

T-23-07

Philips Components

Data sheet	
status	Preliminary specification
date of issue	January 1991

BYV32E-100/150/200**Ultra fast rugged dual rectifier**

GENERAL DESCRIPTION

Glass passivated, high efficiency, rugged dual epitaxial rectifier diodes in plastic envelopes, featuring low forward voltage drop, ultra-fast recovery time, very low stored charge and soft recovery characteristic. They are intended for use in switched-mode power supplies and high-frequency circuits in general, where both low conduction and low switching losses are essential. Their single chip (monolithic) construction ensures excellent matching of the forward and switching characteristics of the two halves, allowing parallel operation without the need for derating. The series consists of common-cathode types.

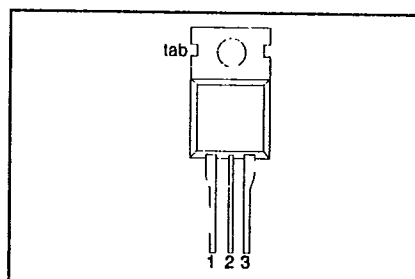
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
	BYV32E-	100 150 200	
V_{RRM}	Repetitive peak voltage	100 150 200	V
I_O	Average forward current	20	A
V_F	Forward voltage	0.85	V
E_{RSM}	Non-repetitive reverse avalanche energy	30	mJ
t_{rr}	Reverse recovery time	25	ns

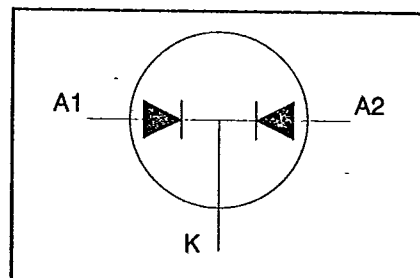
PINNING - TO220AB

PIN	DESCRIPTION
1	Anode (A1)
2	Cathode (K)
3	Anode (A2)
tab	Cathode

PIN CONFIGURATION



SYMBOL



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T-23-07

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Preliminary specification

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LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MAX.			UNIT
V_{RRM}	Voltages Repetitive peak reverse voltage	BYV32E- $R_{thja} < 14 \text{ K/W}$	100	150	200	V
V_{RWM}	Crest working reverse voltage		100	150	200	V
V_R	Continuous reverse voltage		100	150	200	V
E_{RSM}	Avalanche Energy Non-repetitive reverse avalanche energy		30			mJ
I_o	Currents (both diodes conducting ¹) Average forward current	square wave; $\delta = 0.5$; $T_{mb} \leq 118^\circ\text{C}$ square wave; $\delta = 0.5$; $T_{mb} \leq 125^\circ\text{C}$ sinusoidal; $T_{mb} \leq 120^\circ\text{C}$ sinusoidal; $T_{mb} \leq 125^\circ\text{C}$	20			A
$I_{F(RMS)}$	R.M.S. forward current		16.5			A
I_{FRM}	Repetitive peak forward current		18			A
I_{FSM}	Non-repetitive peak forward current		16			A
			28			A
			230			A
			125			A
I^2t	I^2t for fusing	$t_p = 20 \mu\text{s}$; $\delta = 0.02$; per diode half sine-wave; $T_j = 150^\circ\text{C}$; per diode; with re-applied V_{RWM} $t = 10 \text{ ms}$ $t = 8.3 \text{ ms}$ $t = 10 \text{ ms}$; per diode	137.5			A ² s
			78			A ² s
	Temperatures		MIN.	MAX.		
T_{stg}	Storage temperature		-40	150		$^\circ\text{C}$
T_j	Operating junction temperature		-40	150		$^\circ\text{C}$

CHARACTERISTICS

 T_j at 25°C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage ³	$I_F = 20 \text{ A}$ $I_F = 8 \text{ A}$; $T_j = 150^\circ\text{C}$	-	-	1.15	V
I_R	Reverse current	$V_R = V_{RWM} \text{ max}$ $V_R = V_{RWM} \text{ max}$; $T_j = 100^\circ\text{C}$	-	-	0.85	V
t_{rr1}	Reverse recovery time	$I_F = 1 \text{ A}$ to $V_R \geq 30 \text{ V}$; $di_F/dt = 100 \text{ A}/\mu\text{s}$	-	-	30	μA
t_{rr2}	Reverse recovery time	$I_F = 0.5 \text{ A}$; $I_R = 1 \text{ A}$; $I_{rec} = 0.25 \text{ A}$	-	-	0.6	mA
Q_s	Reverse recovery charge	$I_F = 2 \text{ A}$ to $V_R \geq 30 \text{ V}$; $di_F/dt = 20 \text{ A}/\mu\text{s}$	-	-	25	ns
V_{fr}	Forward recovery voltage	$I_F = 1 \text{ A}$; $di_F/dt = 10 \text{ A}/\mu\text{s}$	-	-	40	ns
			-	1.5	12.5	nC
					-	V

1 The limits for both diodes apply whether both diodes conduct simultaneously or on alternate half cycles.

2 Switching losses negligible up to 500 kHz.

3 Measured under pulsed conditions; pulse width $t_p = 300 \mu\text{s}$.

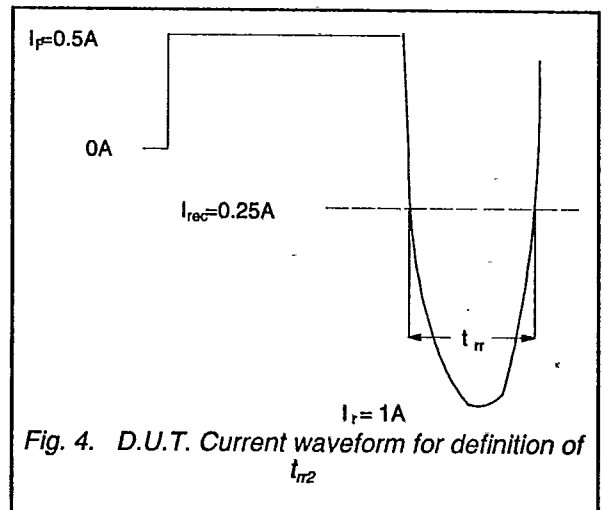
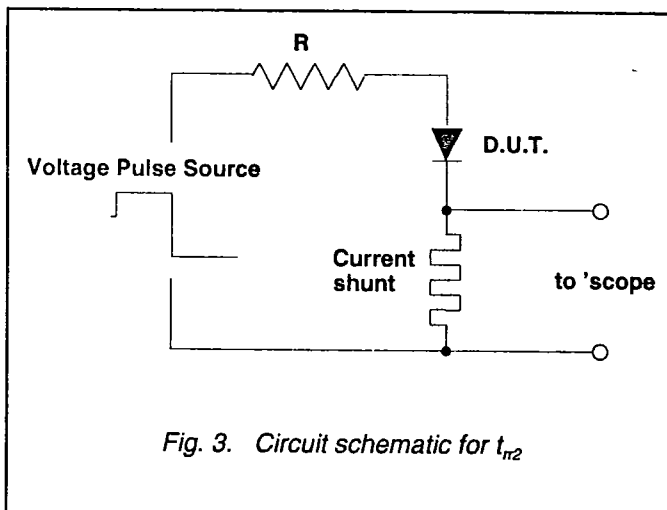
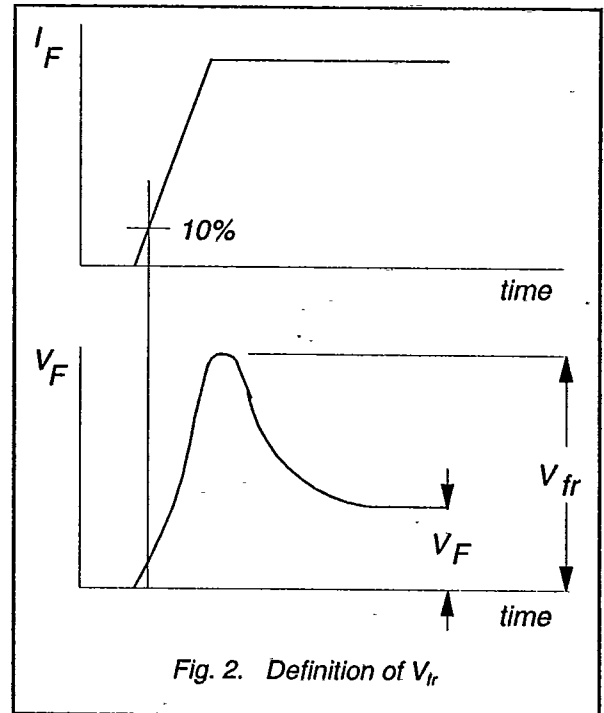
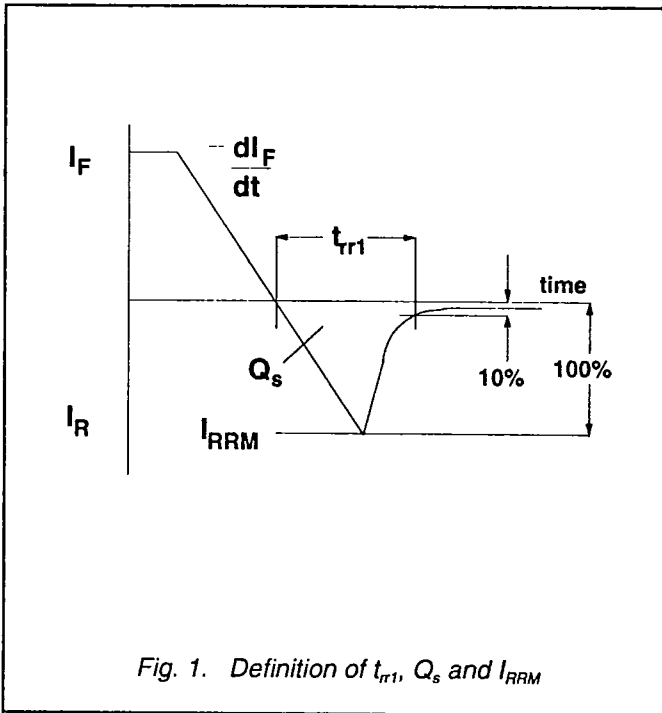
T-23-07

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Ultra fast rugged dual rectifier**BYV32E-100/150/200****THERMAL RESISTANCE**

From junction to mounting base (both diodes conducting)

$$R_{th\ j-mb} = 1.6\ K/W$$

From junction to mounting base (per diode)

$$R_{th\ j-mb} = 2.4\ K/W$$

Influence of mounting method

1. Heatsink mounted with clip (see mounting instructions)

Thermal resistance from mounting base to heatsink

a. with heatsink compound

$$R_{th\ mb-h} = 0.3\ K/W$$

b. with heatsink compound and 0.06 mm maximum mica insulator

$$R_{th\ mb-h} = 1.4\ K/W$$

c. with heatsink compound and 0.1 mm maximum mica insulator (56369)

$$R_{th\ mb-h} = 2.2\ K/W$$

d. with heatsink compound and 0.25 mm maximum alumina insulator (56367)

$$R_{th\ mb-h} = 0.8\ K/W$$

e. without heatsink compound

$$R_{th\ mb-h} = 1.4\ K/W$$

2. Free air operation

The quoted values of $R_{th\ j-a}$ should be used only when no leads of other dissipating components run to the same tie point.

Thermal resistance from junction to ambient in free air mounted on a circuit board at any device lead length and with copper laminate on the board

$$R_{th\ j-a} = 60\ K/W$$

T-23-07

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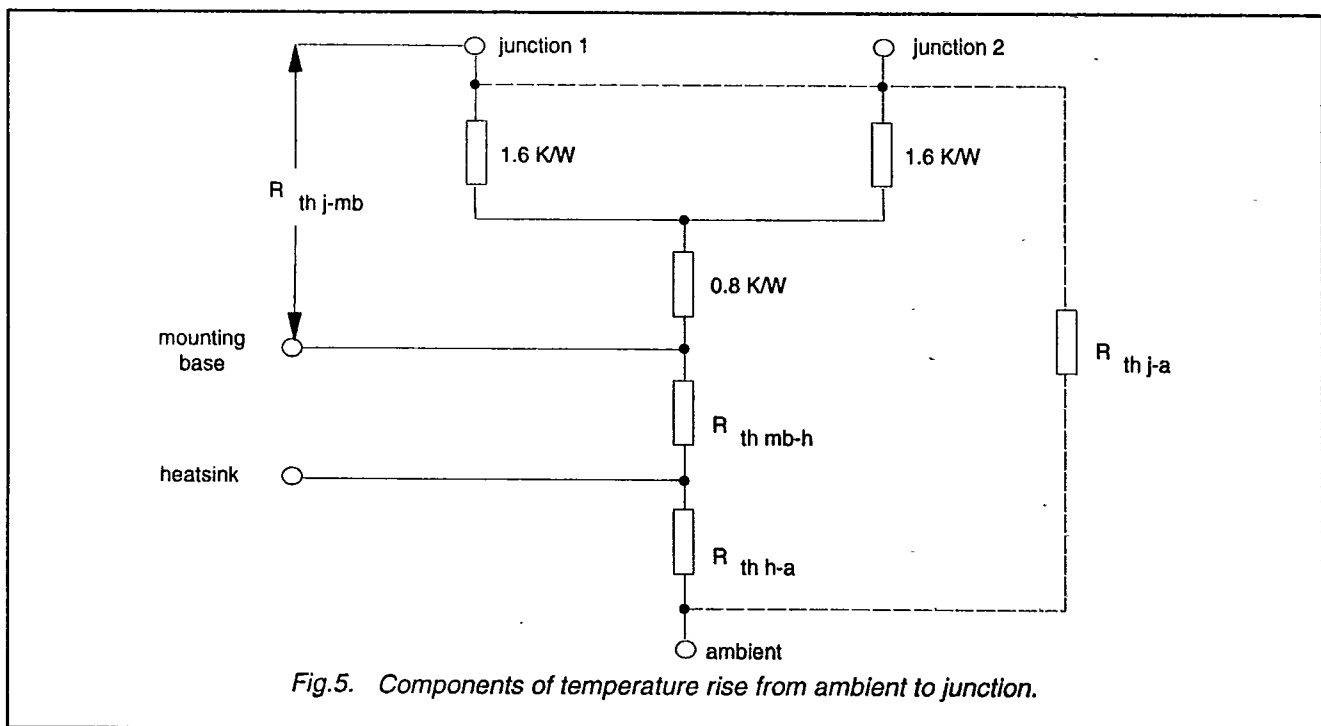
MOUNTING INSTRUCTIONS

1. The device may be soldered directly into the circuit, but the maximum permissible temperature of the soldering iron or bath is 275 °C; the heat source must not be in contact with the joint for more than 5 seconds. Soldered joints must be at least 4.7 mm from the seal.
2. The leads should not be bent less than 2.4 mm from the seal, and should be supported during bending. The bend radius must be no less than 1.0 mm.
3. Mounting by means of a spring clip is the best mounting method because it offers:
 - a. A good thermal contact under the crystal area and slightly lower $R_{th\ mb-h}$ values than does screw mounting.
 - b. Safe isolation for mains operation.
 However, if a screw is used, it should be M3 cross-recess pan head. Care should be taken to avoid damage to the plastic body.
4. For good thermal contact heatsink compound should be used between mounting base and heatsink. Values of $R_{th\ mb-hs}$ given for mounting with heatsink compound refer to the use of a metallic oxide-loaded compound. Ordinary silicone grease is not recommended.
5. Rivet mounting (only possible for non-insulated mounting).
Devices may be rivetted to flat heatsinks; such a process must **neither** deform the mounting tab, **nor** enlarge the mounting hole.

OPERATING NOTES

Dissipation and heatsink calculations.

Any measurement of heatsink temperature should be made immediately adjacent to the device.



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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

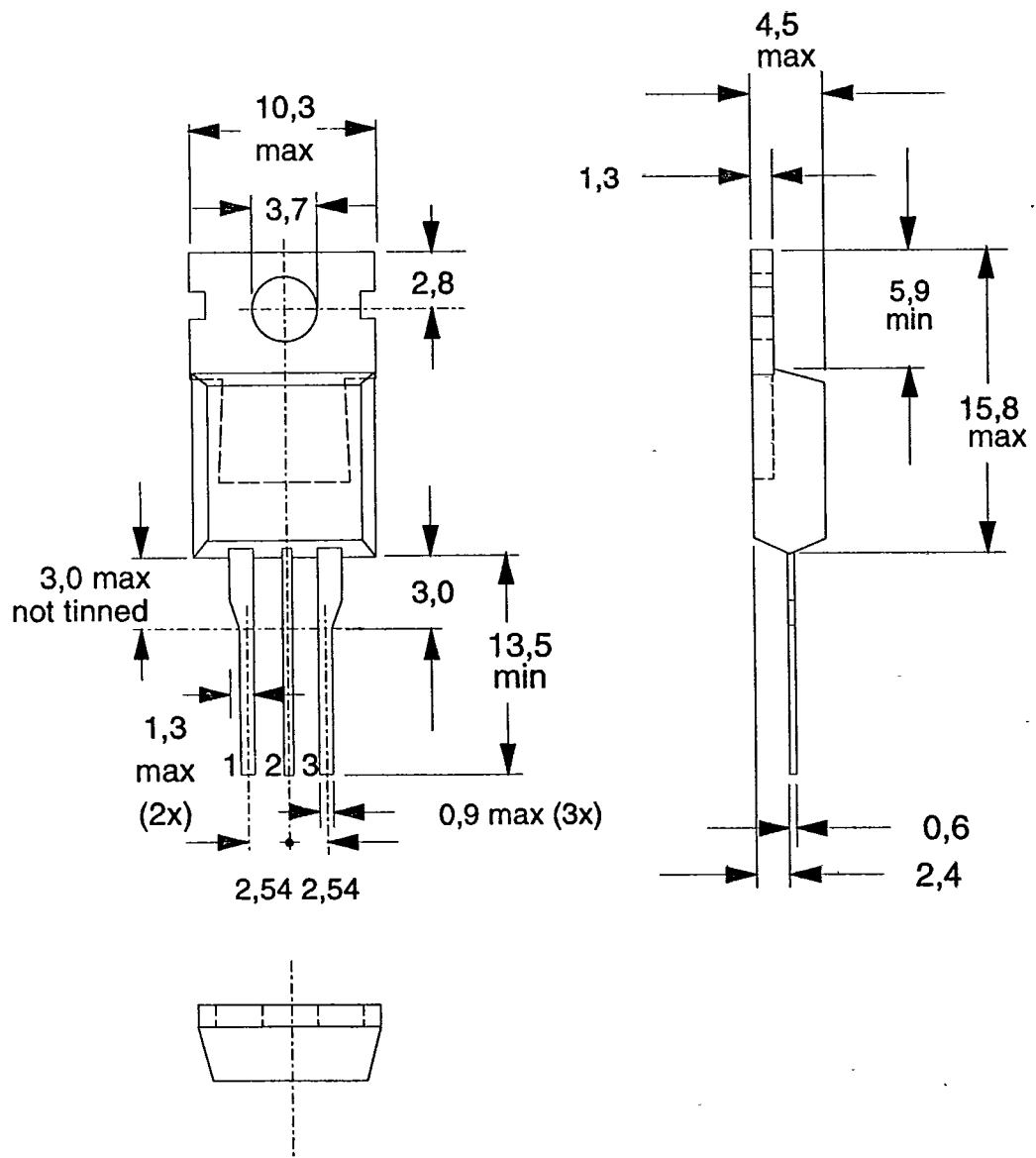


Fig.6. TO220AB; pin 2 connected to mounting base.

Notes

1. Accessories supplied on request: refer to mounting instructions for TO220 envelopes.