

HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 15A
V_{RRM}	200 V
T_j (max)	175 °C
V_F (typ)	0.75 V
t_{rr} (typ)	17 ns

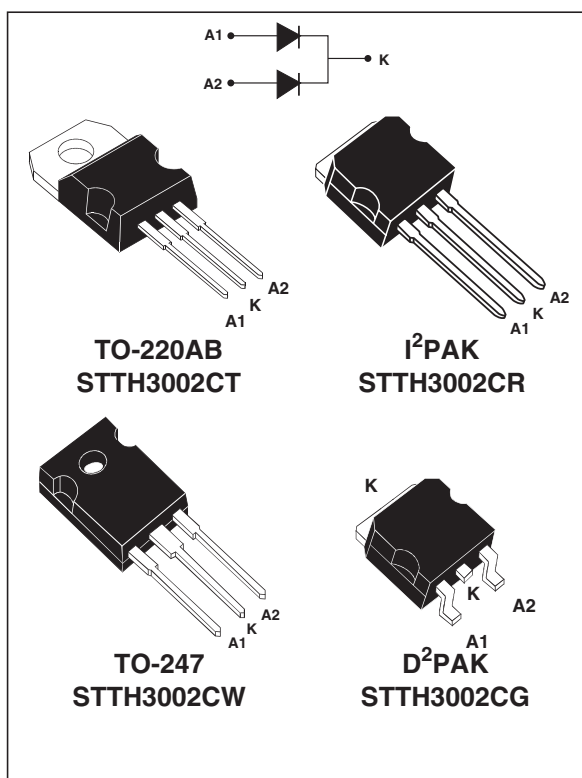
FEATURES AND BENEFITS

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- High surge current capability
- High junction temperature
- Low leakage current

DESCRIPTION

Dual center tap rectifier suited for Switch Mode Power Supplies and High frequency DC to DC converters.

Packaged in TO-220AB, D²PAK, TO-247 and I²PAK, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			200	V
I _{F(RMS)}	RMS forward current			50	A
I _{F(AV)}	Average forward current δ =0.5	T _c = 155°C	Per diode	15	A
		T _c = 145°C	Per device	30	
I _{FSM}	Surge non repetitive forward current	tp = 10 ms Sinusoidal		180	A
T _{stg}	Storage temperature range			- 65 + 175	°C
T _j	Maximum operating junction temperature			175	°C

STTH3002C

THERMAL PARAMETERS

Symbol	Parameter		Maximum	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.5	°C/W
		Per device	1.0	
$R_{th(j-c)}$	Coupling		0.5	°C/W

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P(\text{diode1}) \times R_{th(j-c)} (\text{per diode}) + P(\text{diode2}) \times R_{th(c)}$$

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			20	μA
		$T_j = 125^\circ\text{C}$			10	125	
V_F^{**}	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 15\text{ A}$			1.05	V
		$T_j = 25^\circ\text{C}$	$I_F = 30\text{ A}$			1.18	
		$T_j = 150^\circ\text{C}$	$I_F = 15\text{ A}$		0.75	0.84	
		$T_j = 150^\circ\text{C}$	$I_F = 30\text{ A}$			0.99	

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

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

To evaluate the maximum conduction losses use the following equation :

$$P = 0.69 \times I_{F(AV)} + 0.01 I_F^2 (RMS)$$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$ $V_R = 30\text{V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$		17	22	ns
I_{RM}	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 15\text{ A}$ $V_R = 160\text{V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$		6.0	7.8	A
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 15\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			110	ns
V_{FP}	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 15\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$		2.5		V

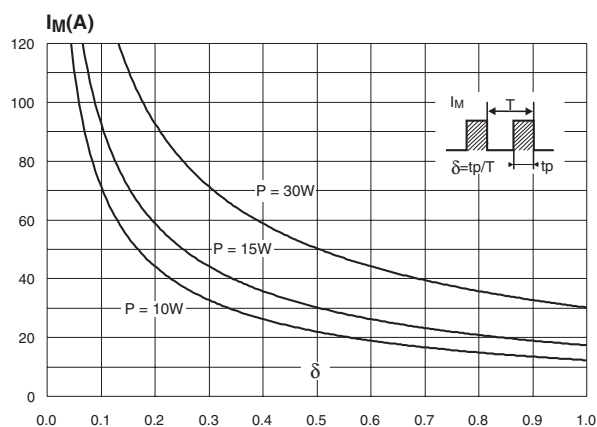
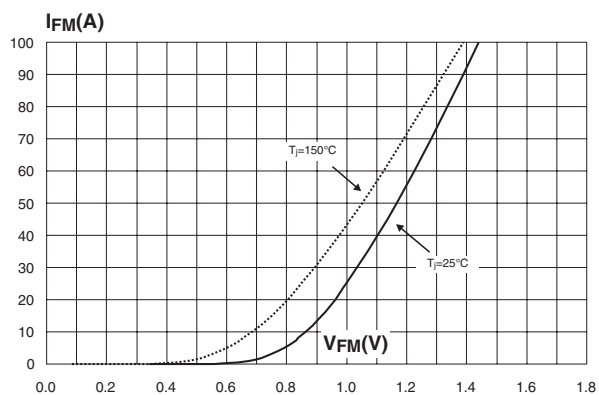
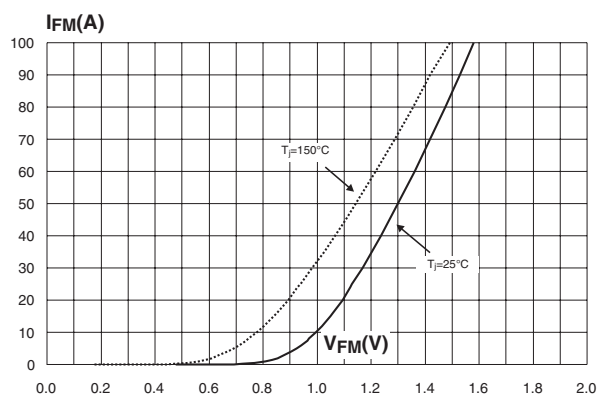
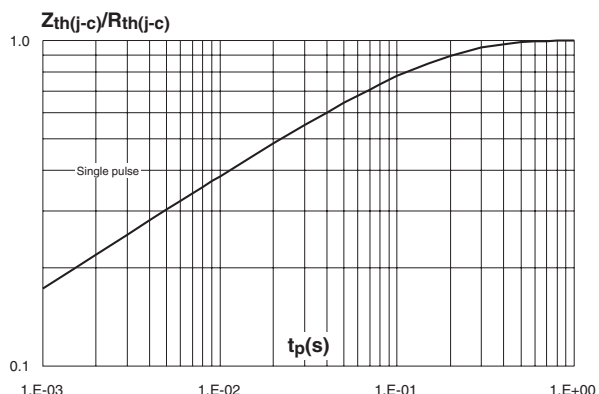
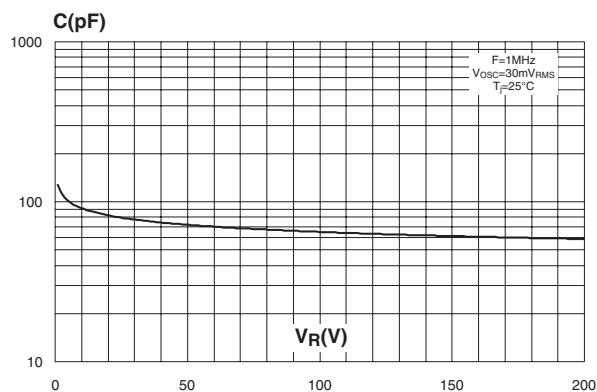
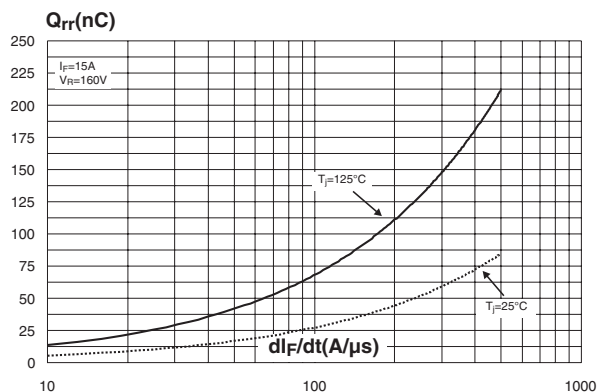
Fig. 1: Peak current versus duty cycle (per diode).**Fig. 2-1:** Forward voltage drop versus forward current (typical values, per diode).**Fig. 2-2:** Forward voltage drop versus forward current (maximum values, per diode).**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.**Fig. 4:** Junction capacitance versus reverse voltage applied (typical values, per diode).**Fig. 5:** Reverse recovery charges versus di_F/dt (typical values, per diode).

Fig. 6: Reverse recovery time versus di_F/dt (typical values, per diode).

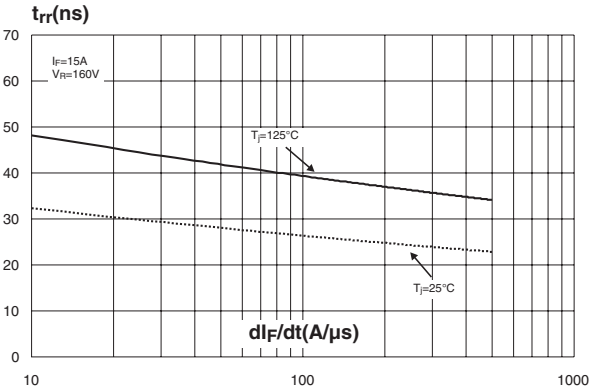


Fig. 7: Peak reverse recovery current versus di_F/dt (typical values, per diode).

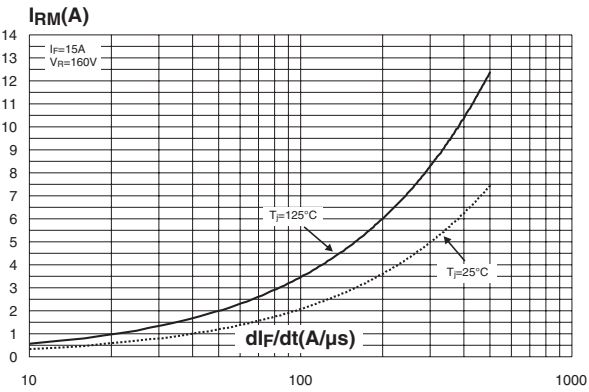


Fig. 8: Dynamic parameters versus junction temperature.

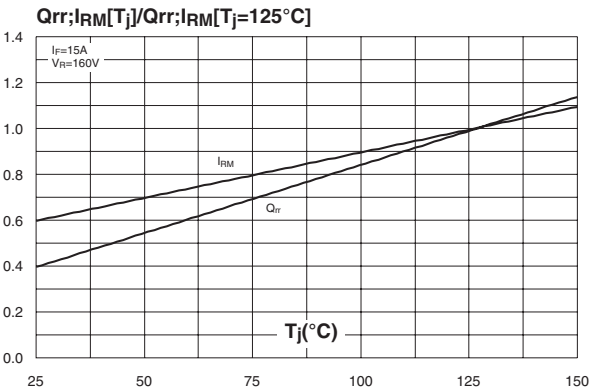
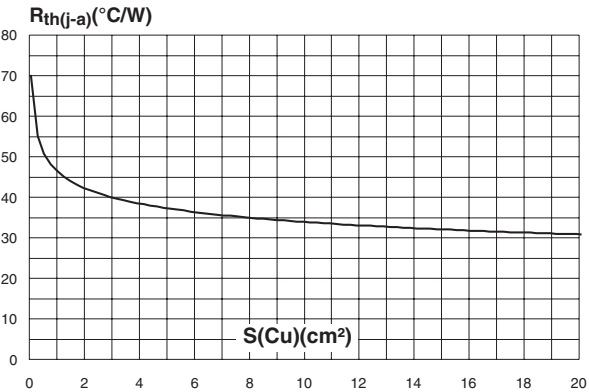


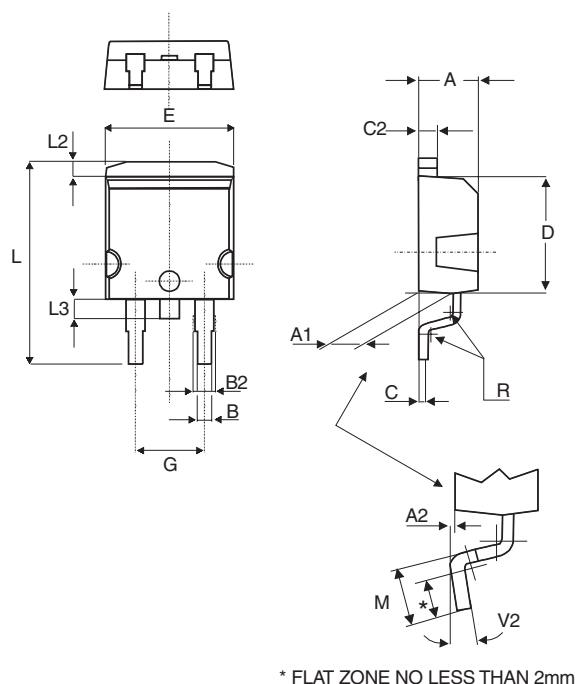
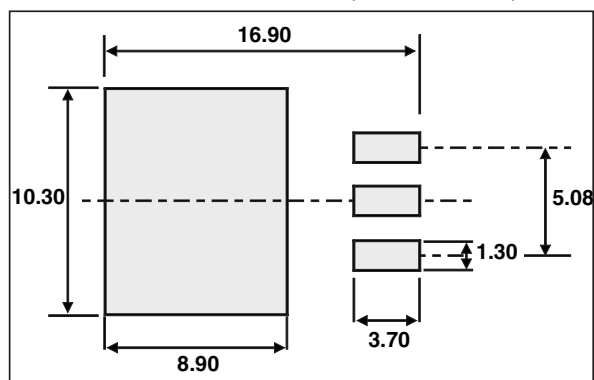
Fig. 9: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, e_{Cu} : 35μm) for D²PAK.



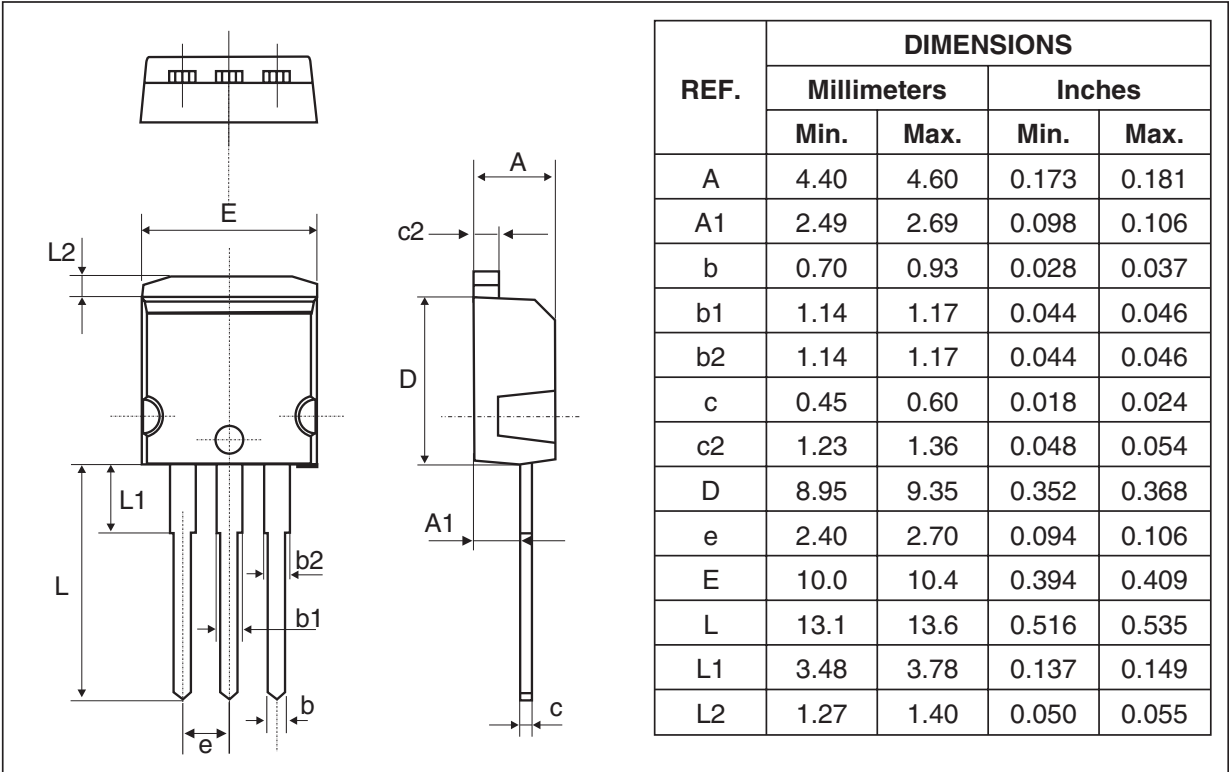
Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH3002CT	STTH3002CT	TO-220AB	2.23 g	50	Tube
STTH3002CG	STTH3002CG	D ² PAK	1.48 g	50	Tube
STTH3002CG-TR	STTH3002CG	D ² PAK	1.48 g	1000	Tape & reel
STTH3002CR	STTH3002CR	I ² PAK	1.49 g	50	Tube
STTH3002CW	STTH3002CW	TO-247	4.46 g	50	Tube

PACKAGE MECHANICAL DATAD²PAK

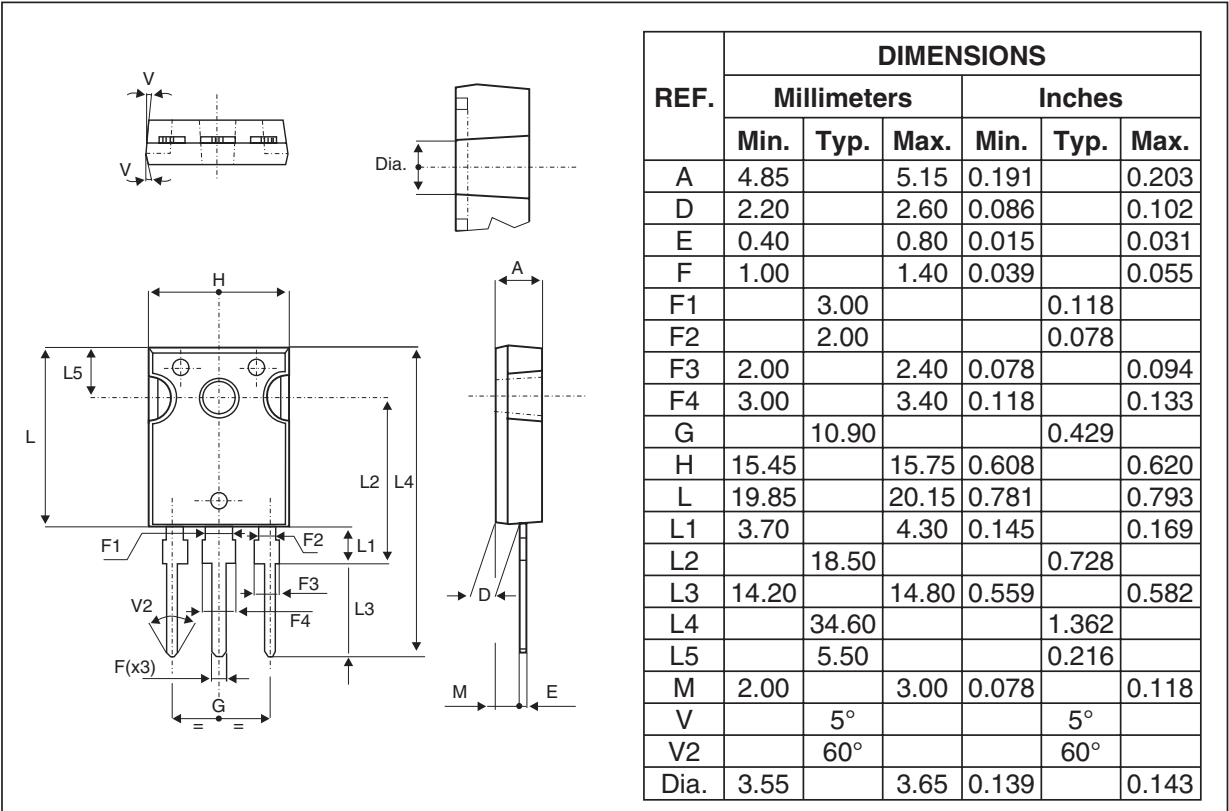
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	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°

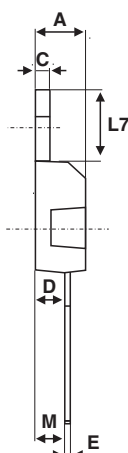
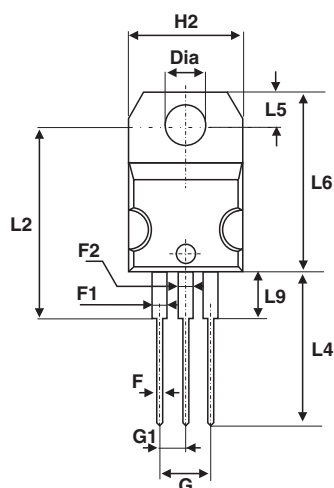
**FOOTPRINT DIMENSIONS** (in millimeters)

PACKAGE MECHANICAL DATA
I²PAK



PACKAGE MECHANICAL DATA
TO-247



PACKAGE MECHANICAL DATA
TO-220AB


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

- Epoxy meets UL94,V0
- Cooling method: by conduction (method C)
- Recommended torque value (TO-220AB): 0.8 N.m.
- Maximum torque value (TO-220AB): 1.0 N.m.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.

All other names are the property of their respective owners.

© 2004 STMicroelectronics - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany -
 Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain -
 Sweden - Switzerland - United Kingdom - United States

www.st.com