



# STPS3045CT/CG/CR/CP/CPI/CW/CFP

## POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 15 A
$V_{RRM}$	45 V
$T_j(\text{max})$	175 °C
$V_F$	0.57 V

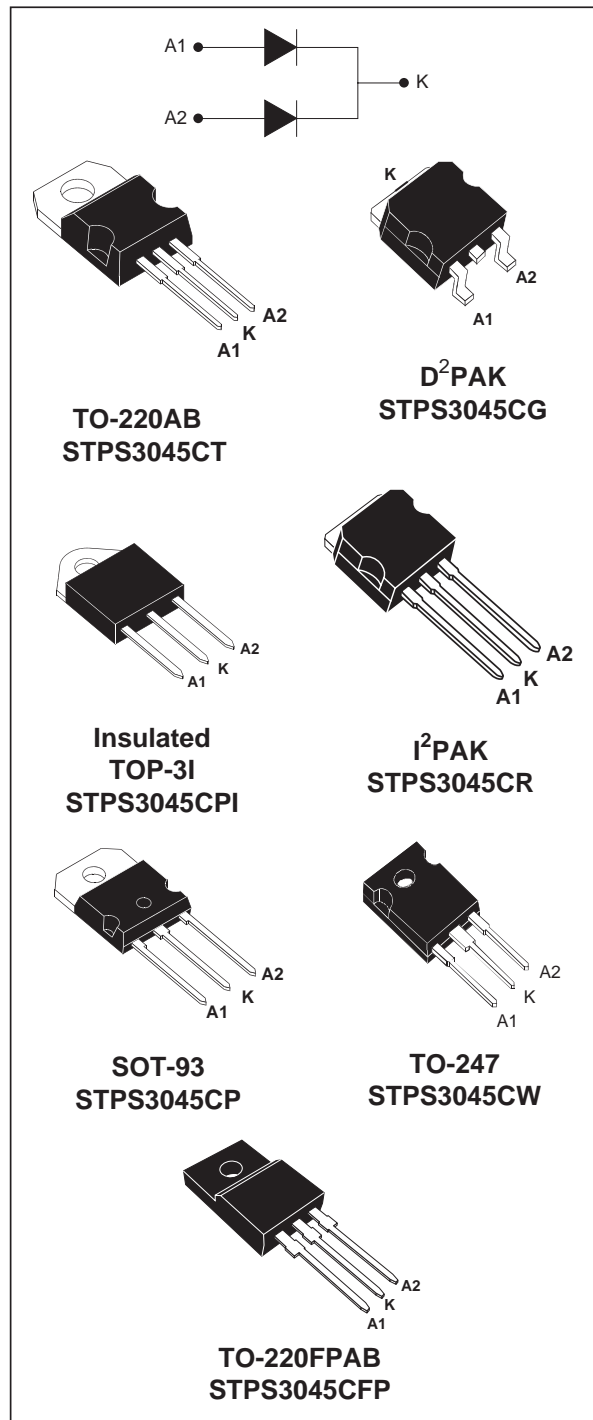
### FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE: TOP-3I  
Insulating voltage = 2500V RMS  
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, TO-220FPAB, D<sup>2</sup>PAK, I<sup>2</sup>PAK, TO-247, SOT93 or TOP-3I, this device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



## STPS3045CT/CG/CR/CP/CPI/CW/CFP

### ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter			Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage			45	V	
I <sub>F(RMS)</sub>	RMS forward current			30	A	
I <sub>F(AV)</sub>	Average forward current δ = 0.5	TO-220AB / D <sup>2</sup> PAK / I <sup>2</sup> PAK / SOT-93 / TO-247	T <sub>c</sub> = 155°C	Per diode Per device	15 30	A
		TO-220FPAB	T <sub>c</sub> = 130°C			
		TOP-3I	T <sub>c</sub> = 150°C			
I <sub>FSM</sub>	Surge non repetitive forward current		t <sub>p</sub> = 10 ms sinusoidal	220	A	
I <sub>RRM</sub>	Repetitive peak reverse current		t <sub>p</sub> = 2 μs square F = 1kHz	1	A	
I <sub>RSM</sub>	Non repetitive peak reverse current		t <sub>p</sub> = 100 μs square	3	A	
P <sub>ARM</sub>	Repetitive peak avalanche power		t <sub>p</sub> = 1μs T <sub>j</sub> = 25°C	6000	W	
T <sub>stg</sub>	Storage temperature range			-65 to +175	°C	
T <sub>j</sub>	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 <sub>th(j-c)</sub>	Junction to case	TO-220AB / D <sup>2</sup> PAK / I <sup>2</sup> PAK	Per diode Total	1.60 0.85	°C/W
		SOT-93 / TO-247	Per diode Total	1.5 0.8	
		TO-220FPAB	Per diode Total	4 3.2	
		TOP-3I	Per diode Total	2.2 1.6	
R <sub>th(c)</sub>		TO-220AB / D <sup>2</sup> PAK / I <sup>2</sup> PAK SOT-93 / TO-247	Coupling	0.10	
		TO-220FPAB	Coupling	2.5	
		TOP-3I	Coupling	1.0	

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)

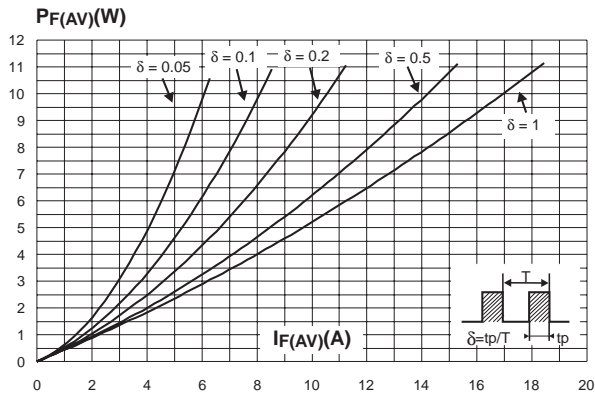
Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> *	Reverse leakage current	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			200	μA
		T <sub>j</sub> = 125°C			11	40	mA
V <sub>F</sub> *	Forward voltage drop	T <sub>j</sub> = 125°C	I <sub>F</sub> = 15 A		0.5	0.57	V
		T <sub>j</sub> = 25°C	I <sub>F</sub> = 30 A			0.84	
		T <sub>j</sub> = 125°C	I <sub>F</sub> = 30 A		0.65	0.72	

Pulse test : \* t<sub>p</sub> = 380 μs, δ < 2%

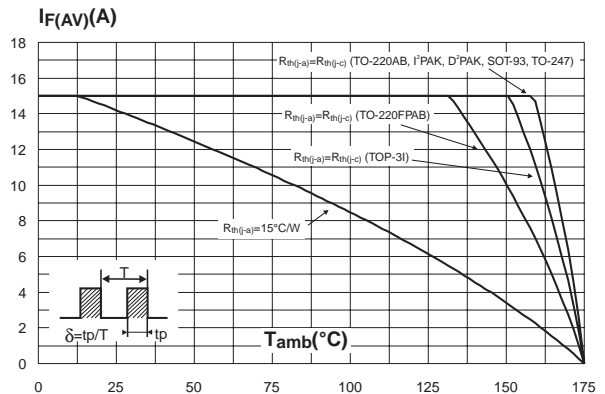
To evaluate the conduction losses use the following equation :

$$P = 0.42 \times I_{F(AV)} + 0.01 I_{F(RMS)}^2$$

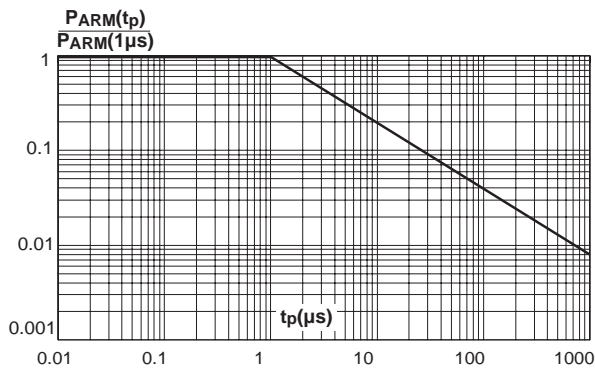
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



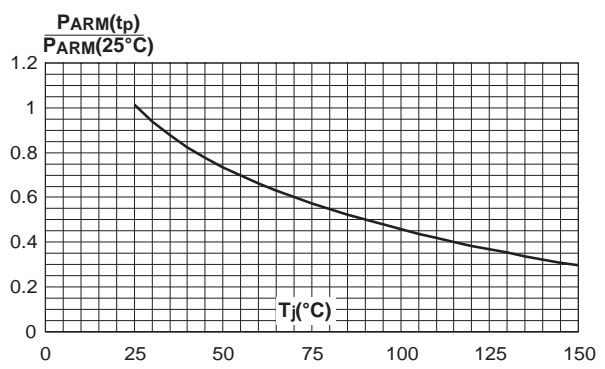
**Fig. 2:** Average current versus ambient temperature ( $\delta = 0.5$ , per diode).



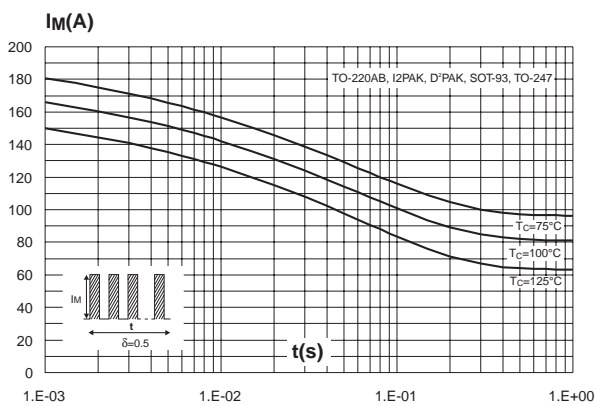
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



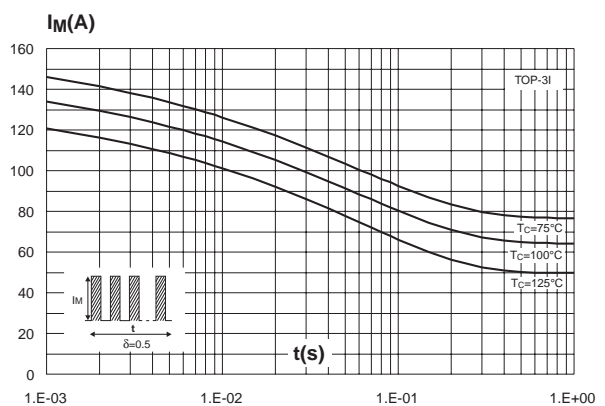
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



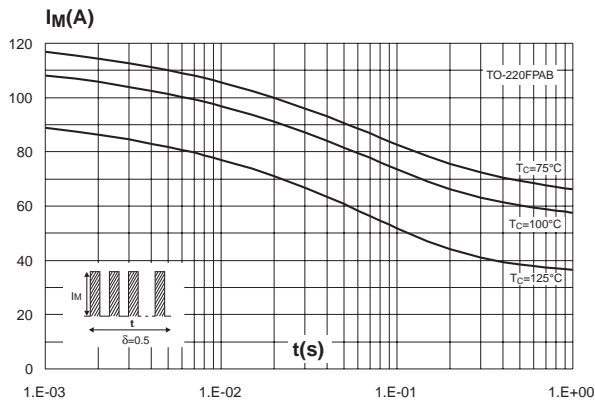
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode).



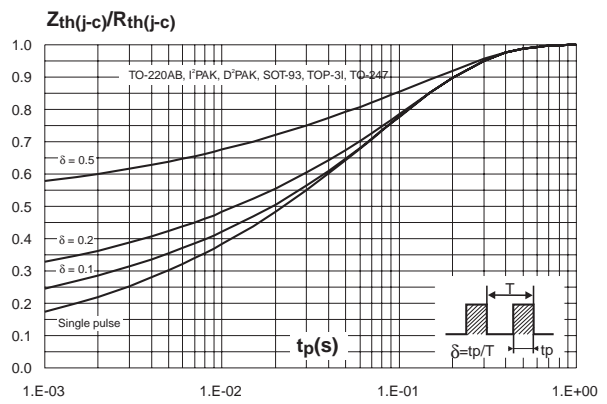
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode).



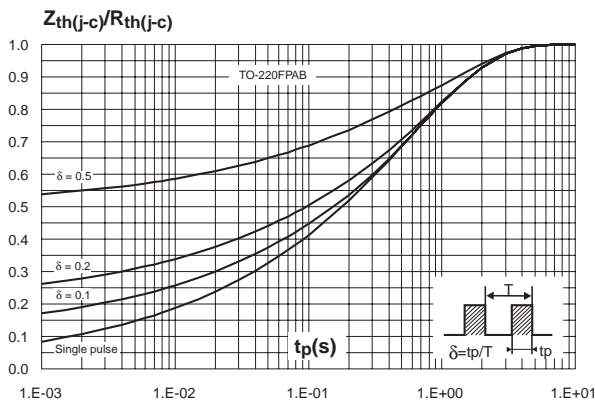
**Fig. 5-3:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode).



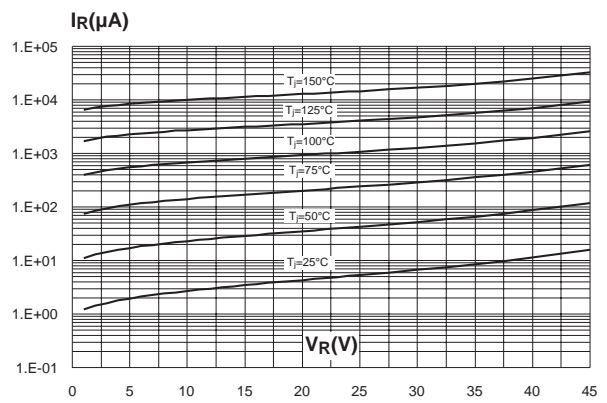
**Fig. 6-1:** Relative variation of thermal transient impedance junction to case versus pulse duration.



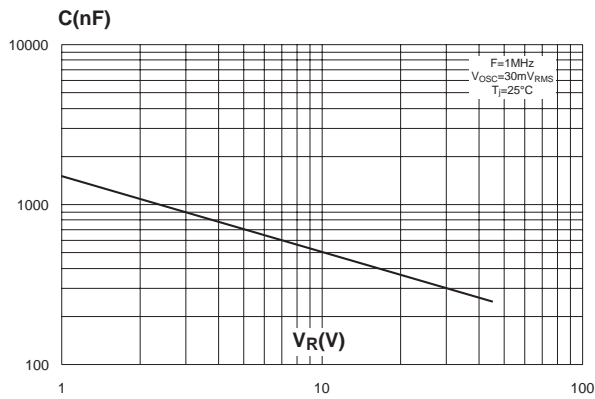
**Fig. 6-2:** Relative variation of thermal transient impedance junction to case versus pulse duration.



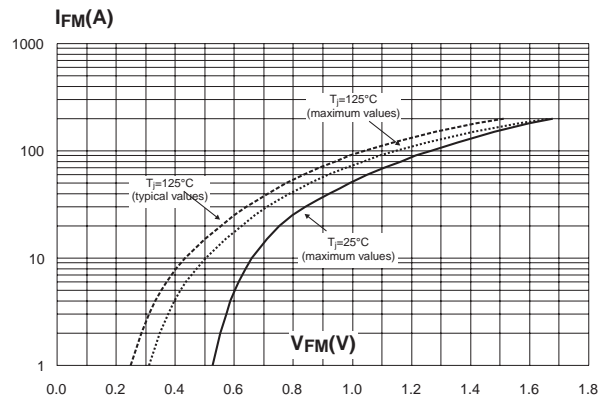
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values, per diode).



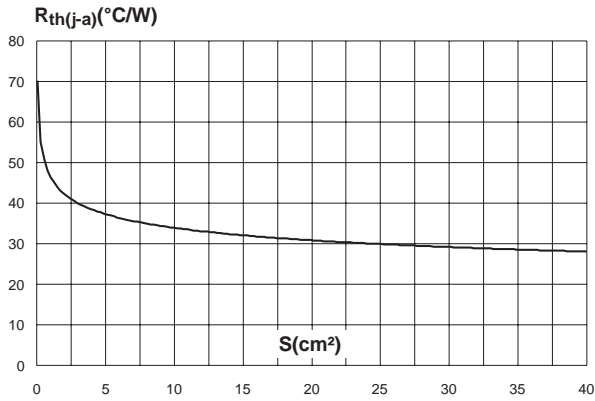
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values, per diode).



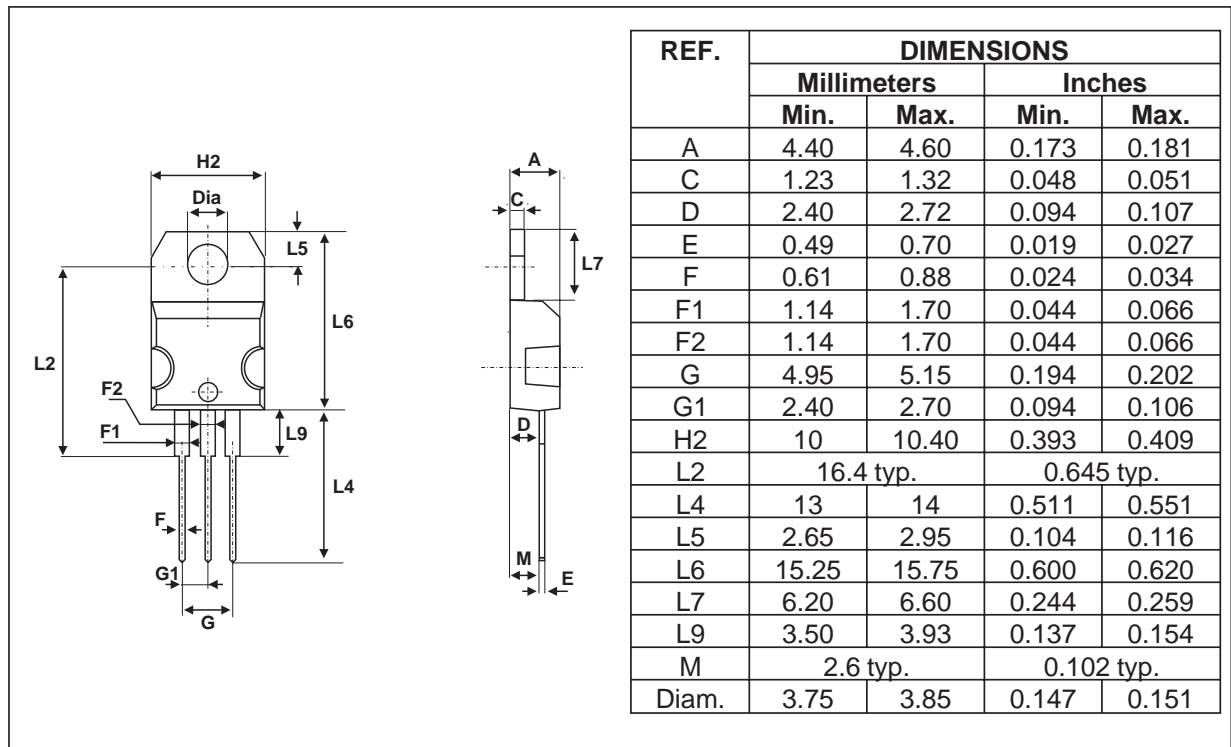
**Fig. 9:** Forward voltage drop versus forward current (maximum values, per diode).



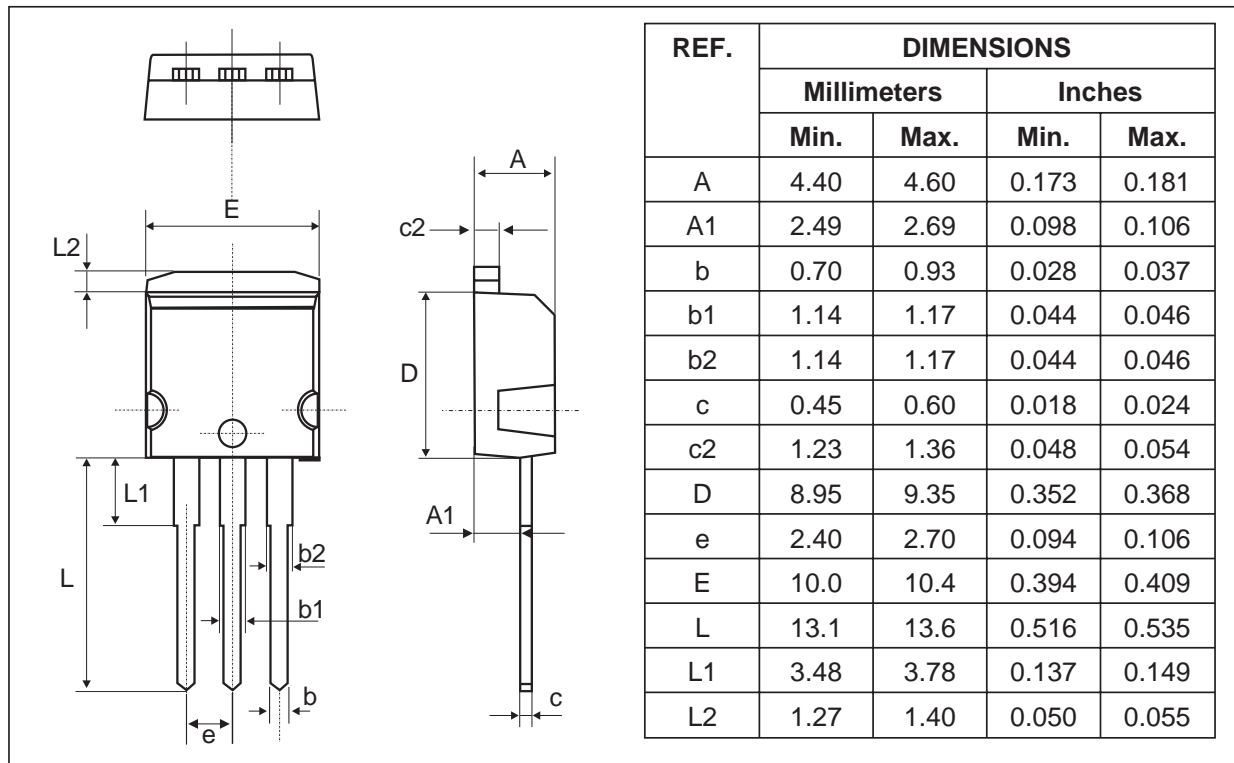
**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu=35µm).



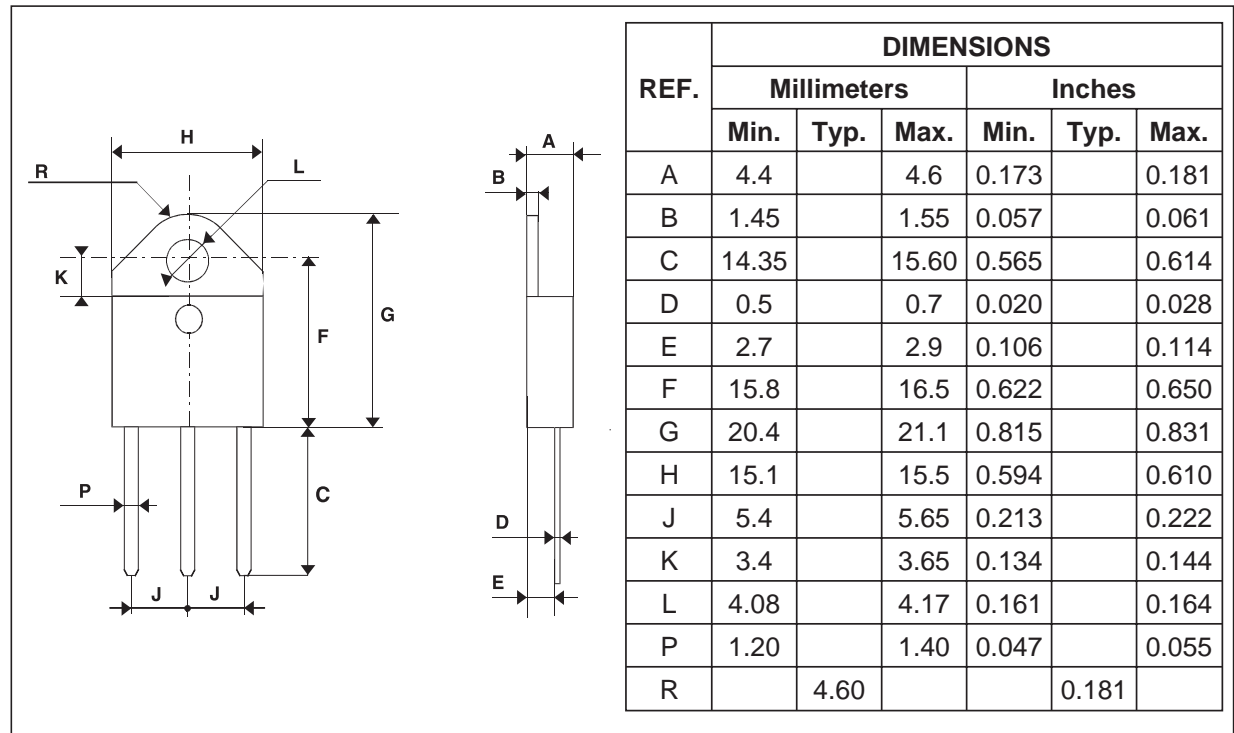
**PACKAGE MECHANICAL DATA**  
TO-220AB



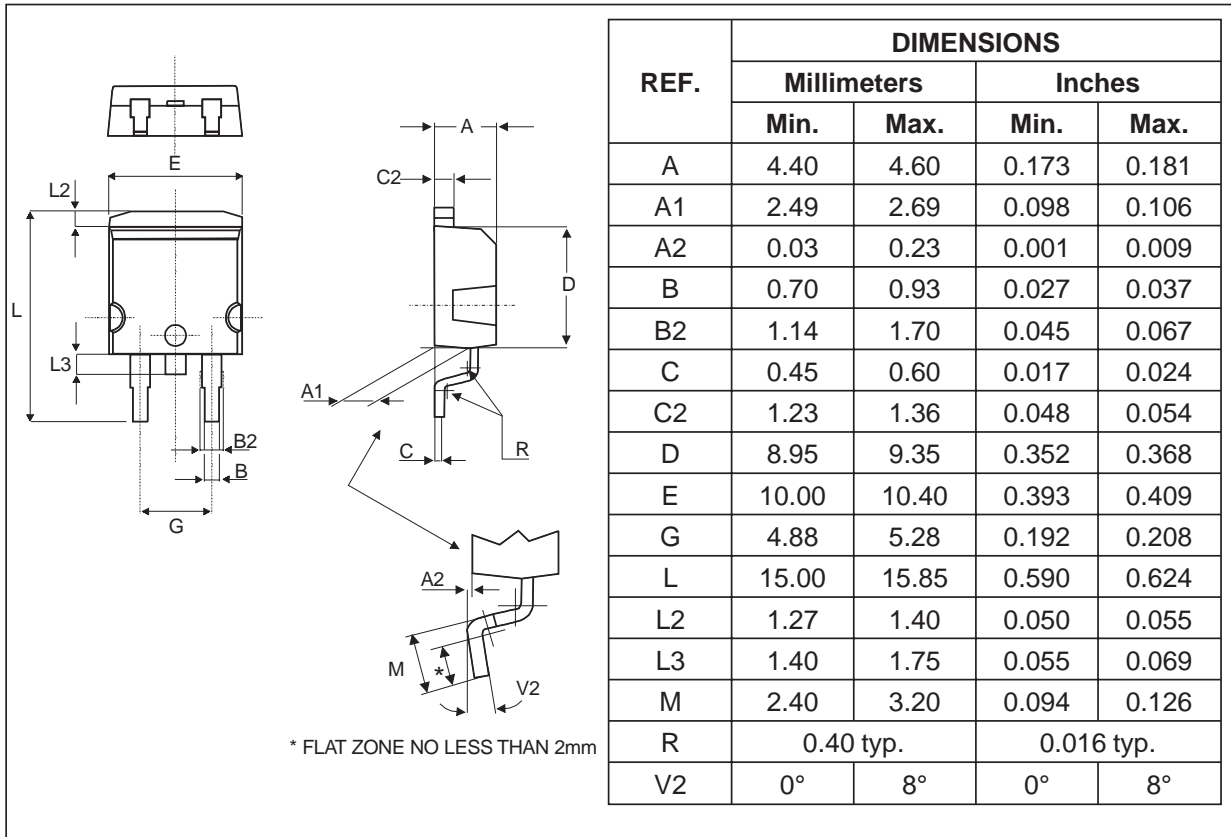
PACKAGE MECHANICAL DATA  
I<sup>2</sup>PAK



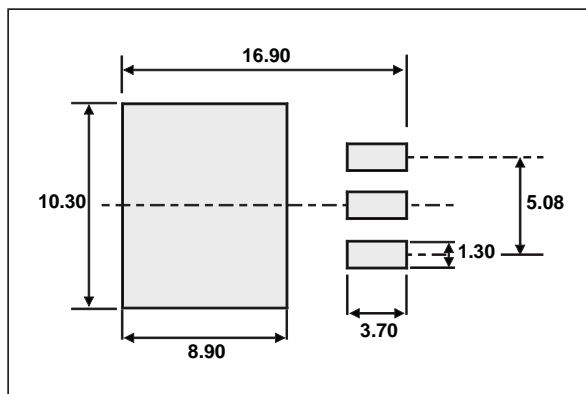
PACKAGE MECHANICAL DATA  
TOP-3I (isolated)



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

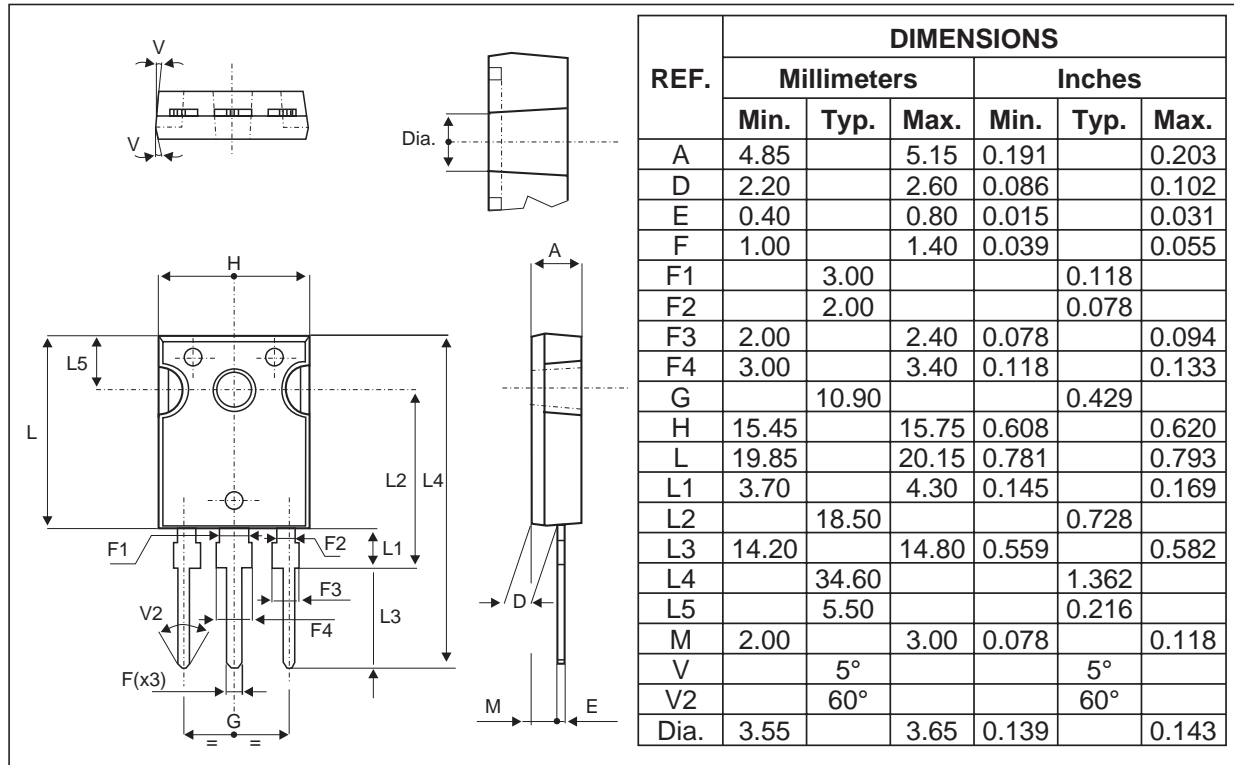


**FOOTPRINT DIMENSIONS** (in millimeters)

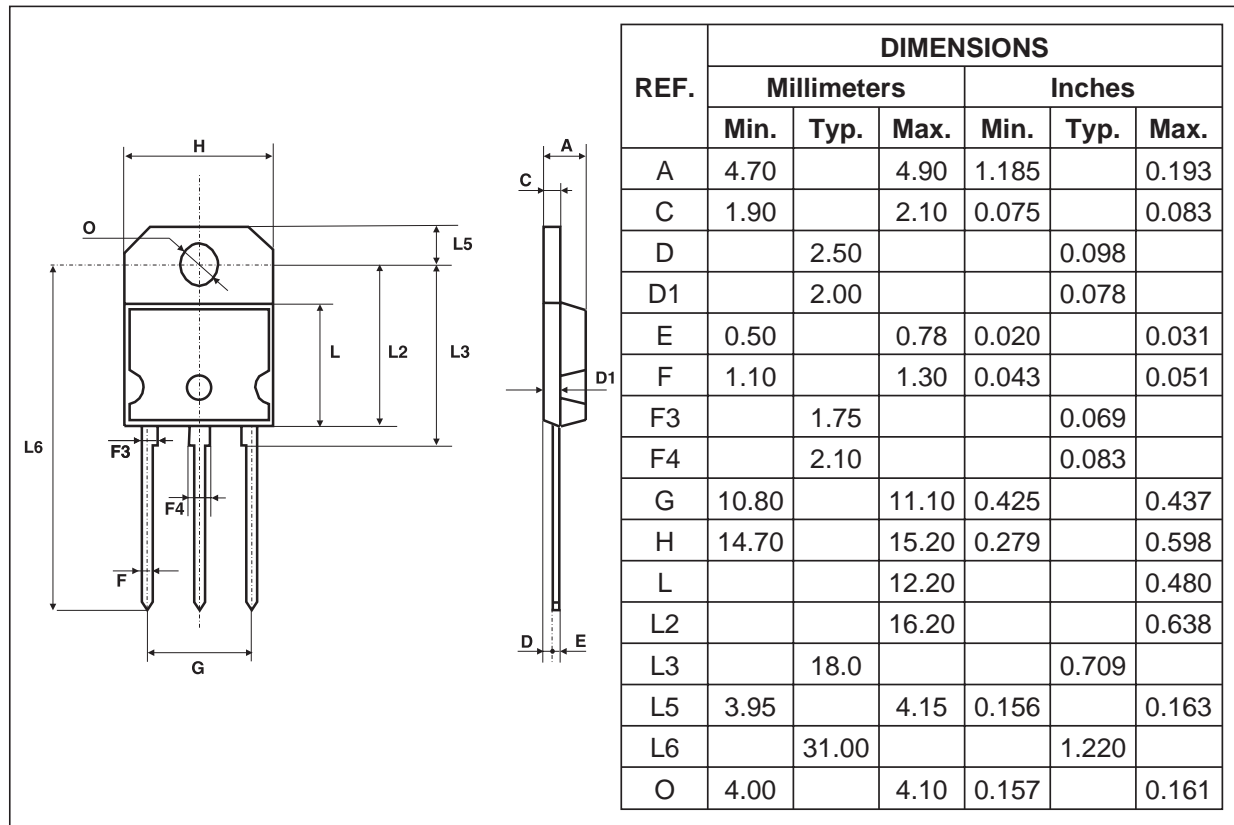


**STPS3045CT/CG/CR/CP/CPI/CW/CFP**

**PACKAGE MECHANICAL DATA**  
TO-247

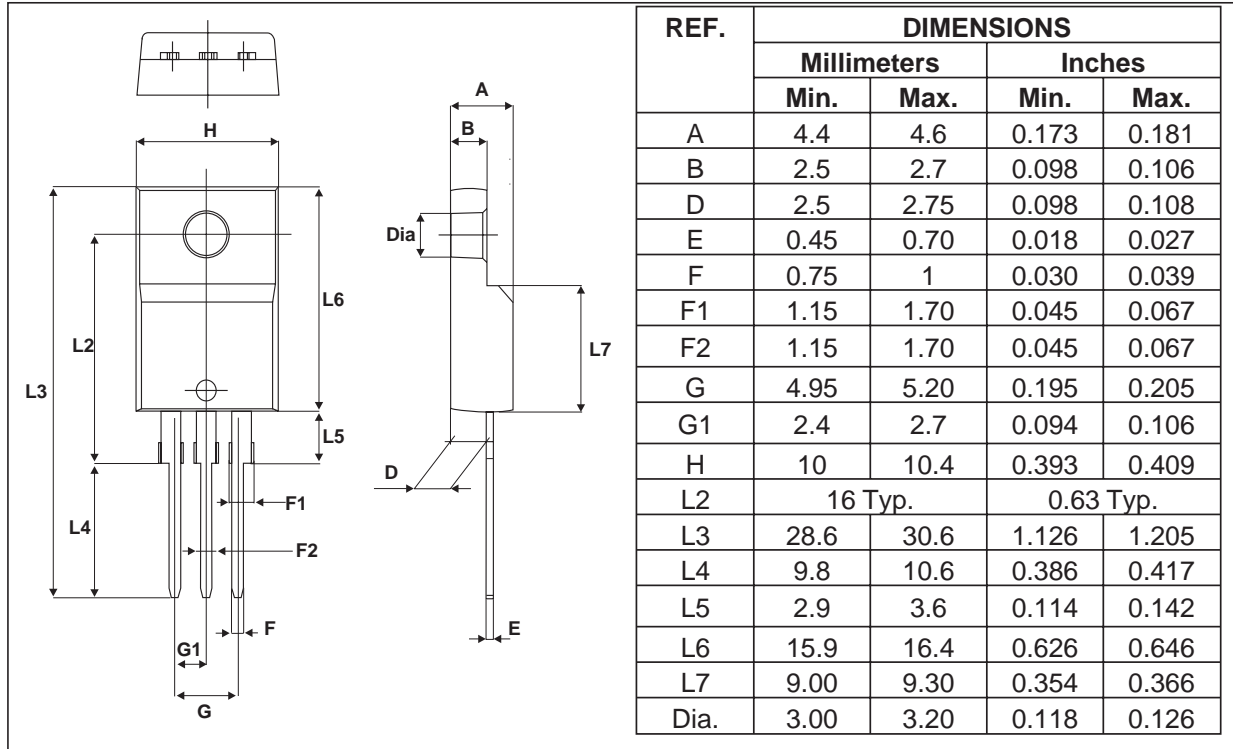


**PACKAGE MECHANICAL DATA**  
SOT-93





**PACKAGE MECHANICAL DATA**  
TO-220FPAB



Type	Marking	Package	Weight	Base qty	Delivery mode
STPS3045CT	STPS3045CT	TO-220AB	2.23 g.	50	Tube
STPS3045CG	STPS3045CG	D <sup>2</sup> PAK	1.48 g.	50	Tube
STPS3045CG-TR	STPS3045CG	D <sup>2</sup> PAK	1.48 g.	1000	Tape & reel
STPS3045CR	STPS3045CR	I <sup>2</sup> PAK	1.48 g.	50	Tube
STPS3045CP	STPS3045CP	SOT-93	3.97 g.	30	Tube
STPS3045CPI	STPS3045CPI	TOP-3I	4.46 g.	120	Bulk
STPS3045CW	STPS3045CW	TO-247	4.46 g.	30	Tube
STPS3045CFP	STPS3045CFP	TO-220FPAB	2.0 g.	50	Tube

- Cooling method: by conduction (C)
- Recommended torque value (SOT-93, TOP-3I, TO-247): 0.8 N.m.
- Recommended torque value (TO-220AB): 0.55 N.m.
- Maximum torque value (SOT-93, TOP-3I, TO-247): 1.0 N.m.
- Maximum torque value (TO-220AB): 0.7 N.m.

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