



STPS10L45CT/CG/CF/CFP

LOW DROP POWER SCHOTTKY RECTIFIER

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	2x5 A
V_{RRM}	45 V
T_j (max)	150°C
V_F (max)	0.46 V

FEATURES AND BENEFITS

- LOW FORWARD VOLTAGE DROP MEANING VERY SMALL CONDUCTION LOSSES
- LOW SWITCHING LOSSES ALLOWING HIGH FREQUENCY OPERATION
- INSULATED PACKAGE: ISOWATT220AB, TO-220FPAB
Insulating voltage = 2000V DC
Capacitance = 12pF
- AVALANCHE CAPABILITY SPECIFIED

DESCRIPTION

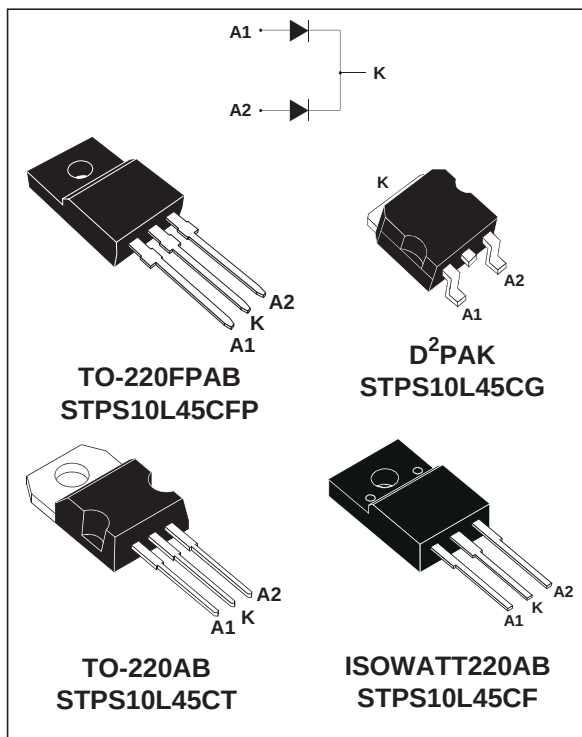
Dual center tap Schottky rectifiers suited for Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in TO-220AB, ISOWATT220AB, TO-220FPAB 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(RMS)}	RMS forward current				20	A
I _{F(AV)}	Average forward current	TO-220AB D ² PAK	T _c =135°C δ = 0.5	Per diode Per device	5 10	A
		ISOWATT220AB TO-220FPAB	T _c =115°C δ = 0.5	Per diode Per device	5 10	A
I _{FSM}	Surge non repetitive forward current		tp = 10 ms Sinusoidal		150	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		2	A
P _{ARM}	Repetitive peak avalanche power		tp = 1μs Tj = 25°C		2700	W
T _{stg}	Storage temperature range				- 65 to + 150	°C
Tj	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



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THERMAL RESISTANCES

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB D ² PAK	Per diode Total	3 1.7	°C/W
$R_{th(c)}$			Coupling	0.35	
$R_{th(j-c)}$	Junction to case	ISOWATT220AB TO-220FPAB	Per diode Total	5 3.8	°C/W
$R_{th(c)}$			Coupling	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	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			0.15	mA
		$T_j = 125^\circ\text{C}$			45	90	mA
V_F^*	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 5\text{ A}$			0.53	V
		$T_j = 125^\circ\text{C}$	$I_F = 5\text{ A}$		0.36	0.46	
		$T_j = 25^\circ\text{C}$	$I_F = 10\text{ A}$			0.67	
		$T_j = 125^\circ\text{C}$	$I_F = 10\text{ A}$		0.49	0.59	

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

To evaluate the conduction losses use the following equation :

$$P = 0.33 \times I_{F(AV)} + 0.026 I_{F(RMS)}^2$$

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

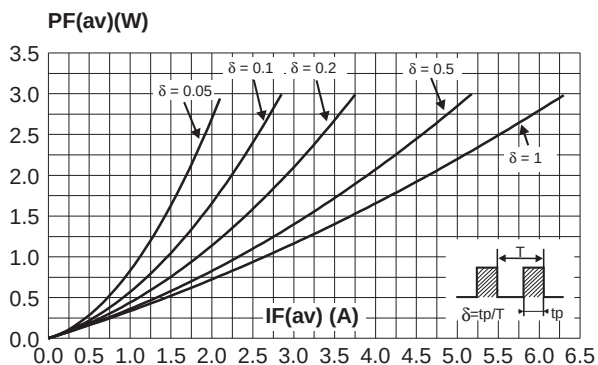


Fig. 2: Average forward current versus ambient temperature ($\delta=0.5$, per diode).

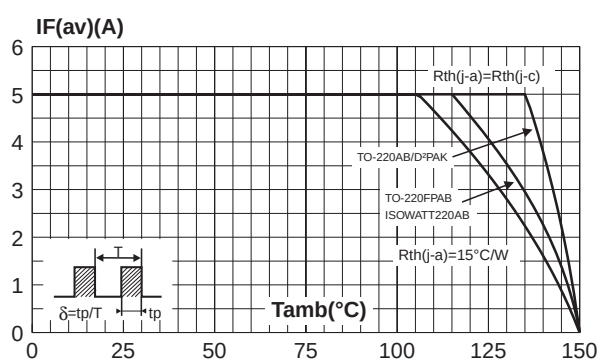


Fig. 3: Normalized avalanche power derating versus pulse duration.

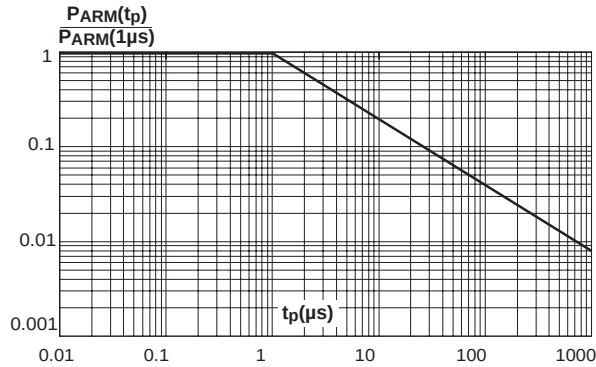


Fig. 4: Normalized avalanche power derating versus junction temperature.

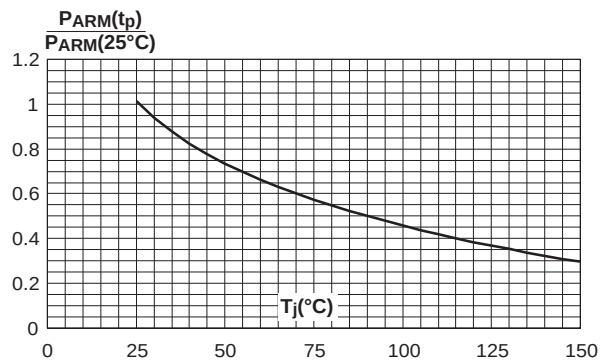


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB and D²PAK).

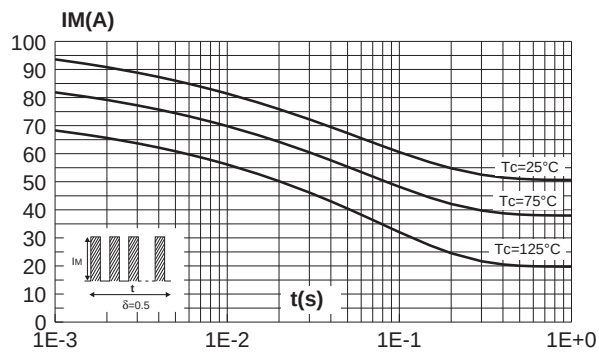


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (ISOWATT220AB, TO-220FPAB).

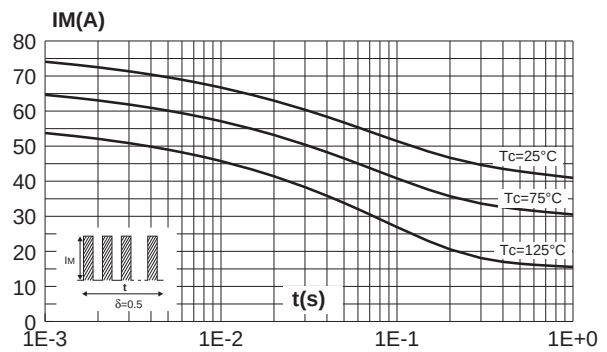


Fig. 6-1: Relative variation of thermal impedance junction to case versus pulse duration. (TO-220AB and D²PAK).

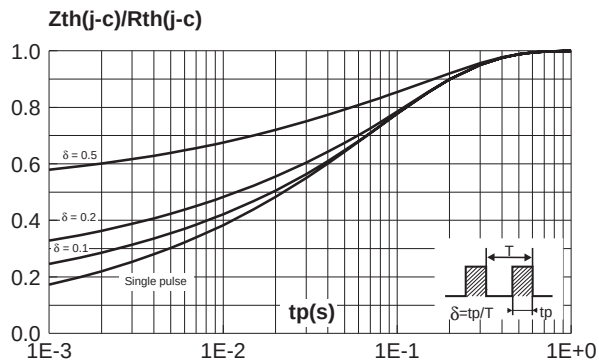


Fig. 6-2: Relative variation of thermal impedance junction to case versus pulse duration. (ISOWATT220AB, TO-220FPAB).

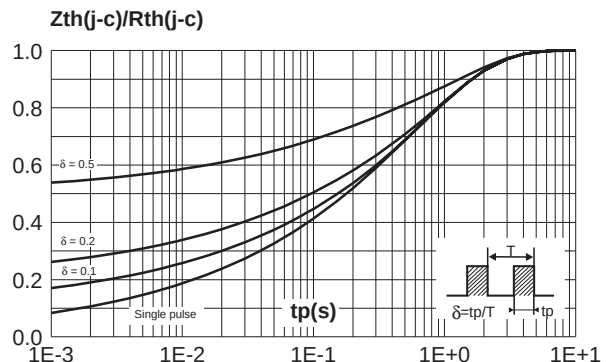


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values, per diode).

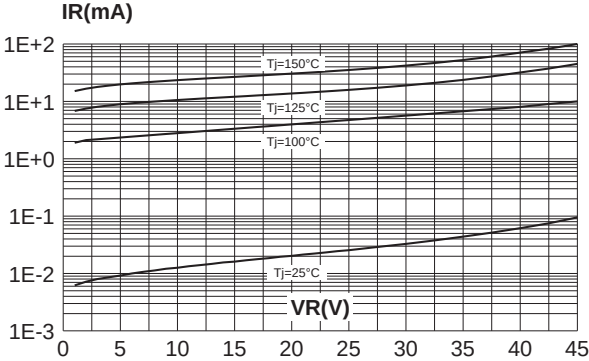


Fig. 8: Junction capacitance versus reverse voltage applied (typical values, per diode).

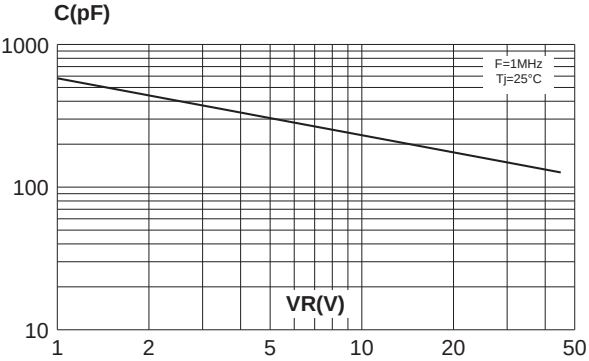


Fig. 9: Forward voltage drop versus forward current (maximum values, per diode).

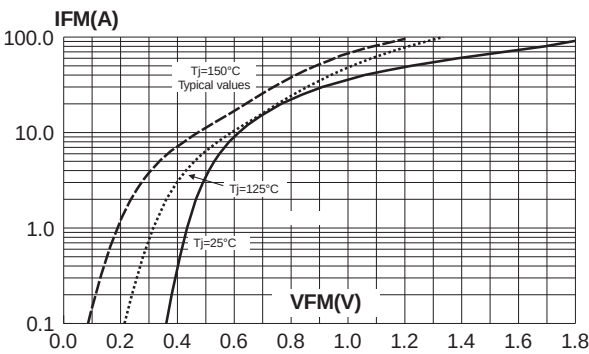
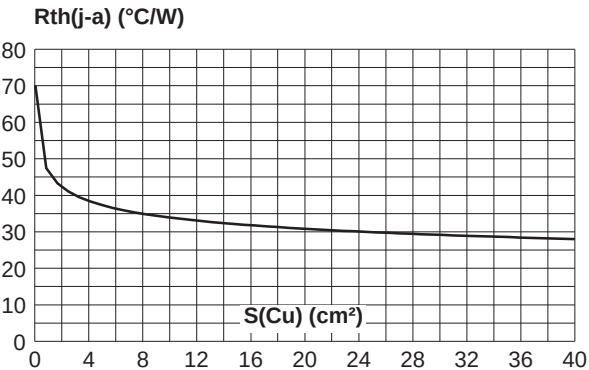
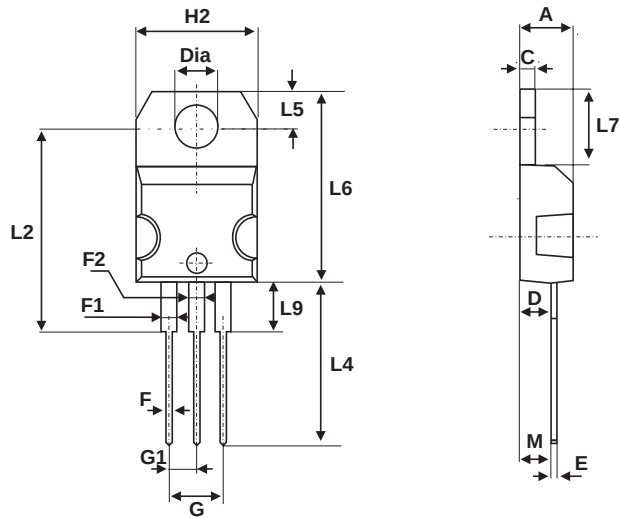
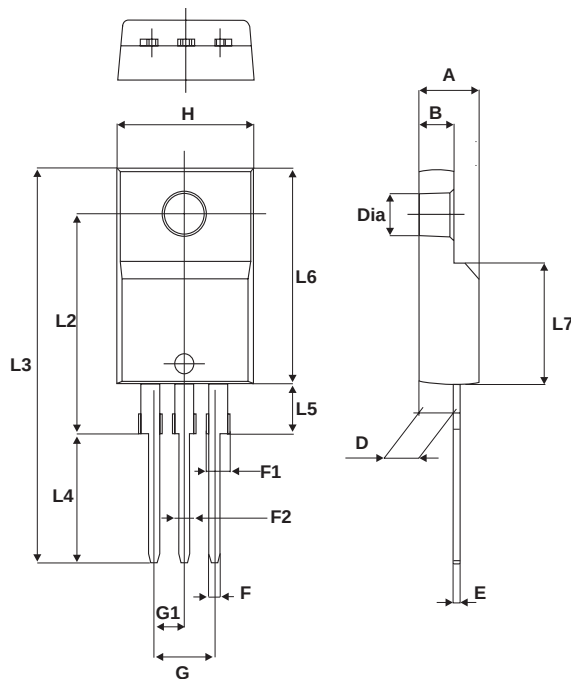


Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35μm)(D²PAK).



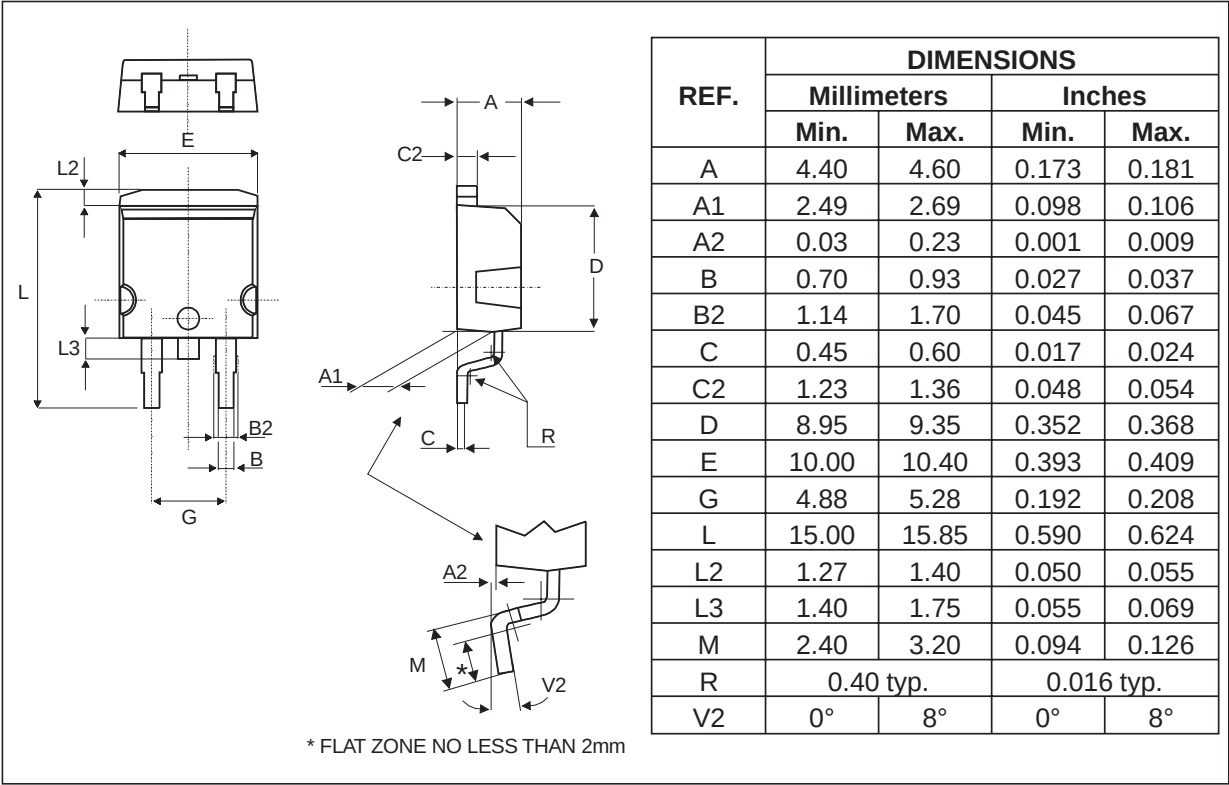
PACKAGE MECHANICAL DATA
 TO-220AB


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

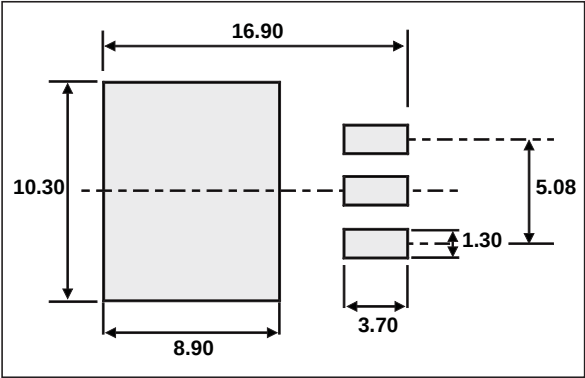
PACKAGE MECHANICAL DATA
 TO-220FPAB


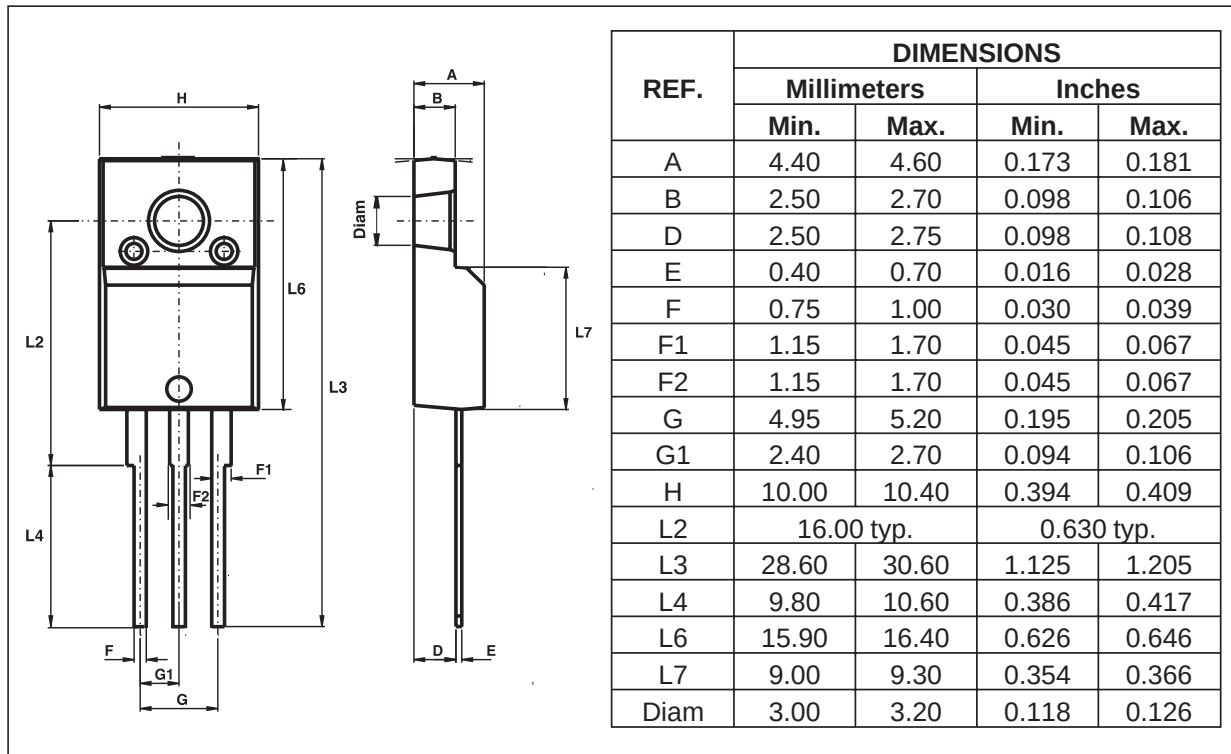
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

PACKAGE MECHANICAL DATA
D²PAK



FOOT PRINT DIMENSIONS (in millimeters)



PACKAGE MECHANICAL DATA
ISOWATT220AB


Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS10L45CT	STPS10L45CT	TO-220AB	2.23g	50	Tube
STPS10L45CFP	STPS10L45CFP	TO-220FPAB	2 g	50	Tube
STPS10L45CG	STPS10L45CG	D ² PAK	1.48g	50	Tube
STPS10L45CG-TR	STPS10L45CG	D ² PAK	1.48g	1000	Tape & reel
STPS10L45CF	STPS10L45CF	ISOWATT220AB	2.08g	50	Tube

- Cooling method : by conduction (C)
- Recommended torque value : 0.55 N.m.
- Maximum torque value : 0.70 N.m.
- Epoxy meets UL94,V0

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