

PDTA143X series

PNP resistor-equipped transistors; R1 = 4.7 kΩ, R2 = 10 kΩ

Rev. 04 — 16 April 2007

Product data sheet

1. Product profile

1.1 General description

PNP Resistor-Equipped Transistors (RET) family in small plastic packages.

Table 1. Product overview

Type number	Package			NPN complement
	NXP	JEITA	JEDEC	
PDTA143XE	SOT416	SC-75	-	PDTC143XE
PDTA143XK	SOT346	SC-59A	TO-236	PDTC143XK
PDTA143XM	SOT883	SC-101	-	PDTC143XM
PDTA143XS ^[1]	SOT54	SC-43A	TO-92	PDTC143XS
PDTA143XT	SOT23	-	TO-236AB	PDTC143XT
PDTA143XU	SOT323	SC-70	-	PDTC143XU

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#)).

1.2 Features

- 100 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs

1.3 Applications

- Digital applications
- Control of IC inputs
- Cost-saving alternative to BC857 series in digital applications
- Low current peripheral driver

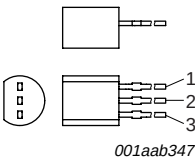
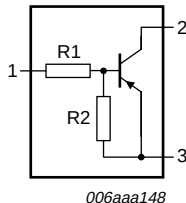
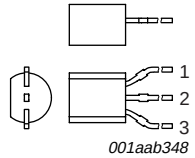
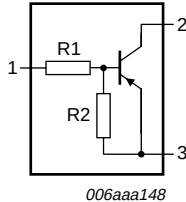
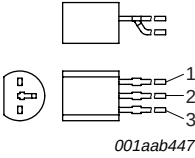
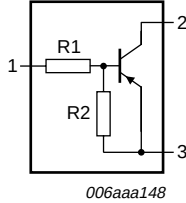
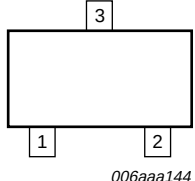
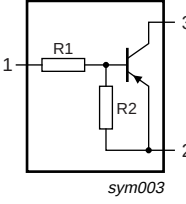
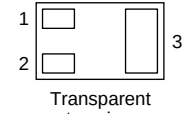
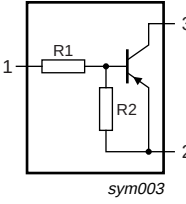
1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{CEO}	collector-emitter voltage	open base	-	-	-50	V
I _O	output current		-	-	-100	mA
R1	bias resistor 1 (input)		3.3	4.7	6.1	kΩ
R2/R1	bias resistor ratio		1.7	2.1	2.6	

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
SOT54			
1	input (base)		
2	output (collector)		
3	GND (emitter)		
SOT54A			
1	input (base)		
2	output (collector)		
3	GND (emitter)		
SOT54 variant			
1	input (base)		
2	output (collector)		
3	GND (emitter)		
SOT23; SOT323; SOT346; SOT416			
1	input (base)		
2	GND (emitter)		
3	output (collector)		
SOT883			
1	input (base)		
2	GND (emitter)		
3	output (collector)		

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
PDTA143XE	SC-75	plastic surface-mounted package; 3 leads	SOT416
PDTA143XK	SC-59A	plastic surface-mounted package; 3 leads	SOT346
PDTA143XM	SC-101	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTA143XS ^[1]	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTA143XT	-	plastic surface-mounted package; 3 leads	SOT23
PDTA143XU	SC-70	plastic surface-mounted package; 3 leads	SOT323

[1] Also available in SOT54A and SOT54 variant packages (see [Section 2](#) and [Section 9](#)).

4. Marking

Table 5. Marking codes

Type number	Marking code ^[1]
PDTA143XE	35
PDTA143XK	25
PDTA143XM	DN
PDTA143XS	TA143X
PDTA143XT	*31
PDTA143XU	*46

[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 _{CBO}	collector-base voltage	open emitter	-	-50	V
V _{CEO}	collector-emitter voltage	open base	-	-50	V
V _{EBO}	emitter-base voltage	open collector	-	-7	V
V _I	input voltage				
	positive		-	+7	V
	negative		-	-20	V
I _O	output current		-	-100	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms	-	-100	mA

Table 6. Limiting values ...continued

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

Symbol	Parameter	Conditions	Min	Max	Unit
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$			
	PDTA143XE		[1] -	150	mW
	PDTA143XK		[1] -	250	mW
	PDTA143XM		[2][3] -	250	mW
	PDTA143XS		[1] -	500	mW
	PDTA143XT		[1] -	250	mW
	PDTA143XU		[1] -	200	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.

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

[3] Device mounted on an FR4 PCB with 60 μm copper strip line, standard footprint.

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				
	PDTA143XE		[1] -	-	833	K/W
	PDTA143XK		[1] -	-	500	K/W
	PDTA143XM		[2][3] -	-	500	K/W
	PDTA143XS		[1] -	-	250	K/W
	PDTA143XT		[1] -	-	500	K/W
	PDTA143XU		[1] -	-	625	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.

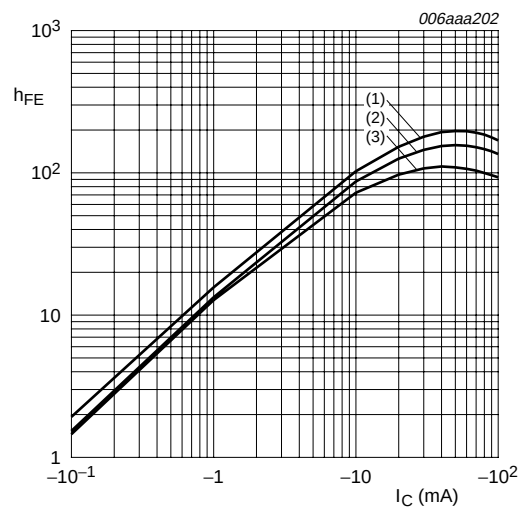
[3] Device mounted on an FR4 PCB with 60 μm copper strip line, standard footprint.

7. Characteristics

Table 8. Characteristics

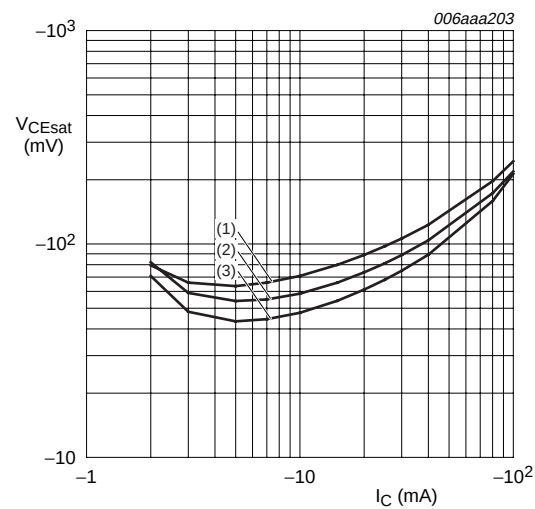
$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = -50\text{ V}$; $I_E = 0\text{ A}$	-	-	-100	nA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = -30\text{ V}$; $I_B = 0\text{ A}$	-	-	-1	μA
		$V_{CE} = -30\text{ V}$; $I_B = 0\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	-	-50	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}$; $I_C = 0\text{ A}$	-	-	-600	μA
h_{FE}	DC current gain	$V_{CE} = -5\text{ V}$; $I_C = -10\text{ mA}$	50	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -10\text{ mA}$; $I_B = -0.5\text{ mA}$	-	-	-150	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = -5\text{ V}$; $I_C = -100\text{ }\mu\text{A}$	-	-0.9	-0.3	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = -0.3\text{ V}$; $I_C = -20\text{ mA}$	-2.5	-1.5	-	V
R1	bias resistor 1 (input)		3.3	4.7	6.1	k Ω
R2/R1	bias resistor ratio		1.7	2.1	2.6	
C_c	collector capacitance	$V_{CB} = -10\text{ V}$; $I_E = I_E = 0\text{ A}$; $f = 1\text{ MHz}$	-	-	3	pF



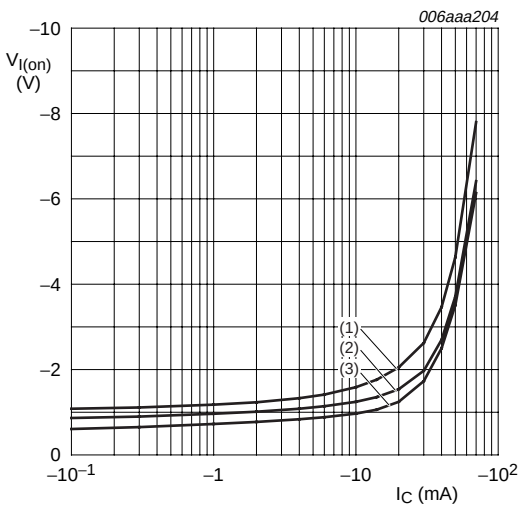
$V_{CE} = -5\text{ V}$
(1) $T_{amb} = 100^\circ\text{C}$
(2) $T_{amb} = 25^\circ\text{C}$
(3) $T_{amb} = -40^\circ\text{C}$

Fig 1. DC current gain as a function of collector current; typical values



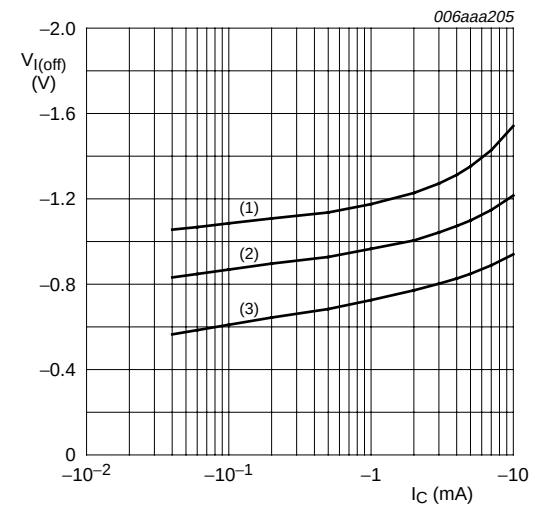
$I_C/I_B = 20$
(1) $T_{amb} = 100^\circ\text{C}$
(2) $T_{amb} = 25^\circ\text{C}$
(3) $T_{amb} = -40^\circ\text{C}$

Fig 2. Collector-emitter saturation voltage as a function of collector current; typical values



$V_{CE} = -0.3\text{ V}$
(1) $T_{amb} = -40^\circ\text{C}$
(2) $T_{amb} = 25^\circ\text{C}$
(3) $T_{amb} = 100^\circ\text{C}$

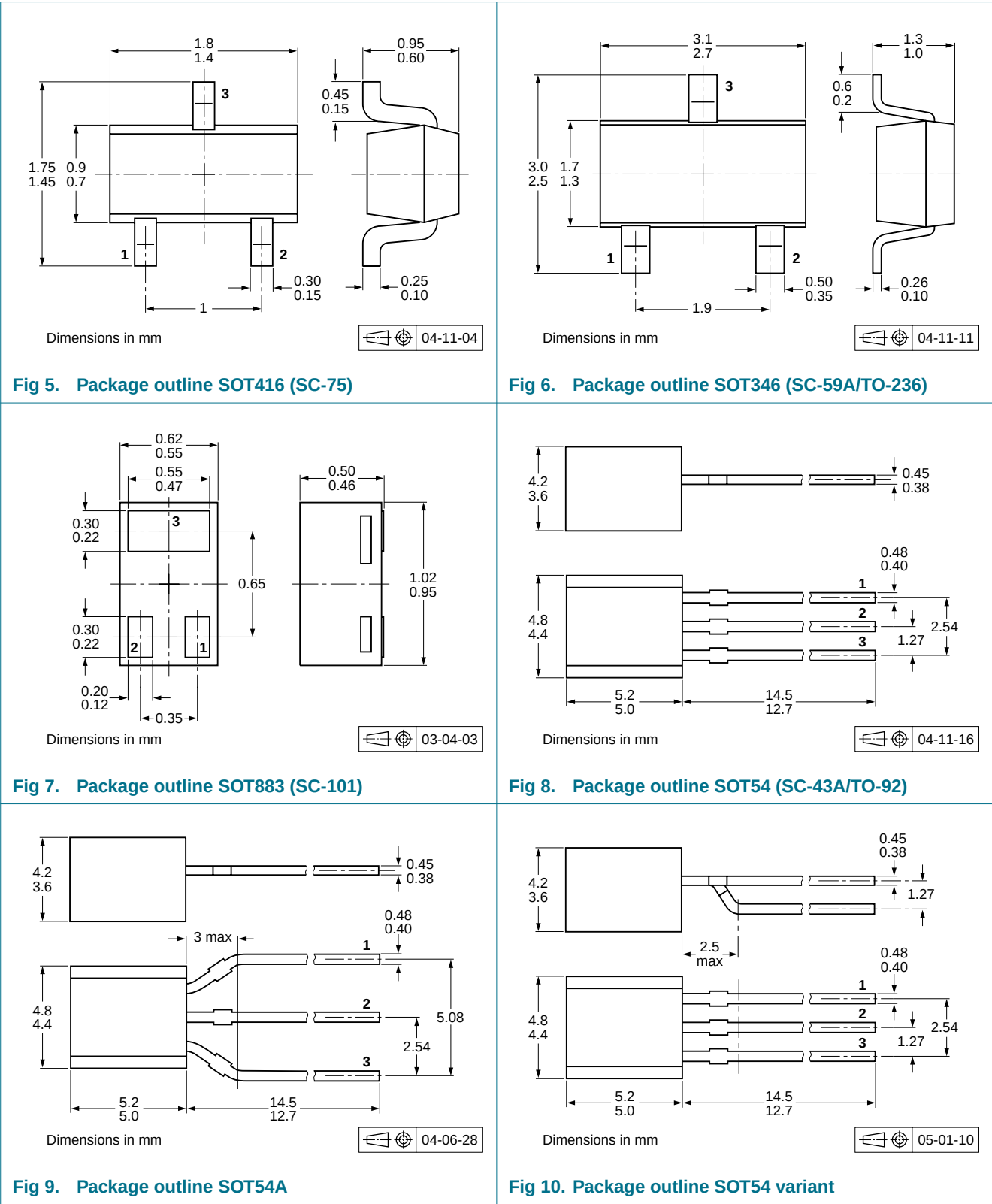
Fig 3. On-state input voltage as a function of collector current; typical values



$V_{CE} = -5\text{ V}$
(1) $T_{amb} = -40^\circ\text{C}$
(2) $T_{amb} = 25^\circ\text{C}$
(3) $T_{amb} = 100^\circ\text{C}$

Fig 4. Off-state input voltage as a function of collector current; typical values

8. Package outline



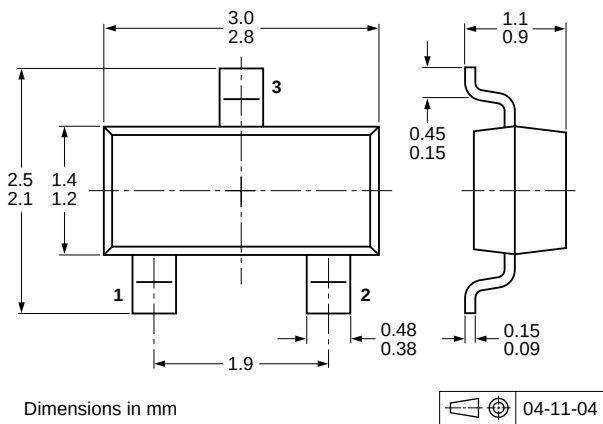


Fig 11. Package outline SOT23 (TO-236AB)

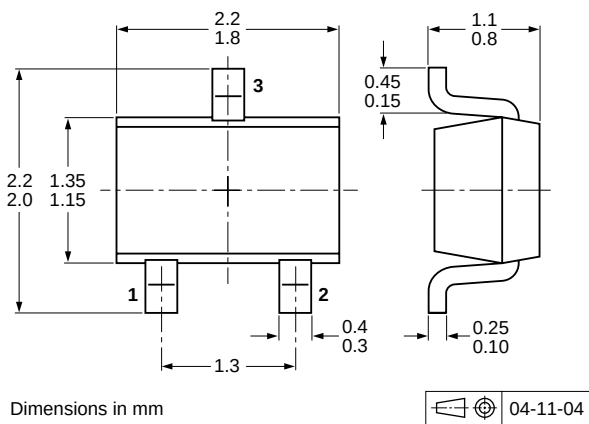


Fig 12. Package outline SOT323 (SC-70)

9. Packing information

Table 9. Packing methods

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

Type number	Package	Description	Packing quantity		
			3000	5000	10000
PDTA143XE	SOT416	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA143XK	SOT346	4 mm pitch, 8 mm tape and reel	-115	-	-135
PDTA143XM	SOT883	2 mm pitch, 8 mm tape and reel	-	-	-315
PDTA143XS	SOT54	bulk, straight leads	-	-412	-
	SOT54A	tape and reel, wide pitch	-	-	-116
		tape ammopack, wide pitch	-	-	-126
	SOT54 variant	bulk, delta pinning	-	-112	-
PDTA143XT	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-235
PDTA143XU	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-135

[1] For further information and the availability of packing methods, see [Section 12](#).

10. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PDTA143X_SER_4	20070416	Product data sheet	-	PDTA143X_SERIES_3
Modifications: • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Type number PDTA143XEF removed • Section 1.2 “Features”: amended • Section 1.3 “Applications”: amended • Table 4 “Ordering information”: added • Table 5 “Marking codes”: enhanced table note section • Table 6 “Limiting values”: typing error for value V_{EBO} emitter-base voltage corrected • Table 6 “Limiting values”: I_{CM} peak collector current conditions added • Table 8 “Characteristics”: $V_{I(on)}$ redefined to $V_{I(on)}$ on-state input voltage • Table 8 “Characteristics”: $V_{I(off)}$ redefined to $V_{I(off)}$ off-state input voltage • Figure 1, 2, 3, 4, 9 and 10: added • Figure 5, 6, 7, 8, 11 and 12: superseded by minimized package outline drawings • Section 9 “Packing information”: added • Section 11 “Legal information”: updated				
PDTA143X_SERIES_3	20040804	Product specification	-	PDTA143X_SERIES_2
PDTA143X_SERIES_2	20030410	Product specification	-	PDTA143XEF_1 PDTA143XK_1 PDTA143XE_1 PDTA143XT_1
PDTA143XEF_1	20020314	Product specification	-	-
PDTA143XK_1	20020115	Product specification	-	-
PDTA143XE_1	19990420	Product specification	-	-
PDTA143XT_1	19990420	Product specification	-	-

11. Legal information

11.1 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 URL <http://www.nxp.com>.

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