

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	8 A
V_{RRM}	600 V
$I_{RM} (typ)$	5.5 A
T_j	175°C
$V_F (typ)$	1.4 V
$t_{rr} (max)$	25 ns

FEATURES AND BENEFITS

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses

DESCRIPTION

The STTH8R06, which is using ST Turbo 2 600V technology, is specially suited as boost diode in continuous mode power factor corrections and hard switching conditions.

Table 2: Order Codes

Part Number	Marking
STTH8R06D	STTH8R06D
STTH8R06FP	STTH8R06FP
STTH8R06R	STTH8R06R
STTH8R06G	STTH8R06G
STTH8R06G-TR	STTH8R06G
STTH8R06DI	STTH8R06DI
STTH8R06DIRG	STTH8R06DI

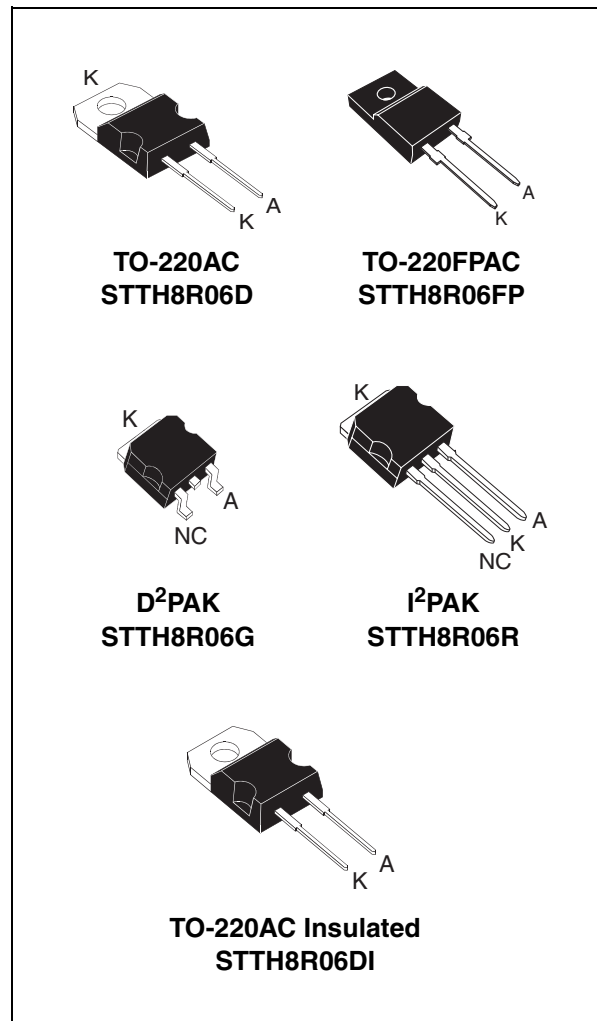


Table 3: Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward voltage	TO-220AC / TO-220FPAC / D ² PAK / I ² PAK	30	A	
		TO-220AC Ins.	24		
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AC / D ² PAK / I ² PAK	8	A	
		TO-220FPAC			$T_c = 130^\circ\text{C}$
		TO-220AC Ins.			$T_c = 85^\circ\text{C}$
		TO-220AC Ins.	$T_c = 100^\circ\text{C}$		
I_{FSM}	Surge non repetitive forward current		80	A	
		$t_p = 10\text{ms}$ sinusoidal			
T_{stg}	Storage temperature range		-65 to + 175	$^\circ\text{C}$	
T_j	Maximum operating junction temperature		175	$^\circ\text{C}$	

Table 4: Thermal Resistance

Symbol	Parameter		Value (max).	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / D ² PAK / I ² PAK	2.2	$^\circ\text{C/W}$
		TO-220FPAC	4.6	
		TO-220AC Ins.	3.8	

Table 5: Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			30	μA
		$T_j = 125^\circ\text{C}$			35	400	
V_F	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 8\text{A}$			2.9	V
		$T_j = 125^\circ\text{C}$			1.4	1.8	

To evaluate the conduction losses use the following equation: $P = 1.16 \times I_{F(AV)} + 0.08 I_F^2 (RMS)$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$			25	ns
			$I_F = 1\text{A}$ $dI_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$			45	
I_{RM}	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 8\text{A}$ $V_R = 400\text{V}$ $dI_F/dt = -200\text{ A}/\mu\text{s}$		5.5	7.2	A
S factor	Softness factor				0.3		
Qrr	Reverse recovery charges				150		
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 8\text{A}$ $dI_F/dt = 64\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			150	ns
V_{FP}	Forward recovery voltage					5	V

Figure 1: Conduction losses versus average current

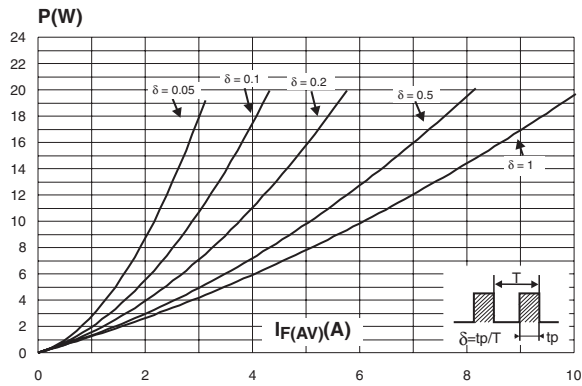


Figure 2: Forward voltage drop versus forward current

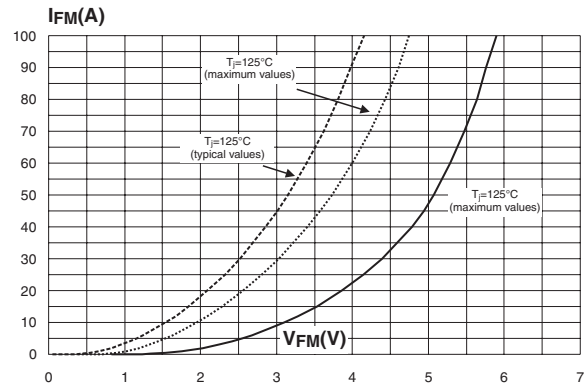


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC, I²PAK, D²PAK)

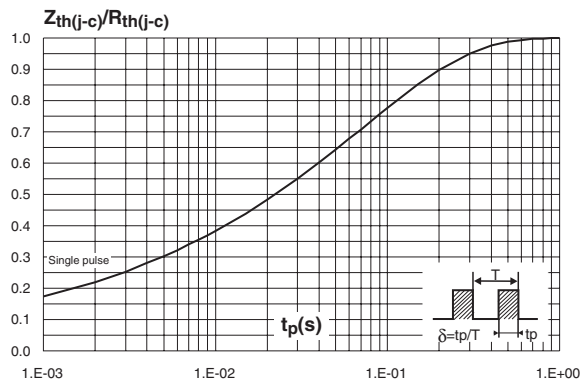


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC Insulated)

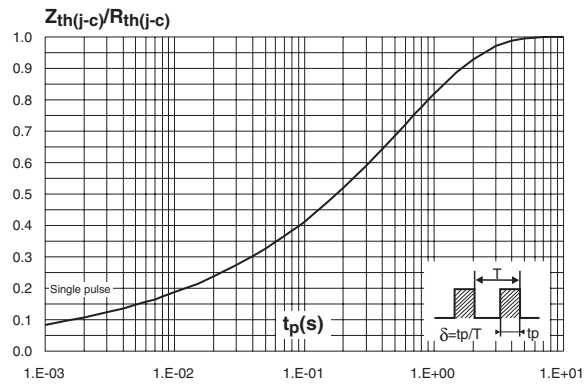


Figure 5: Peak reverse recovery current versus di_F/dt (typical values)

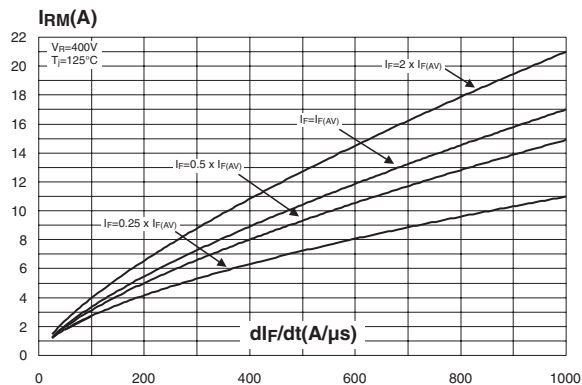


Figure 6: Reverse recovery time versus di_F/dt (typical values)

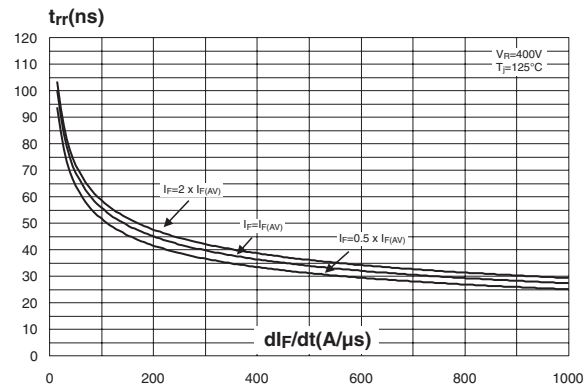


Figure 7: Reverse recovery charges versus di_F/dt (typical values)

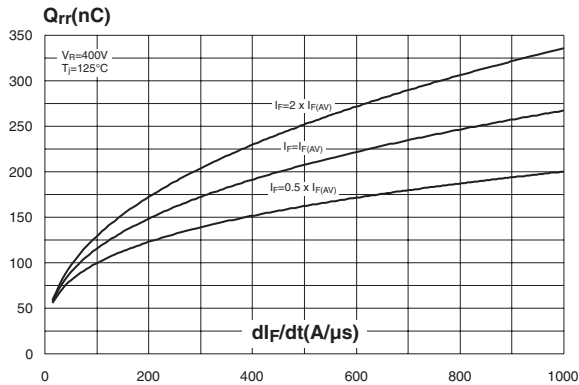


Figure 8: Softness factor versus di_F/dt (typical values)

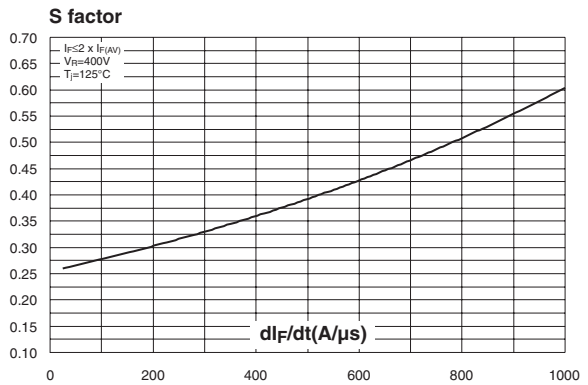


Figure 9: Relative variations of dynamic parameters versus junction temperature

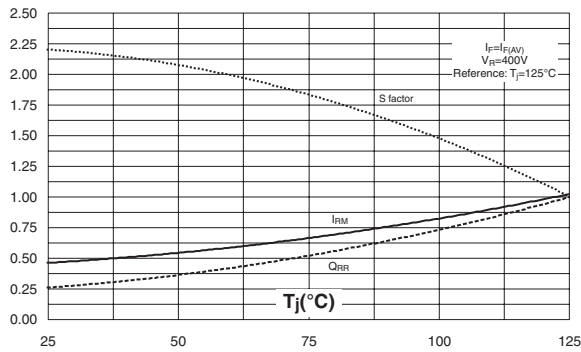


Figure 10: Transient peak forward voltage versus di_F/dt (typical values)

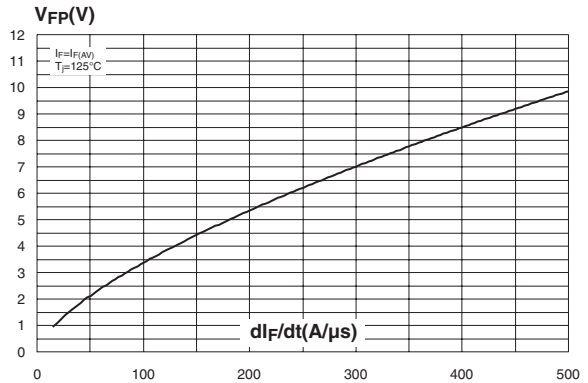


Figure 11: Forward recovery time versus di_F/dt (typical values)

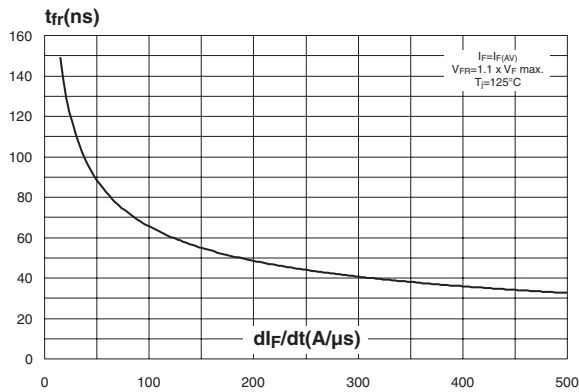


Figure 12: Junction capacitance versus reverse voltage applied (typical values)

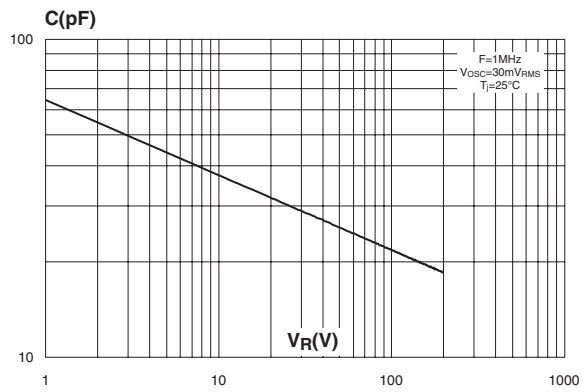


Figure 13: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, $e_{Cu}=35\mu m$) (D²PAK)

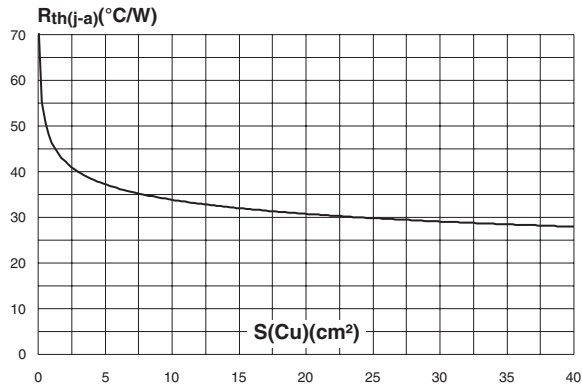


Figure 14: I²PAK Package Mechanical Data

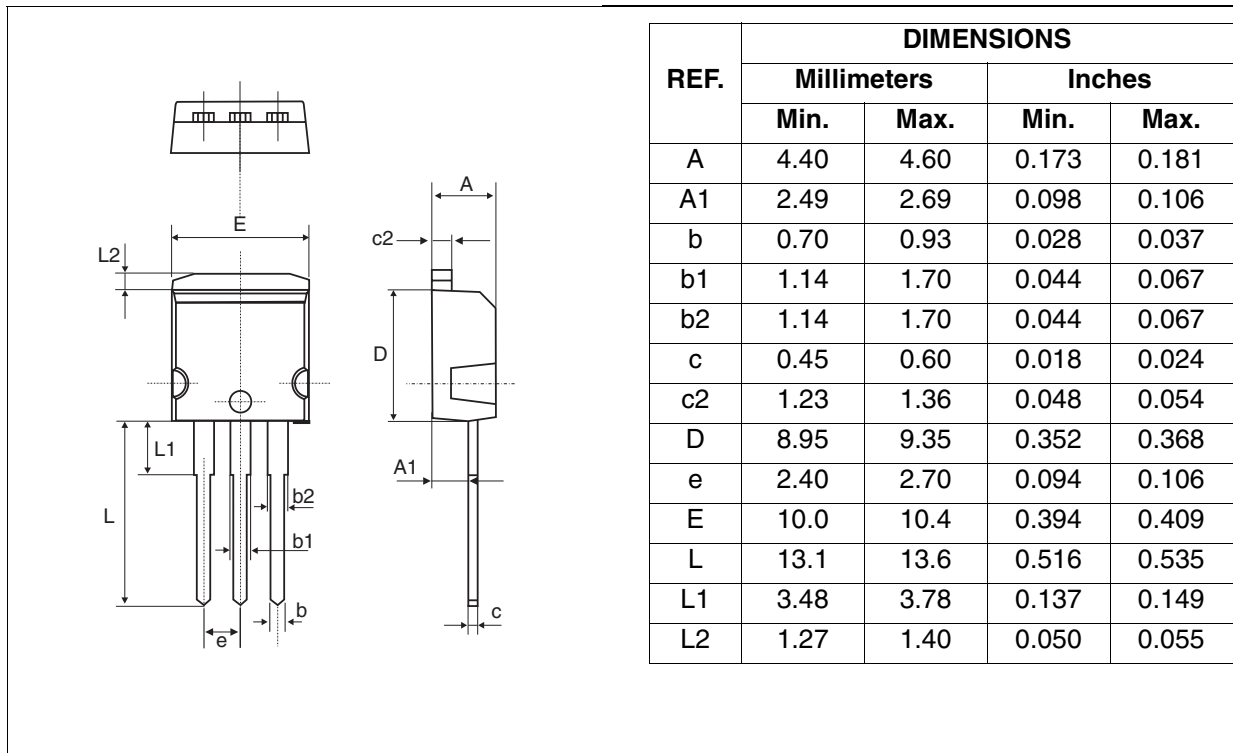


Figure 15: D²PAK Package Mechanical Data

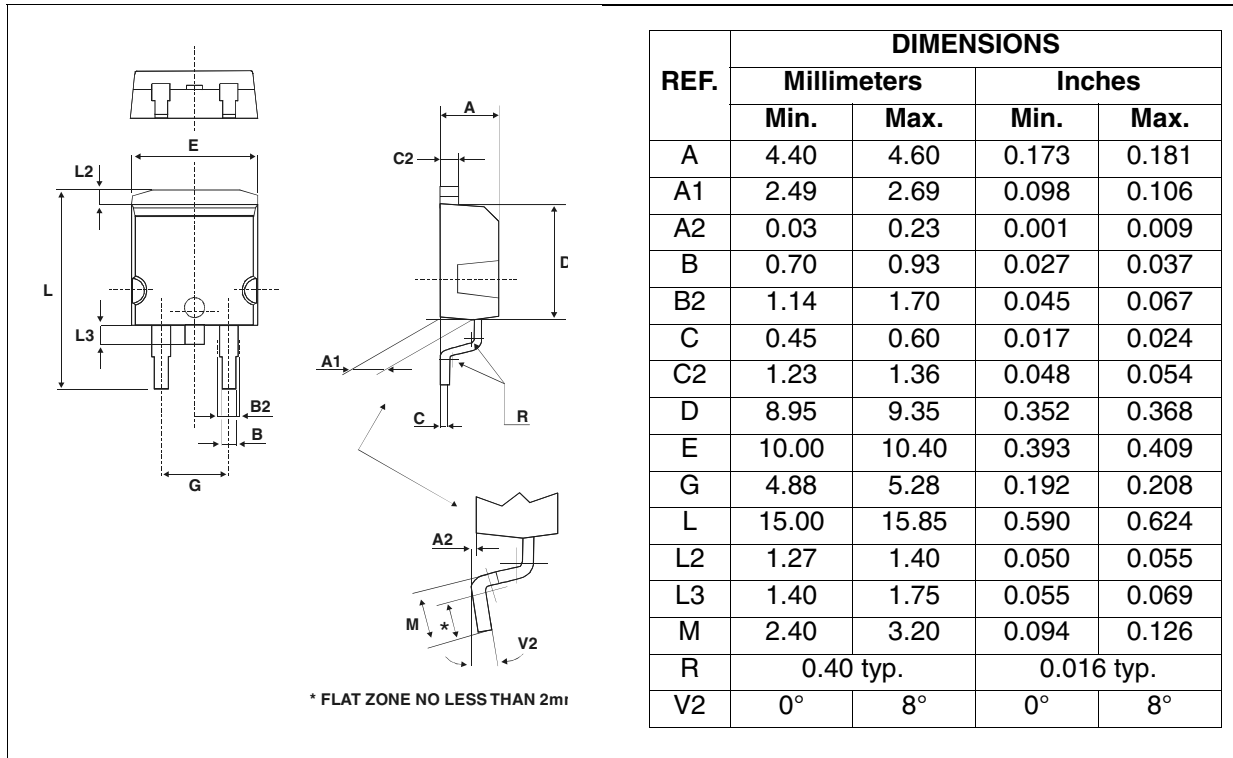


Figure 16: D²PAK Foot Print Dimensions (in millimeters)

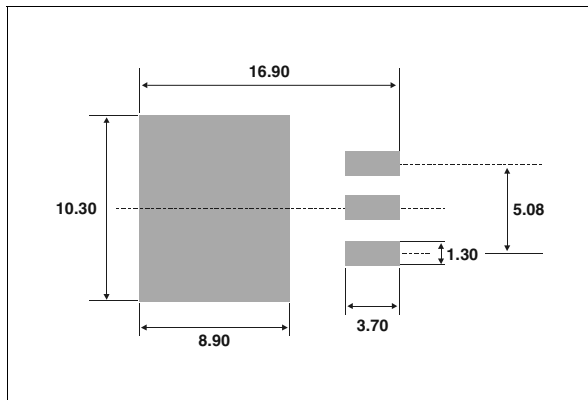


Figure 17: TO-220FPAC Package Mechanical Data

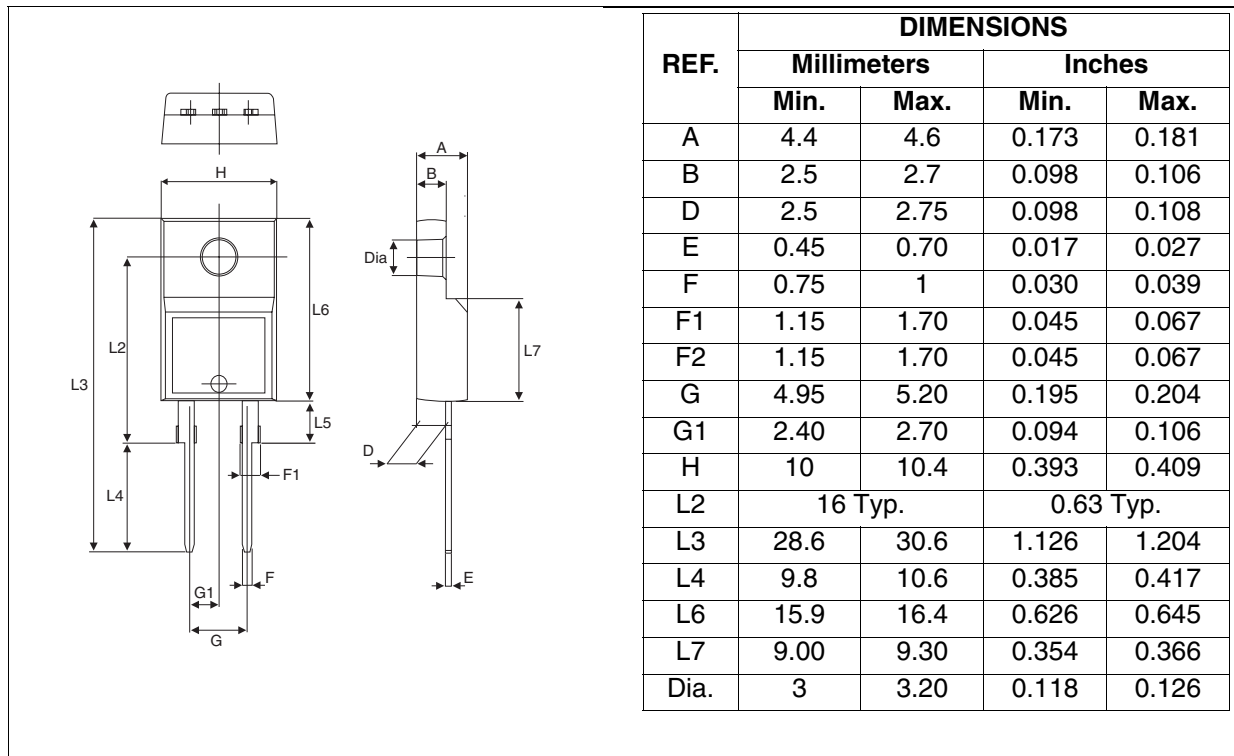
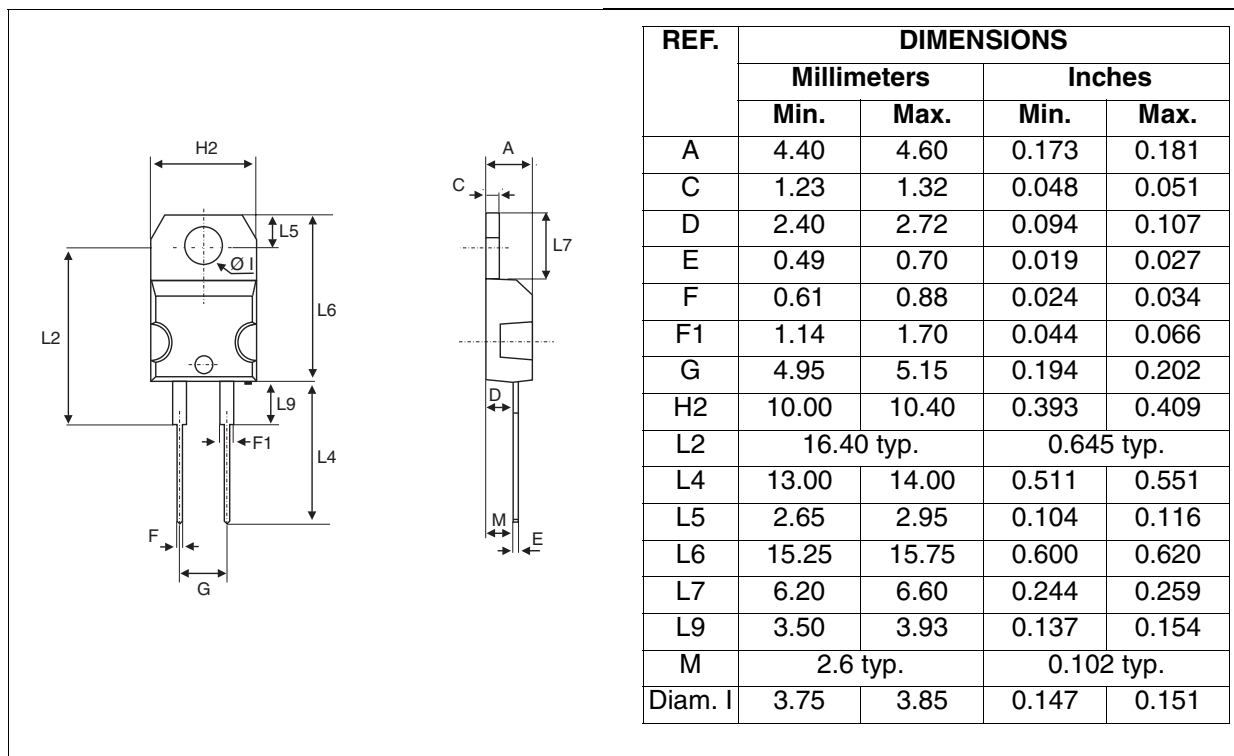


Figure 18: TO-220AC Package Mechanical Data



STTH8R06

Figure 19: TO-220AC Insulated Package Mechanical Data

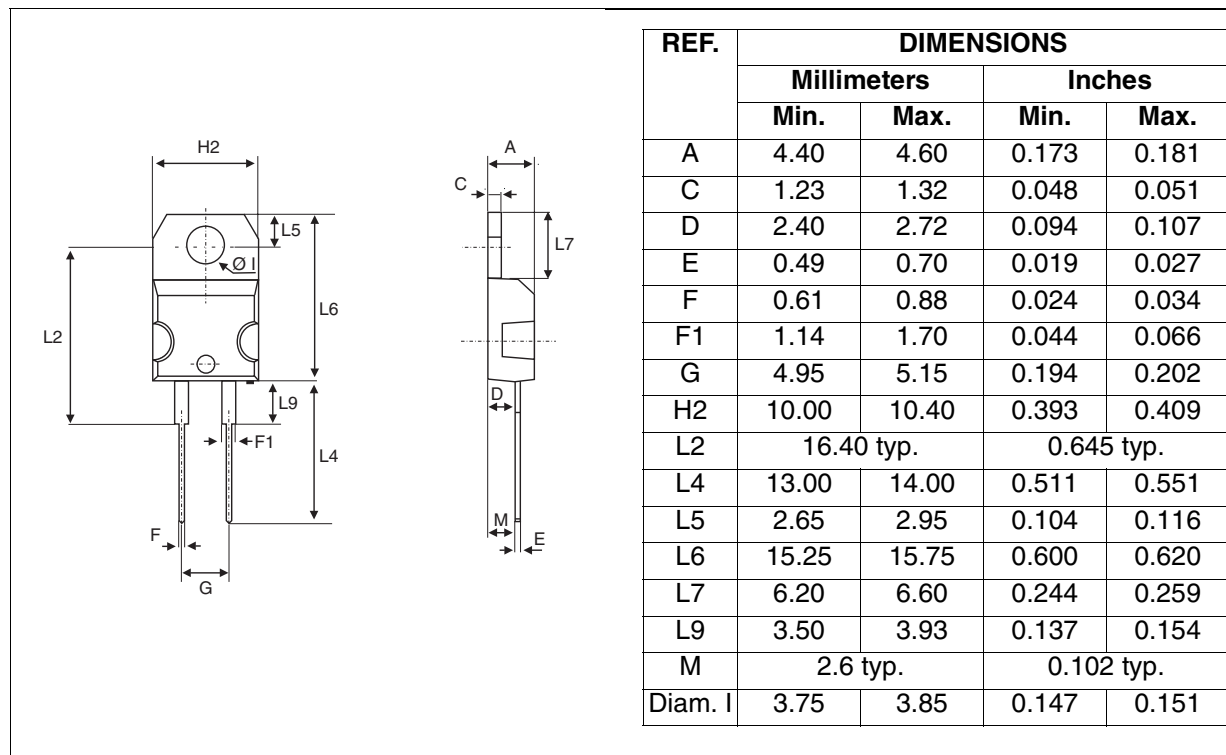


Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH8R06D	STTH8R06D	TO-220AC	1.90 g	50	Tube
STTH8R06G	STTH8R06G	D ² PAK	1.48 g	50	Tube
STTH8R066G-TR	STTH8R06G	D ² PAK	1.48 g	1000	Tape & reel
STTH8R06FP	STTH8R06FP	TO-220FPAC	1.70 g	50	Tube
STTH8R06R	STTH8R06R	I ² PAK	1.5 g	50	Tube
STTH8R06DI	STTH8R06DI	TO-220AC Ins.	1.86 g	250	Box
STTH8R06DIRG	STTH8R06DI	TO-220AC Ins.	1.86 g	50	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 m.N. (TO-220FPAC) / 0.55 m.N. (TO-220AC)
- Maximum torque value: 1.0 m.N. (TO-220FPAC) / 0.70 m.N. (TO-220AC)

Table 8: Revision History

Date	Revision	Description of Changes
May-2001	1	First issue
January-2002	2	D ² PAK and I ² PAK packages added
18-Oct-2004	3	TO-220AC Insulated package added
05-Dec-2004	4	D ² PAK foot print correction

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