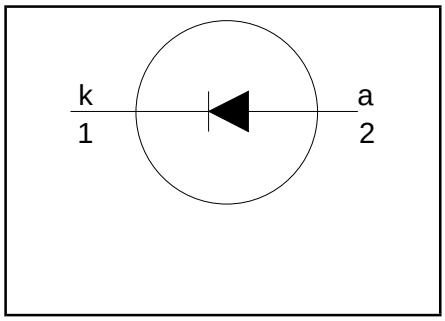
Damper diode fast, high-voltage

BY459X-1500, BY459X-1500S

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Isolated mounting tab

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq$ 1.2 V / 1.25 V

$I_{F(peak)}$ = 12 A (f = 48 kHz)

$I_{F(peak)}$ = 10 A (f = 82 kHz)

$I_{FSM} \leq$ 100 A

$t_{rr} \leq$ 350 ns / 220 ns

GENERAL DESCRIPTION

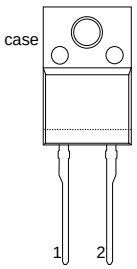
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in HDTV receivers and multi-sync monitor horizontal deflection circuits.

The BY459X series is supplied in the conventional leaded SOD113 package.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
tab	isolated

SOD113



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{RSM}	Peak non repetitive reverse voltage		-	1500		V
V_{RRM}	Peak repetitive reverse voltage		-	1500		V
V_{RWM}	Crest working reverse voltage		-	1300		V
				-1500	**-1500S**	
$I_{F(peak)}$	Peak working forward current	f = 48 kHz;	-	12	-	A
		f = 82 kHz;	-	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	100		A
$I_{F(RMS)}$	RMS forward current		-	30		A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms	-	100		A
		t = 8.3 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	110		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from both terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65% ; clean and dustfree	-		2500	V
C_{isol}	Capacitance from both terminals to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	4.8	K/W
		without heatsink compound	-	-	5.9	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air.	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459X-	1500	1500S	1500	1500S	
V_F	Forward voltage	I_F = 6.5 A	0.95	1.05	1.30	1.35	V
		I_F = 6.5 A; T_j = 125 ˚C	0.85	0.95	1.20	1.25	V
I_R	Reverse current	V_R = 1300 V	-	250	-	250	µA
		V_R = 1300 V; T_j = 125 ˚C	-	1	-	1	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
		BY459X-	1500	1500S	1500	1500S	
t_{rr}	Reverse recovery time	I_F = 1 A, $V_R \geq$ 30 V;	0.25	0.17	0.35	0.22	µs
Q_s	Reverse recovery charge	I_F = 2 A, -dI_F/dt = 20 A/µs	2.0	0.70	3.0	0.95	µC
V_{fr}	Peak forward recovery voltage	I_F = 6.5A, dI_F/dt = 50A/µs	8.0	11.0	14.0	19.0	V
t_{fr}	Forward recovery time	I_F = 6.5A, dI_F/dt = 50A/µs	170	200	250	300	ns

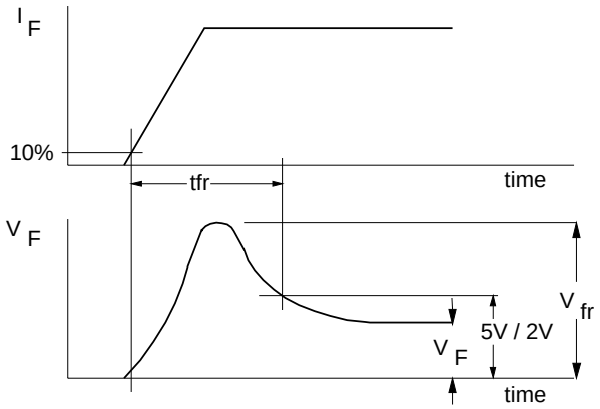


Fig.1. Definition of Vfr and tfr

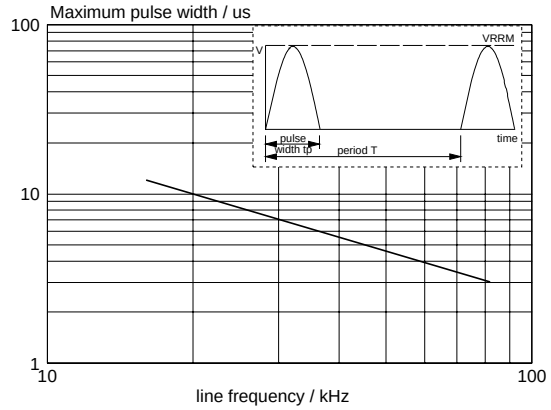


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

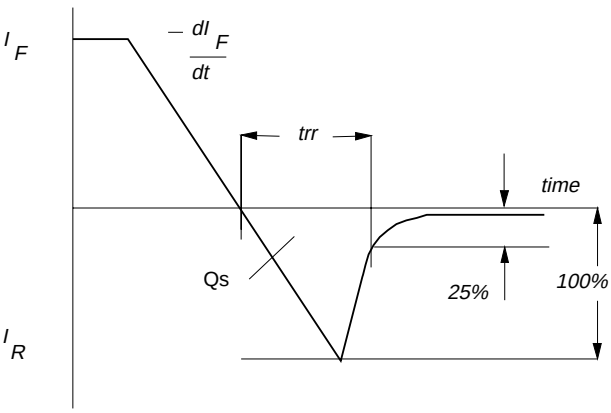


Fig.2. Definition of t_{rr} and Q_s

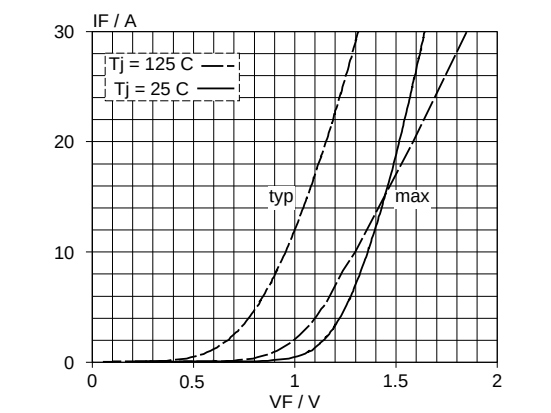


Fig.5. BY459X-1500 Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

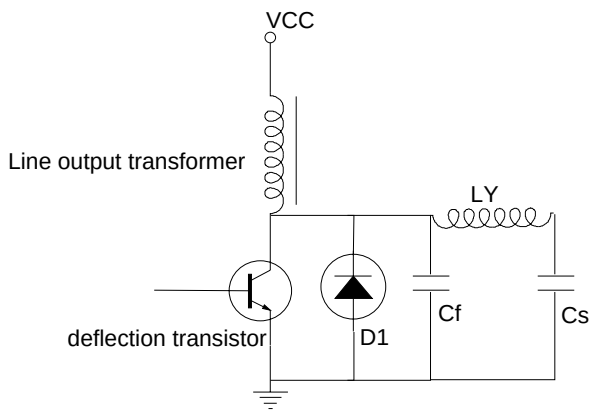


Fig.3. Basic horizontal deflection circuit.

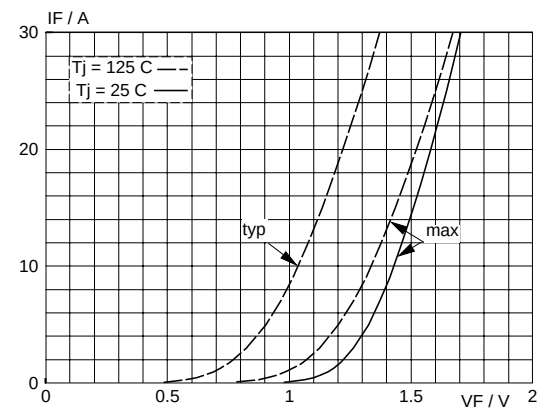


Fig.6. BY459X-1500S Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

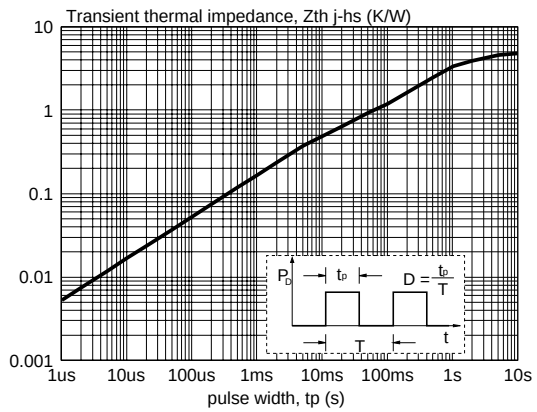


Fig.7. Transient thermal impedance $Z_{th} = f(t_p)$

MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

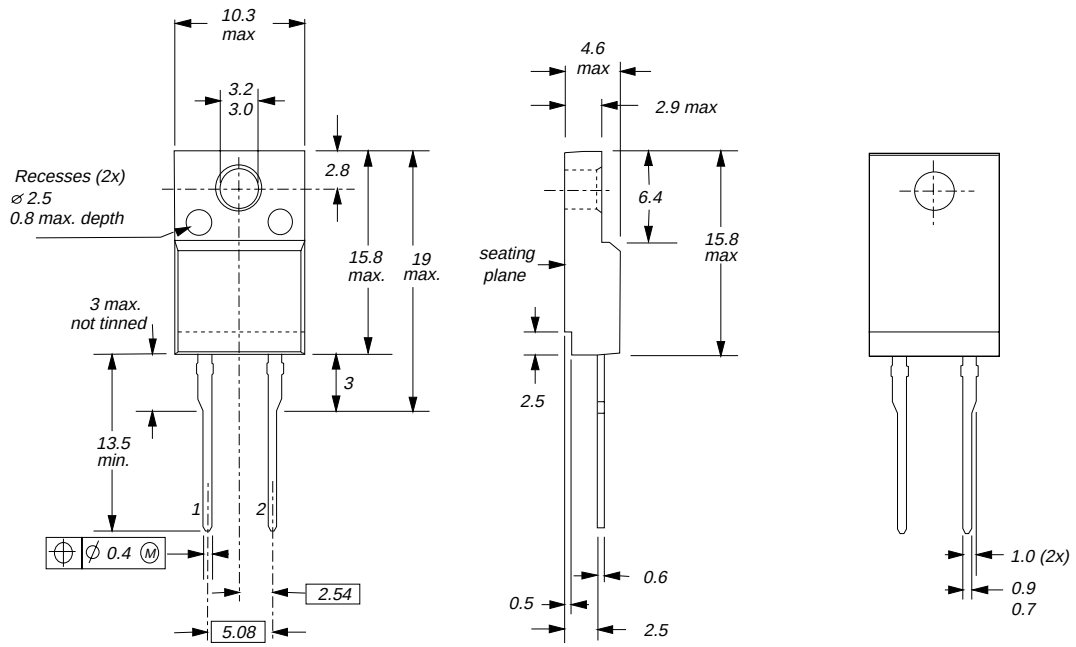


Fig.8. SOD113; The seating plane is electrically isolated from all terminals.

Notes
1. Refer to mounting instructions for F-pack envelopes.
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

These products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.