



# PEMZ7

## NPN/PNP general purpose double transistor

29 December 2022

Product data sheet

### 1. General description

NPN/PNP low  $V_{CEsat}$  double transistor in a SOT666 ultra small and flat lead Surface-Mounted Device (SMD)plastic package.

### 2. Features and benefits

- 300 mW total power dissipation
- Very small 1.6 x 1.2 mm ultra thin package
- Self alignment during soldering due to straight leads
- Low collector capacitance
- Low  $V_{CEsat}$
- High current capabilities
- Improved thermal behaviour due to flat leads
- Reduced required PCB area
- Reduced pick and place costs.

### 3. Applications

- Heavy duty battery powered equipment (telecom and audio-video) such as lamp drivers
- $V_{CEsat}$  critical applications such as latest low supply voltage IC applications
- All battery driven equipment, to save battery power

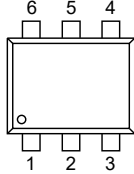
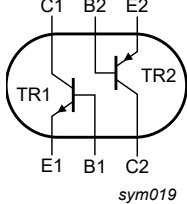
### 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor; for the PNP transistor with negative polarity</b>						
$V_{CEO}$	collector-emitter voltage	open base	-	-	12	V
$I_C$	collector current		-	-	500	mA
$h_{FE}$	DC current gain	$V_{CE} = 2\text{ V}; I_C = 10\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	200	-	-	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1	 <p style="text-align: center;"><b>SOT666</b></p>	 <p style="text-align: center;"><i>sym019</i></p>
2	B1	base TR1		
3	C2	collector TR2		
4	E2	emitter TR2		
5	B2	base TR2		
6	C1	collector TR1		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PEMZ7</a>	SOT666	plastic, surface-mounted package; 6 leads; 0.5 mm pitch; 1.6 mm x 1.2 mm x 0.55 mm body	<a href="#">SOT666</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PEMZ7	Z7

## 8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per transistor; for the PNP transistor with negative polarity</b>					
$V_{CBO}$	collector-base voltage	open emitter	-	15	V
$V_{CEO}$	collector-emitter voltage	open base	-	12	V
$V_{EBO}$	emitter-base voltage	open collector	-	6	V
$I_C$	collector current		-	500	mA
$I_{CM}$	peak collector current		-	1	A
$I_{BM}$	peak base current		-	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	200	mW
<b>Per device</b>					
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	300	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	150	°C
$T_{stg}$	storage temperature		-65	150	°C

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

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	416	K/W

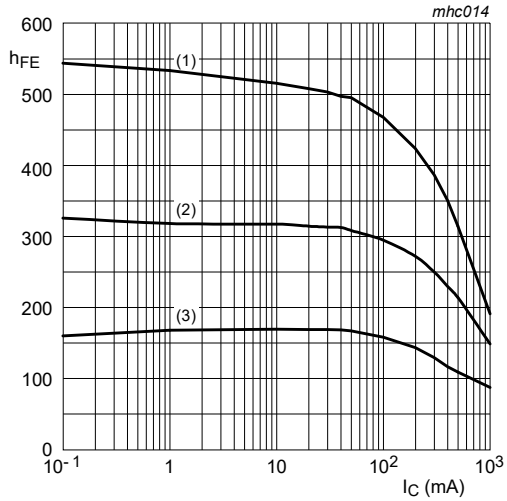
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Reflow soldering is the only recommended soldering method.

## 10. Characteristics

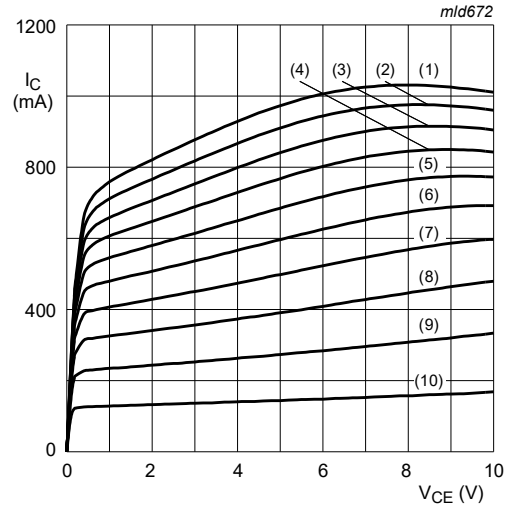
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per transistor; for the PNP transistor with negative polarity</b>							
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 15\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$		-	-	100	nA
		$V_{CB} = 15\text{ V}; I_E = 0\text{ A}; T_J = 150\text{ }^\circ\text{C}$		-	-	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$		-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 2\text{ V}; I_C = 10\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$		200	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 200\text{ mA}; I_B = 10\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$		-	-	220	mV
<b>Transistor 1 (NPN)</b>							
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$		-	4.4	6	pF
$f_T$	transition frequency	$V_{CE} = 5\text{ V}; I_C = 100\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$		250	420	-	MHz
<b>Transistor 2 (PNP)</b>							
$C_c$	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$		-	-	10	pF
$f_T$	transition frequency	$V_{CE} = -5\text{ V}; I_C = -100\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$		100	280	-	MHz



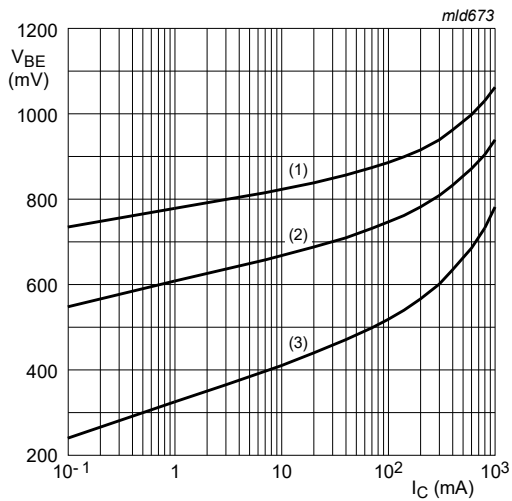
$V_{CE} = 2\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 1. TR1 (NPN): DC current gain as a function of collector current; typical values



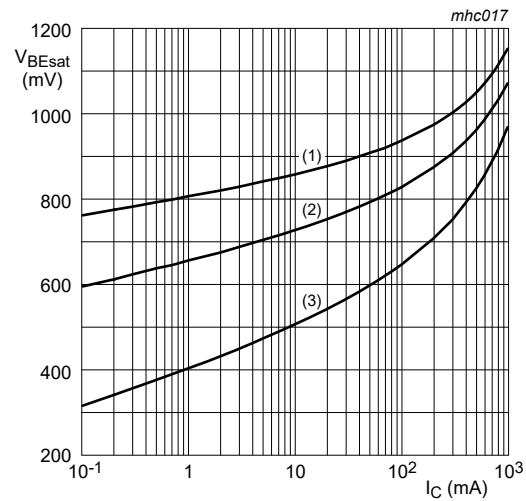
$T_{amb} = 25\text{ °C}$   
 (1)  $I_B = 4.60\text{ mA}$   
 (2)  $I_B = 4.14\text{ mA}$   
 (3)  $I_B = 3.68\text{ mA}$   
 (4)  $I_B = 3.22\text{ mA}$   
 (5)  $I_B = 2.76\text{ mA}$   
 (6)  $I_B = 2.30\text{ mA}$   
 (7)  $I_B = 1.84\text{ mA}$   
 (8)  $I_B = 1.38\text{ mA}$   
 (9)  $I_B = 0.92\text{ mA}$   
 (10)  $I_B = 0.46\text{ mA}$

Fig. 2. TR1 (NPN): Collector current as a function of collector-emitter voltage; typical values



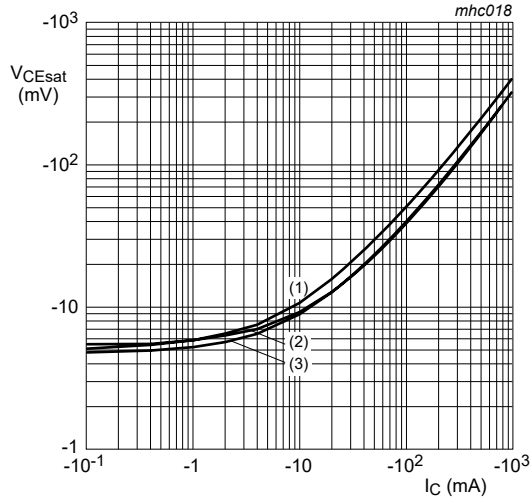
$V_{CE} = 2\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 3. TR1 (NPN): Base-emitter voltage as a function of collector current; typical values



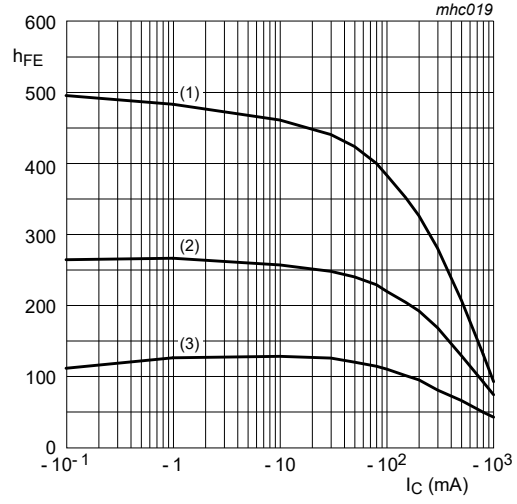
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 4. TR1 (NPN): Base-emitter saturation voltage as a function of collector current; typical values



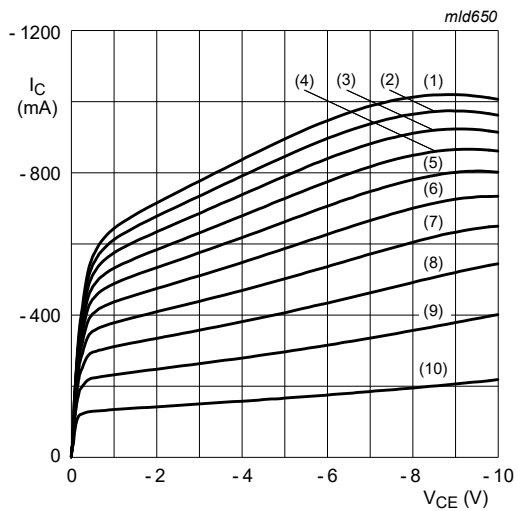
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 5. TR1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values



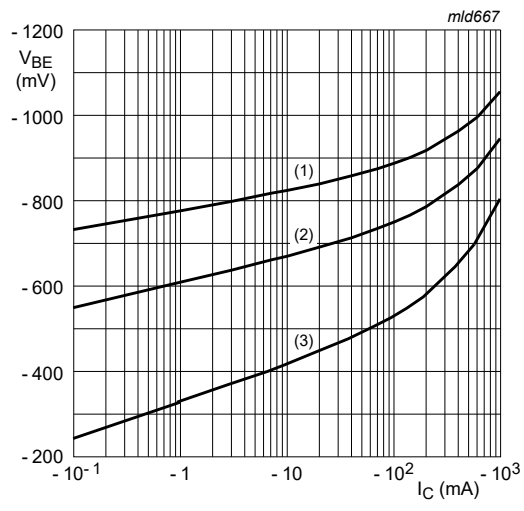
$V_{CE} = -2\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 6. TR2 (PNP): DC current gain as a function of collector current; typical values



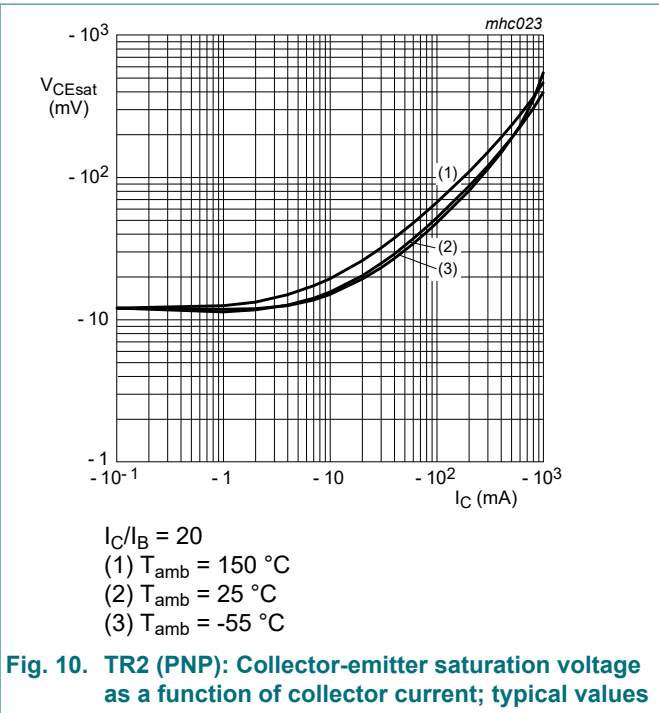
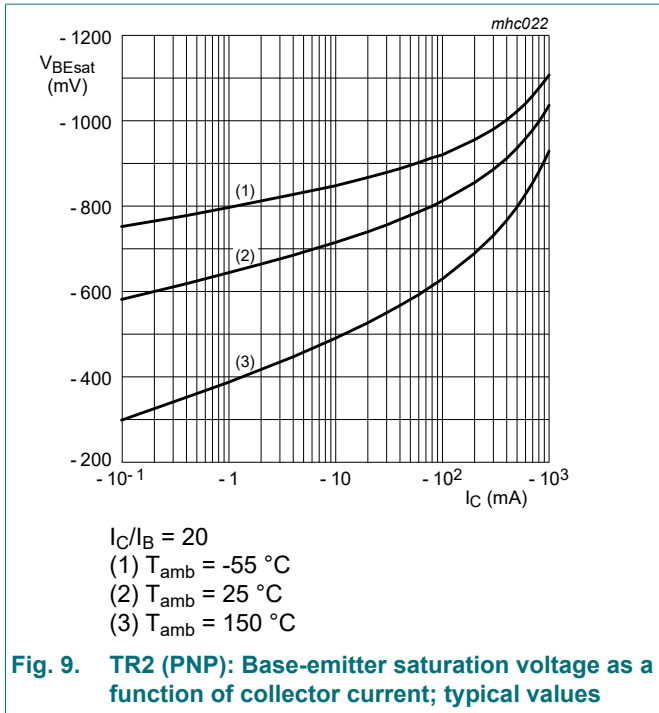
$T_{amb} = 25\text{ °C}$   
 (1)  $I_B = -7.0\text{ mA}$   
 (2)  $I_B = -6.3\text{ mA}$   
 (3)  $I_B = -5.6\text{ mA}$   
 (4)  $I_B = -4.9\text{ mA}$   
 (5)  $I_B = -4.2\text{ mA}$   
 (6)  $I_B = -3.5\text{ mA}$   
 (7)  $I_B = -2.8\text{ mA}$   
 (8)  $I_B = -2.1\text{ mA}$   
 (9)  $I_B = -1.4\text{ mA}$   
 (10)  $I_B = -0.7\text{ mA}$

Fig. 7. TR2 (PNP): Collector current as a function of collector-emitter voltage; typical values

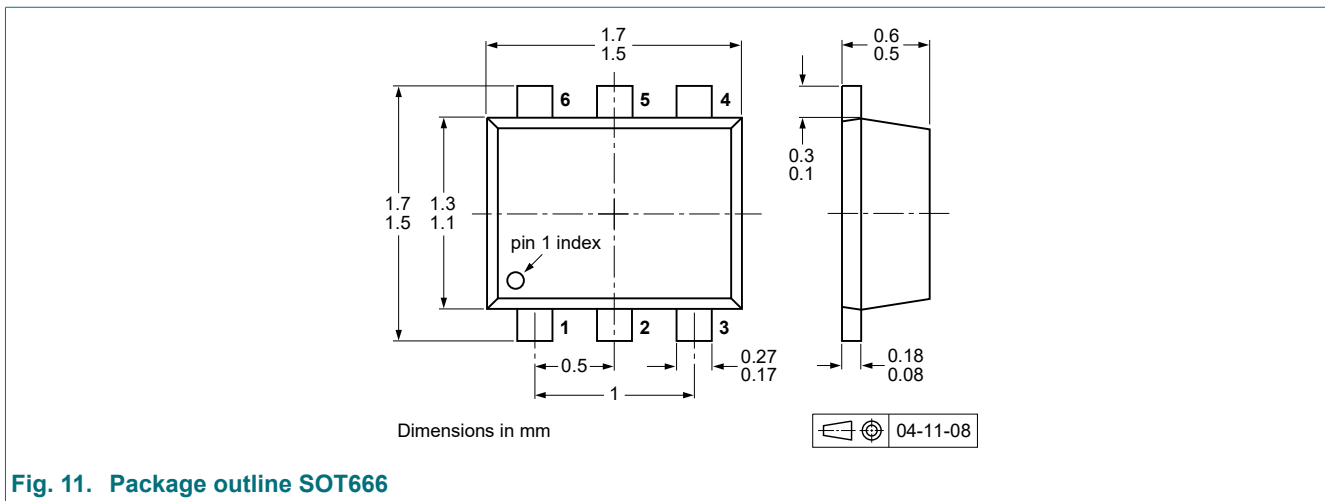


$V_{CE} = -2\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 8. TR2 (PNP): Base-emitter voltage as a function of collector current; typical values



## 11. Package outline



## 12. Soldering

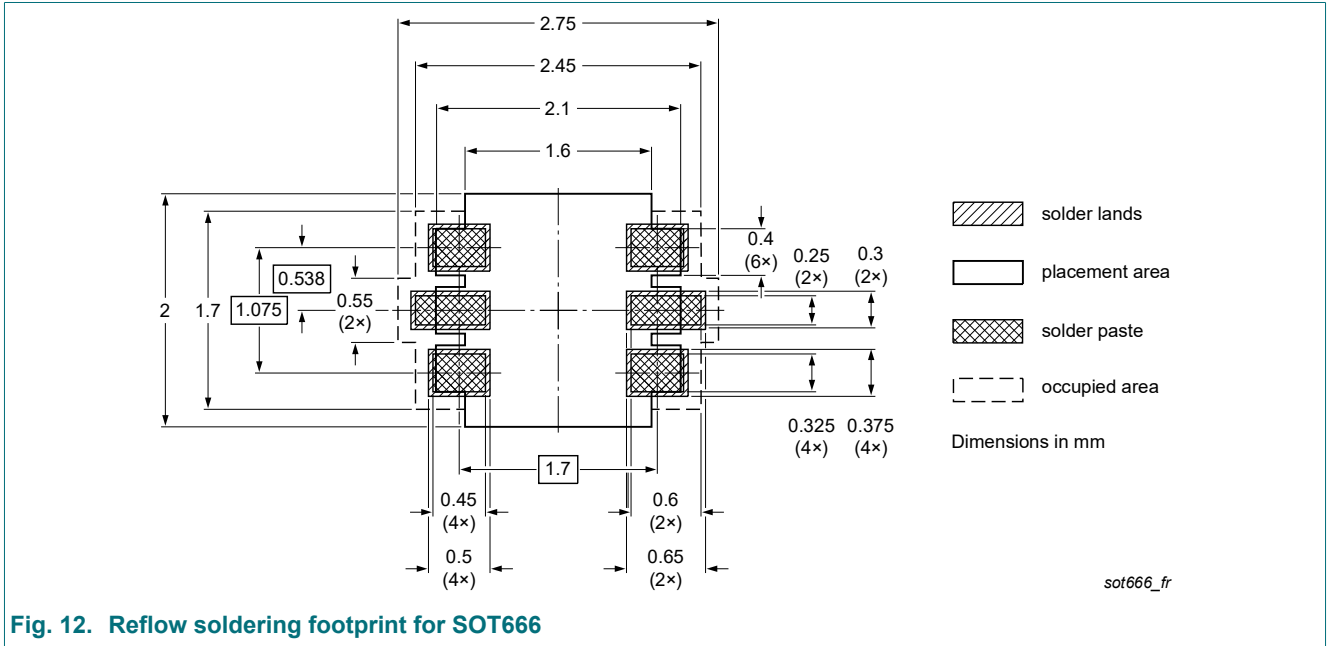


Fig. 12. Reflow soldering footprint for SOT666

## 13. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PEMZ7 v.3	20221229	Product data sheet	-	PEMZ7 v.2
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Product(s) changed to non-automotive qualification.</li></ul>			
PEMZ7 v.2	20011107	Product data sheet	-	PEMZ7 v.1
PEMZ7 v.1	20010925	Product data sheet	-	-



## 14. Legal information

### Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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