PRS07 series

Fast soft-recovery rectifiers

Rev. 02 — 26 July 2004 Product data sheet

1. Product profile

1.1 General description

Fast soft-recovery rectifier diodes in a cavity free cylindrical glass surface mounted package using Implotec™ technology.

1.2 Features

- Low leakage current
- Hermetically sealed package
- Glass passivated
- Small package.

1.3 Applications

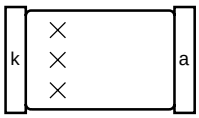
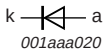
- Switched-mode power supplies
- Snubber diode.

1.4 Quick reference data

- $V_R \leq 600$ V (PRS07J)
- $V_R \leq 400$ V (PRS07G)
- $V_R \leq 200$ V (PRS07D)
- $V_F \leq 1.2$ V
- $I_{F(AV)} \leq 1.7$ A
- $t_{rr} \leq$ 250 ns.

2. Pinning information

Table 1: Discrete pinning

Pin	Description	Simplified outline	Symbol
a	anode (a)	 SOD87	 001aaa020
k	cathode (k)		

SOD87

PHILIPS

3. Ordering information

Table 2: Ordering information

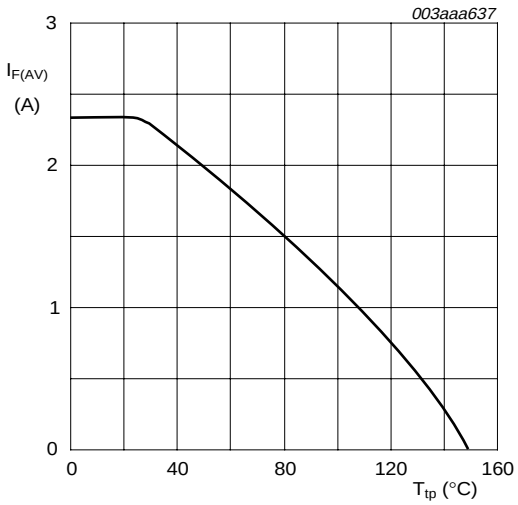
Type number	Package		
	Name	Description	Version
PRS07D	SOD87	Hermetically sealed glass surface mounted package; Implotec™ technology; 2 connectors	SOD87
PRS07G			
PRS07J			

4. Limiting values

Table 3: Limiting values

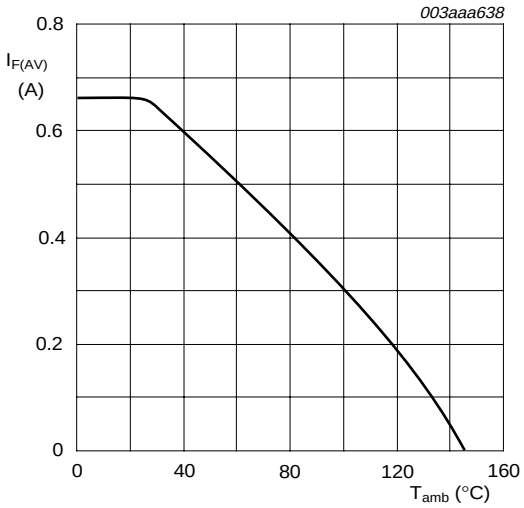
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage				
	PRS07D		-	200	V
	PRS07G		-	400	V
	PRS07J		-	600	V
V_{RWM}	crest working reverse voltage				
	PRS07D		-	200	V
	PRS07G		-	400	V
	PRS07J		-	600	V
V_R	reverse voltage				
	PRS07D		-	200	V
	PRS07G		-	400	V
	PRS07J		-	600	V
$I_{F(AV)}$	average forward current	T_{tp} = 65 °C; Figure 1; averaged over any 20 ms period	-	1.7	A
		T_{amb} = 45 °C; Figure 2; mounted on a printed-circuit board; Figure 6; averaged over any 20 ms period	-	0.6	A
I_{FRM}	repetitive peak forward current	T_{tp} = 105 °C	-	13	A
		T_{amb} = 60 °C	-	5.5	A
I_{FSM}	non-repetitive peak forward current	t_p = 8.3 ms half sine wave; T_j = 150 °C prior to surge; $V_R = V_{RRM(max)}$	-	20	A
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C



a = 1.42; $V_R = V_{RRM(max)}$; δ = 0.5.

Fig 1. Average forward current as a function of tie-point temperature (including losses due to reverse leakage); maximum values.



a = 1.42; $V_R = V_{RRM(max)}$; δ = 0.5.

Device mounted as shown in Figure 6.

Fig 2. Average forward current as a function of ambient temperature (including losses due to reverse leakage); maximum values.

5. Thermal characteristics

Table 4: Thermal characteristics

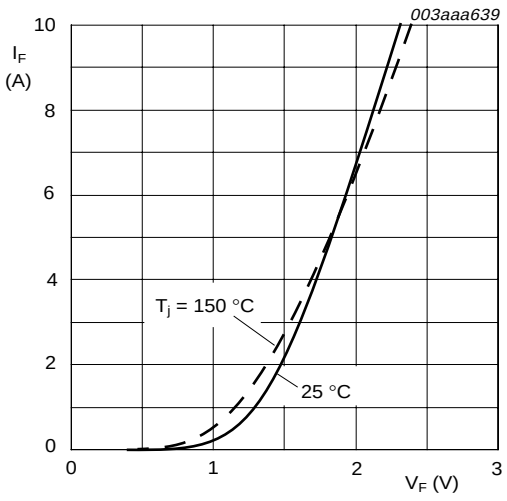
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-tp)}$	thermal resistance from junction to tie-point		-	30	-	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	mounted on a printed-circuit board, 1.5 mm thick; copper thickness ≥ 40 μm; Figure 6	-	150	-	K/W

6. Characteristics

Table 5: Characteristics

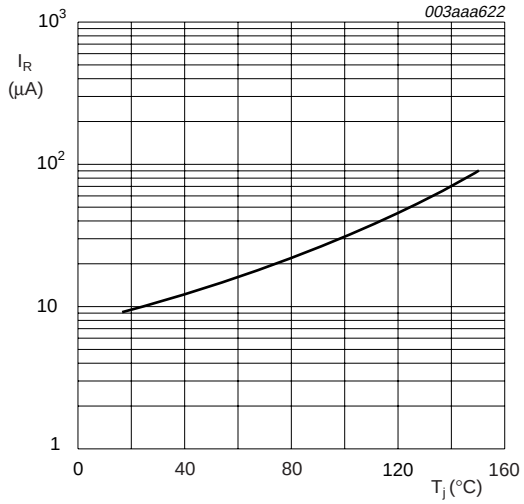
T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	I_F = 0.7 A; Figure 3				
		T_j = 25 °C	-	-	1.2	V
		T_j = 150 °C	-	-	1.05	V
I_R	reverse current	$V_R = V_{RRM}$; Figure 4				
		T_j = 25 °C	-	-	10	µA
		T_j = 125 °C	-	-	50	µA
Dynamic characteristics						
C_d	diode capacitance	f = 1 MHz; V_R = 4 V	-	9	-	pF
t_{rr}	reverse recovery time	switching from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; Figure 7	-	-	250	ns



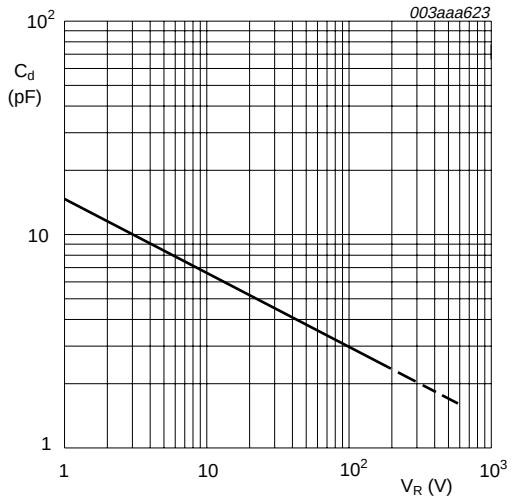
T_j = 25 °C.

Fig 3. Forward current as a function of forward voltage; maximum values.



T_j = 25 °C.

Fig 4. Reverse current as a function of junction temperature; maximum values.



f = 1 MHz; T_j = 25 °C.

Fig 5. Diode capacitance as a function of reverse voltage; typical values.

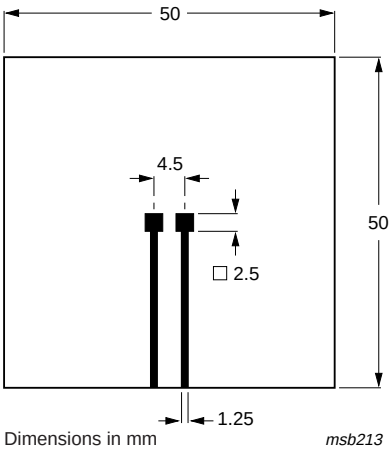
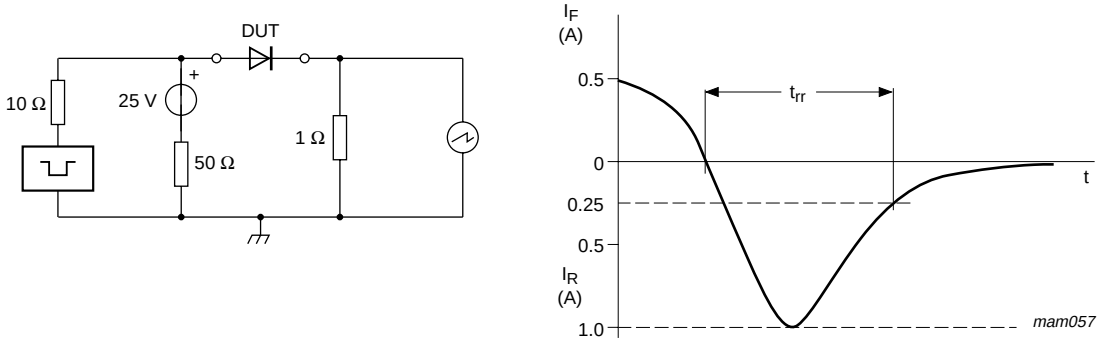


Fig 6. Printed-circuit board for surface mounting.

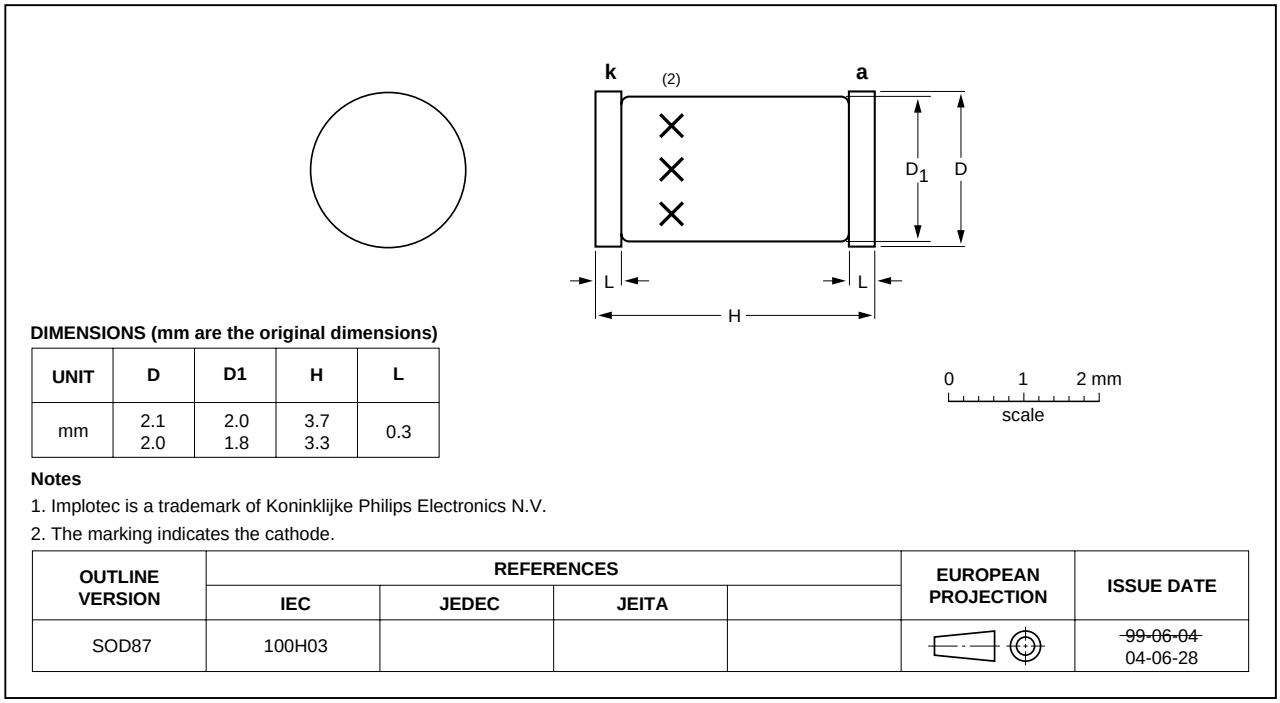


T_j = 25 °C.

Fig 7. Test circuit and reverse recovery time waveform definition.

7. Package outline

Hermetically sealed glass surface mounted package;
Implotec™(1) technology; 2 connectors **SOD87**



DIMENSIONS (mm are the original dimensions)

UNIT	D	D1	H	L
mm	2.1 2.0	2.0 1.8	3.7 3.3	0.3

Notes

1. Implotec is a trademark of Koninklijke Philips Electronics N.V.
2. The marking indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD87	100H03					~~99-06-04~~ 04-06-28

Fig 8. SOD87 package outline.

8. Revision history

Table 6: Revision history

Document ID	Release date	Data sheet status	Change notice	Document number	Supersedes
PRS07_SERIES_2	20040726	Product data sheet	-	9397 750 13204	PRS07_SERIES_1
Modifications:	• $I_{F(AV)}$ data and conditions revised in Section 1.4 “Quick reference data” and Table 3 “Limiting values” • Figure 1, 2 and 3 updated • T_{stg} and T_j data revised in Table 3 “Limiting values” • V_F data and conditions revised in Table 5 “Characteristics”				
PRS07_SERIES_1	20040203	Product data sheet	-	9397 750 12712	-

9. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	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.
II	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.
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[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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 the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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13. Contact information

For additional information, please visit: http://www.semiconductors.philips.com

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14. Contents

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