

## POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	7.5 A
$V_{RRM}$	45 V
$T_j(\text{max})$	175 °C
$V_F(\text{max})$	0.57 V

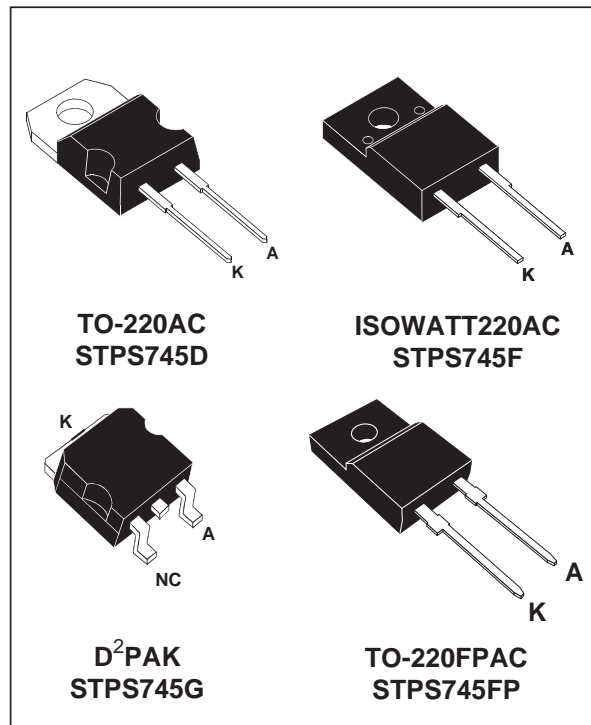
### FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- INSULATED PACKAGE: ISOWATT220AC, TO-220FPAC  
Insulating voltage = 2000V DC  
Capacitance = 12pF
- AVALANCHE CAPABILITY SPECIFIED

### DESCRIPTION

Single Schottky rectifier suited for Switch Mode Power Supply and high frequency DC to DC converters.

Packaged either in TO-220AC, ISOWATT220AC, TO-220FPAC or D<sup>2</sup>PAK, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



### ABSOLUTE RATINGS (limiting values)

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 $\delta = 0.5$	TO-220AC / D <sup>2</sup> PAK	$T_c = 160^\circ\text{C}$	7.5	A
		ISOWATT220AC / TO-220FPAC	$T_c = 145^\circ\text{C}$		
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10 \text{ ms sinusoidal}$	150	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	$t_p = 100 \mu\text{s square}$	2	A	
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 1 \mu\text{s } T_j = 25^\circ\text{C}$	2700	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

# STPS745D/F/G/FP

## THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / D <sup>2</sup> PAK	3.0	°C/W
		ISOWATT220AC/ TO-220FPAC	5.5	

## STATIC ELECTRICAL CHARACTERISTICS

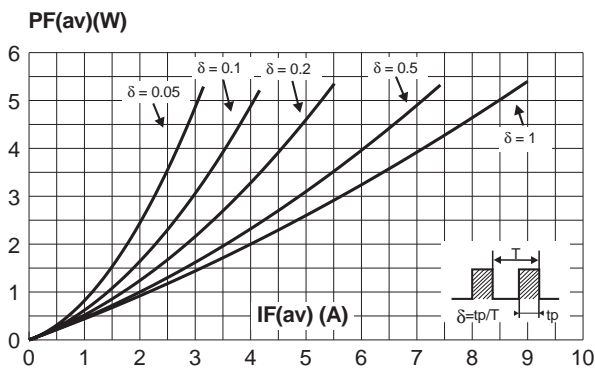
Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			100	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$			5	15	mA
$V_F^*$	Forward voltage drop	$T_j = 125^\circ\text{C}$	$I_F = 7.5\text{ A}$		0.5	0.57	V
		$T_j = 25^\circ\text{C}$	$I_F = 15\text{ A}$			0.84	
		$T_j = 125^\circ\text{C}$	$I_F = 15\text{ A}$		0.65	0.72	

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

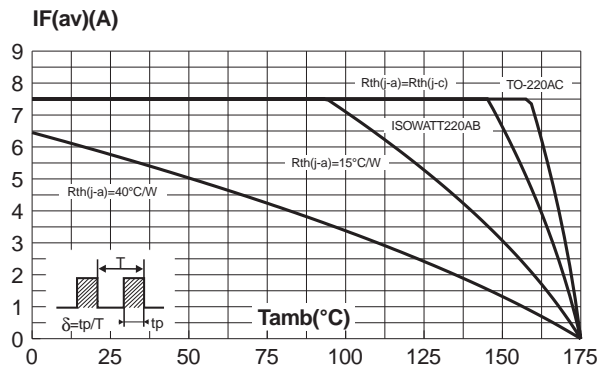
To evaluate the conduction losses use the following equation :

$$P = 0.42 \times I_{F(AV)} + 0.020 I_{F(RMS)}^2$$

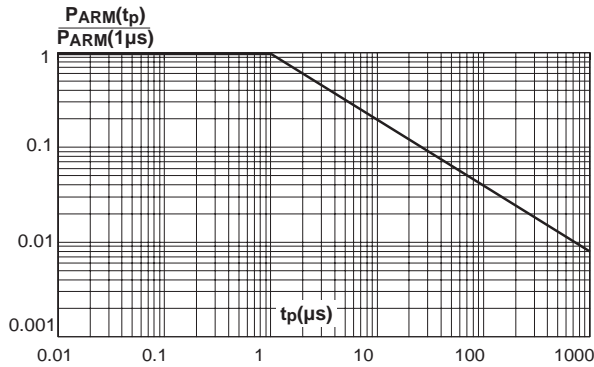
**Fig. 1:** Average forward power dissipation versus average forward current.



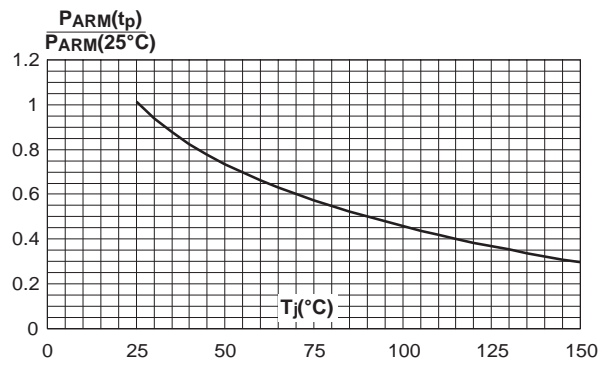
**Fig. 2:** Average current versus ambient temperature ( $\delta = 0.5$ ).



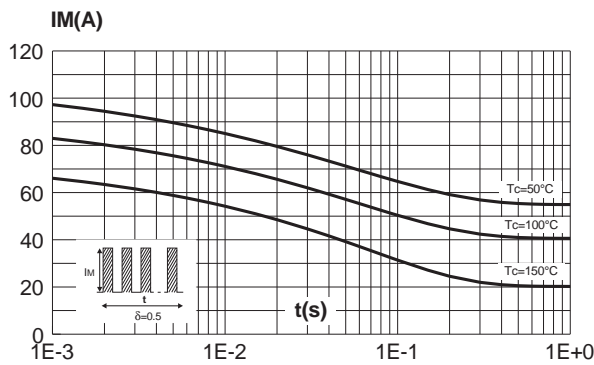
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



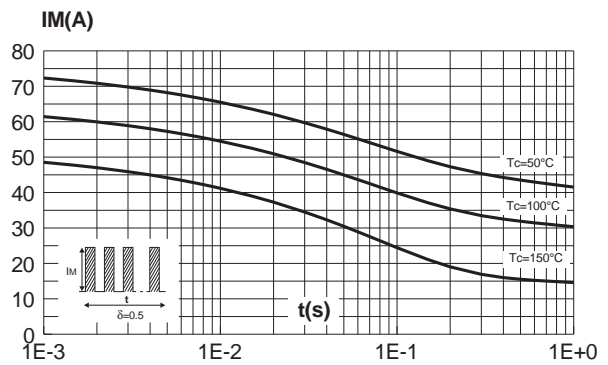
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



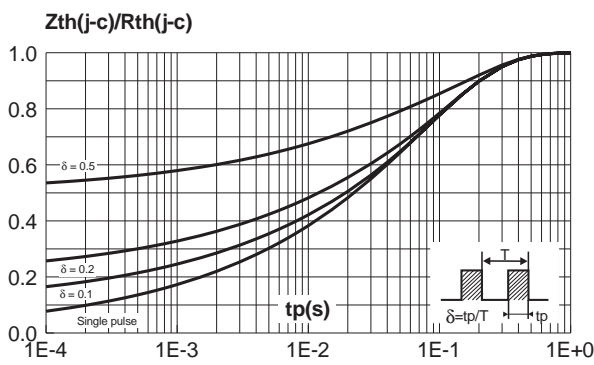
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AC and D<sup>2</sup>PAK).



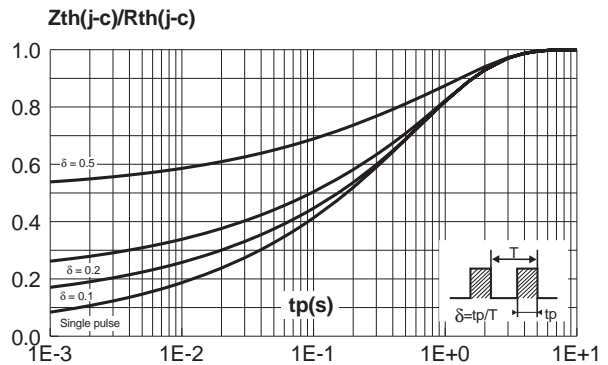
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (maximum values) (ISOWATT220AC/TO-220FPAC).



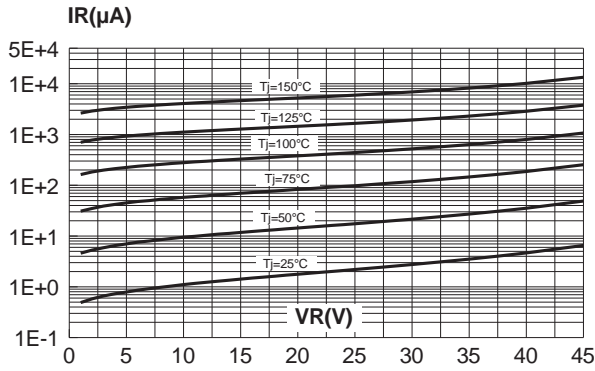
**Fig. 6-1:** Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AC and D<sup>2</sup>PAK).



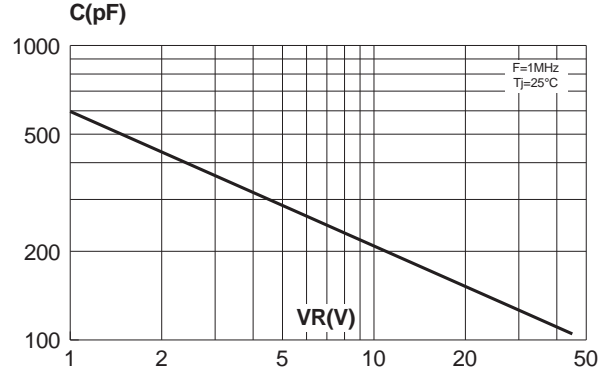
**Fig. 6-2:** Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AC/TO-220FPAC).



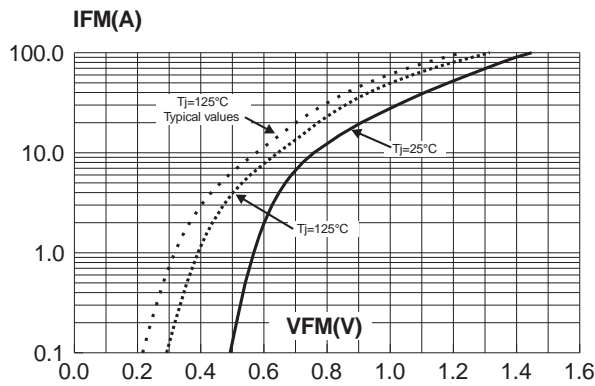
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values).



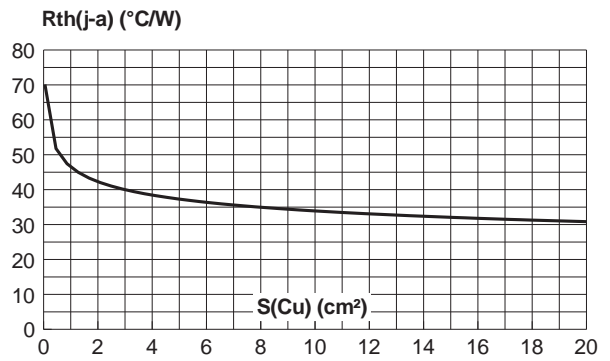
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values).



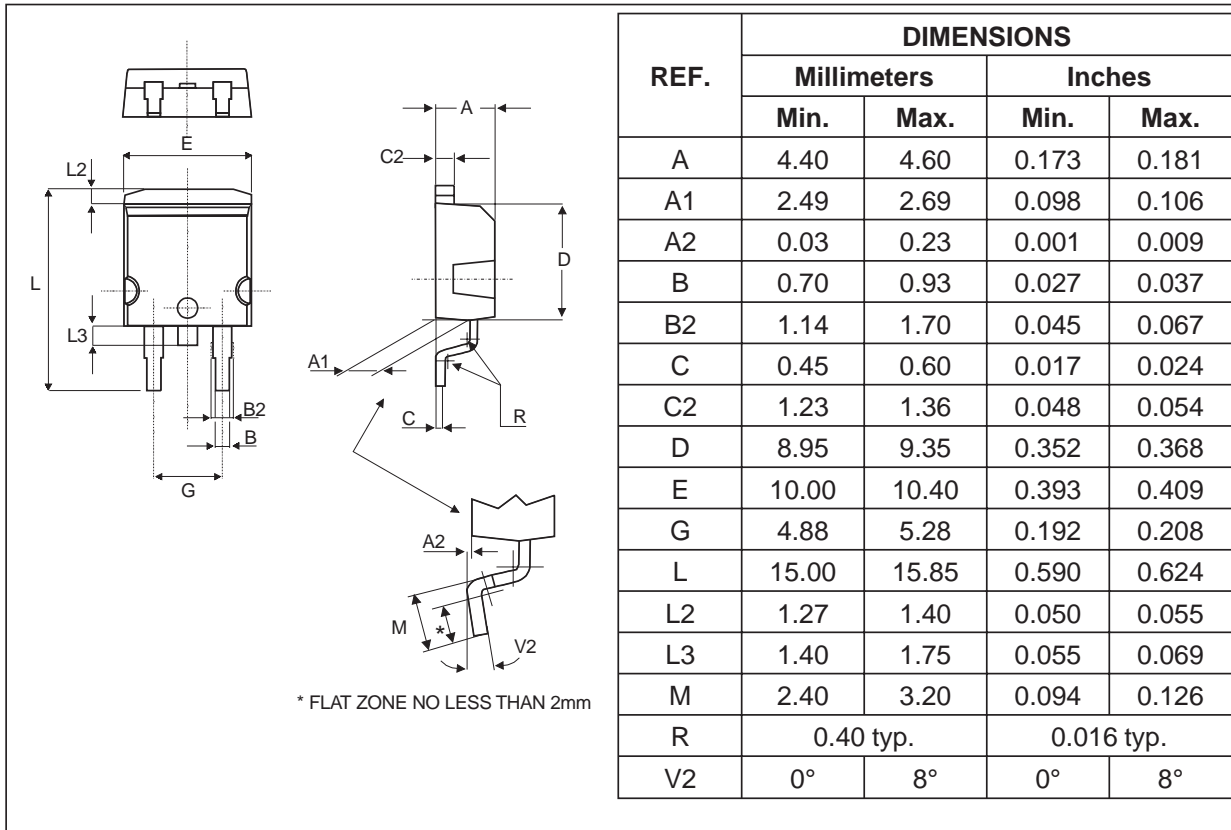
**Fig. 9:** Forward voltage drop versus forward current (maximum values).



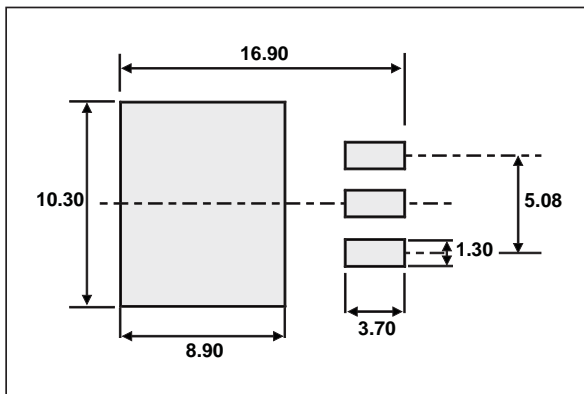
**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board, copper thickness:  $35\mu m$ ).



**PACKAGE MECHANICAL DATA**  
D<sup>2</sup>PAK (Plastic)

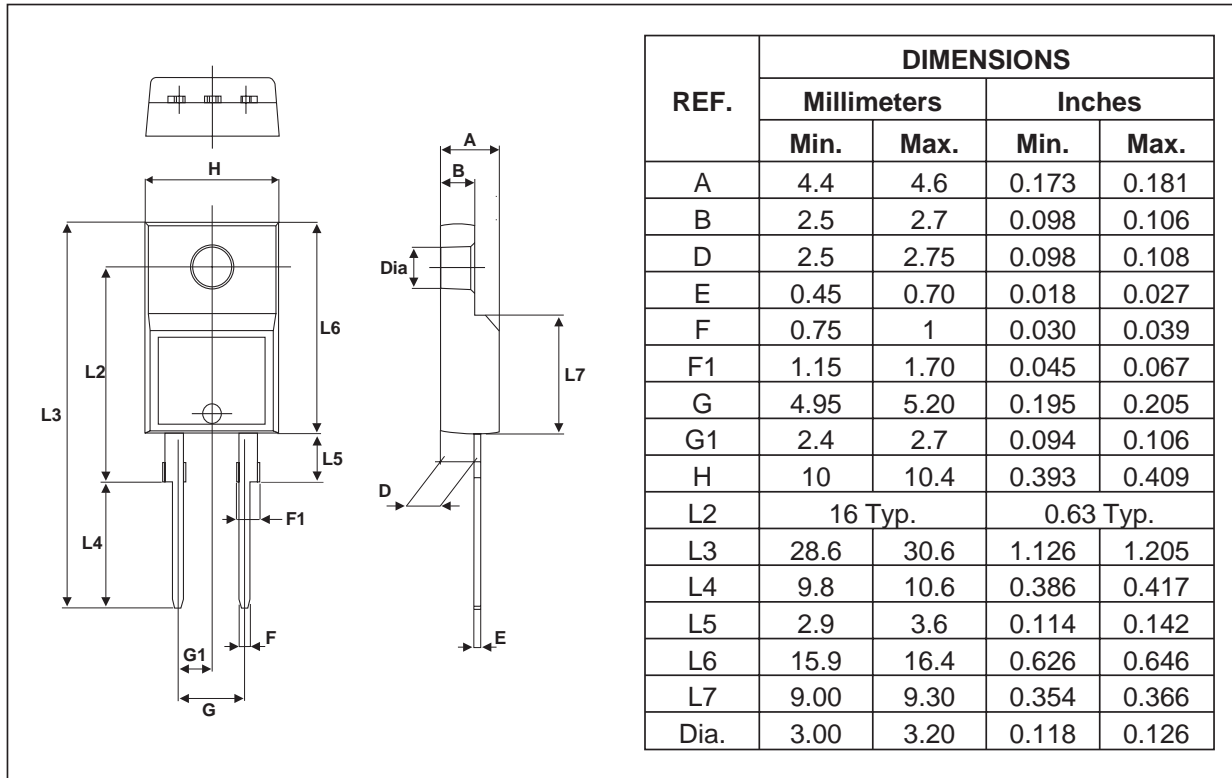


**FOOTPRINT DIMENSIONS** (in millimeters)

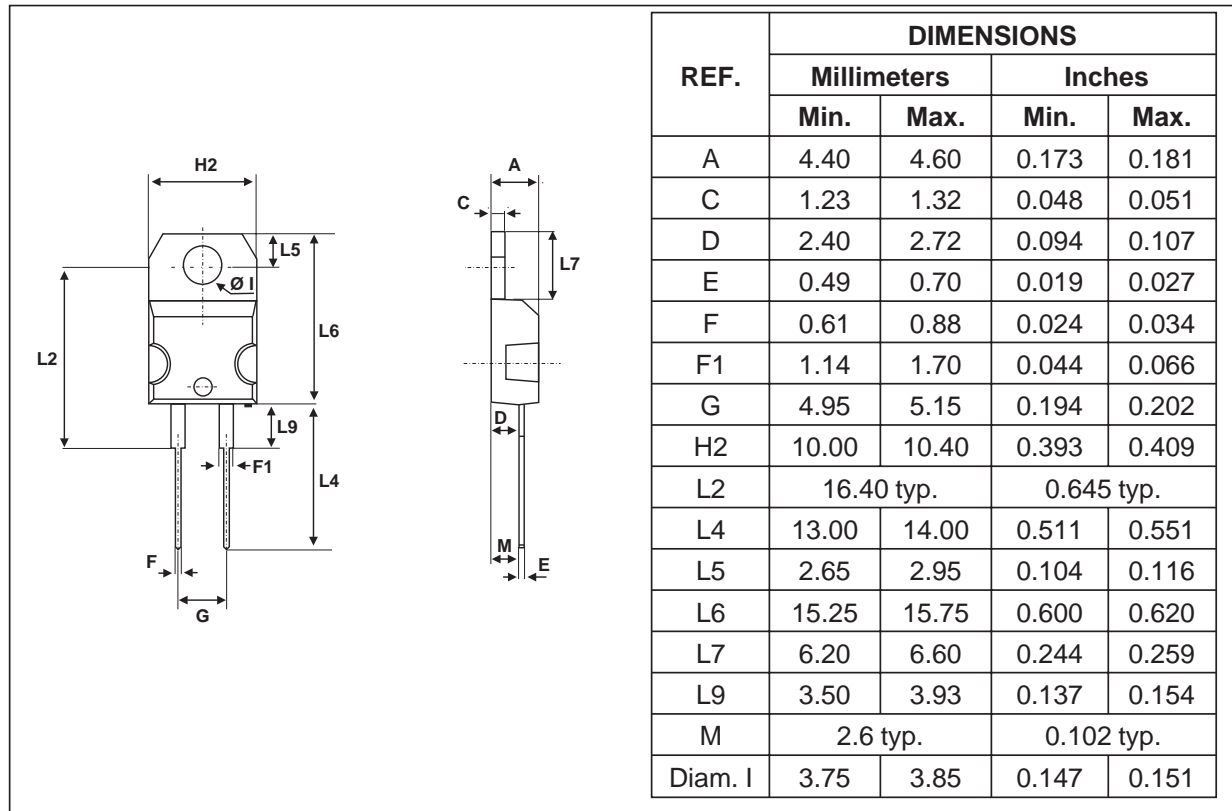


**STPS745D/F/G/FP**

**PACKAGE MECHANICAL DATA**  
TO-220FPAC



**PACKAGE MECHANICAL DATA**  
TO-220AC



**PACKAGE MECHANICAL DATA**  
 ISOWATT220AC

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	2.50		2.70	0.098		0.106
D	2.40		2.75	0.094		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
G	4.95		5.20	0.195		0.205
H	10.00		10.40	0.394		0.409
L2		16.00			0.630	
L3	28.60		30.60	1.125		1.205
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
STPS745D	STPS745D	TO-220AC	1.86 g.	50	Tube
STPS745F	STPS745F	ISOWATT220AC	2 g.	50	Tube
STPS745G	STPS745G	D <sup>2</sup> PAK	1.48 g.	50	Tube
STPS745G-TR	STPS745G	D <sup>2</sup> PAK	1.48 g.	1000	Tape & reel
STPS745FP	STPS745FP	TO-220FPAC	1.9 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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