

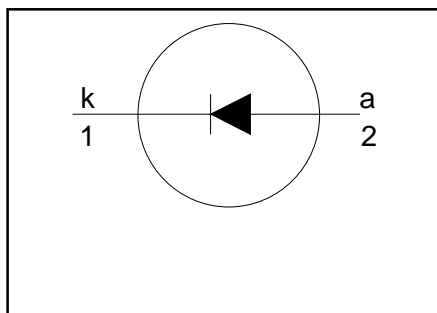
**Damper diode  
fast, high-voltage**

**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**

$V_R = 1500\text{ V}$
$V_F \leq 1.2\text{ V} / 1.25\text{ V}$
$I_{F(\text{peak})} = 12\text{ A}$ (f = 48 kHz)
$I_{F(\text{peak})} = 10\text{ A}$ (f = 82 kHz)
$I_{FSM} \leq 100\text{ A}$
$t_{tr} \leq 350\text{ ns} / 220\text{ ns}$

**GENERAL DESCRIPTION**

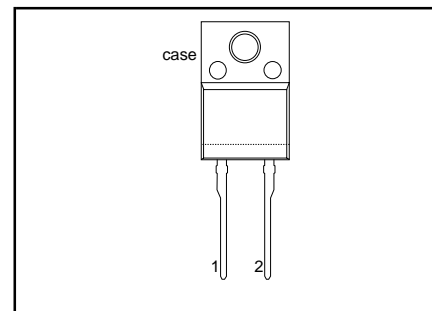
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in HDTV receivers and multi-sync monitor horizontal deflection circuits.

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
$I_{F(\text{peak})}$	Peak working forward current	f = 48 kHz;	-	<b>-1500</b>	A
		f = 82 kHz;	-	<b>12</b>	A
$I_{FRM}$	Peak repetitive forward current	t = 100 $\mu$ s	-	-	A
			-	100	A
$I_{F(\text{RMS})}$	RMS forward current		-	30	A
$I_{FSM}$	Peak non-repetitive forward current	t = 10 ms	-	100	A
		t = 8.3 ms sinusoidal; $T_j = 150\text{ }^\circ\text{C}$ prior to surge; with reapplied $V_{RWM(\text{max})}$	-	110	A
$T_{stg}$	Storage temperature		-40	150	$^\circ\text{C}$
$T_j$	Operating junction temperature		-	150	$^\circ\text{C}$

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### ISOLATION LIMITING VALUE & CHARACTERISTIC

 $T_{hs} = 25\text{ °C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{isol}$	R.M.S. isolation voltage from both terminals to external heatsink	$f = 50\text{-}60\text{ Hz}$ ; sinusoidal waveform; R.H. $\leq 65\%$ ; clean and dustfree	-		2500	V
$C_{isol}$	Capacitance from both terminals to external heatsink	$f = 1\text{ MHz}$	-	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
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	without heatsink compound in free air.	-	55	5.9	K/W

### STATIC CHARACTERISTICS

 $T_j = 25\text{ °C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	TYP.		MAX.		UNIT
			1500	1500S	1500	1500S	
$V_F$	Forward voltage	<b>BY459X-</b> $I_F = 6.5\text{ A}$	0.95	1.05	1.30	1.35	V
$I_R$	Reverse current	$I_F = 6.5\text{ A}; T_j = 125\text{ °C}$ $V_R = 1300\text{ V}$ $V_R = 1300\text{ V}; T_j = 125\text{ °C}$	0.85	0.95	1.20	1.25	V
			-	-	250	250	$\mu\text{A}$
			-	-	1	1	mA

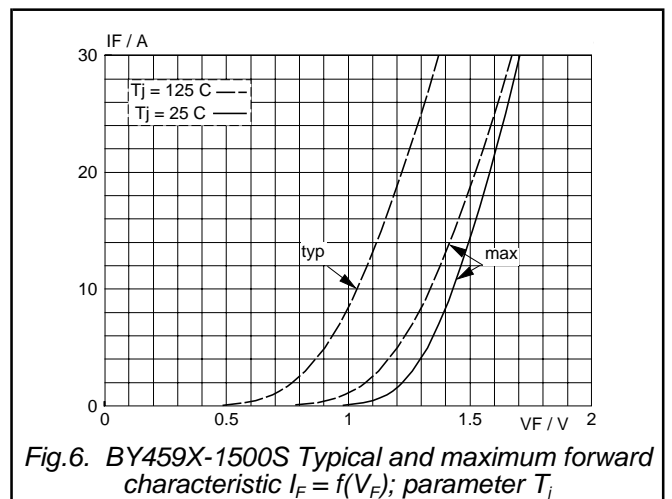
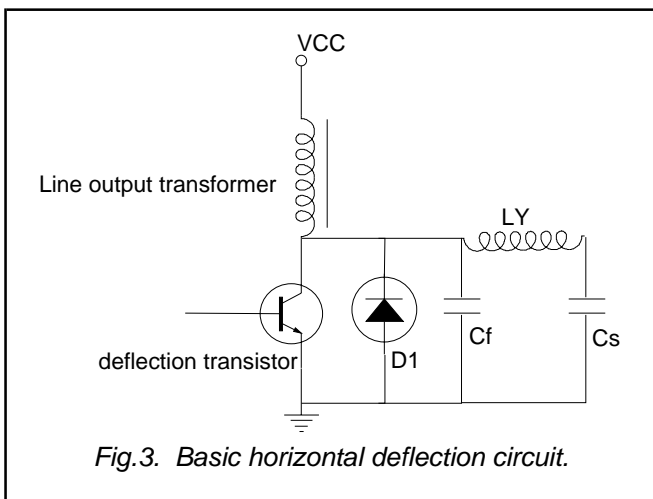
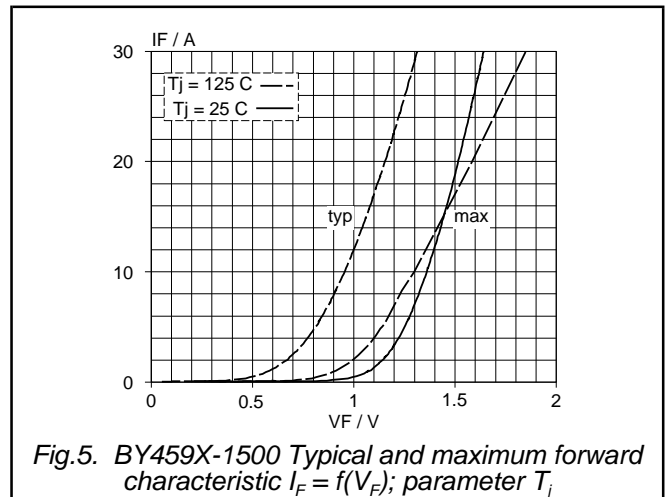
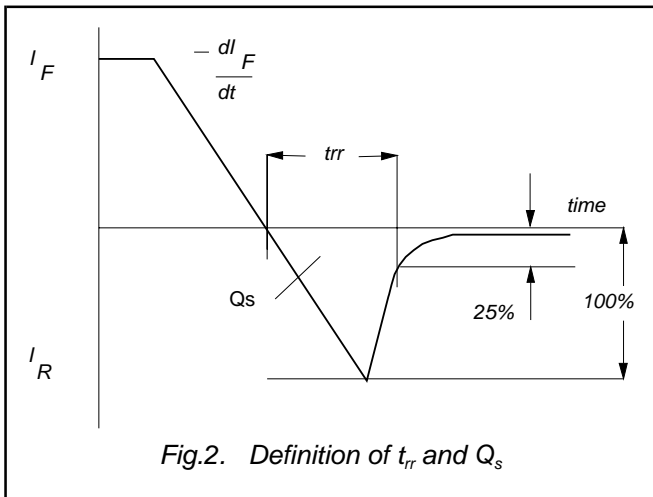
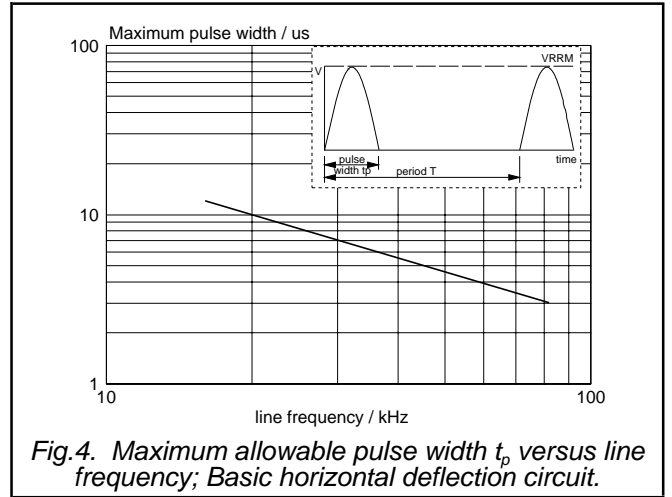
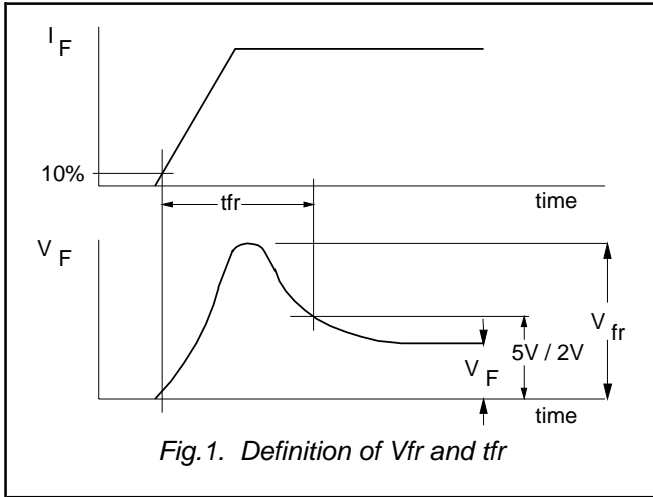
### DYNAMIC CHARACTERISTICS

 $T_j = 25\text{ °C}$  unless otherwise stated

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

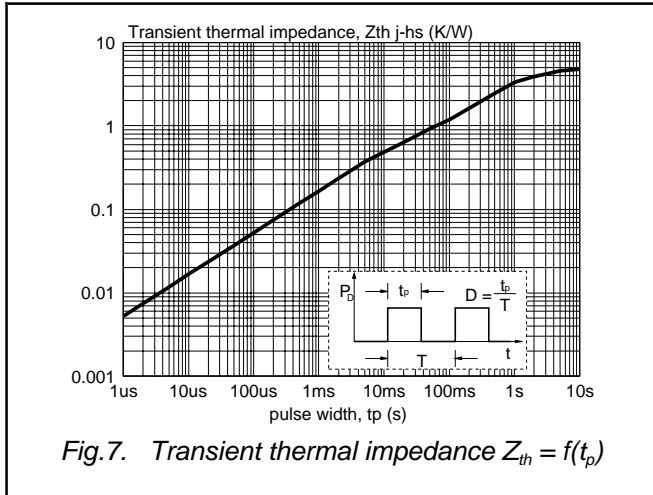
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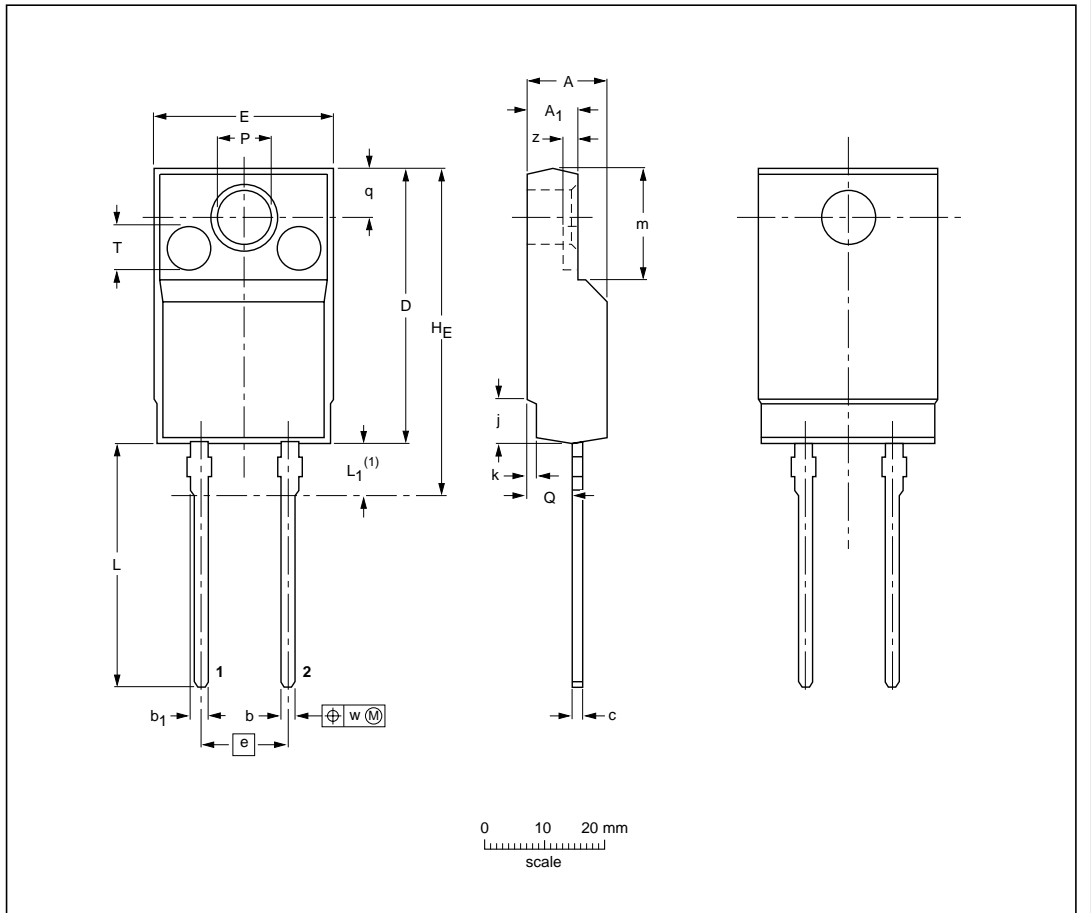
**MECHANICAL DATA**

Dimensions in mm

Net Mass: 2 g

Plastic single-ended package; isolated heatsink mounted;  
1 mounting hole; 2-leads TO-220 'full pack'

SOD113



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	b <sub>1</sub>	c	D	E	e	H <sub>E</sub> max.	j	k	L	L <sub>1</sub> <sup>(1)</sup>	m	P	Q	q	T	w	z <sup>(2)</sup>
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	0.7 0.4	15.8 15.2	10.3 9.7	5.08	19.0	2.7 2.3	0.6 0.4	14.4 13.5	3.3 2.8	6.5 6.3	3.2 3.0	2.6 2.3	2.6	2.55	0.4	0.8

Notes

1. Terminals are uncontrolled within zone L<sub>1</sub>.
2. z is depth of T.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD113		2-lead TO-220				97-06-11

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".

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## DEFINITIONS

DATA SHEET STATUS		
DATA SHEET STATUS <sup>1</sup>	PRODUCT STATUS <sup>2</sup>	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A
<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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<sup>2</sup> The product status of the device(s) described in this datasheet may have changed since this datasheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

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