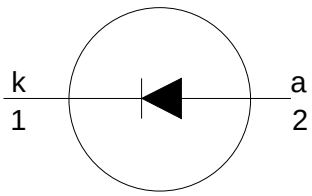
Damper diode ultra fast, high-voltage

BY559X-1500U

FEATURES

- Low forward volt drop
- Low forward recovery voltage
- Ultra Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 1500 V

$V_F \leq 1.5$ V

$V_{fr} \leq 8$ V

$t_{rr} \leq 130$ ns

I_{FWM} = 10 A

$I_{FSM} \leq 160$ A

GENERAL DESCRIPTION

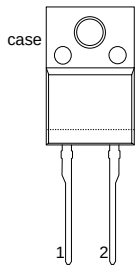
A double diffused rectifier diode in a plastic envelope, featuring ultra fast forward and reverse recovery and low forward voltage. The device is intended for use as a damper diode in horizontal deflection circuits of large screen monitors and workstations in applications up to 150kHz.

The BY559 series is supplied in the conventional leaded SOD59 and SOD113 packages.

PINNING

PIN	DESCRIPTION
1	cathode
2	anode
case	isolated

SOD113



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	Peak repetitive reverse voltage		-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
I_{FWM}	Peak working forward current	f = 120 kHz;	-	10	A
I_{FRM}	Peak repetitive forward current	t = 100 µs	-	150	A
I_{FSM}	Peak non-repetitive forward current	t = 10 ms sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$	-	160	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
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	55	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 6.5 A	-	1.7	2.05	V
		I_F = 6.5 A; T_j = 125 ˚C	-	1.2	1.5	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	0.5	mA
		$V_R = V_{RWMmax}$; T_j = 125 ˚C	-	-	2.0	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{fr}	Forward recovery voltage	I_F = 6.5 A; dI_F/dt = 50 A/µs	-	6	8	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	130	180	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq$ 30 V	-	100	130	ns
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq$ 30 V	-	0.2	0.3	µC

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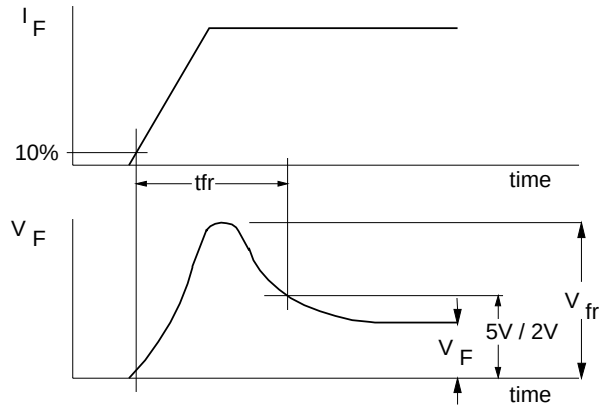


Fig.1. Definition of Vfr and tfr

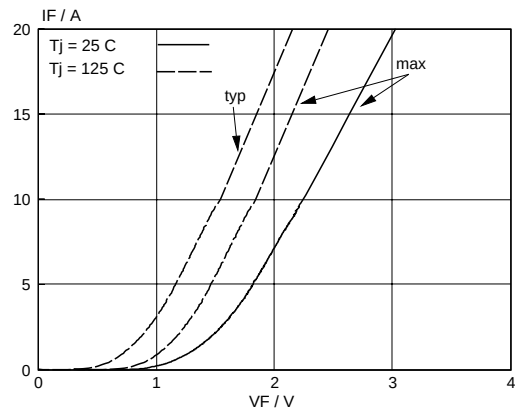


Fig.4. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

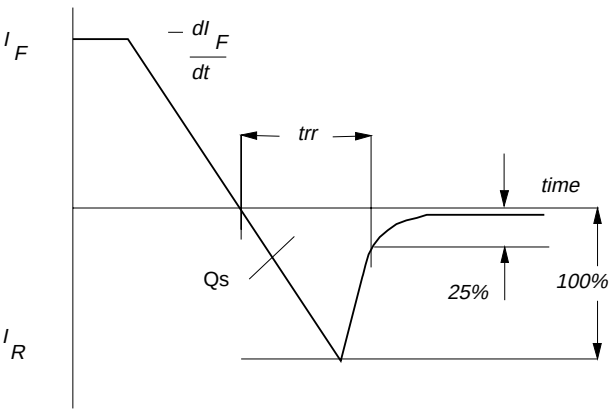


Fig.2. Definition of t_{rr} and Q_s

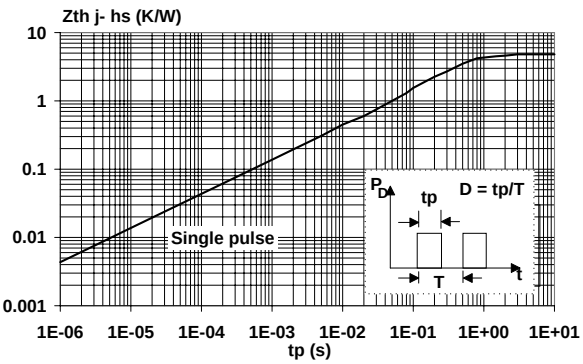


Fig.5. Transient thermal impedance $Z_{th} = f(t_p)$

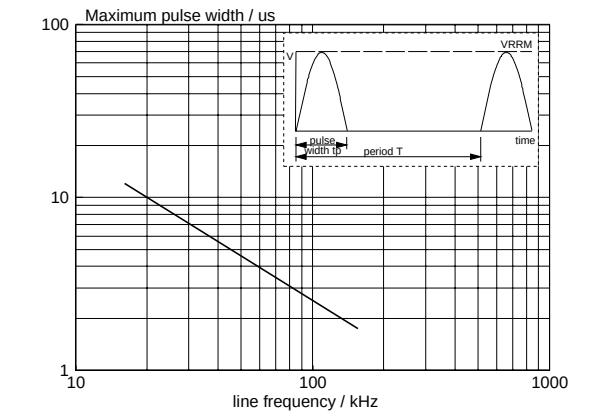


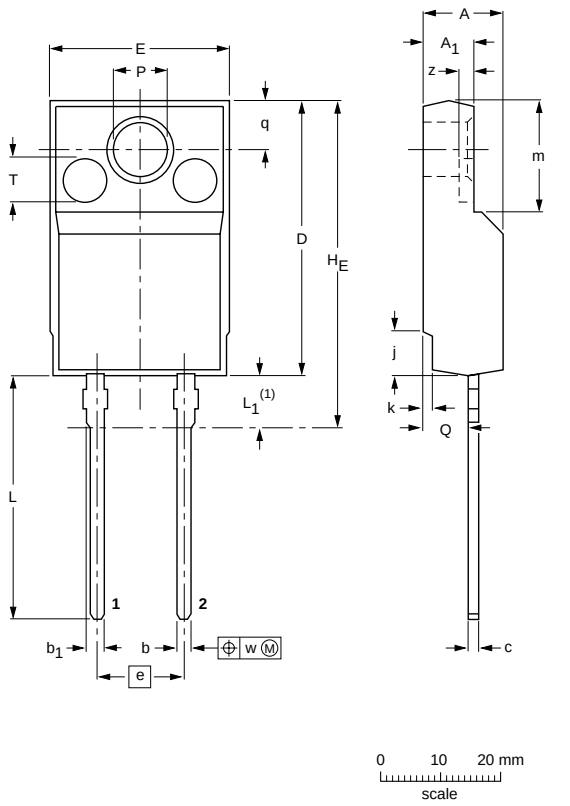
Fig.3. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

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_1	b	b_1	c	D	E	e	H_E max.	j	k	L	L_1(1)	m	P	Q	q	T	w	z(2)
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_1.
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.6. 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.