

HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	Up to 2 x 8A
V_{RRM}	200 V
T_j (max)	175 °C
V_F (typ)	0.78 V
t_{rr} (typ)	20 ns

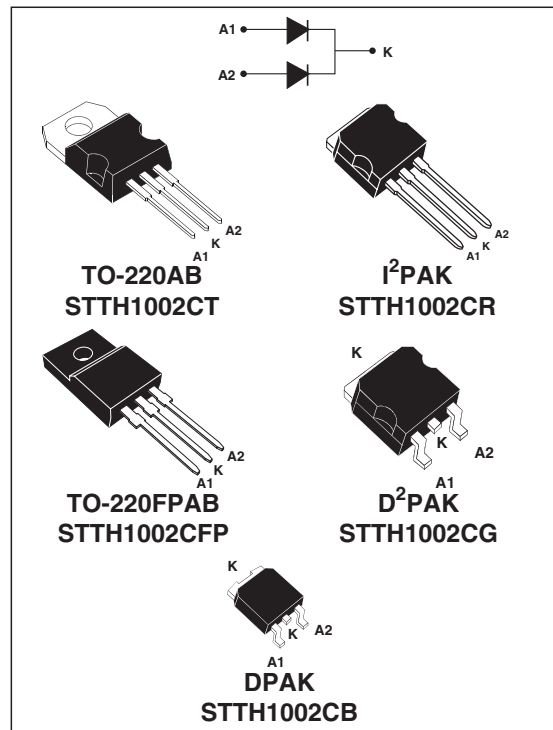
FEATURES AND BENEFITS

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

DESCRIPTION

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

Packaged in DPAK, D²PAK, TO-220AB, TO220-FPAB and I²PAK, this device is 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		200	V	
$I_{F(RMS)}$	RMS forward current	TO-220AB / TO-220FPAB / I ² PAK / D ² PAK /	20	A	
		DPAK	10		
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB / I ² PAK / D ² PAK / DPAK	$T_c = 155^\circ\text{C}$ Per diode	5	A
			$T_c = 150^\circ\text{C}$ Per device	10	
			$T_c = 135^\circ\text{C}$ Per diode	8	
			$T_c = 125^\circ\text{C}$ Per device	16	
		TO-220FPAB	$T_c = 140^\circ\text{C}$ Per diode	5	
			$T_c = 120^\circ\text{C}$ Per device	10	
			$T_c = 110^\circ\text{C}$ Per diode	8	
			$T_c = 75^\circ\text{C}$ Per device	16	
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal	50	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 / DPAK	Per diode	4.0	°C/W
			Per device	2.5	
	TO-220FPAB	Per diode	6.5		
		Per device	5		
$R_{th(j-c)}$	Coupling	TO-220AB / I ² PAK / D ² PAK / DPAK	1.0	°C/W	
		TO-220FPAB	3.5		

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	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			5	μA
		$T_j = 125^\circ\text{C}$			3	40	
V_F^{**}	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 5\text{ A}$			1.1	V
		$T_j = 25^\circ\text{C}$	$I_F = 10\text{ A}$			1.25	
		$T_j = 150^\circ\text{C}$	$I_F = 5\text{ A}$		0.78	0.89	
		$T_j = 150^\circ\text{C}$	$I_F = 10\text{ A}$			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 :

$$P = 0.73 \times I_{F(AV)} + 0.032 I_{F(RMS)}^2$$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$ $V_R = 30\text{V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$		20	25	ns
I_{RM}	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 5\text{ A}$ $V_R = 160\text{V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$		5.9	7.6	A
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 5\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			110	ns
V_{FP}	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 5\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$		2.4		V

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

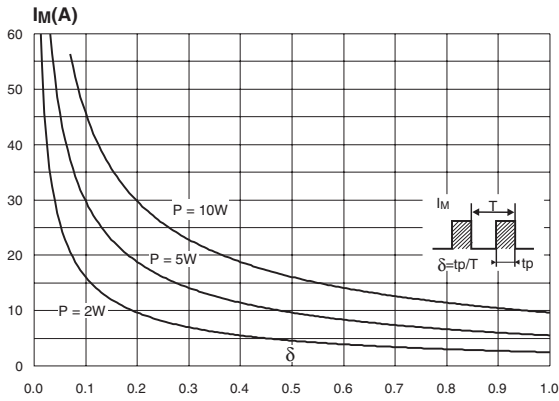


Fig. 2-1: Forward voltage drop versus forward current (typical values, per diode).

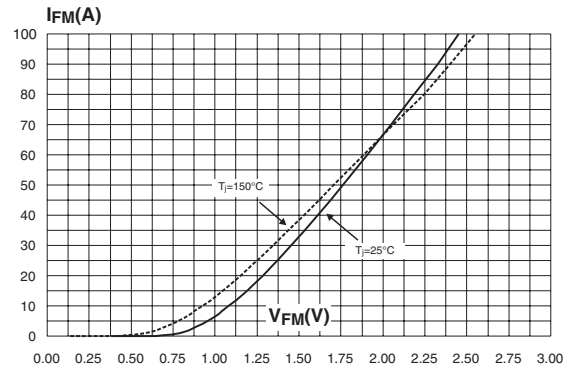


Fig. 2-2: Forward voltage drop versus forward current (maximum values, per diode).

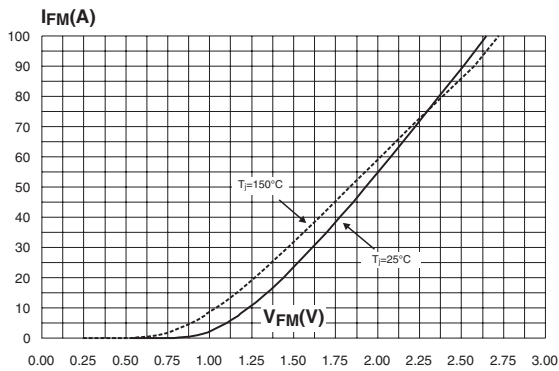


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, I²PAK, D²PAK, DPAK).

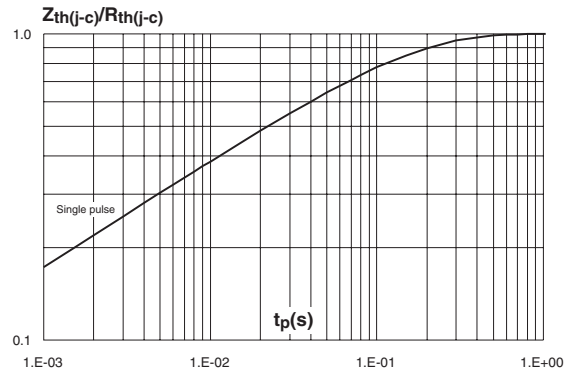


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB).

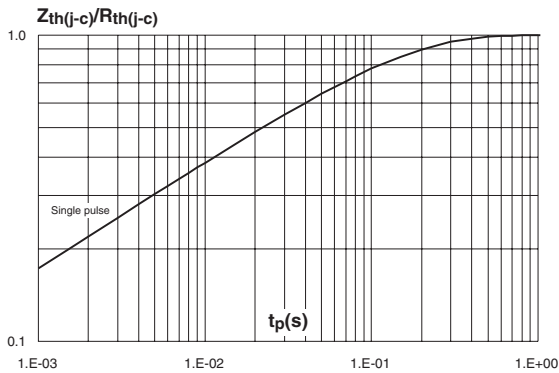


Fig. 4: Junction capacitance versus reverse voltage applied (typical values, per diode).

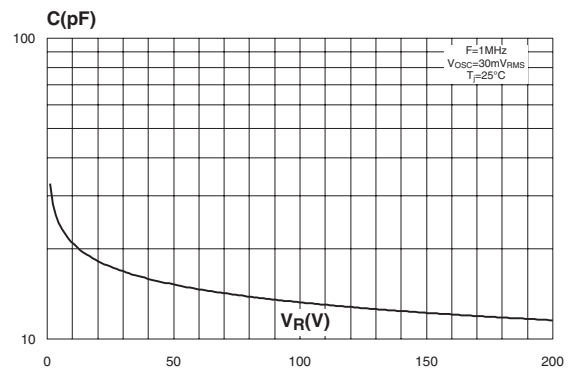


Fig. 5: Reverse recovery charges versus di_F/dt (typical values, per diode).

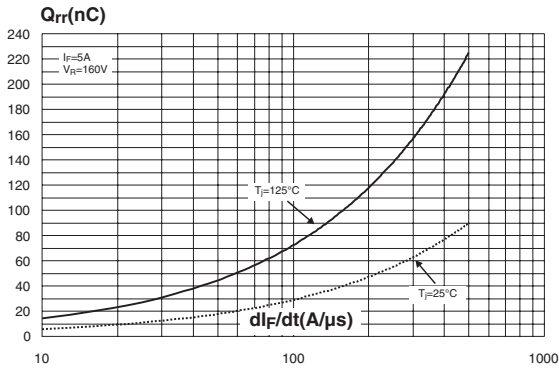


Fig. 6: Reverse recovery time versus di_F/dt (typical values, per diode).

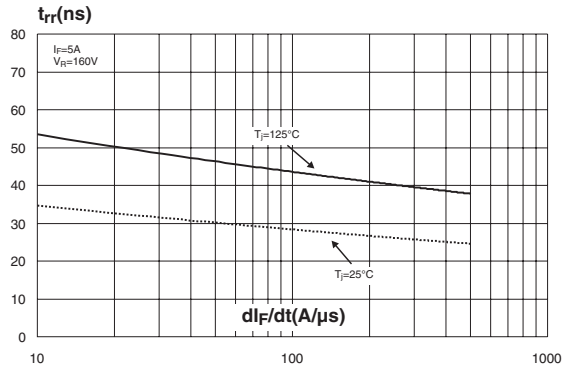


Fig. 7: Peak reverse recovery current versus di_F/dt (typical values, per diode).

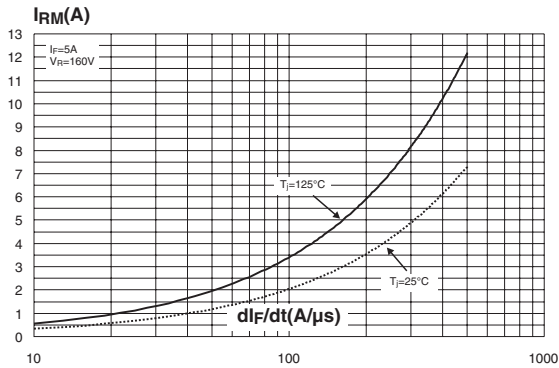


Fig. 8: Dynamic parameters versus junction temperature.

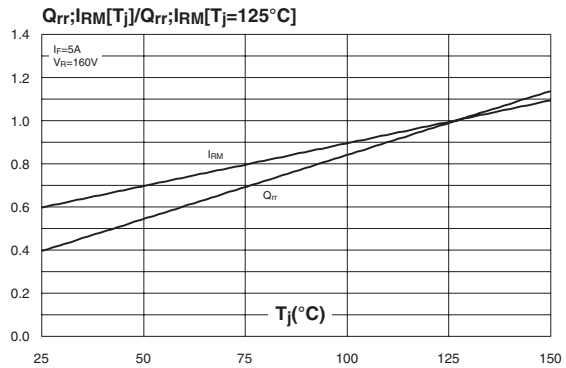


Fig. 9-1: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, e_{Cu} : 35 μ m) for D²PAK.

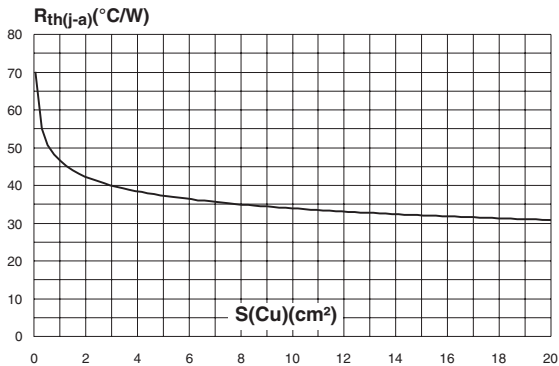
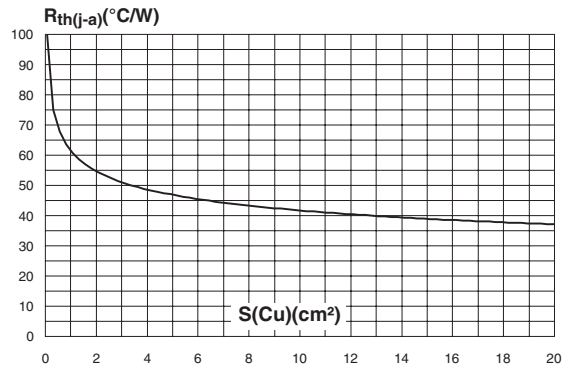
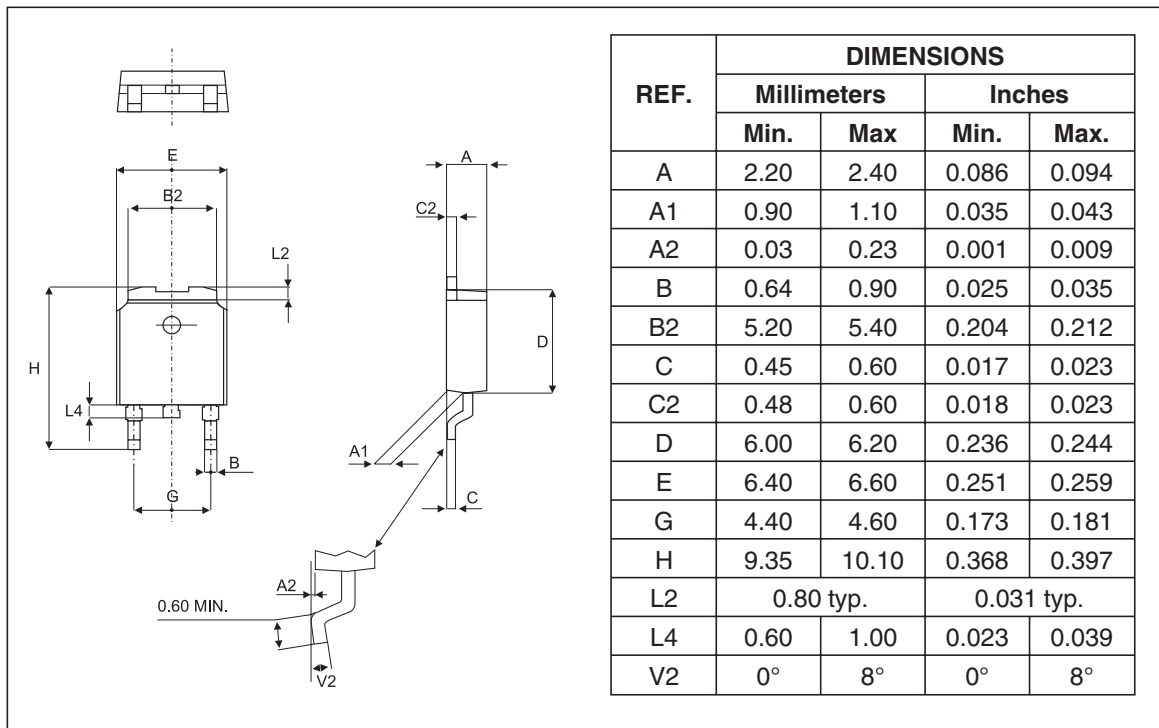


Fig. 9-2: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, e_{Cu} : 35 μ m) for DPAK.

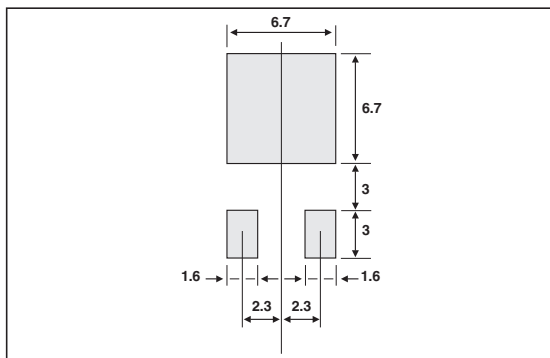


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1002CB	STTH1002CB	DPAK	0.3 g	75	Tube
STTH1002CB-TR	STTH1002CB	DPAK	0.3 g	2500	Tape & reel
STTH1002CT	STTH1002CT	TO-220AB	2.23 g	50	Tube
STTH1002CG	STTH1002CG	D ² PAK	1.48 g	50	Tube
STTH1002CG-TR	STTH1002CG	D ² PAK	1.48g	1000	Tape & reel
STTH1002CR	STTH1002CR	I ² PAK	1.49 g	50	Tube
STTH1002CFP	STTH1002CFP	TO-220FPAB	1.70 g	50	Tube

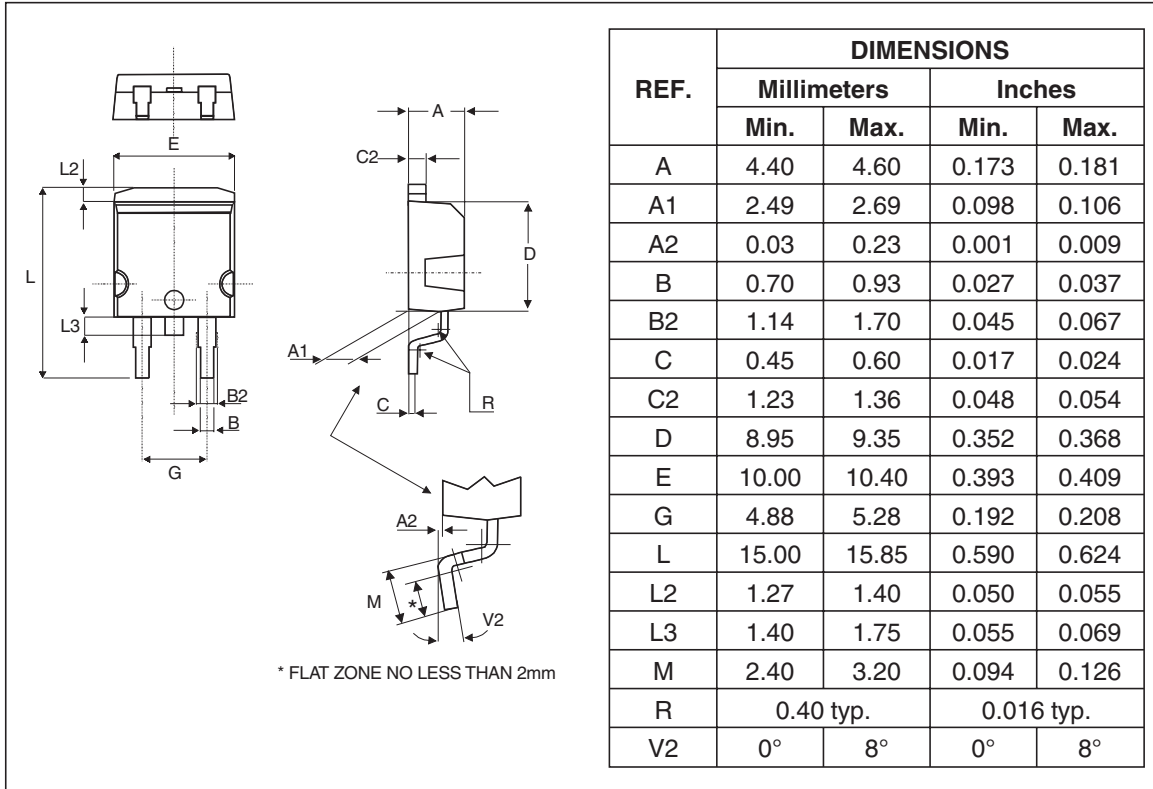
PACKAGE MECHANICAL DATA
DPAK



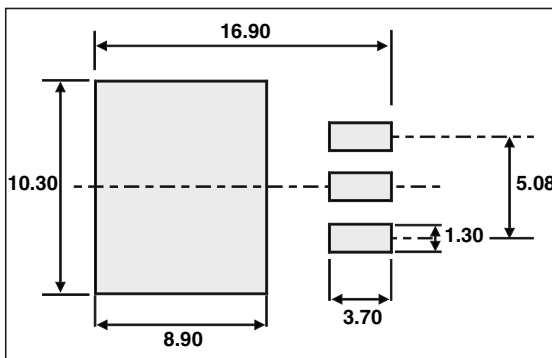
FOOTPRINT

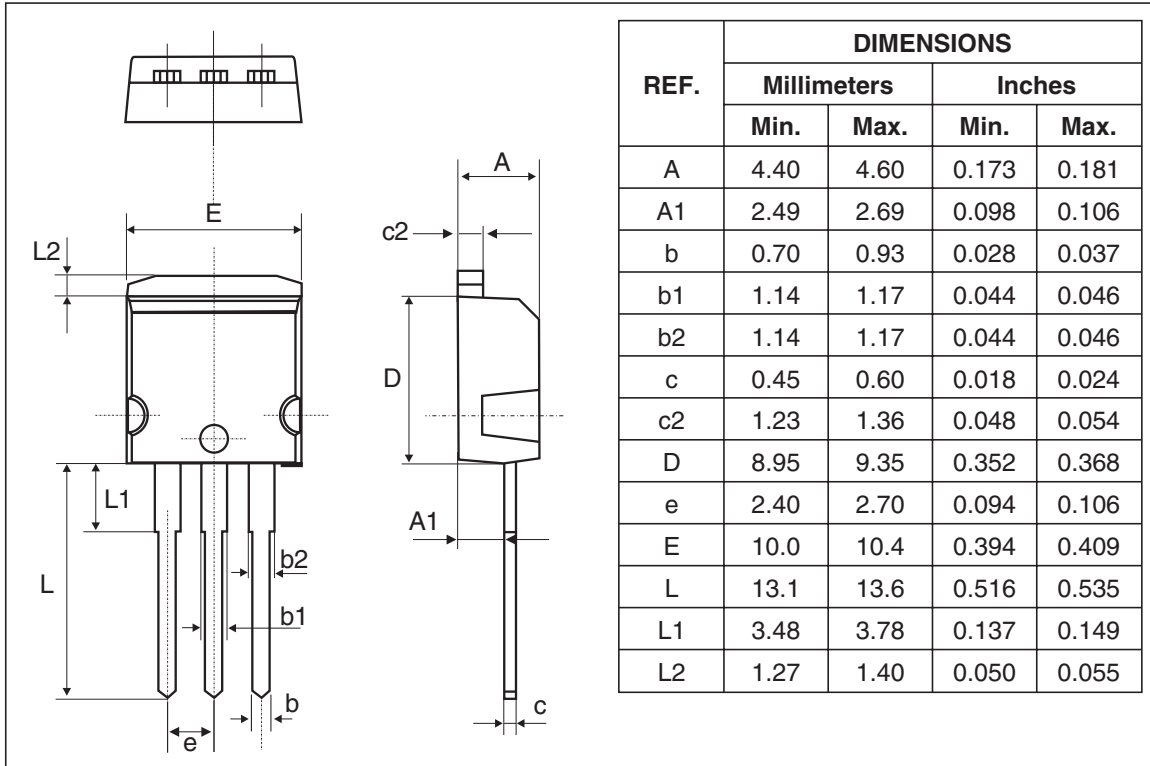
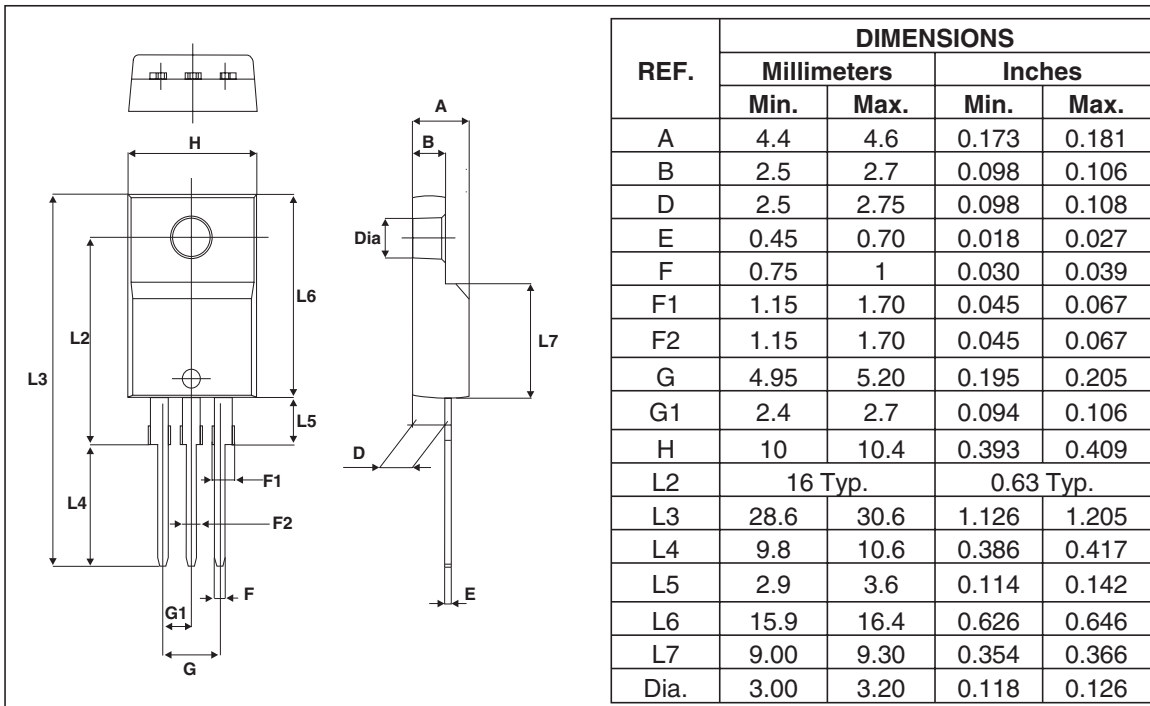


PACKAGE MECHANICAL DATA
D²PAK



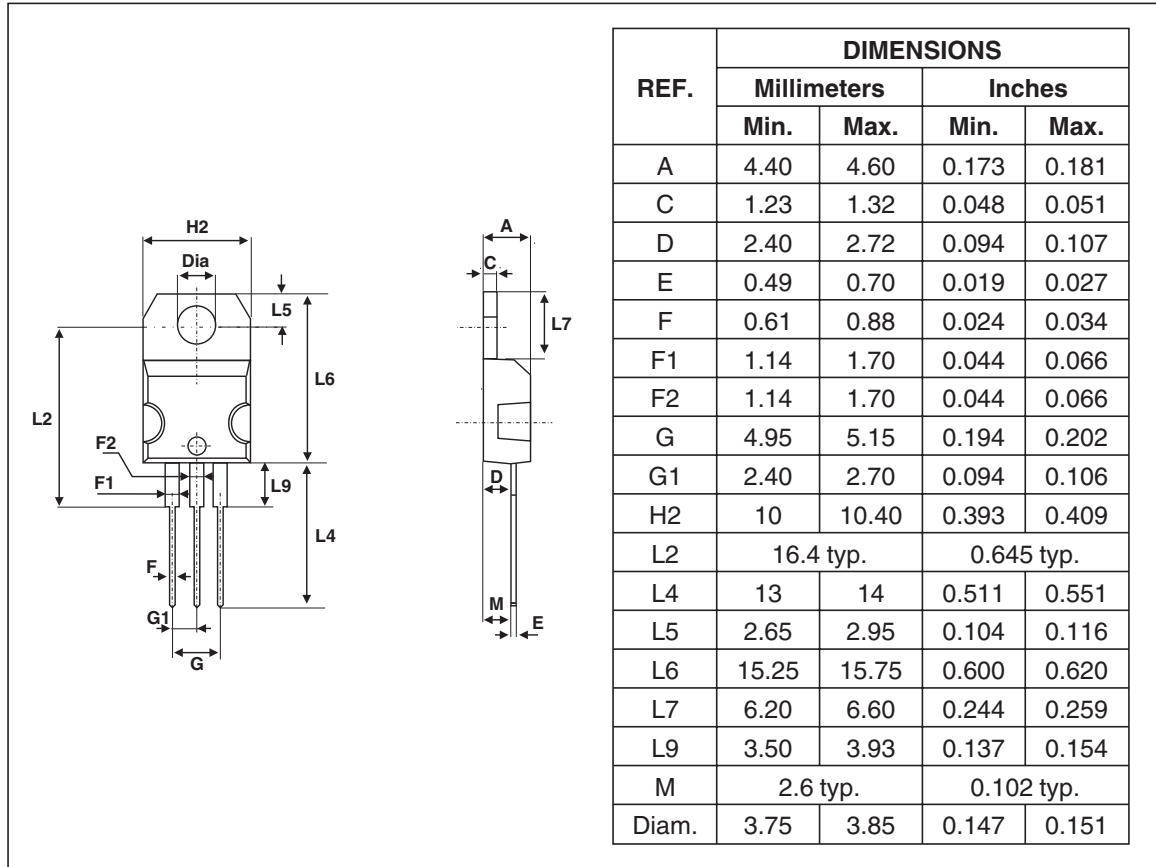
FOOTPRINT DIMENSIONS (in millimeters)



PACKAGE MECHANICAL DATA
I²PAK

PACKAGE MECHANICAL DATA
TO-220FPAB


STTH1002C

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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