

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	Up to 2 x 20 A
V_{RRM}	600 V
T_j	175°C
V_F (typ)	0.95 V
t_{rr} (max)	55 ns

FEATURES AND BENEFITS

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching & conduction losses

DESCRIPTION

The STTH30L06, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and discontinuous mode PFC boost diode.

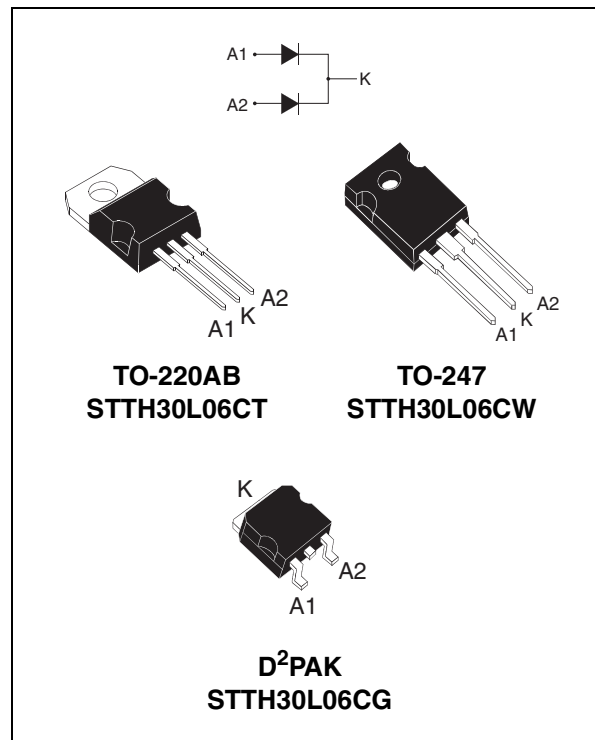


Table 2: Order Codes

Part Number	Marking
STTH30L06CT	STTH30L06CT
STTH30L06CW	STTH30L06CW

Part Number	Marking
STTH30L06CG	STTH30L06CG
STTH30L06GG-TR	STTH30L06CG

Table 3: Absolute Ratings (limiting values, per diode)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward voltage		30	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 140^\circ\text{C}$	Per diode	15	A
		$T_c = 125^\circ\text{C}$	Per device	30	
		$T_c = 120^\circ\text{C}$	Per diode	20	
		$T_c = 110^\circ\text{C}$	Per device	40	
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ms}$ sinusoidal	130	A	
T_{stg}	Storage temperature range		-65 to + 175	°C	
T_j	Maximum operating junction temperature		175	°C	

Table 4: Thermal Resistance

Symbol	Parameter		Value (max).	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.7	$^{\circ}\text{C}/\text{W}$
		Total	1.15	
$R_{th(c)}$	Coupling		0.6	$^{\circ}\text{C}/\text{W}$

When the diodes 1 and 2 are used simultaneously:
 $\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$

Table 5: Static Electrical Characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^{\circ}\text{C}$	$V_R = V_{RRM}$			15	μA
		$T_j = 150^{\circ}\text{C}$			40	400	
V_F^{**}	Forward voltage drop	$T_j = 25^{\circ}\text{C}$	$I_F = 15\text{A}$			1.55	V
		$T_j = 150^{\circ}\text{C}$			0.95	1.2	
		$T_j = 25^{\circ}\text{C}$	$I_F = 30\text{A}$			1.76	
		$T_j = 150^{\circ}\text{C}$			1.15	1.45	

Pulse test: * $t_p = 5 \text{ ms}$, $\delta < 2\%$
 ** $t_p = 380 \mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation: $P = 0.94 \times I_{F(AV)} + 0.017 I_F^2(\text{RMS})$

Table 6: Dynamic Characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^{\circ}\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$			55	ns
			$I_F = 1\text{A}$ $di_F/dt = 50 \text{ A}/\mu\text{s}$ $V_R = 30\text{V}$		60	85	
I_{RM}	Reverse recovery current	$T_j = 125^{\circ}\text{C}$	$I_F = 15\text{A}$ $V_R = 400\text{V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$		8.5	12	A
t_{fr}	Forward recovery time	$T_j = 25^{\circ}\text{C}$	$I_F = 15\text{A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			300	ns
V_{FP}	Forward recovery voltage	$T_j = 25^{\circ}\text{C}$	$I_F = 15\text{A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$		3.0		V

Figure 1: Conduction losses versus average forward current (per diode)

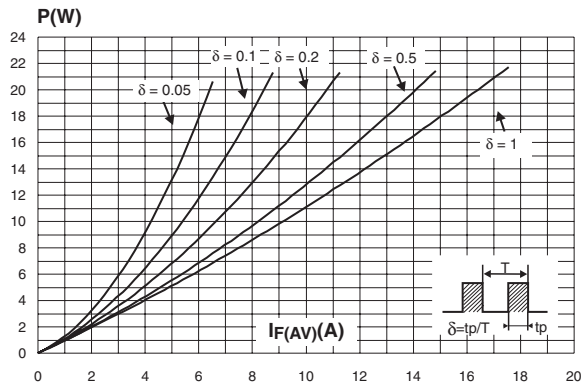


Figure 2: Forward voltage drop versus forward current (per diode)

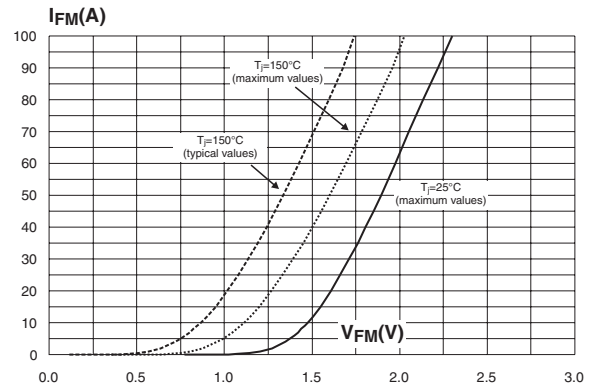


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

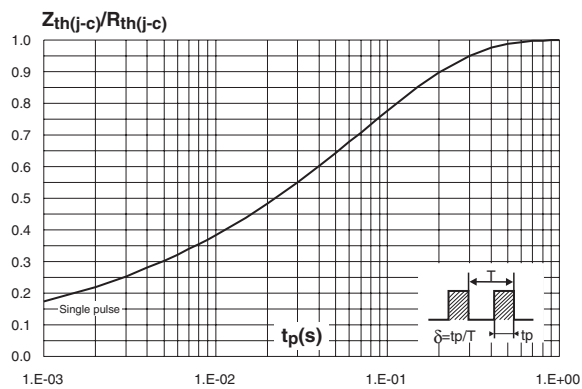


Figure 4: Peak reverse recovery current versus di/dt (typical values, per diode)

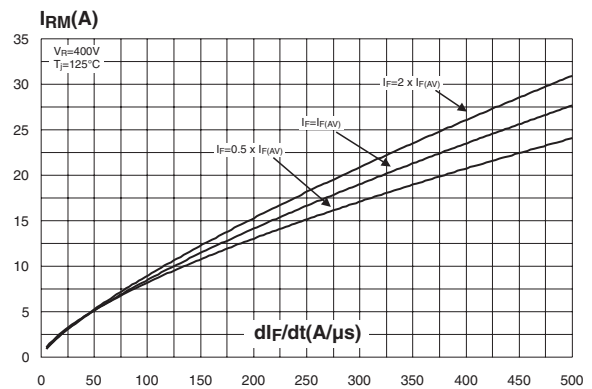


Figure 5: Reverse recovery time versus di/dt (typical values, per diode)

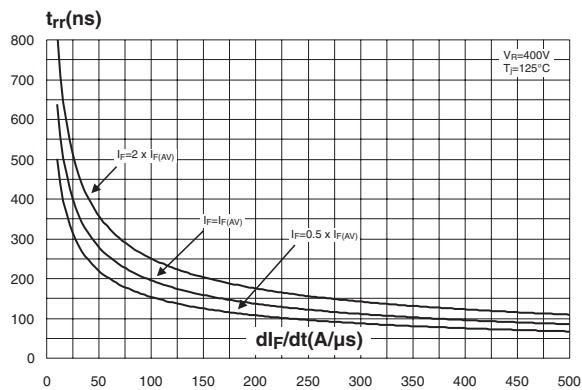


Figure 6: Reverse recovery charges versus di/dt (typical values, per diode)

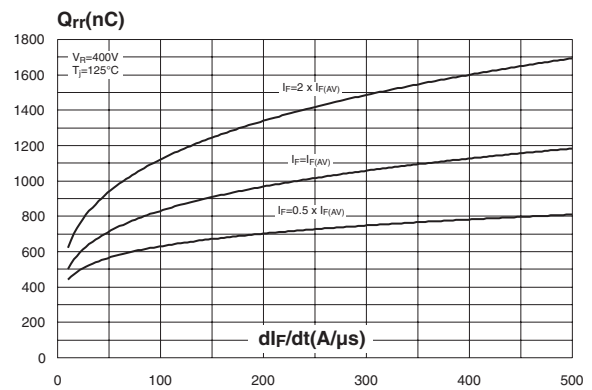


Figure 7: Reverse recovery softness factor versus di_F/dt (typical values, per diode)

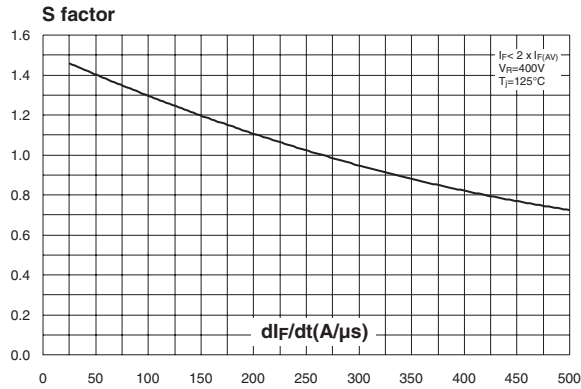


Figure 8: Relative variations of dynamic parameters versus junction temperature

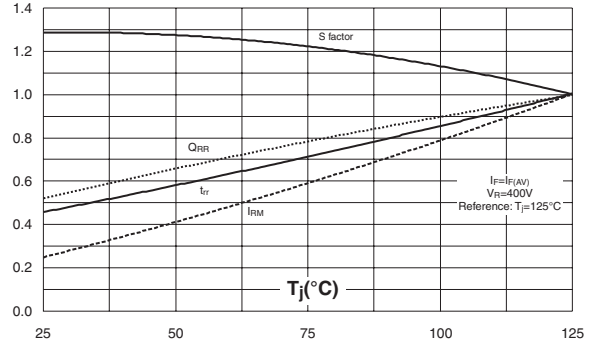


Figure 9: Transient peak forward voltage versus di_F/dt (typical values, per diode)

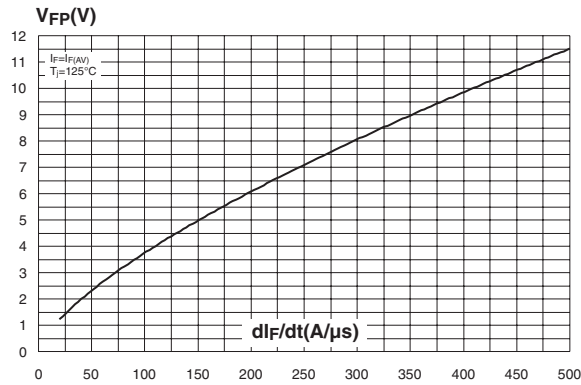


Figure 10: Forward recovery time versus di_F/dt (typical values, per diode)

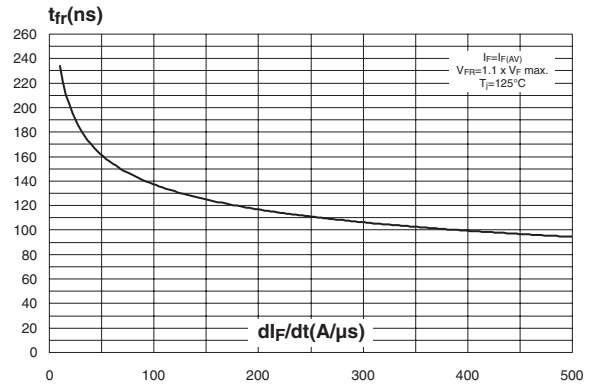


Figure 11: Junction capacitance versus reverse voltage applied (typical values, per diode)

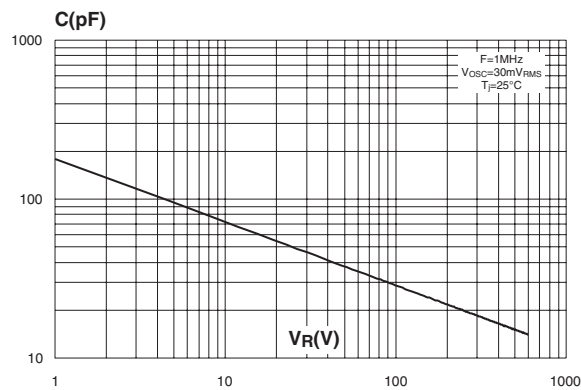


Figure 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, $e_{Cu}=35\mu m$) (D²PAK)

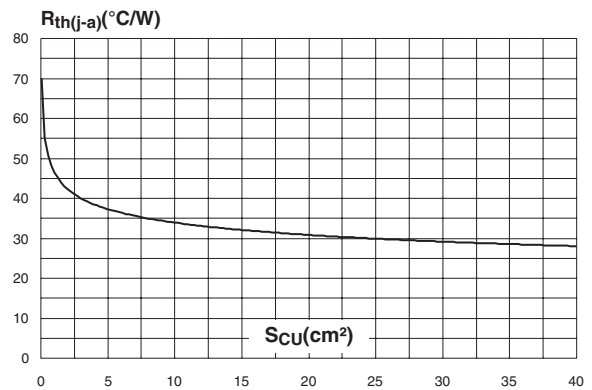


Figure 13: TO-247 Package Mechanical Data

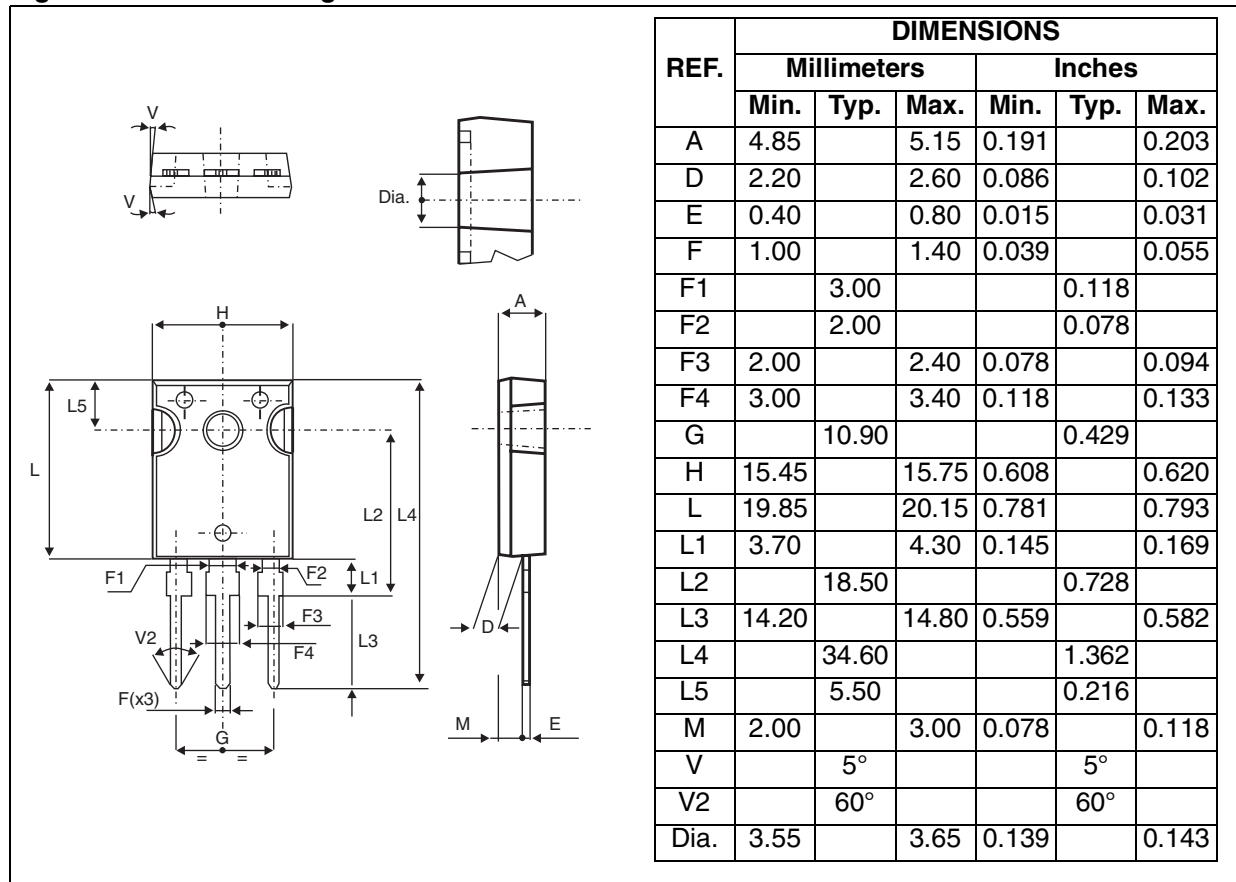


Figure 14: D²PAK Package Mechanical Data

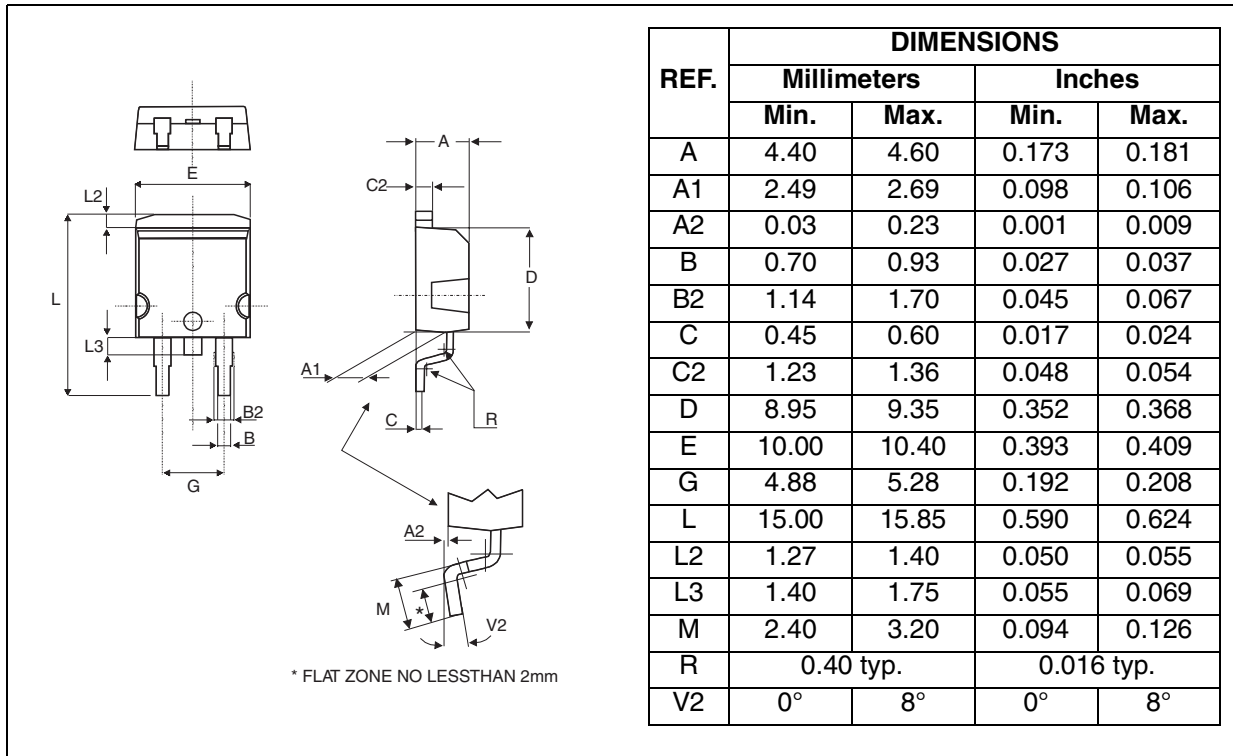


Figure 15: D²PAK Foot Print Dimensions (in millimeters)

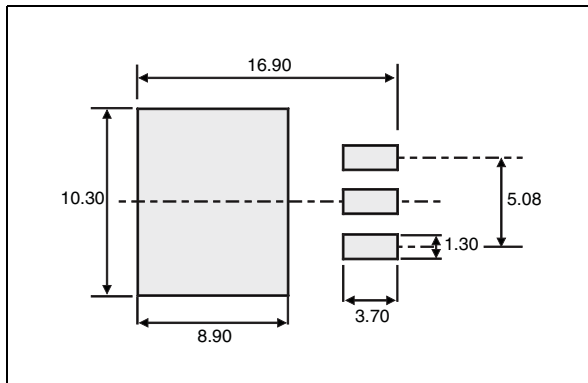


Figure 16: TO-220AB Package Mechanical Data

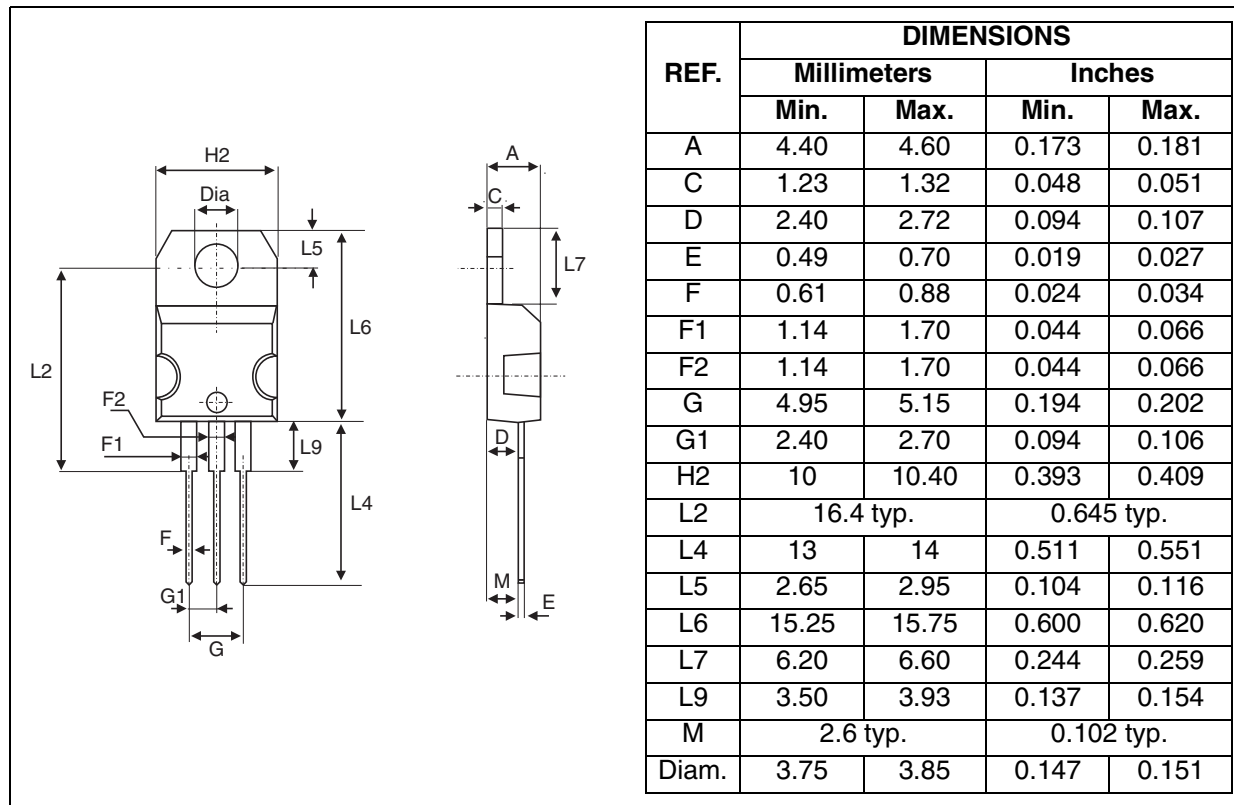


Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30L06CT	STTH30L06CT	TO-220AB	2.23 g	50	Tube
STTH30L06CG	STTH30L06CG	D ² PAK	1.48 g	50	Tube
STTH30L06CG-TR	STTH30L06CG	D ² PAK	1.48 g	1000	Tape & eel
STTH30L06CW	STTH30L06CW	TO-247	4.46 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-220AB)
- Maximum torque value: 1.0 m.N. (TO-220FPAC) / 0.70 m.N. (TO-220AB)

Table 8: Revision History

Date	Revision	Description of Changes
07-Sep-2004	1	First issue

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