



# IMPORTANT NOTICE

10 December 2015

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

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





# BYV25FD-600

Enhanced ultrafast power diode

Rev. 03 — 23 September 2016

Product data sheet

## 1. Product profile

### 1.1 General description

Enhanced ultrafast power diode in a TO252 (DPAK) plastic package.

### 1.2 Features and benefits

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

### 1.3 Applications

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

### 1.4 Quick reference data

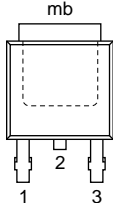
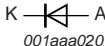
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_{mb} \leq 121$ °C; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	-	5	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5$ A; $T_j = 25$ °C; see <a href="#">Figure 5</a>	-	1.3	1.9	V
		$I_F = 5$ A; $T_j = 150$ °C; see <a href="#">Figure 5</a>	-	1.1	1.7	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ $\mu$ s; $T_j = 25$ °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	n.c.	not connected		
2	K	cathode <sup>[1]</sup>		
3	A	anode		
mb	K	mounting base; cathode		

**TO252 (DPAK)**

[1] It is not possible to connect to pin 2 of the TO252 package.

## 3. Ordering information

Table 3. Ordering information

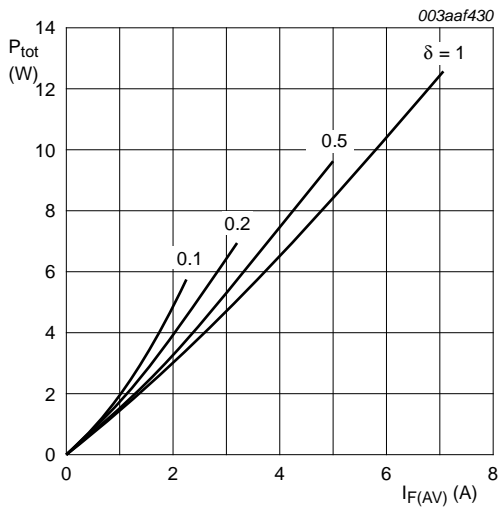
Type number	Package		Version
	Name	Description	
BYV25FD-600	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	TO252

## 4. Limiting values

Table 4. Limiting values

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

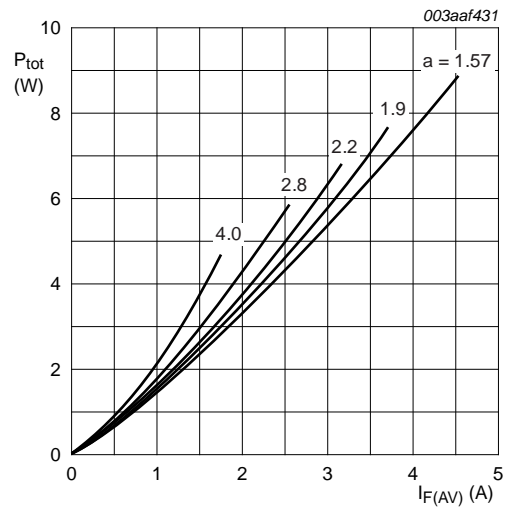
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$V_{RWM}$	crest working reverse voltage		-	600	V
$V_R$	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_{mb} \leq 121$ °C; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	5	A
$I_{FRM}$	repetitive peak forward current	square-wave pulse; $\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 121$ °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



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

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

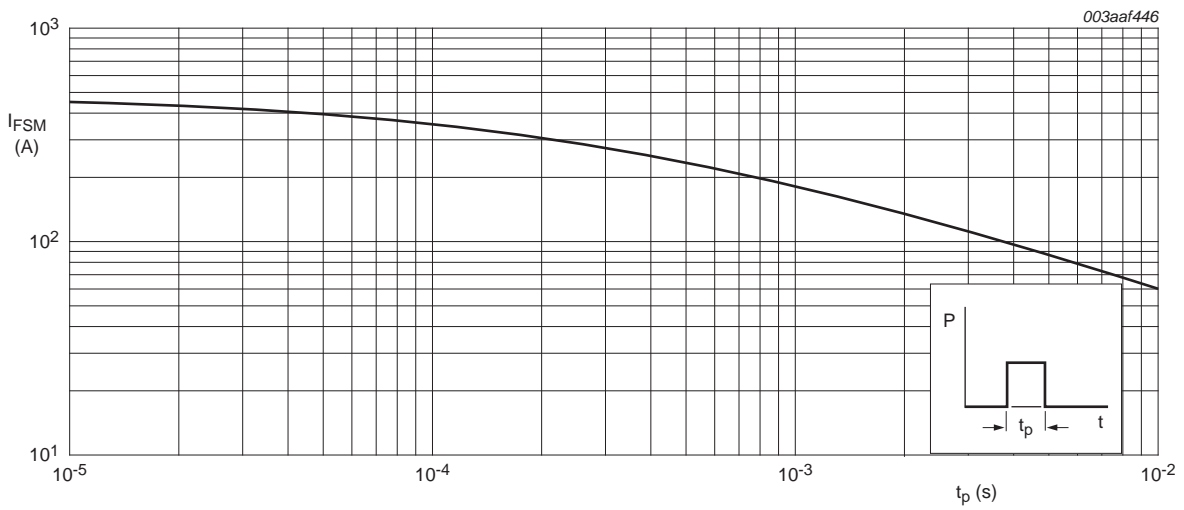
**Fig 1. Forward power dissipation as a function of average forward current; square waveform; maximum values**



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

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

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



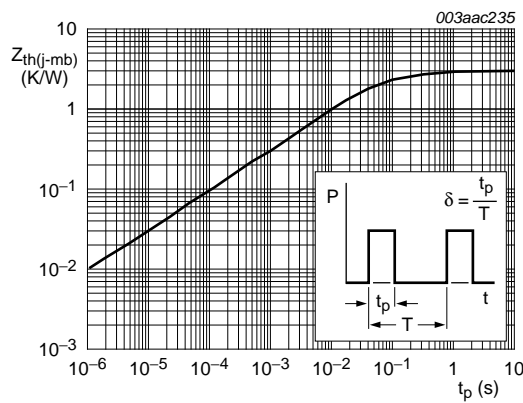
**Fig 3. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values**

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	see <a href="#">Figure 4</a>	-	-	3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	50	-	K/W

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

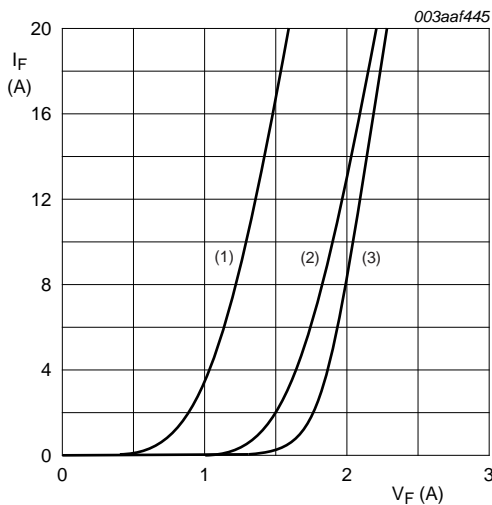


**Fig 4. Transient thermal impedance from junction to mounting base as a function of pulse width**

**6. Characteristics**

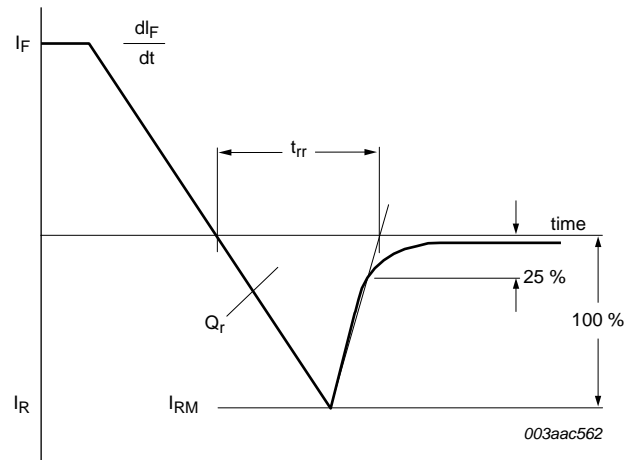
**Table 6. Characteristics**

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

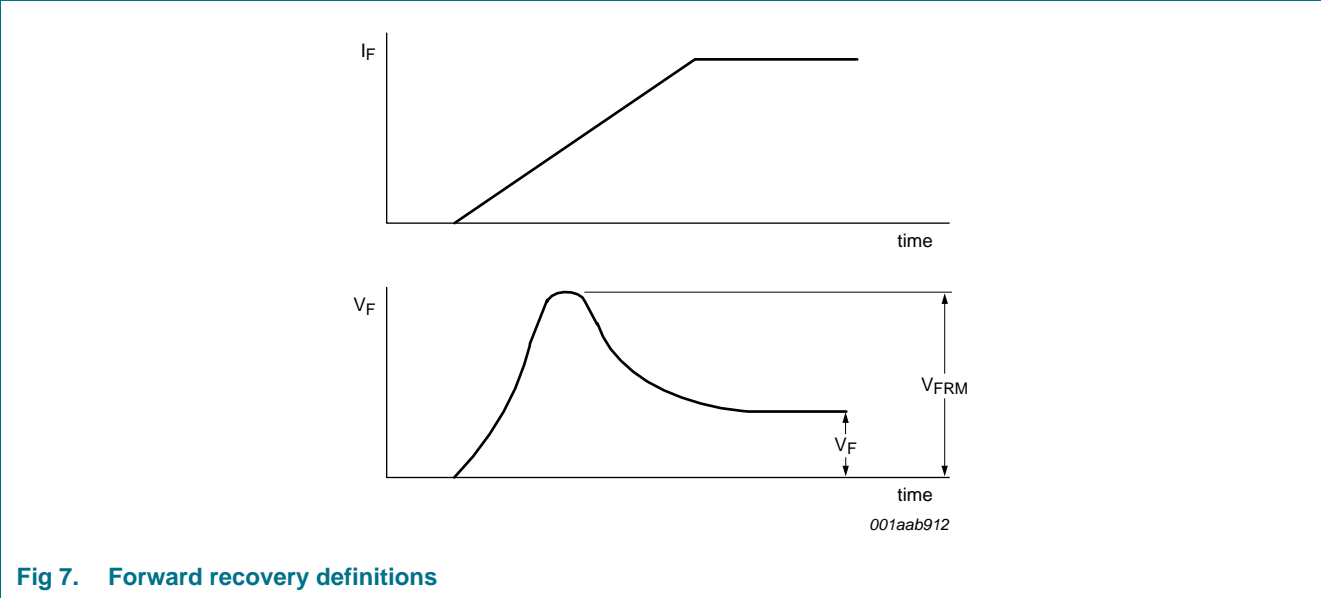


$V_o = 1.499\text{ V}; R_s = 0.041\ \Omega$   
 (1)  $T_j = 150\text{ °C};$  typical values;  
 (2)  $T_j = 150\text{ °C};$  maximum values;  
 (3)  $T_j = 25\text{ °C};$  maximum values;

**Fig 5. Forward current as a function of forward voltage**

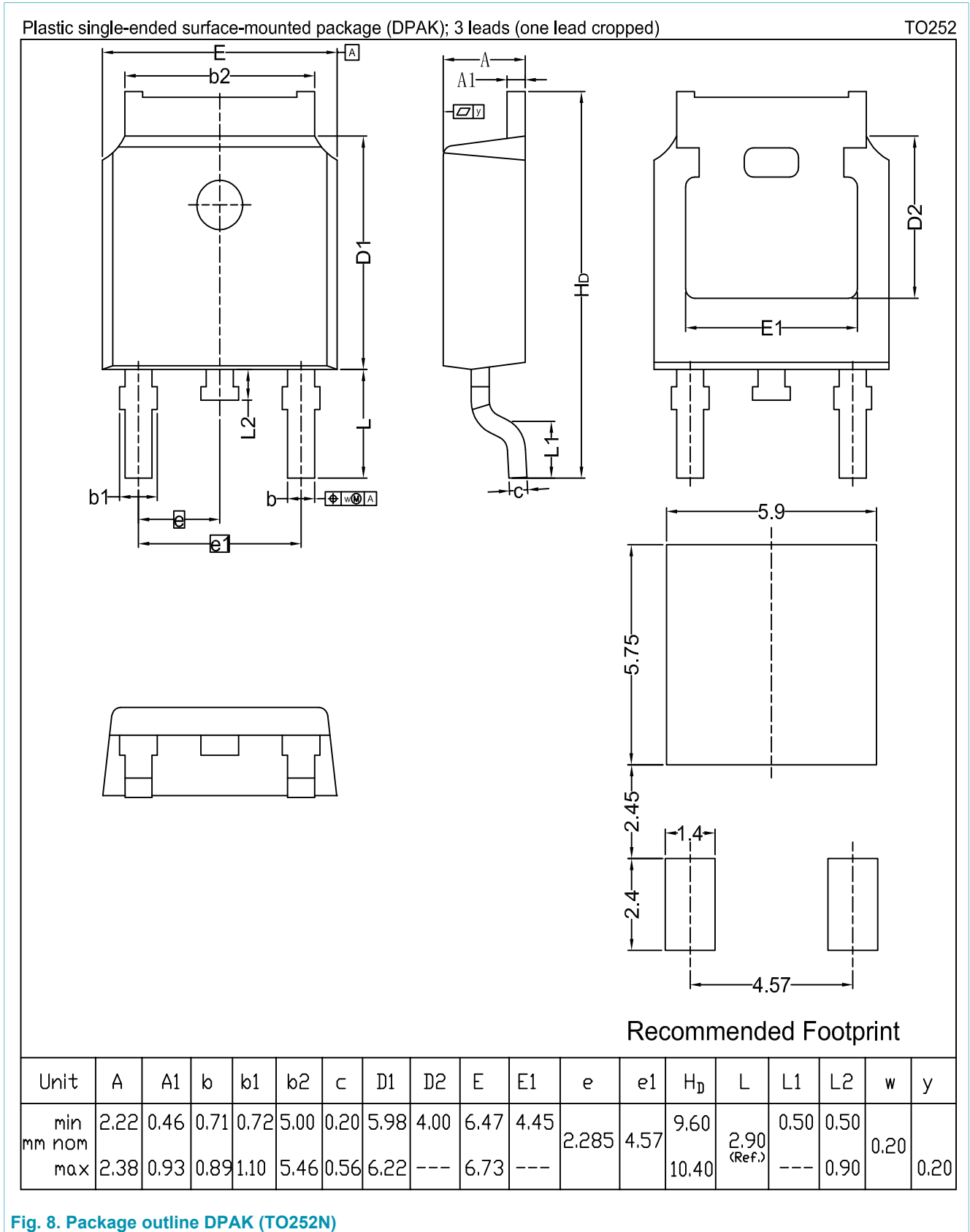


**Fig 6. Reverse recovery definitions; ramp recovery**



**Fig 7. Forward recovery definitions**

**7. Package outline**



**Fig. 8. Package outline DPAK (TO252N)**



## 8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV25FD-600 v.2	20110307	Product data sheet	-	BYV25FD-600 v.1
Modifications:	• Various changes to content.			
BYV25FD-600 v.1	20101001	Product data sheet	-	-

## 9. 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.

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