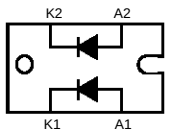
SGS-THOMSON MICROELECTRONICS

# BYT230PIV-1000
# BYT231PIV-1000

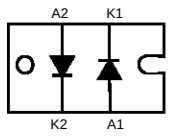
## FAST RECOVERY RECTIFIER DIODES

### FEATURES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 $V_{RMS}$
  Capacitance = 45 pF




**BYT231PIV-1000**

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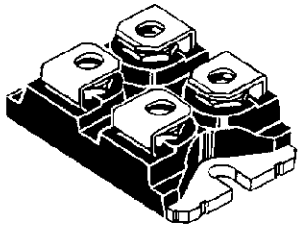


**ISOTOP**™
(Plastic)

### DESCRIPTION

Dual high voltage rectifiers suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.

### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 1000 | V |
| $I_{FRM}$ | Repetitive peak forward current | tp ≤ 10µs | | 375 | A |
| $I_{F(RMS)}$ | RMS forward current | | Per diode | 70 | A |
| $I_{F(AV)}$ | Average forward current | Tc=55°C δ = 0.5 | Per diode | 30 | A |
| $I_{FSM}$ | Surge non repetitive forward current | tp=10ms sinusoidal | Per diode | 200 | A |
| Tstg<br>Tj | Storage and junction temperature range | | | - 40 to + 150<br>- 40 to + 150 | °C<br>°C |

TM : ISOTOP is a trademark of **SGS-THOMSON Microelectronics**.

## THERMAL RESISTANCE

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| Rth (j-c) | Junction to case | Per diode | 1.5 | °C/W |
| | | Total | 0.8 | |
| Rth (c) | Coupling | | 0.1 | °C/W |

When the diodes 1 and 2 are used simultaneously :
$\Delta$ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

## ELECTRICAL CHARACTERISTICS (Per diode)
## STATIC CHARACTERISTICS

| Symbol | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_F$ * | $T_j$ = 25°C | $I_F$ = 30 A | | | 1.9 | V |
| | $T_j$ = 100°C | | | | 1.8 | |
| $I_R$ ** | $T_j$ = 25°C | $V_R = V_{RRM}$ | | | 100 | µA |
| | $T_j$ = 100°C | | | | 5 | mA |

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

## RECOVERY CHARACTERISTICS

| Symbol | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| trr | $T_j$ = 25°C | $I_F$ = 0.5A Irr = 0.25A $I_R$ = 1A | | | 70 | ns |
| | | $I_F$ = 1A $dI_F/dt$ = -15A/µs $V_R$ = 30V | | | 165 | |

## TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

| Symbol | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $t_{IRM}$ | $dI_F/dt$ = -120A/µs | $V_{CC}$ = 200V $I_F$ = 30A Lp ≤ 0.05µH $T_j$ = 100°C see fig. 11 | | | 200 | ns |
| | $dI_F/dt$ = -240A/µs | | | 120 | | |
| $I_{RM}$ | $dI_F/dt$ = -120A/µs | | | | 19.5 | A |
| | $dI_F/dt$ = -240A/µs | | | 22 | | |

## TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

| Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $C = \frac{V_{RP}}{V_{CC}}$ | $T_j$ = 100°C $V_{CC}$ = 200V $I_F = I_{F(AV)}$ $dI_F/dt$ = -30A/µs Lp = 5µH see fig.12 | | | 4.5 | / |

To evaluate the conduction losses use the following equation :
$P = 1.47 \times I_{F(AV)} + 0.010 \times I_F{}^2{}_{(RMS)}$

**Fig.1 :** Low frequency power losses versus average current.

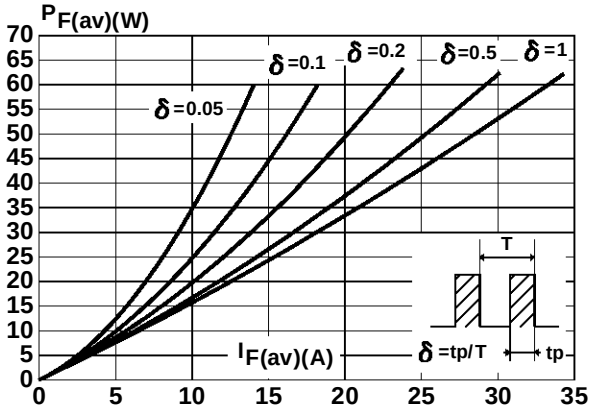



**Fig.2 :** Peak current versus form factor.

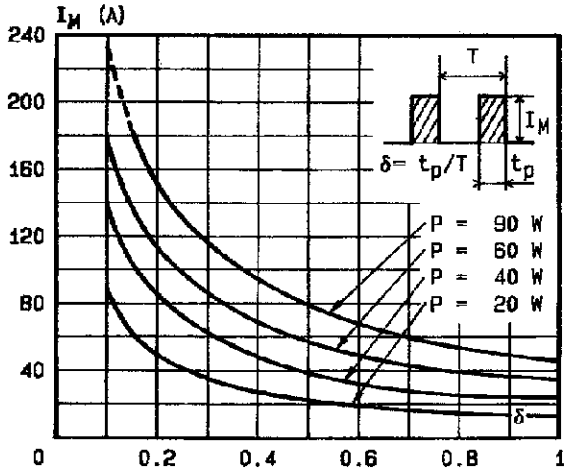



**Fig.3 :** Non repetitive peak surge current versus overload duration.

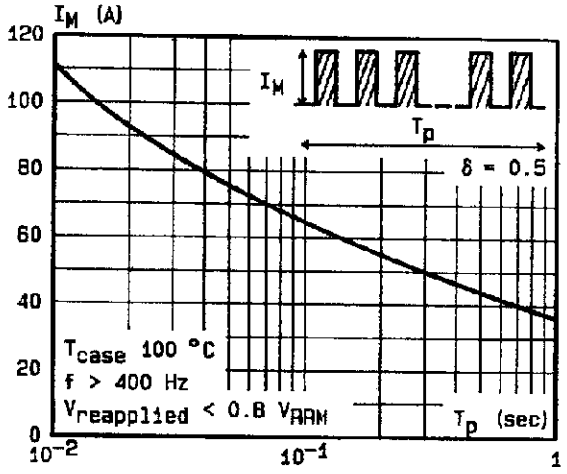



**Fig.4 :** Relative variation of thermal impedance junction to case versus pulse duration.

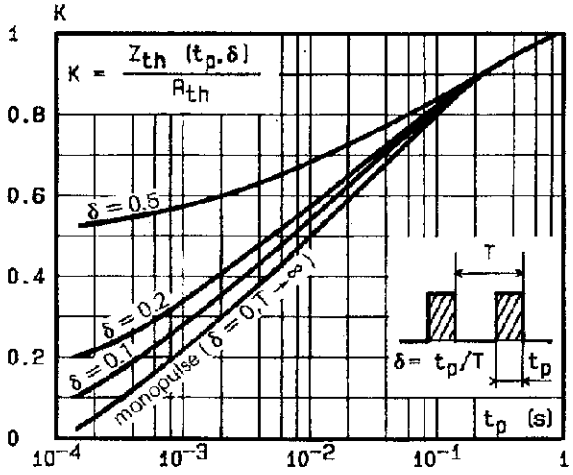



**Fig.5 :** Voltage drop versus forward current.

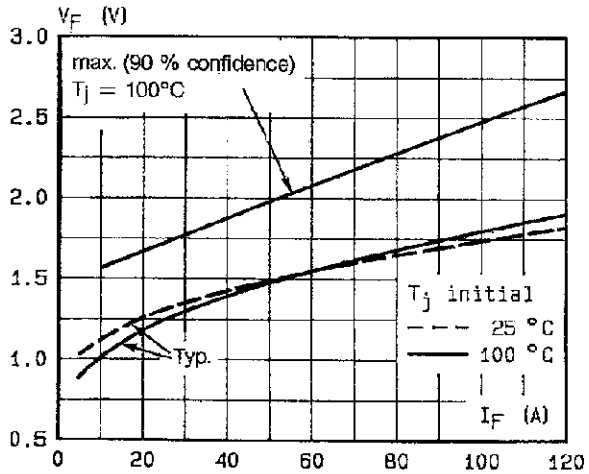



**Fig.6 :** Recovery charge versus $dI_F/dt$.

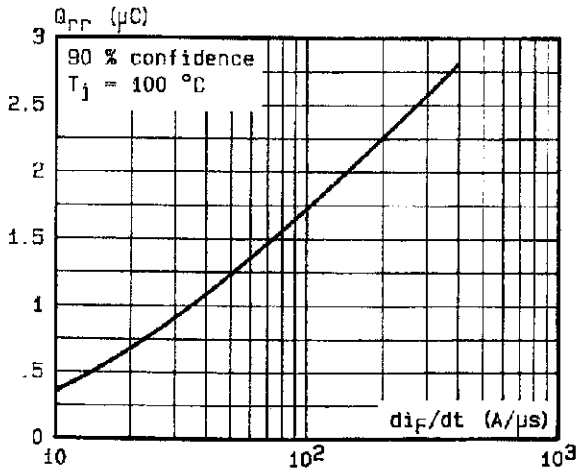


**Fig.7 :** Recovery time versus $dI_F/dt$.

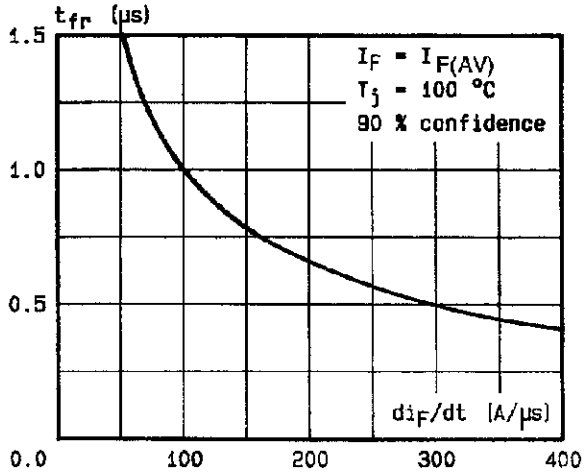



**Fig.8 :** Peak reverse current versus dIF/dt.

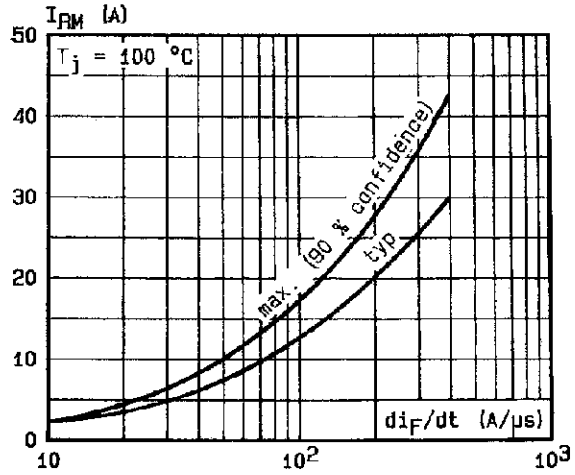



**Fig.9 :** Peak forward voltage versus $dI_F/dt$.

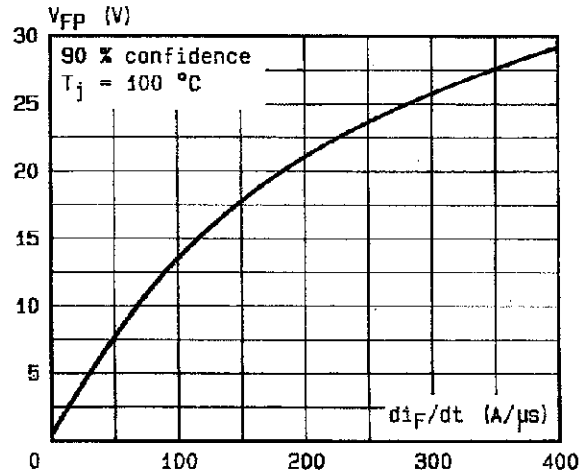



**Fig.10 :** Dynamic parameters versus junction temperature.

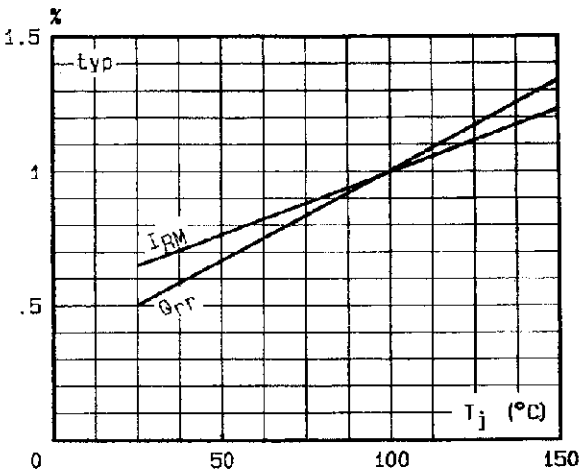



**Fig.11 :** TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

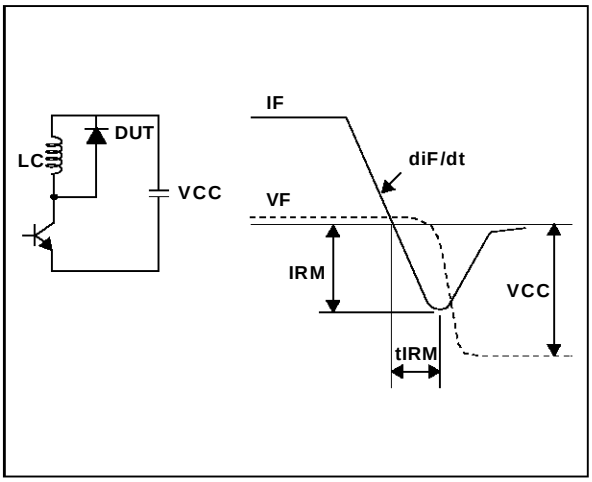
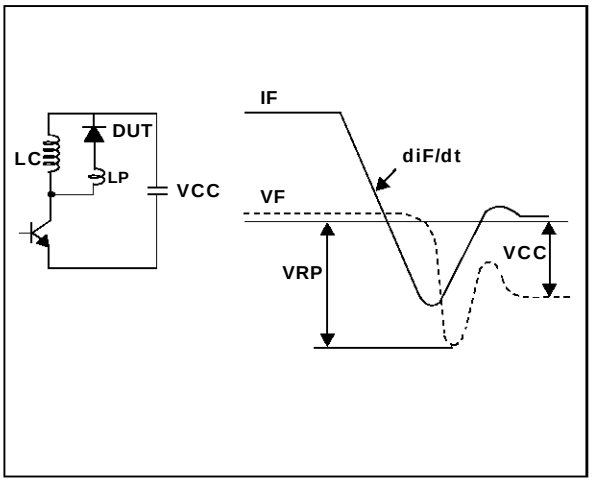
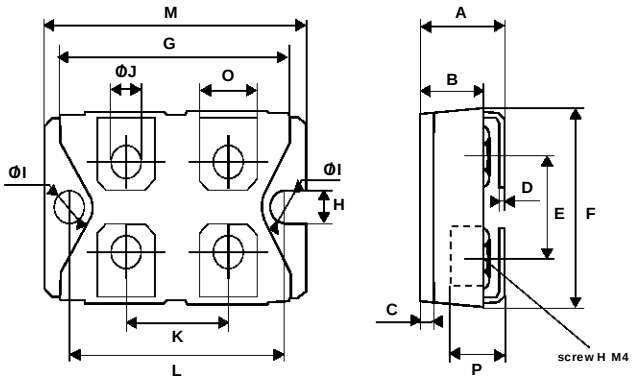



**Fig.12 :** TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



**PACKAGE MECHANICAL DATA**
ISOTOP Screw version




| REF. | DIMENSIONS | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 11.80 | 12.20 | 0.465 | 0.480 |
| B | 8.90 | 9.10 | 0.350 | 0.358 |
| C | 1.95 | 2.05 | 0.077 | 0.081 |
| D | 0.75 | 0.85 | 0.029 | 0.034 |
| E | 12.60 | 12.80 | 0.496 | 0.504 |
| F | 25.10 | 25.50 | 0.988 | 1.004 |
| G | 31.50 | 31.70 | 1.240 | 1.248 |
| H | 4.00 | | 0.157 | |
| I | 4.10 | 4.30 | 0.161 | 0.169 |
| J | 4.10 | 4.30 | 0.161 | 0.169 |
| K | 14.90 | 15.10 | 0.586 | 0.595 |
| L | 30.10 | 30.30 | 1.185 | 1.193 |
| M | 37.80 | 38.20 | 1.488 | 1.504 |
| O | 7.80 | 8.20 | 0.307 | 0.323 |
| P | 5.50 | | 0.216 | |

Cooling method : C
Marking : Type number
Weight : 28 g (without screws)
Electrical isolation : 2500$V_{(RMS)}$
Capitance : < 45 pF
Inductance : < 5 nH

- Recommended torque value : 1.3 N.m (MAX 1.5 N.m) for the 6 x M4 screws. (2 x M4 screws recommended for mounting the package on the heatsink and the 4 screws given with the screw version).
- The screws supplied with the package are adapted for mounting on a board (or other types of terminals) with a thickness of 0.6 mm min and 2.2 mm max.