IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

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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

BYV32EB-200

Dual ultrafast power diode

13 October 2016 Product data sheet

1. General description

Dual ultrafast power diode in a SOT404 (D2PAK) surface-mountable plastic package.

2. Features and benefits

- High reverse voltage surge capability
- High thermal cycling performance
- Low thermal resistance
- Soft recovery characteristic minimizes power consuming oscillations
- Surface-mountable package
- Very low on-state loss

3. Applications

- Output rectifiers in high-frequency switched-mode power supplies

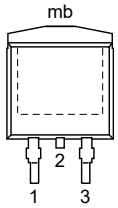
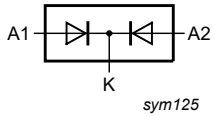
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	-	200	V
$I_{O(AV)}$	average output current	δ = 0.5 ; T_{mb} ≤ 115 °C; square-wave pulse; both diodes conducting; Fig. 1; Fig. 2		-	-	20	A
I_{RRM}	repetitive peak reverse current	δ = 0.001 ; t_p = 2 µs		-	-	0.2	A
V_{ESD}	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 kΩ; all pins		-	-	8	kV
Static characteristics							
V_F	forward voltage	I_F = 8 A; T_j = 150 °C; Fig. 4		-	0.72	0.85	V
		I_F = 20 A; T_j = 25 °C		-	1	1.15	V
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; ramp recovery; Fig. 5		-	20	25	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 **D2PAK (SOT404)**	
2	K	cathode[1]		
3	A2	anode 2		
mb	K	mounting base; cathode		

[1] it is not possible to make a connection to pin 2 of the SOT404 package

6. Ordering information

Table 3. Ordering information

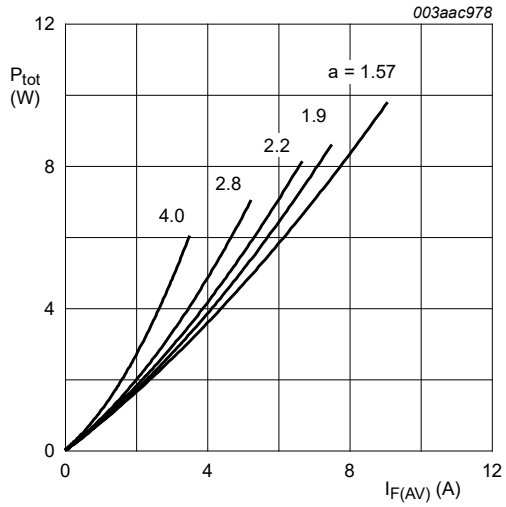
Type number	Package		
	Name	Description	Version
BYV32EB-200	D2PAK	plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)	SOT404

7. Limiting values

Table 4. Limiting values

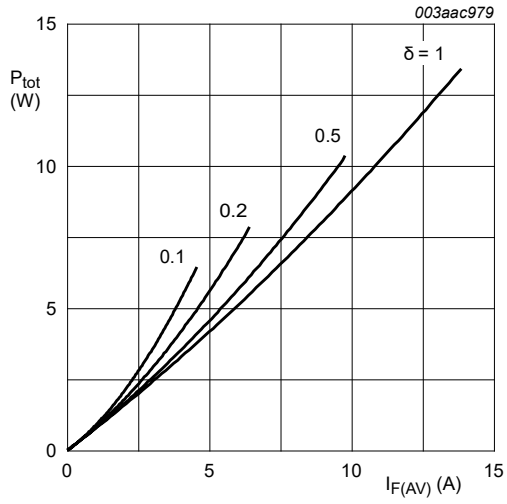
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	200	V
V_{RWM}	crest working reverse voltage			-	200	V
V_R	reverse voltage	DC		-	200	V
$I_{O(AV)}$	average output current	δ = 0.5 ; $T_{mb} \leq$ 115 °C; square-wave pulse; both diodes conducting; Fig. 1; Fig. 2		-	20	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq$ 115 °C; per diode		-	20	A
I_{FSM}	non-repetitive peak forward current	t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode		-	137	A
		t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; per diode		-	125	A
I_{RRM}	repetitive peak reverse current	δ = 0.001 ; t_p = 2 µs		-	0.2	A
I_{RSM}	non-repetitive peak reverse current	t_p = 100 µs		-	0.2	A
T_{stg}	storage temperature			-40	150	°C
T_j	junction temperature			-	150	°C
V_{ESD}	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 kΩ; all pins		-	8	kV



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

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



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

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

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; both diodes conducting		-	-	1.6	K/W
		with heatsink compound; per diode; Fig. 3		-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	minimum footprint FR4 board		-	50	-	K/W

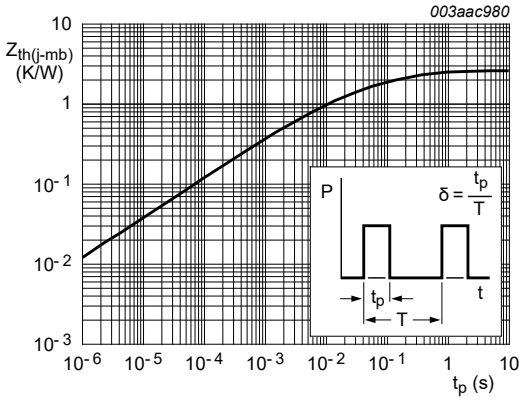
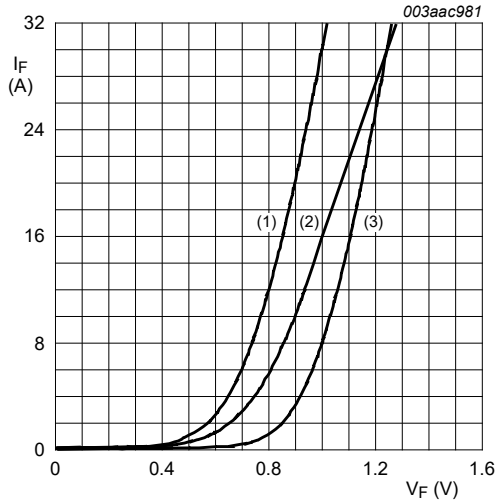


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 8 A; T_j = 150 °C; Fig. 4		-	0.72	0.85	V
		I_F = 20 A; T_j = 25 °C		-	1	1.15	V
I_R	reverse current	V_R = 200 V; T_j = 25 °C		-	6	30	µA
		V_R = 200 V; T_j = 100 °C		-	0.2	0.6	mA
Dynamic characteristics							
Q_r	recovered charge	I_F = 2 A; V_R = 30 V; dI_F/dt = 20 A/µs		-	8	12.5	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; ramp recovery; Fig. 5		-	20	25	ns
		I_F = 0.5 A; I_R = 1 A; T_j = 25 °C; measured at reverse current = 0.25 A; step recovery; Fig. 6		-	10	20	ns
V_{FR}	forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs; Fig. 7		-	-	1	V



(1) T_j = 150 °C; typical values

(2) T_j = 150 °C; maximum values

(3) T_j = 25 °C; maximum values

Fig. 4. Forward current as a function of forward voltage

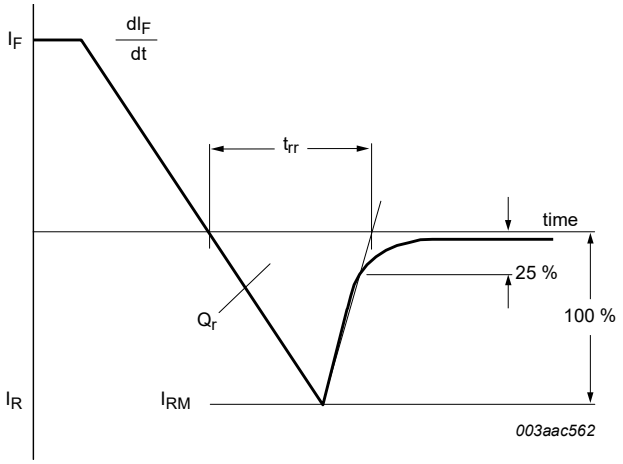


Fig. 5.

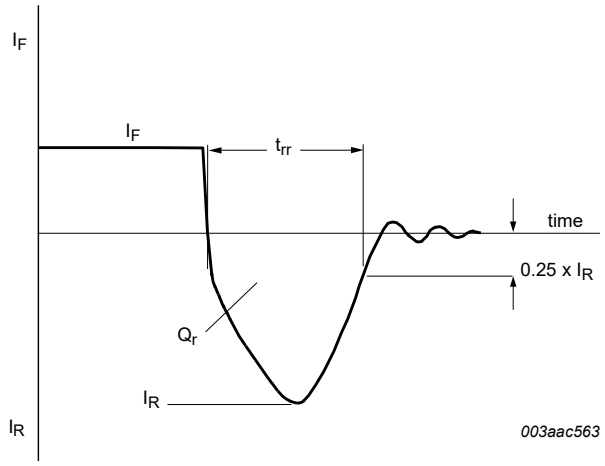


Fig. 6. Reverse recovery definitions; step recovery

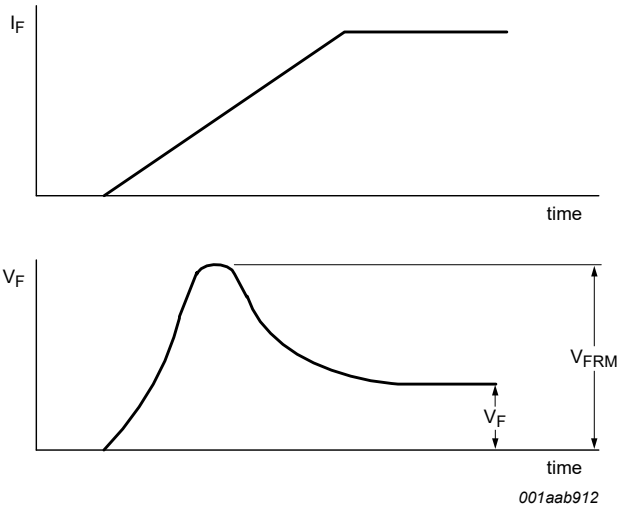
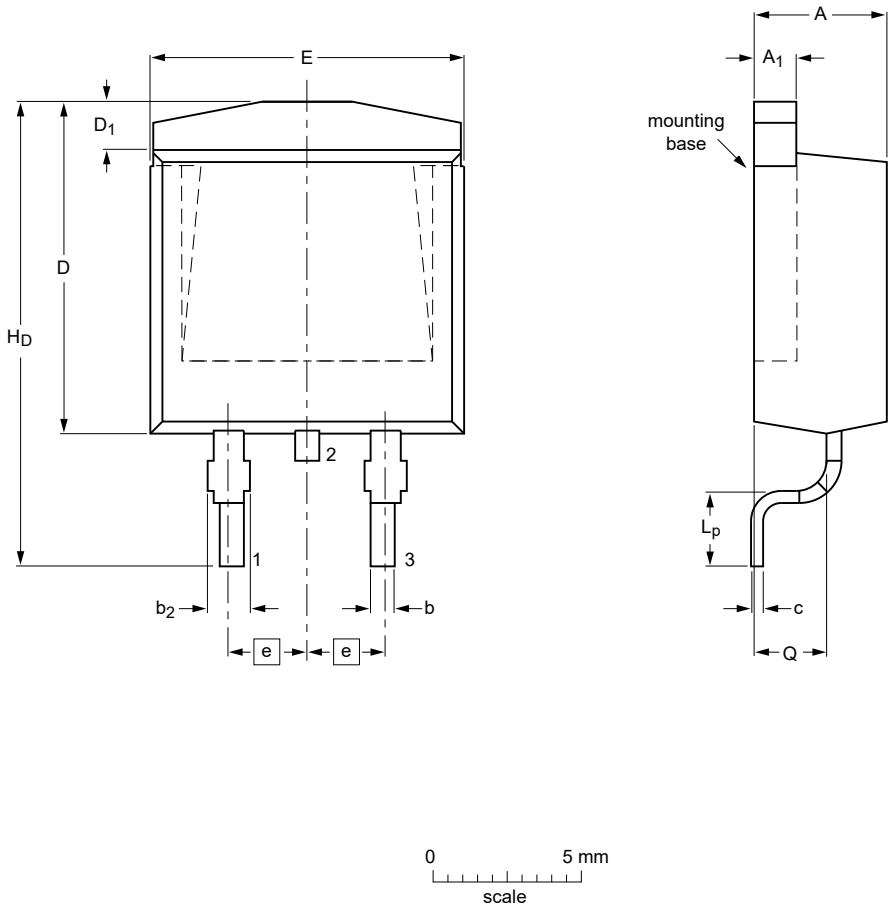


Fig. 7. Forward recovery definitions

10. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) **SOT404**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b	b_2	c	D	D_1	E	e	H_D	L_p	Q
mm	max	4.5	1.40	0.85	1.45	0.64	11	1.6	10.3	2.54	15.8	2.9	2.6
	nom												
	min	4.1	1.27	0.60	1.05	0.46		1.2	9.7		14.8	2.1	2.2

sot404_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT404						~~06-03-16~~ 13-02-25

Fig. 8. Package outline D2PAK (SOT404)

11. Soldering

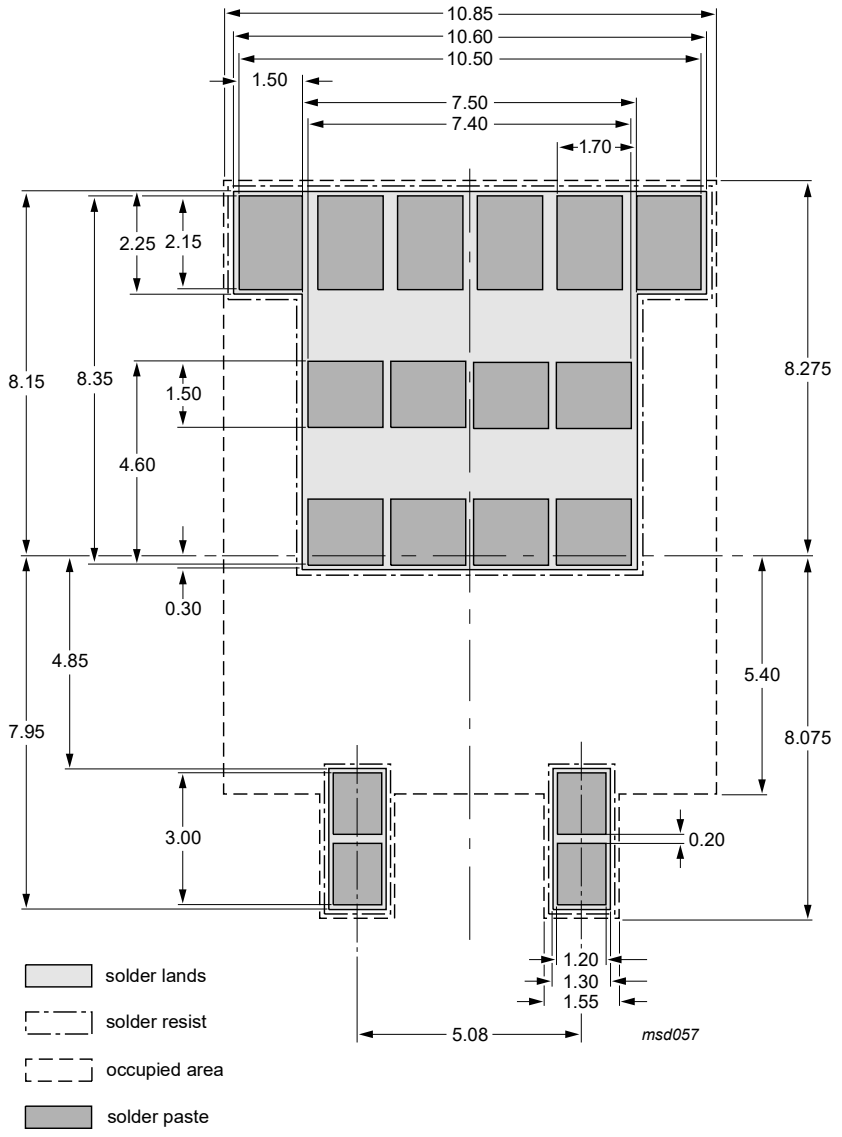


Fig. 9. Reflow soldering footprint for D2PAK (SOT404)

12. 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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