

## FAST RECOVERY RECTIFIER DIODES

### MAIN PRODUCT CHARACTERISTICS

|                      |       |
|----------------------|-------|
| $I_{F(AV)}$          | 8 A   |
| $V_{RRM}$            | 400 V |
| $V_F(\text{max})$    | 1.4 V |
| $t_{rr}(\text{max})$ | 35 ns |

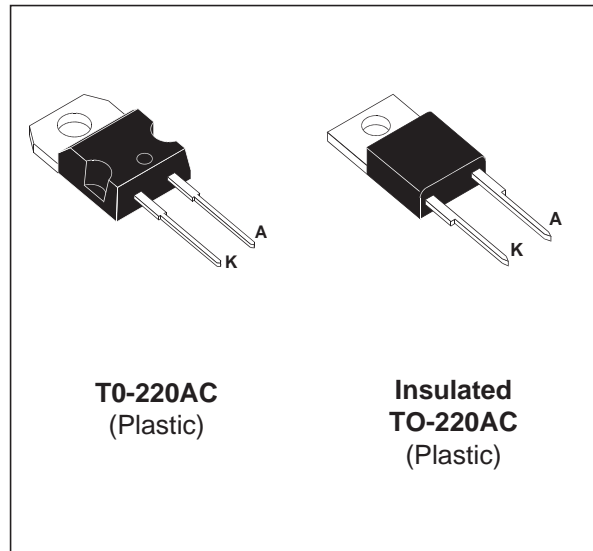
### FEATURES AND BENEFITS

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE: TO-220AC  
Insulation voltage: 2500 V<sub>RMS</sub>  
Capacitance = 7 pF

### DESCRIPTION

This single rectifier is suited for Switch Mode Power Supplies and other power converters.

This device is intended to free-wheeling function in converters and motor control circuits.



### ABSOLUTE RATINGS (limiting values)

| Symbol       | Parameter                              |                        | Value         | Unit       |                                       |
|--------------|--|------------------------|---------------|------------|---------------------------------------|
| $V_{RRM}$    | Repetitive peak reverse voltage        |                        | 400           | V          |                                       |
| $I_{FRM}$    | Repetitive peak forward current        | $t_p=5 \mu s$ $F=5kHz$ | 200           | A          |                                       |
| $I_{F(RMS)}$ | RMS forward current                    |                        | 16            | A          |                                       |
| $I_{F(AV)}$  | Average forward current                | TO-220AC               | 8             | A          |                                       |
|              |  | Insulated TO-220AC     |               |            | $T_c = 120^\circ C$<br>$\delta = 0.5$ |
| $I_{FSM}$    | Surge non repetitive forward current   | tp = 10 ms Sinusoidal  |               | 100        | A                                     |
|              |  |                        |               |            |                                       |
| $T_{stg}$    | Storage temperature range              |                        | - 40 to + 150 | $^\circ C$ |                                       |
| $T_j$        | Maximum operating junction temperature |                        | 150           | $^\circ C$ |                                       |

## BYT08P-400 / BYT08PI-400

### THERMAL RESISTANCES

| Symbol               | Parameter        | Value         | Unit |
|----------------------|------------------|---------------|------|
| R <sub>th(j-c)</sub> | Junction to case | TO-220AC      | 2.5  |
|                      |                  | Ins. TO-220AC | 3.5  |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol            | Parameter               | Test Conditions        |                                   | Min. | Typ. | Max. | Unit |
|-------------------|-------------------------|------------------------|-----------------------------------|------|------|------|------|
| V <sub>F</sub> *  | Forward voltage drop    | T <sub>j</sub> = 25°C  | I <sub>F</sub> = 8 A              |      |      | 1.5  | V    |
|                   |                         | T <sub>j</sub> = 100°C |                                   |      |      | 1.4  |      |
| I <sub>R</sub> ** | Reverse leakage current | T <sub>j</sub> = 25°C  | V <sub>R</sub> = V <sub>RRM</sub> |      |      | 15   | μA   |
|                   |                         | T <sub>j</sub> = 100°C |                                   |      |      | 2.5  | mA   |

Pulse test : \* tp = 380 μs, δ < 2%

\*\* tp = 5 ms, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 1.1 \times I_{F(AV)} + 0.024 I_{F(RMS)}^2$$

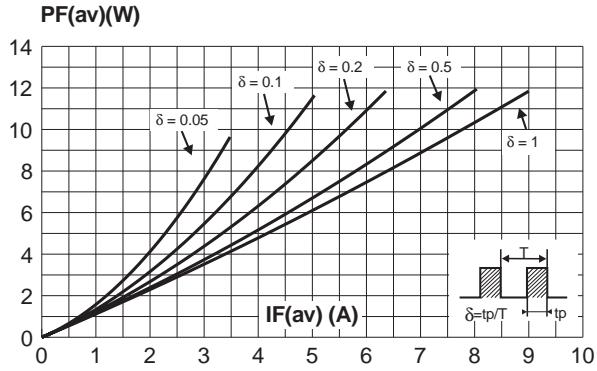
### RECOVERY CHARACTERISTICS

| Symbol          | Test Conditions       |   | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------|---|------|------|------|------|
| t <sub>rr</sub> | T <sub>j</sub> = 25°C | I <sub>F</sub> = 1A V <sub>R</sub> = 30V dI <sub>F</sub> /dt = - 15A/μs |      |      | 75   | ns   |
|                 |                       | I <sub>F</sub> = 0.5A I <sub>R</sub> = 1A I <sub>rr</sub> = 0.25A       |      |      | 35   |      |

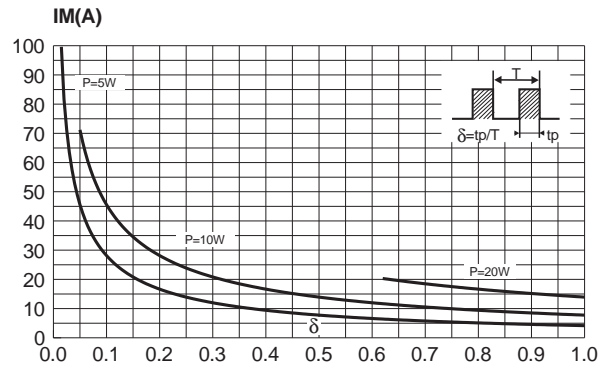
### TURN-OFF SWITCHING CHARACTERISTICS

| Symbol                      | Parameter                        | Test Conditions   |  | Min. | Typ. | Max. | Unit |
|-----------------------------|----------------------------------|---|--|------|------|------|------|
| t <sub>IRM</sub>            | Maximum reverse recovery time    | dI <sub>F</sub> /dt = - 32 A/μs   | V <sub>CC</sub> = 200 V<br>I <sub>F</sub> = 8 A<br>L <sub>p</sub> ® 0.05 μH<br>T <sub>j</sub> = 100°C<br>(see fig. 13) |      |      | 75   | ns   |
|                             |                                  | dI <sub>F</sub> /dt = - 64 A/μs   |  |      |      | 50   |      |
| I <sub>IRM</sub>            | Maximum reverse recovery current | dI <sub>F</sub> /dt = - 32 A/μs   | (see fig. 13)  |      |      | 2.2  | A    |
|                             |                                  | dI <sub>F</sub> /dt = - 64 A/μs   |  |      |      | 2.8  |      |
| C = $\frac{V_{RP}}{V_{CC}}$ | Turn-off overvoltage coefficient | T <sub>j</sub> = 100°C V <sub>CC</sub> = 60V I <sub>F</sub> = I <sub>F(AV)</sub><br>dI <sub>F</sub> /dt = - 30A/μs L <sub>p</sub> = 1μH |  |      | 3.3  |      | /    |

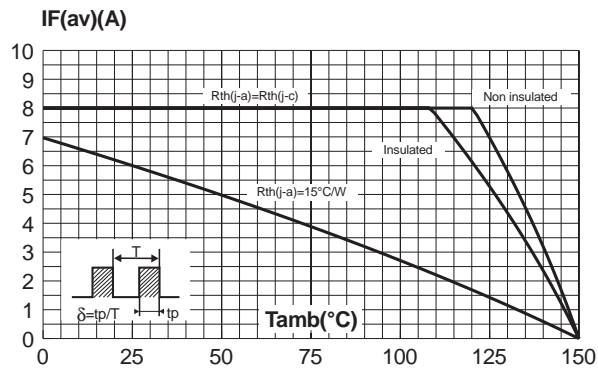
**Fig. 1:** Average forward power dissipation versus average forward current .



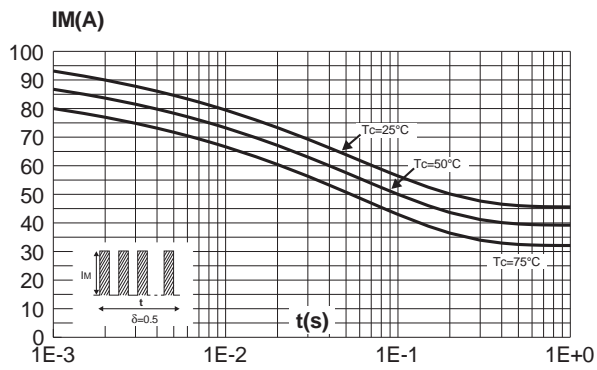
**Fig. 2:** Peak current versus form factor.



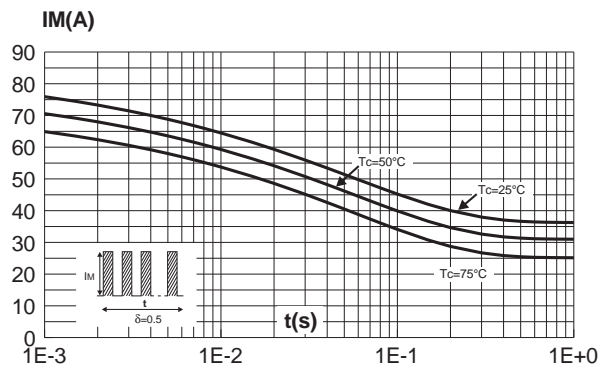
**Fig. 3:** Average forward current versus ambient temperature ( $\delta=0.5$ ).



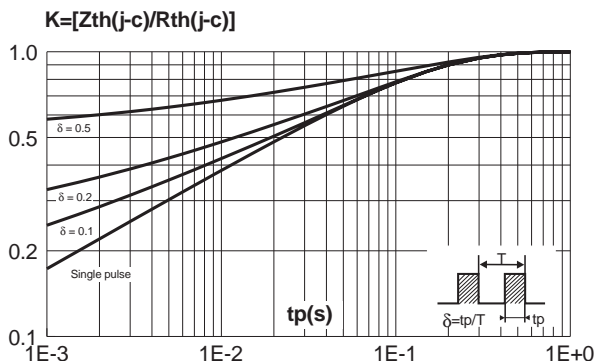
**Fig. 4-1:** Non repetitive surge peak forward current versus overload duration (TO-220AC).



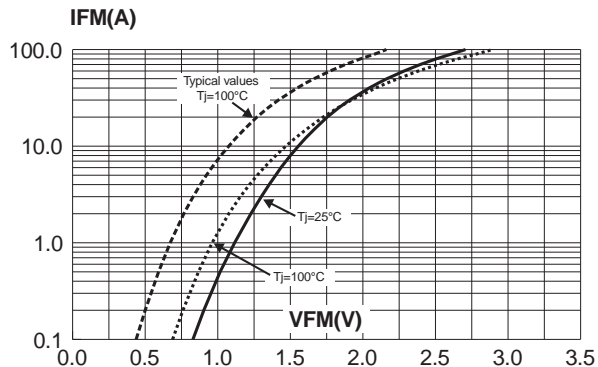
**Fig. 4-2:** Non repetitive surge peak forward current versus overload duration (insulated TO-220AC).



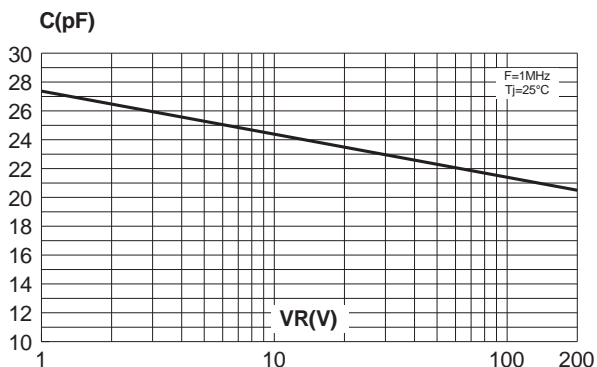
**Fig. 5:** Relative variation of thermal impedance junction to case versus pulse duration.



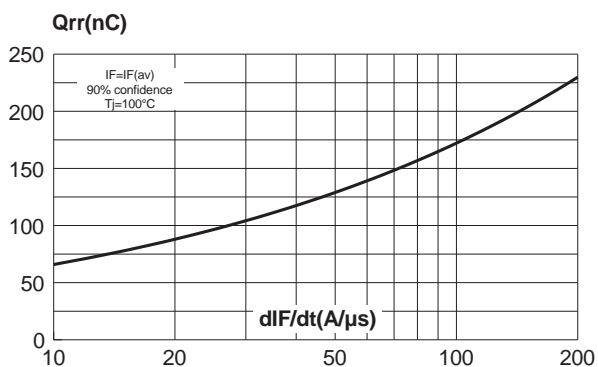
**Fig. 6:** Forward voltage drop versus forward current (maximum values, per diode).



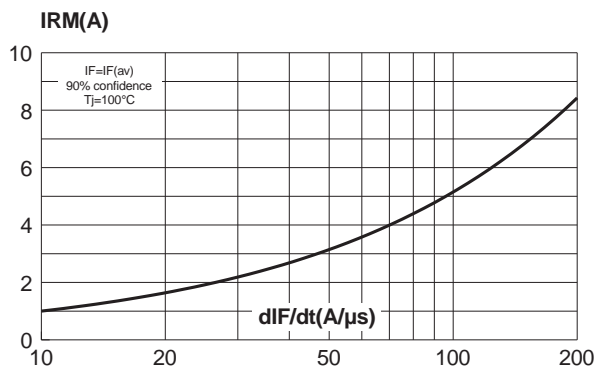
**Fig. 7:** Junction capacitance versus reverse voltage applied (typical values, per diode).



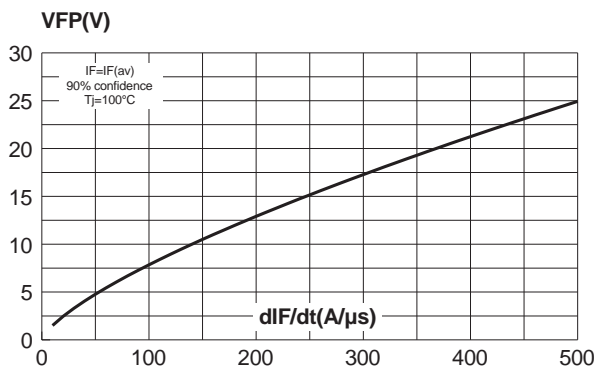
**Fig. 8:** Recovery charges versus  $dI_F/dt$  (per diode).



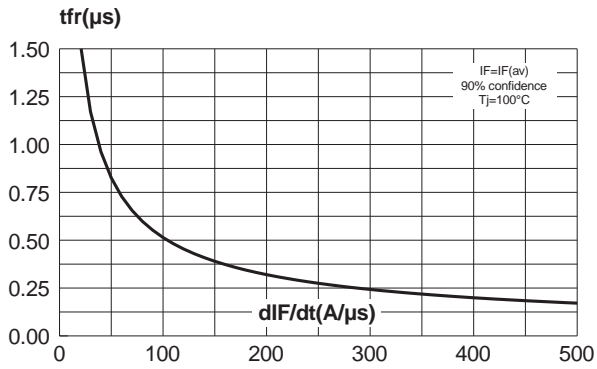
**Fig. 9:** Recovery current versus  $dI_F/dt$  (per diode).



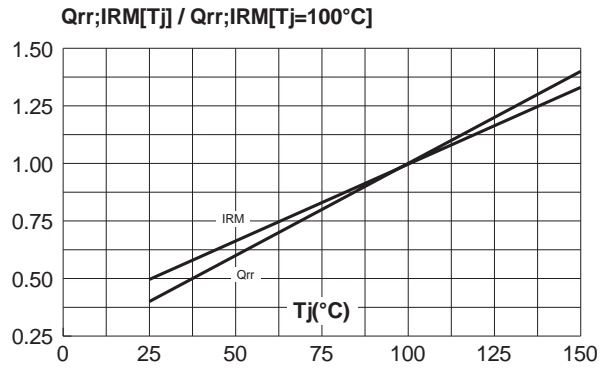
**Fig. 10:** Transient peak forward voltage versus  $dI_F/dt$  (per diode)



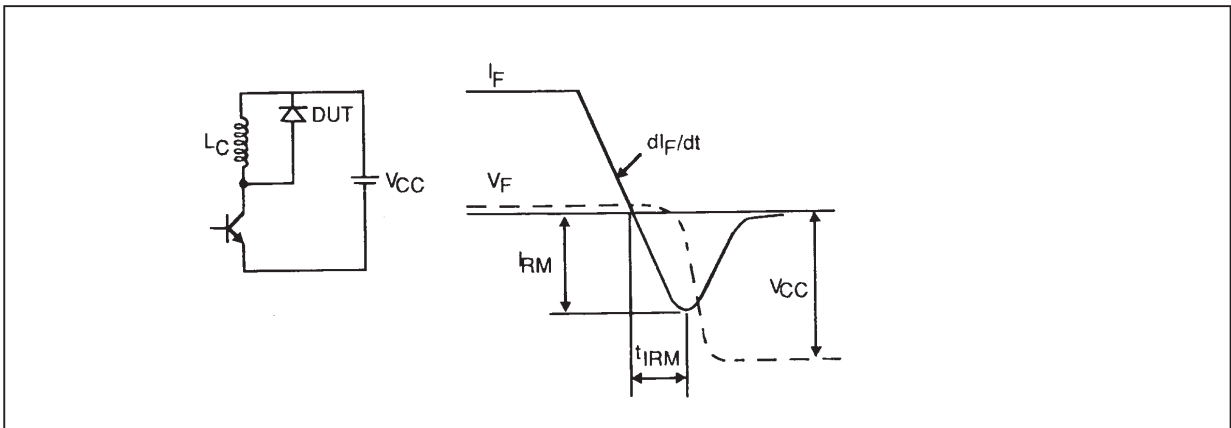
**Fig. 11:** Forward recovery time versus  $di_F/dt$  (per diode)



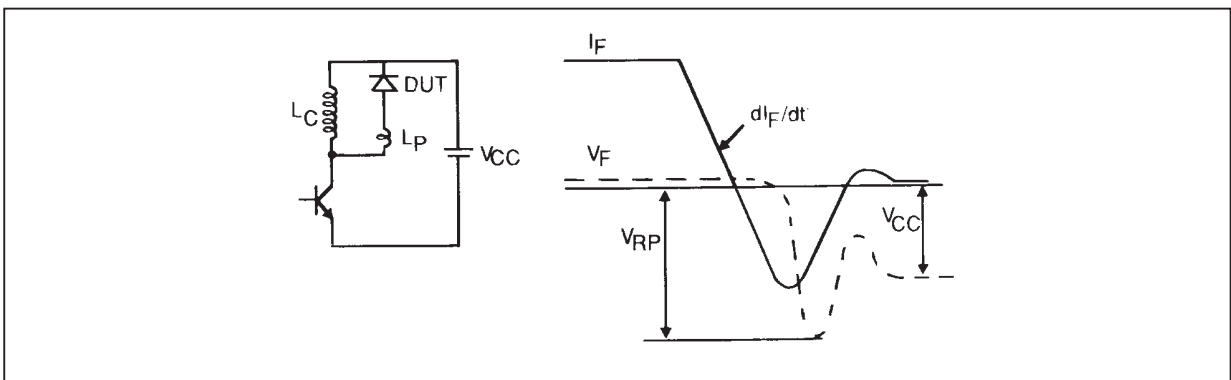
**Fig. 12:** Dynamic parameters versus junction temperature.



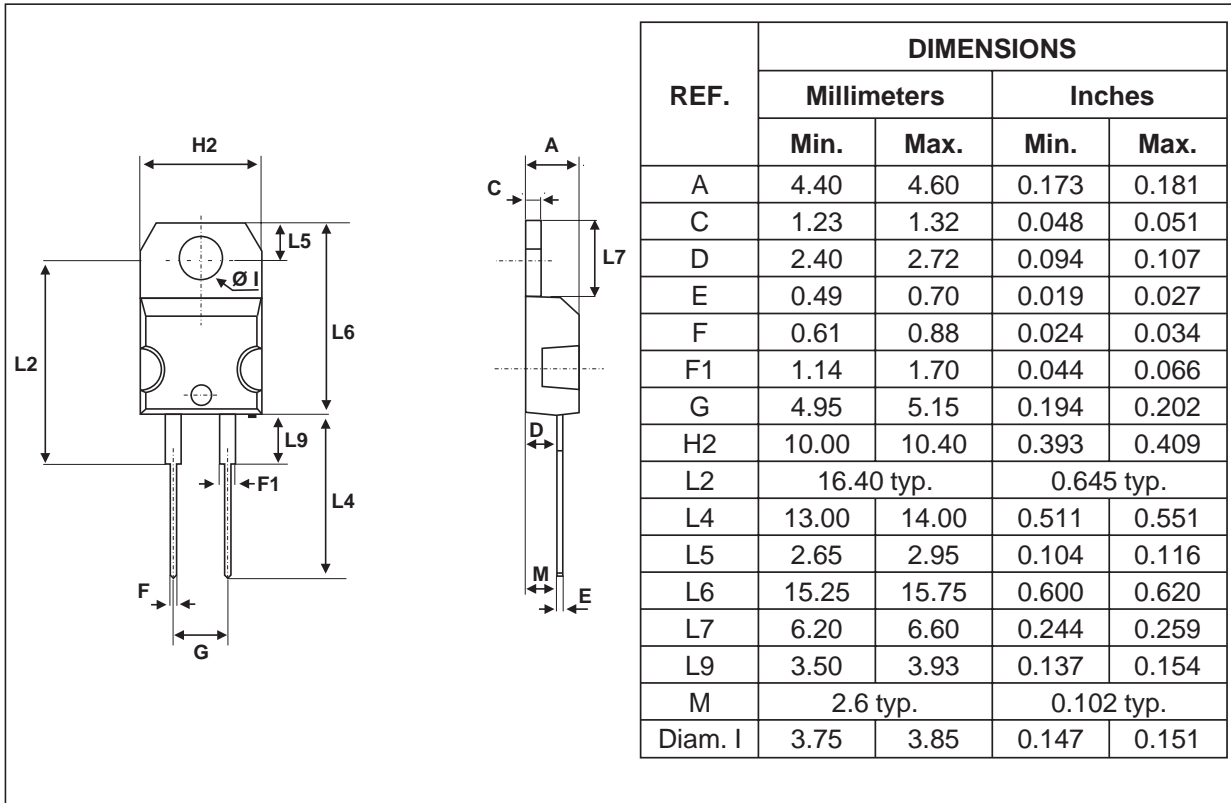
**Fig. 13:** Turn-off switching characteristics (without series inductance).



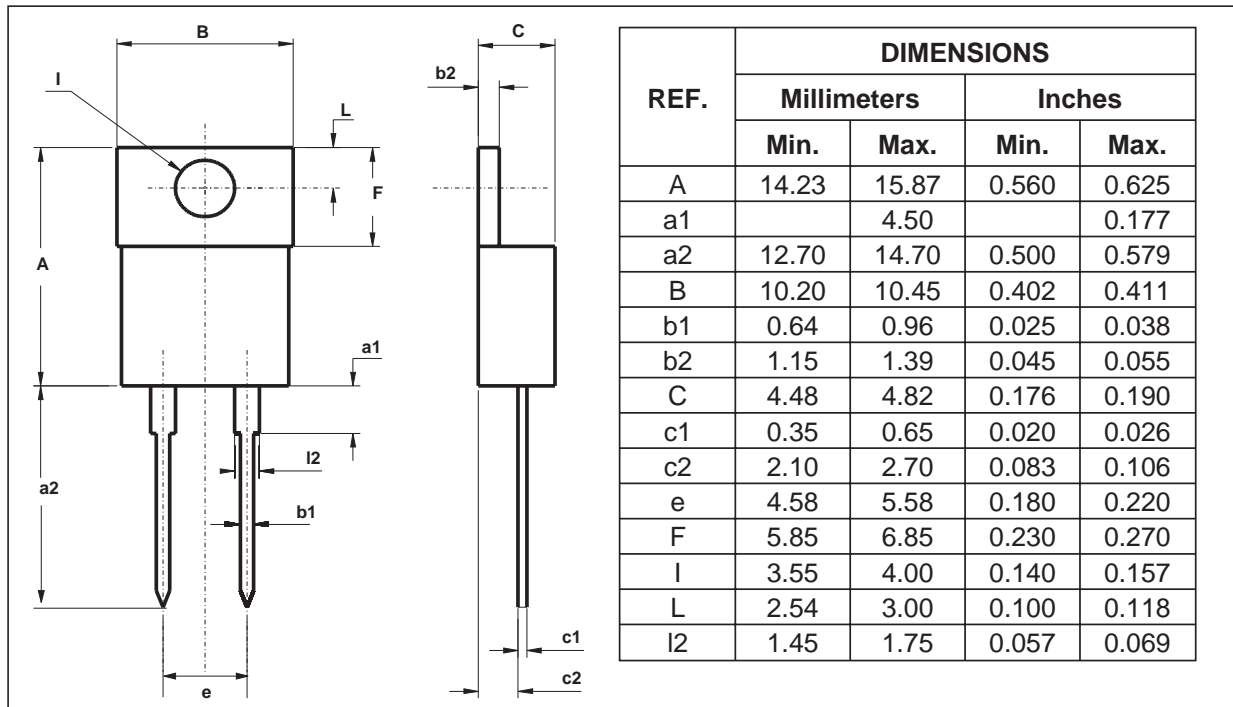
**Fig. 14:** Turn-off switching characteristics (with series inductance).



PACKAGE MECHANICAL DATA  
TO-220AC



**PACKAGE MECHANICAL DATA**  
TO-220AC Insulated



| Ordering type | Marking     | Package            | Weight  | Base qty | Delivery mode |
|---------------|-------------|--------------------|---------|----------|---------------|
| BYT08P-400    | BYT08P-400  | TO-220AC           | 1.86 g. | 50       | Tube          |
| BYT08PI-400   | BYT08PI-400 | Insulated TO-220AC | 1.86 g. | 250      | Bulk          |

- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N.m.
- Maximum torque value: 1.0 N.m.
- Epoxy meets UL94,V0

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