



BYT230PIV-1000 BYT231PIV-1000

FAST RECOVERY RECTIFIER DIODES

MAIN PRODUCT CHARACTERISTICS

| | |
|----------------|-----------------|
| $I_{F(AV)}$ | 2 x 30 A |
| V_{RRM} | 1000 V |
| $V_F(\max)$ | 1.8 V |
| $t_{rr}(\max)$ | 80 ns |

FEATURES AND BENEFITS

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE: ISOTOP
 - Insulation voltage: 2500 V_{RMS}
 - Capacitance = 45 pF
 - Inductance < 5 nH

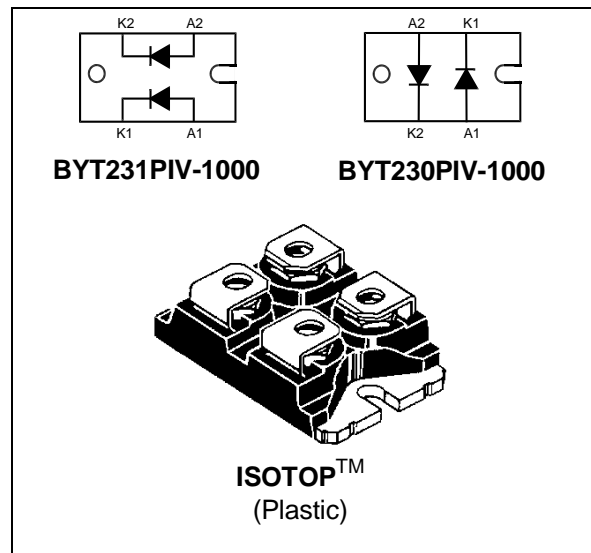
DESCRIPTION

Dual high voltage rectifier devices are suited for free-wheeling function in converters and motor control circuits.

Packaged in ISOTOP, they are intended for use in Switch Mode Power Supplies.

ABSOLUTE RATINGS (limiting values, per diode)

| Symbol | Parameter | | Value | Unit |
|--------------|----------------------------------------|--------------------------------------|---------------|------|
| V_{RRM} | Repetitive peak reverse voltage | | 1000 | V |
| I_{FRM} | Repetitive peak forward current | $t_p=5 \mu s \quad F=1kHz$ | 700 | A |
| $I_{F(RMS)}$ | RMS forward current | | 50 | A |
| $I_{F(AV)}$ | Average forward current | $T_c = 55^\circ C$ $\delta = 0.5$ | 30 | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10 ms$ Sinusoidal | 200 | A |
| T_{stg} | Storage temperature range | | - 40 to + 150 | °C |
| T_j | Maximum operating junction temperature | | 150 | °C |



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BYT230PIV-1000 / BYT231PIV-1000

THERMAL RESISTANCES

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

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode}) \times R_{th(j-c)} (\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|-------------------|-------------------------|------------------------|-----------------------------------|------|------|------|------|
| V _F * | Forward voltage drop | T _j = 25°C | I _F = 30 A | | | 1.9 | V |
| | | T _j = 100°C | | | | 1.8 | |
| I _R ** | Reverse leakage current | T _j = 25°C | V _R = V _{RRM} | | | 100 | μA |
| | | T _j = 100°C | | | | 5 | mA |

Pulse test : * tp = 380 μs, δ < 2%

** tp = 5 ms, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 1.47 \times I_{F(AV)} + 0.010 I_{F(RMS)}^2$$

RECOVERY CHARACTERISTICS (per diode)

| Symbol | Test Conditions | | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------|-------------------------------------------------------------------------|------|------|------|------|
| t _{rr} | T _j = 25°C | I _F = 1A V _R = 30V dI _F /dt = - 15A/μs | | | 165 | ns |
| | | I _F = 0.5A I _R = 1A I _{rr} = 0.25A | | | 80 | |

TURN-OFF SWITCHING CHARACTERISTICS (per diode)

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|-----------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| t _{IRM} | Maximum reverse recovery time | dI _F /dt = - 120 A/μs | V _{CC} = 200 V I _F = 30 A L _p ≤ 0.05 μH T _j = 100°C (see fig. 11) | | | 200 | ns |
| | | dI _F /dt = - 240 A/μs | | | | 120 | |
| I _{RM} | Maximum reverse recovery current | dI _F /dt = - 120 A/μs | L _p ≤ 0.05 μH T _j = 100°C (see fig. 11) | | | 19.5 | A |
| | | dI _F /dt = - 240 A/μs | | | | 22 | |
| C = $\frac{V_{RP}}{V_{CC}}$ | Turn-off overvoltage coefficient | T _j = 100°C V _{CC} = 200V I _F = I _{F(AV)} dI _F /dt = - 30A/μs L _p = 5μH (see fig. 12) | | | | 4.5 | / |

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

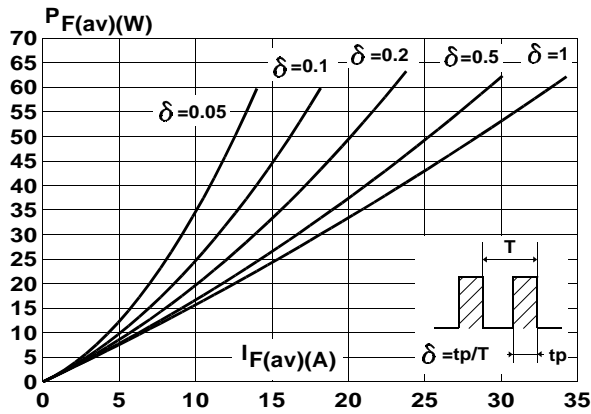


Fig. 2: Peak current versus form factor.

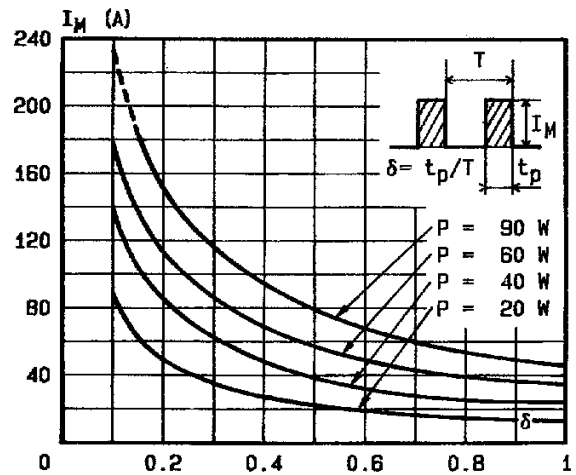


Fig. 3: Non repetitive peak surge current versus overload duration.

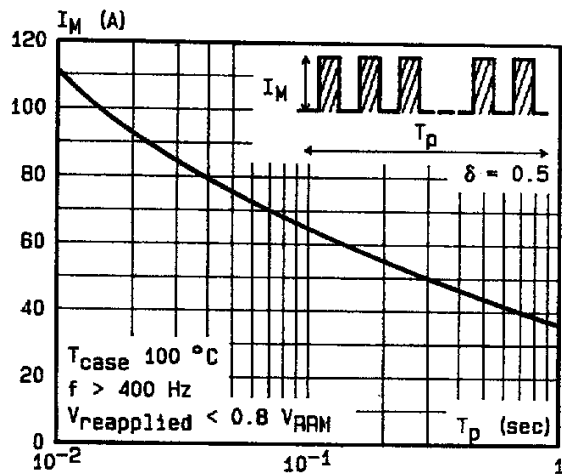


Fig. 4: Relative variation of thermal impedance junction to case versus pulse duration.

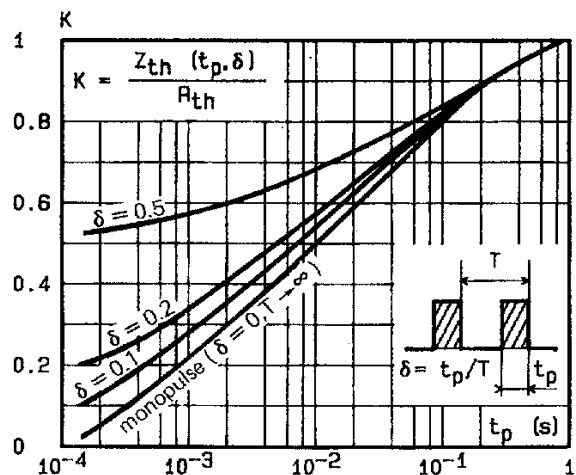


Fig. 5: Voltage drop versus forward current.

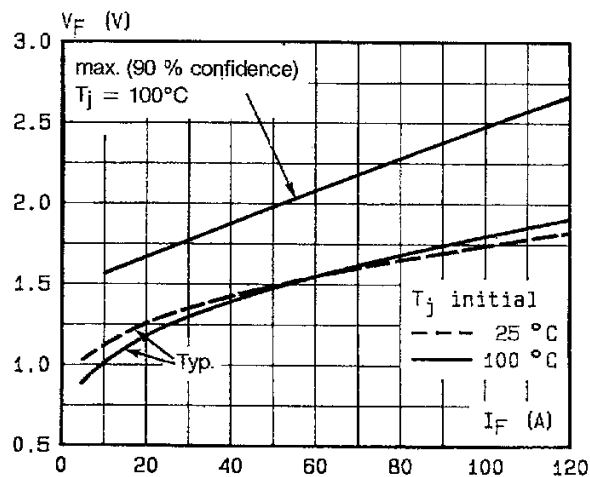


Fig. 6: Recovery charge versus di_F/dt.

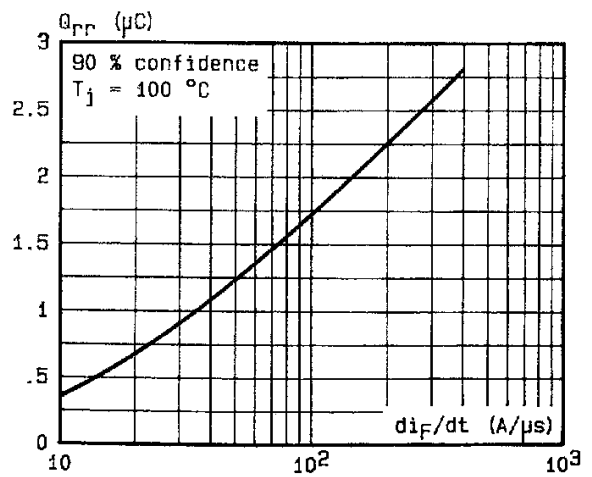


Fig. 7: Recovery time versus di_F/dt .

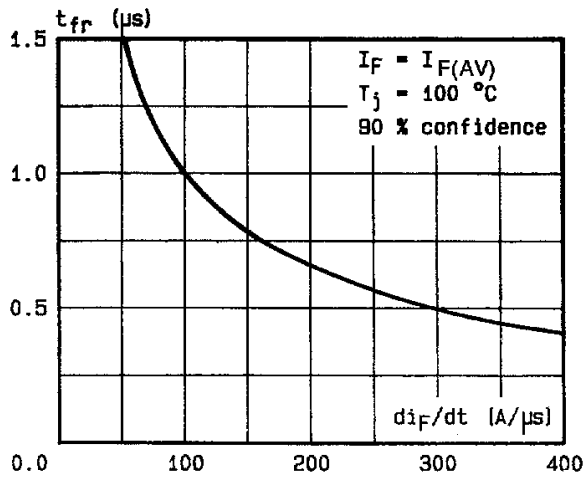


Fig. 9: Peak forward voltage versus di_F/dt .

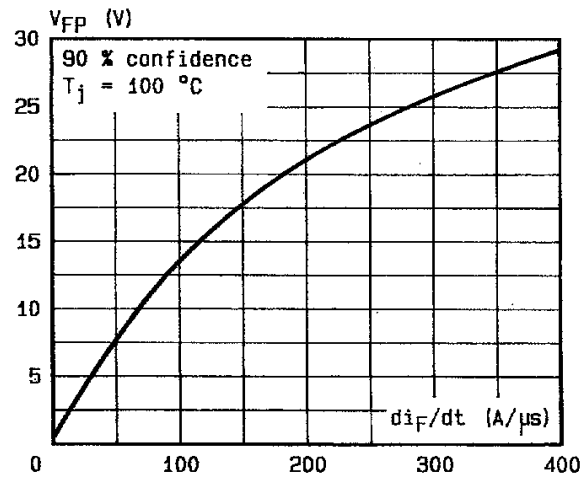


Fig. 11: Turn-off switching characteristics (without serie inductance).

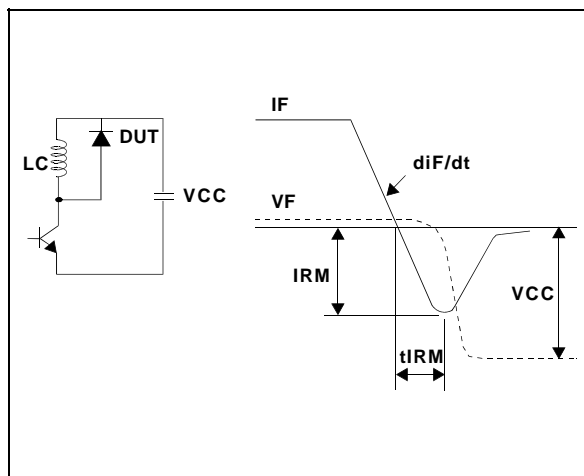


Fig. 8: Peak reverse current versus di_F/dt .

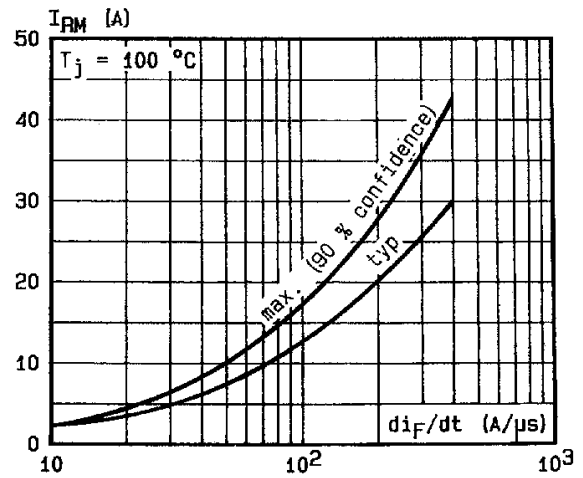


Fig. 10: Dynamic parameters versus junction temperature.

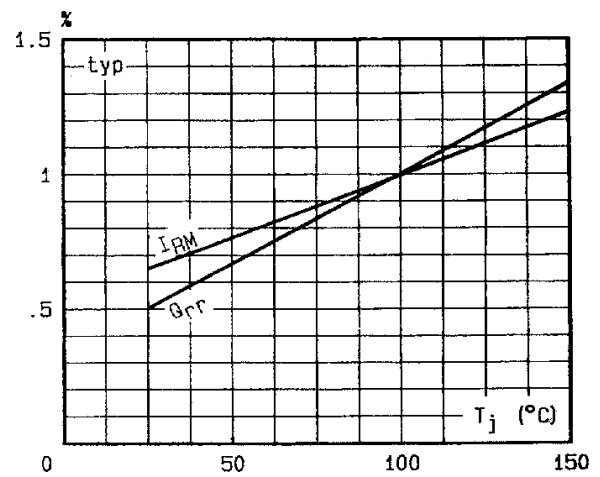
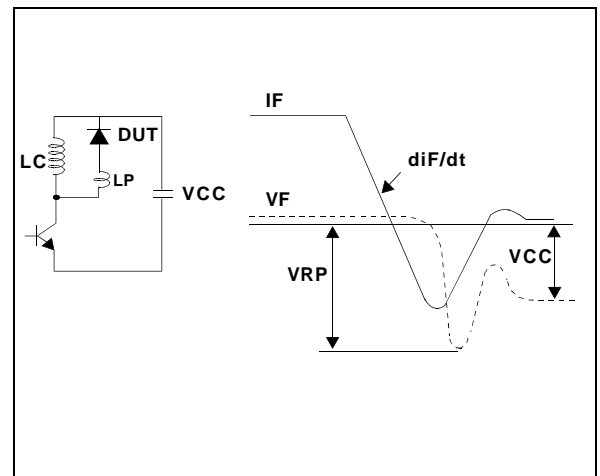
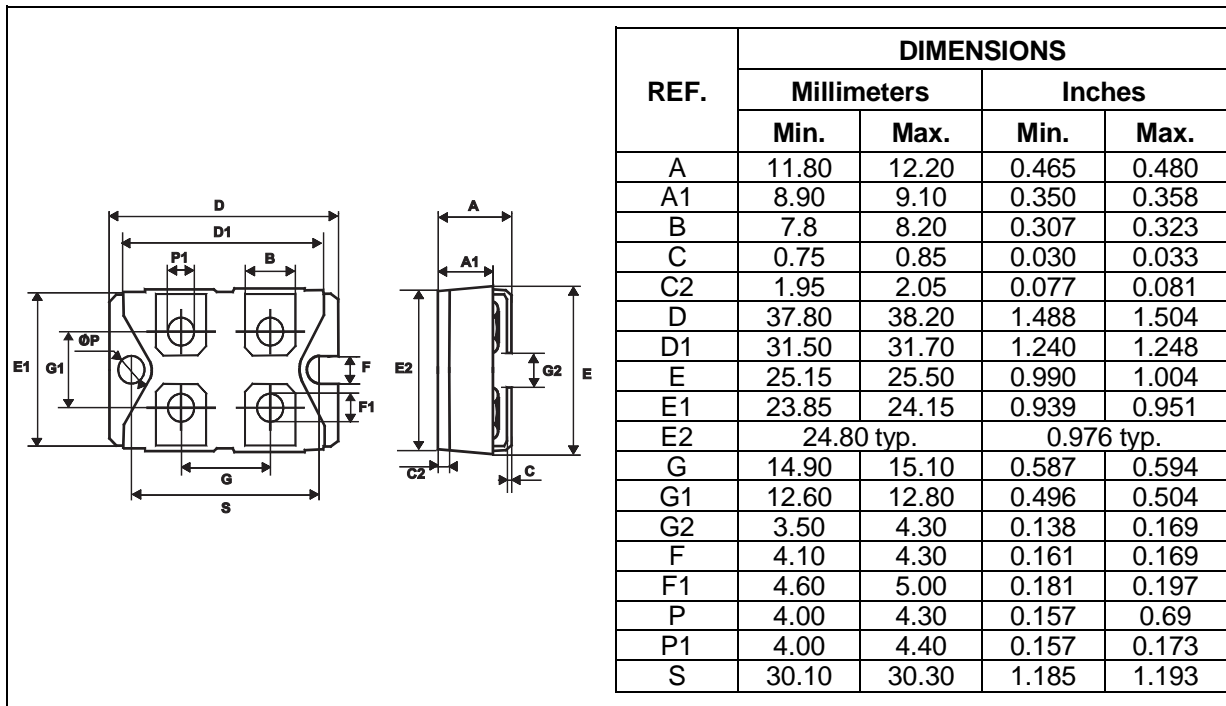


Fig. 12: Turn-off switching characteristics (with serie inductance).



PACKAGE MECHANICAL DATA
ISOTOP



| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|----------------|----------------|---------|------------------------|----------|---------------|
| BYT230PIV-1000 | BYT230PIV-1000 | ISOTOP | 28 g. (without screws) | 10 | Tube |
| BYT231PIV-1000 | BYT231PIV-1000 | ISOTOP | 28 g. (without screws) | 10 | Tube |

- Cooling method: by conduction (C)
- 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.
- Epoxy meets UL94,V0

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