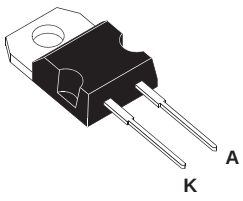
STTH5L06D/B/FP

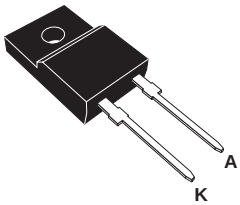
TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

MAIN PRODUCT CHARACTERISTICS

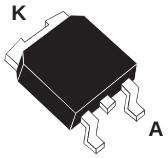
$I_{F(AV)}$	5 A
V_{RRM}	600 V
I_R (max)	125 µA
Tj (max)	175 °C
V_F (max)	1.05 V
trr (max)	95 ns



TO-220AC
STTH5L06D



TO-220FPAC
STTH5L06FP



DPAK
STTH5L06B

FEATURES AND BENEFITS

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

DESCRIPTION

The STTH5L06D/B/FP, which is using ST Turbo 2 600V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.
The device, available in TO-220AC, TO-220FPAC and DPAK, is also intended for use as a free wheeling diode in power supplies and other power switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward current		TO-220AC/TO-220FPAC DPAK	20 10	A
$I_{F(AV)}$	Average forward current	TO-220AC / DPAK	Tc = 150°C δ =0.5	5	A
		TO-220FPAC	Tc = 135°C δ =0.5		
I_{FSM}	Surge non repetitive forward current	tp = 10 ms Sinusoidal tp = 10 ms Sinusoidal	TO-220AC/TO-220FPAC DPAK	90 60	A
T_{stg}	Storage temperature range			- 65 + 175	°C
T_j	Maximum operating junction temperature			+ 175	°C

THERMAL PARAMETERS

Symbol	Parameter		Maximum	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / DPAK	3.5	°C/W
		TO-220FPAC	6.0	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	V_R = 600V	T_j = 25°C			5	µA
			T_j = 150°C		10	125	
V_F	Forward voltage drop	I_F = 5 A	T_j = 25°C			1.3	V
			T_j = 150°C		0.85	1.05	

To evaluate the maximum conduction losses use the following equation :
$P = 0.89 \times I_{F(AV)} + 0.033\ I_F{}^2{}_{(RMS)}$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A dI_F/dt = - 50 A/µs V_R = 30V	T_j = 25°C		65	95	ns
t_{fr}	Forward recovery time	I_F = 5 A dI_F/dt = 100 A/µs V_{FR} = 1.1 x $V_F$max	T_j = 25°C			150	ns
V_{FP}	Forward recovery time	I_F = 5 A dI_F/dt = 100 A/µs	T_j = 25°C			7	V

Fig. 1: Conduction losses versus average current.

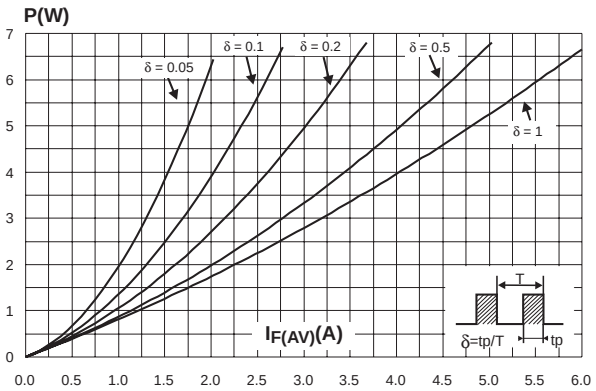


Fig. 2: Forward voltage drop versus forward current.

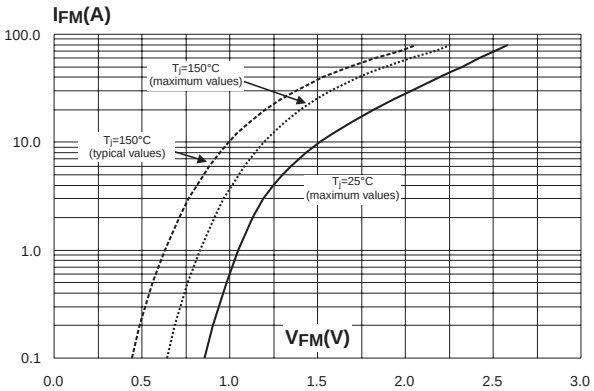


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC, DPAK).

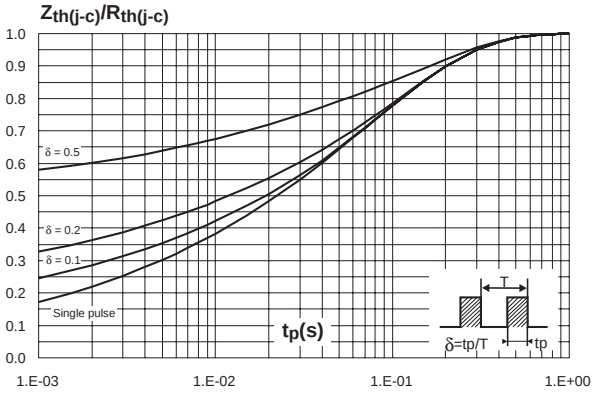


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC).

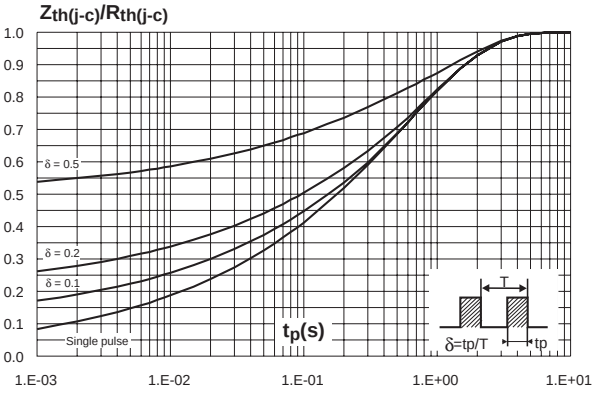


Fig. 4: Peak reverse recovery current versus dI_F/dt (90% confidence).

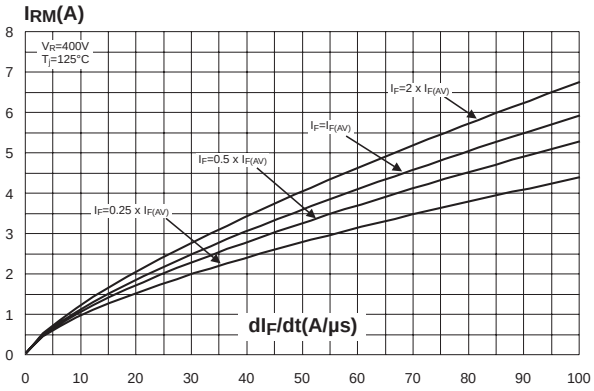


Fig. 5: Reverse recovery time versus dI_F/dt (90% confidence).

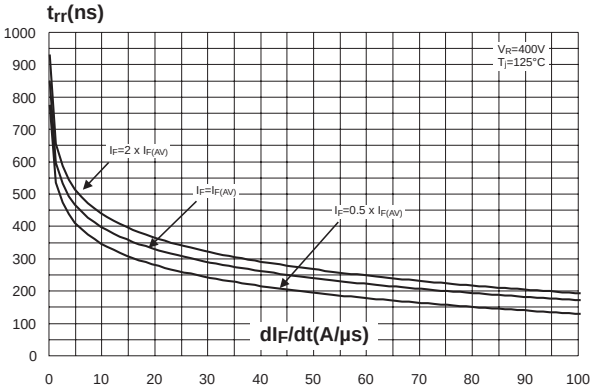


Fig. 6: Reverse recovery charges versus dI_F/dt (90% confidence).

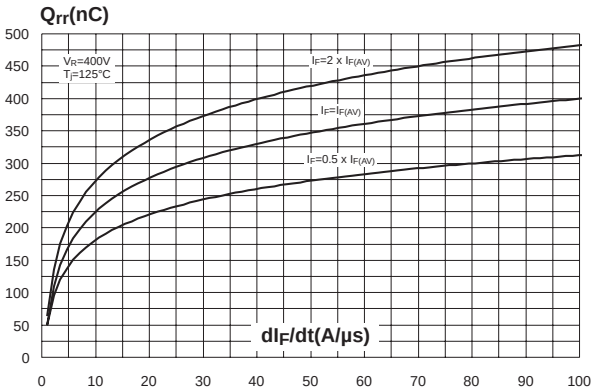


Fig. 7: Softness factor versus dI_F/dt (typical values).

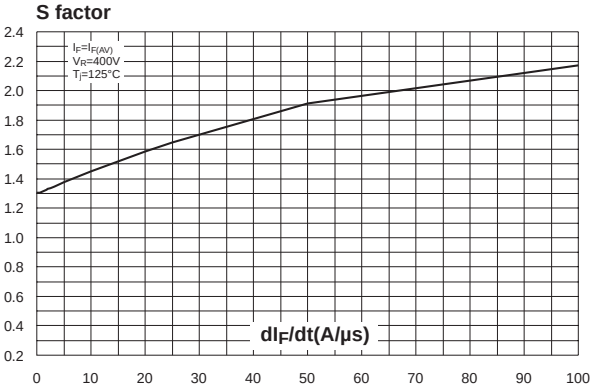


Fig. 8: Relative variations of dynamic parameters versus junction temperature.

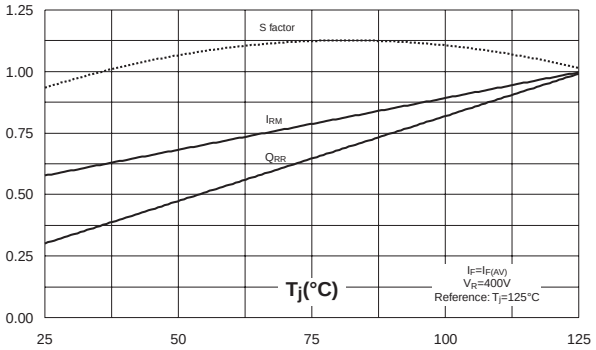


Fig. 9: Transient peak forward voltage versus dI_F/dt (90% confidence).

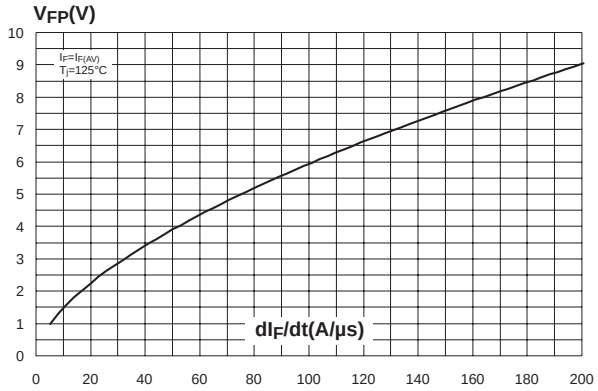


Fig. 10: Forward recovery time versus dI_F/dt (90% confidence).

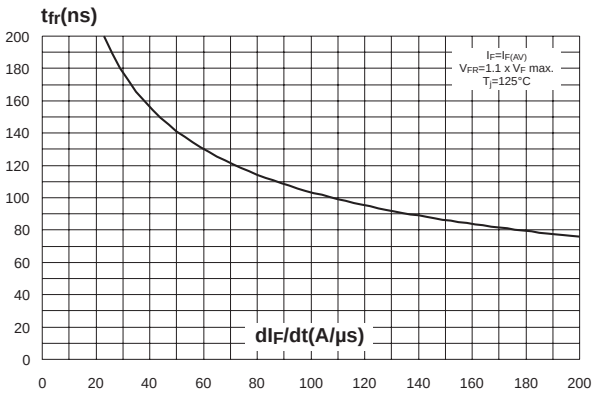


Fig. 11: Junction capacitance versus reverse voltage applied (typical values).

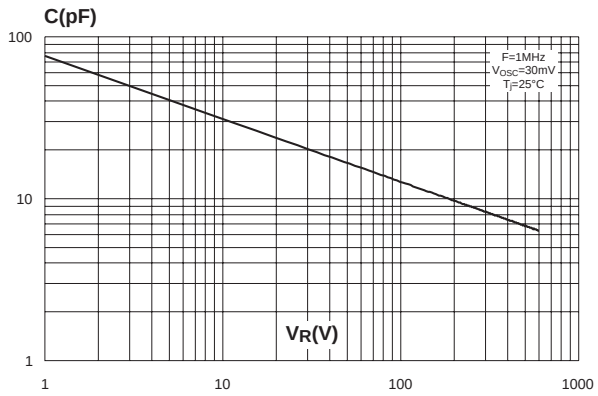
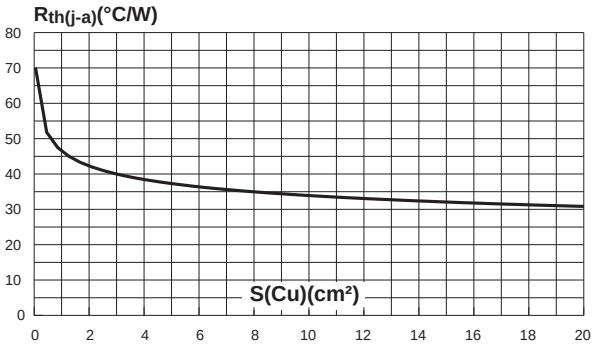
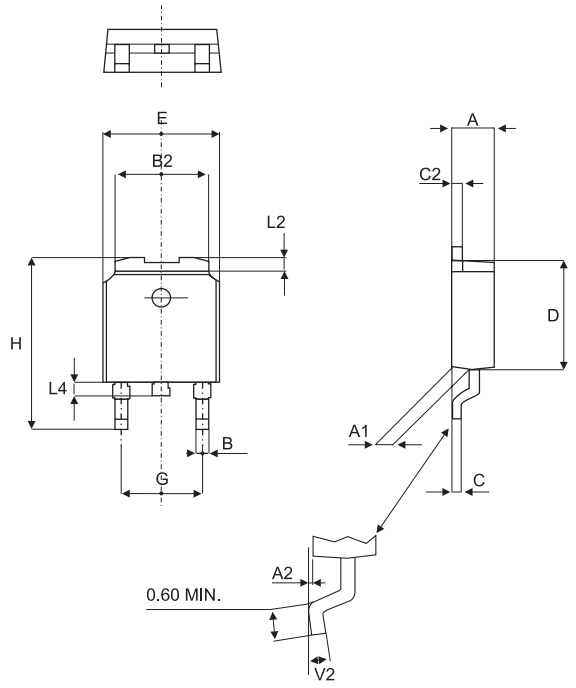


Fig. 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed circuit board FR4, copper thickness: 35µm) (DPAK).



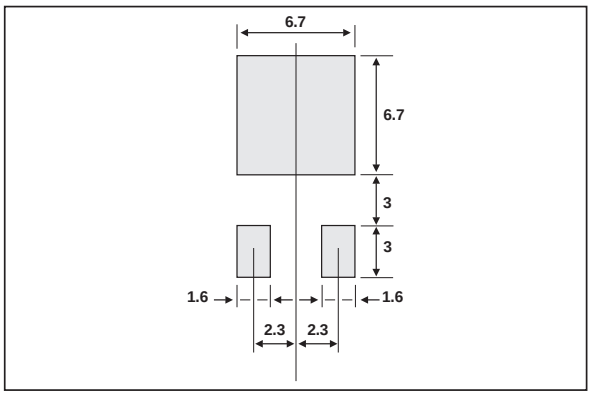
PACKAGE MECHANICAL DATA

DPAK



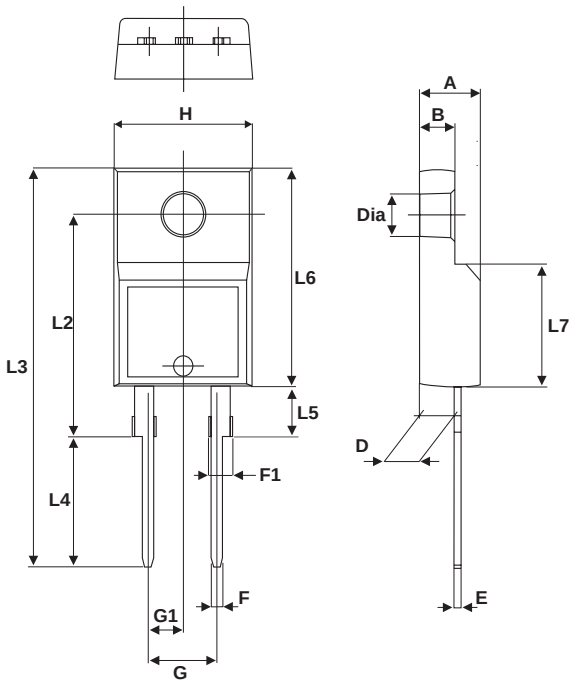
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

FOOTPRINT



PACKAGE MECHANICAL DATA

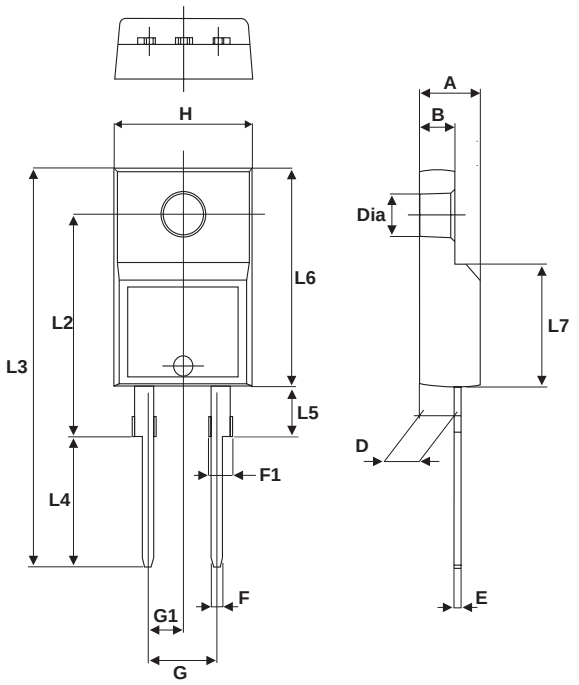
TO-220FPAC



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

PACKAGE MECHANICAL DATA

TO-220AC



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
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	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. I	3.75	3.85	0.147	0.151

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH5L06D	STTH5L06D	TO-220AC	1.9 g	50	Tube
STTH5L06B	STTH5L06B	DPAK	0.3 g	75	Tube
STTH5L06B-TR	STTH5L06B	DPAK	0.3 g	2500	Tape & reel
STTH5L06FP	STTH5L06FP	TO-220PFAC	1.7 g	50	Tube

- Epoxy meets UL 94,V0
- Recommended torque value (TO-220AC): 0.55 Nm
- Maximum torque value (TO-220AC / TO-220FPAC): 0.7 Nm