

# Silicon Diode

## **BY459X-1500**

1500V/12A

# DATASHEET

OEM – Philips

Source: Philips Databook 1999

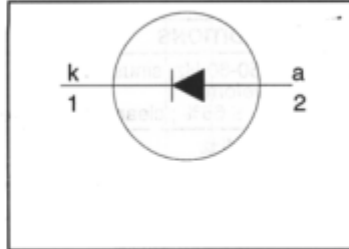
## Damper diode fast, high-voltage

## 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                |
| $I_{F(\text{peak})} = 12$ A (f = 48 kHz) |
| $I_{F(\text{peak})} = 10$ A (f = 82 kHz) |
| $I_{FSM} \leq 100$ A                     |
| $t_{rr} \leq 350$ ns / 220 ns            |

### GENERAL DESCRIPTION

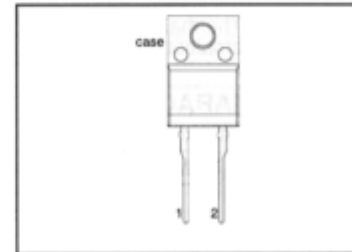
Glass-passivated double diffused rectifier diode featuring fast forward recovery and low forward recovery voltage. The device is intended for use in HDTV receivers and multi-sync monitor horizontal deflection circuits.

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    |
| $I_{F(\text{peak})}$ | Peak working forward current        | f = 48 kHz;  | -    | -1500  | A    |
|                      |                                     | f = 82 kHz;  | -    | -1500S | A    |
| $I_{FRM}$            | Peak repetitive forward current     | t = 100 $\mu$ s  | -    | 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; $T_j = 150$ °C prior to surge; with reapplied $V_{RWM(\text{max})}$ | -    | 110    | A    |
| $T_{stg}$            | Storage temperature                 |  | -40  | 150    | °C   |
| $T_j$                | Operating junction temperature      |  | -    | 150    | °C   |

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### ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{mb} = 25\text{ }^{\circ}\text{C}$  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;<br>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 |
|--------------------|---|---|------|------|------|------|
| $R_{th\text{-}hs}$ | Thermal resistance junction to heatsink | with heatsink compound                    | -    | -    | 4.8  | K/W  |
| $R_{th\text{-}a}$  | Thermal resistance junction to ambient  | without heatsink compound<br>in free air. | -    | 55   | 5.9  | K/W  |

### STATIC CHARACTERISTICS

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

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

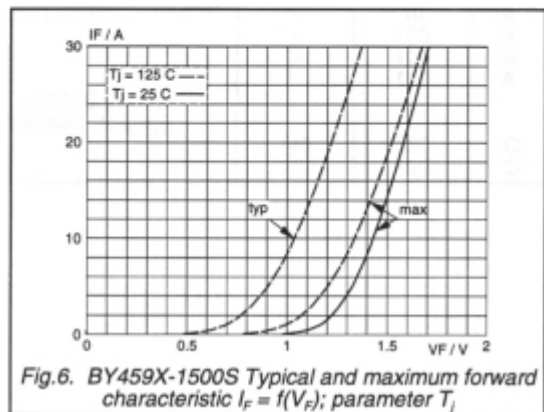
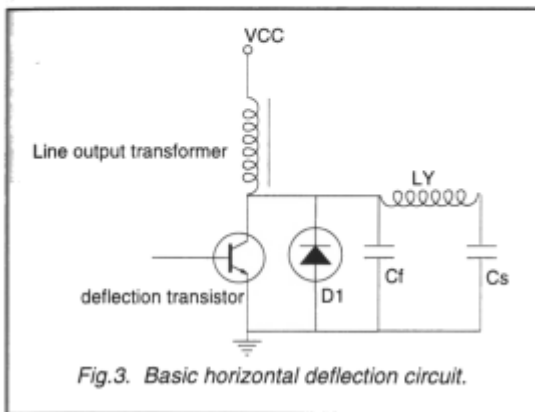
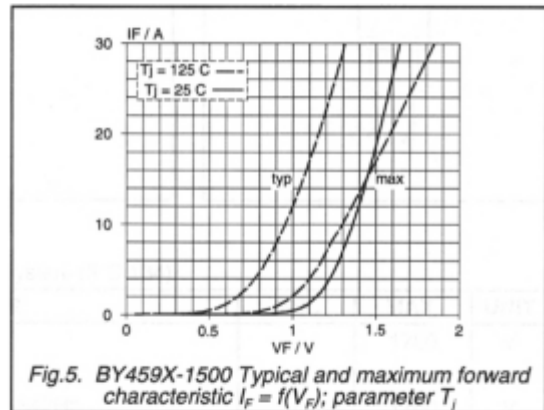
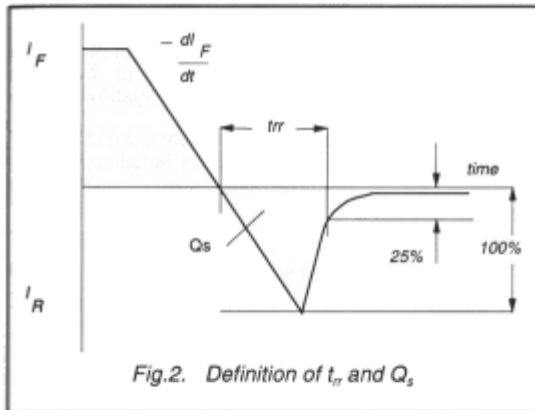
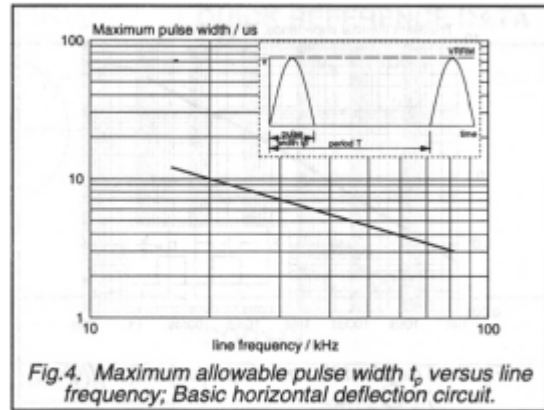
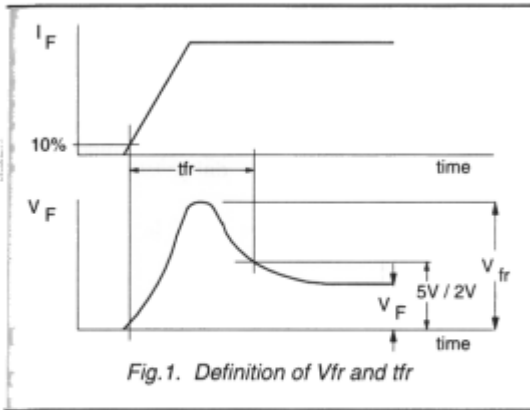
### DYNAMIC CHARACTERISTICS

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

| SYMBOL   | PARAMETER                     | CONDITIONS   | TYP. |       | MAX. |       | UNIT          |
|----------|-------------------------------|--|------|-------|------|-------|---------------|
|          |                               |  | 1500 | 1500S | 1500 | 1500S |               |
| $t_{rr}$ | Reverse recovery time         | <b>BY459X-</b><br>$I_F = 1\text{ A}, V_R \geq 30\text{ V}$ | 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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