

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	30 A
V_{RRM}	600 V
T_j	175°C
V_F (typ)	1.0 V
t_{rr} (max)	65 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
STTH30L06D	STTH30L06D
STTH30L06G	STTH30L06G
STTH30L06G-TR	STTH30L06G
STTH30L06W	STTH30L06W
STTH30L06P	STTH30L06P
STTH30L06PI	STTH30L06PI

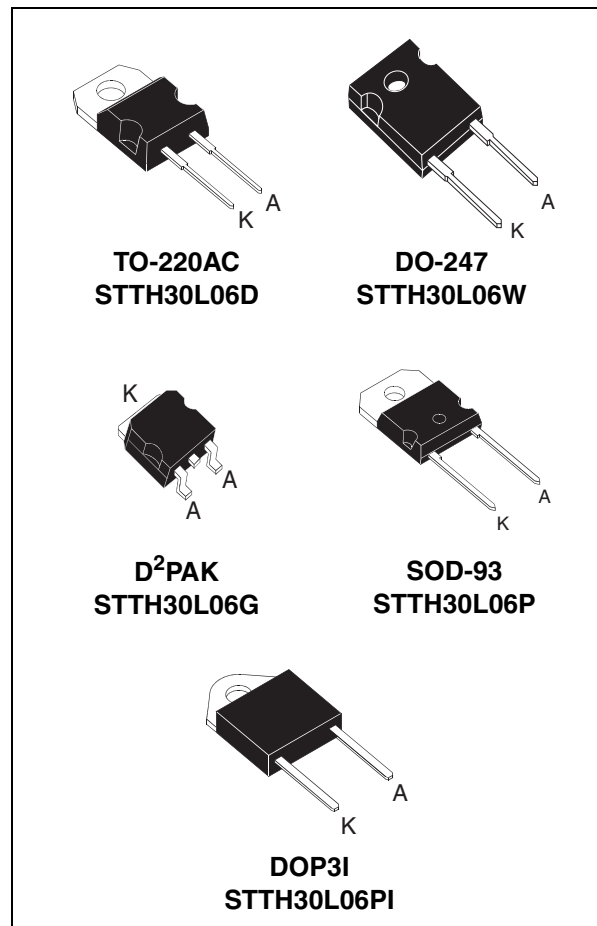


Table 3: Absolute Ratings (limiting values)

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	TO-220AC / TO-247 / D ² PAK / SOT-93	$T_c = 125^{\circ}\text{C}$ $\delta = 0.5$	50	A
		DOP3I	$T_c = 95^{\circ}\text{C}$ $\delta = 0.5$		
I_{FSM}	Surge non repetitive forward current		$t_p = 10\text{ms}$ sinusoidal	160	A
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 / TO-247 / D ² PAK / SOT-93	1.1	$^{\circ}\text{C}/\text{W}$
		DOP3I	1.7	

Table 5: Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^{\circ}\text{C}$	$V_R = V_{RRM}$			25	μA
		$T_j = 150^{\circ}\text{C}$		80	800		
V_F^{**}	Forward voltage drop	$T_j = 25^{\circ}\text{C}$	$I_F = 30\text{A}$			1.55	V
		$T_j = 150^{\circ}\text{C}$		1.0	1.25		

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: $P = 0.95 \times I_{F(AV)} + 0.010 I_{F(RMS)}^2$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^{\circ}\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$			65	ns
			$I_F = 1\text{A}$ $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$		65	90	
I_{RM}	Reverse recovery current	$T_j = 125^{\circ}\text{C}$	$I_F = 30\text{A}$ $V_R = 400\text{V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$		11.5	16	A
t_{fr}	Forward recovery time	$T_j = 25^{\circ}\text{C}$	$I_F = 30\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			500	ns
V_{FP}	Forward recovery voltage	$T_j = 25^{\circ}\text{C}$	$I_F = 30\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$		2.5		V

Figure 1: Conduction losses versus average forward current

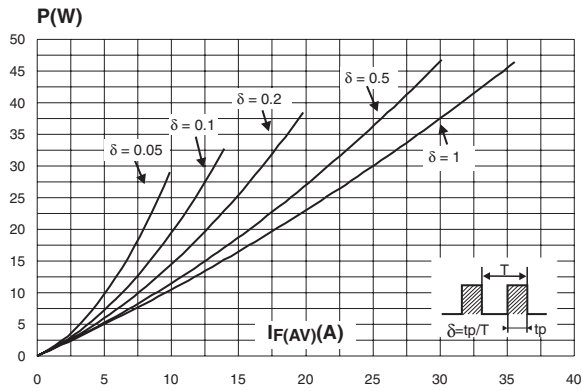


Figure 2: Forward voltage drop versus forward current

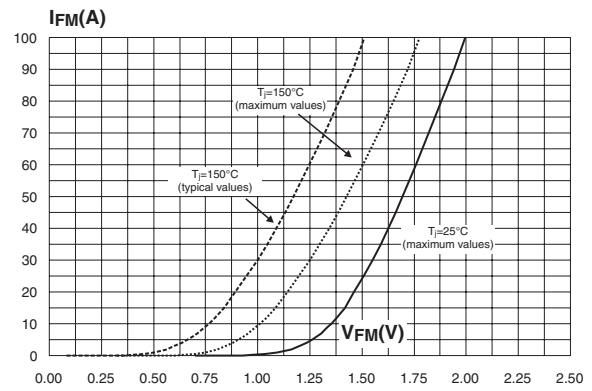


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

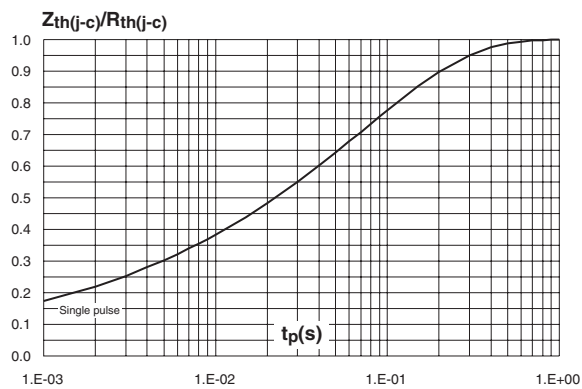


Figure 4: Peak reverse recovery current versus di_F/dt (typical values)

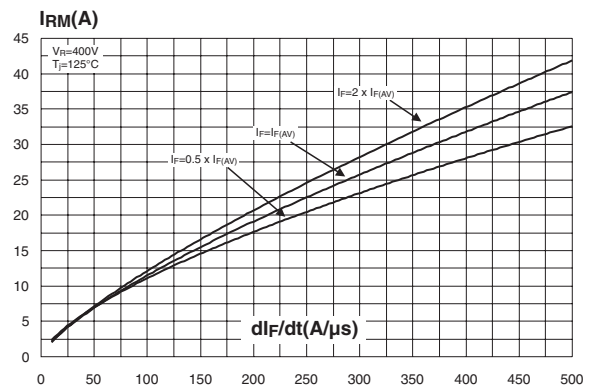


Figure 5: Reverse recovery time versus di_F/dt (typical values)

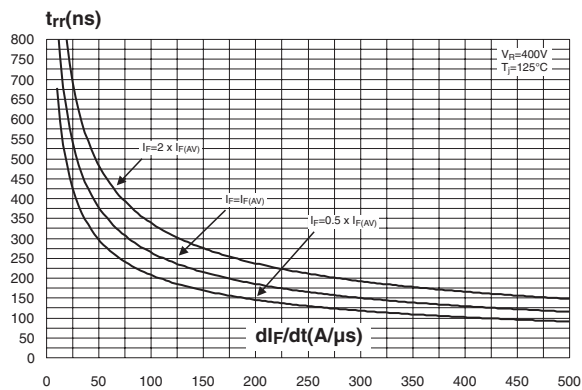


Figure 6: Reverse recovery charges versus di_F/dt (typical values)

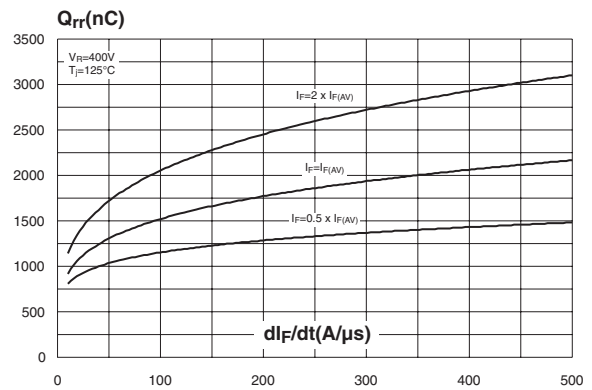


Figure 7: Reverse recovery softness factor versus di_F/dt (typical values)

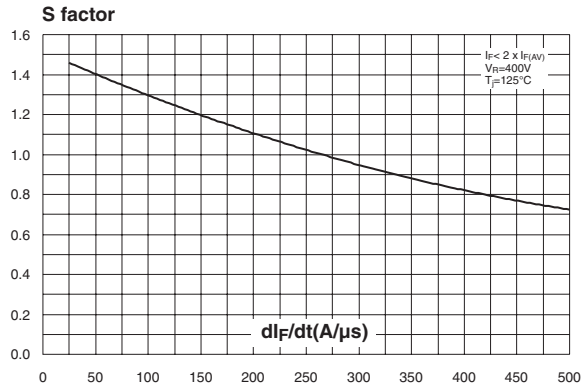


Figure 8: Relative variations of dynamic parameters versus junction temperature

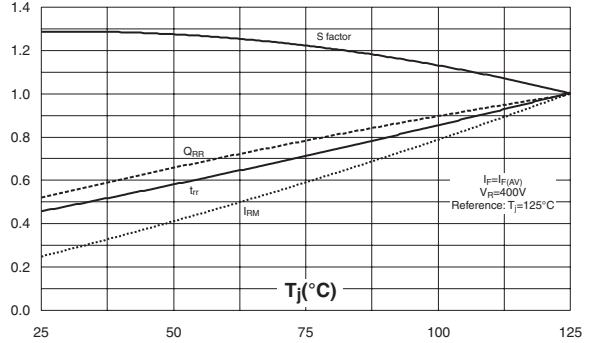


Figure 9: Transient peak forward voltage versus di_F/dt (typical values)

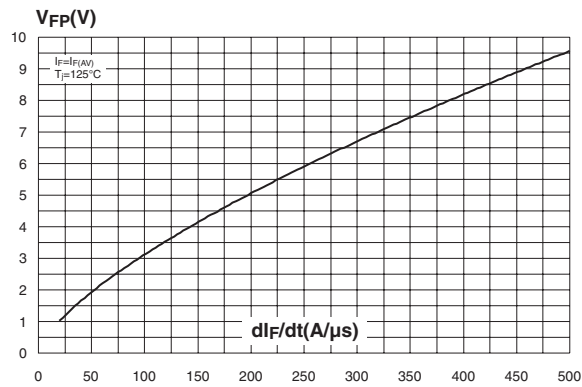


Figure 10: Forward recovery time versus di_F/dt (typical values)

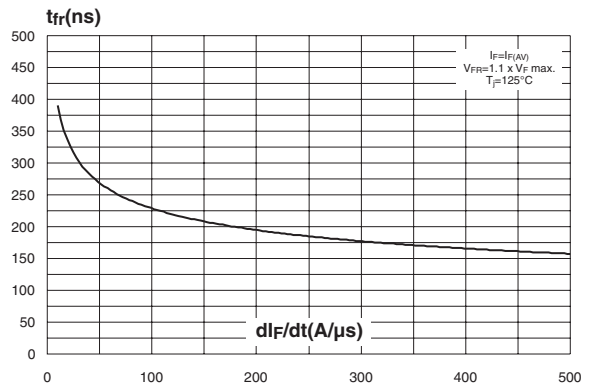


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

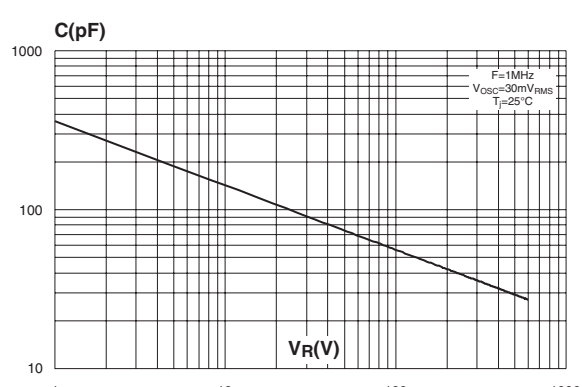


Figure 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, $e_{CU}=35\mu m$) (D^2PAK)

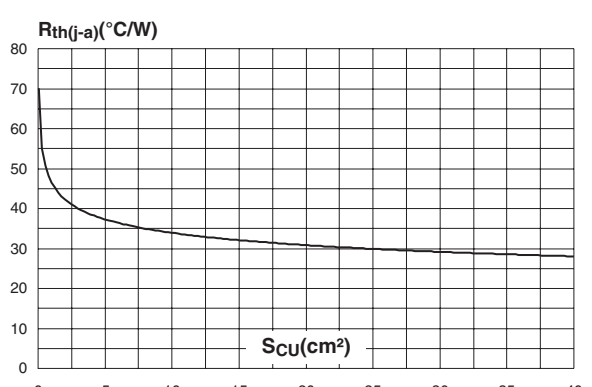


Figure 13: D²PAK Package Mechanical Data

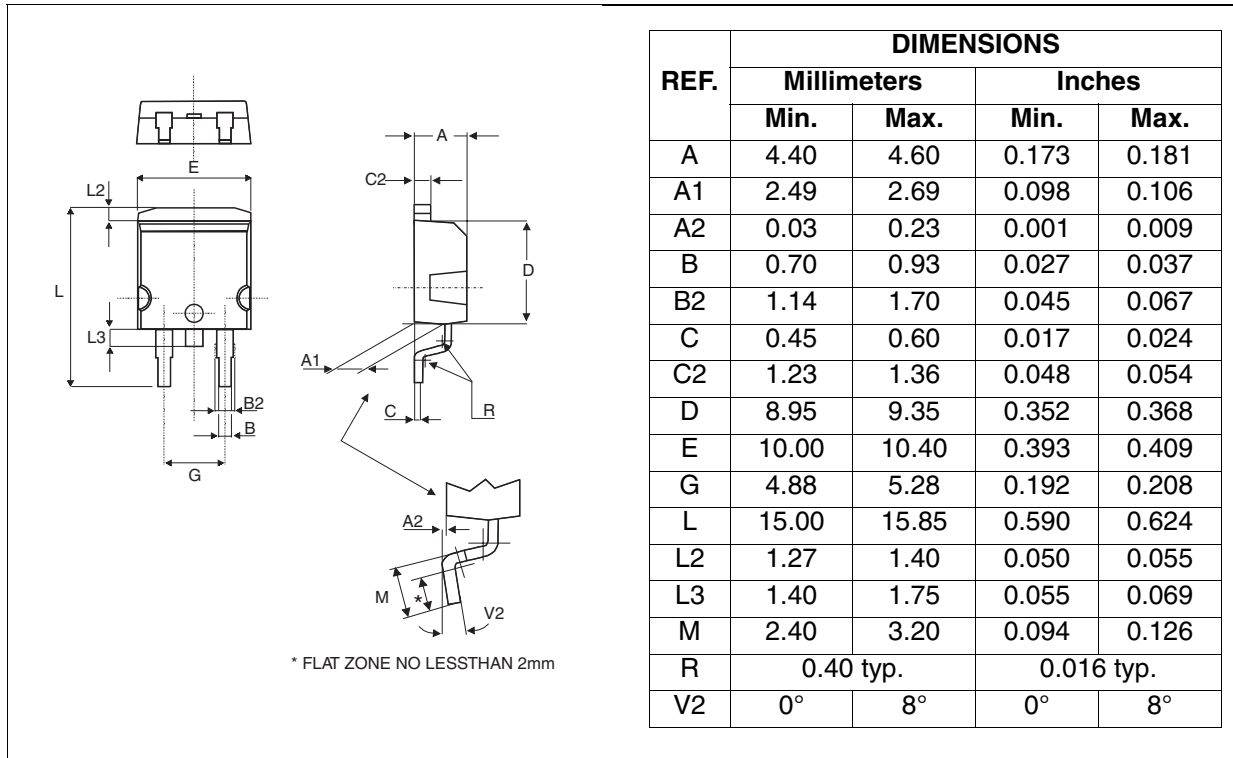


Figure 14: D²PAK Foot Print Dimensions (in millimeters)

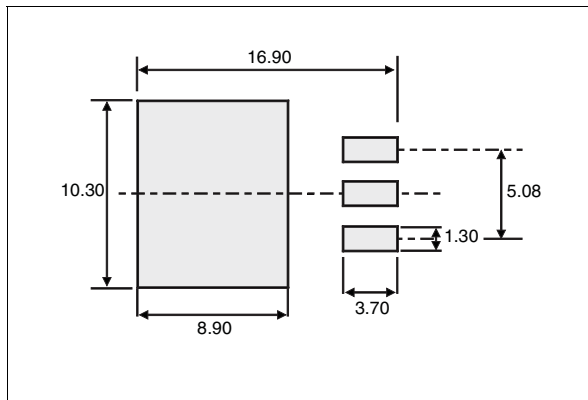


Figure 15: DO-247 Package Mechanical Data

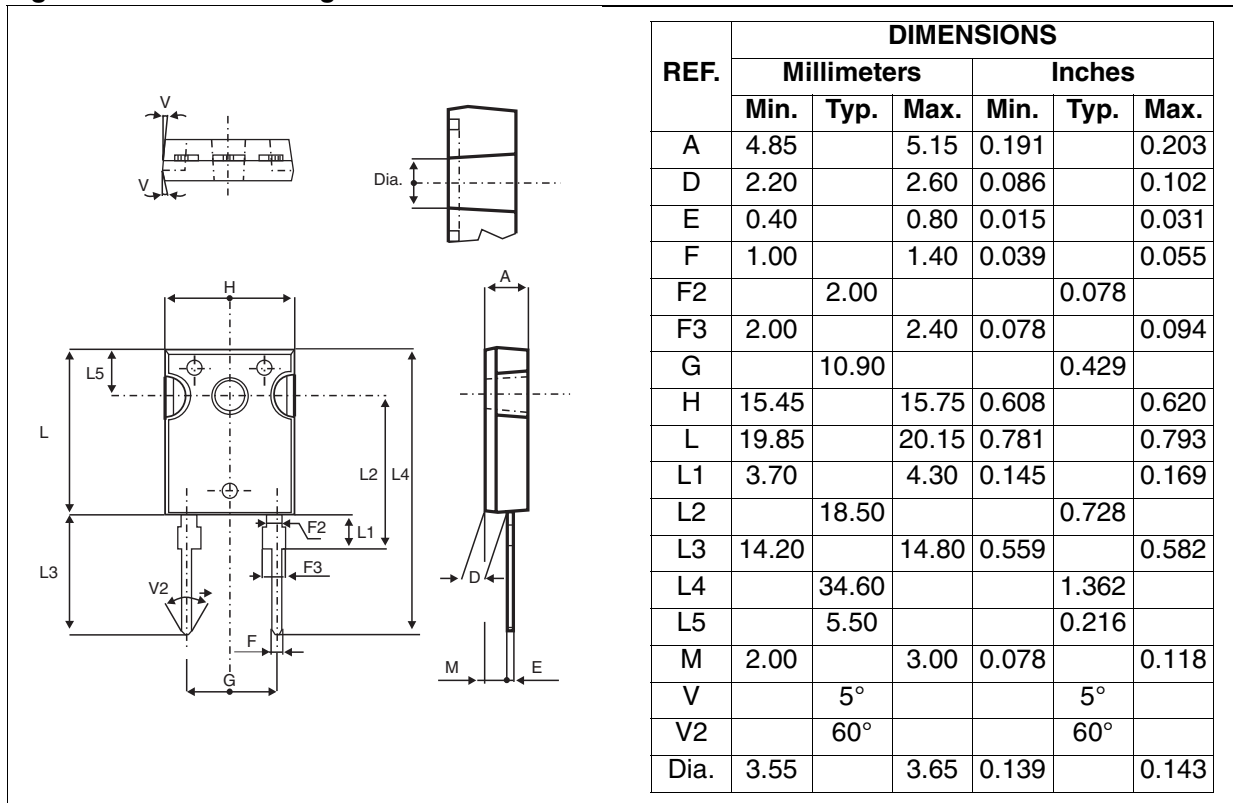


Figure 16: SOD-93 Package Mechanical Data

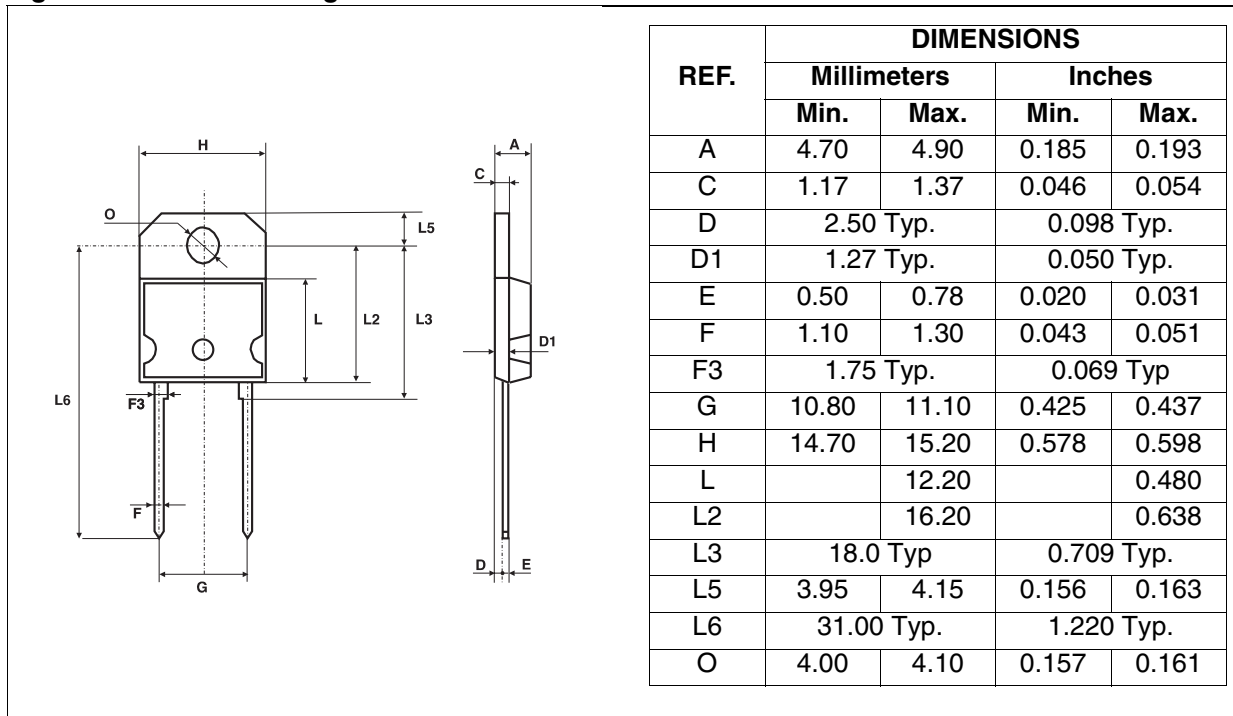


Figure 17: SOD-93 Package Mechanical Data

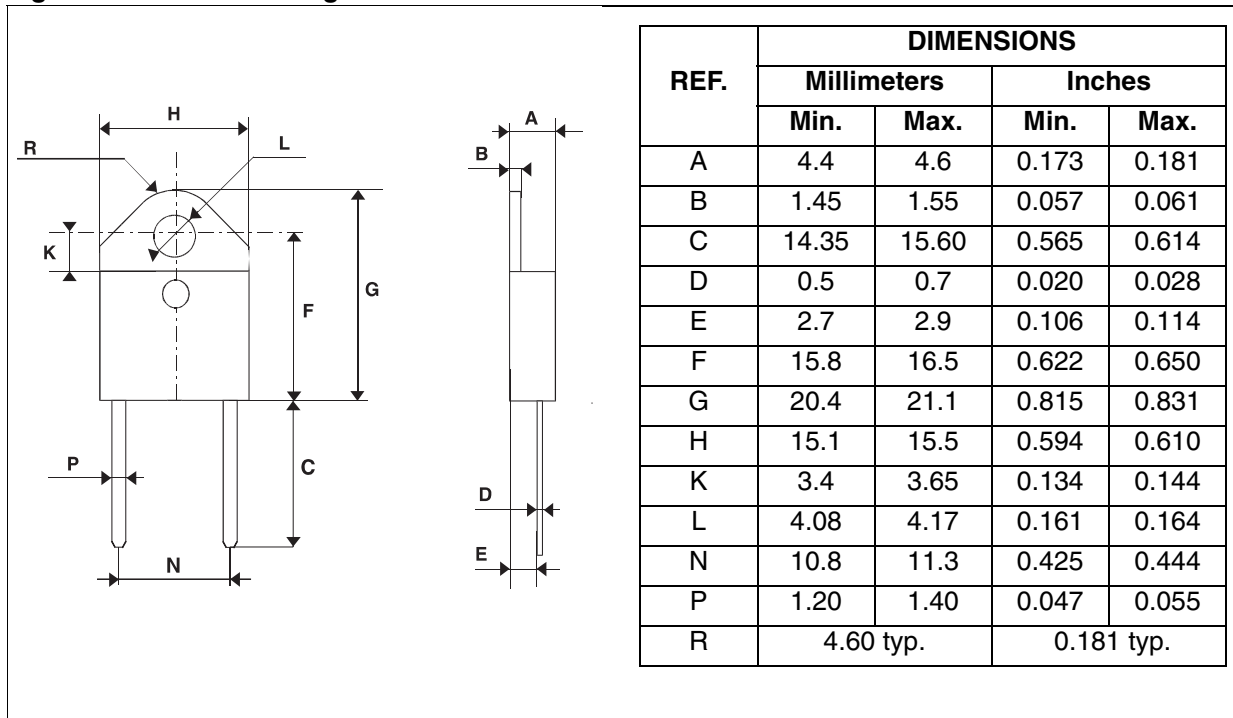


Figure 18: TO-220AC Package Mechanical Data

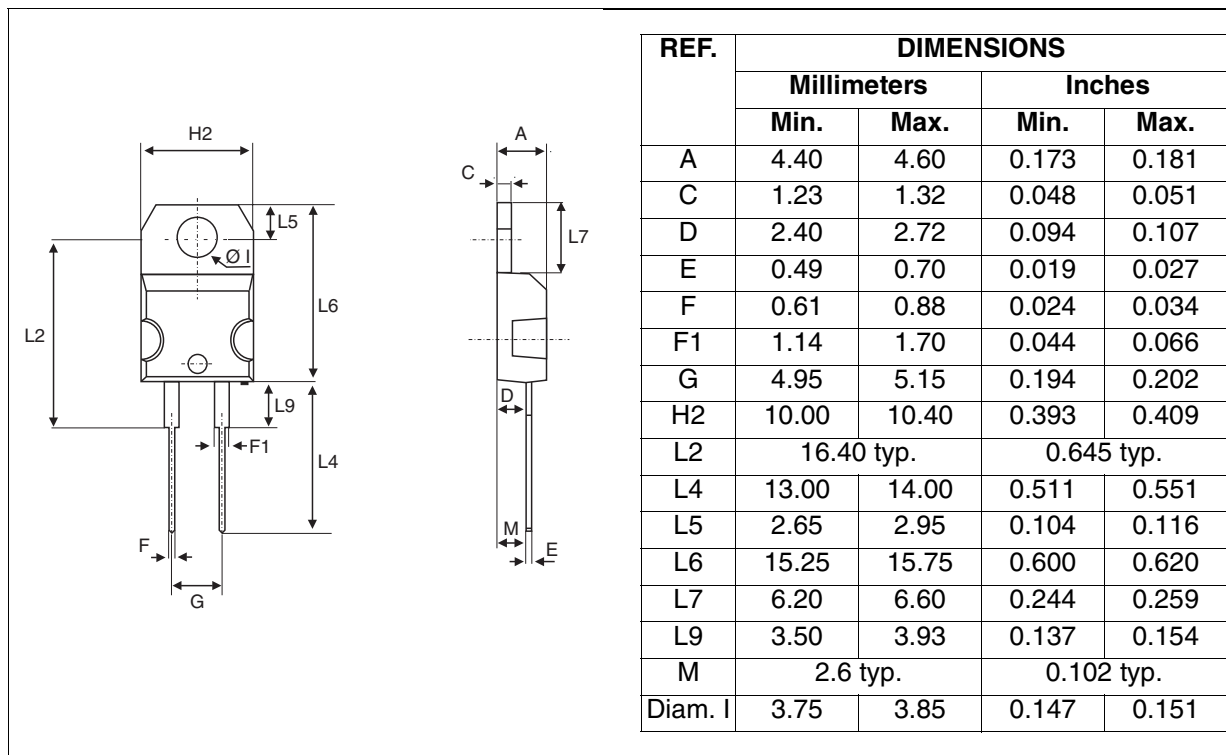


Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30L06D	STTH30L06D	TO-220AC	1.90 g	50	Tube
STTH30L06G	STTH30L06G	D ² PAK	1.48 g	50	Tube
STTH30L06G-TR	STTH30L06G	D ² PAK	1.48 g	1000	Tape & reel
STTH30L06W	STTH30L06W	DO-247	4.40 g	30	Tube
STTH30L06P	STTH30L06P	SOD-93	3.79 g	30	Tube
STTH30L06P	STTH30L06P	DOP3I	4.46 g	30	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
07-Sep-2004	1	First issue.
21-Oct-2004	2	DOP3I package added.

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