



# BYW80F/FP-200

## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

### MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	20 A
$V_{RRM}$	200 V
$T_j$ (max)	150°C
$V_F$ (max)	0.85 V
$t_{rr}$ (max)	35 ns

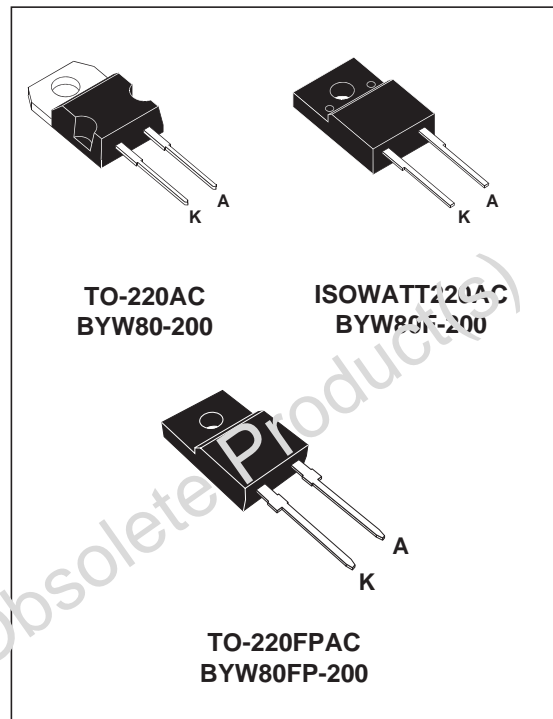
### FEATURES

- Suited for SMPS
- Very low forward losses
- Negligible switching losses
- High surge current capability
- Insulated packages:  
ISOWATT220AC / TO-220FPAC:  
Insulation voltage = 2000 V DC  
Capacitance = 12 pF

### DESCRIPTION

Single chip rectifier suited for Switch Mode Power Supplies and high frequency DC to DC converters.

Packaged in TO-220AC, ISOWATT220AC and TO-220FPAC this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		200	V	
$I_{F(RMS)}$	RMS forward current		20	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AC	$T_c = 120^\circ\text{C}$	10	A
		ISOWATT220AC TO-220FPAC	$T_c = 95^\circ\text{C}$	10	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ms}$ sinusoidal	100	A	
$T_{stg}$	Storage and junction temperature range		- 65 to + 150	°C	
$T_j$	Maximum operating temperature range		+ 150	°C	

## BYW80F/FP-200

### THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	TO-220AC	2.5	°C/W
		ISOWATT220AC / TO-220FPAC	4.7	

### ELECTRICAL CHARACTERISTICS STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> *	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			10	μA
	T <sub>j</sub> = 100°C				1	mA
V <sub>F</sub> **	T <sub>j</sub> = 125°C	I <sub>F</sub> = 7 A			0.85	V
	T <sub>j</sub> = 125°C	I <sub>F</sub> = 15 A			1.05	
	T <sub>j</sub> = 25°C	I <sub>F</sub> = 15 A			1.15	

Pulse test : \* tp = 5 ms, duty cycle < 2 %

\*\* tp = 380 μs, duty cycle < 2 %

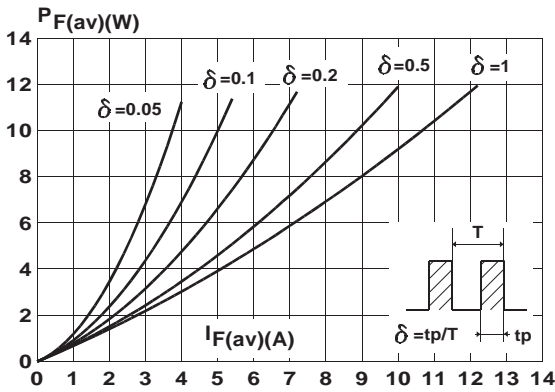
To evaluate the conduction losses use the following equation :

$$P = 0.65 \times I_{F(AV)} + 0.027 \times I_{F(RMS)}^2$$

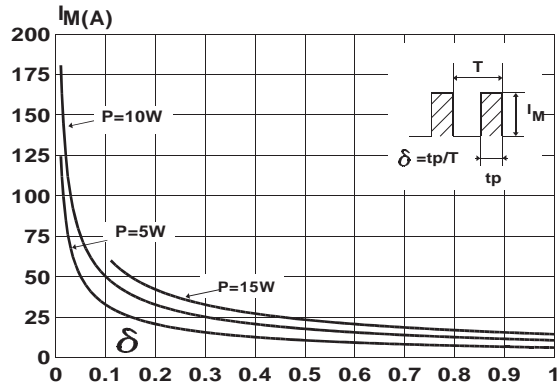
### RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr	T <sub>j</sub> = 25°C	I <sub>F</sub> = 0.5A I <sub>R</sub> = 1A	I <sub>rr</sub> = 0.25A			25	ns
		I <sub>F</sub> = 1A V <sub>R</sub> = 30V	dI <sub>F</sub> /dt = -50A/μs			35	
tfr	T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A V <sub>FR</sub> = 1.1 x V <sub>F</sub>	tr = 10 ns		15		ns
V <sub>FP</sub>	T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A	tr = 10 ns		2		V

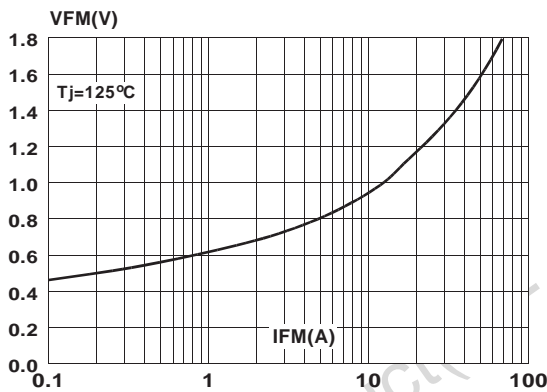
**Fig. 1:** Average forward power dissipation versus average forward current



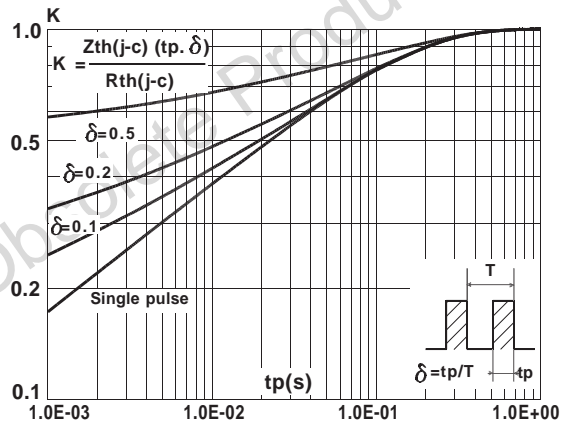
**Fig. 2:** Peak current versus form factor



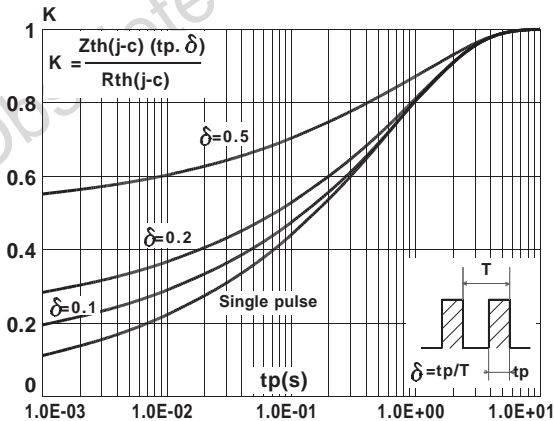
**Fig. 3:** Forward voltage drop versus forward current (maximum values)



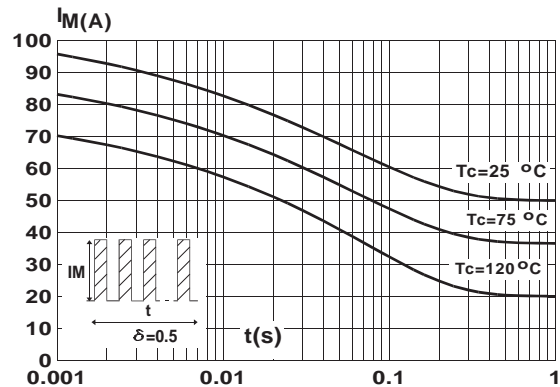
**Fig. 4:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC)



**Fig. 5:** Relative variation of thermal impedance junction to case versus pulse duration. (ISOWATT220AC / TO-220FPAC)

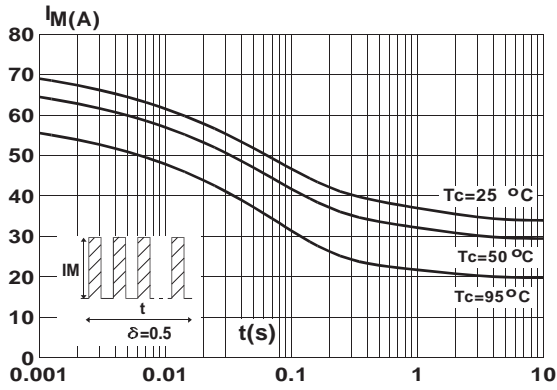


**Fig. 6:** Non repetitive surge peak forward current versus overload duration (TO-220AC)

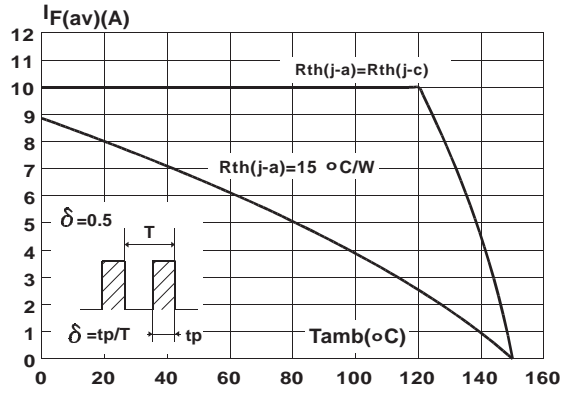


**BYW80F/FP-200**

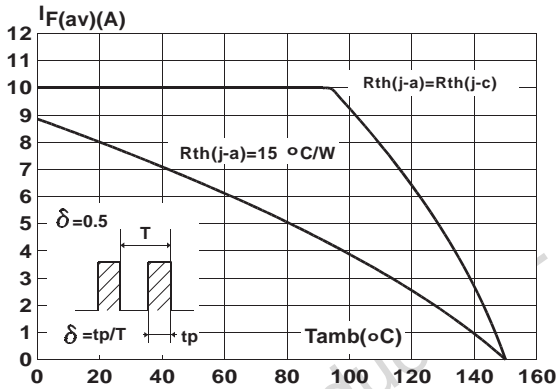
**Fig. 7:** Non repetitive surge peak forward current versus overload duration (ISOWATT220AC / TO-220FPAC)



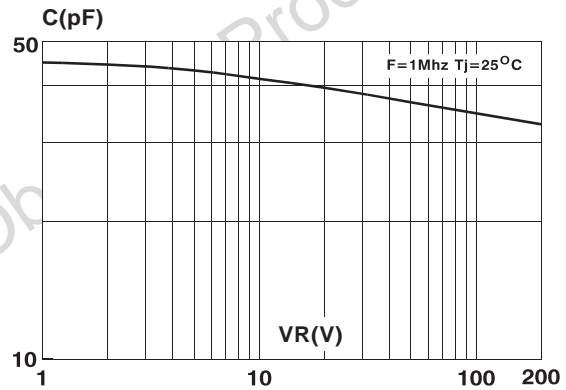
**Fig. 8:** Average current versus ambient temperature (duty cycle : 0.5) (TO-220AC)



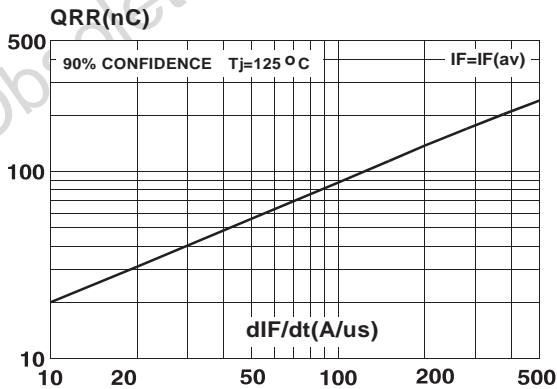
**Fig. 9:** Average current versus ambient temperature (duty cycle: 0.5) (ISOWATT220AC / TO-220FPAC)



**Fig. 10:** Junction capacitance versus reverse voltage applied (Typical values)



**Fig. 11:** Recovery charges versus  $dI_F/dt$ .



**Fig. 12:** Peak reverse current versus  $dI_F/dt$ .

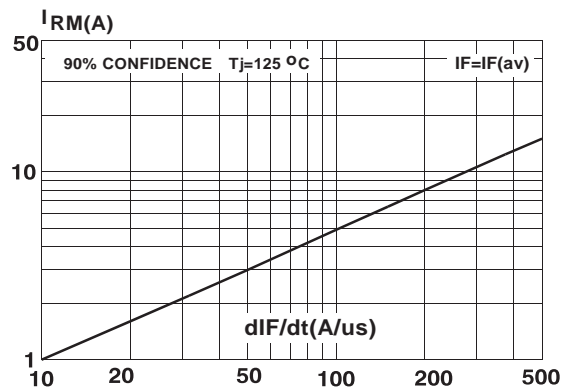
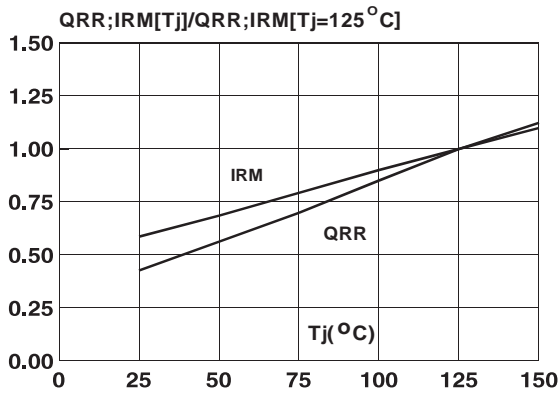
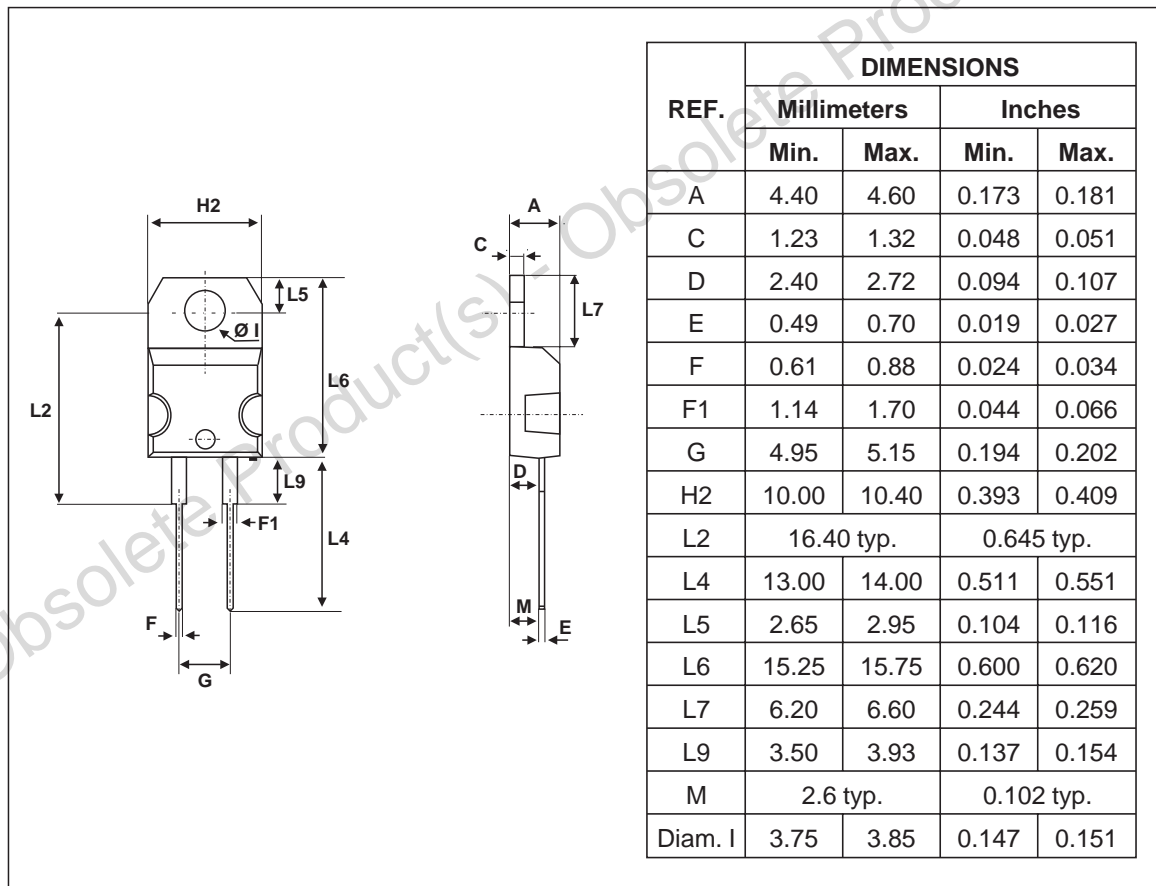


Fig. 13: Dynamic parameters versus junction temperature

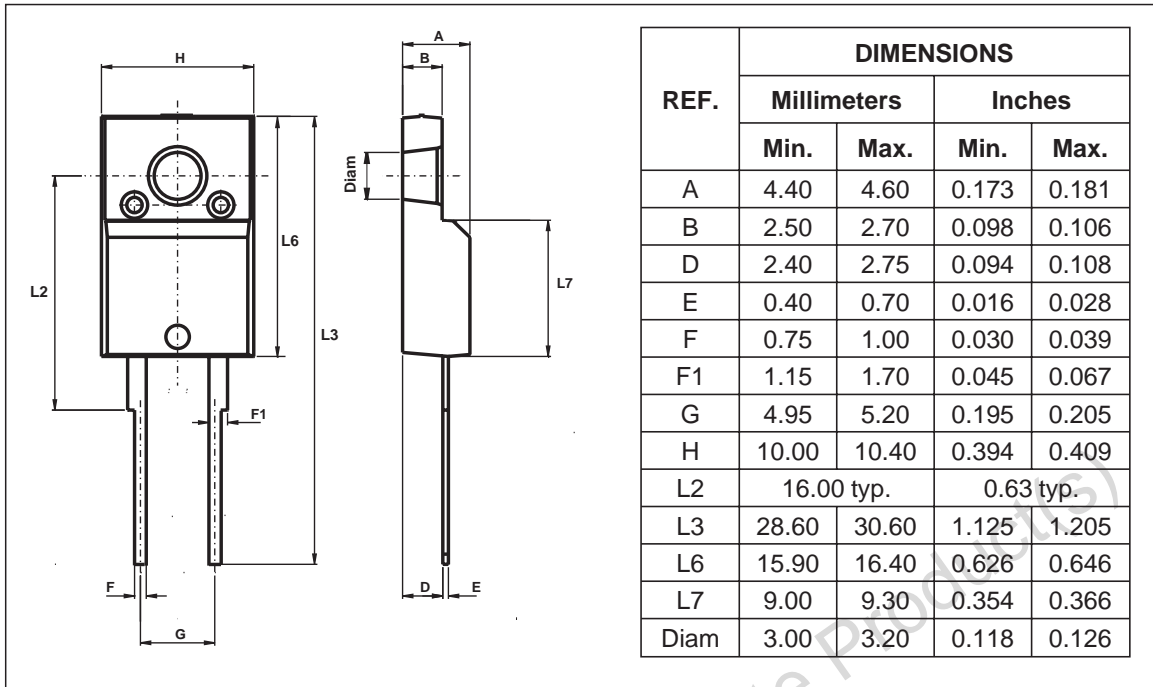


PACKAGE MECHANICAL DATA  
TO-220AC (JEDEC outline)

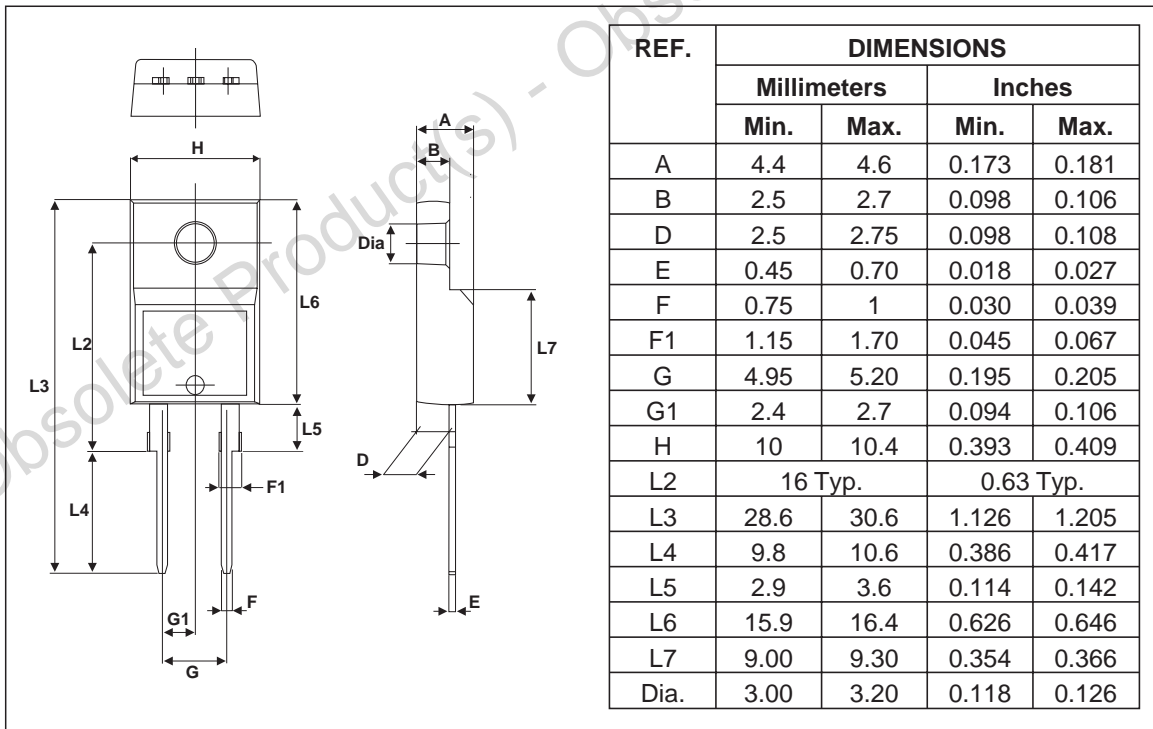


## BYW80F/FP-200

### PACKAGE MECHANICAL DATA ISOWATT220AC (JEDEC outline)



### PACKAGE MECHANICAL DATA TO-220FPAC



## BYW80F/FP-200

---

Type	Marking	Package	Weight	Base Qty	Delivery mode
BYW80-200	BYW80-200	TO-220AC	2.3 g	50	Tube
BYW80F-200	BYW80F-200	ISOWATT220AC	2 g	50	Tube
BYW80FP-200	BYW80FP-200	TO-220FPAC	1.8 g	50	Tube

- Cooling method: by conduction (C)
- Recommended torque value (ISOWATT220AC, TO-220FPAC): 0.55 nm
- Maximum torque value (ISOWATT220AC, TO-220FPAC): 0.7 Nm
- Recommended torque value (TO-220AC): 0.8 Nm
- Maximum torque value (TO-220AC): 1.0 Nm
- Epoxy meets UL94, V0

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

© 2002 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

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

<http://www.st.com>

