



# BYT60P-1000 BYT261PIV-1000

## FAST RECOVERY RECTIFIER DIODES

### MAJOR PRODUCT CHARACTERISTICS

|               |          |
|---------------|----------|
| $I_F(AV)$     | 2 x 60 A |
| $V_{RRM}$     | 1000 V   |
| $V_F(max)$    | 1.8 V    |
| $t_{rr}(max)$ | 70 ns    |

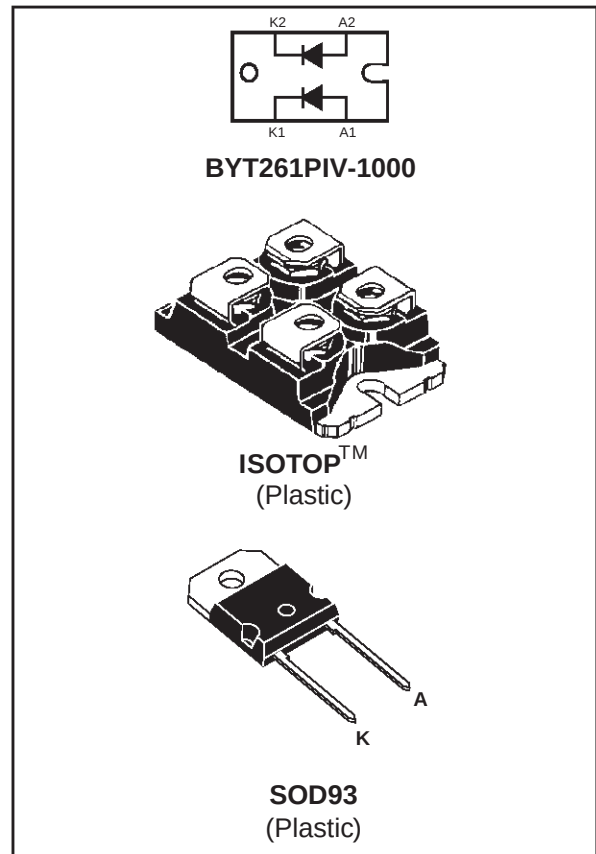
### FEATURES AND BENEFITS

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE: ISOTOP  
Insulation voltage: 2500 V<sub>RMS</sub>  
Capacitance = 45 pF  
Inductance < 5 nH

### DESCRIPTION

Dual or high single voltage rectifier devices suited for Switch Mode Power Supplies and other power converters.

These devices are packaged in ISOTOP or in SOD93.



### ABSOLUTE RATINGS (limiting values, per diode)

| Symbol       | Parameter                              |                           | Value         | Unit       |
|--------------|----------------------------------------|---------------------------|---------------|------------|
| $V_{RRM}$    | Repetitive peak reverse voltage        |                           | 1000          | V          |
| $I_{FRM}$    | Repetitive peak forward current        | $t_p=5\mu s$ $F=1kHz$     | 1000          | A          |
| $I_{F(RMS)}$ | RMS forward current                    | ISOTOP                    | 140           | A          |
|              |                                        | SOD93                     | 100           |            |
| $I_{F(AV)}$  | Average forward current $\delta = 0.5$ | $T_c = 50^\circ C$ ISOTOP | 60            | A          |
|              |                                        | $T_c = 60^\circ C$ SOD93  | 60            |            |
| $I_{FSM}$    | Surge non repetitive forward current   | $t_p = 10 ms$ Sinusoidal  | 400           | A          |
| $T_{stg}$    | Storage temperature range              |                           | - 40 to + 150 | $^\circ C$ |
| $T_j$        | Maximum operating junction temperature |                           | 150           | $^\circ C$ |

TM: ISOTOP is a registered trademark of STMicroelectronics.

## BYT60P-1000 / BYT261PIV-1000

### THERMAL RESISTANCES

| Symbol        | Parameter        |        |           | Value | Unit                 |
|---------------|------------------|--------|-----------|-------|----------------------|
| $R_{th(j-c)}$ | Junction to case | ISOTOP | Per diode | 0.8   | $^{\circ}\text{C/W}$ |
|               |                  |        | Total     | 0.45  |                      |
|               |                  | SOD93  | Total     | 0.7   |                      |
| $R_{th(c)}$   | Coupling         |        |           | 0.1   | $^{\circ}\text{C/W}$ |

When the diodes 1 and 2 are used simultaneously :

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

### STATIC ELECTRICAL CHARACTERISTICS (per diode)

| Symbol   | Parameter               | Test Conditions             |                     | Min. | Typ. | Max. | Unit          |
|----------|-------------------------|-----------------------------|---------------------|------|------|------|---------------|
| $V_F$ *  | Forward voltage drop    | $T_j = 25^{\circ}\text{C}$  | $I_F = 60\text{ A}$ |      |      | 1.9  | V             |
|          |                         | $T_j = 100^{\circ}\text{C}$ |                     |      |      | 1.8  |               |
| $I_R$ ** | Reverse leakage current | $T_j = 25^{\circ}\text{C}$  | $V_R = V_{RRM}$     |      |      | 100  | $\mu\text{A}$ |
|          |                         | $T_j = 100^{\circ}\text{C}$ |                     |      |      | 6    | mA            |

Pulse test : \*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

\*\*  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.47 \times I_{F(AV)} + 0.005 I_F^2 (RMS)$$

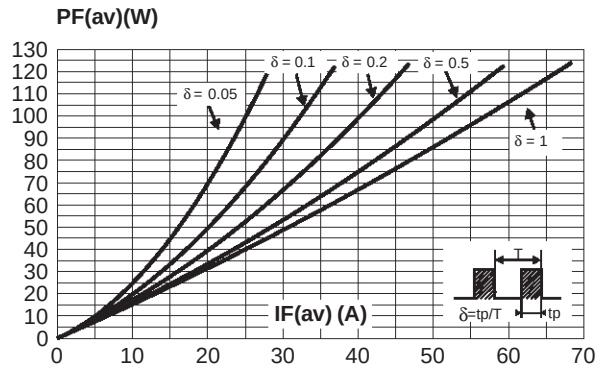
### RECOVERY CHARACTERISTICS (per diode)

| Symbol   | Test Conditions            |                                                                             |  | Min. | Typ. | Max. | Unit |
|----------|----------------------------|-----------------------------------------------------------------------------|--|------|------|------|------|
| $t_{rr}$ | $T_j = 25^{\circ}\text{C}$ | $I_F = 1\text{ A}$ $V_R = 30\text{ V}$ $dI_F/dt = -15\text{ A}/\mu\text{s}$ |  |      |      | 170  | ns   |
|          |                            | $I_F = 0.5\text{ A}$ $I_R = 1\text{ A}$ $I_{rr} = 0.25\text{ A}$            |  |      |      | 70   |      |

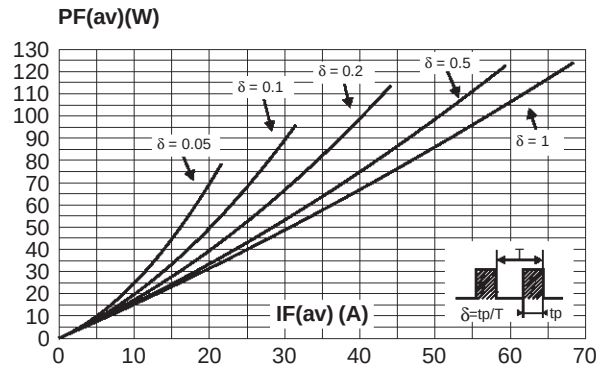
### TURN-OFF SWITCHING CHARACTERISTICS

| Symbol                      | Parameter                        | Test Conditions                                                                                                                                     |                                                                                                                                      | Min. | Typ. | Max. | Unit |
|-----------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| $t_{IRM}$                   | Maximum reverse recovery time    | $dI_F/dt = -240\text{ A}/\mu\text{s}$                                                                                                               | $V_{CC} = 200\text{ V}$<br>$I_F = 60\text{ A}$<br>$L_p \leq 0.05\text{ }\mu\text{H}$<br>$T_j = 100^{\circ}\text{C}$<br>(see fig. 13) |      |      | 200  | ns   |
|                             |                                  | $dI_F/dt = -480\text{ A}/\mu\text{s}$                                                                                                               |                                                                                                                                      |      | 120  |      |      |
| $I_{RM}$                    | Maximum reverse recovery current | $dI_F/dt = -240\text{ A}/\mu\text{s}$                                                                                                               |                                                                                                                                      |      |      | 40   | A    |
|                             |                                  | $dI_F/dt = -480\text{ A}/\mu\text{s}$                                                                                                               |                                                                                                                                      | 44   |      |      |      |
| $C = \frac{V_{RP}}{V_{CC}}$ | Turn-off overvoltage coefficient | $T_j = 100^{\circ}\text{C}$ $V_{CC} = 200\text{V}$ $I_F = I_{F(AV)}$<br>$dI_F/dt = -60\text{A}/\mu\text{s}$ $L_p = 2.5\mu\text{H}$<br>(see fig. 14) |                                                                                                                                      |      | 3.3  | 4.5  | /    |

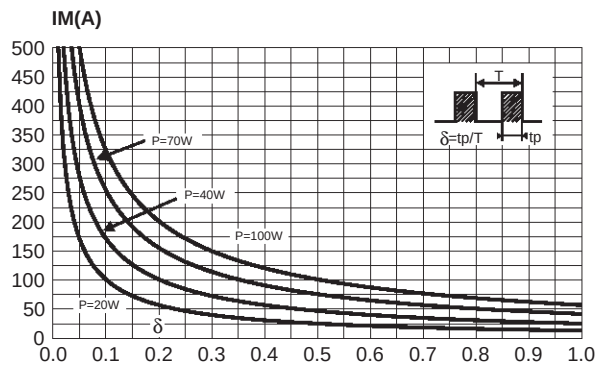
**Fig. 1-1:** Average forward power dissipation versus average forward current (per diode, ISOTOP).



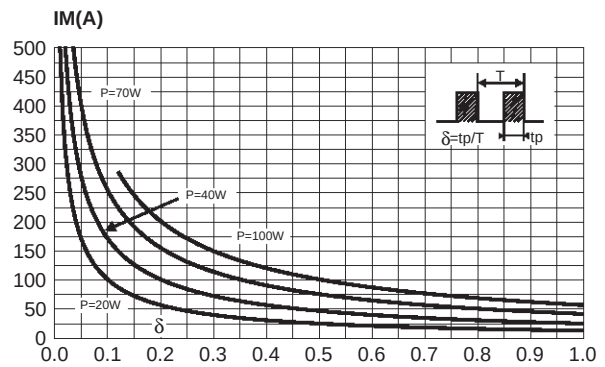
**Fig. 1-2:** Average forward power dissipation versus average forward current (SOD93).



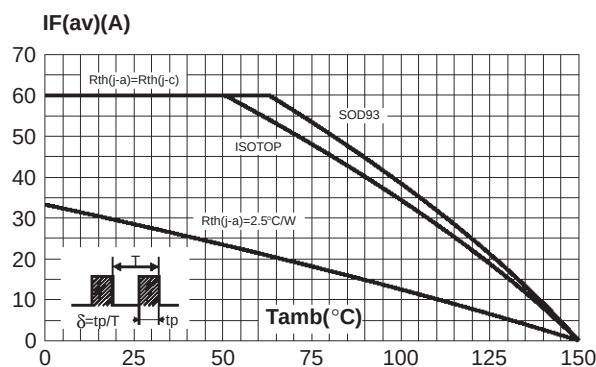
**Fig. 2-1:** Peak current versus form factor (per diode, ISOTOP).



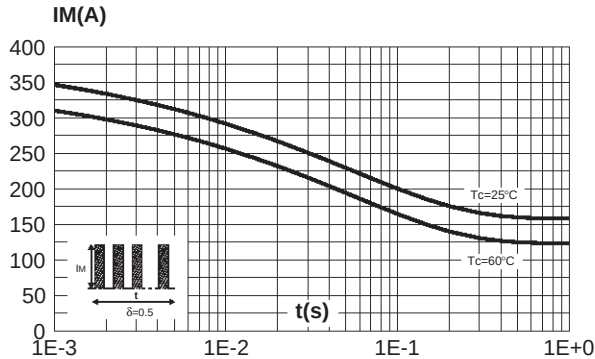
**Fig. 2-2:** Peak current versus form factor (SOD93).



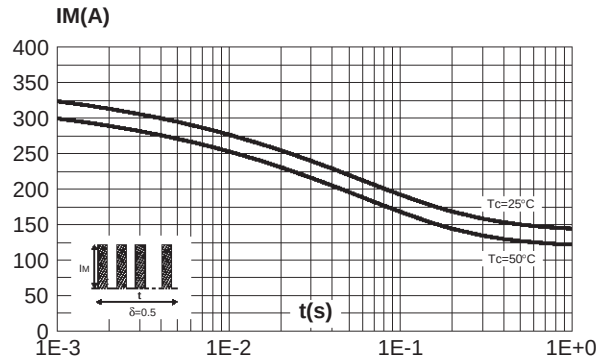
**Fig. 3:** Average forward current versus ambient temperature ( $\delta=0.5$ , per diode for ISOTOP).



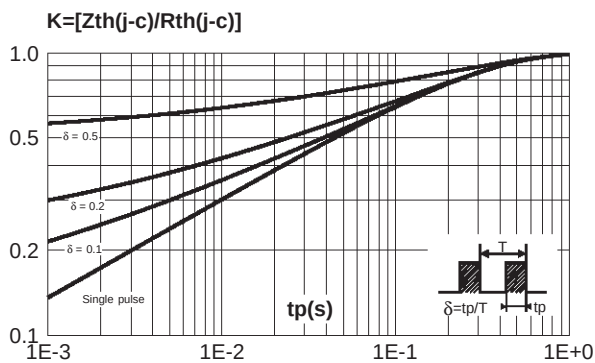
**Fig. 4-1:** Non repetitive surge peak forward current versus overload duration (SOD93).



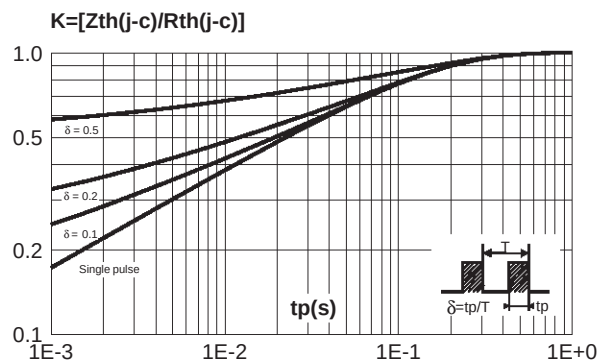
**Fig. 4-2:** Non repetitive surge peak forward current versus overload duration (per diode, ISOTOP).



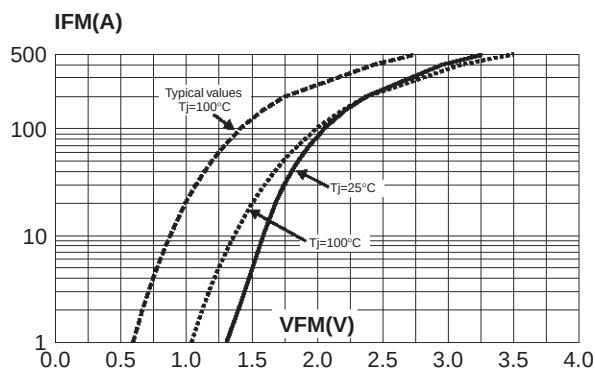
**Fig. 5-1:** Relative variation of thermal impedance junction to case versus pulse duration (per diode, ISOTOP).



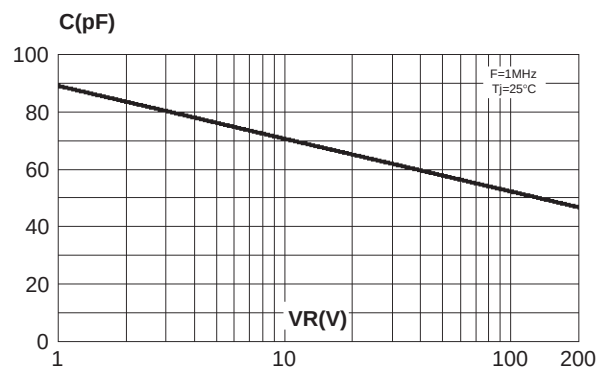
**Fig. 5-2:** Relative variation of thermal impedance junction to case versus pulse duration (SOD93).



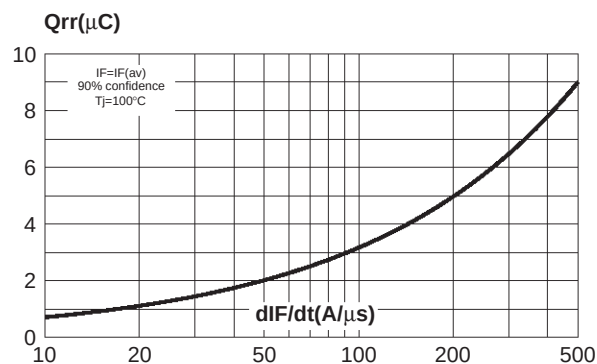
**Fig. 6:** Forward voltage drop versus forward current (maximum values, per diode for ISOTOP).



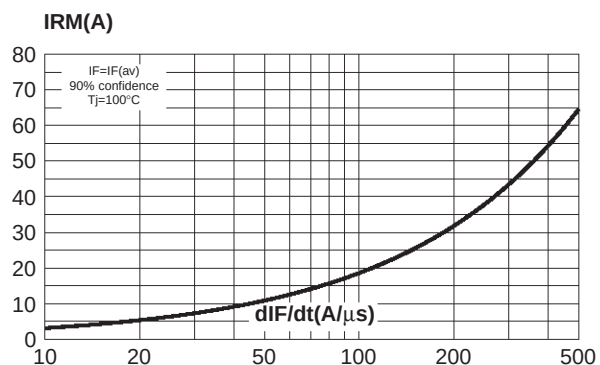
**Fig. 7:** Junction capacitance versus reverse voltage applied (typical values, per diode for ISOTOP).



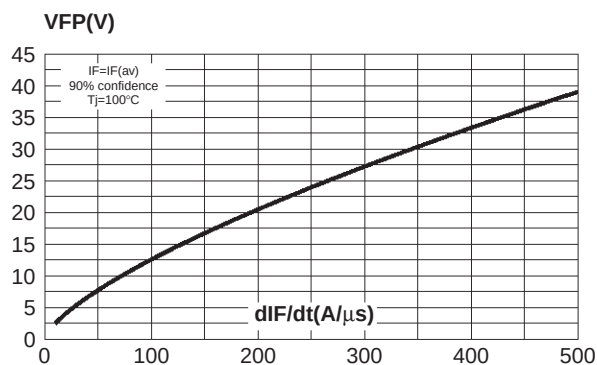
**Fig. 8:** Recovery charges versus  $dI_F/dt$  (per diode for ISOTOP).



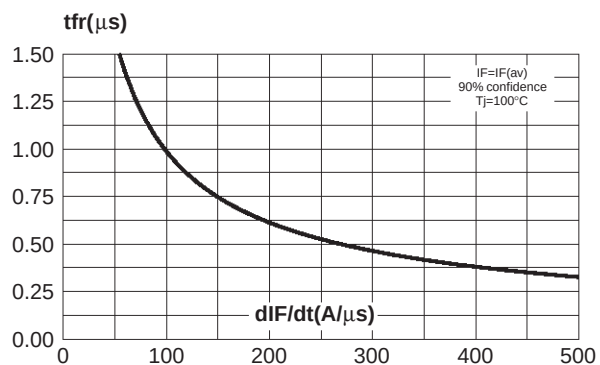
**Fig. 9:** Recovery current versus  $dI_F/dt$  (per diode for ISOTOP).



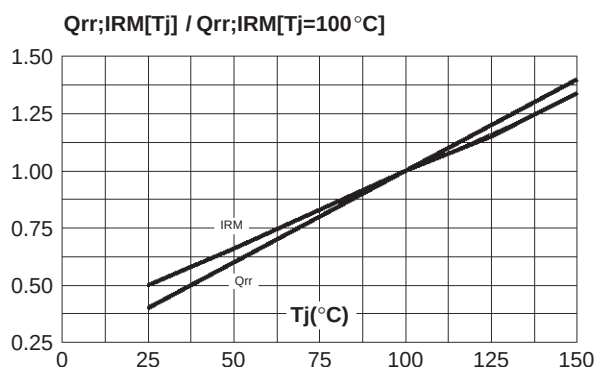
**Fig. 10:** Transient peak forward voltage versus  $dI_F/dt$  (per diode for ISOTOP).



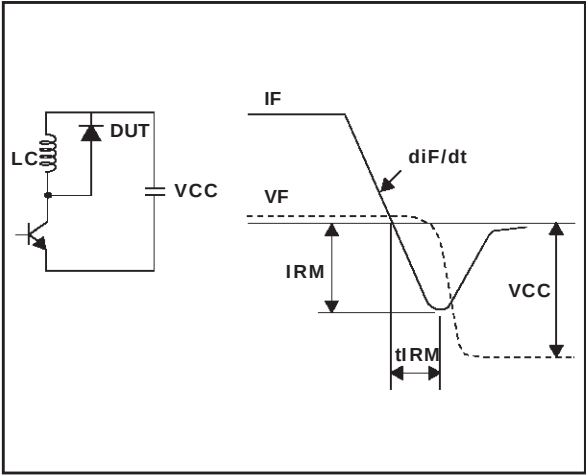
**Fig. 11:** Forward recovery time versus  $dI_F/dt$  (per diode for ISOTOP).



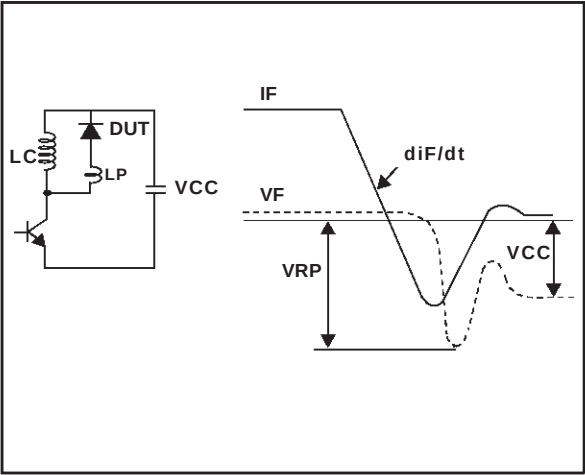
**Fig. 12:** Dynamic parameters versus junction temperature.



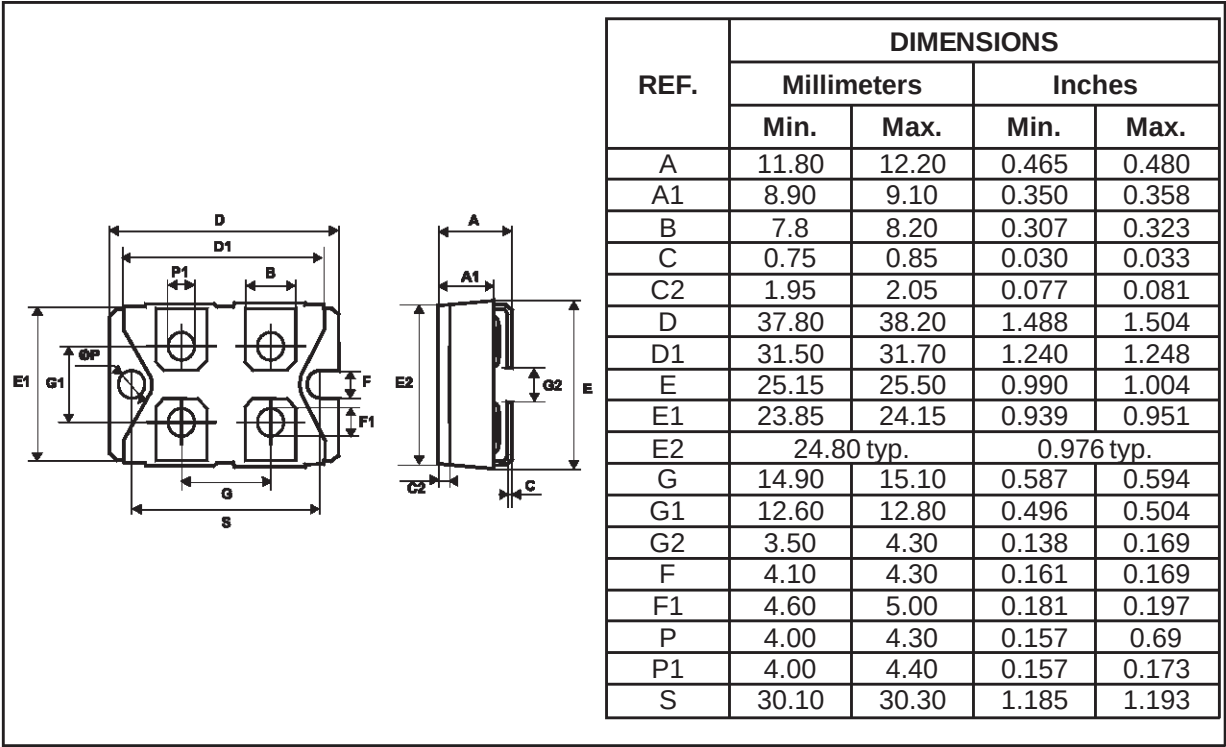
**Fig. 13:** Turn-off switching characteristics (without series inductance).



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

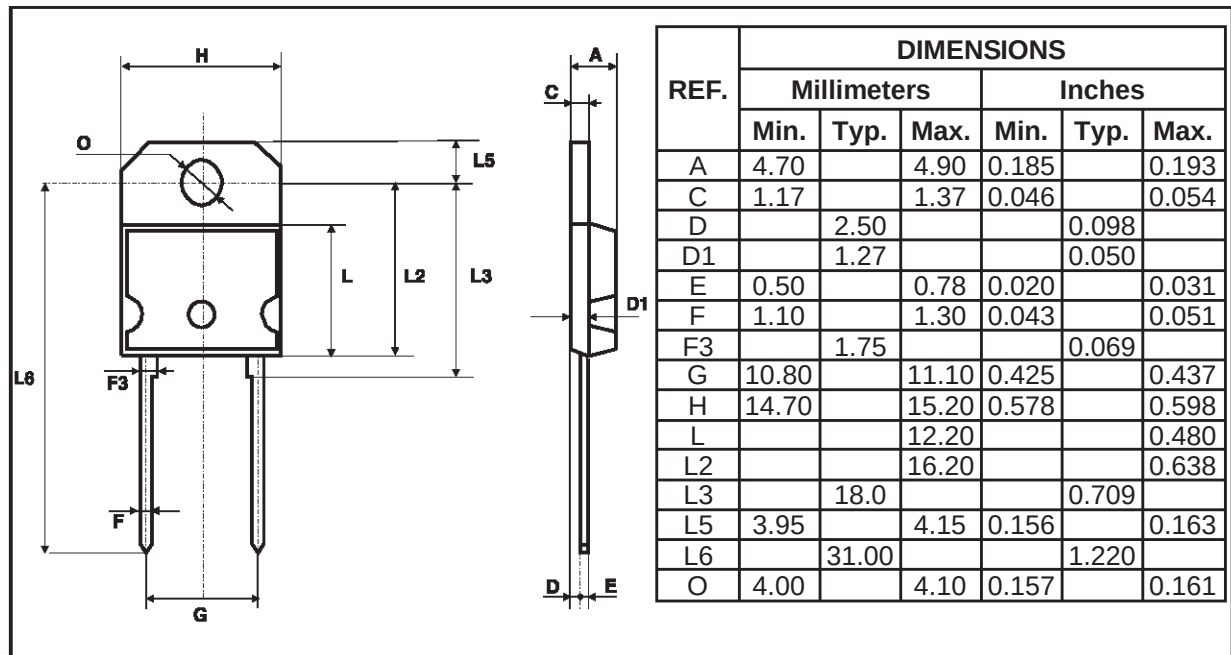


**PACKAGE MECHANICAL DATA**  
 ISOTOP



## PACKAGE MECHANICAL DATA

SOD93 Plastic



| Ordering type  | Marking        | Package | Weight                 | Base qty | Delivery mode |
|----------------|----------------|---------|------------------------|----------|---------------|
| BYT60P-1000    | BYT60P-1000    | SOD93   | 3.79 g.                | 30       | Tube          |
| BYT261PIV-1000 | BYT261PIV-1000 | ISOTOP  | 28 g. (without screws) | 10       | Tube          |

- Cooling method: by conduction (C)
- Recommended torque value (ISOTOP): 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.
- Recommended torque value (SOD93): 0.8 N.m.
- Maximum torque value (SOD93): 1.0 N.m.
- Epoxy meets UL94,V0

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