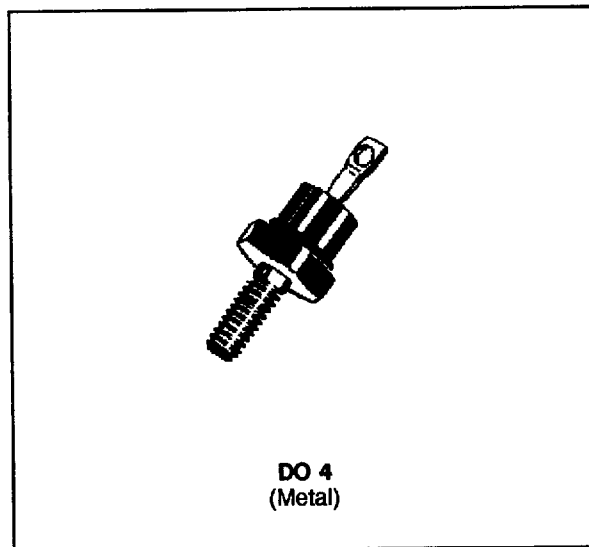


## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT AND AVALANCHE CAPABILITY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF  $t_{rr}$  AND  $I_{RM}$  AT 100°C UNDER USERS CONDITIONS



### DESCRIPTION

Low voltage drop rectifiers suited for switching mode power supply.

### ABSOLUTE MAXIMUM RATINGS (limiting values)

| Symbol             | Parameter                              |                                       | Value                          | Unit       |
|--------------------|--|---------------------------------------|--------------------------------|------------|
| $I_{FRM}$          | Repetitive Peak Forward Current        | $t_p \leq 20\mu s$                    | 500                            | A          |
| $I_F (RMS)$        | RMS Forward Current                    |                                       | 50                             | A          |
| $I_F (AV)$         | Average Forward Current                | $T_C = 115^\circ C$<br>$\delta = 0.5$ | 25                             | A          |
| $I_{FSM}$          | Surge non Repetitive Forward Current   | $t_p = 10ms$<br>Sinusoidal            | 500                            | A          |
| $P_{tot}$          | Power Dissipation                      | $T = 100^\circ C$                     | 33                             | W          |
| $T_{stg}$<br>$T_J$ | Storage and Junction Temperature Range |                                       | - 40 to + 150<br>- 40 to + 150 | $^\circ C$ |

| Symbol    | Parameter                           | BYT 77- |     |     |     | Unit |
|-----------|-------------------------------------|---------|-----|-----|-----|------|
|           |                                     | 50      | 100 | 150 | 200 |      |
| $V_{RRM}$ | Repetitive Peak Reverse Voltage     | 50      | 100 | 150 | 200 | V    |
| $V_{RSM}$ | Non Repetitive Peak Reverse Voltage | 55      | 110 | 165 | 220 | V    |

### THERMAL RESISTANCE

| Symbol        | Parameter     | Value | Unit         |
|---------------|---------------|-------|--------------|
| $R_{th(j-c)}$ | Junction-case | 1.5   | $^\circ C/W$ |

**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> |      |      | 25   | μA   |
|                | T <sub>J</sub> = 100°C |                                   |      |      | 2.5  | mA   |
| V <sub>F</sub> | T <sub>J</sub> = 25°C  | I <sub>F</sub> = 63A              |      |      | 1.1  | V    |
|                | T <sub>J</sub> = 100°C | I <sub>F</sub> = 20A              |      |      | 0.85 |      |

**RECOVERY CHARACTERISTICS**

| Symbol          |   |                                      |                                | Min. | Typ. | Max. | Unit |
|-----------------|---|--------------------------------------|--------------------------------|------|------|------|------|
| t <sub>rr</sub> | T <sub>J</sub> = 25°C<br>V <sub>R</sub> = 30V             | I <sub>F</sub> = 1A<br>see figure 12 | di <sub>F</sub> /dt = - 50A/μs |      |      | 50   | ns   |
| Q <sub>rr</sub> | T <sub>J</sub> = 25°C<br>V <sub>R</sub> ≤ 30V             | I <sub>F</sub> = 2A                  | di <sub>F</sub> /dt = - 20A/μs |      |      | 20   | nC   |
| t <sub>fr</sub> | T <sub>J</sub> = 25°C<br>Measured at 1.1 x V <sub>F</sub> | I <sub>F</sub> = 1A                  | t <sub>r</sub> = 5ns           |      | 10   |      | ns   |
| V <sub>FP</sub> | T <sub>J</sub> = 25°C                                     | I <sub>F</sub> = 1A                  | t <sub>r</sub> = 5ns           |      | 1.5  |      | V    |

To evaluate the conduction losses use the following equations:

$$V_F = 0.66 + 0.0047I_F \quad P = 0.66 \times I_{F(AV)} + 0.0047 I_{F(RMS)}^2$$

Figure 1. Power losses versus average current.

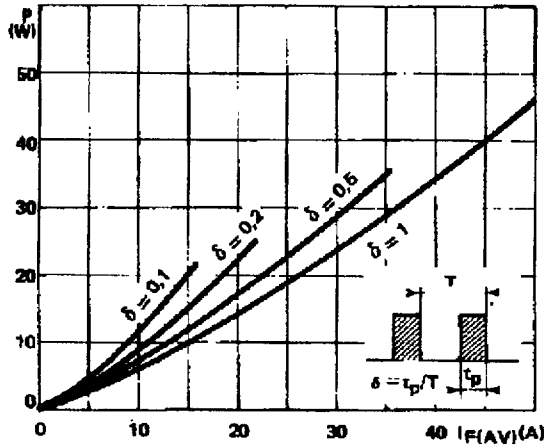


Figure 3. Non repetitive peak surge current versus duration

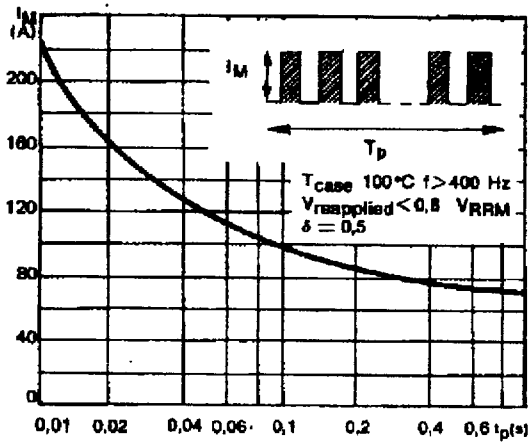


Figure 5. Voltage drop and dispersion versus forward current.

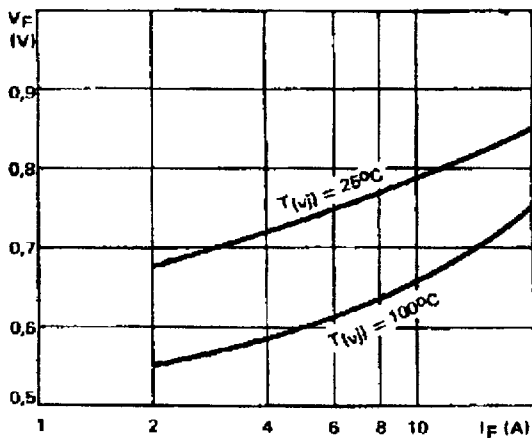


Figure 2. Peak current versus form factor.

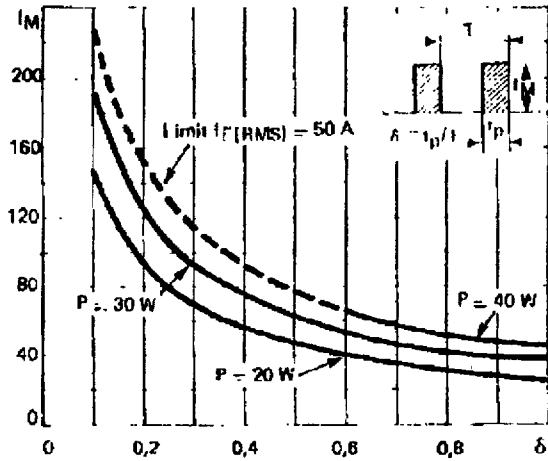


Figure 4. Thermal impedance versus pulse width.

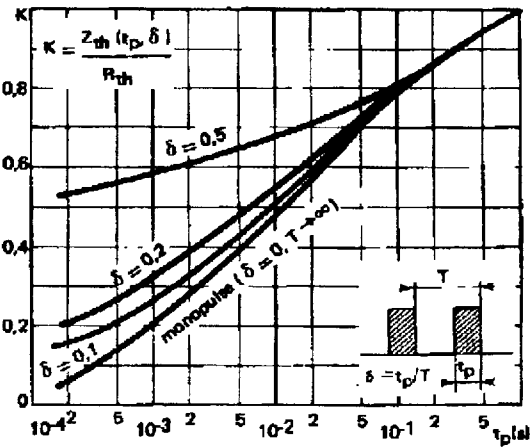


Figure 6. Recovery charge versus forward current.

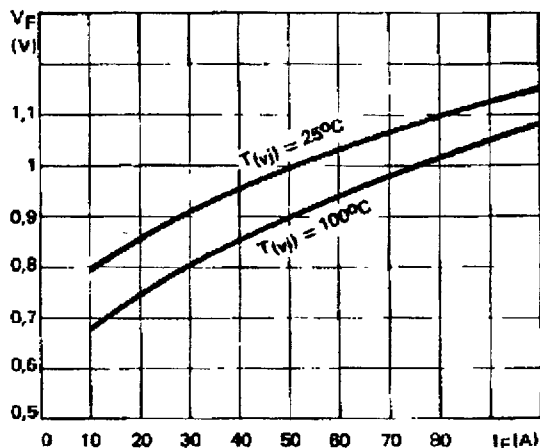


Figure 7. Capacitance versus reverse voltage applied

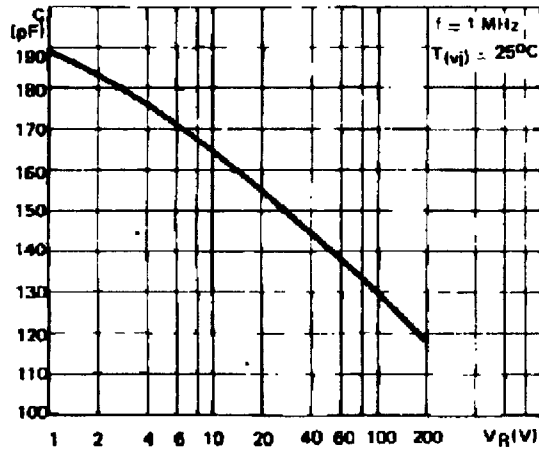


Figure 8. Recovery charge versus  $di_F/dt$

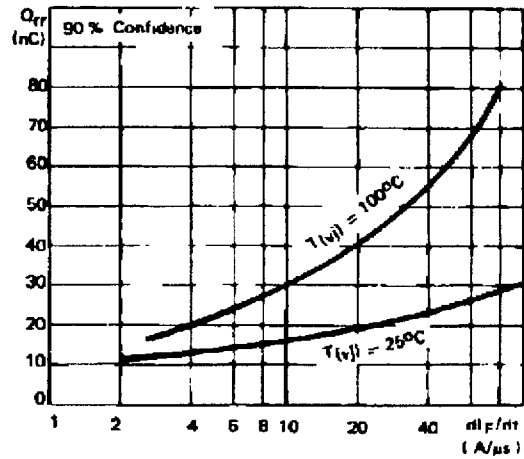


Figure 9. Recovery time versus  $di_F/dt$ .

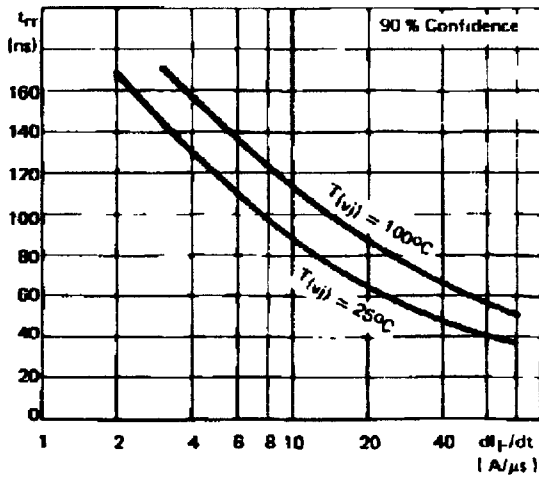


Figure 10. Peak reverse current versus  $di_F/dt$

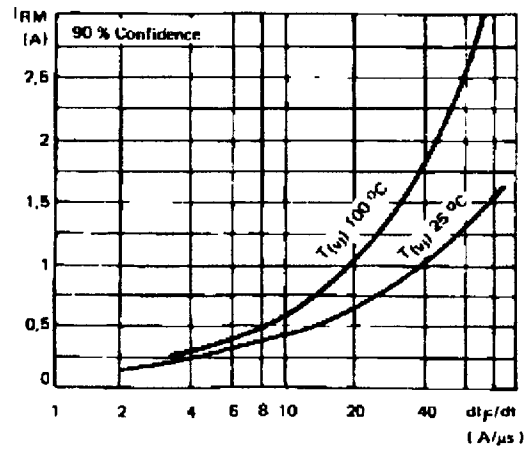


Figure 11. Dynamic parameter versus junction temperature

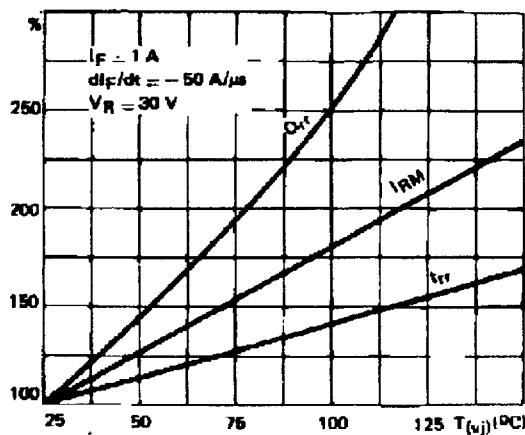
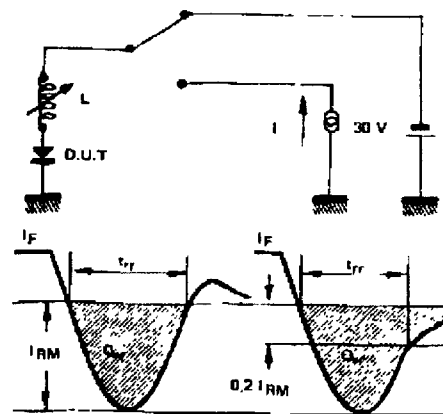
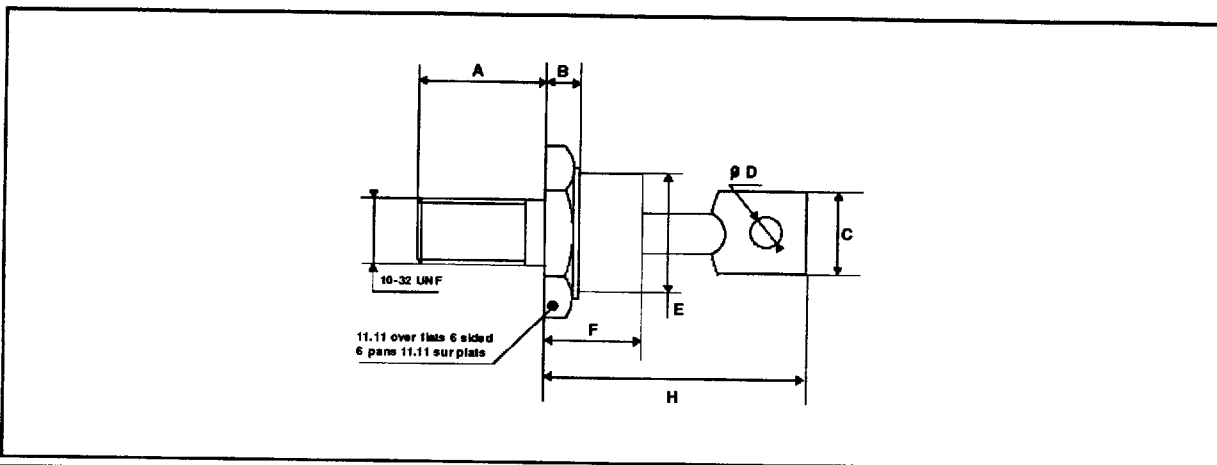


Figure 12. Measurement of  $t_{rr}$  (fig. 9) and  $I_{RM}$  (fig. 10)



**PACKAGE MECHANICAL DATA**

**DO 4 Metal**



| REF. | DIMENSIONS  |      |       |        |      |        |
|------|-------------|------|-------|--------|------|--------|
|      | Millimeters |      |       | Inches |      |        |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.   |
| A    | 10.72       |      | 11.50 | 0.422  |      | 0.453  |
| B    | 2.00        |      | 4.40  | 0.079  |      | 0.0173 |
| C    |             |      | 6.35  |        |      | 0.25   |
| D    | 1.53        |      |       | 0.060  |      |        |
| E    |             |      | 10.76 |        |      | 0.424  |
| F    |             |      | 10.28 |        |      | 0.405  |
| H    |             |      | 20.32 |        |      | 0.800  |

Cooling method: by conduction (method C)

Marking: Cathode connected to case: type number

Anode connected to case : type number + suffix R (Consult us for these reverse version datasheets)

Weight: 5.1g

Recommended torque value: 180cm. N

Maximum torque value: 220cm. N

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