

## HIGH EFFICIENCY FAST RECOVERY DIODES

### MAIN PRODUCT CHARACTERISTICS

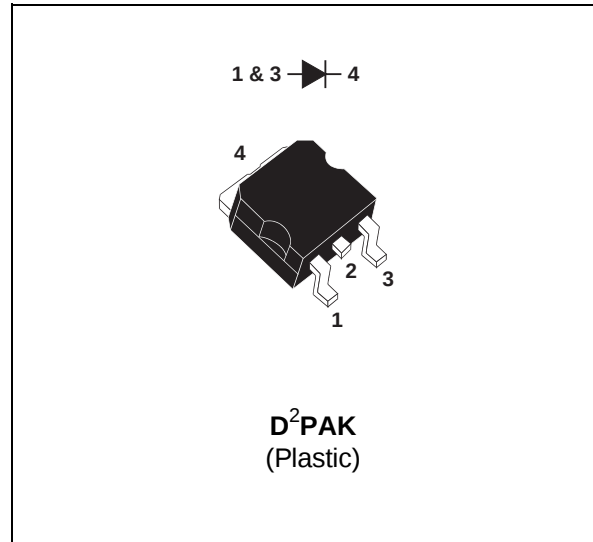
|             |       |
|-------------|-------|
| $I_{F(AV)}$ | 30 A  |
| $V_{RRM}$   | 400 V |
| $t_{rr}$    | 50 ns |
| $V_F$       | 1.4 V |

### FEATURES AND BENEFITS

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- SMD PACKAGE

### DESCRIPTION

Single rectifier suited for freewheeling in converters and motor control circuits. Packaged in D<sup>2</sup>PAK, this surface mount device is intended for use in high frequency inverters, freewheeling and polarity protection applications.



### ABSOLUTE MAXIMUM RATINGS

| Symbol             | Parameter                              |                                             | Value         | Unit               |
|--------------------|----------------------------------------|---------------------------------------------|---------------|--------------------|
| $V_{RRM}$          | Repetitive peak reverse voltage        |                                             | 400           | V                  |
| $I_{F(RMS)}$       | RMS forward current                    |                                             | 50            | A                  |
| $I_{F(AV)}$        | Average forward current                | $T_c=100^{\circ}\text{C}$<br>$\delta = 0.5$ | 30            | A                  |
| $I_{FSM}$          | Surge non repetitive forward current   | $t_p=10\text{ms}$<br>sinusoidal             | 350           | A                  |
| $I_{FRM}$          | Repetitive peak forward current        | $t_p = 5\mu\text{s}$<br>$f = 5\text{ kHz}$  | 280           | A                  |
| $T_{stg}$<br>$T_j$ | Storage and junction temperature range |                                             | - 40 to + 150 | $^{\circ}\text{C}$ |

## BYT30G-400

### THERMAL RESISTANCE

| Symbol    | Parameter        | Value | Unit |
|-----------|------------------|-------|------|
| Rth (j-c) | Junction to case | 1     | °C/W |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol            | Parameter               | Test Conditions                   |                        | Min. | Typ. | Max. | Unit |
|-------------------|-------------------------|-----------------------------------|------------------------|------|------|------|------|
| I <sub>R</sub> *  | Reverse leakage current | V <sub>R</sub> = V <sub>RRM</sub> | T <sub>j</sub> = 25°C  |      |      | 35   | μA   |
|                   |                         |                                   | T <sub>j</sub> = 100°C |      |      | 6    | mA   |
| V <sub>F</sub> ** | Forward voltage drop    | I <sub>F</sub> = 30 A             | T <sub>j</sub> = 100°C |      |      | 1.4  | V    |
|                   |                         | I <sub>F</sub> = 30 A             | T <sub>j</sub> = 25°C  |      |      | 1.5  |      |

Pulse test : \* tp = 5 ms, δ < 2 %

\*\* tp = 380 μs, δ < 2 %

To evaluate the conduction losses use the following equation :

$$P = 1.1 \times I_{F(AV)} + 0.0095 I_{F(RMS)}^2$$

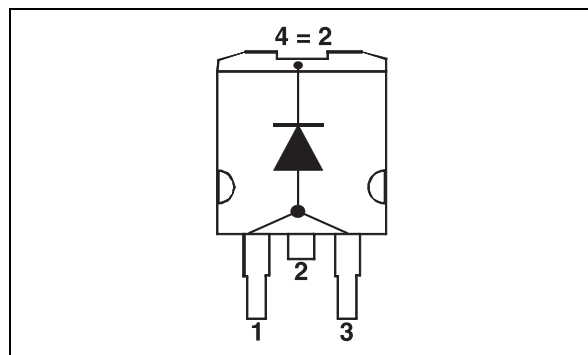
### RECOVERY CHARACTERISTICS

| Symbol          | Parameter             | Test Conditions               |                       | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------|-------------------------------|-----------------------|------|------|------|------|
| t <sub>rr</sub> | Reverse recovery time | T <sub>j</sub> = 25°C         | I <sub>F</sub> = 0.5A |      |      | 50   | ns   |
|                 |                       | I <sub>rr</sub> = 0.25 A      | I <sub>R</sub> = 1A   |      |      |      |      |
|                 |                       | T <sub>j</sub> = 25°C         | I <sub>F</sub> = 1A   |      |      | 100  |      |
|                 |                       | dI <sub>F</sub> /dt = -15A/μs | V <sub>R</sub> = 30V  |      |      |      |      |

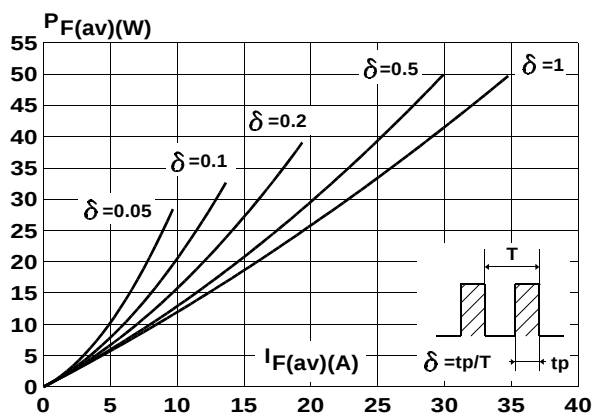
### TURN-OFF SWITCHING CHARACTERISTICS

| Symbol           | Parameter                        | Test Conditions               |                                     | Min. | Typ. | Max. | Unit |
|------------------|----------------------------------|-------------------------------|-------------------------------------|------|------|------|------|
| t <sub>IRM</sub> | Maximum reverse recovery time    | T <sub>j</sub> = 100°C        | dI <sub>F</sub> /dt = -120A/μs      |      |      | 75   | ns   |
|                  |                                  | I <sub>F</sub> = 30 A         | dI <sub>F</sub> /dt = -240A/μs      |      | 50   |      |      |
| I <sub>RM</sub>  | Maximum reverse recovery current | V <sub>CC</sub> = 200 V       | dI <sub>F</sub> /dt = -120A/μs      |      |      | 9    | ns   |
|                  |                                  | L <sub>p</sub> < 0.05 μH      | dI <sub>F</sub> /dt = -240A/μs      |      | 12   |      |      |
| C factor         | Turn-off overvoltage coefficient | T <sub>j</sub> = 100°C        | I <sub>F</sub> = I <sub>F(AV)</sub> |      | 3.3  |      | /    |
|                  |                                  | V <sub>CC</sub> = 60 V        | L <sub>p</sub> = 1 μH               |      |      |      |      |
|                  |                                  | dI <sub>F</sub> /dt = -30A/μs |                                     |      |      |      |      |

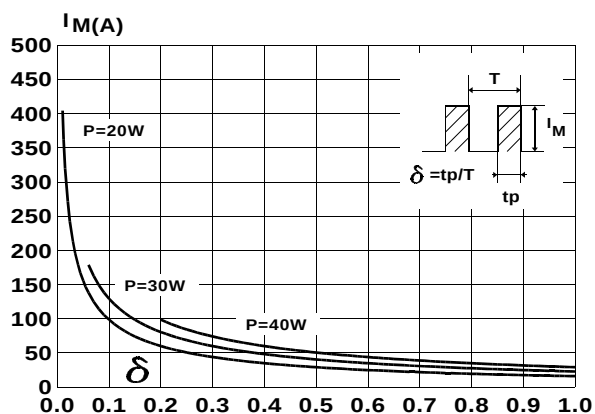
### PIN OUT configuration in D<sup>2</sup>PAK:



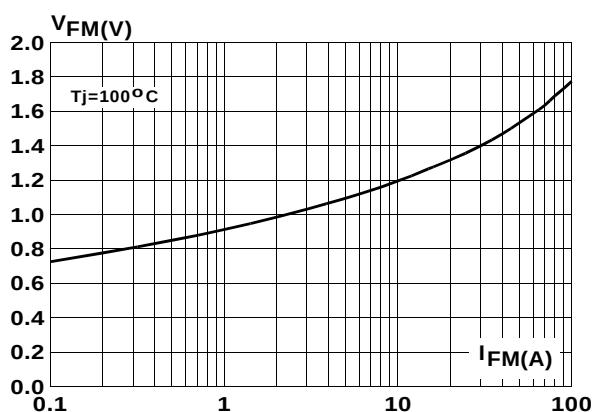
**Fig.1** : Average forward power dissipation versus average forward current.



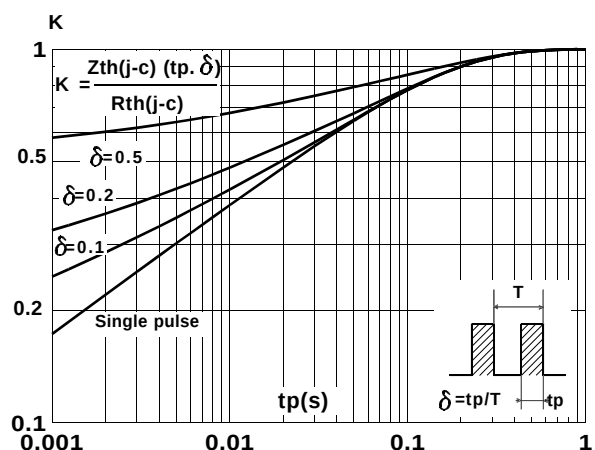
**Fig.2** : Peak current versus form factor.



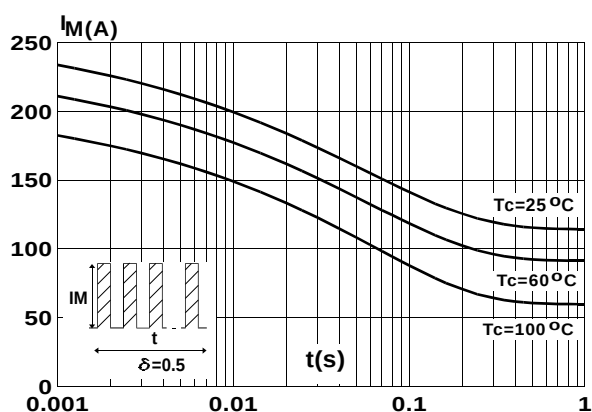
**Fig.3** : Forward voltage drop versus forward current (maximum values).



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



**Fig.5** : Non repetitive surge peak forward current versus overload duration.



**Fig.6** : Average current versus ambient temperature. ( $\delta: 0.5$ )

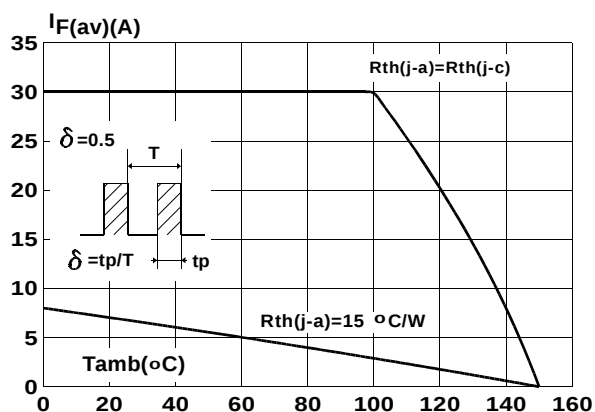


Fig.7 : Reverse recovery charge versus  $dl_F/dt$ .

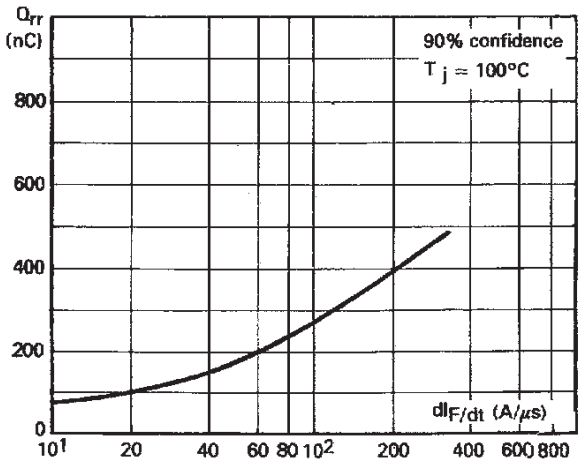


Fig.9 : Peak reverse current versus  $dl_F/dt$ .

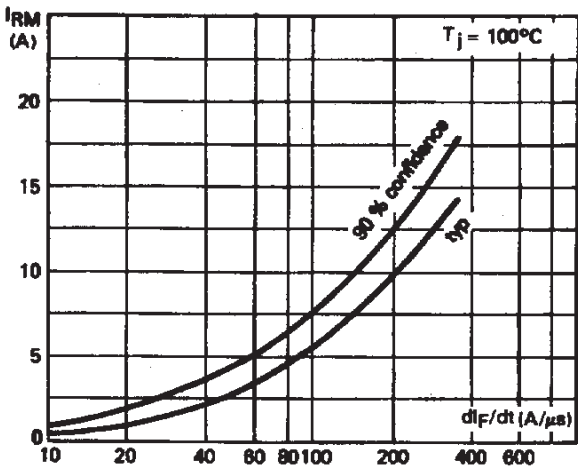


Fig.11: Dynamic parameters versus junction temperature.

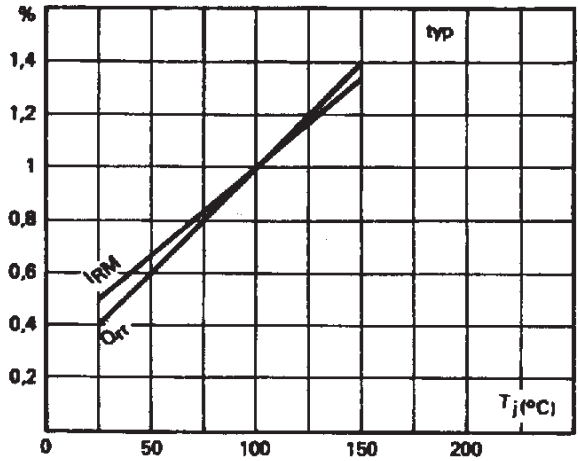


Fig.8 : Forward recovery times versus  $dl_F/dt$ .

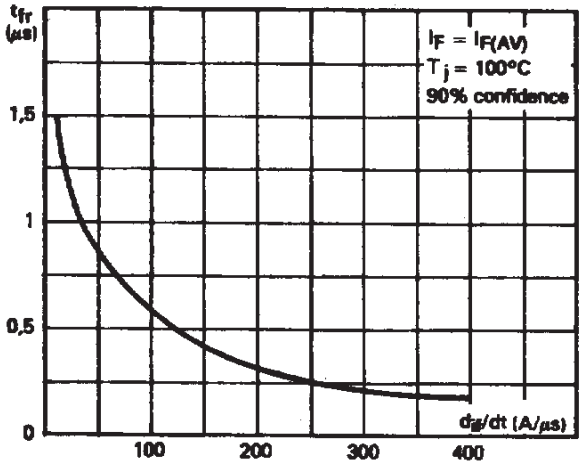
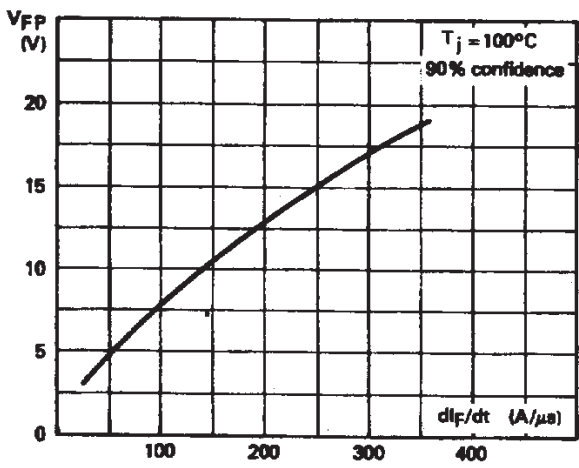
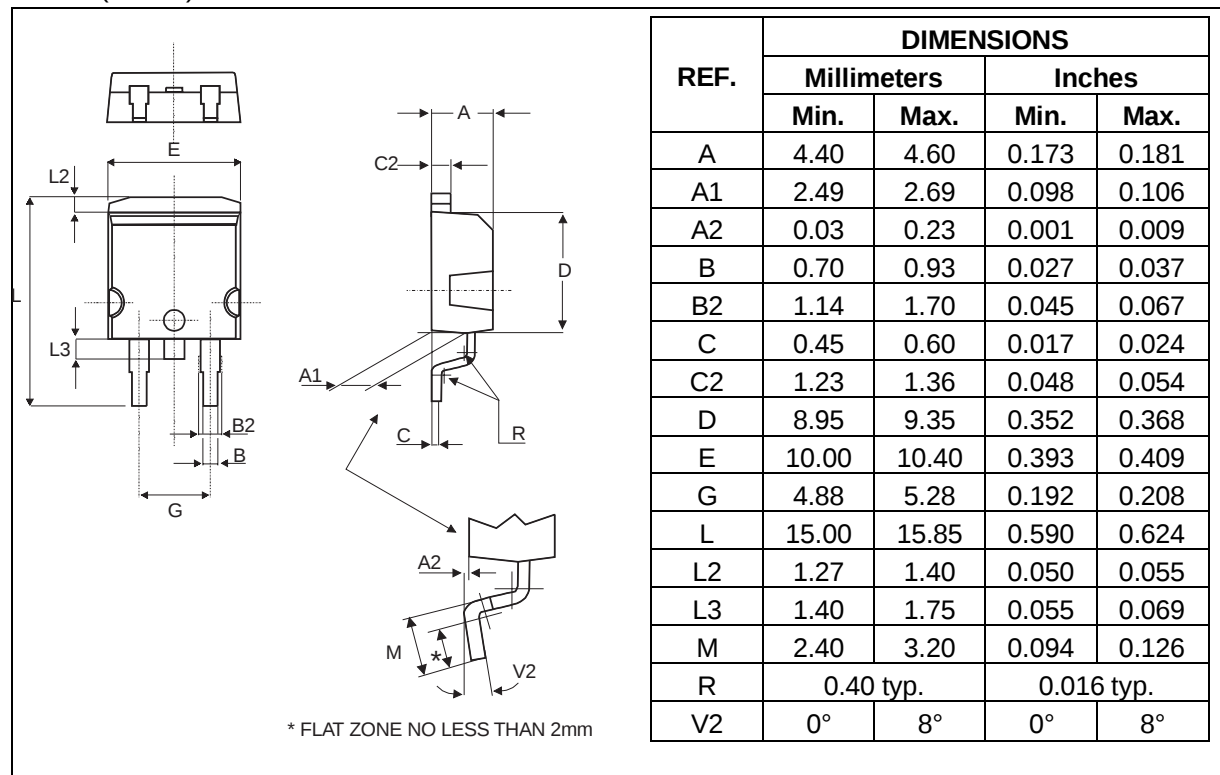
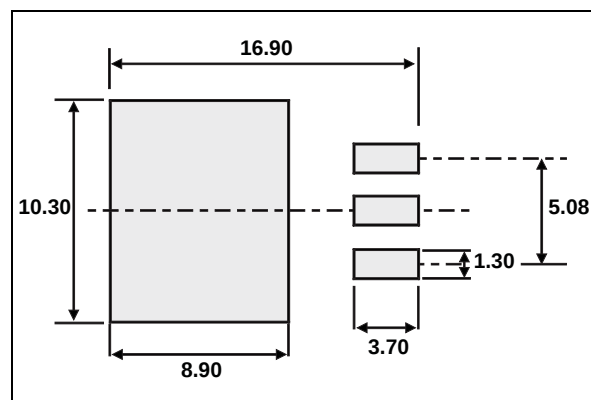


Fig.10 : Peak forward voltage versus  $dl_F/dt$ .



**PACKAGE MECHANICAL DATA**  
**D<sup>2</sup>PAK (Plastic)**

**FOOT PRINT (in millimeters)**


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