BYT260PIV-400 BYT261PIV-400

## FAST RECOVERY RECTIFIER DIODES

## FEATURES

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

Insulating voltage $=2500 \mathrm{~V}_{\text {RMS }}$
Capacitance $=45 \mathrm{pF}$

## DESCRIPTION

Dual high voltage rectifiers ranging from 400 V to 200V suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.


ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter |  |  | Value | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: |
| IfRM | Repetitive peak forward current | tp $\leq 10 \mu \mathrm{~s}$ |  | 800 | A |
| $\mathrm{IF}_{\text {( } \mathrm{RMS}}$ | RMS forward current |  | Per diode | 140 | A |
| $\mathrm{I}_{\mathrm{F}(\mathrm{AV})}$ | Average forward current | $\begin{gathered} \mathrm{Tc}=80^{\circ} \mathrm{C} \\ \delta=0.5 \\ \hline \end{gathered}$ | Per diode | 60 | A |
| IFSM | Surge non repetitive forward current | $\begin{aligned} & \mathrm{tp}=10 \mathrm{~ms} \\ & \text { sinusoidal } \\ & \hline \end{aligned}$ | Per diode | 600 | A |
| Tstg $\mathrm{Tj}$ | Storage and junction temperature range |  |  | $\begin{aligned} & -40 \text { to }+150 \\ & -40 \text { to }+150 \end{aligned}$ | ${ }^{\circ} \mathrm{C}$ |


| Symbol | Parameter | BYT261PIV-/BYT260PIV- |  |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 200 | 300 | 400 |  |
| VRRM |  | 200 | 300 | 400 | V |

TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

## THERMAL RESISTANCE

| Symbol | Parameter |  | Value | Unit |
| :---: | :--- | :--- | :---: | :---: |
| Rth (j-c) | Junction to case | Per diode | 0.7 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |
|  |  | Total | 0.4 |  |
| Rth (c) | Coupling | 0.1 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |  |

When the diodes 1 and 2 are used simultaneously:
$\Delta \mathrm{Tj}($ diode 1$)=\mathrm{P}($ diode $) \times \operatorname{Rth}($ Per diode $)+\mathrm{P}($ diode 2$) \times \operatorname{Rth}(\mathrm{c})$
ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

| Symbol | Test Conditions |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $V_{F}$ * | $\mathrm{Tj}=25^{\circ} \mathrm{C}$ | $\mathrm{I}_{\mathrm{F}}=60 \mathrm{~A}$ |  |  | 1.5 | V |
|  | $\mathrm{T}_{\mathrm{j}}=100^{\circ} \mathrm{C}$ |  |  |  | 1.4 |  |
| $I_{R}^{* *}$ | $\mathrm{T}_{\mathrm{j}}=25^{\circ} \mathrm{C}$ | $\mathrm{V}_{\mathrm{R}}=\mathrm{V}_{\mathrm{RRM}}$ |  |  | 60 | $\mu \mathrm{A}$ |
|  | $\mathrm{T}_{\mathrm{j}}=100^{\circ} \mathrm{C}$ |  |  |  | 6 | mA |

Pulse test : *tp $=380 \mu \mathrm{~s}$, duty cycle $<2 \%$
${ }^{* *}$ tp $=5 \mathrm{~ms}$, duty cycle $<2 \%$
RECOVERY CHARACTERISTICS

| Symbol | Test Conditions |  |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| trr | $\mathrm{T}_{\mathrm{j}}=25^{\circ} \mathrm{C}$ | $\begin{aligned} & I_{F}=0.5 \mathrm{~A} \\ & I_{R}=1 \mathrm{~A} \end{aligned}$ | $\operatorname{lrr}=0.25 \mathrm{~A}$ |  |  | 50 | ns |
|  |  | $\begin{aligned} & I_{F}=1 A \\ & V_{R}=30 V \end{aligned}$ | $\mathrm{dl}_{\mathrm{F}} / \mathrm{dt}=-15 \mathrm{~A} / \mu \mathrm{s}$ |  |  | 100 |  |

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

| Symbol | Test Conditions |  |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| tIRM | $\mathrm{dl}_{\mathrm{F}} / \mathrm{dt}=-240 \mathrm{~A} / \mu \mathrm{s}$ | $\begin{aligned} & \mathrm{Vcc}=200 \mathrm{~V} \\ & \mathrm{Lp} \leq 0.05 \mu \mathrm{H} \\ & \text { see fig. } 11 \end{aligned}$ | $\begin{aligned} & \mathrm{I}_{\mathrm{F}}=60 \mathrm{~A} \\ & \mathrm{~T}_{\mathrm{j}}=100^{\circ} \mathrm{C} \end{aligned}$ |  |  | 75 | ns |
|  | $\mathrm{dlF} / \mathrm{dt}=-480 \mathrm{~A} / \mu \mathrm{s}$ |  |  |  | 50 |  |  |
| IRM | $\mathrm{dl}_{\mathrm{F}} / \mathrm{dt}=-240 \mathrm{~A} / \mu \mathrm{s}$ |  |  |  |  | 18 | A |
|  | $\mathrm{dl}_{\mathrm{F}} / \mathrm{dt}=-480 \mathrm{~A} / \mu \mathrm{s}$ |  |  |  | 24 |  |  |

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

| Symbol | Test Conditions |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $C=\frac{V_{R P}}{V_{C C}}$ | $T_{j}=100^{\circ} \mathrm{C} \quad \mathrm{VCC}=120 \mathrm{~V} \quad \mathrm{I}_{\mathrm{F}=} \mathrm{I}_{\mathrm{F}(\mathrm{AV})}$ <br> $\mathrm{dI}_{\mathrm{F}} / \mathrm{dt}=-60 \mathrm{~A} / \mu \mathrm{s}$$\quad$see note <br> see fig. 12 |  | 3.3 | 4 | $/$ |  |

Note : Applicable to BYT261PIV-400 only
To evaluate the conduction losses use the following equation :
$\left.\mathrm{P}=1.1 \times \mathrm{I}_{\mathrm{F}(\mathrm{AV})}+0.0045 \times \mathrm{IF}^{2}{ }^{2} \mathrm{RMS}\right)$

Fig. 1 : Low frequency power losses versus average current.


Fig. 3 : Non repetitive peak surge current versus overload duration.


Fig. 5 : Voltage drop versus forward current.


Fig. 2 : Peak current versus form factor.


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


Fig. 6 : Recovery charge versus $\mathrm{dif}_{\mathrm{F}} / \mathrm{dt}$.


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Fig. 7 : Recovery time versus $\mathrm{dl}_{\mathrm{F}} / \mathrm{dt}$.


Fig. 9 : Peak forward voltage versus $\mathrm{dl}_{\mathrm{F}} / \mathrm{dt}$.


Fig. 11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)


Fig. 8 : Peak reverse current versus dIF/dt.


Fig. 10 : Dynamic parameters versus junction temperature.


Fig. 12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)


## PACKAGE MECHANICAL DATA

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| REF. | DIMENSIONS |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Millimeters |  | Inches |  |
|  | Min. | Max. | Min. | Max. |
| A | 11.80 | 12.20 | 0.465 | 0.480 |
| B | 8.90 | 9.10 | 0.350 | 0.358 |
| C | 1.95 | 2.05 | 0.077 | 0.081 |
| D | 0.75 | 0.85 | 0.029 | 0.034 |
| E | 12.60 | 12.80 | 0.496 | 0.504 |
| F | 25.10 | 25.50 | 0.988 | 1.004 |
| G | 31.50 | 31.70 | 1.240 | 1.248 |
| H | 4.00 |  | 0.157 |  |
| I | 4.10 | 4.30 | 0.161 | 0.169 |
| J | 4.10 | 4.30 | 0.161 | 0.169 |
| L | 14.90 | 15.10 | 0.586 | 0.595 |
| M | 30.10 | 30.30 | 1.185 | 1.193 |
| O | 7.80 | 38.20 | 1.488 | 1.504 |
| P | 5.50 | 8.20 | 0.307 | 0.323 |

Cooling method: C
Marking : Type number
Weight: 28 g (without screws)
Electric isolation : $2500 \mathrm{~V}_{\text {(RMS) }}$
Capacitance : < 45 pF
Inductance : $<5 \mathrm{nH}$

- Recommended torque value : 1.3 N.m (MAX $1.5 \mathrm{~N} . \mathrm{m}$ ) for the $6 \times \mathrm{M} 4$ screws. $(2 \times \mathrm{M} 4$ 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.

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