

HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	1 A
V_{RRM}	400 V
$T_j(\text{max})$	150°C
$V_F(\text{max})$	1.4 V
$t_{rr}(\text{max})$	25 ns

FEATURES AND BENEFITS

- Very low conduction losses
- Negligible switching losses
- Low forward & reverse recovery times

DESCRIPTION

The BYT01-400 which is using ST's 400V planar technology, is specially suited for switching mode base drive & transistor circuits.

The device, which is available in axial (DO-15) package, 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}	Repetive peak reverse voltage		400	V
$I_{F(AV)}$	Average forward current	$T_I = 80^\circ\text{C}$ $\delta = 0.5$	1	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ms}$ Sinusoidal	30	A
T_{stg}	Storage temperature range		- 65 to +150	°C
T_j	Maximum operating junction temperature		150	°C

BYT01-400

THERMAL PARAMETERS

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient*	45	°C/W

* On infinite heatsink with 10mm lead length.

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameters	Test Conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			20	μA
		$T_j = 100^\circ\text{C}$			0.1	0.5	mA
V_F^{**}	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 1\text{A}$			1.5	V
		$T_j = 100^\circ\text{C}$			1.0	1.4	

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:

$$P = 1.1 \times I_{F(AV)} + 0.25 I_{F(RMS)}^2$$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$ $I_R = 1\text{A}$ $I_{rr} = 0.25\text{A}$		16	25	ns
			$I_F = 1\text{A}$ $di_F/dt = -15\text{A}/\mu\text{s}$ $V_R = 30\text{V}$			55	
t_{fr}	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 1\text{A}$ $di_F/dt = 50\text{A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$		60		ns
V_{FP}	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 1\text{A}$ $di_F/dt = 50\text{A}/\mu\text{s}$		9.5		V

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

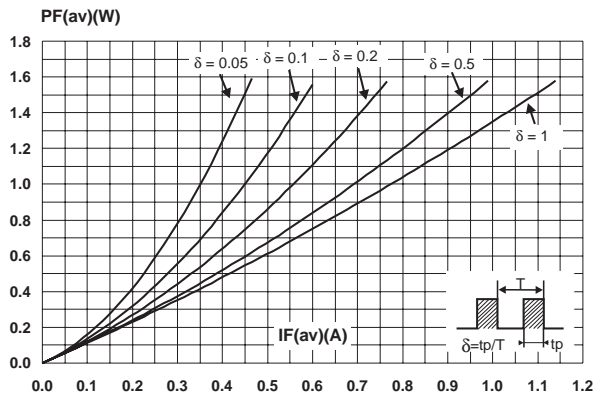


Fig. 2: Average forward current versus ambient temperature ($\delta = 0.5$).

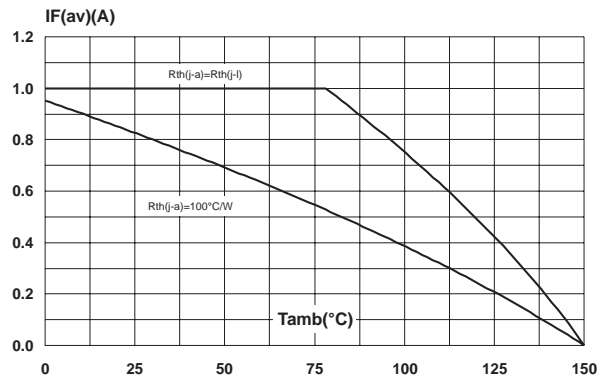


Fig. 3: Thermal resistance versus lead length.

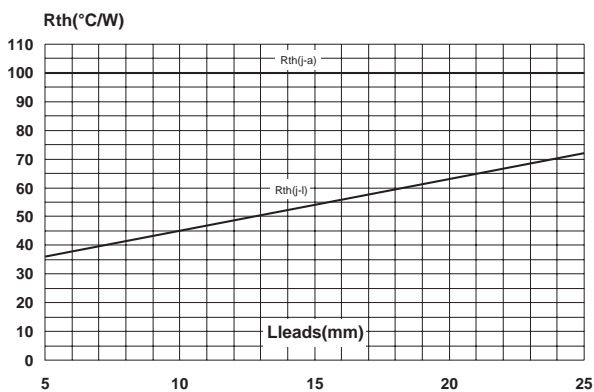


Fig. 4: Relative variation of thermal impedance junction ambient versus pulse duration (printed circuit board epoxy FR4, Leads = 10mm).

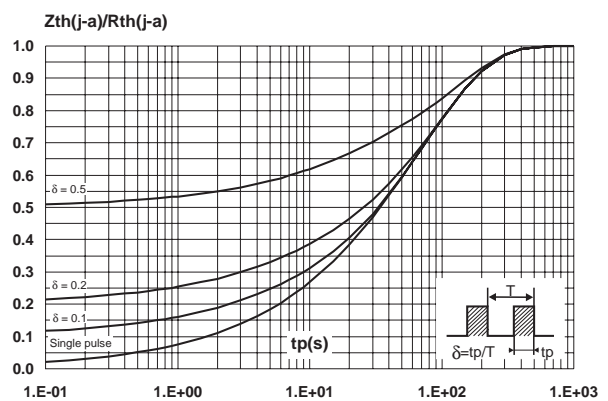


Fig. 5: Forward voltage drop versus forward current.

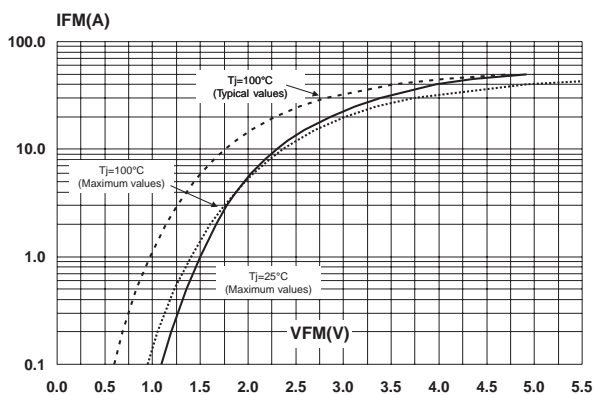


Fig. 6: Junction capacitance versus reverse voltage applied (typical values).

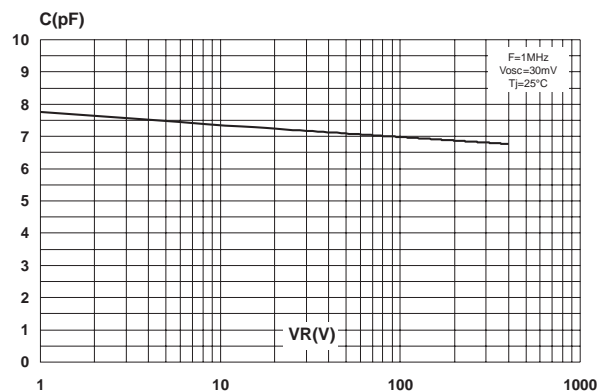


Fig. 7: Forward recovery time versus dI_F/dt (90% confidence).

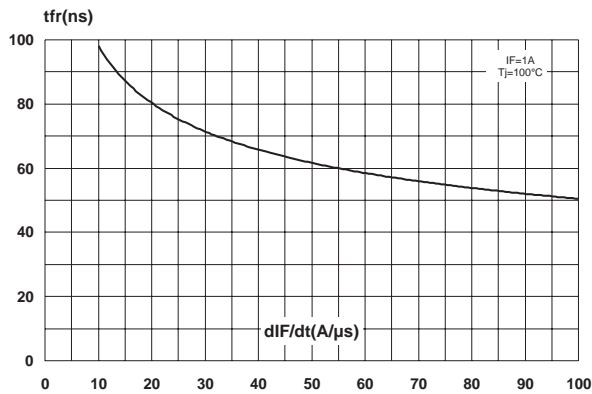


Fig. 8: Transient peak forward voltage versus dI_F/dt (90% confidence).

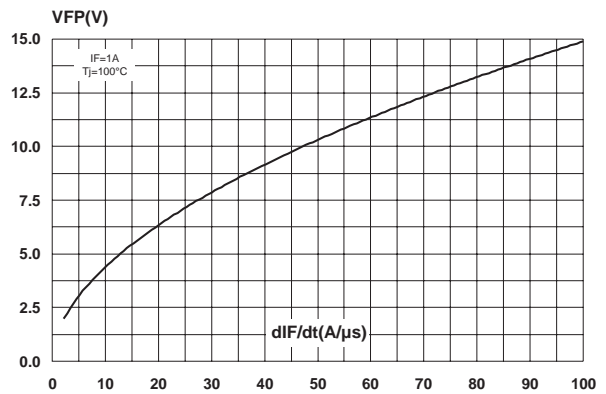


Fig. 9: Peak reverse recovery current versus dI_F/dt (90% confidence).

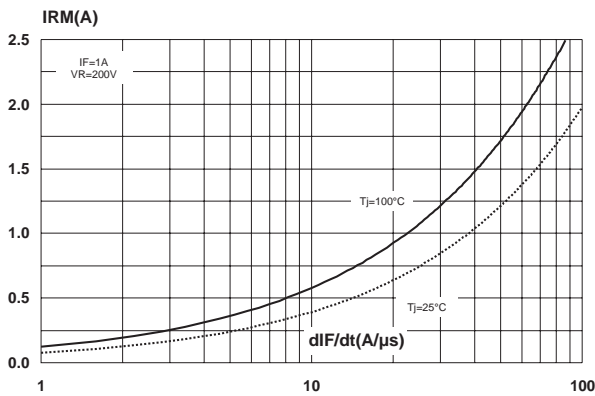


Fig. 10: Dynamic parameters versus junction temperature.

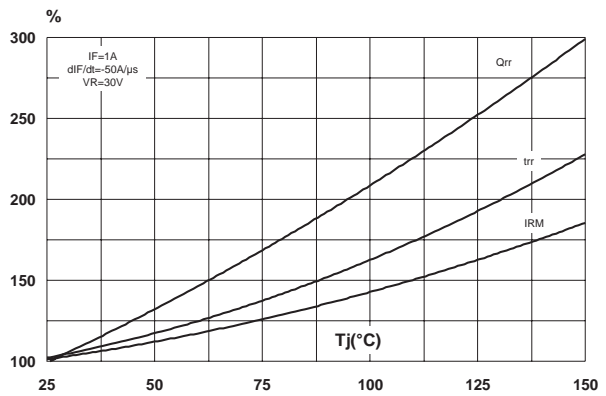
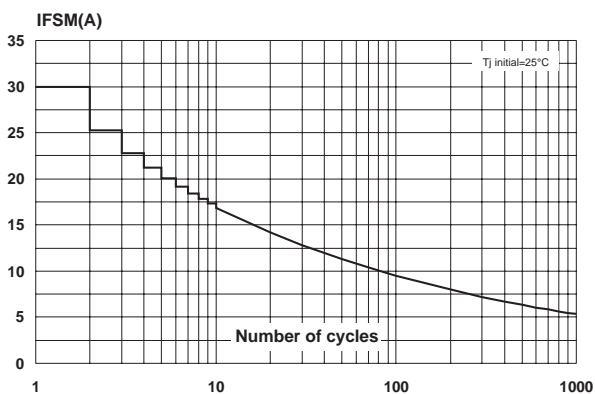
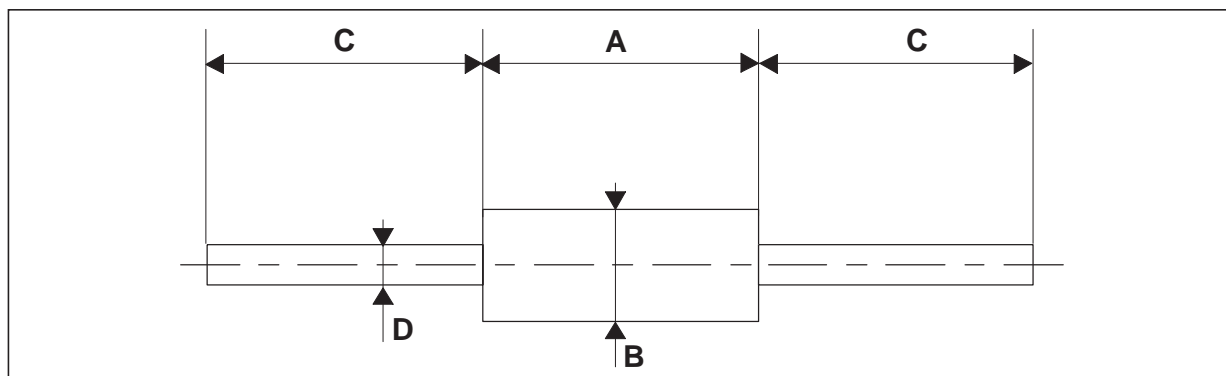


Fig. 11: Non repetitive surge peak current versus number of cycles.



PACKAGE MECHANICAL DATA

DO-15



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	6.05	6.75	0.238	0.266
B	2.95	3.53	0.116	0.139
C	26	31	1.024	1.220
D	0.71	0.88	0.028	0.035

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
BYT01-400	BYT01-400	DO-15	0.4 g	1000	Ammopack
BYT01-400RL	BYT01-400	DO-15	0.4 g	6000	Tape & Reel

- Cooling method: by conduction (method A)
- Epoxy meets UL 94,V0
- Bending method: Application note AN1471

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

© 2001 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>