



# PMEGxx05ET series

0.5 A very low  $V_F$  MEGA Schottky barrier rectifiers in SOT23 package

Rev. 01 — 15 July 2005

Product data sheet

## 1. Product profile

### 1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOT23 small Surface Mounted Device (SMD) plastic package.

Table 1: Product overview

Type number	Package		Configuration
	Philips	JEITA	
PMEG2005ET	SOT23	-	single diode
PMEG3005ET	SOT23	-	single diode
PMEG4005ET	SOT23	-	single diode

### 1.2 Features

- Forward current: 0.5 A
- Very low forward voltage
- Small SMD plastic package

### 1.3 Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Inverse polarity protection
- Low power consumption applications

# PHILIPS

### 1.4 Quick reference data

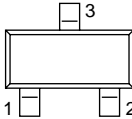
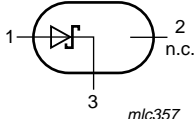
**Table 2: Quick reference data**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current		-	-	0.5	A
$V_R$	reverse voltage					
	PMEG2005ET		-	-	20	V
	PMEG3005ET		-	-	30	V
	PMEG4005ET		-	-	40	V
$V_F$	forward voltage	$I_F = 500 \text{ mA}$	[1]			
	PMEG2005ET		-	355	390	mV
	PMEG3005ET		-	380	430	mV
	PMEG4005ET		-	420	470	mV

[1] Pulse test:  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$ .

## 2. Pinning information

**Table 3: Pinning**

Pin	Description	Simplified outline	Symbol
1	anode		
2	not connected		
3	cathode		

## 3. Ordering information

**Table 4: Ordering information**

Type number	Package		
	Name	Description	Version
PMEG2005ET	-	plastic surface mounted package; 3 leads	SOT23
PMEG3005ET	-	plastic surface mounted package; 3 leads	SOT23
PMEG4005ET	-	plastic surface mounted package; 3 leads	SOT23

## 4. Marking

**Table 5: Marking codes**

Type number	Marking code <sup>[1]</sup>
PMEG2005ET	P3*
PMEG3005ET	P4*
PMEG4005ET	P5*

- [1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

**Table 6: Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	reverse voltage				
	PMEG2005ET		-	20	V
	PMEG3005ET		-	30	V
	PMEG4005ET		-	40	V
$I_F$	forward current		-	0.5	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1 \text{ ms}; \delta \leq 0.5$	-	3.9	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8 \text{ ms square wave}$	<sup>[1]</sup> -	10	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	<sup>[1]</sup> -	280	mW
			<sup>[2]</sup> -	420	mW
$T_j$	junction temperature		-	150	$^\circ\text{C}$
$T_{amb}$	ambient temperature		-65	+150	$^\circ\text{C}$
$T_{stg}$	storage temperature		-65	+150	$^\circ\text{C}$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

## 6. Thermal characteristics

**Table 7: Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	<sup>[1]</sup> <sup>[2]</sup> -	-	440	K/W
			<sup>[1]</sup> <sup>[3]</sup> -	-	300	K/W

[1] For Schottky barrier diodes thermal run-away has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses. Nomograms for determining the reverse power losses  $P_R$  and  $I_{F(AV)}$  rating will be available on request.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

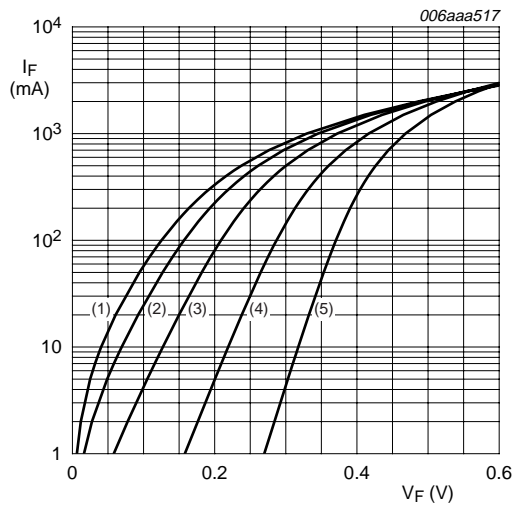
## 7. Characteristics

**Table 8: Characteristics**

$T_{amb} = 25^\circ\text{C}$  unless otherwise specified.

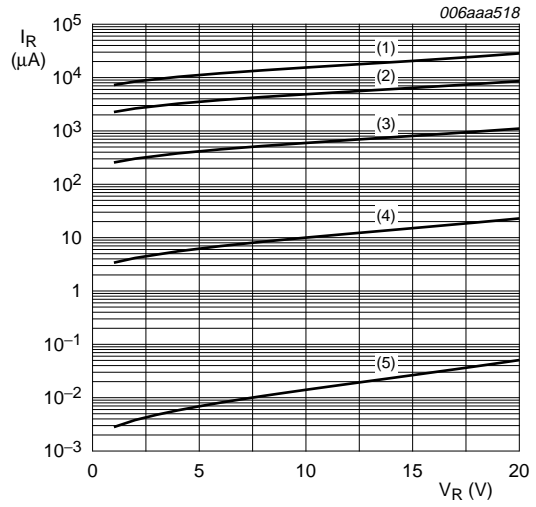
Symbol	Parameter	Conditions	Min	Typ	Max	Unit			
$V_F$	forward voltage					[1]			
		PMEG2005ET	$I_F = 0.1\text{ mA}$	-	90	130	mV		
			$I_F = 1\text{ mA}$	-	150	190	mV		
			$I_F = 10\text{ mA}$	-	210	240	mV		
			$I_F = 100\text{ mA}$	-	280	330	mV		
			$I_F = 500\text{ mA}$	-	355	390	mV		
		PMEG3005ET	$I_F = 0.1\text{ mA}$	-	90	130	mV		
			$I_F = 1\text{ mA}$	-	150	200	mV		
			$I_F = 10\text{ mA}$	-	215	250	mV		
			$I_F = 100\text{ mA}$	-	285	340	mV		
			$I_F = 500\text{ mA}$	-	380	430	mV		
		PMEG4005ET	$I_F = 0.1\text{ mA}$	-	95	130	mV		
			$I_F = 1\text{ mA}$	-	155	210	mV		
			$I_F = 10\text{ mA}$	-	220	270	mV		
			$I_F = 100\text{ mA}$	-	295	350	mV		
			$I_F = 500\text{ mA}$	-	420	470	mV		
		$I_R$	reverse current	PMEG2005ET	$V_R = 10\text{ V}$	-	15	40	$\mu\text{A}$
					$V_R = 20\text{ V}$	-	40	200	$\mu\text{A}$
				PMEG3005ET	$V_R = 10\text{ V}$	-	12	30	$\mu\text{A}$
$V_R = 30\text{ V}$	-				40	150	$\mu\text{A}$		
PMEG4005ET	$V_R = 10\text{ V}$			-	7	20	$\mu\text{A}$		
	$V_R = 40\text{ V}$			-	30	100	$\mu\text{A}$		
$C_d$	diode capacitance	$V_R = 1\text{ V}; f = 1\text{ MHz}$	PMEG2005ET	-	66	80	pF		
			PMEG3005ET	-	55	70	pF		
			PMEG4005ET	-	43	50	pF		

[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .



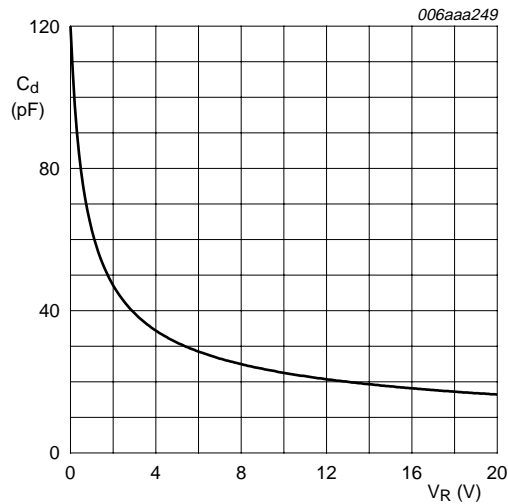
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 1. PMEG2005ET: Forward current as a function of forward voltage; typical values**



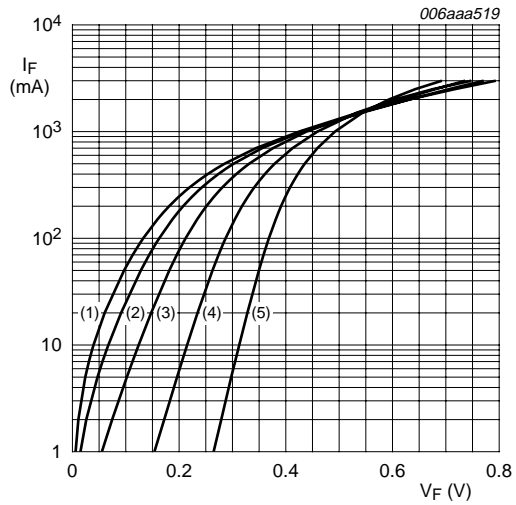
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 2. PMEG2005ET: Reverse current as a function of reverse voltage; typical values**



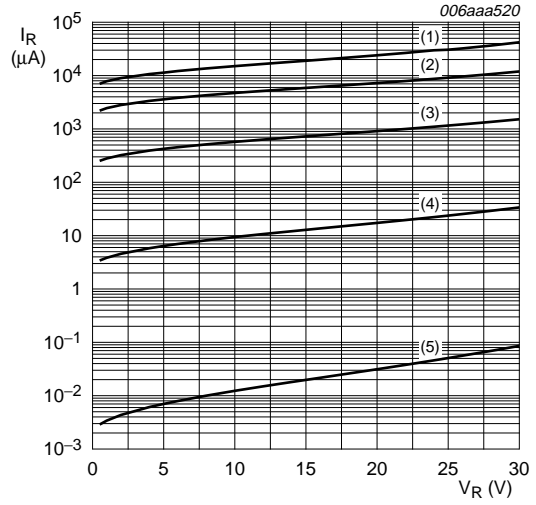
$T_{amb} = 25\text{ °C}; f = 1\text{ MHz}$

**Fig 3. PMEG2005ET: Diode capacitance as a function of reverse voltage; typical values**



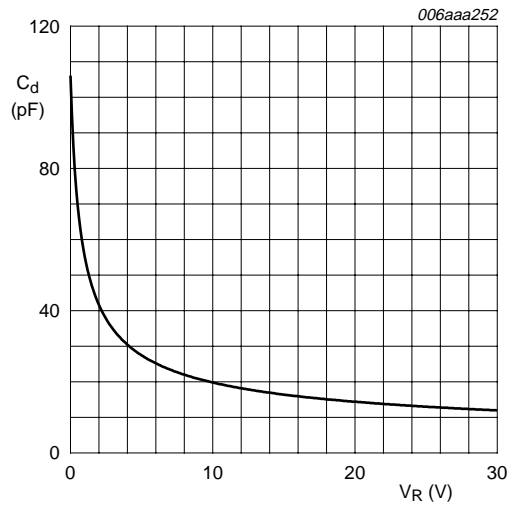
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 4. PMEG3005ET: Forward current as a function of forward voltage; typical values**



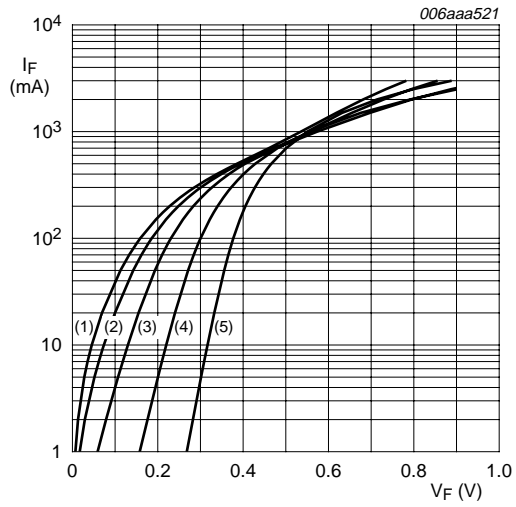
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 5. PMEG3005ET: Reverse current as a function of reverse voltage; typical values**



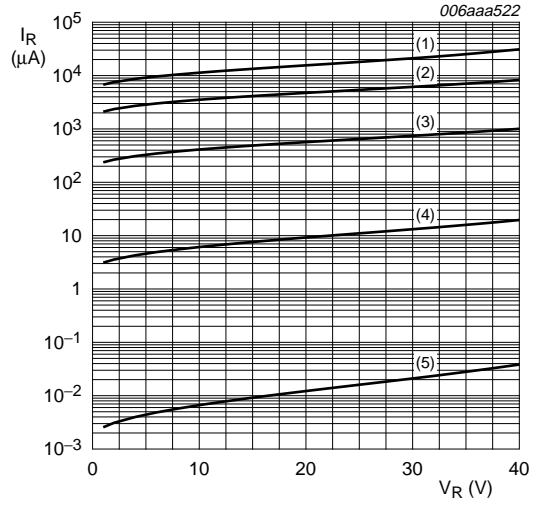
$T_{amb} = 25\text{ °C}; f = 1\text{ MHz}$

**Fig 6. PMEG3005ET: Diode capacitance as a function of reverse voltage; typical values**



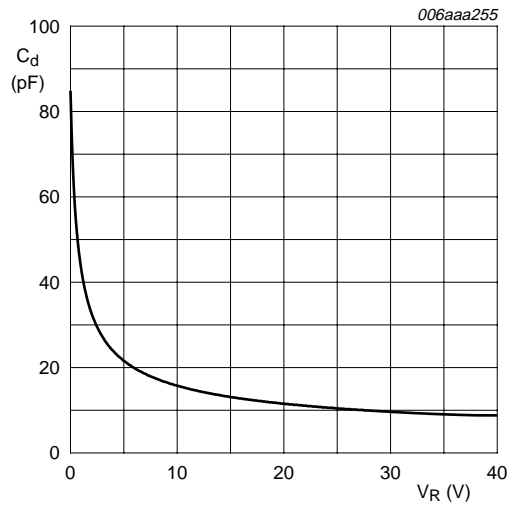
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 7. PMEG4005ET: Forward current as a function of forward voltage; typical values**



- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

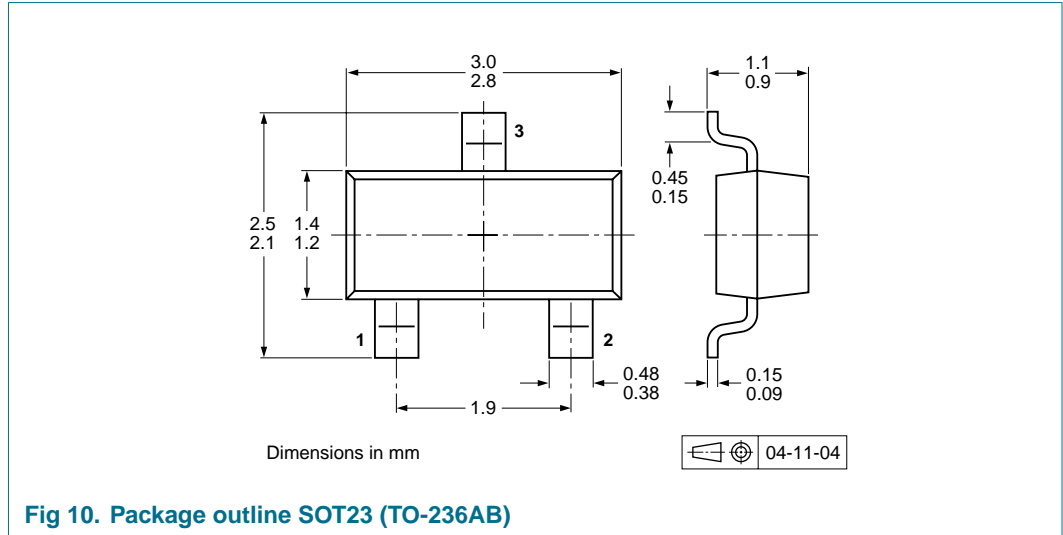
**Fig 8. PMEG4005ET: Reverse current as a function of reverse voltage; typical values**



$T_{amb} = 25\text{ °C}; f = 1\text{ MHz}$

**Fig 9. PMEG4005ET: Diode capacitance as a function of reverse voltage; typical values**

## 8. Package outline



## 9. Packing information

**Table 9: Packing methods**

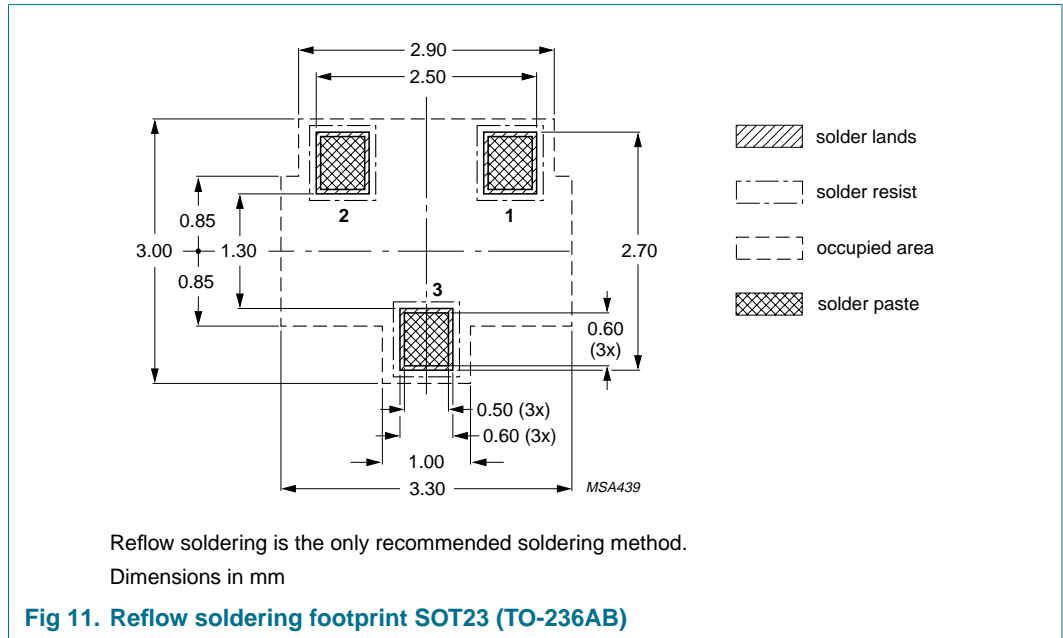
The -xxx numbers are the last three digits of the 12NC ordering code. [\[1\]](#)

Type number	Package	Description	Packing quantity	
			3000	10000
PMEG2005ET	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
PMEG3005ET				
PMEG4005ET				

[1] For further information and the availability of packing methods, see [Section 16](#).



**10. Soldering**



## 11. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PMEGXX05ET_SER_1	20050715	Product data sheet	-	9397 750 15183	-

## 12. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	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.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[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.

## 13. Definitions

**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.

**Application information** — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

## 14. Disclaimers

**Life support** — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors

## 16. Contact information

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

For sales office addresses, send an email to: [sales.addresses@www.semiconductors.philips.com](mailto:sales.addresses@www.semiconductors.philips.com)

customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

**Right to make changes** — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

## 15. Trademarks

**Notice** — All referenced brands, product names, service names and trademarks are the property of their respective owners.

## 17. Contents

---

<b>1</b>	<b>Product profile</b> . . . . .	<b>1</b>
1.1	General description . . . . .	1
1.2	Features . . . . .	1
1.3	Applications . . . . .	1
1.4	Quick reference data . . . . .	2
<b>2</b>	<b>Pinning information</b> . . . . .	<b>2</b>
<b>3</b>	<b>Ordering information</b> . . . . .	<b>2</b>
<b>4</b>	<b>Marking</b> . . . . .	<b>3</b>
<b>5</b>	<b>Limiting values</b> . . . . .	<b>3</b>
<b>6</b>	<b>Thermal characteristics</b> . . . . .	<b>3</b>
<b>7</b>	<b>Characteristics</b> . . . . .	<b>4</b>
<b>8</b>	<b>Package outline</b> . . . . .	<b>8</b>
<b>9</b>	<b>Packing information</b> . . . . .	<b>8</b>
<b>10</b>	<b>Soldering</b> . . . . .	<b>9</b>
<b>11</b>	<b>Revision history</b> . . . . .	<b>10</b>
<b>12</b>	<b>Data sheet status</b> . . . . .	<b>11</b>
<b>13</b>	<b>Definitions</b> . . . . .	<b>11</b>
<b>14</b>	<b>Disclaimers</b> . . . . .	<b>11</b>
<b>15</b>	<b>Trademarks</b> . . . . .	<b>11</b>
<b>16</b>	<b>Contact information</b> . . . . .	<b>11</b>



© Koninklijke Philips Electronics N.V. 2005

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: 15 July 2005  
Document number: 9397 750 15183

Published in The Netherlands