



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

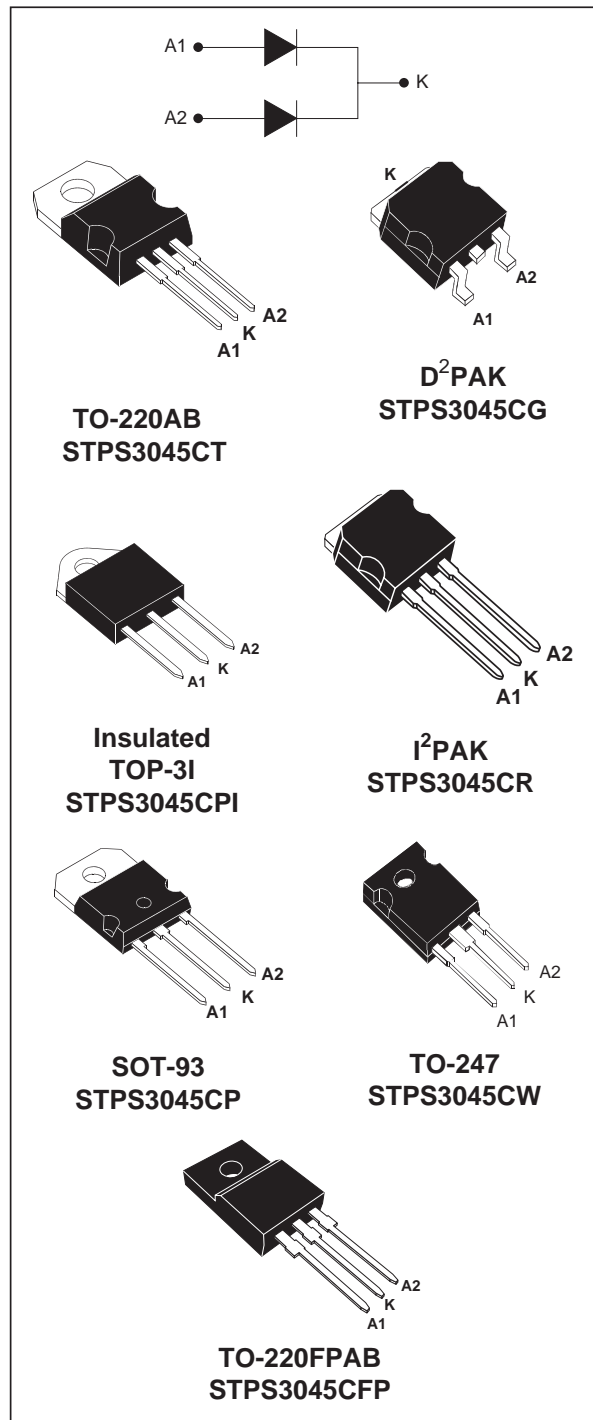
FEATURES AND BENEFITS

- 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, D²PAK, I²PAK, 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.



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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 δ = 0.5	TO-220AB / D ² PAK / I ² PAK / SOT-93 / TO-247	T _c = 155°C	Per diode Per device	15 30	A
		TO-220FPAB	T _c = 130°C			
		TOP-3I	T _c = 150°C			
I _{FSM}	Surge non repetitive forward current		t _p = 10 ms sinusoidal	220	A	
I _{RRM}	Repetitive peak reverse current		t _p = 2 μs square F = 1kHz	1	A	
I _{RSM}	Non repetitive peak reverse current		t _p = 100 μs square	3	A	
P _{ARM}	Repetitive peak avalanche power		t _p = 1μs T _j = 25°C	6000	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

THERMAL RESISTANCES

Symbol	Parameter			Value	Unit
R _{th(j-c)}	Junction to case	TO-220AB / D ² PAK / I ² 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 _{th(c)}		TO-220AB / D ² PAK / I ² 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 _R *	Reverse leakage current	T _j = 25°C	V _R = V _{RRM}			200	μA
		T _j = 125°C			11	40	mA
V _F *	Forward voltage drop	T _j = 125°C	I _F = 15 A		0.5	0.57	V
		T _j = 25°C	I _F = 30 A			0.84	
		T _j = 125°C	I _F = 30 A		0.65	0.72	

Pulse test : * t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation :

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

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

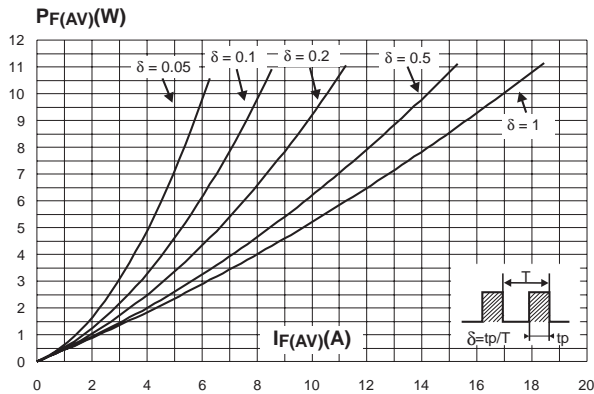


Fig. 2: Average current versus ambient temperature ($\delta = 0.5$, per diode).

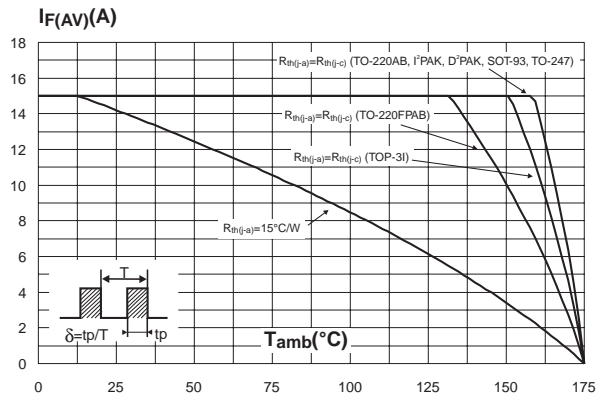


Fig. 3: Normalized avalanche power derating versus pulse duration.

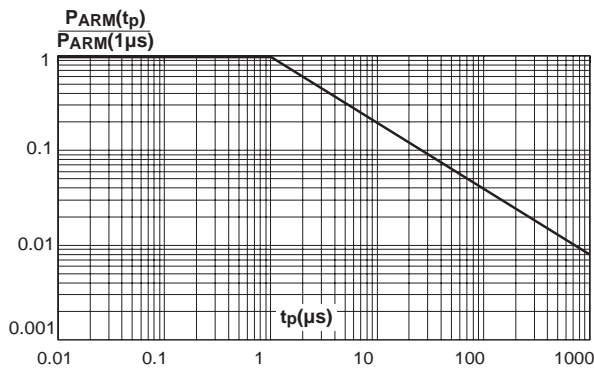


Fig. 4: Normalized avalanche power derating versus junction temperature.

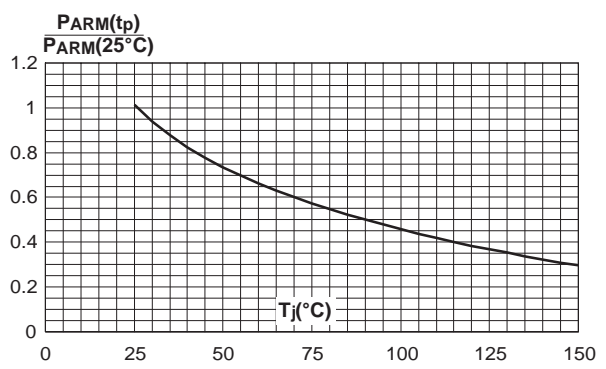


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values, per diode).

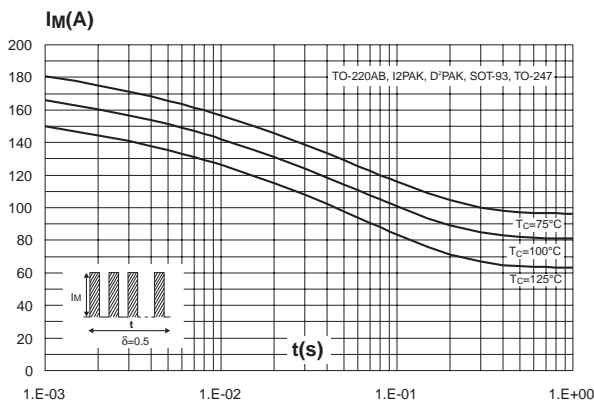


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values, per diode).

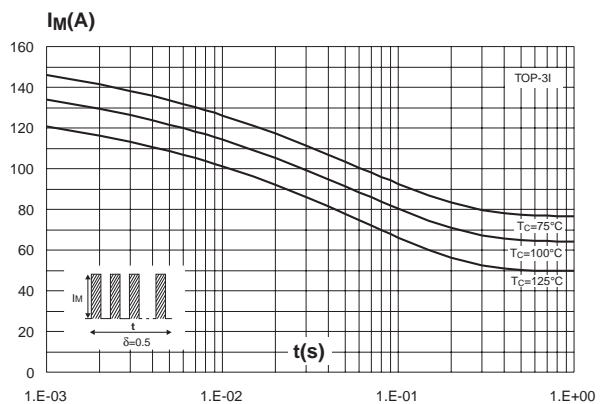


Fig. 5-3: Non repetitive surge peak forward current versus overload duration (maximum values, per diode).

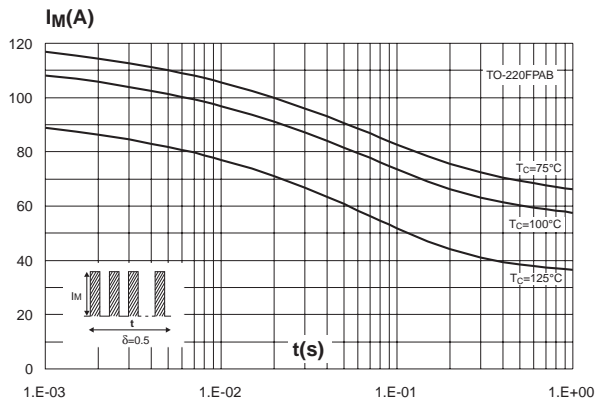


Fig. 6-1: Relative variation of thermal transient impedance junction to case versus pulse duration.

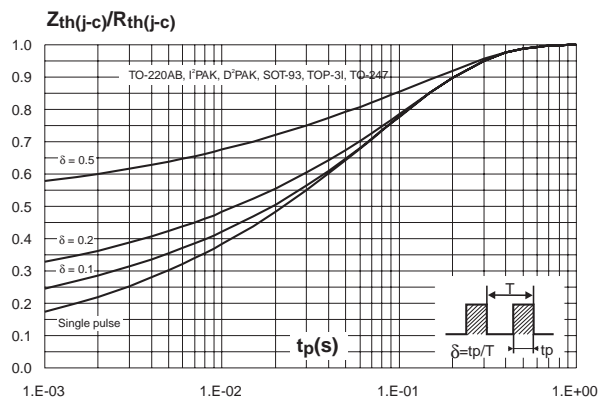


Fig. 6-2: Relative variation of thermal transient impedance junction to case versus pulse duration.

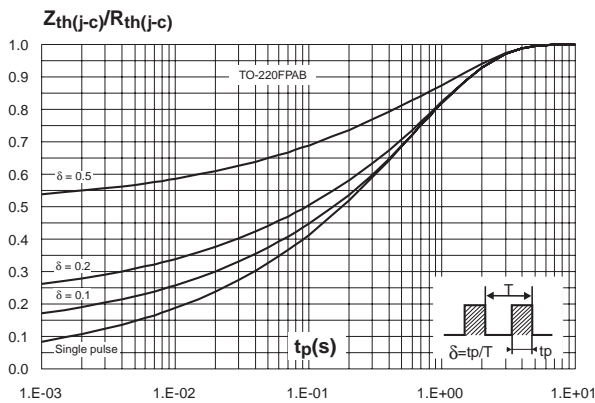


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values, per diode).

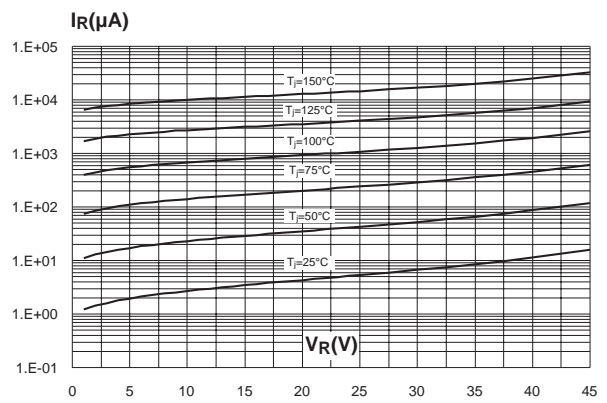


Fig. 8: Junction capacitance versus reverse voltage applied (typical values, per diode).

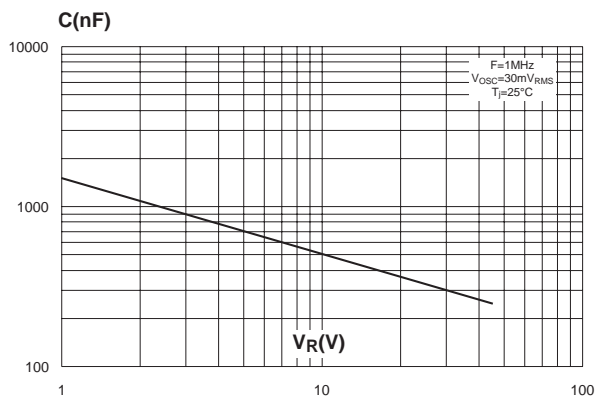


Fig. 9: Forward voltage drop versus forward current (maximum values, per diode).

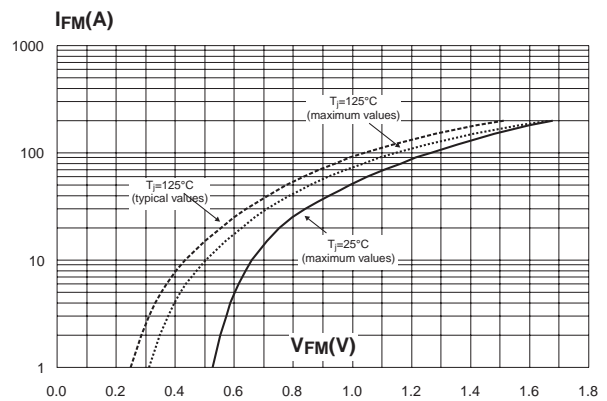
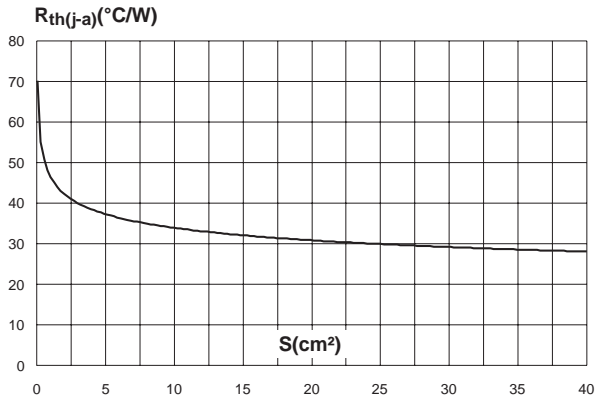
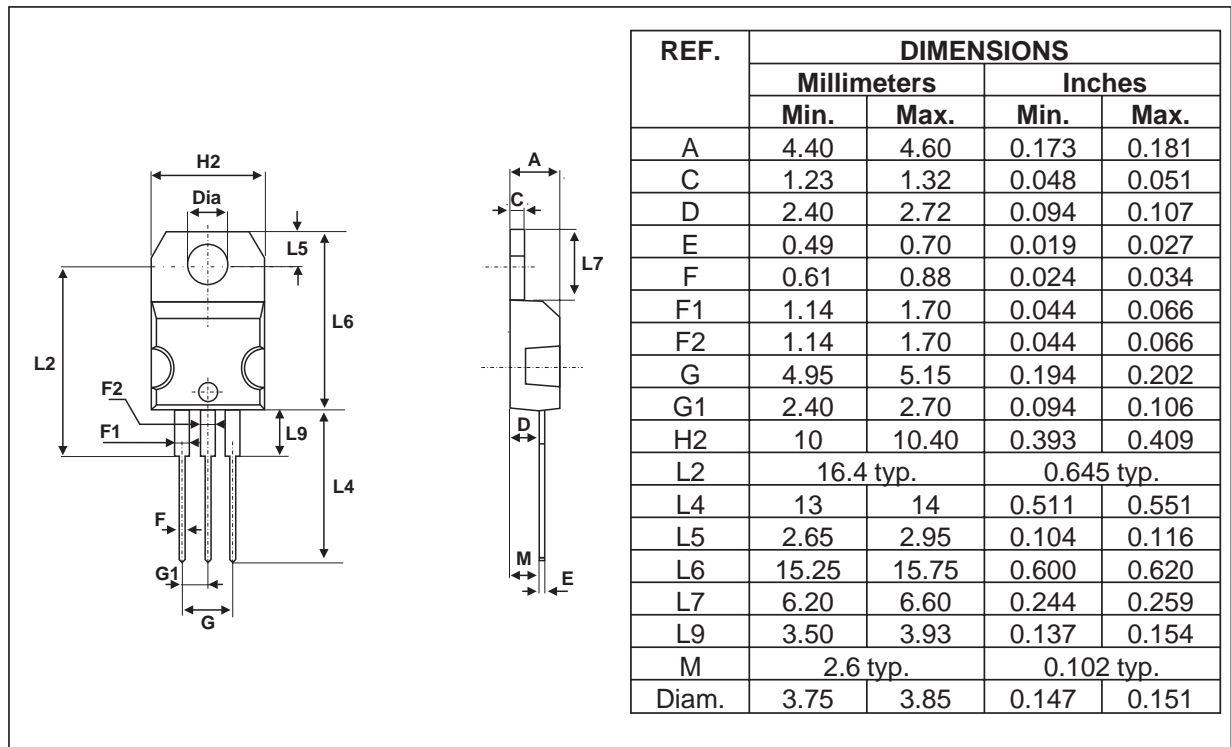


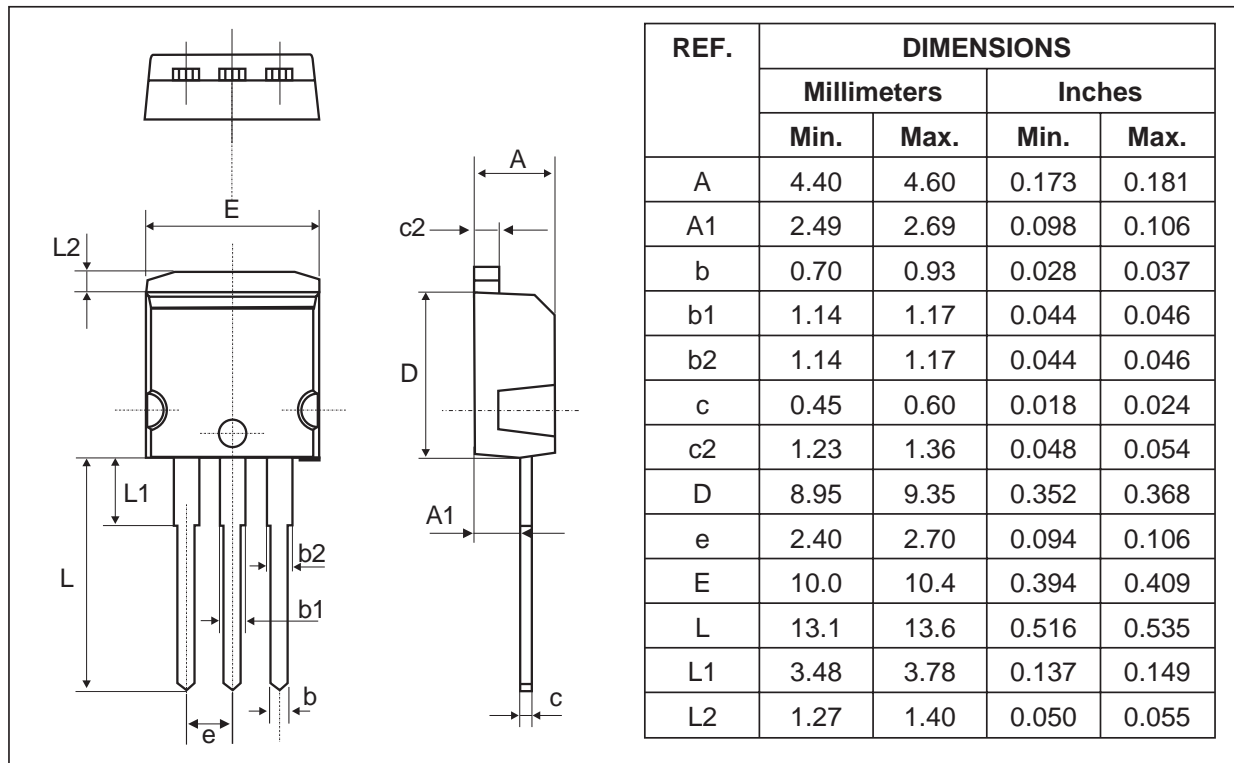
Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu=35µm).



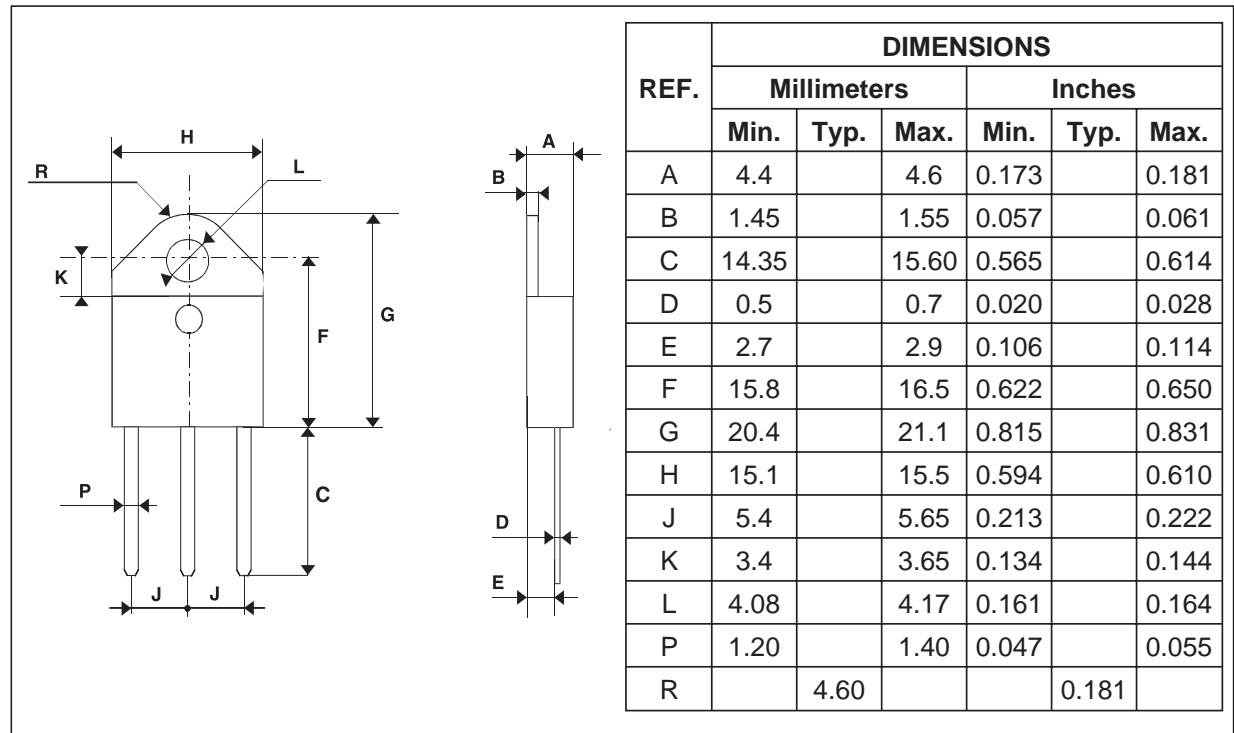
PACKAGE MECHANICAL DATA
TO-220AB



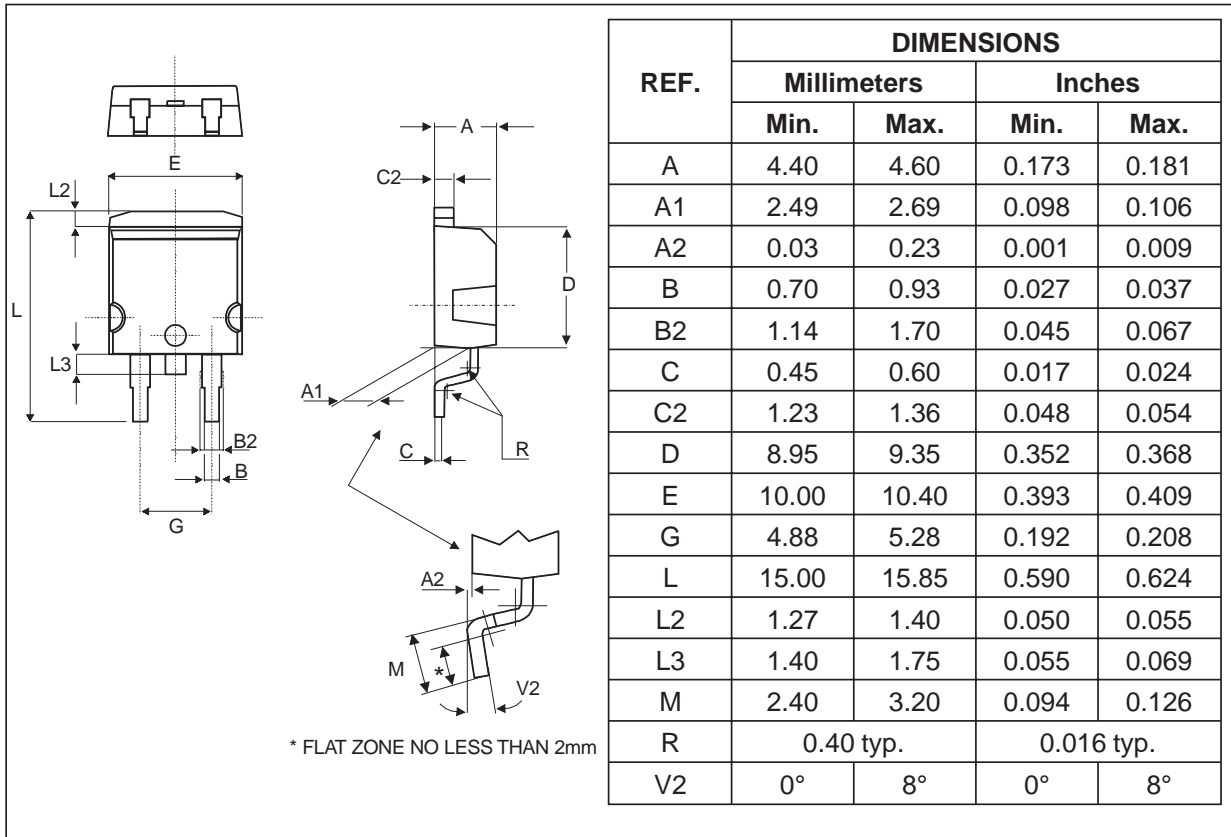
PACKAGE MECHANICAL DATA
I²PAK



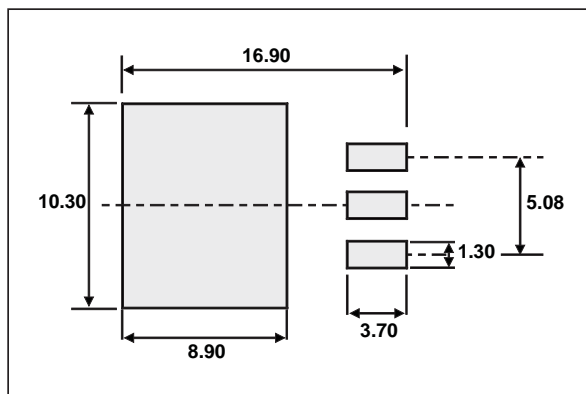
PACKAGE MECHANICAL DATA
TOP-3I (isolated)



PACKAGE MECHANICAL DATA
D²PAK

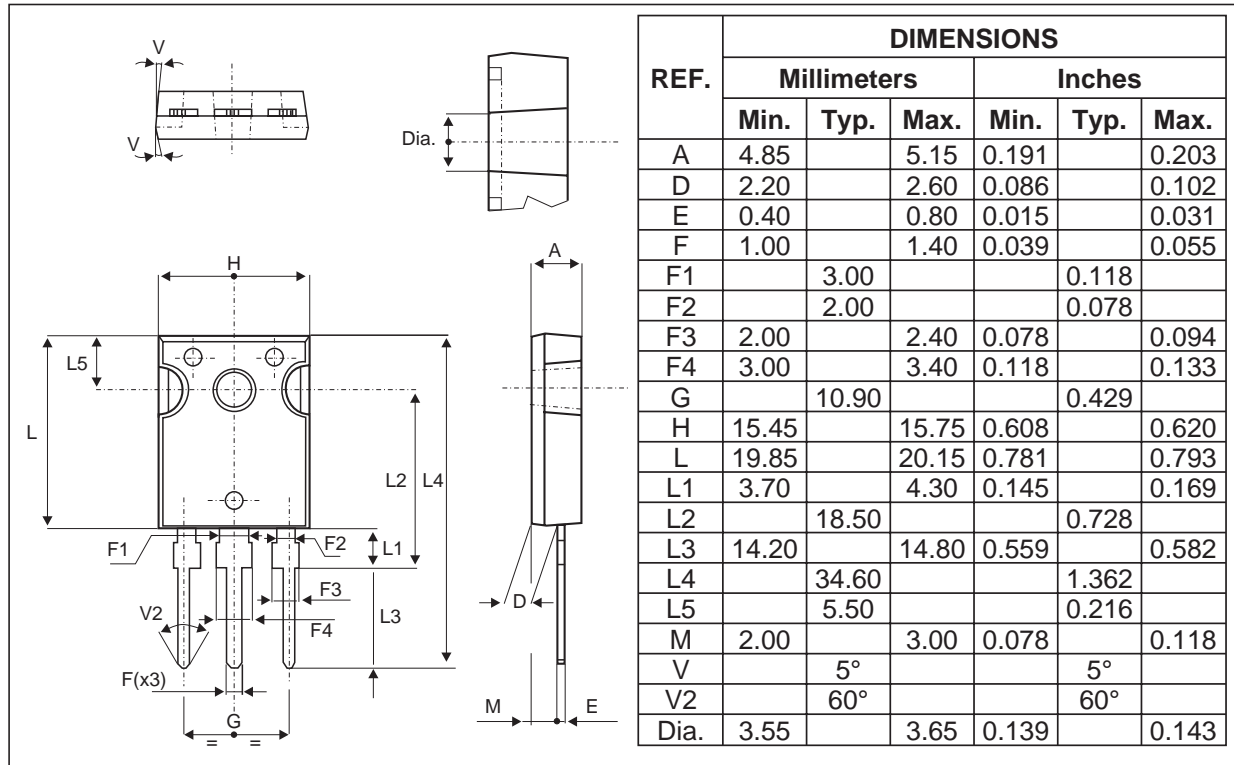


FOOTPRINT DIMENSIONS (in millimeters)

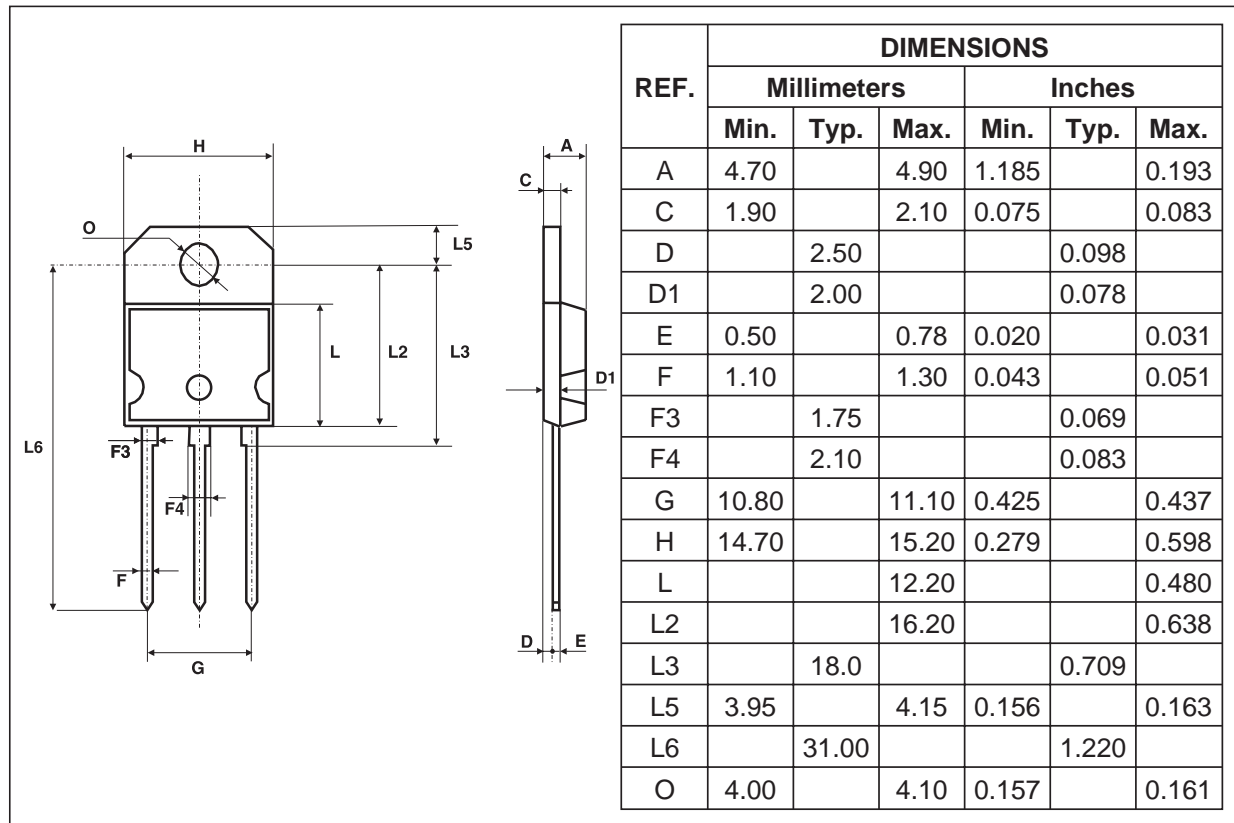


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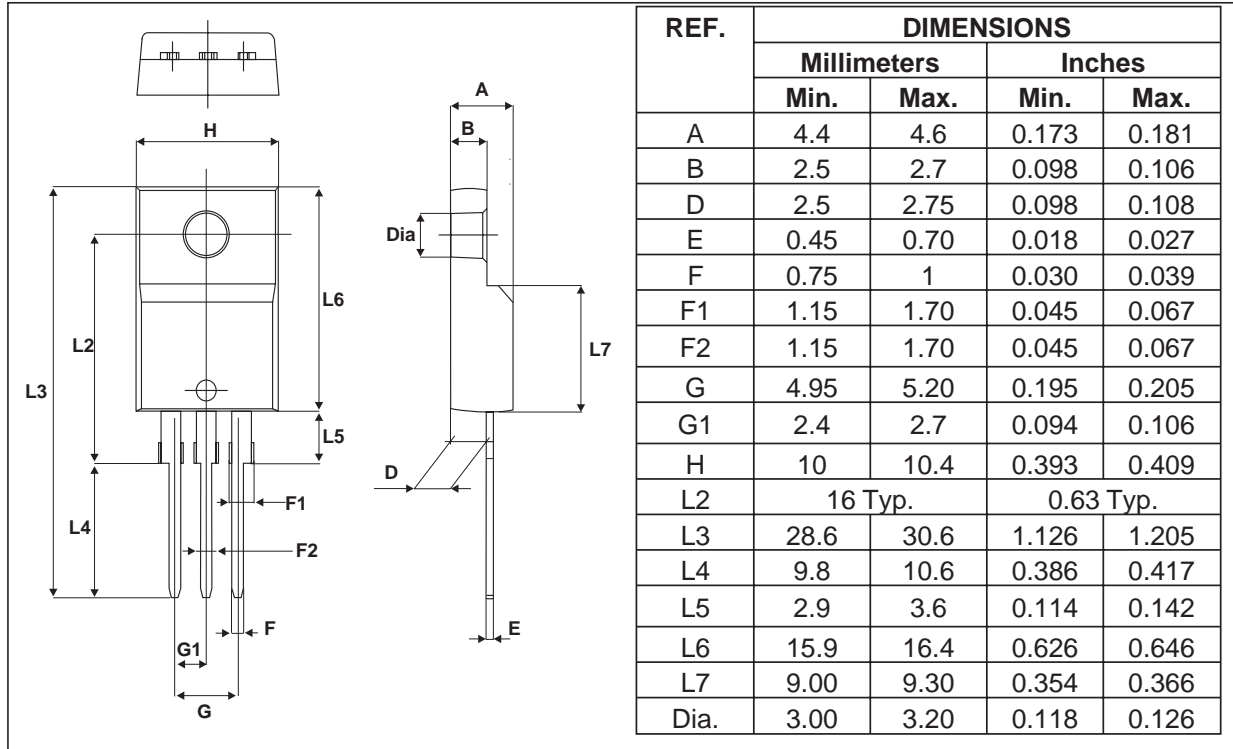
PACKAGE MECHANICAL DATA
TO-247



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 ² PAK	1.48 g.	50	Tube
STPS3045CG-TR	STPS3045CG	D ² PAK	1.48 g.	1000	Tape & reel
STPS3045CR	STPS3045CR	I ² 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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