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STTH30L06C

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.

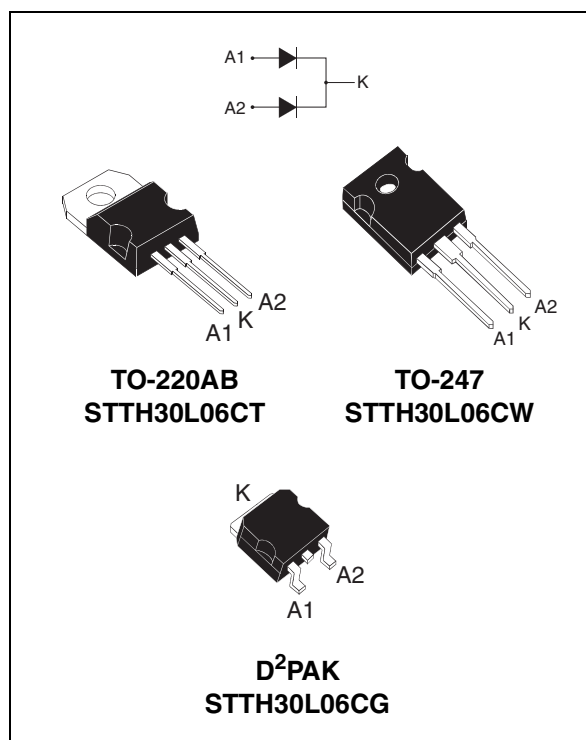


Table 2: Order Codes

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 current			30	A
$I_F(AV)$	Average forward current $\delta = 0.5$	$T_c = 140^\circ C$	Per diode	15	A
		$T_c = 125^\circ C$	Per device	30	
		$T_c = 120^\circ C$	Per diode	20	
		$T_c = 110^\circ C$	Per device	40	
I_{FSM}	Surge non repetitive forward current			130	A
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature			175	°C

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Table 4: Thermal Resistance

Symbol	Parameter		Value (max).	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.7	°C/W
		Total	1.15	
$R_{th(c)}$	Coupling		0.6	°C/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: * $t_p = 5\text{ ms}$, $\delta < 2\%$

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

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

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
			$I_F = 1\text{A}$ $dl_F/dt = 50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$		60	85	
I_{RM}	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 15\text{A}$ $V_R = 400\text{V}$ $dl_F/dt = 100\text{ A}/\mu\text{s}$		8.5	12	A
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 15\text{A}$ $dl_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			300	ns
V_{FP}	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 15\text{A}$ $dl_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$		3.0		V

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

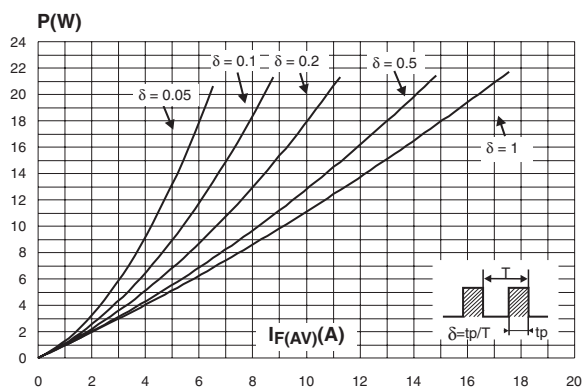


Figure 2: Forward voltage drop versus forward current (per diode)

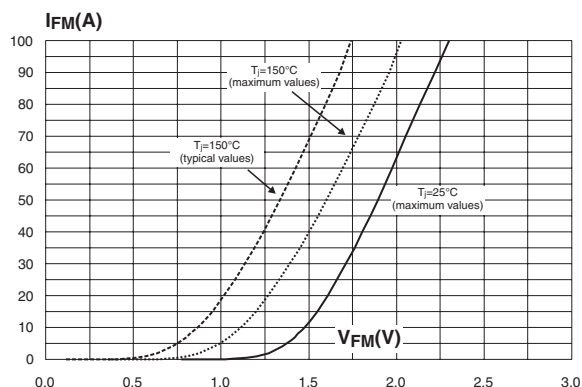


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

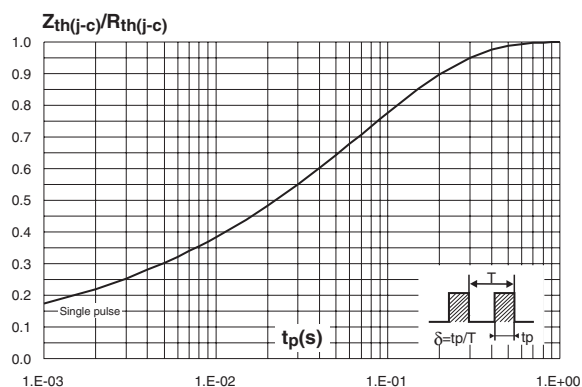


Figure 4: Peak reverse recovery current versus di_F/dt (typical values, per diode)

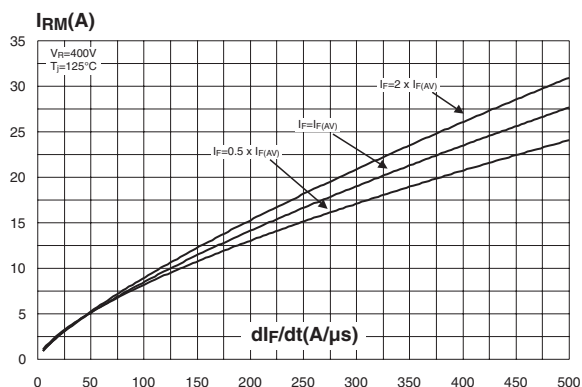


Figure 5: Reverse recovery time versus di_F/dt (typical values, per diode)

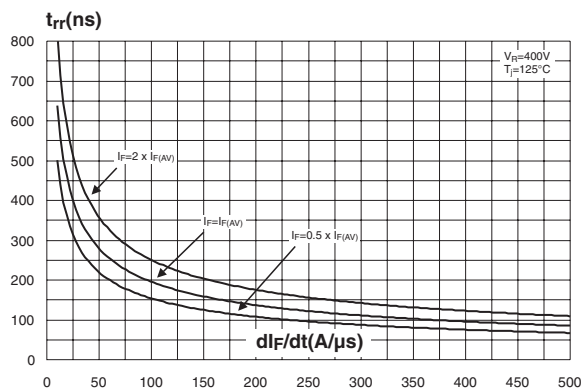
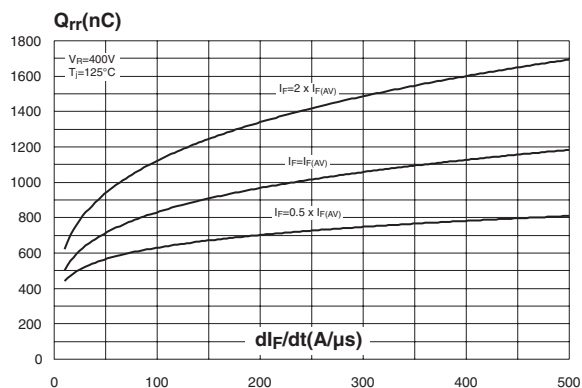


Figure 6: Reverse recovery charges versus di_F/dt (typical values, per diode)



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

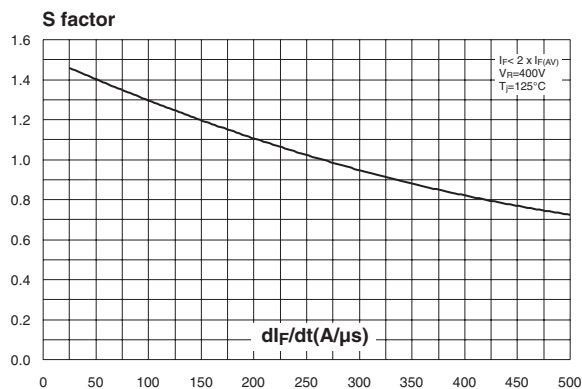


Figure 8: Relative variations of dynamic parameters versus junction temperature

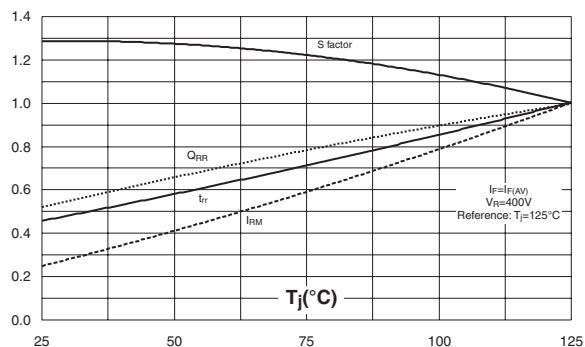


Figure 9: Transient peak forward voltage versus di_F/dt (typical values, per diode)

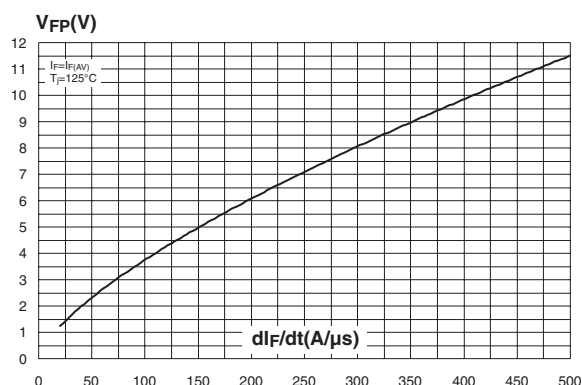


Figure 10: Forward recovery time versus di_F/dt (typical values, per diode)

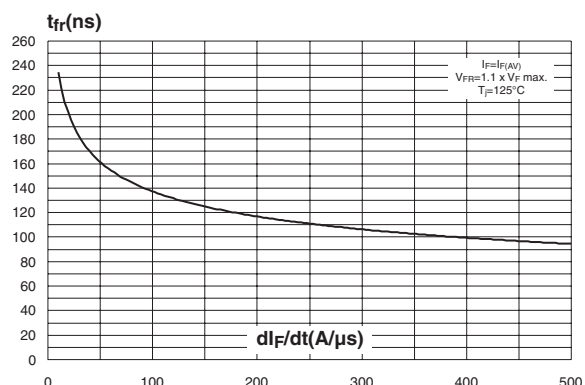


Figure 11: Junction capacitance versus reverse voltage applied (typical values, per diode)

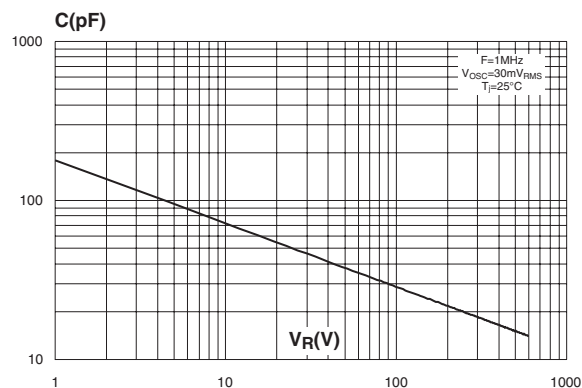
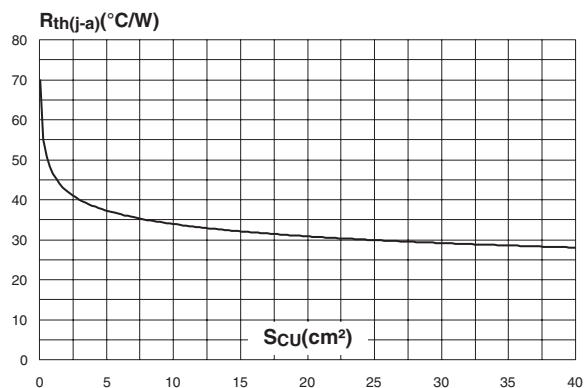
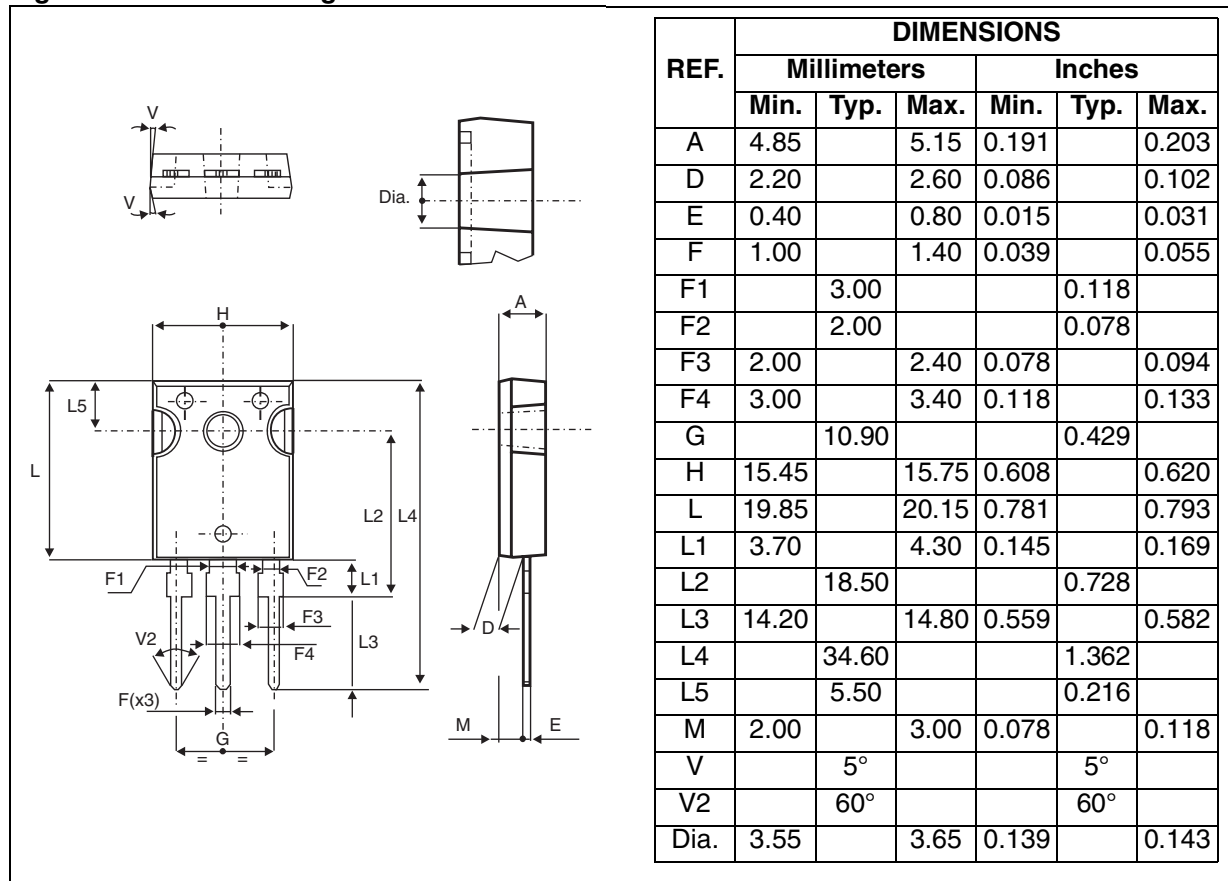


Figure 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, $e_{CU} = 35\mu m$) (D²PAK)



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Figure 13: TO-247 Package Mechanical Data



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Figure 14: D²PAK Package Mechanical Data

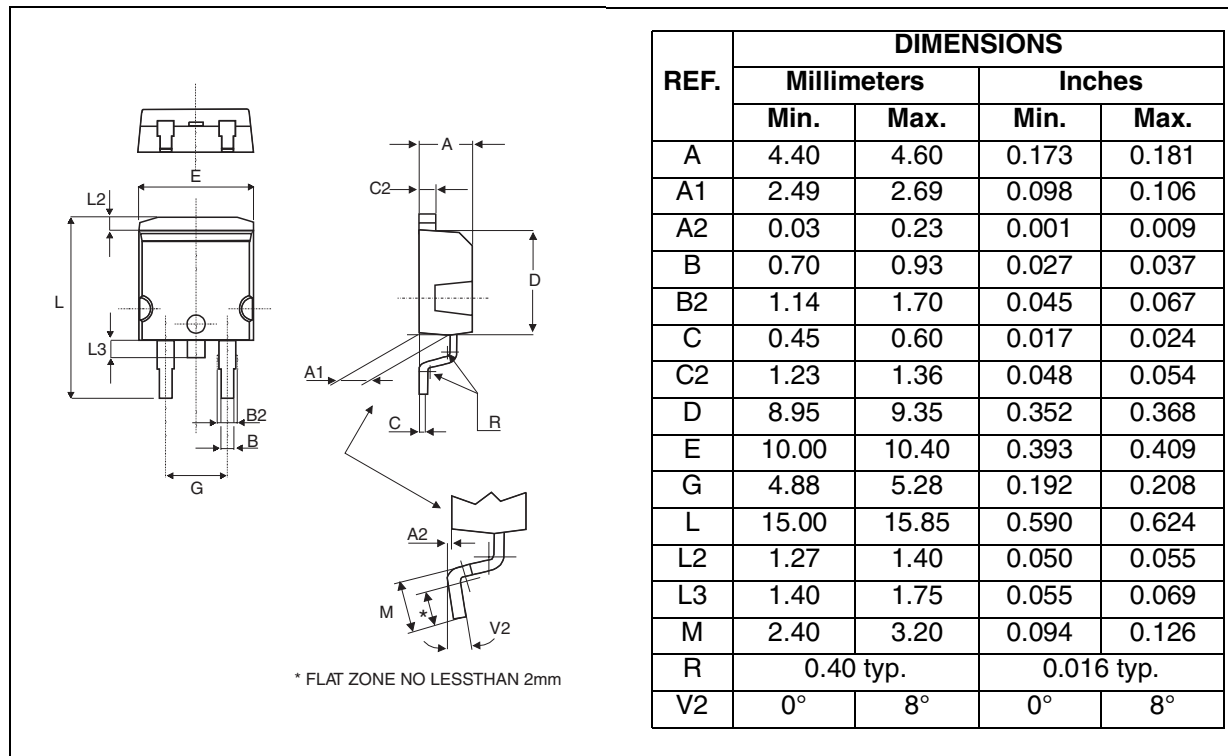
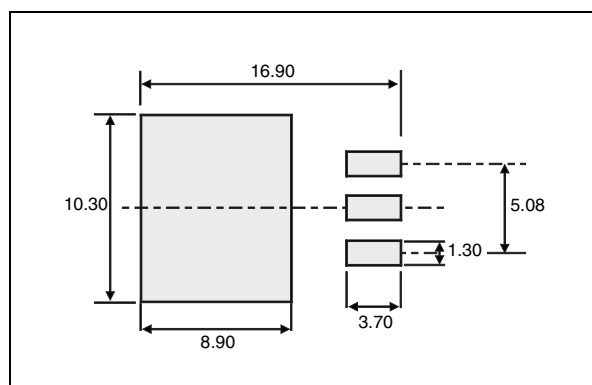


Figure 15: D²PAK Foot Print Dimensions
(in millimeters)



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Figure 16: TO-220AB Package Mechanical Data

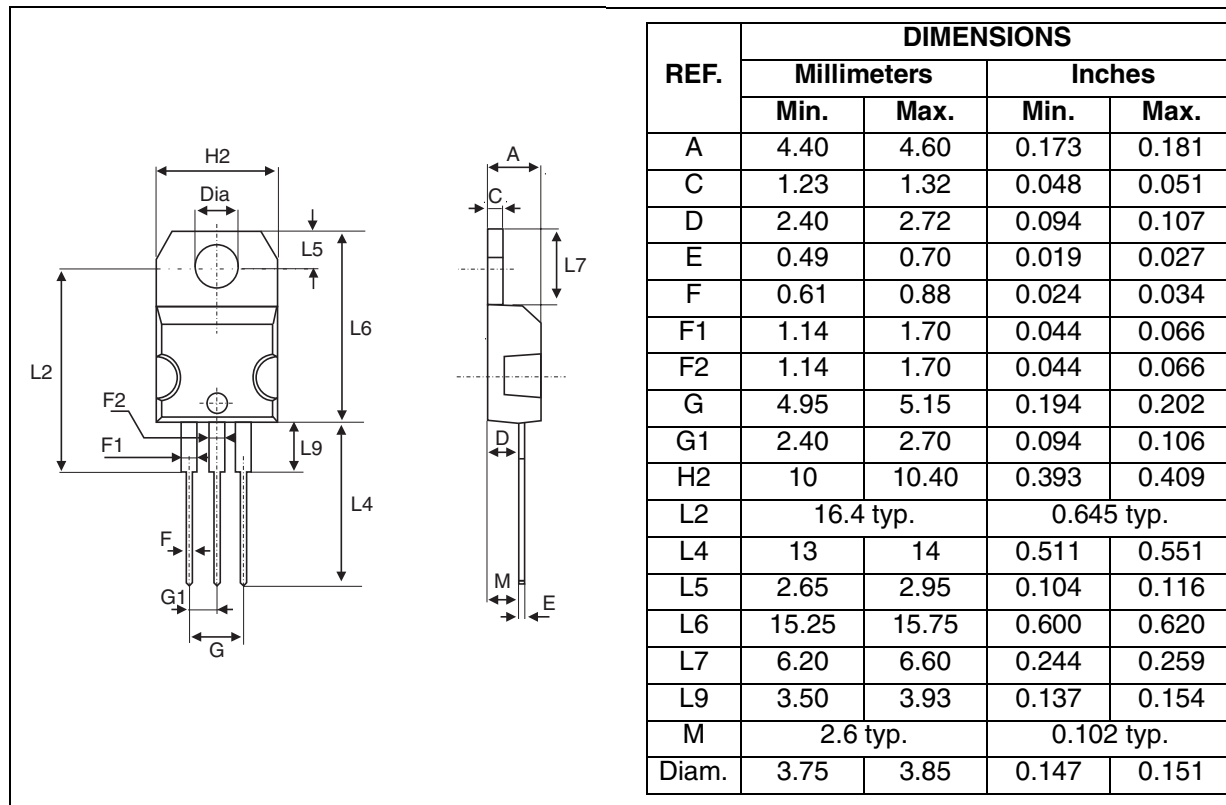


Table 7: Ordering Information

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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