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# IMPORTANT NOTICE

10 December 2015

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## 1. Global joint venture starts operations as WeEn Semiconductors

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Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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Thank you for your cooperation and understanding,

WeEn Semiconductors





# BYV25FX-600

Enhanced ultrafast power diode

Rev. 02 — 7 March 2011

Product data sheet

## 1. Product profile

### 1.1 General description

Enhanced ultrafast power diode in a SOD113 (2-lead TO-220F) plastic package.

### 1.2 Features and benefits

- High thermal cycling performance
- Isolated package
- Low on-state losses
- Low thermal resistance
- Soft recovery characteristic

### 1.3 Applications

- Dual Mode (DCM and CCM) PFC
- Power Factor Correction (PFC) for Interleaved Topology

### 1.4 Quick reference data

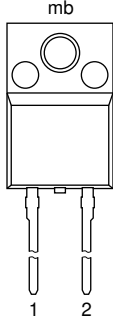

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_h \leq 97\text{ }^\circ\text{C}$ ; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	-	5	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; see <a href="#">Figure 5</a>	-	1.3	1.9	V
		$I_F = 5\text{ A}$ ; $T_j = 150\text{ }^\circ\text{C}$ ; see <a href="#">Figure 5</a>	-	1.1	1.7	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $di_F/dt = 100\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; see <a href="#">Figure 6</a>	-	17.5	35	ns



## 2. Pinning information

**Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		 001aaa020
2	A	anode		
mb	n.c.	mounting base; isolated		

**SOD113 (TO-220F)**

## 3. Ordering information

**Table 3. Ordering information**

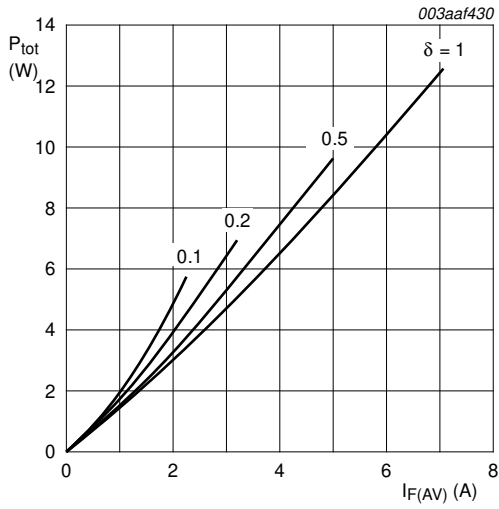
Type number	Package		
	Name	Description	Version
BYV25FX-600	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

## 4. Limiting values

**Table 4. Limiting values**

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

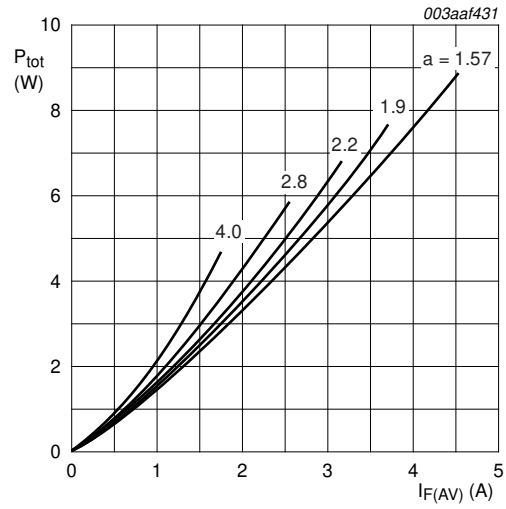
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$V_{RWM}$	crest working reverse voltage		-	600	V
$V_R$	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_h \leq 97$ °C; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	5	A
$I_{FRM}$	repetitive peak forward current	square-wave pulse; $\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_h \leq 97$ °C	-	10	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C; see <a href="#">Figure 3</a>	-	60	A
		$t_p = 8.3$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C; see <a href="#">Figure 3</a>	-	66	A
$T_{stg}$	storage temperature		-40	150	°C
$T_j$	junction temperature		-	150	°C



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$V_o = 1.499 \text{ V}; R_s = 0.041 \text{ } \Omega$

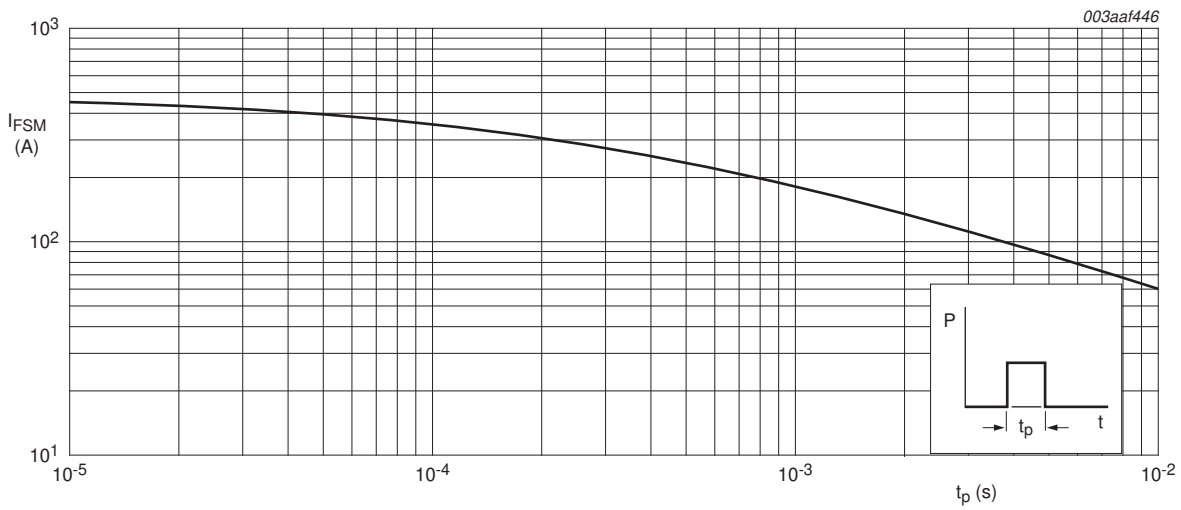
**Fig 1. Forward power dissipation as a function of average forward current; square waveform; maximum values**



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$V_o = 1.499 \text{ V}; R_s = 0.041 \text{ } \Omega$

**Fig 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values**

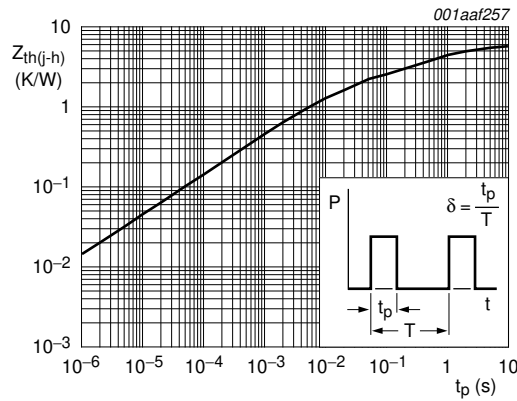


**Fig 3. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values**

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; see <a href="#">Figure 4</a>	-	-	5.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	55	-	K/W



**Fig 4. Transient thermal impedance from junction to heatsink as a function of pulse width**

## 6. Isolation characteristics

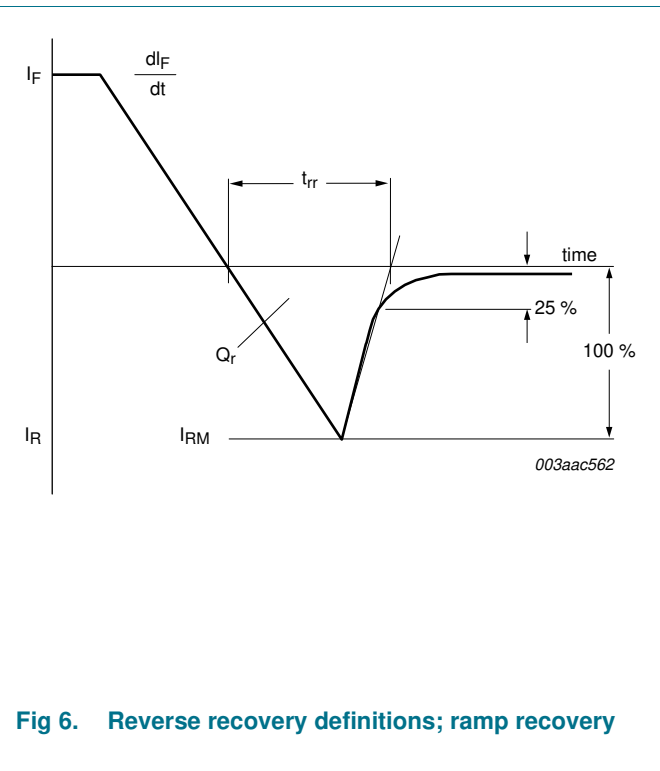
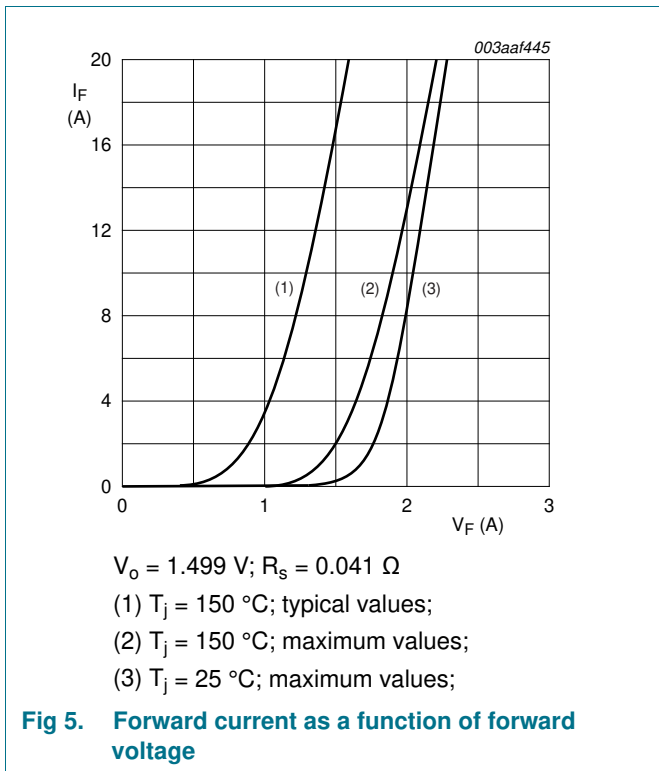
**Table 6. Isolation characteristics**

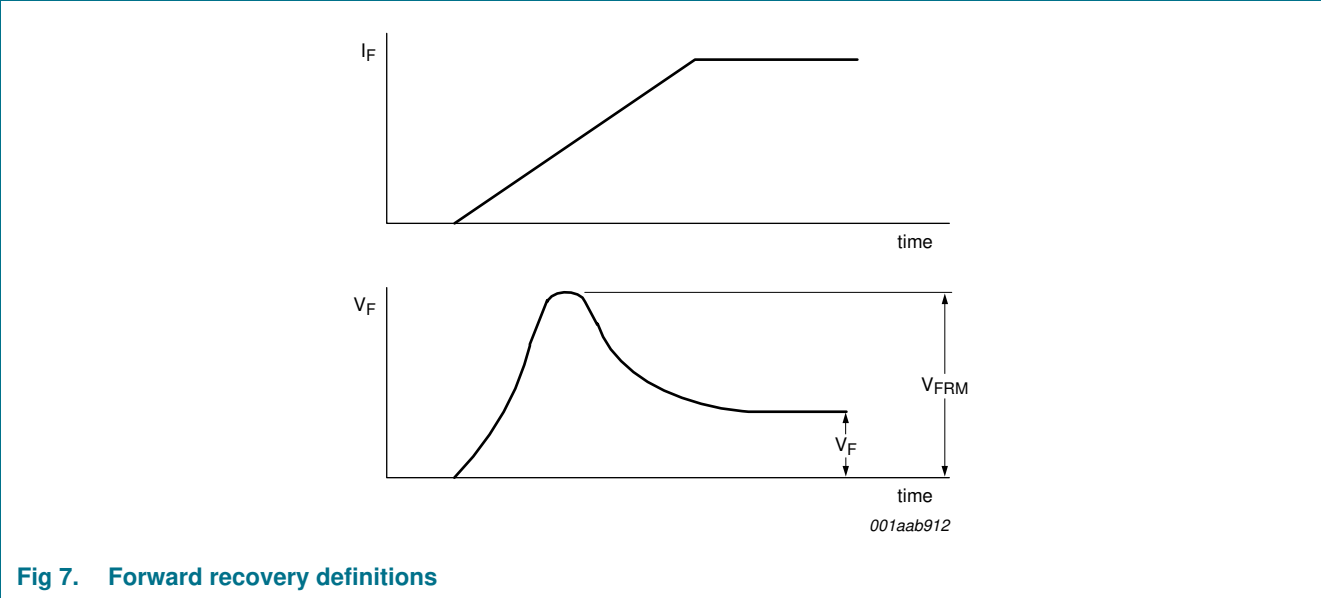
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	$50 \text{ Hz} \leq f \leq 60 \text{ Hz}$ ; $RH \leq 65 \%$ ; from all pins to external heatsink; sinusoidal waveform; clean and dust free	-	-	2500	V
$C_{isol}$	isolation capacitance	$f = 1 \text{ MHz}$ ; from cathode to external heatsink	-	10	-	pF

**7. Characteristics**

**Table 7. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5\text{ A}; T_j = 25\text{ °C};$ see <a href="#">Figure 5</a>	-	1.3	1.9	V
		$I_F = 5\text{ A}; T_j = 150\text{ °C};$ see <a href="#">Figure 5</a>	-	1.1	1.7	V
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 100\text{ °C}$	-	-	1.5	mA
		$V_R = 600\text{ V}; T_j = 25\text{ °C}$	-	-	50	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see <a href="#">Figure 6</a>	-	13	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see <a href="#">Figure 6</a>	-	17.5	35	ns
$I_{RM}$	peak reverse recovery current	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see <a href="#">Figure 6</a>	-	1.5	-	A
$V_{FRM}$	forward recovery voltage	$I_F = 1\text{ A}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ see <a href="#">Figure 7</a>	-	3.2	-	V





**Fig 7. Forward recovery definitions**



**8. Package outline**

Plastic single-ended package; isolated heatsink mounted;  
1 mounting hole; 2-lead TO-220 'full pack'

SOD113

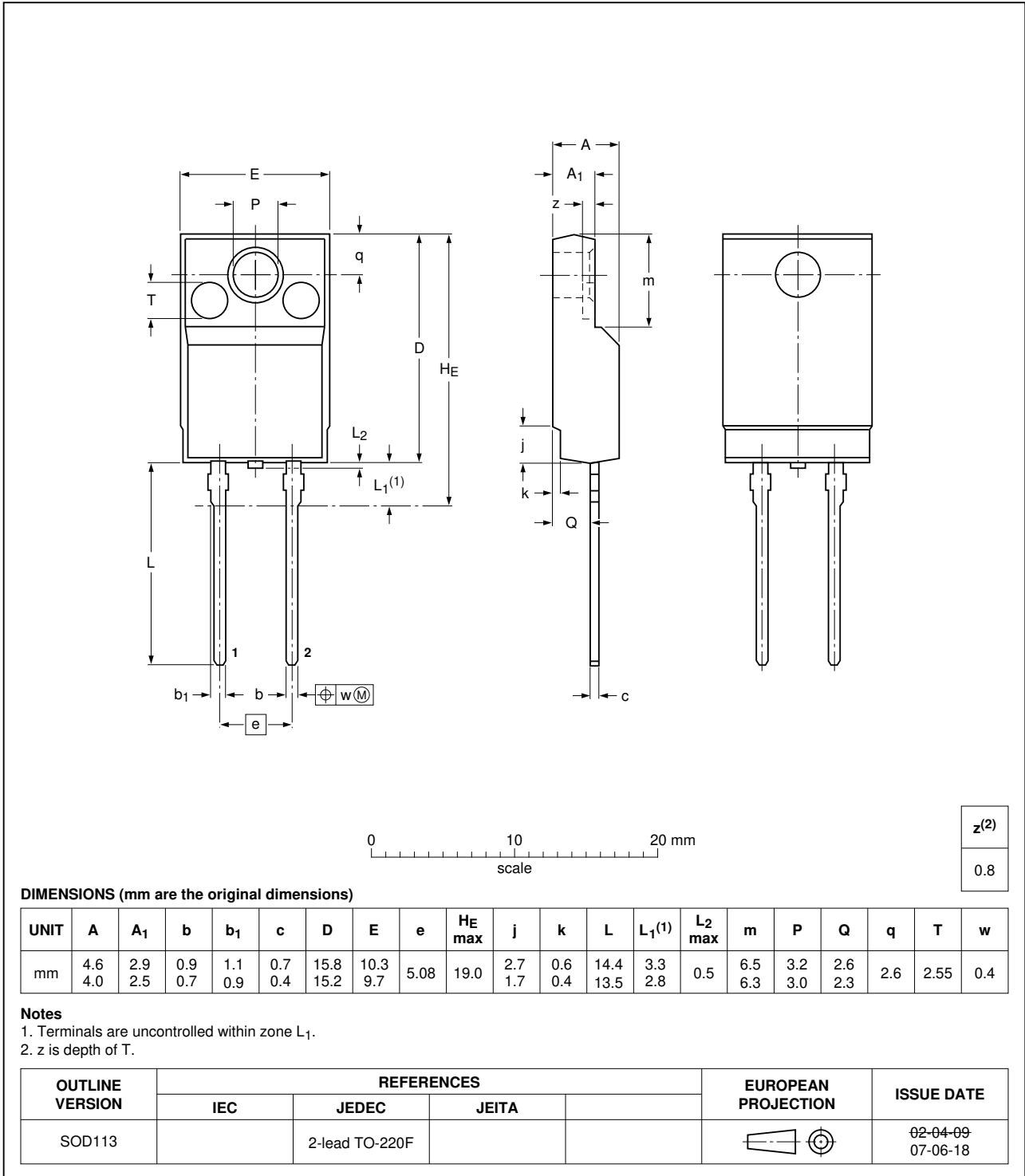


Fig 8. Package outline SOD113 (TO-220F)

## 9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV25FX-600 v.2	20110307	Product data sheet	-	BYV25FX-600 v.1
Modifications:	• Various changes to content.			
BYV25FX-600 v.1	20101004	Product data sheet	-	-

## 10. Legal information

### 10.1 Data sheet status

Document status <sup>[1]</sup> <sup>[2]</sup>	Product status <sup>[3]</sup>	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.

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[2] The term 'short data sheet' is explained in section "Definitions".

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Date of release: 7 March 2011

Document identifier: BYV25FX-600