Rectifier diode fast, high-voltage

BY459X-1500

GENERAL DESCRIPTION

Glass-passivated double diffused rectifier diode in a full pack plastic envelope, featuring fast forward recovery and low forward recovery voltage. The device is intended for use in multi-sync monitor horizontal deflection circuits.

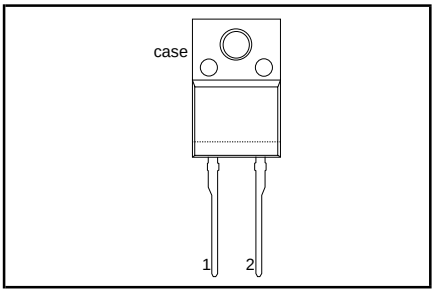
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{RRM}	Repetitive peak reverse voltage	1500	V
V_F	Forward voltage	1.2	V
I_{FWM}	Working peak forward current	10	A
I_{FRM}	Repetitive peak forward current	100	A
t_{fr}	Forward recovery time	250	ns
V_{fr}	Forward recovery voltage	14	V

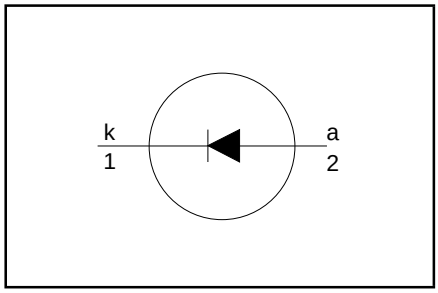
PINNING - SOD113

PIN	DESCRIPTION
1	cathode
2	anode
case	isolated

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RSM}	Non-repetitive peak reverse voltage during flash-over of picture tube		-	1500	V
V_{RRM}	Repetitive peak reverse voltage	t = 6 μs; f = 82kHz	-	1500	V
V_{RWM}	Crest working reverse voltage		-	1300	V
I_{FWM}	Working peak forward current[1]	f = 82kHz; $T_{hs} \leq 127$ ˚C	-	10	A
I_{FRM}	Repetitive peak forward current	t = 100 μs	-	100	A
I_{FSM}	Non-repetitive peak forward current	t = 10 ms	-	100	A
		t = 8.3 ms	-	110	A
		sinusoidal; T_j = 150 ˚C prior to surge; with reapplied $V_{RWM(max)}$			
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

1 Including worst case forward recovery losses, see fig:5.

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	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 6.5 A	-	0.95	1.3	V
		I_F = 6.5 A; T_j = 125 ˚C	-	0.85	1.2	V
I_R	Reverse current	$V_R = V_{RWMmax}$	-	-	0.25	mA
		$V_R = V_{RWMmax}$; T_j = 125 ˚C	-	-	1.0	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	-	8	14	V
t_{fr}	Forward recovery time	I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 5 V	-	170	250	ns
		I_F = 6.5 A; dI_F/dt = 50 A/µs; V_F = 2 V	-	350	-	ns
t_{rr}	Reverse recovery time	I_F = 1 A; $-dI_F/dt$ = 50 A/µs; $V_R \geq$ 30 V	-	250	350	ns
Q_s	Reverse recovery charge	I_F = 2 A; $-dI_F/dt$ = 20 A/µs; $V_R \geq$ 30 V	-	2.0	3.0	µC

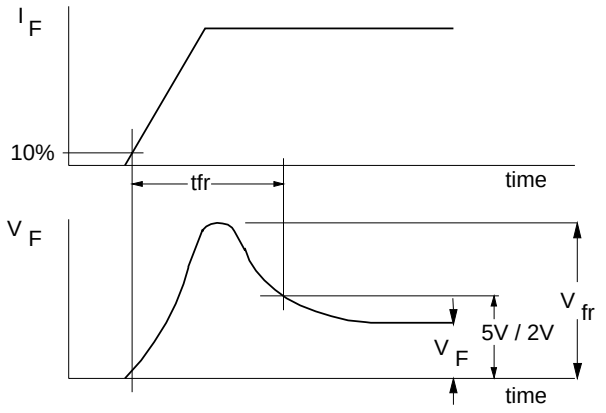


Fig.1. Definition of Vfr and tfr

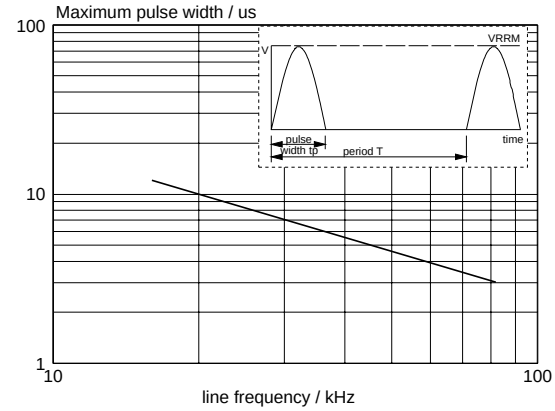


Fig.4. Maximum allowable pulse width t_p versus line frequency; Basic horizontal deflection circuit.

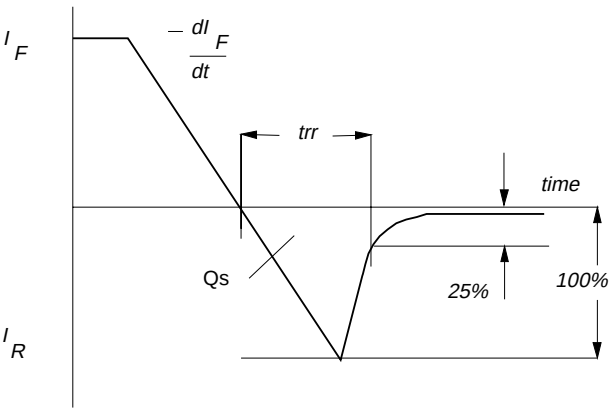


Fig.2. Definition of t_{rr} and Q_s

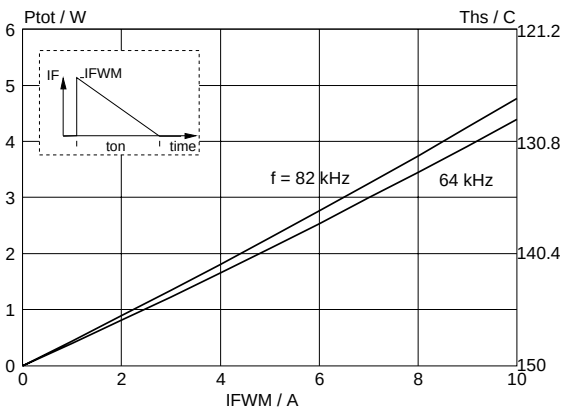


Fig.5. Total dissipation $P_{tot} = f(I_{FWM})$; including forward recovery losses; Basic horizontal deflection circuit.

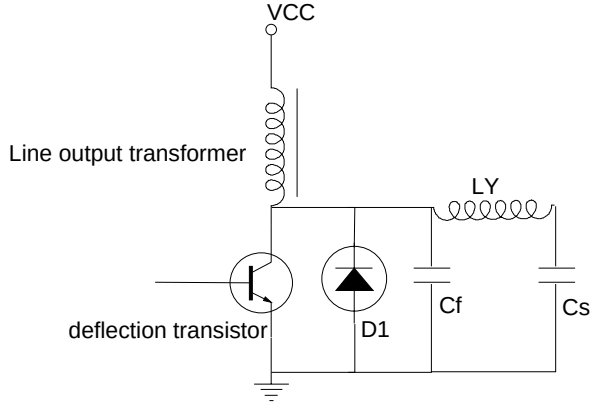


Fig.3. Basic horizontal deflection circuit.

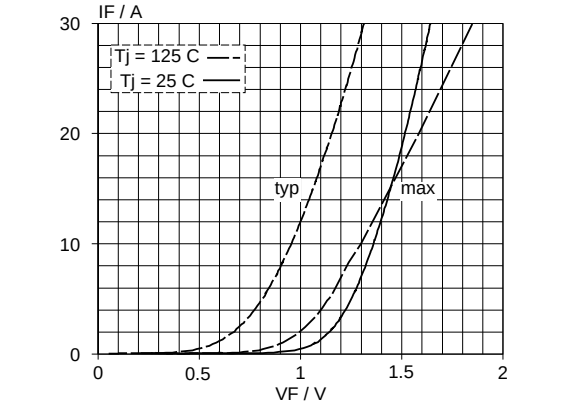


Fig.6. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

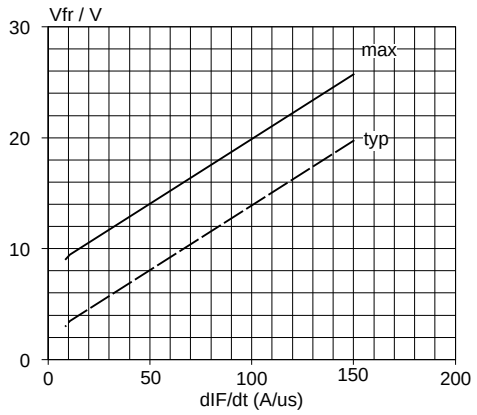


Fig.7. Typical and maximum $V_{fr} = f(dI_F/dt)$; $I_F = 6.5A$; $T_j = 25^{\circ}C$

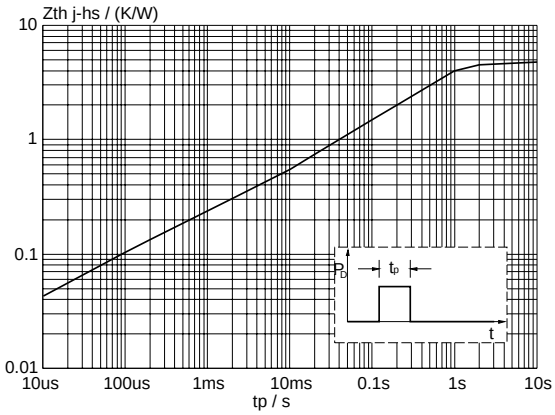


Fig.9. Transient thermal impedance $Z_{th} = f(t_p)$

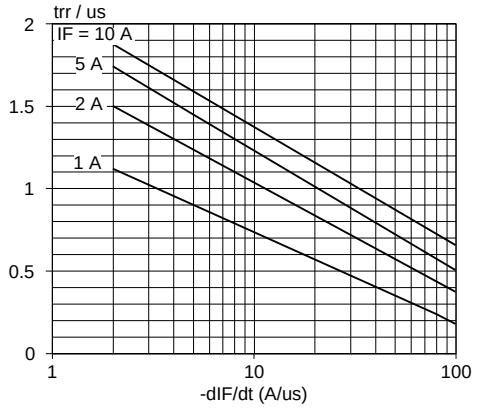


Fig.8. Maximum reverse recovery time $t_{rr} = f(dI_F/dt)$; parameter T_j; $V_R \geq 30V$

MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

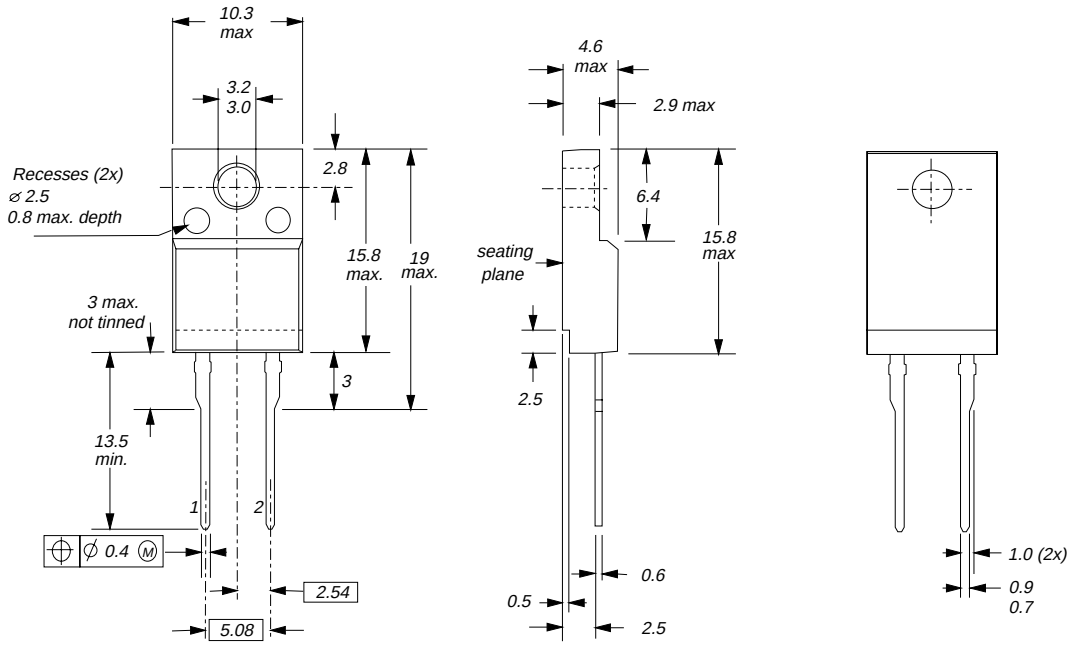


Fig.10. SOD113; The seating plane is electrically isolated from all terminals.

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.