Rectifier diodes ultrafast

BYV40 series

GENERAL DESCRIPTION

Glass passivated high efficiency dual rectifier diodes in a plastic envelope suitable for surface mounting, featuring low forward voltage drop, ultra-fast recovery times and soft recovery characteristic. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

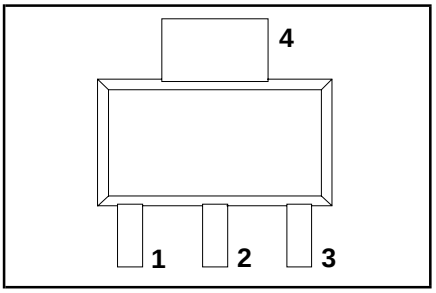
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BYV40-	**100**	**150**	**200**	
V_{RRM}	Repetitive peak reverse voltage	100	150	200	V
V_F	Forward voltage	0.7	0.7	0.7	V
$I_{O(AV)}$	Output current (both diodes conducting)	1.5	1.5	1.5	A
t_{rr}	Reverse recovery time	25	25	25	ns

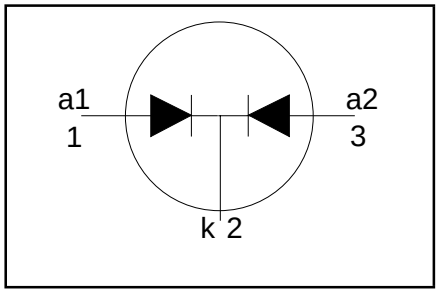
PINNING - SOT223

PIN	DESCRIPTION
1	anode 1 (a)
2	cathode (k)
3	anode 2 (a)
4	cathode (k)

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-100	**-150**	**-200**	
V_{RRM}	Repetitive peak reverse voltage		-	100	150	200	V
V_{RWM}	Crest working reverse voltage		-	100	150	200	V
V_R	Continuous reverse voltage[1]		-	100	150	200	V
$I_{O(AV)}$	Output current (both diodes conducting)[2]	square wave; $\delta = 0.5$; $T_{sp} \leq 132^{\circ}C$	-	1.5			A
		sinusoidal; a = 1.57; $T_{sp} \leq 134^{\circ}C$	-	1.35			A
$I_{O(RMS)}$	RMS forward current		-	2.1			A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{sp} \leq 132^{\circ}C$	-	1.5			A
I_{FSM}	Non-repetitive peak forward current per diode	t_p = 10 ms	-	6			A
		t_p = 8.3 ms sinusoidal; $T_j = 150^{\circ}C$ prior to surge; with reapplied $V_{RWM(max)}$	-	6.6			A
I^2t	I^2t for fusing	t = 10 ms	-	0.18			A^2s
T_{stg}	Storage temperature		-65	150			$^{\circ}C$
T_j	Operating junction temperature		-	150			$^{\circ}C$

1 $T_{sp} \leq 120^{\circ}C$ for thermal stability.

2 Neglecting switching and reverse current losses

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}sp}$	Thermal resistance junction to solder point	one or both diodes conducting	-	-	15	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted; minimum footprint	-	156	-	K/W
		pcb mounted; pad area as in fig:9	-	70	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage (per diode)	I_F = 0.5 A; T_j = 150˚C	-	0.50	0.7	V
		I_F = 1.5 A	-	0.82	1.0	V
I_R	Reverse current (per diode)	$V_R = V_{RWM}$; T_j = 100 ˚C	-	100	300	µA
		$V_R = V_{RWM}$	-	5	10	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_s	Reverse recovery charge (per diode)	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	-	11	nC
t_{rr}	Reverse recovery time (per diode)	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	-	25	ns
V_{fr}	Forward recovery voltage (per diode)	I_F = 2 A; dI_F/dt = 20 A/µs	-	3	-	V

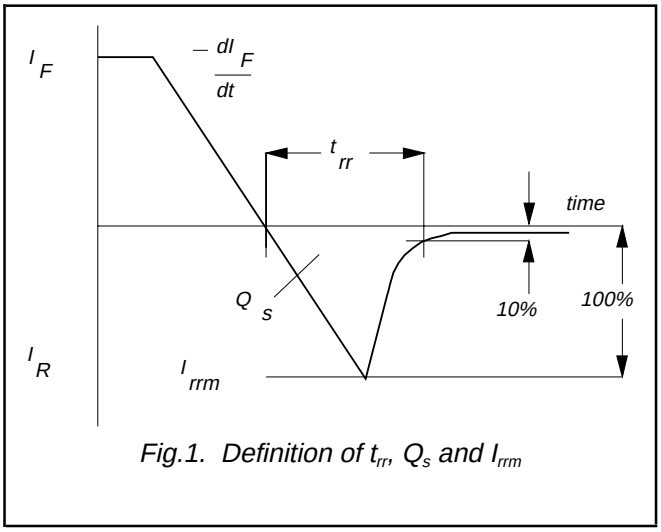


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

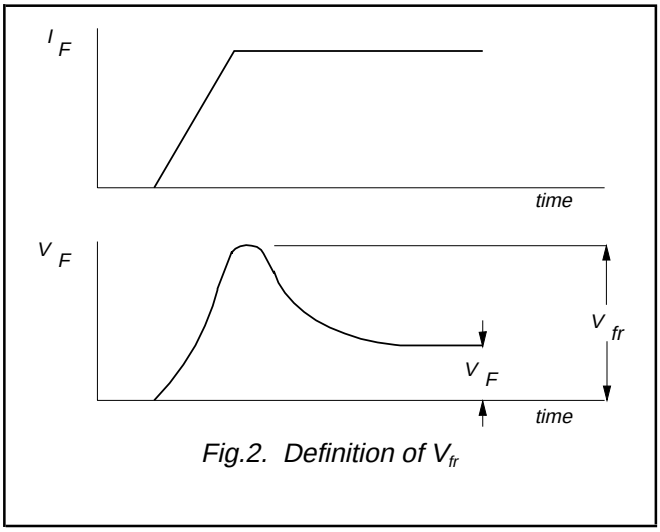


Fig.2. Definition of V_{fr}

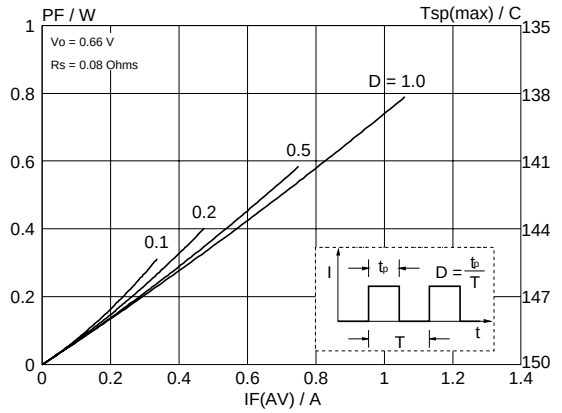


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

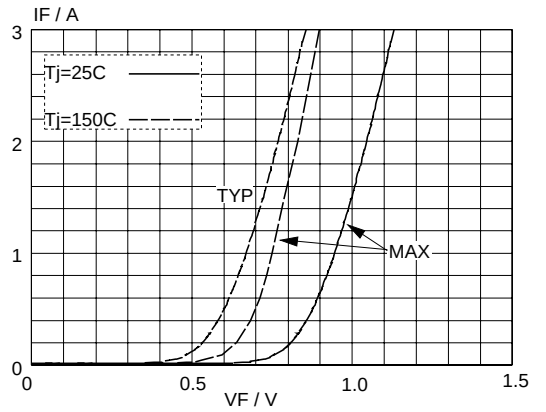


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

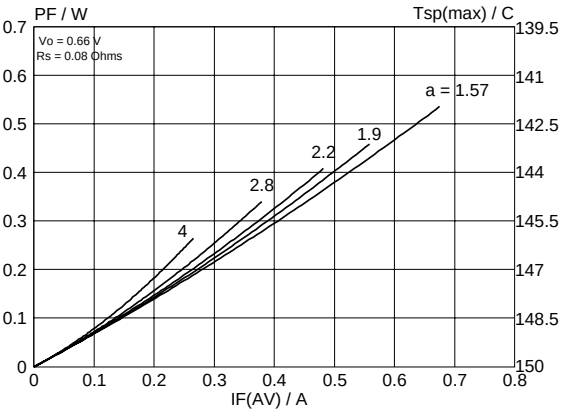


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

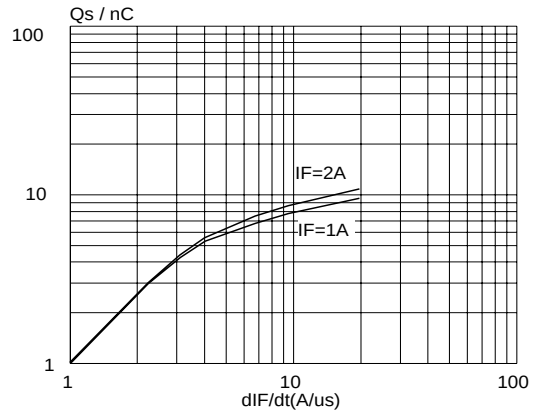


Fig.7. Maximum Q_s at T_j = 25 ˚C; per diode

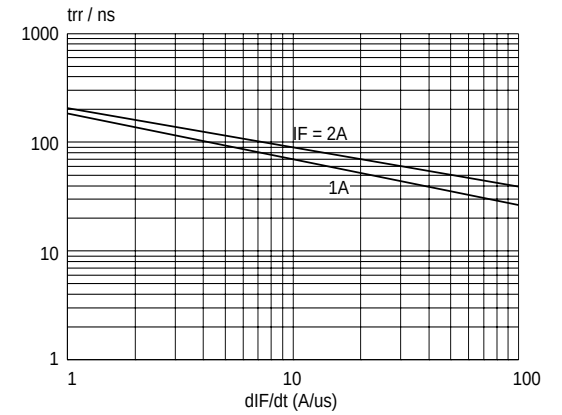


Fig.5. Maximum t_{rr} at T_j = 25 ˚C; per diode

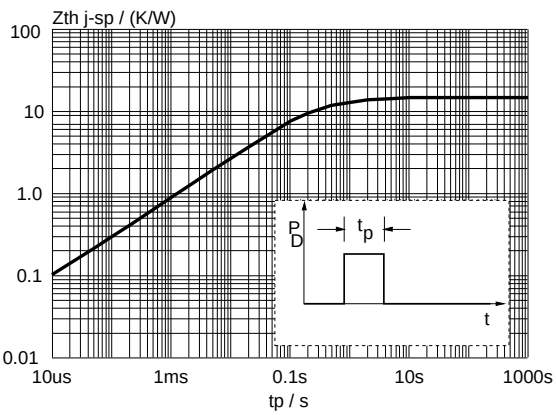


Fig.8. Transient thermal impedance; per diode; $Z_{th\ j\text{-}sp} = f(t_p)$.

PRINTED CIRCUIT BOARD

Dimensions in mm.

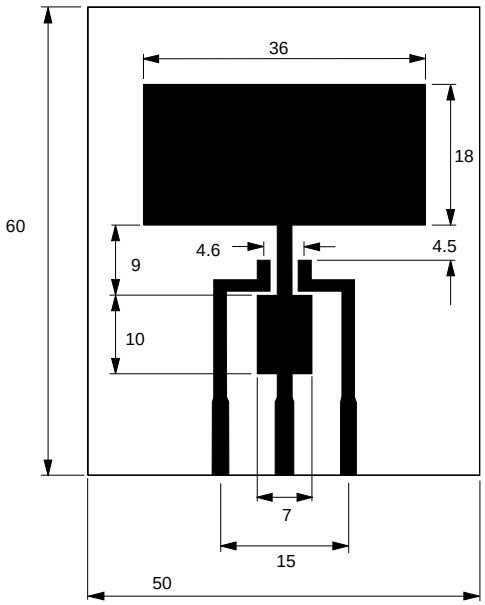


Fig.9. PCB for thermal resistance and power rating for SOT223.
PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 μm thick).

MECHANICAL DATA

Dimensions in mm

Net Mass: 0.11 g

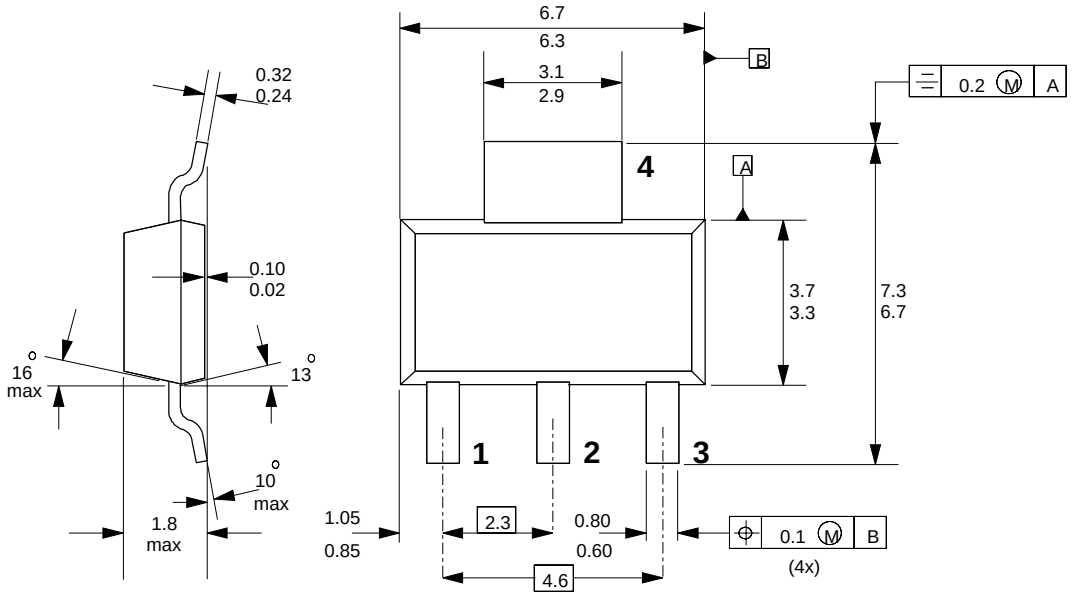


Fig.10. SOT223 surface mounting package.

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".

DEFINITIONS

Data sheet status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

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