

# DATA SHEET

**BYV40E series**  
Rectifier diodes  
ultrafast, rugged

Product specification

September 2018

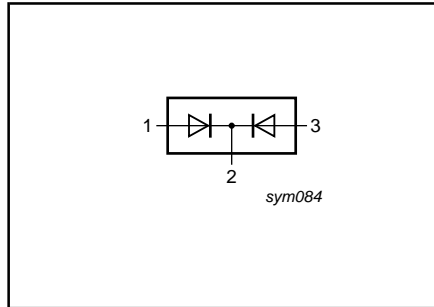
**Rectifier diodes  
ultrafast, rugged**

**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**

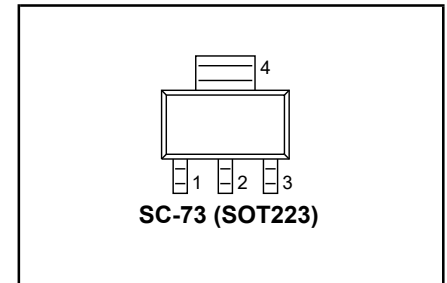
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

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		-	-150	-200	V
$V_{RWM}$	Crest working reverse voltage		-	150	200	V
$V_R$	Continuous reverse voltage	$T_{sp} \leq 120^\circ\text{C}$	-	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
		$t_p = 8.3\text{ ms}$	-	6.6		A
$I_{RRM}$	Repetitive peak reverse current per diode	sinusoidal; $T_j = 150^\circ\text{C}$ prior to surge; with reapplied $V_{RWM(max)}$	-	0.1		A
		$t_p = 2\ \mu\text{s}$ ; $\delta = 0.001$	-	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

## Rectifier diodes ultrafast, rugged

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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

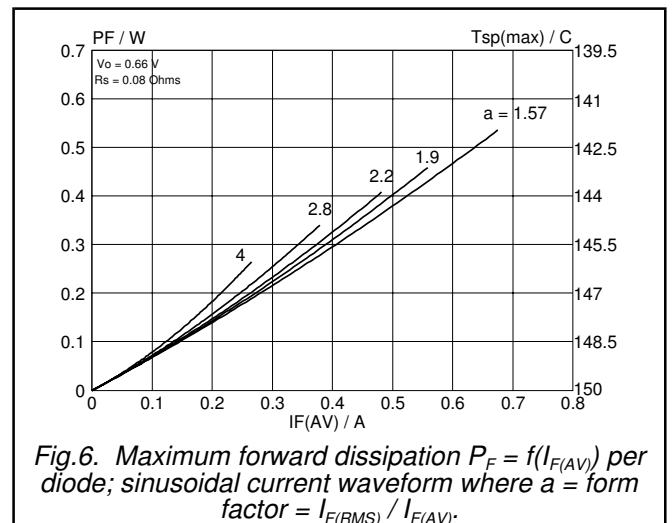
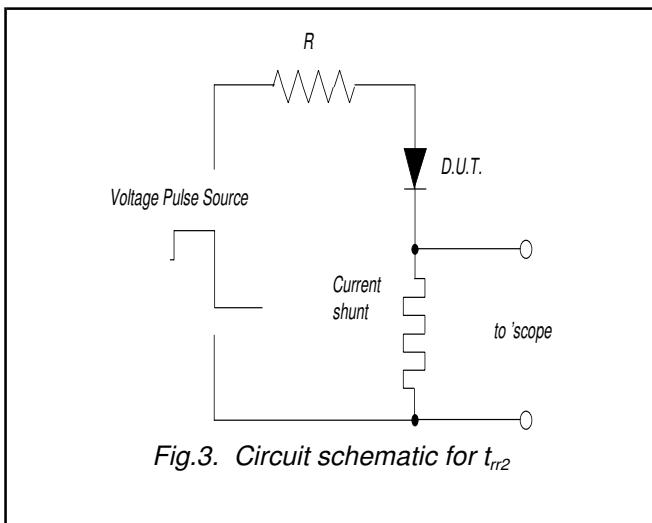
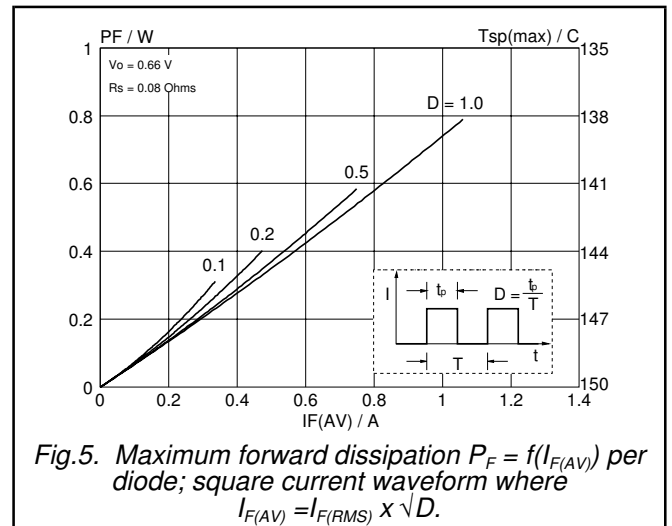
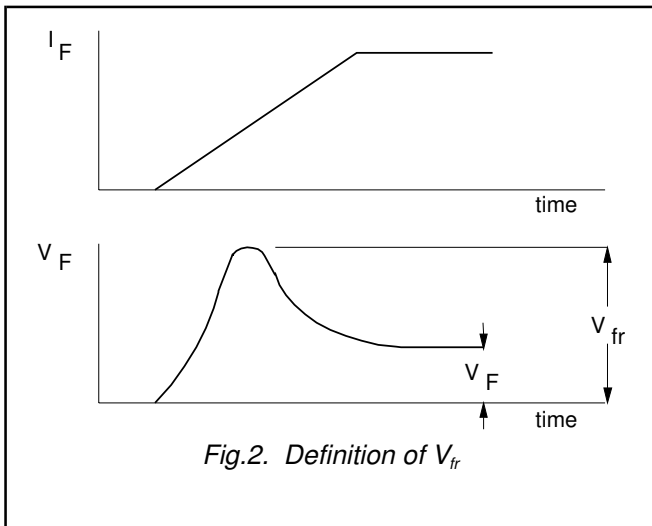
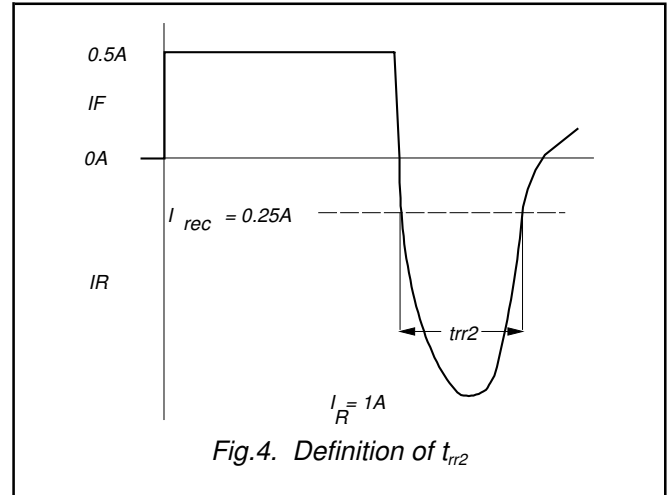
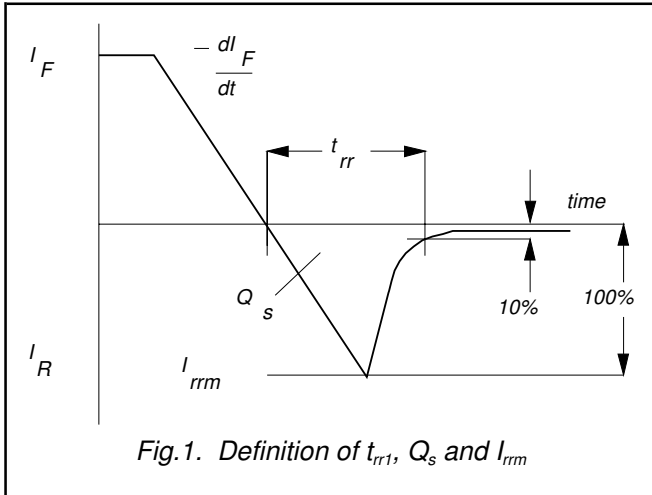
### ELECTRICAL CHARACTERISTICS

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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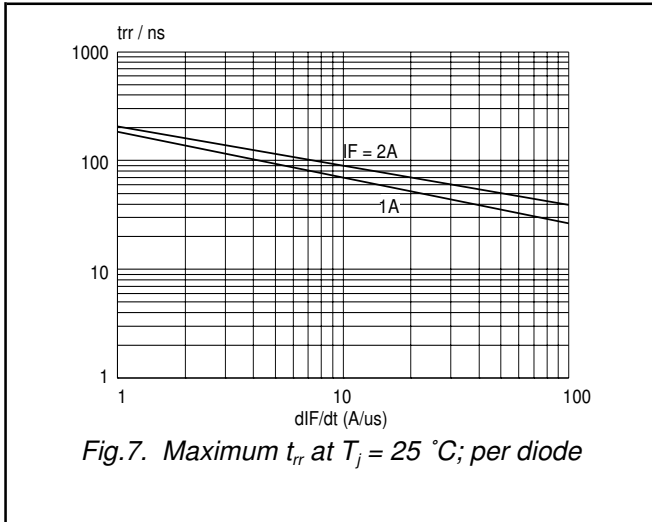


Fig.7. Maximum  $t_{rr}$  at  $T_j = 25\text{ }^\circ\text{C}$ ; per diode

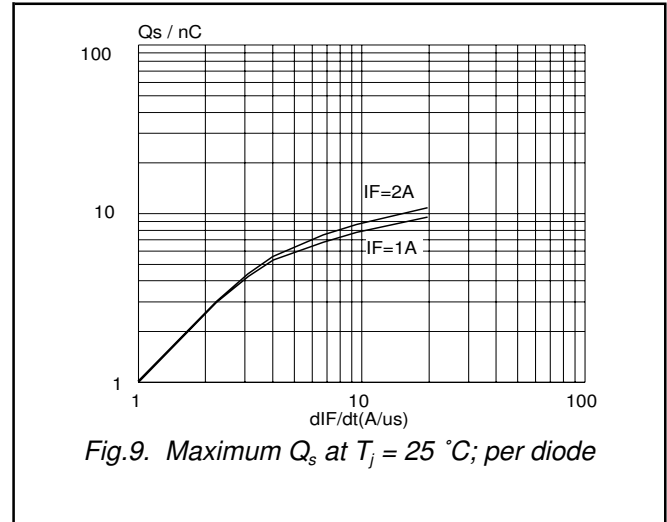


Fig.9. Maximum  $Q_s$  at  $T_j = 25\text{ }^\circ\text{C}$ ; per diode

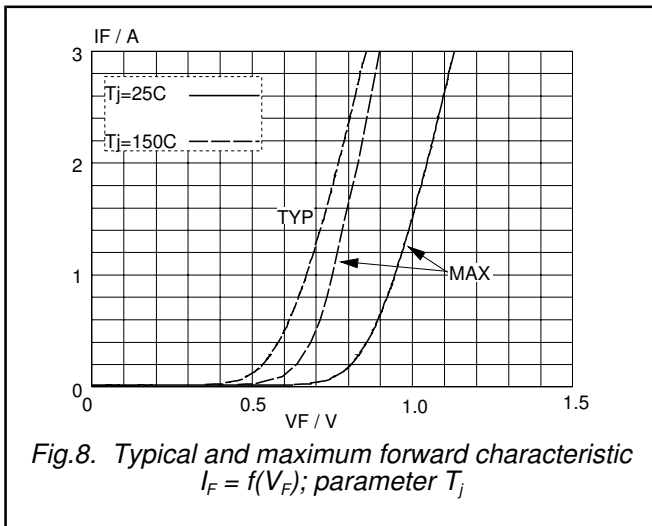


Fig.8. Typical and maximum forward characteristic  $I_F = f(V_F)$ ; parameter  $T_j$

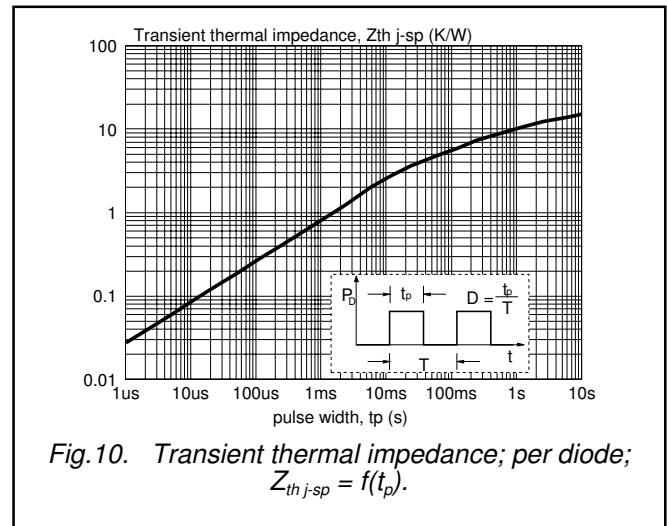


Fig.10. Transient thermal impedance; per diode;  $Z_{th\ j-sp} = f(t_p)$ .

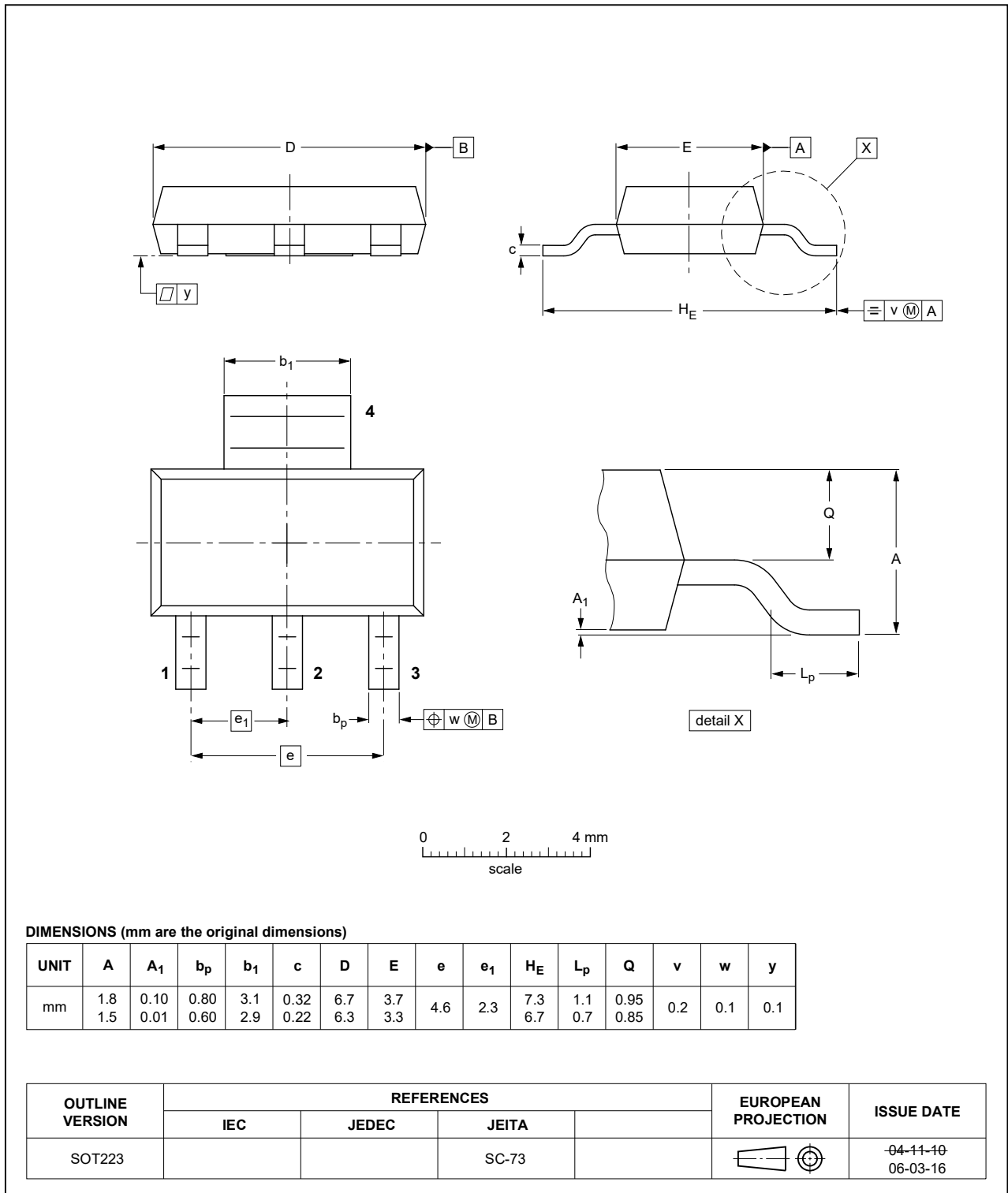
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**MECHANICAL DATA**

Plastic surface-mounted package with increased heatsink; 4 leads

SOT223



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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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