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

founded by NXP

BYV34-500

Dual ultrafast power diodes

4 June 2014 **Product data sheet**

1. General description

Dual ultrafast power diodes in a SOT78 (TO-220AB) plastic package.

2. Features and benefits

- Fast switching
- High thermal cycling performance
- Low forward voltage drop
- Low switching loss
- Low thermal resistance
- Soft recovery characteristic

3. Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- Output rectifiers in high-frequency switched-mode power supplies

4. Quick reference data

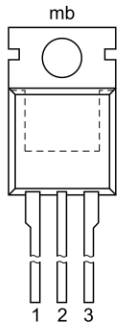
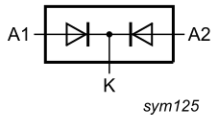
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	-	500	V
$I_{O(AV)}$	average output current	SQW; δ = 0.5; T_{mb} ≤ 115 °C; both diodes conducting; Fig. 1; Fig. 2		-	-	20	A
Static characteristics							
V_F	forward voltage	I_F = 10 A; T_j = 150 °C; Fig. 4		-	0.87	1.05	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; Fig. 7; Fig. 5		-	50	60	ns

Scan or click this QR code to view the latest information for this product

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 TO-220AB (SOT78)	
2	K	cathode		
3	A2	anode 2		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV34-500	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

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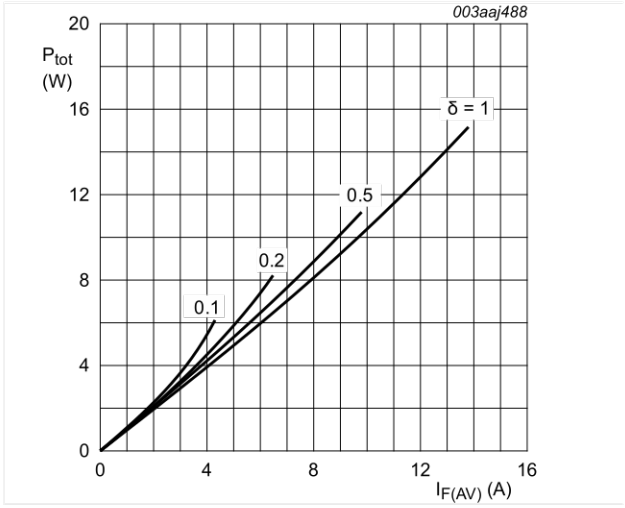
7. Limiting values

Table 4. Limiting values

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

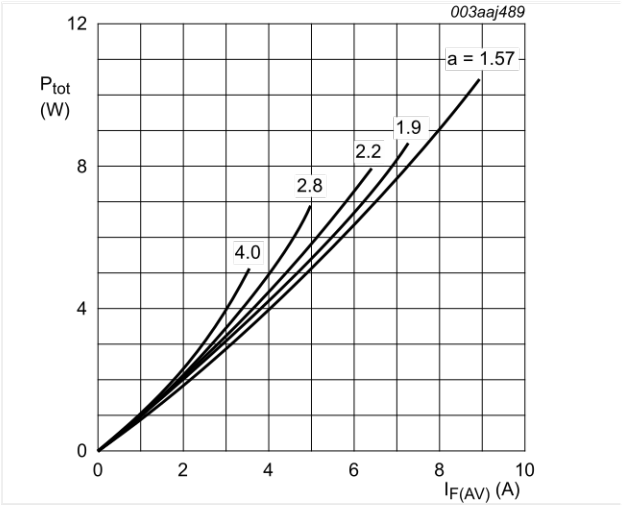
Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	500	V
V_{RWM}	crest working reverse voltage			-	500	V
V_R	reverse voltage	$T_{mb} \leq 138$ °C; DC		-	500	V
$I_{O(AV)}$	average output current	SQW; $\delta = 0.5$; $T_{mb} \leq 115$ °C; both diodes conducting; Fig. 1; Fig. 2		-	20	A
I_{FRM}	repetitive peak forward current	SQW; $\delta = 0.5$; $t_p = 25$ µs; $T_{mb} \leq 115$ °C; per diode		-	20	A
I_{FSM}	non-repetitive peak forward current	SIN; $t_p = 10$ ms; $T_{j(init)} = 25$ °C; per diode		-	120	A
		SIN; $t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; per diode		-	132	A
T_{stg}	storage temperature			-40	150	°C
T_j	junction temperature			-	150	°C



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

$V_o = 0.94$ V; $R_s = 0.01$ Ω

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



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

$V_o = 0.94$ V; $R_s = 0.01$ Ω

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

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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; per diode; Fig. 3		-	-	2.4	K/W
		with heatsink compound; both diodes conducting		-	-	1.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W

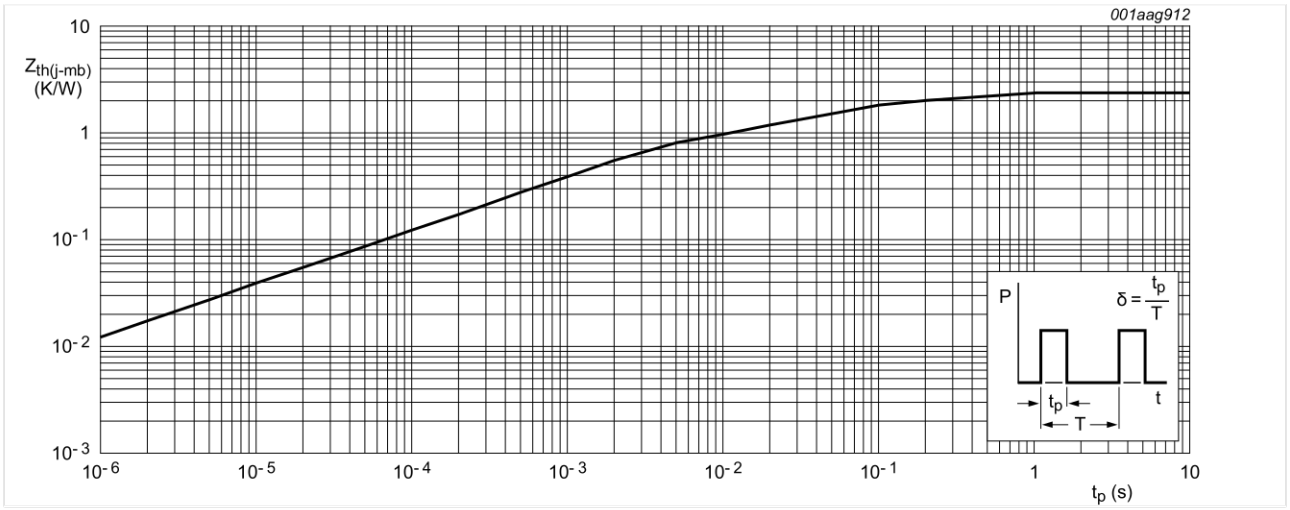

Fig. 3. Transient thermal impedance from junction to mounting base per diode as a function of pulse width

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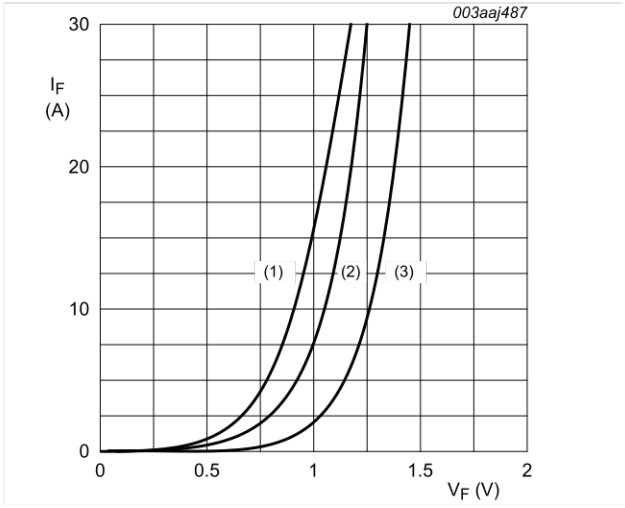
9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 20 A; T_j = 25 °C; Fig. 4		-	1.1	1.35	V
		I_F = 10 A; T_j = 150 °C; Fig. 4		-	0.87	1.05	V
I_R	reverse current	V_R = 500 V; T_j = 25 °C		-	10	50	µA
		V_R = 500 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/s; T_j = 25 °C; Fig. 5; Fig. 6		-	50	60	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; Fig. 7; Fig. 5		-	50	60	ns
I_{RM}	peak reverse recovery current	I_F = 10 A; V_R = 30 V; dI_F/dt = 50 A/µs; T_j = 100 °C; Fig. 8; Fig. 5		-	4	5	A
V_{FRM}	forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs; T_j = 25 °C; Fig. 9		-	2.5	-	V



V_o = 0.94 V; R_s = 0.01 Ω

(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; per diode

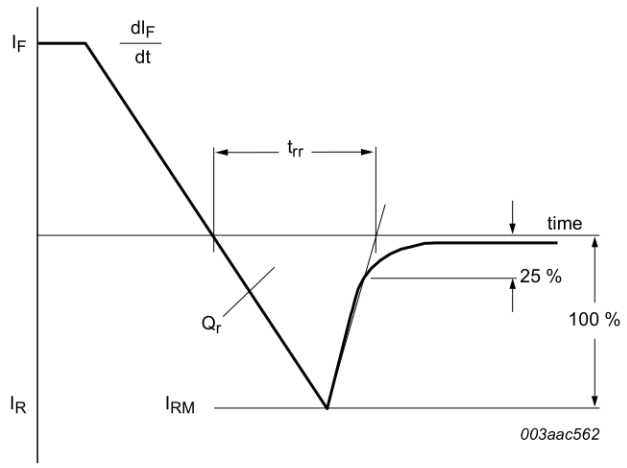


Fig. 5. Reverse recovery definitions; ramp recovery

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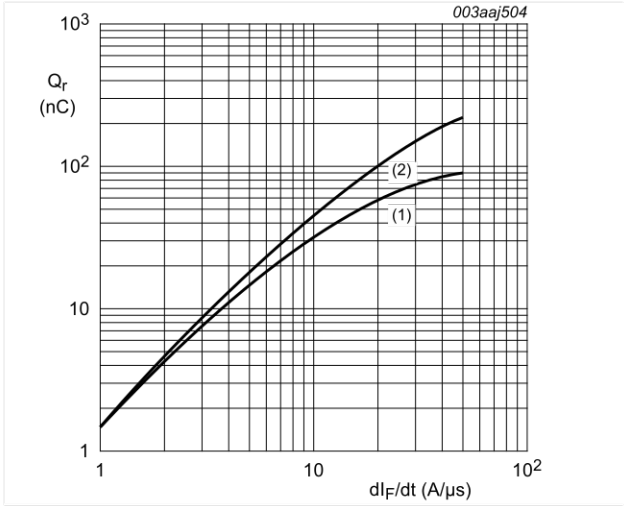
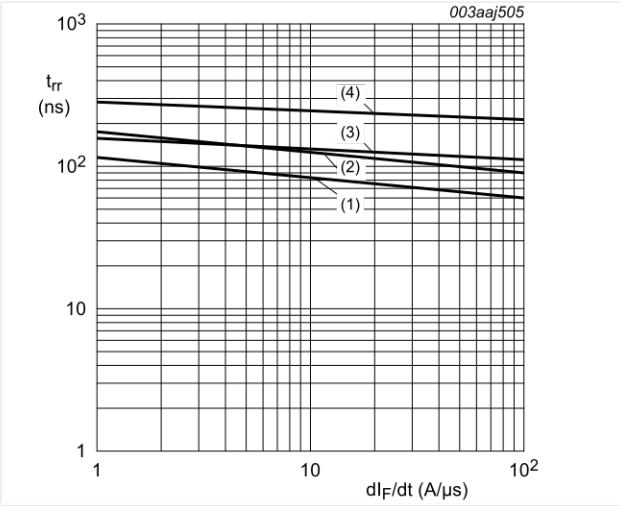


(1) I_F = 2 A; T_j = 25 °C

(2) I_F = 20 A; T_j = 25 °C

Fig. 6. Recovered charge as a function of rate of change of forward current; per diode; maximum values



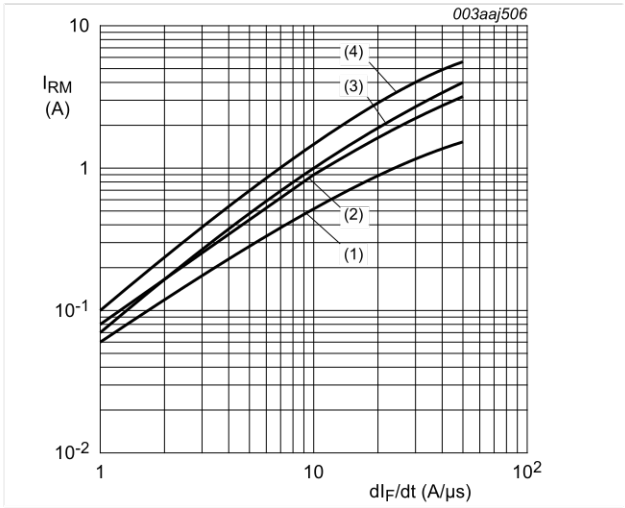
(1) I_F = 1 A; T_j = 25 °C

(2) I_F = 1 A; T_j = 100 °C

(3) I_F = 20 A; T_j = 25 °C

(4) I_F = 20 A; T_j = 100 °C

Fig. 7. Reverse recovery time as a function of rate of change of forward current; per diode; maximum values



(1) I_F = 1 A; T_j = 25 °C

(2) I_F = 1 A; T_j = 100 °C

(3) I_F = 20 A; T_j = 25 °C

(4) I_F = 20 A; T_j = 100 °C

Fig. 8. Peak reverse recovery current as a function of rate of change of forward current; per diode; maximum values

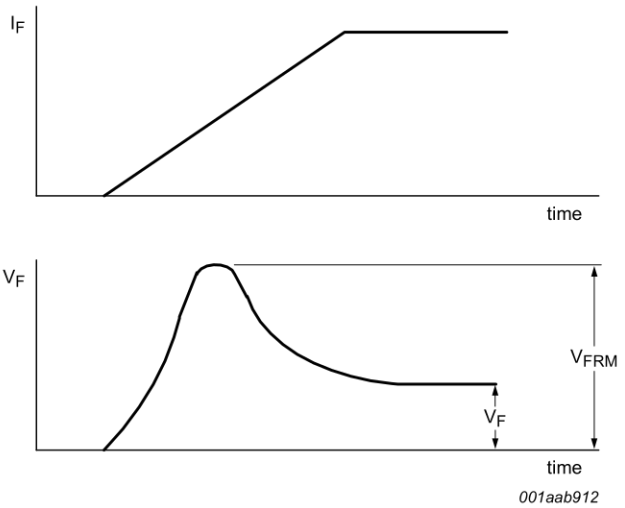


Fig. 9. Forward recovery definitions

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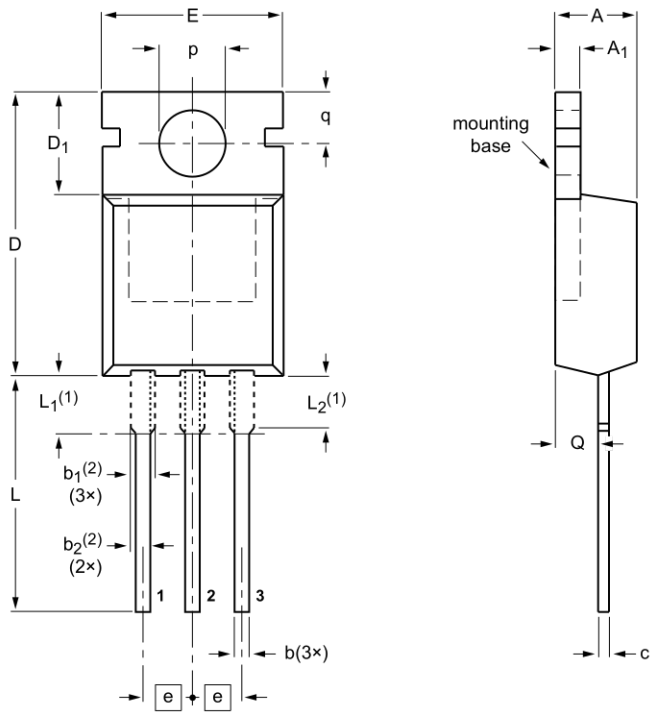
10. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB **SOT78**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1(2)	b_2(2)	c	D	D_1	E	e	L	L_1(1)	L_2(1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

Notes

1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT78		3-lead TO-220AB	SC-46			~~08-04-23~~ 08-06-13

Fig. 10. Package outline TO-220AB (SOT78)

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