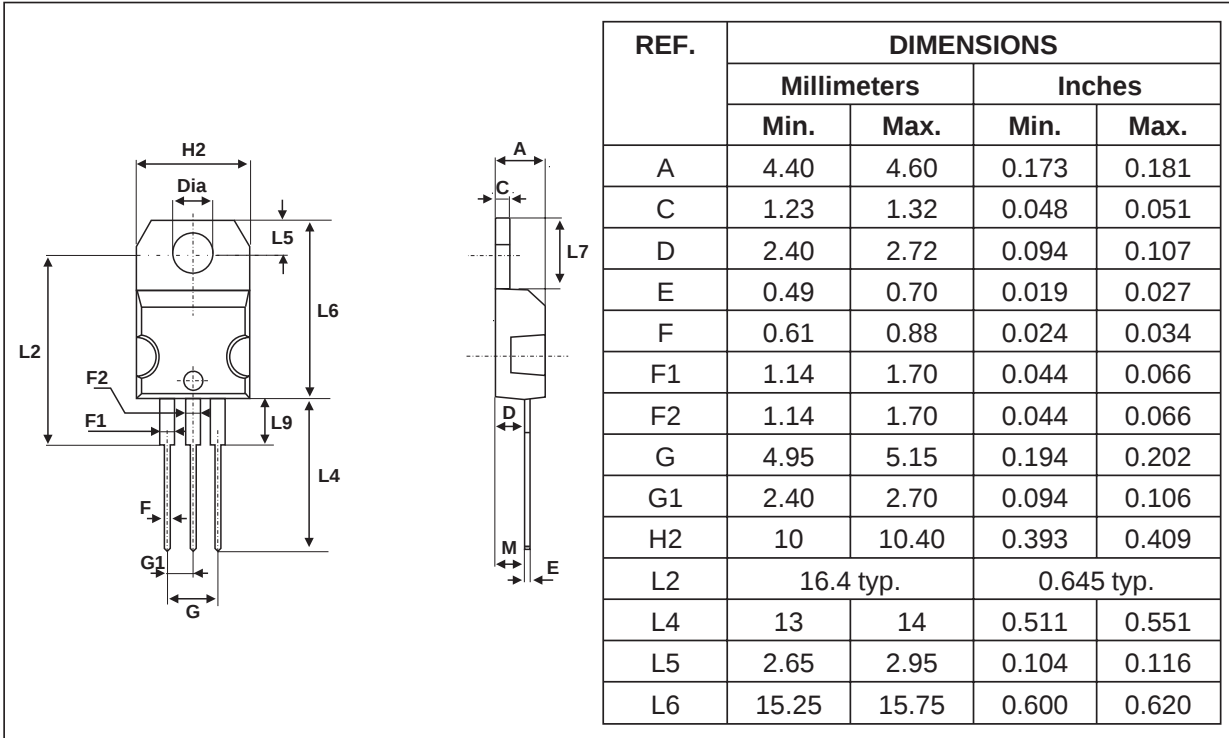


PACKAGE MECHANICAL DATA
D²PAK


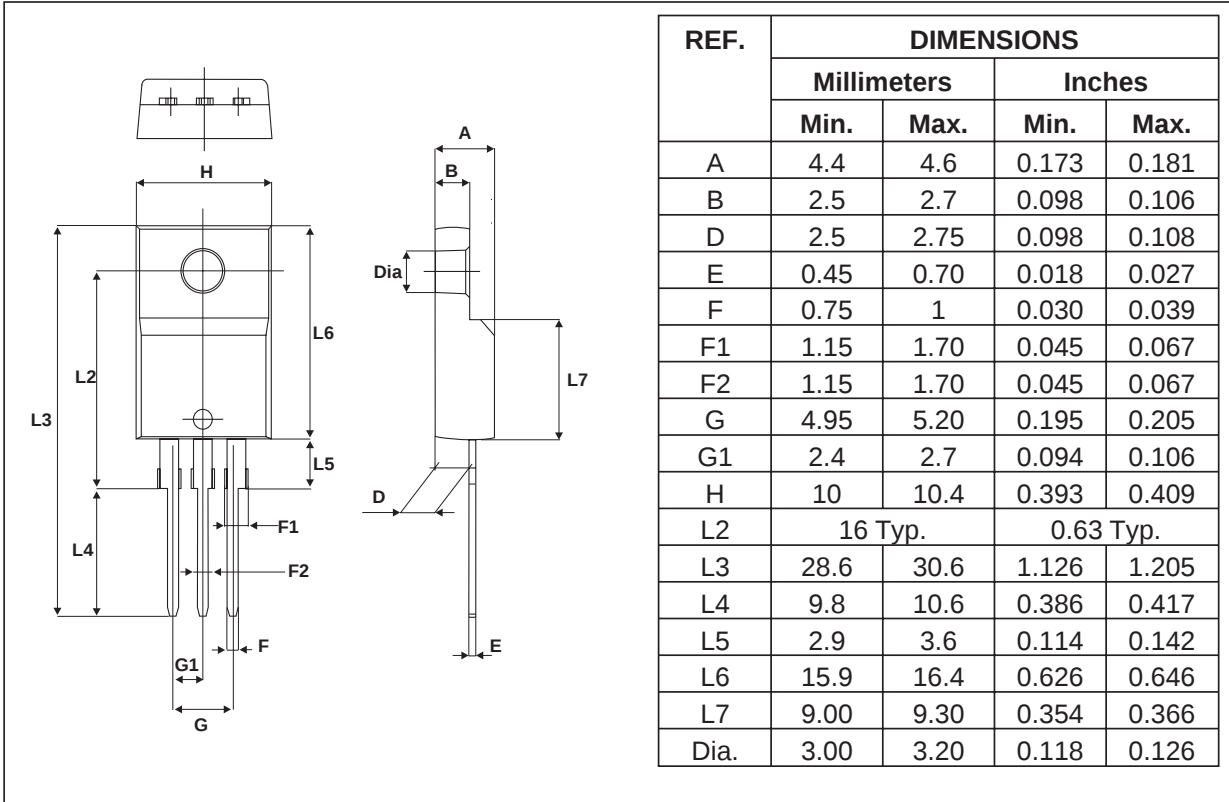
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192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


PACKAGE MECHANICAL DATA
TO-220AB



PACKAGE MECHANICAL DATA
TO-220FPAB



PACKAGE MECHANICAL DATAI²PAK

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
b	0.70	0.93	0.028	0.037
b1	1.14	1.17	0.044	0.046
b2	1.14	1.17	0.044	0.046
c	0.45	0.60	0.018	0.024
c2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
E	10.0	10.4	0.394	0.409
L	13.1	13.6	0.516	0.535
L1	3.48	3.78	0.137	0.149
L2	1.27	1.40	0.050	0.055

PACKAGE MECHANICAL DATA

ISOWATT220AB

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.50	2.70	0.098	0.106
D	2.50	2.75	0.098	0.108
E	0.40	0.70	0.016	0.028
F	0.75	1.00	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.40	2.70	0.094	0.106
H	10.00	10.40	0.394	0.409
L2	16.00 typ.		0.630 typ.	
L3	28.60	30.60	1.125	1.205
L4	9.80	10.60	0.386	0.417
L6	15.90	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Diam	3.00	3.20	0.118	0.126

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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