



# BYT60P-400 BYT260PIV-400 / BYT261PIV-400

## FAST RECOVERY RECTIFIER DIODES

### MAIN PRODUCT CHARACTERISTICS

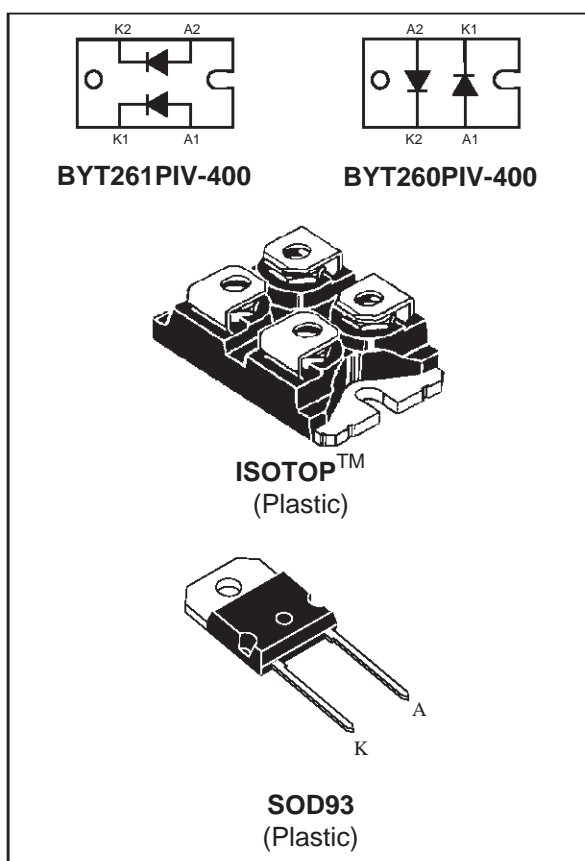
$I_{F(AV)}$	2 x 60 A
$V_{RRM}$	400 V
$V_F(\max)$	1.4 V
$t_{rr}(\max)$	50 ns

### 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

These rectifier devices are suited for free-wheeling function in converters and motor control circuits. Packaged in ISOTOP or SOD93, 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		400	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 $\delta = 0.5$	$T_c = 70^\circ C$ ISOTOP	60	A
		$T_c = 80^\circ C$ SOD93		
$I_{FSM}$	Surge non repetitive forward current $t_p = 10 ms$ Sinusoidal	ISOTOP	600	A
		SOD93	550	
$T_{stg}$	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.

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### THERMAL RESISTANCES

Symbol	Parameter		Value	Unit	
$R_{th(j-c)}$	Junction to case	ISOTOP	Per diode Total	0.8 0.45	°C/W
		SOD93	Total	0.7	
$R_{th(c)}$			Coupling	0.1	°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	$T_j = 25^\circ\text{C}$	$I_F = 60\text{ A}$			1.5	V
		$T_j = 100^\circ\text{C}$				1.4	
$I_R^{**}$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			60	$\mu\text{A}$
		$T_j = 100^\circ\text{C}$				6	mA

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

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

To evaluate the conduction losses use the following equation:

$$P = 1.1 \times I_{F(AV)} + 0.0045 I_F^2(\text{RMS})$$

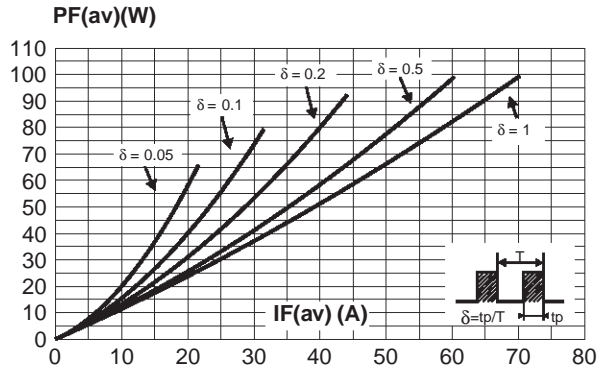
### RECOVERY CHARACTERISTICS (per diode)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	$T_j = 25^\circ\text{C}$	$I_F = 1\text{ A}$ $V_R = 30\text{ V}$ $di_F/dt = -15\text{ A}/\mu\text{s}$			100	ns
		$I_F = 0.5\text{ A}$ $I_R = 1\text{ A}$ $I_{rr} = 0.25\text{ A}$			50	

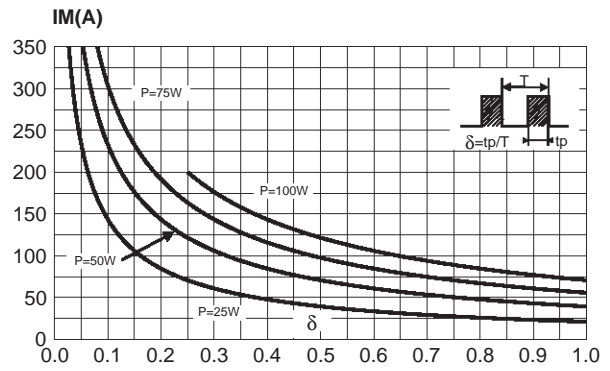
### TURN-OFF SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$t_{IRM}$	Maximum reverse recovery time	$di_F/dt = -240\ \text{A}/\mu\text{s}$	$V_{CC} = 200\text{ V}$ $I_F = 60\text{ A}$ $L_p \text{ @ } 0.05\ \mu\text{H}$ $T_j = 100^\circ\text{C}$ (see fig. 13)			75	ns
		$di_F/dt = -480\ \text{A}/\mu\text{s}$				50	
$I_{RM}$	Maximum reverse recovery current	$di_F/dt = -240\ \text{A}/\mu\text{s}$	$V_{CC} = 200\text{ V}$ $I_F = 60\text{ A}$ $L_p \text{ @ } 0.05\ \mu\text{H}$ $T_j = 100^\circ\text{C}$ (see fig. 13)			18	A
		$di_F/dt = -480\ \text{A}/\mu\text{s}$				24	
$C = \frac{V_{RP}}{V_{CC}}$	Turn-off overvoltage coefficient	$T_j = 100^\circ\text{C}$ $V_{CC} = 120\text{ V}$ $I_F = I_{F(AV)}$ $di_F/dt = -60\text{ A}/\mu\text{s}$ $L_p = 0.8\ \mu\text{H}$ (see fig. 14)			3.3	4	/

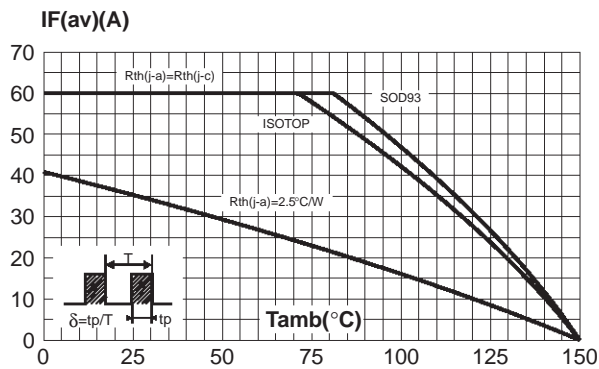
**Fig. 1:** Average forward power dissipation versus average forward current (per diode, for ISOTOP).



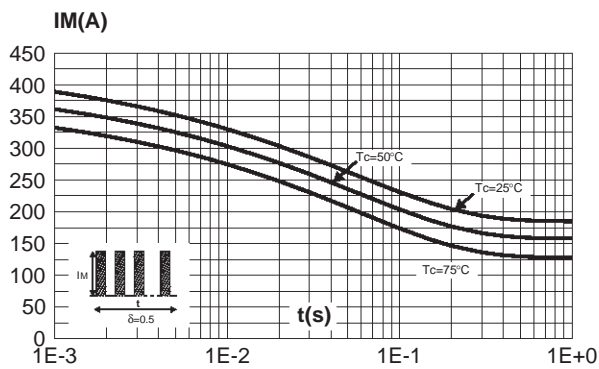
**Fig. 2:** Peak current versus form factor (per diode, for ISOTOP).



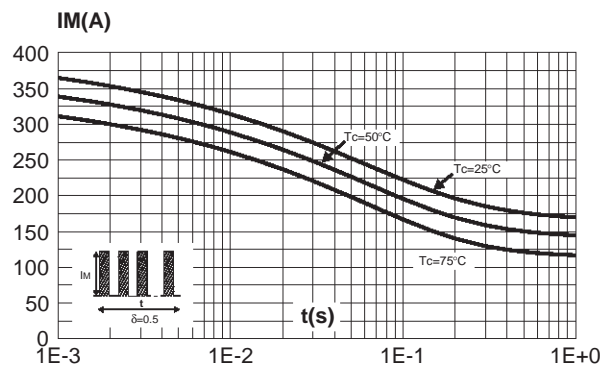
**Fig. 3:** Average forward current versus ambient temperature ( $\delta=0.5$ , per diode for ISOTOP).



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

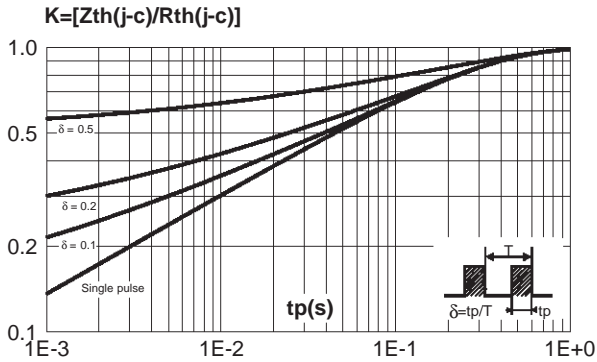


**Fig. 4-2:** Non repetitive surge peak forward current versus overload duration (per diode, for ISOTOP).

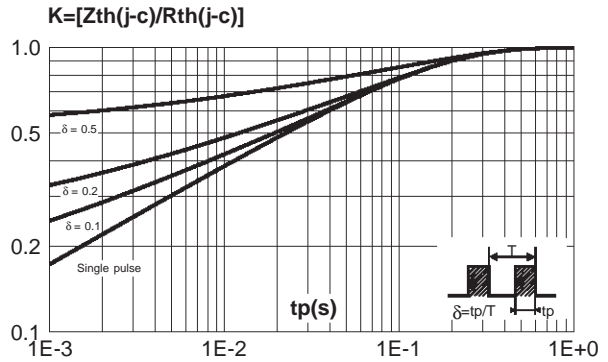


**BYT60P-400 / BYT260PIV-400 / BYT261PIV-400**

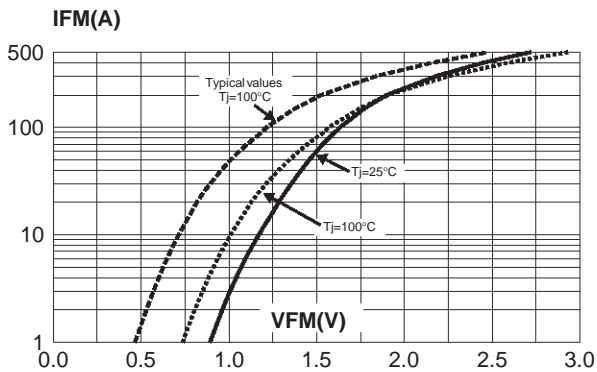
**Fig. 5-1:** Relative variation of thermal impedance junction to case versus pulse duration (per diode for ISOTOP).



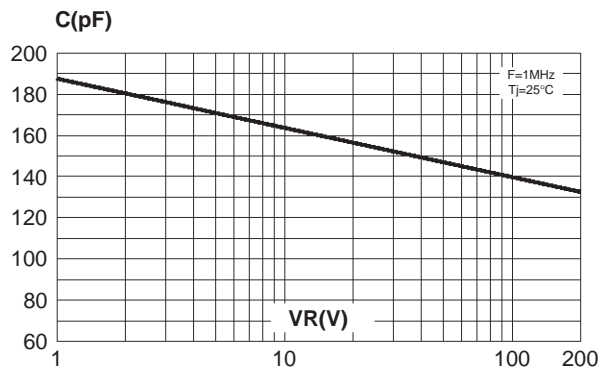
**Fig. 5-2:** Relative variation of thermal impedance junction to case versus pulse duration (SOD93).



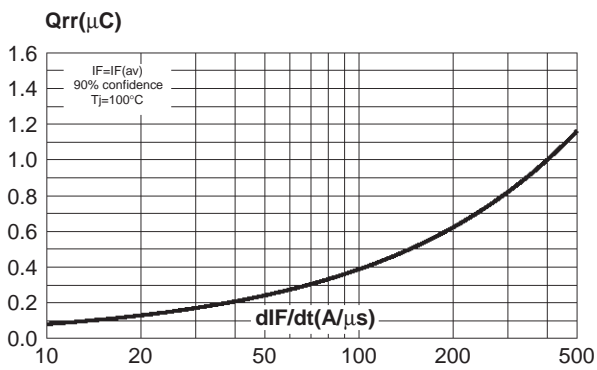
**Fig. 6:** Forward voltage drop versus forward current (maximum values, per diode for ISOTOP).



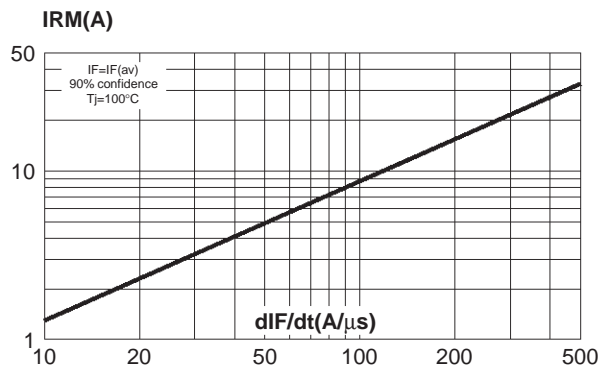
**Fig. 7:** Junction capacitance versus reverse voltage applied (typical values, per diode for ISOTOP).



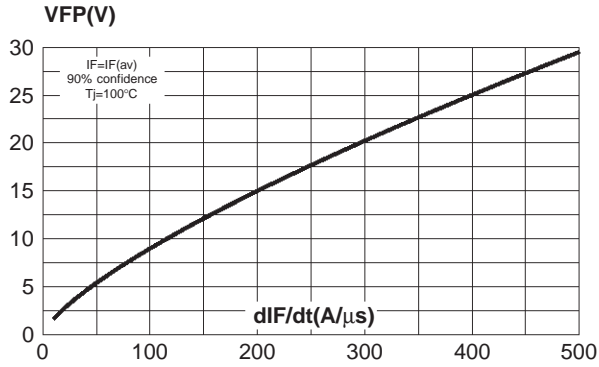
**Fig. 8:** Recovery charges versus  $dI_F/dt$  (per diode for ISOTOP).



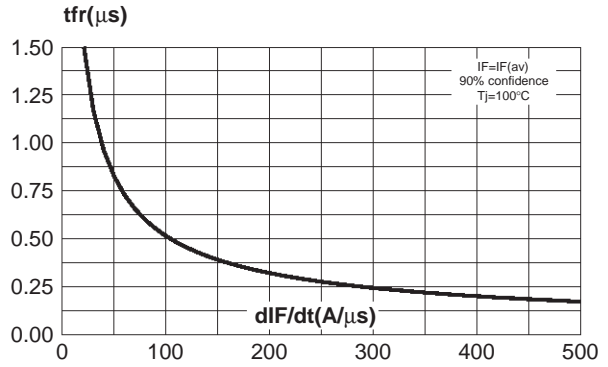
**Fig. 9:** Recovery current versus  $dI_F/dt$  (per diode for ISOTOP).



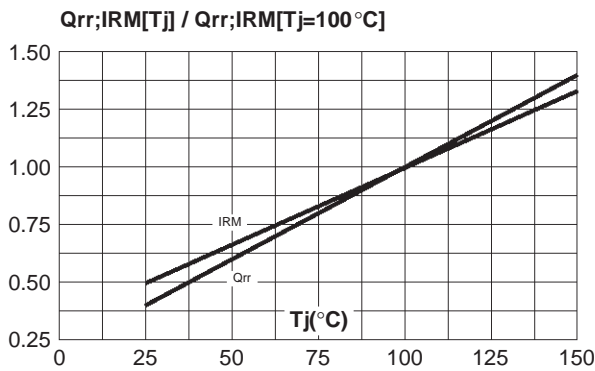
**Fig. 10:** Transient peak forward voltage versus  $di_F/dt$  (per diode for ISOTOP).



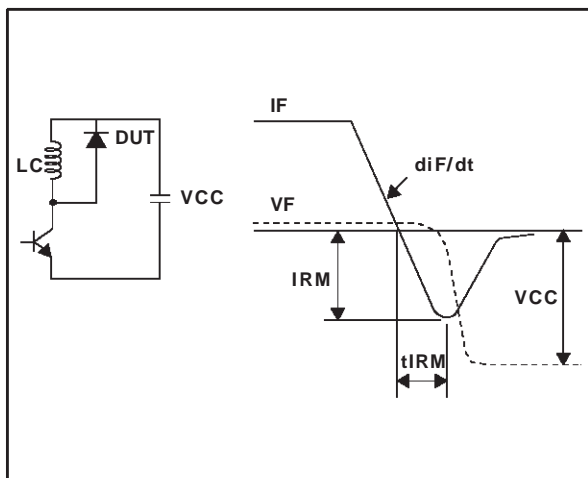
**Fig. 11:** Forward recovery time versus  $di_F/dt$  (per diode for ISOTOP).



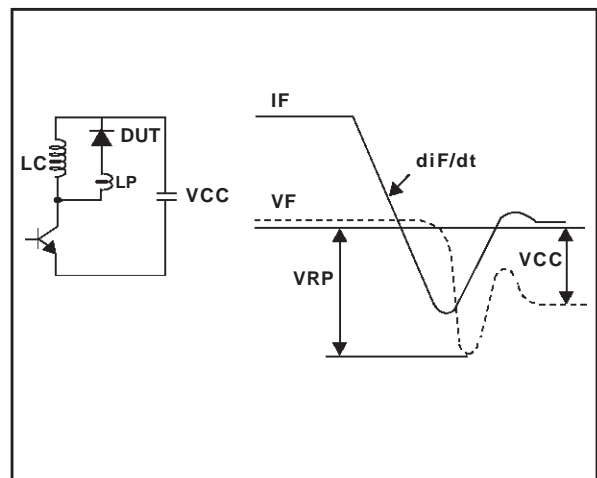
**Fig. 12:** Dynamic parameters versus junction temperature.



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

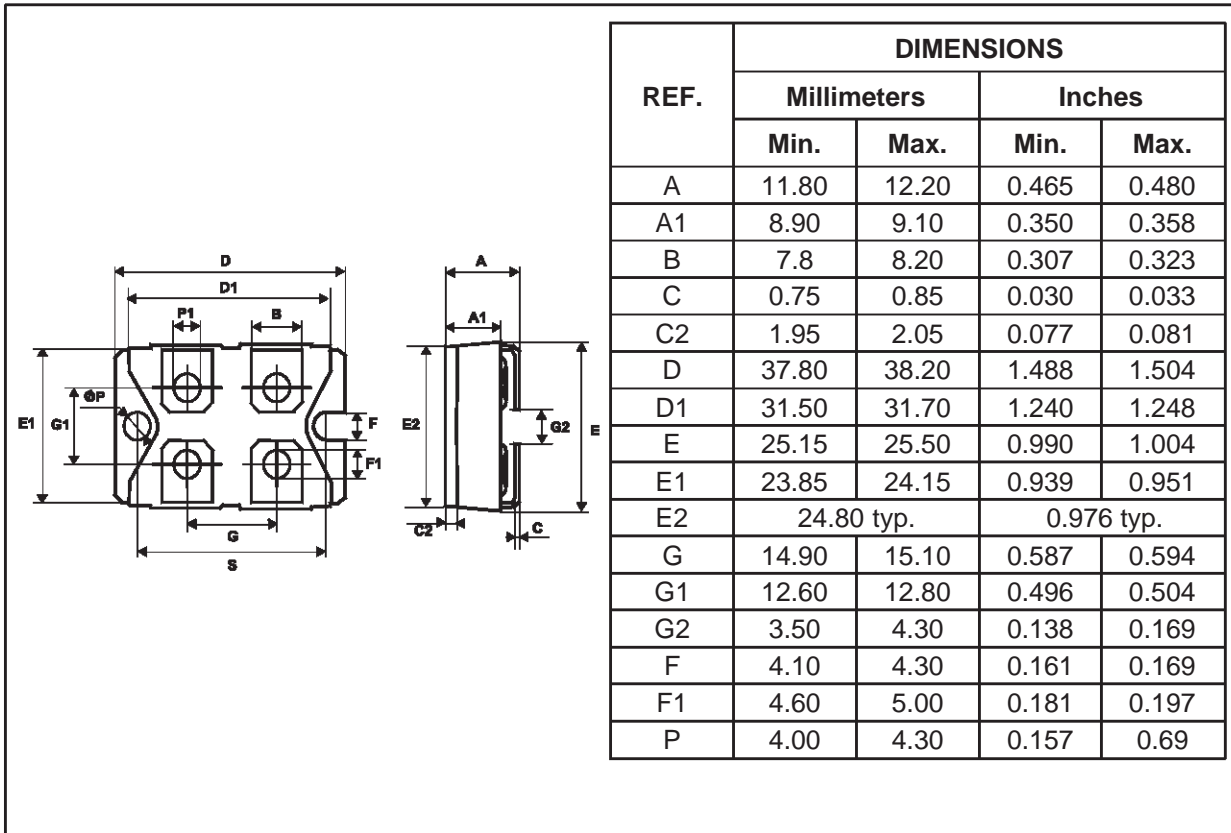


**Fig. 14:** Turn-off switching characteristics (with serie inductance).



PACKAGE MECHANICAL DATA

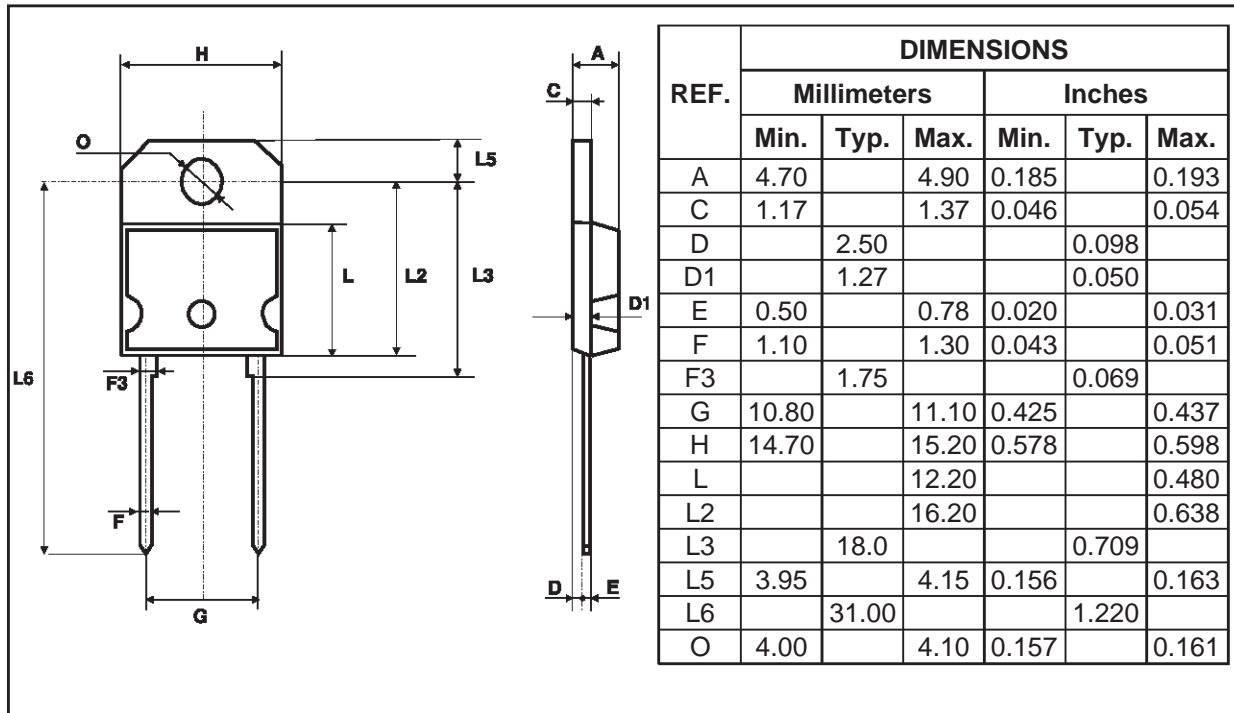
ISOTOP



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.465	0.480
A1	8.90	9.10	0.350	0.358
B	7.8	8.20	0.307	0.323
C	0.75	0.85	0.030	0.033
C2	1.95	2.05	0.077	0.081
D	37.80	38.20	1.488	1.504
D1	31.50	31.70	1.240	1.248
E	25.15	25.50	0.990	1.004
E1	23.85	24.15	0.939	0.951
E2	24.80 typ.		0.976 typ.	
G	14.90	15.10	0.587	0.594
G1	12.60	12.80	0.496	0.504
G2	3.50	4.30	0.138	0.169
F	4.10	4.30	0.161	0.169
F1	4.60	5.00	0.181	0.197
P	4.00	4.30	0.157	0.69

**PACKAGE MECHANICAL DATA**

SOD93 Plastic



Ordering type	Marking	Package	Weight	Base qty	Delivery mode
BYT60P-400	BYT60P-400	SOD93	3.79 g.	30	Tube
BYT260PIV-400	BYT260PIV-400	ISOTOP	28 g. (without screws)	10	Tube
BYT261PIV-400	BYT261PIV-400	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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