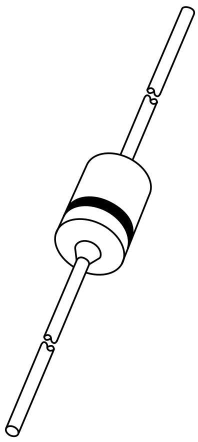
DATA SHEET



1N4148; 1N4448
High-speed diodes

Product data sheet
Supersedes data of 2002 Jan 23

2004 Aug 10

founded by Philips

FEATURES

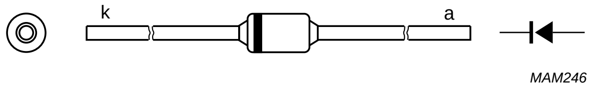
- Hermetically sealed leaded glass SOD27 (DO-35) package
- High switching speed: max. 4 ns
- General application
- Continuous reverse voltage: max. 100 V
- Repetitive peak reverse voltage: max. 100 V
- Repetitive peak forward current: max. 450 mA.

APPLICATIONS

- High-speed switching.

DESCRIPTION

The 1N4148 and 1N4448 are high-speed switching diodes fabricated in planar technology, and encapsulated in hermetically sealed leaded glass SOD27 (DO-35) packages.



The diodes are type branded.

Fig.1 Simplified outline (SOD27; DO-35) and symbol.

MARKING

TYPE NUMBER	MARKING CODE
1N4148	1N4148PH or 4148PH
1N4448	1N4448

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
1N4148	–	hermetically sealed glass package; axial leaded; 2 leads	SOD27
1N4448			

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
I_F	continuous forward current	see Fig.2; note 1	–	200	mA
I_{FRM}	repetitive peak forward current		–	450	mA
I_{FSM}	non-repetitive peak forward current	square wave; T_j = 25 °C prior to surge; see Fig.4			
		t = 1 μs	–	4	A
		t = 1 ms	–	1	A
		t = 1 s	–	0.5	A
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 1	–	500	mW
T_{stg}	storage temperature		–65	+200	°C
T_j	junction temperature		–	200	°C

Note

1. Device mounted on an FR4 printed-circuit board; lead length 10 mm.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	see Fig.3			
	1N4148	I_F = 10 mA	–	1	V
	1N4448	I_F = 5 mA	0.62	0.72	V
		I_F = 100 mA	–	1	V
I_R	reverse current	V_R = 20 V; see Fig.5		25	nA
		V_R = 20 V; T_j = 150 °C; see Fig.5	–	50	μA
I_R	reverse current; 1N4448	V_R = 20 V; T_j = 100 °C; see Fig.5	–	3	μA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Fig.6	–	4	pF
t_{rr}	reverse recovery time	when switched from I_F = 10 mA to I_R = 60 mA; R_L = 100 Ω; measured at I_R = 1 mA; see Fig.7	–	4	ns
V_{fr}	forward recovery voltage	when switched from I_F = 50 mA; t_r = 20 ns; see Fig.8	–	2.5	V

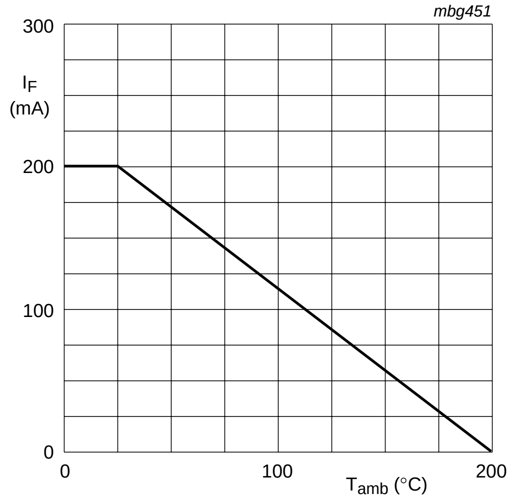
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-tp)}$	thermal resistance from junction to tie-point	lead length 10 mm	240	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	lead length 10 mm; note 1	350	K/W

Note

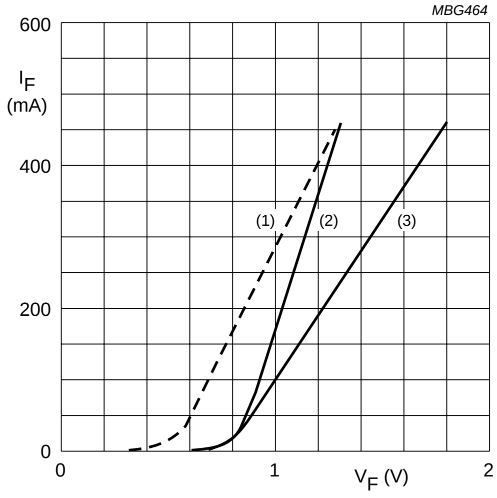
1. Device mounted on a printed-circuit board without metallization pad.

GRAPHICAL DATA



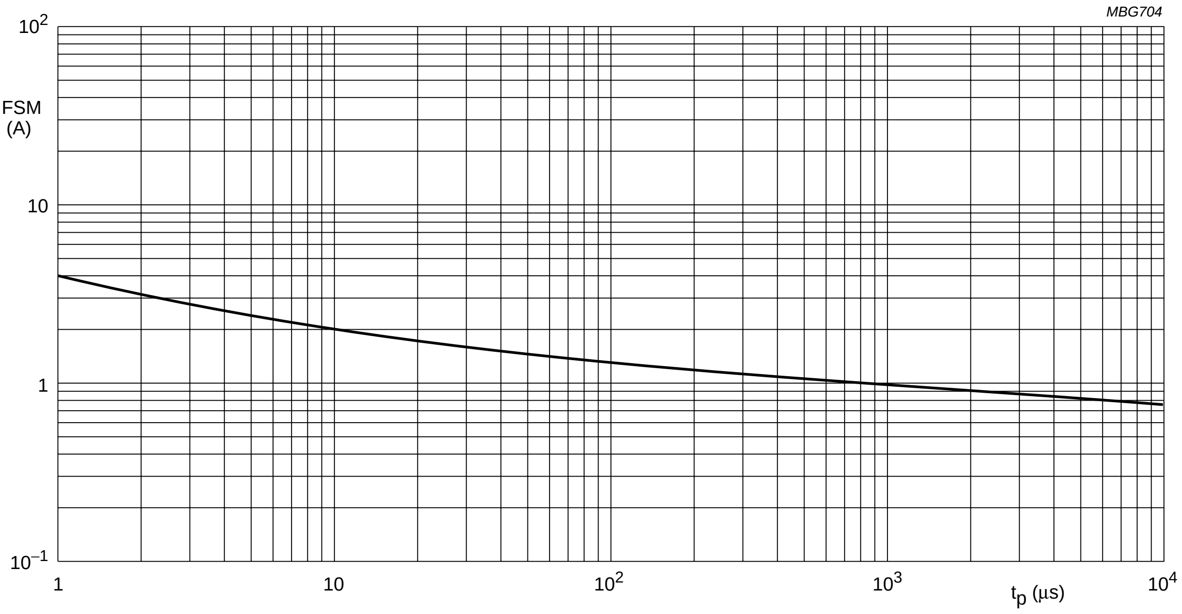
Device mounted on an FR4 printed-circuit board; lead length 10 mm.

Fig.2 Maximum permissible continuous forward current as a function of ambient temperature.



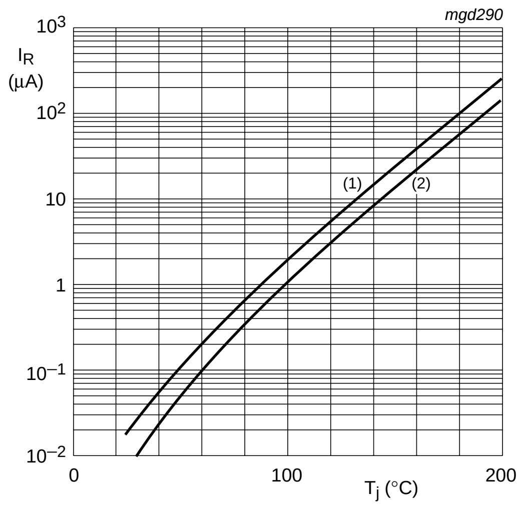
(1) T_j = 175 °C; typical values.
(2) T_j = 25 °C; typical values.
(3) T_j = 25 °C; maximum values.

Fig.3 Forward current as a function of forward voltage.



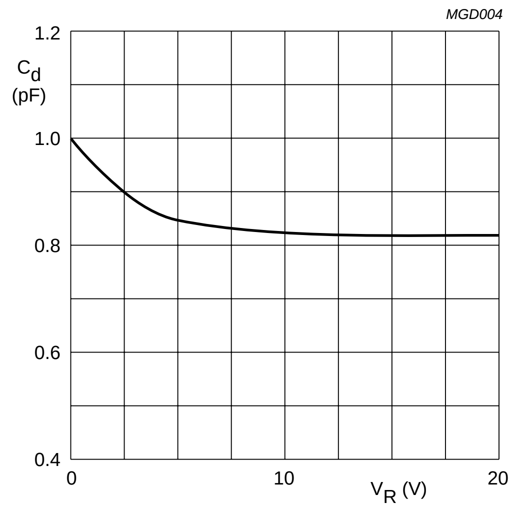
Based on square wave currents.
T_j = 25 °C prior to surge.

Fig.4 Maximum permissible non-repetitive peak forward current as a function of pulse duration.



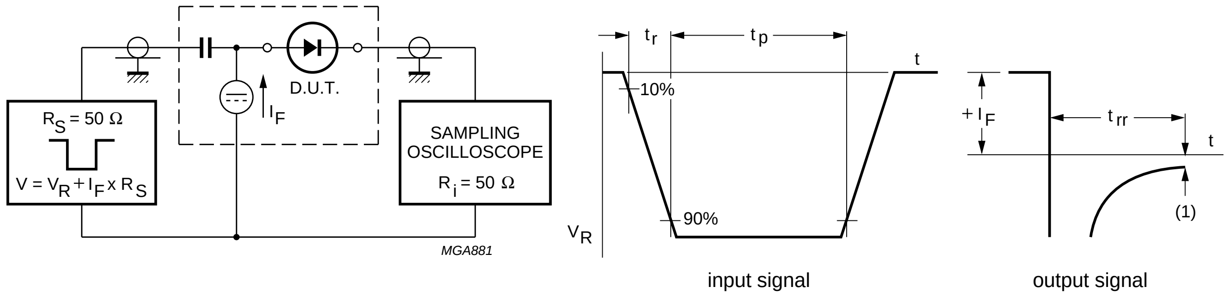
(1) V_R = 75 V; typical values.
(2) V_R = 20 V; typical values.

Fig.5 Reverse current as a function of junction temperature.



f = 1 MHz; T_j = 25 °C.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.



(1) I_R = 1 mA.

Fig.7 Reverse recovery voltage test circuit and waveforms.

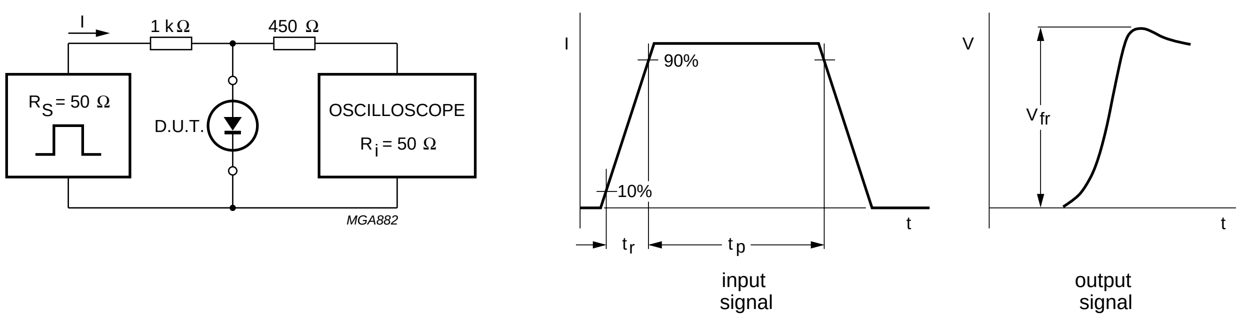
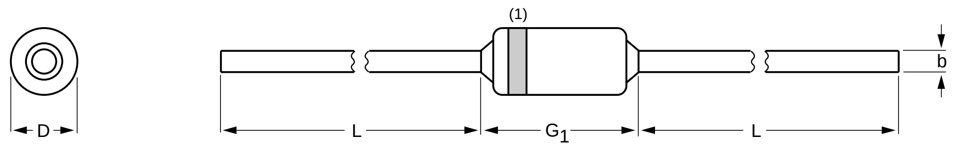


Fig.8 Forward recovery voltage test circuit and waveforms.

PACKAGE OUTLINE

Hermetically sealed glass package; axial leaded; 2 leads **SOD27**



DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G_1 max.	L min.
mm	0.56	1.85	4.25	25.4

0 1 2 mm
scale

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD27	A24	DO-35	SC-40			~~97-06-09~~ 05-12-22

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

Notes

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Printed in The Netherlands R76/05/pp9 Date of release: 2004 Aug 10 Document order number: 9397 750 13541

founded by

PHILIPS

Datasheet

(Product Specification)
v.5.0, 2004-08-10
Pages, 122kB

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High-speed diodes

General description
Features and benefits
Applications
Quick reference
Parametrics/similar products
Block diagrams/pinning
Pricing/ordering/availability
Samples
Products/packages
Quality/reliability/chemical content
Design support
Print/email
Disclaimers

All information hereunder is subject to the subsequent disclaimers

General description

Hide

The 1N4148 and 1N4448 are high-speed switching diodes fabricated in planar technology, and encapsulated in hermetically sealed leaded glass SOD27 (DO-35) packages.

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Features and benefits

Hide

Hermetically sealed leaded glass SOD27 (DO-35)package
High switching speed: max. 4 ns
General application
Continuous reverse voltage: max. 100 V
Repetitive peak reverse voltage: max. 100 V
Repetitive peak forward current: max. 450 mA.

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Applications

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High-speed switching.

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Parametrics/similar products

Hide

Type number	Package	V_R max(V)	C_d max.(pF)	t_{rr} max(ns)	I_{FSM} max.(A)	IFRM(mA)	$V_F$max(mV)	I_F max(mA)	$I_R$max(nA)	Configuration
1N4148	SOD27 (ALF2)	100	4	4	4	450	1000@IF=10mA	200	25@VR=20V	single
1N4448	SOD27 (ALF2)	100	4	4	4	450	1000@IF=100mA	200	25@VR=20V	single

Similar products
1N4148_1N4448 links to the similar products page containing an overview of products that are similar in function or related to the type number(s) as listed on this page. The similar products page includes products from the same catalog tree(s), relevant selection guides and products from the same functional category.

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Block diagrams

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Pricing/ordering/availability

Hide

Type number	Ordering code (12NC)	Orderable part number	Region	Distributor	In stock	Order quantity	Inventory date	Buy online	Samples
1N4148	9330 839 90113	1N4148,113	NA	NEWARK	7,064		11/29/2010	Buy online	Order samples
			EU	FARNELL	171,923		11/29/2010	Buy online	
			NA	DIGI-KEY CORPORATION	200,000		11/27/2010	Buy online	
			NA	DIGI-KEY CORPORATION	207,268		11/27/2010	Buy online	
			NA	MOUSER ELECTRONICS	45,889		11/27/2010	Buy online	
			NA	FUTURE ELECTRONICS	719,133		11/28/2010	Buy online	
			EU	FUTURE ELECTRONICS UK	1,470,000		11/28/2010	Buy online	
			NA	AVNET ELECTRONICS MARKETING	130,000		11/29/2010	Buy online	
			NA	ARROW ELECTRONICS	191,000		11/29/2010	Buy online	
			AS	FUTURE ELECTRONICS- ASIA	1,950,000		11/28/2010	Buy online	
			NA	WPG AMERICAS INC.	2,000,000		11/24/2010	Buy online	
			AS	AVNET ELECTRONICS HONG KONG	150,000		11/23/2010	Buy online	
			NA	MOUSER ELECTRONICS	45,889		11/27/2010	Buy online	
			JAPAN	CHIP ONE STOP	yes		08/27/2010	Buy online	

1N4148	9330 839 90133	1N4148,133	NA	NEWARK	7,064		11/29/2010	Buy online	Order samples
			EU	FARNELL	171,923		11/29/2010	Buy online	
			NA	MOUSER ELECTRONICS	52,700		11/27/2010	Buy online	
			NA	AVNET ELECTRONICS MARKETING	40,000		11/29/2010	Buy online	
			NA	ARROW ELECTRONICS	40,000		11/29/2010	Buy online	
			AS	FUTURE ELECTRONICS- ASIA	50		11/28/2010	Buy online	
			AS	AVNET ELECTRONICS HONG KONG	78,000		11/23/2010	Buy online	
			NA	MOUSER ELECTRONICS	52,700		11/27/2010	Buy online	
			ASIA	SACL - Hong Kong/China	yes	1000010000	11/01/2010	Buy online	
			ASIA	SAC - Taiwan	yes	1000010000	11/01/2010	Buy online	
			JAPAN	CHIP ONE STOP	yes		08/27/2010	Buy online	
1N4148	9330 839 90143	1N4148,143	NA	NEWARK	7,064		11/29/2010	Buy online	Order samples
			EU	FARNELL	171,923		11/29/2010	Buy online	
			NA	MOUSER ELECTRONICS	47,592		11/27/2010	Buy online	
			NA	AVNET ELECTRONICS MARKETING	60,000		11/29/2010	Buy online	
			NA	MOUSER ELECTRONICS	47,592		11/27/2010	Buy online	
			ASIA	SAC - Taiwan	yes	500020000	11/01/2010	Buy online	
			JAPAN	CHIP ONE STOP	yes		08/27/2010	Buy online	
1N4448	9331 203 50113	1N4448,113	NA	NEWARK	99,318		11/29/2010	Buy online	Order samples
			EU	FARNELL	107,637		11/29/2010	Buy online	
			NA	DIGI-KEY CORPORATION	80,000		11/27/2010	Buy online	
			NA	DIGI-KEY CORPORATION	85,897		11/27/2010	Buy online	
			NA	MOUSER ELECTRONICS	6,602		11/27/2010	Buy online	
			NA	FUTURE ELECTRONICS	55,150		11/28/2010	Buy online	
			EU	FUTURE ELECTRONICS UK	150,000		11/28/2010	Buy online	
			NA	AVNET ELECTRONICS MARKETING	90,000		11/29/2010	Buy online	
			NA	ARROW ELECTRONICS	130,000		11/29/2010	Buy online	
			NA	WPG AMERICAS INC.	40,000		11/24/2010	Buy online	
			AS	AVNET ELECTRONICS HONG KONG	70,000		11/23/2010	Buy online	
			NA	MOUSER ELECTRONICS	6,602		11/27/2010	Buy online	
			ASIA	SACL - Hong Kong/China	yes	1000010000	11/01/2010	Buy online	
			JAPAN	CHIP ONE STOP	yes		08/27/2010	Buy online	
1N4448	9331 203 50133	1N4448,133	NA	NEWARK	99,318		11/29/2010	Buy online	Order samples
			EU	FARNELL	107,637		11/29/2010	Buy online	
			NA	MOUSER ELECTRONICS	39,194		11/27/2010	Buy online	
			AS	ARROW ASIA PAC LTD	50,000		11/28/2010	Buy online	
			AS	FUTURE ELECTRONICS- ASIA	30,000		11/28/2010	Buy online	
			NA	MOUSER ELECTRONICS	39,194		11/27/2010	Buy online	
			ASIA	WPI	10,000	1000010000	11/29/2010	Buy online	
			JAPAN	CHIP ONE STOP	no		08/27/2010	Buy online	
1N4448	9331 203 50143	1N4448,143	NA	NEWARK	99,318		11/29/2010	Buy online	Order samples
			EU	FARNELL	107,637		11/29/2010	Buy online	
			AS	ARROW ASIA PAC LTD	25,000		11/28/2010	Buy online	
			JAPAN	CHIP ONE STOP	no		08/27/2010	Buy online	

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Products/packages

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Type number	Orderable part number	Ordering code (12NC)	Product status	Package	Packing	Marking	ECCN
1N4148	1N4148,113	9330 839 90113	Volume production	SOD27 (ALF2)	Reel pack axial radial	Standard Marking	
1N4148	1N4148,133	9330 839 90133	Volume production	SOD27 (ALF2)	Ammo pack axial radial taped	Standard Marking	
1N4148	1N4148,143	9330 839 90143	Volume production	SOD27 (ALF2)	Ammo pack axial radial taped	Standard Marking	
1N4448	1N4448,113	9331 203 50113	Volume production	SOD27 (ALF2)	Reel pack axial radial	Standard Marking	
1N4448	1N4448,133	9331 203 50133	Volume production	SOD27 (ALF2)	Ammo pack axial radial taped	Standard Marking	
1N4448	1N4448,143	9331 203 50143	Volume production	SOD27 (ALF2)	Ammo pack axial radial taped	Standard Marking	

The variants in the table below are discontinued. See the table Discontinued information for more information.

Type number	Orderable part number	Ordering code (12NC)	Product status	Package	Packing	Marking	ECCN
1N4148	1N4148,116	9330 839 90116	Withdrawn Replacement product	SOD27 (ALF2)	Reel pack axial radial	Standard Marking	
1N4148	1N4148,136	9330 839 90136	Withdrawn Replacement product	SOD27 (ALF2)	Reel Pack, Radial, Reverse	Standard Marking	

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Quality/reliability/chemical content

Hide

Type number	Orderable part number	Chemical content	RoHS	Leadfree conversion date	RHF	IFR (FIT)	MTBF (hours)	MSL
					F			

1N4148	1N4148,113		EU RoHS COMPLIANT	week 13, 2005				1
1N4148	1N4148,133		EU RoHS COMPLIANT	week 13, 2005	E			1
1N4148	1N4148,143		EU RoHS COMPLIANT	week 13, 2005	E			1
1N4448	1N4448,113		EU RoHS COMPLIANT	week 13, 2005	E			1
1N4448	1N4448,133		EU RoHS COMPLIANT	week 13, 2005	E			1
1N4448	1N4448,143		EU RoHS COMPLIANT	week 13, 2005	E			1

The variants in the table below are discontinued. See the table Discontinued information for more information.

Type number	Orderable part number	Chemical content	RoHS	Leadfree conversion date	RHF	IFR (FIT)	MTBF (hours)	MSL
1N4148	1N4148,116		EU RoHS COMPLIANT		E			1
1N4148	1N4148,136		EU RoHS COMPLIANT		E			1

Quality and reliability disclaimer

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Discontinued information

Hide

Type number	Ordering code (12NC)	Last-time buy date	Last-time delivery date	Replacement product	DN Notice	Status	Comments
1N4148	933083990116				DN		
1N4148	933083990136				DN		

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Design support

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Application note
- ECO-monitor (v.1.0, 2000-11-08)
- Vacuum cleaner with Philips P89LPC901 (v.1.0, 2006-08-10)
- 22 MHz Video Amplifier for Large Jumbo Picture Tubes (v.1.0, 1996-03-16)
- Circuit description of CCM420 monitor (v.1.0, 1997-10-14)
- 90W Resonant SMPS with TEA1610 SwingChip (tm) (v.1.0, 2000-09-14)

Other type
- Letter Symbols - Diodes General (v.1.0, 1999-05-01)

User manual
- SSL2102 19/22 W mains dimmable LED driver (v.1.0, 2009-09-28)

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Disclaimers

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Quality and reliability disclaimer