

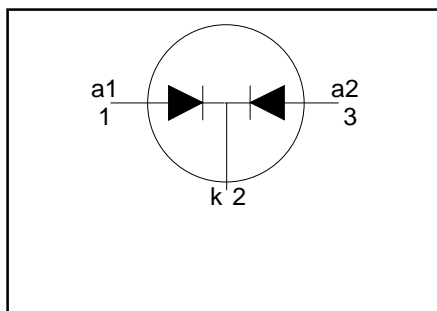
**Rectifier diodes  
ultrafast, rugged**

**BYV40E series**

**FEATURES**

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- low profile surface mounting package

**SYMBOL**



**QUICK REFERENCE DATA**

$V_R = 150\text{ V} / 200\text{ V}$
$V_F \leq 0.7\text{ V}$
$I_{O(AV)} = 1.5\text{ A}$
$I_{RRM} = 0.1\text{ A}$
$t_{tr} \leq 25\text{ ns}$

**GENERAL DESCRIPTION**

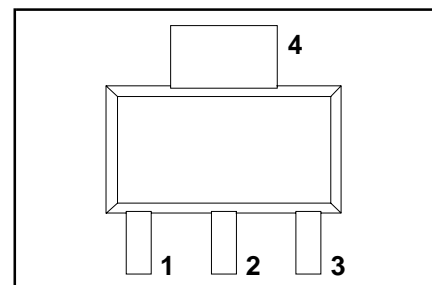
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYV40E series is supplied in the SOT223 surface mounting package.

**PINNING**

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

**SOT223**



**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
				BYV40E		
$V_{RRM}$	Peak repetitive reverse voltage	$T_{sp} \leq 120^\circ\text{C}$	-	-150	-200	V
$V_{RWM}$	Crest working reverse voltage		-	150	200	V
$V_R$	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting) <sup>1</sup>	square wave; $\delta = 0.5$ ; $T_{sp} \leq 132^\circ\text{C}$	-	1.5		A
$I_{FRM}$	Repetitive peak forward current per diode	$t = 25\ \mu\text{s}$ ; $\delta = 0.5$ ; $T_{sp} \leq 132^\circ\text{C}$	-	1.5		A
$I_{FSM}$	Non-repetitive peak forward current per diode	$t_p = 10\text{ ms}$	-	6		A
		$t_p = 8.3\text{ ms}$ sinusoidal; $T_j = 150^\circ\text{C}$ prior to surge; with reapplied $V_{RWM(max)}$	-	6.6		A
$I_{RRM}$	Repetitive peak reverse current per diode	$t_p = 2\ \mu\text{s}$ ; $\delta = 0.001$	-	0.1		A
$I_{RSM}$	Non-repetitive peak reverse current per diode	$t_p = 100\ \mu\text{s}$	-	0.1		A
$T_{stg}$	Storage temperature		-65	150		$^\circ\text{C}$
$T_j$	Operating junction temperature		-	150		$^\circ\text{C}$

<sup>1</sup> Neglecting switching and reverse current losses

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**ESD LIMITING VALUE**

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_C$	Electrostatic discharge capacitor voltage	Human body model; $C = 250 \text{ pF}$ ; $R = 1.5 \text{ k}\Omega$	-	8	kV

**THERMAL RESISTANCES**

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-sp}$	Thermal resistance junction to solder point	one or both diodes conducting	-	-	15	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	pcb mounted; minimum footprint pcb mounted; pad area as in fig:11	-	156 70	-	K/W K/W

**ELECTRICAL CHARACTERISTICS**

 characteristics are per diode at  $T_j = 25 \text{ }^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_F$	Forward voltage	$I_F = 0.5 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$	-	0.50	0.7	V
		$I_F = 1.5 \text{ A}$	-	0.82	1.0	V
$I_R$	Reverse current	$V_R = V_{RWM}$ ; $T_j = 100 \text{ }^\circ\text{C}$	-	100	300	$\mu\text{A}$
		$V_R = V_{RWM}$	-	5	10	$\mu\text{A}$
$Q_s$	Reverse recovery charge	$I_F = 2 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 20 \text{ A}/\mu\text{s}$	-	-	11	nC
$t_{rr1}$	Reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 100 \text{ A}/\mu\text{s}$	-	-	25	ns
$t_{rr2}$	Reverse recovery time	$I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$ ; $I_{rec} = 0.25 \text{ A}$	-	10	20	ns
$V_{fr}$	Forward recovery voltage	$I_F = 2 \text{ A}$ ; $di_F/dt = 20 \text{ A}/\mu\text{s}$	-	3	-	V

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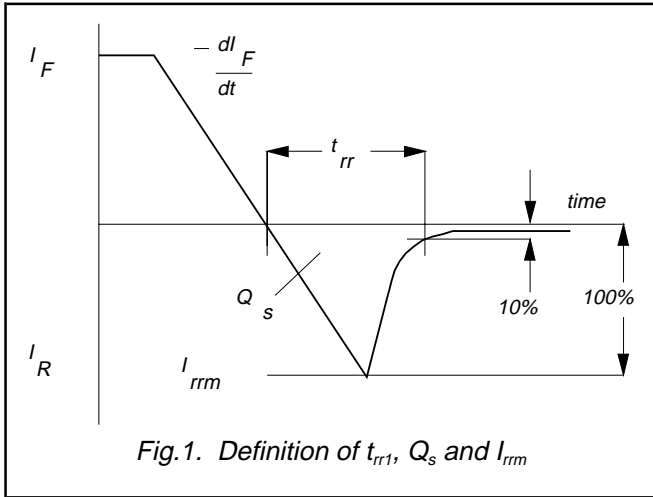


Fig.1. Definition of  $t_{rr1}$ ,  $Q_s$  and  $I_{rm}$

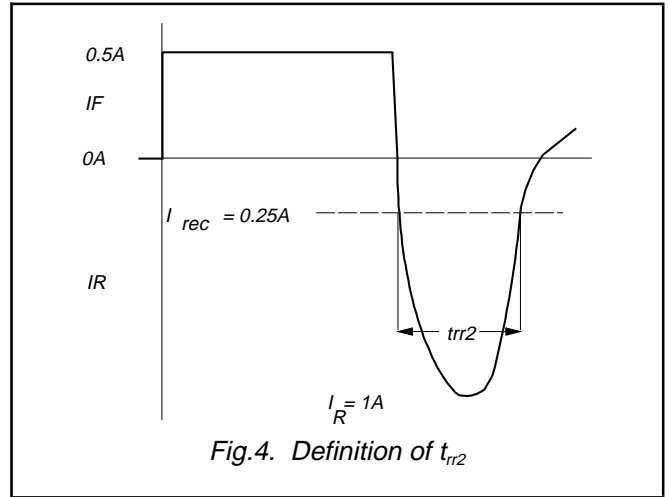


Fig.4. Definition of  $t_{rr2}$

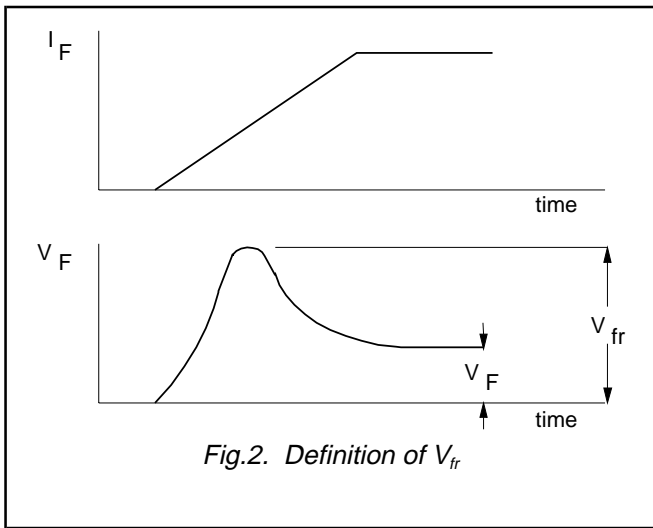


Fig.2. Definition of  $V_{fr}$

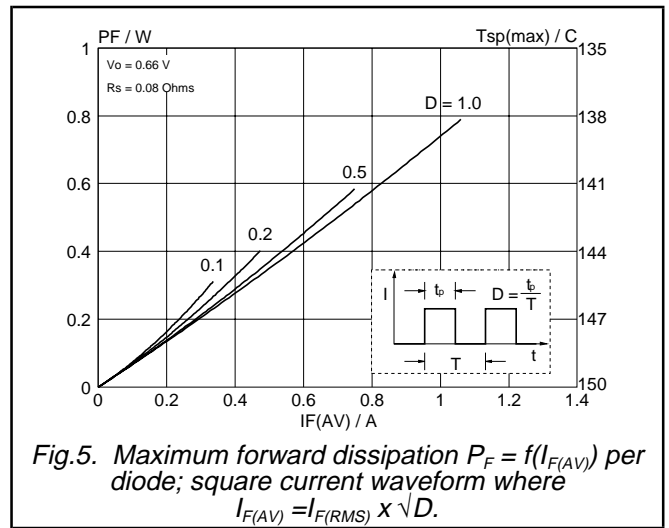


Fig.5. Maximum forward dissipation  $P_F = f(I_{F(AV)})$  per diode; square current waveform where  $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$ .

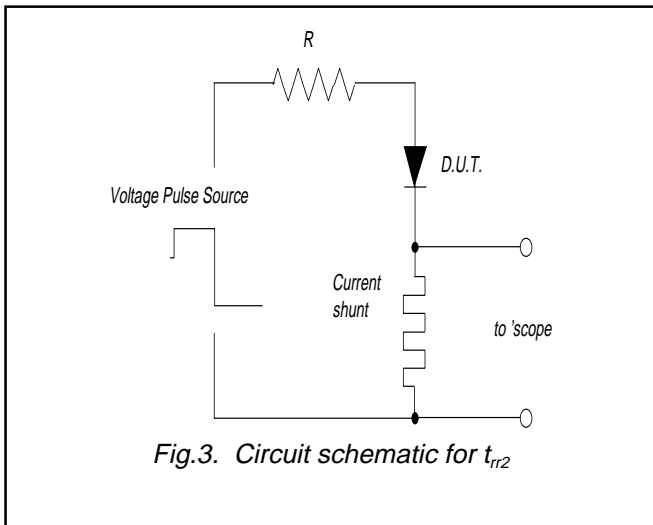


Fig.3. Circuit schematic for  $t_{rr2}$

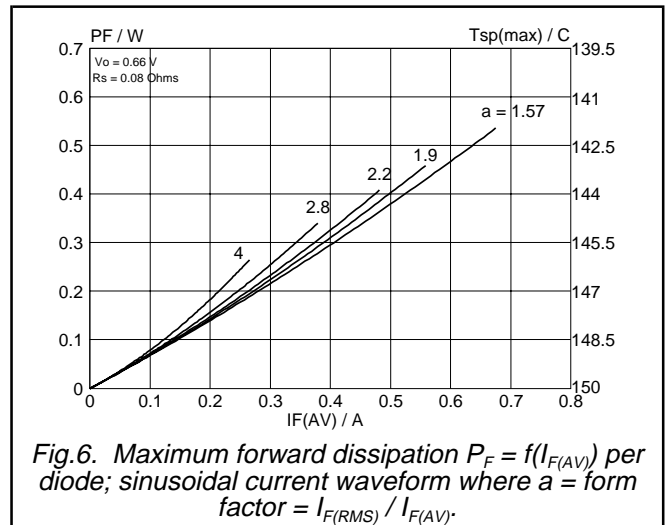


Fig.6. Maximum forward dissipation  $P_F = f(I_{F(AV)})$  per diode; sinusoidal current waveform where  $a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$ .

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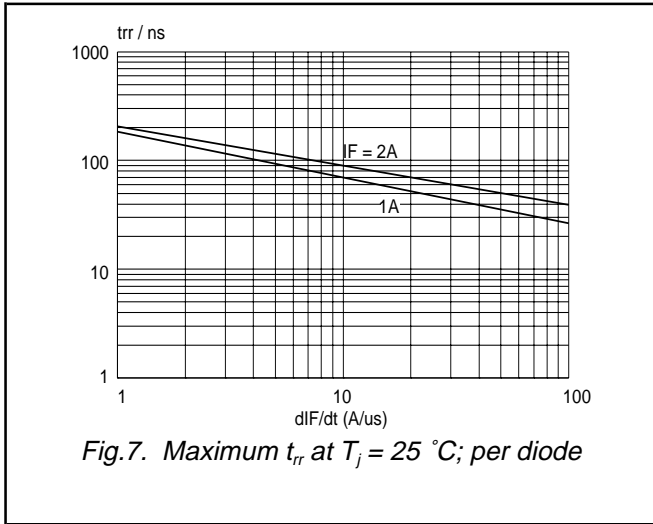


Fig.7. Maximum  $t_{rr}$  at  $T_j = 25\text{ }^\circ\text{C}$ ; per diode

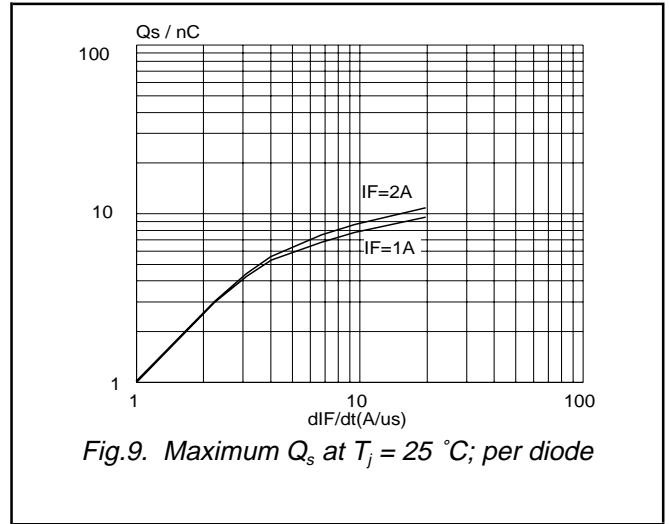


Fig.9. Maximum  $Q_s$  at  $T_j = 25\text{ }^\circ\text{C}$ ; per diode

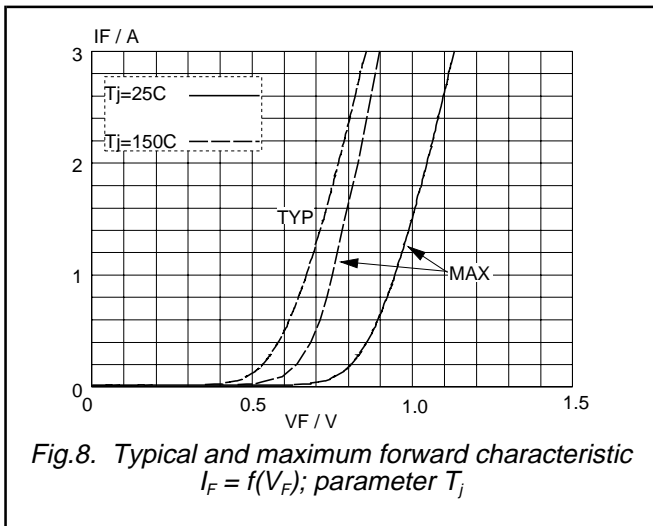


Fig.8. Typical and maximum forward characteristic  $I_F = f(V_F)$ ; parameter  $T_j$

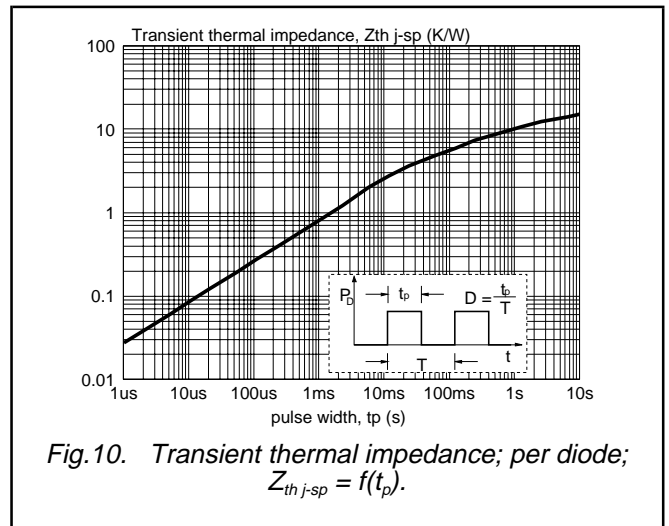
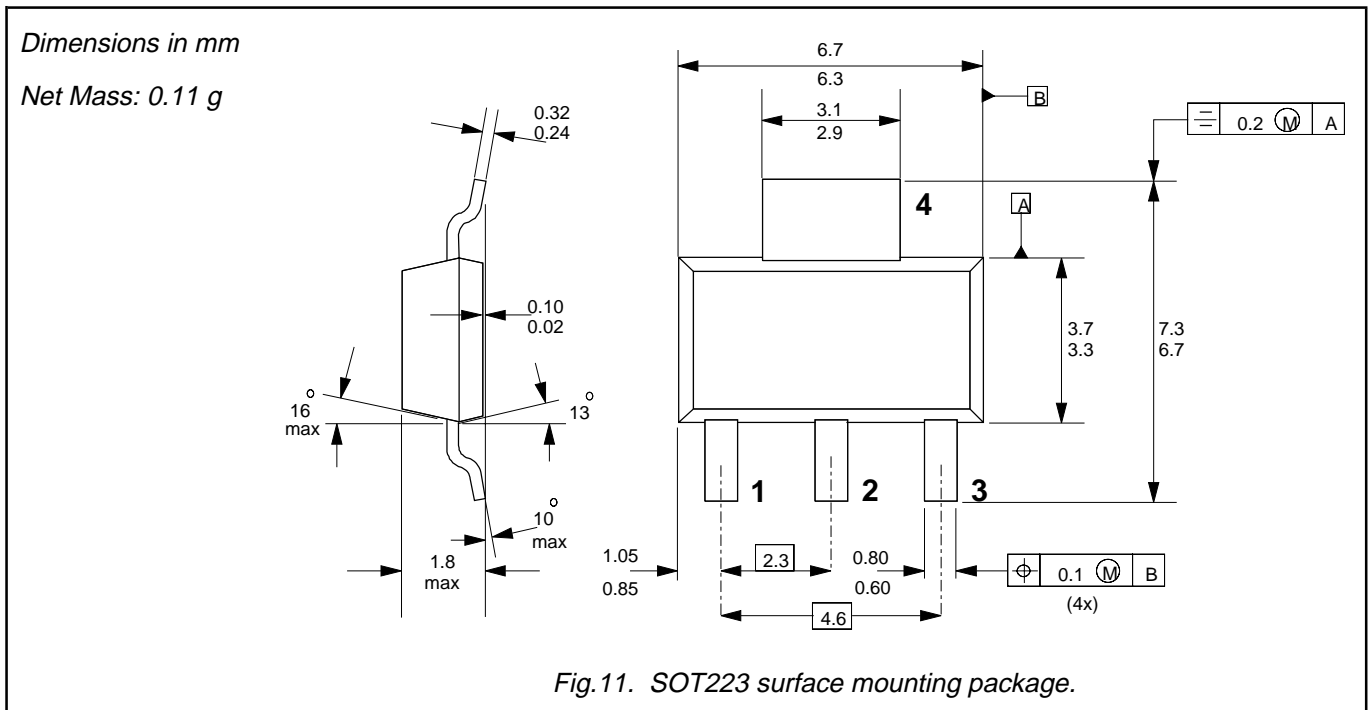


Fig.10. Transient thermal impedance; per diode;  $Z_{th\ j-sp} = f(t_p)$ .

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**MECHANICAL DATA**



**Notes**

1. For further information, refer to Philips publication SC18 " SMD Footprint Design and Soldering Guidelines".  
Order code: 9397 750 00505.
2. Epoxy meets UL94 V0 at 1/8".

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**DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	
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