

HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	Up to 2 x 15A
V_{RRM}	200 V
T_j (max)	175 °C
V_F (typ)	0.78 V
t_{rr} (typ)	22 ns

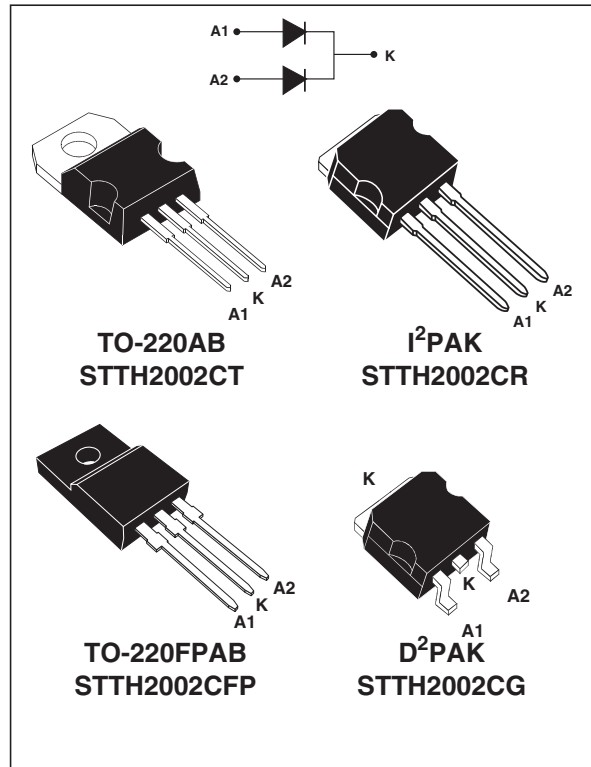
FEATURES AND BENEFITS

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- Low leakage current
- High junction temperature
- Insulated package: TO-220FPAB

DESCRIPTION

Dual center tap rectifier suited for Switch Mode Power Supplies and High frequency DC to DC converters.

Packaged in TO-220AB, D²PAK, TO-220FPAB and I²PAK, 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		200	V			
$I_{F(RMS)}$	RMS forward current		30	A			
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB / I ² PAK / D ² PAK	Tc = 150°C	Per diode	10	A	
			Tc = 140°C	Per device	20		
			Tc = 130°C	Per diode	15		
			Tc = 115°C	Per device	30		
		TO-220FPAB		Tc = 120°C	Per diode		10
				Tc = 95°C	Per device		20
I_{FSM}	Surge non repetitive forward current		tp = 10 ms Sinusoidal	90	A		
T_{stg}	Storage temperature range		- 65 + 175		°C		
T_j	Maximum operating junction temperature		175		°C		

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THERMAL PARAMETERS

Symbol	Parameter		Maximum	Unit	
$R_{th(j-c)}$	Junction to case	TO-220AB / I ² PAK / D ² PAK	Per diode	2.5	°C/W
			Per device	1.6	
		TO-220FPAB	Per diode	5	
			Per device	3.8	
$R_{th(j-c)}$	Coupling	TO-220AB / I ² PAK / D ² PAK	0.7	°C/W	
		TO-220FPAB	2.5		

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P(\text{diode1}) \times R_{th(j-c)} (\text{per diode}) + P(\text{diode2}) \times R_{th(c)}$$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			10	μA
		$T_j = 125^\circ\text{C}$			6	100	
V_F^{**}	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 10 \text{ A}$			1.1	V
		$T_j = 25^\circ\text{C}$	$I_F = 20 \text{ A}$			1.25	
		$T_j = 150^\circ\text{C}$	$I_F = 10 \text{ A}$		0.78	0.89	
		$T_j = 150^\circ\text{C}$	$I_F = 20 \text{ A}$			1.05	

Pulse test: * $t_p = 5\text{ms}$, $\delta < 2\%$

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

To evaluate the maximum conduction losses use the following equation :

$$P = 0.73 \times I_{F(AV)} + 0.016 I_{F(RMS)}^2$$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 1 \text{ A}$ $V_R = 30\text{V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$		22	27	ns
I_{RM}	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 10 \text{ A}$ $V_R = 160\text{V}$ $di_F/dt = 200 \text{ A}/\mu\text{s}$		7.0	9.0	A
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 10 \text{ A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			200	ns
V_{FP}	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 10 \text{ A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$		2.4		V

Fig. 1: Peak current versus duty cycle (per diode).

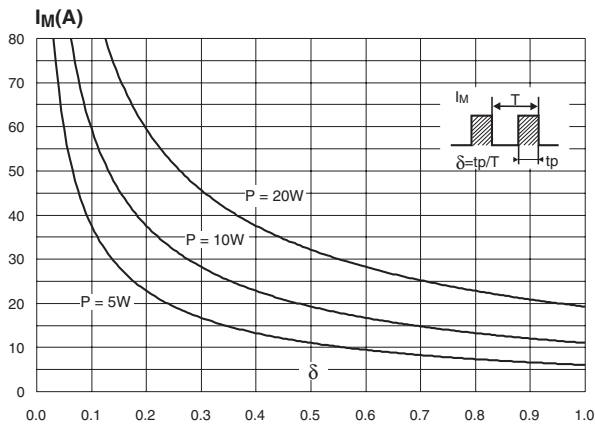


Fig. 2-1: Forward voltage drop versus forward current (typical values, per diode).

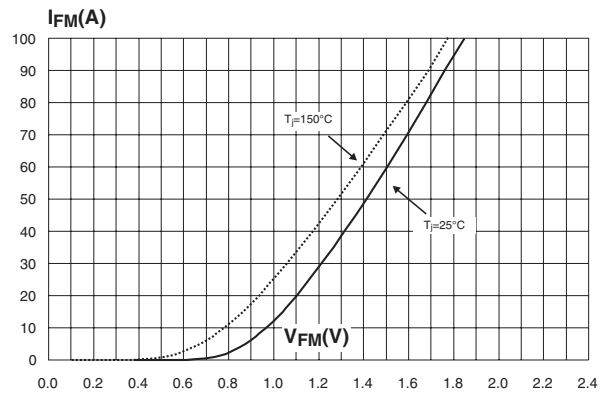


Fig. 2-2: Forward voltage drop versus forward current (maximum values, per diode).

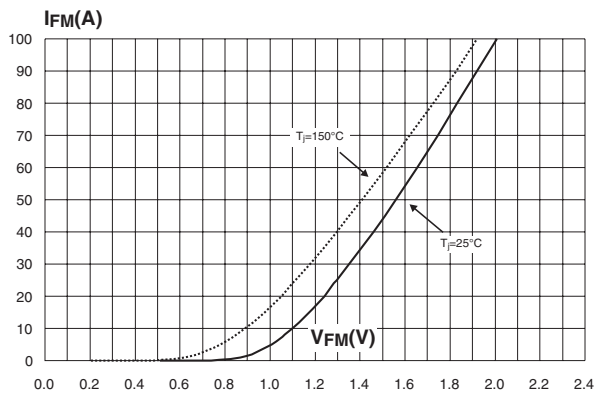


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, I²PAK, D²PAK).

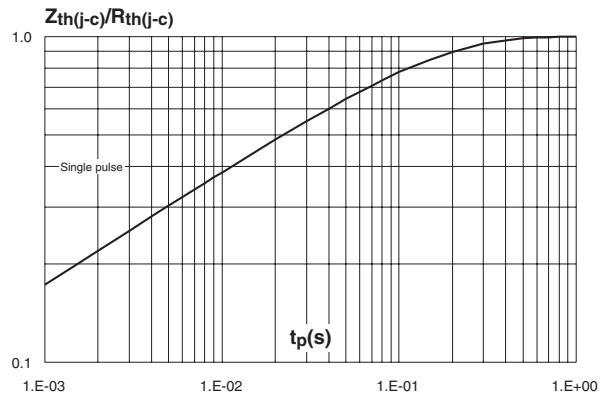


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB).

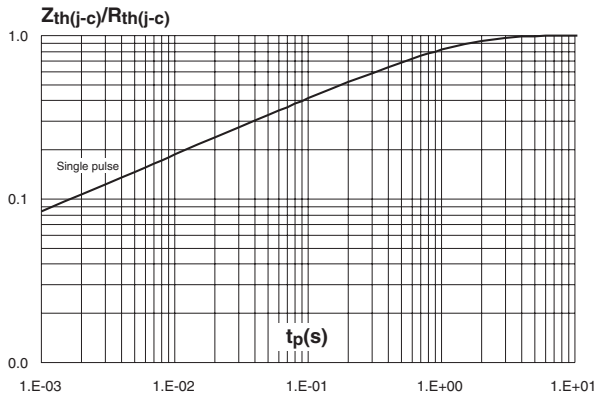


Fig. 4: Junction capacitance versus reverse voltage applied (typical values, per diode).

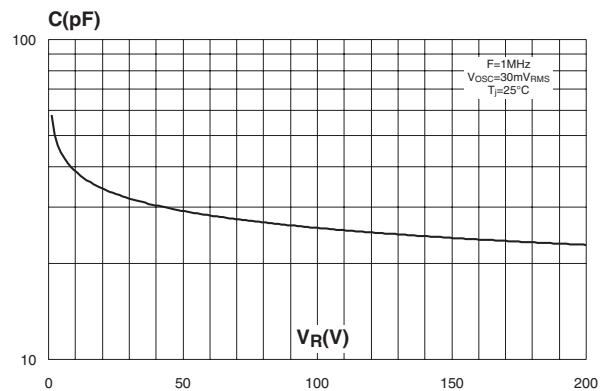


Fig. 5: Reverse recovery charges versus di_F/dt (typical values, per diode).

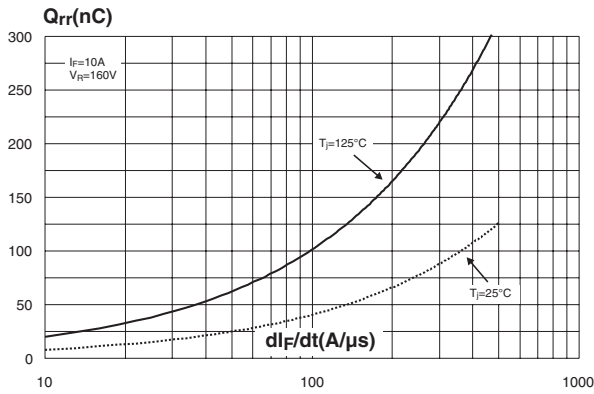


Fig. 6: Reverse recovery time versus di_F/dt (typical values, per diode).

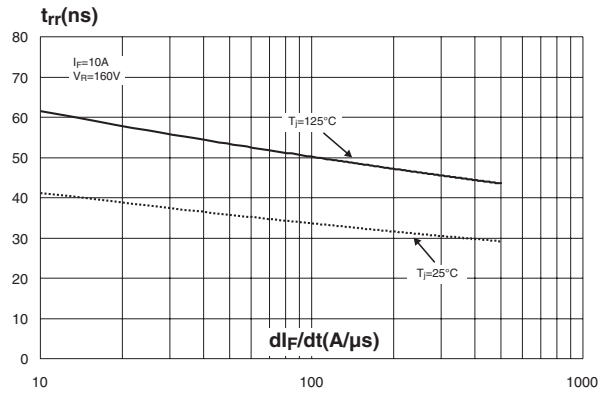


Fig. 7: Peak reverse recovery current versus di_F/dt (typical values, per diode).

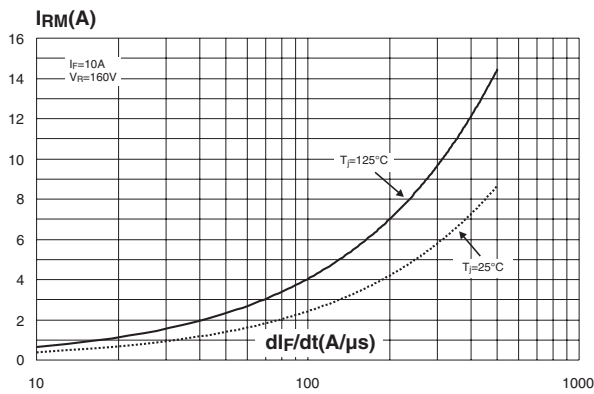


Fig. 8: Dynamic parameters versus junction temperature.

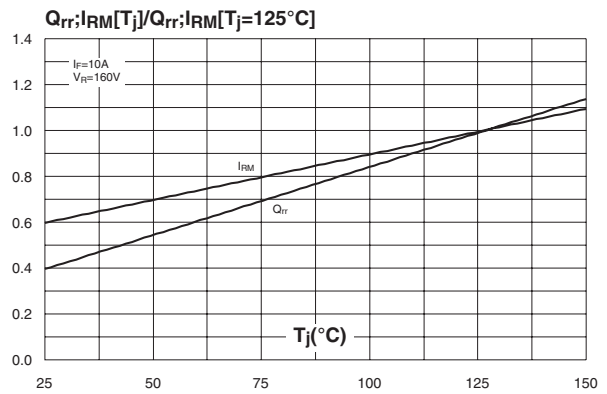
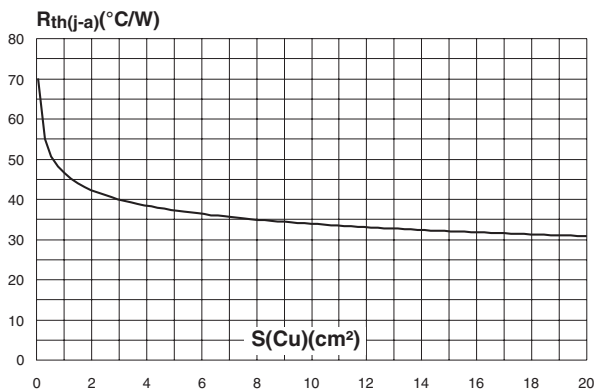


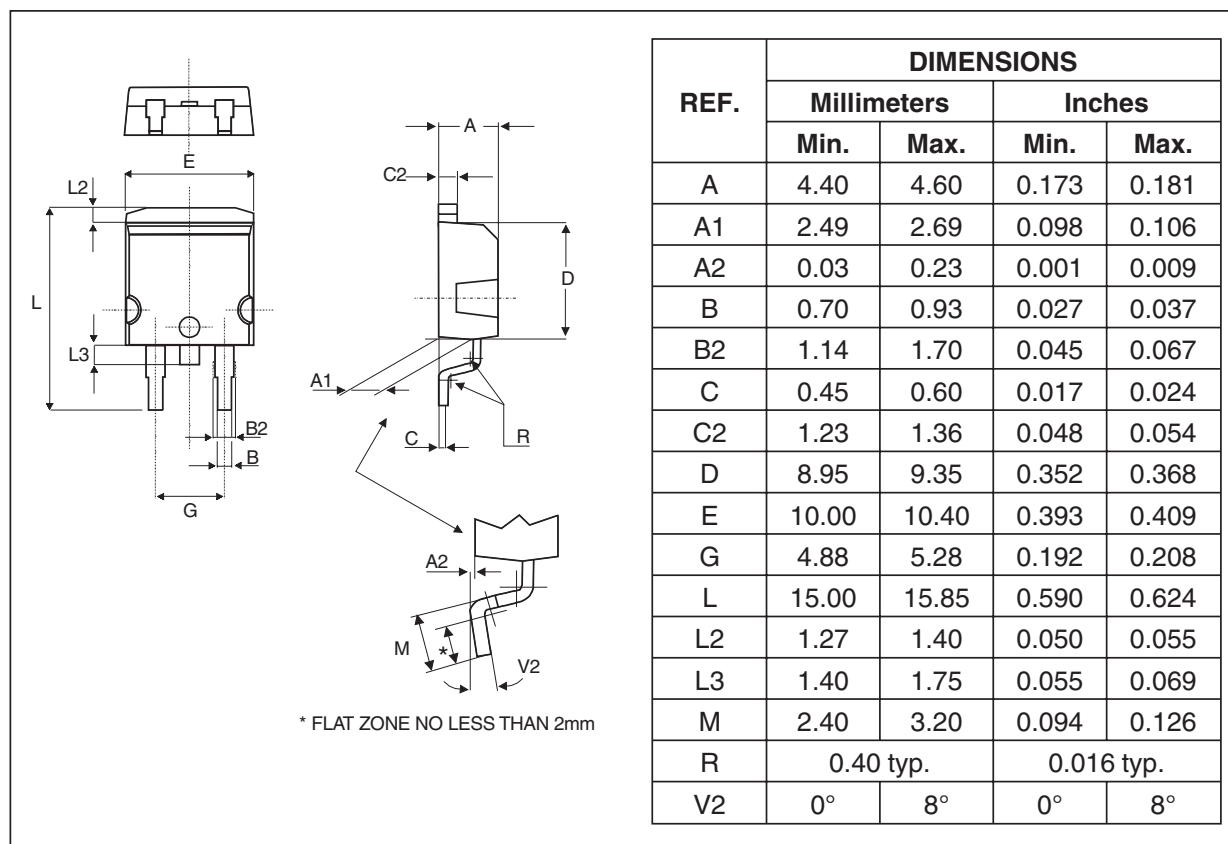
Fig. 9: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, ϵ_{cu} : 35 μ m) for D²PAK.



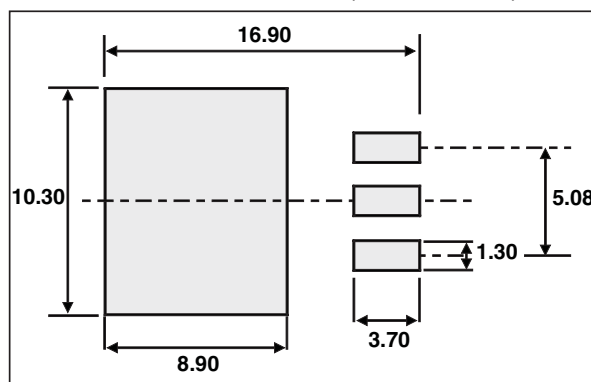
Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH2002CT	STTH2002CT	TO-220AB	2.23 g	50	Tube
STTH2002CG	STTH2002CG	D ² PAK	1.48 g	50	Tube
STTH2002CG-TR	STTH2002CG	D ² PAK	1.48 g	1000	Tape & reel
STTH2002CR	STTH2002CR	I ² PAK	1.49 g	50	Tube
STTH2002CFP	STTH2002CFP	TO-220FPAB	1.70g	50	Tube

PACKAGE MECHANICAL DATA

D²PAK

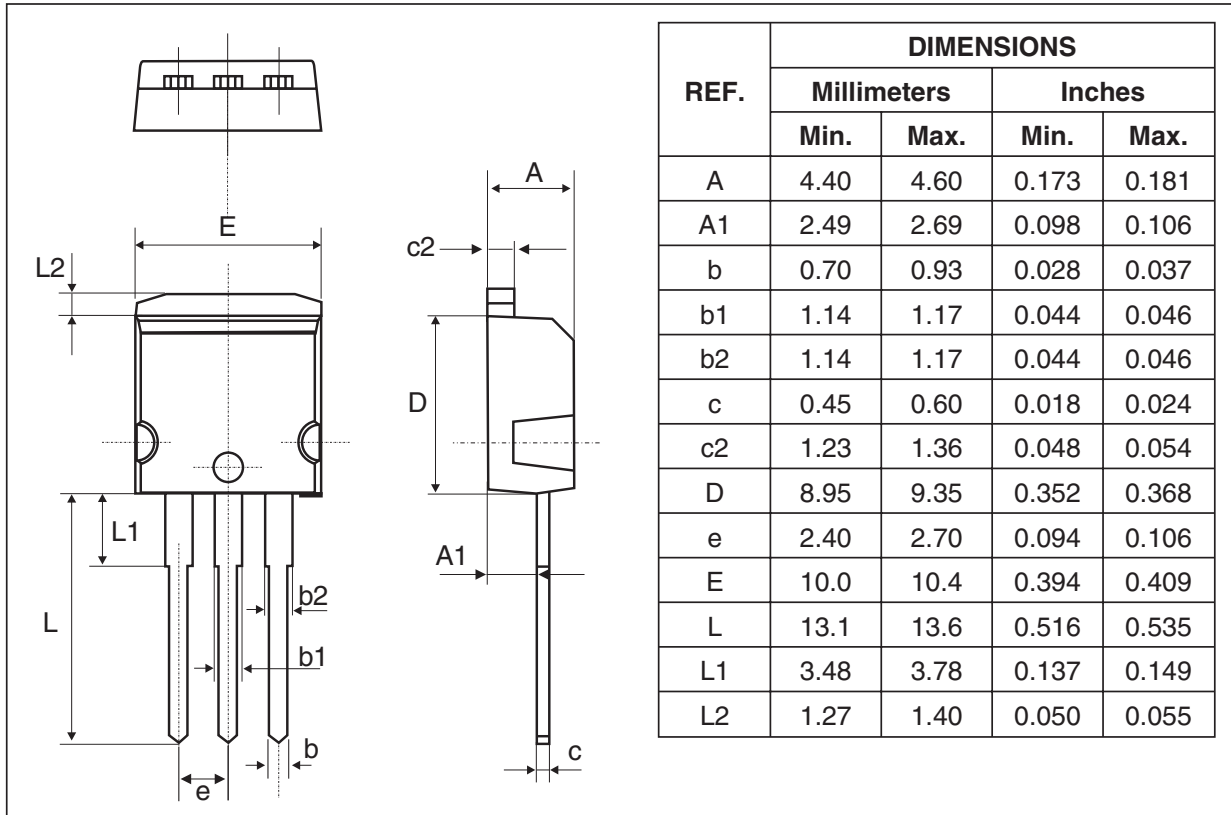


FOOTPRINT DIMENSIONS (in millimeters)

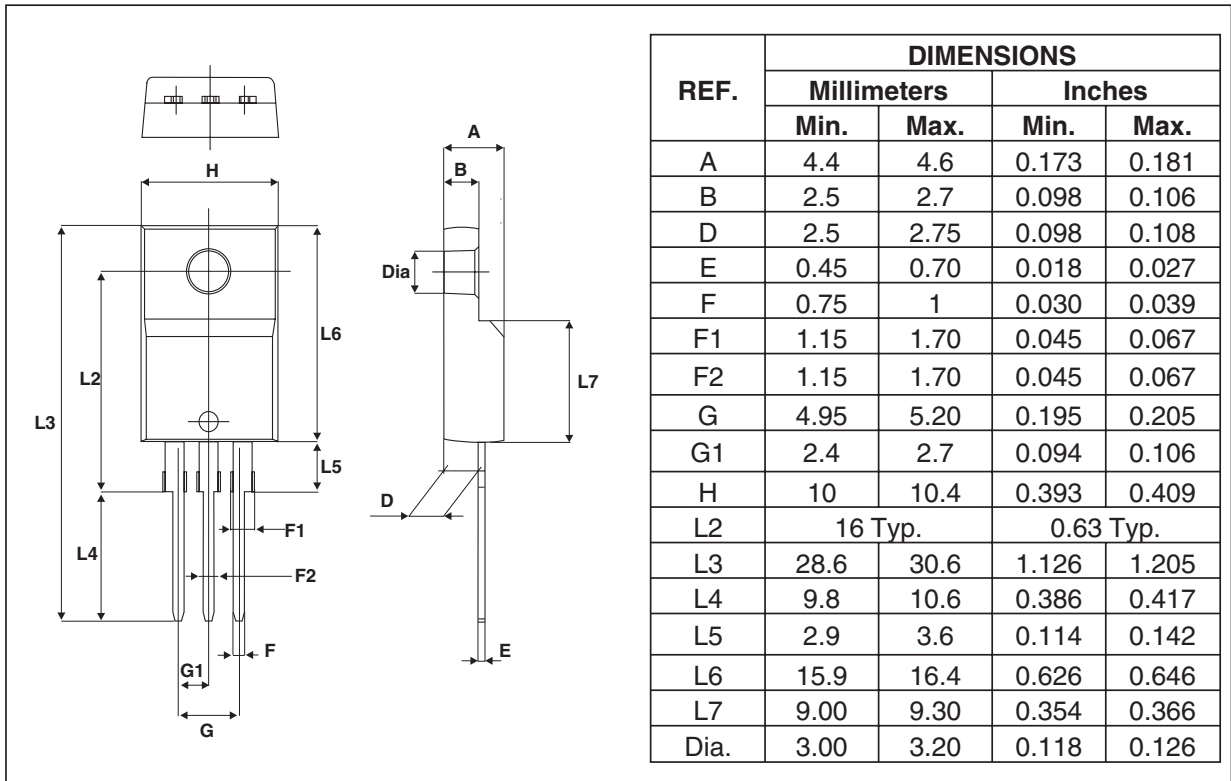


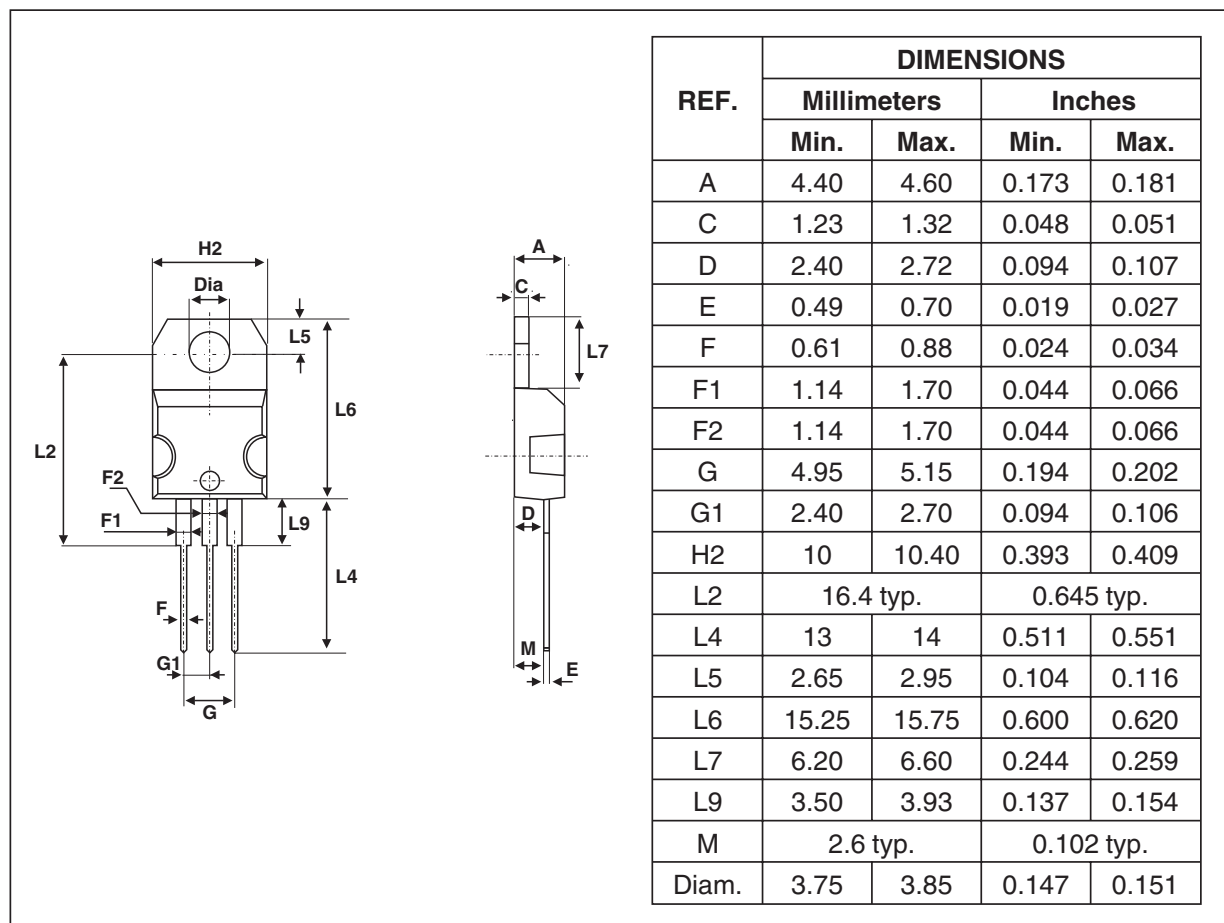
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PACKAGE MECHANICAL DATA
I²PAK



PACKAGE MECHANICAL DATA
TO-220FPAB



PACKAGE MECHANICAL DATA
TO-220AB


- Epoxy meets UL94,V0
- Cooling method: by conduction (method C)
- Recommended torque value (TO-220AB): 0.8 N.m.
- Maximum torque value (TO-220AB): 1.0 N.m.
- Recommended torque value (TO-220FPAB): 0.55 N.m.
- Maximum torque value (TO-220FPAB): 0.7 N.m.

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