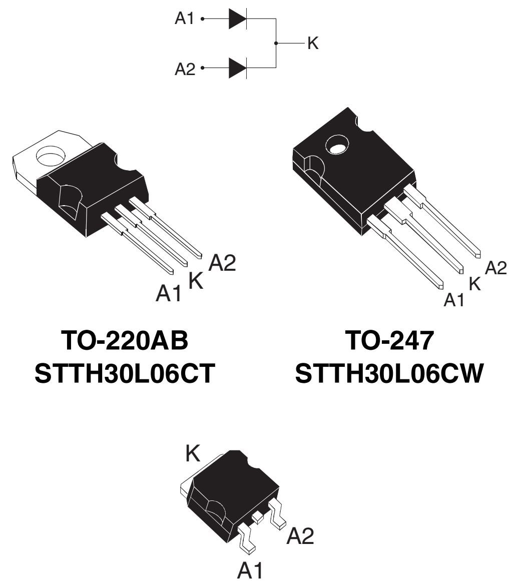
TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

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**



TO-220AB
STTH30L06CT

TO-247
STTH30L06CW

D²PAK
STTH30L06CG

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 $\delta = 0.5$	Tc = 140°C Tc = 125°C	Per diode Per device	15 30	A
		Tc = 120°C Tc = 110°C	Per diode Per device	20 40	
I_{FSM}	Surge non repetitive forward current	tp = 10ms 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	°C/W
		Total	1.15	
$R_{th(c)}$	Coupling		0.6	°C/W

When the diodes 1 and 2 are used simultaneously:
Δ Tj(diode 1) = P(diode 1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 5: Static Electrical Characteristics (per diode)

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

Pulse test: * tp = 5 ms, δ < 2%
** tp = 380 µs, δ < 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°C	I_F = 0.5A Irr = 0.25A I_R =1A			55	ns
			I_F = 1A dI_F/dt = 50 A/µs V_R =30V		60	85	
I_{RM}	Reverse recovery current	T_j = 125°C	I_F = 15A V_R = 400V dI_F/dt = 100 A/µs		8.5	12	A
t_{fr}	Forward recovery time	T_j = 25°C	I_F = 15A dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_{Fmax}			300	ns
V_{FP}	Forward recovery voltage	T_j = 25°C	I_F = 15A dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_{Fmax}		3.0		V

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

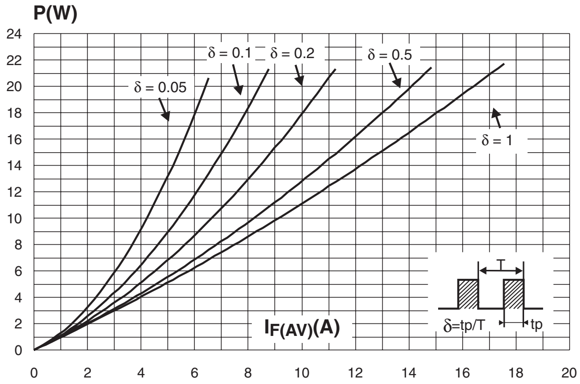


Figure 2: Forward voltage drop versus forward current (per diode)

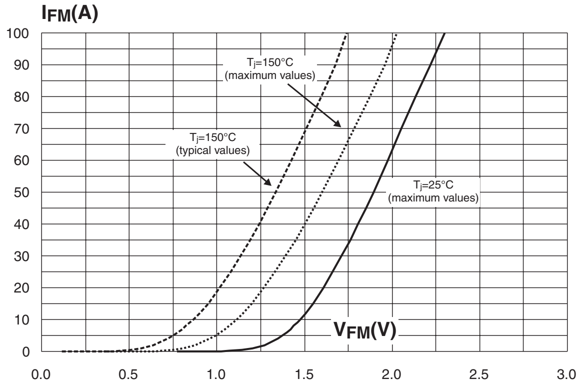


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

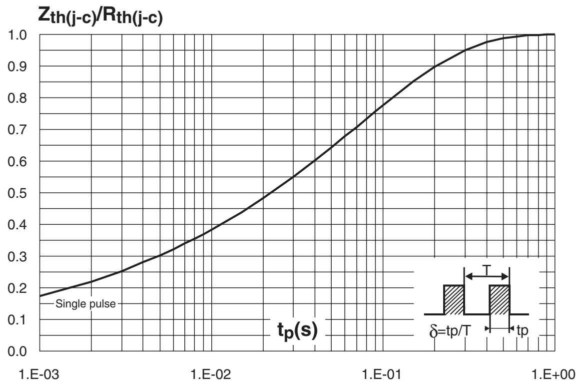


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values, per diode)

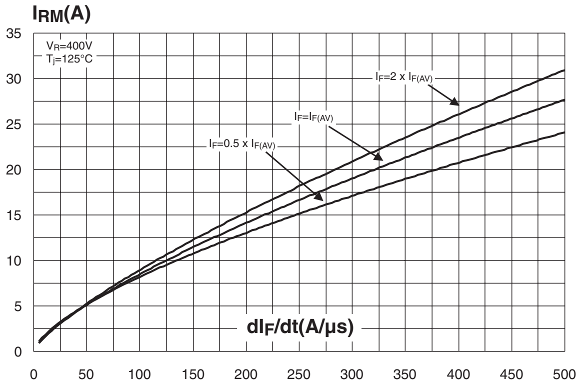


Figure 5: Reverse recovery time versus dI_F/dt (typical values, per diode)

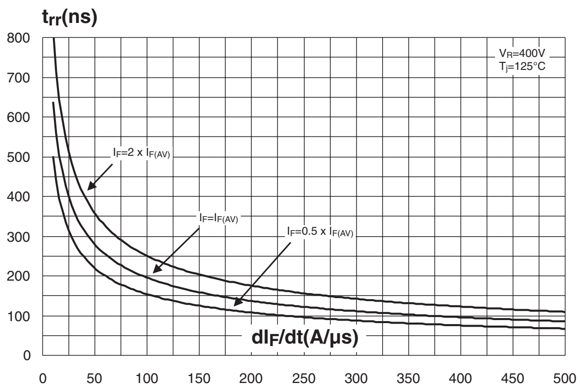


Figure 6: Reverse recovery charges versus dI_F/dt (typical values, per diode)

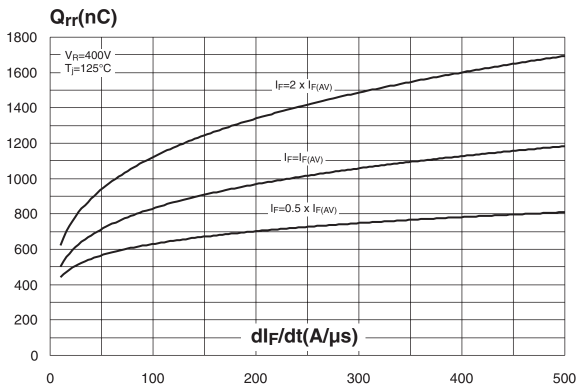


Figure 7: Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

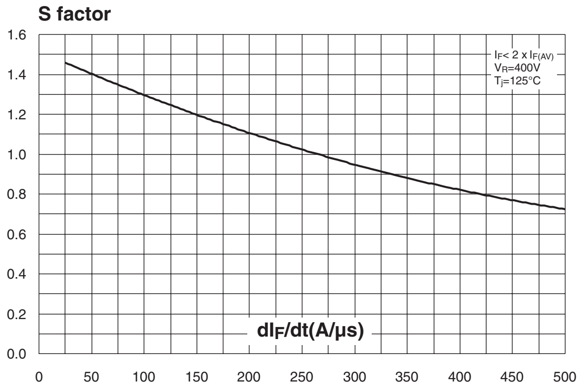


Figure 8: Relative variations of dynamic parameters versus junction temperature

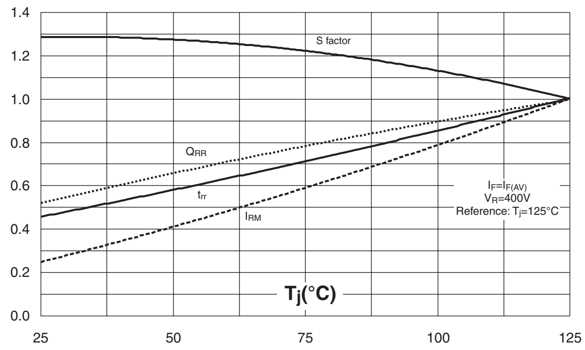


Figure 9: Transient peak forward voltage versus dI_F/dt (typical values, per diode)

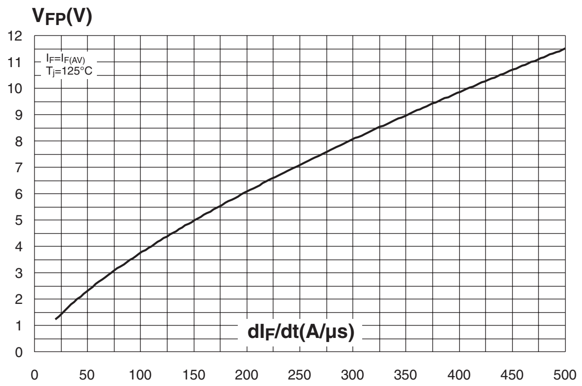


Figure 10: Forward recovery time versus dI_F/dt (typical values, per diode)

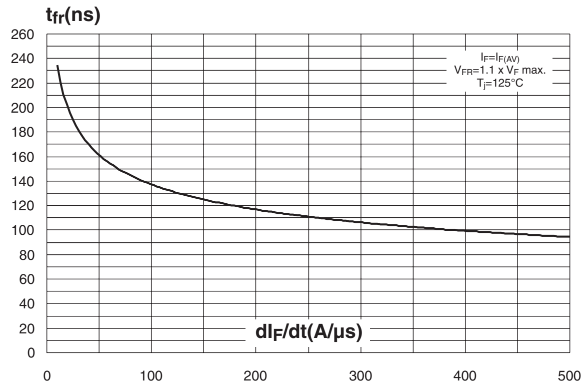


Figure 11: Junction capacitance versus reverse voltage applied (typical values, per diode)

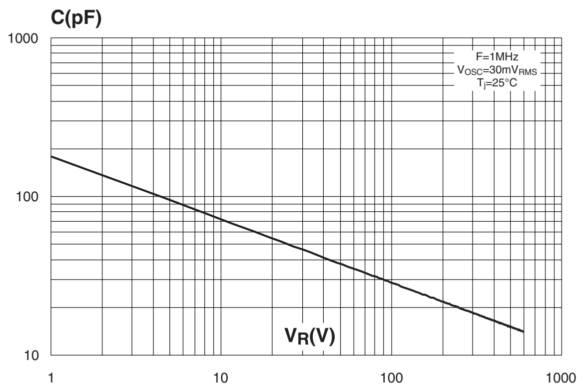


Figure 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, e_{CU}=35µm) (D^2PAK)

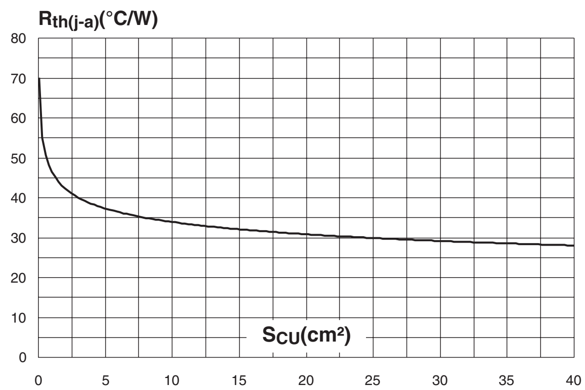
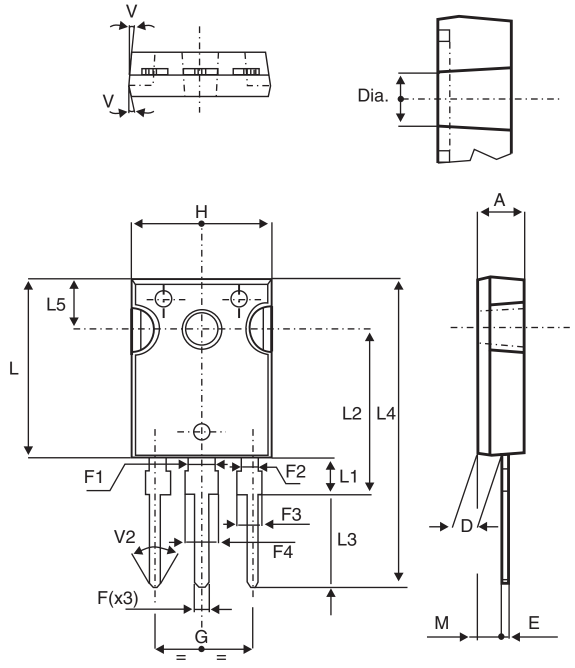
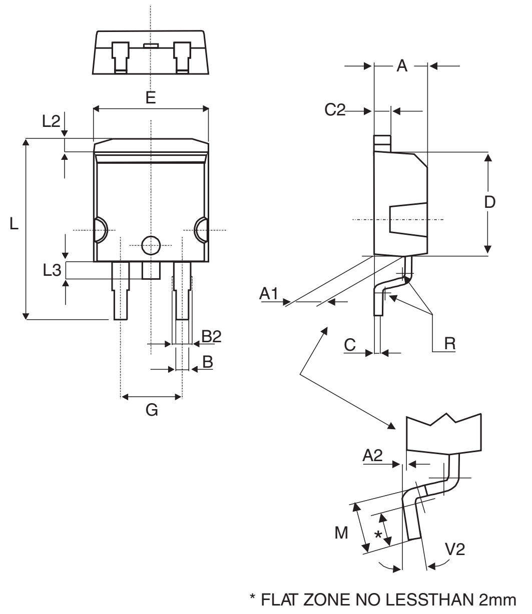


Figure 13: TO-247 Package Mechanical Data



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

Figure 14: D²PAK Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	**Max.**	**Min.**	**Max.**
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 15: D²PAK Foot Print Dimensions
(in millimeters)

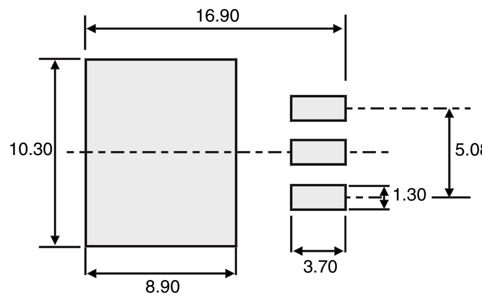
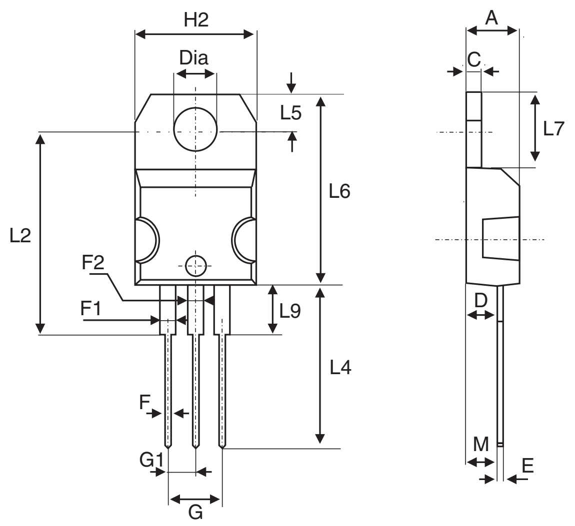


Figure 16: TO-220AB Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151

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^2PAK	1.48 g	50	Tube
STTH30L06CG-TR	STTH30L06CG	D^2PAK	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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- Техническая поддержка проекта;
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