BYV29-600

Rectifier diode ultrafast

Rev.03 - 7 March 2018 Product data sheet

1. General description

Ultrafast, epitaxial rectifier diode in a SOD59 (TO-220AC) plastic package.

2. Features and benefits

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

3. Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- High frequency switched-mode power supplies

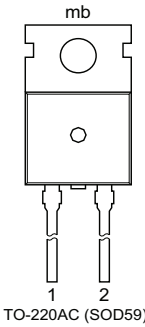
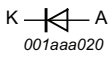
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		600				V
$I_{F(AV)}$	average forward current	δ = 0.5; square-wave pulse; $T_{mb} \leq 120$ °C	9				A
I_{FRM}	repetitive peak forward current	δ = 0.5; $T_{mb} \leq 120$ °C; square-wave pulse	18				A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; sine-wave pulse	70				A
		t_p = 8.3 ms; sine-wave pulse	77				A
Symbol	**Parameter**	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 8 A; T_j = 25 °C		-	1.12	1.25	V
		I_F = 8 A; T_j = 150 °C; Fig. 2		-	0.97	1.11	V
		I_F = 20 A; T_j = 25 °C; Fig. 2		-	1.31	1.45	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. 3		-	50	60	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 TO-220AC (SOD59)	 *001aaa020*
2	A	anode		
mb	mb	mounting base; cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV29-600	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

7. Marking

Table 4. Marking codes

Type number	Marking codes
BYV29-600	BYV29-600

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8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	δ = 1.0; square-wave pulse; $T_{mb} \leq 100$ °C	600	V
$I_{F(AV)}$	average forward current	δ = 0.5; square-wave pulse; $T_{mb} \leq 120$ °C	9	A
I_{FRM}	repetitive peak forward current	δ = 0.5; $T_{mb} \leq 120$ °C; square-wave pulse	18	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; sine-wave pulse	70	A
		t_p = 8.3 ms; sine-wave pulse	77	A
T_{stg}	storage temperature		-40 to 150	°C
T_j	junction temperature		150	°C

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9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; Fig 1		-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W

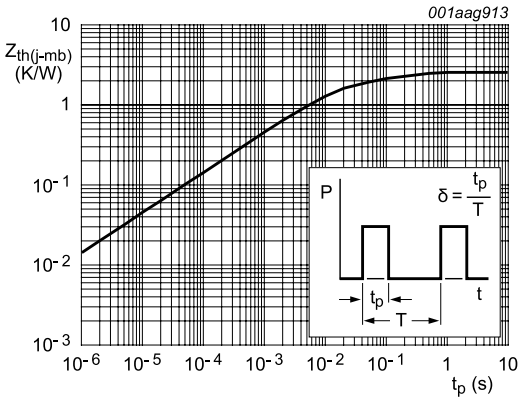


Fig. 1. Transient thermal impedance from junction to mounting base as a function of pulse width

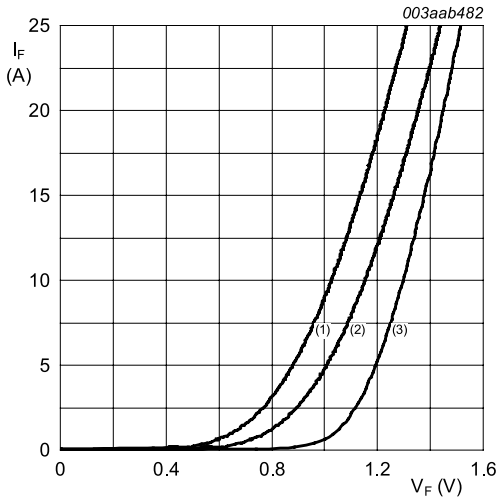
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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 20A; T_j = 25 °C; Fig. 2		-	1.31	1.45	V
		I_F = 8 A; T_j = 25 °C		-	1.12	1.25	V
		I_F = 8 A; T_j = 150 °C; Fig. 2		-	0.97	1.11	V
I_R	reverse current	V_R = 600 V; T_j = 25 °C		-	2	50	µA
		V_R = 600 V; T_j = 100 °C		-	0.1	0.35	mA
Dynamic characteristics							
Q_r	recovered charge	I_F = 2 A; V_R = 30 V; dI_F/dt = 20 A/µs; T_j = 25 °C; Fig. 3		-	40	70	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. 3		-	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. 3		-	3	5.5	A
V_{FR}	forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs; T_j = 25 °C; Fig. 4		-	3.2	-	V



(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 2. Forward current as a function of forward voltage

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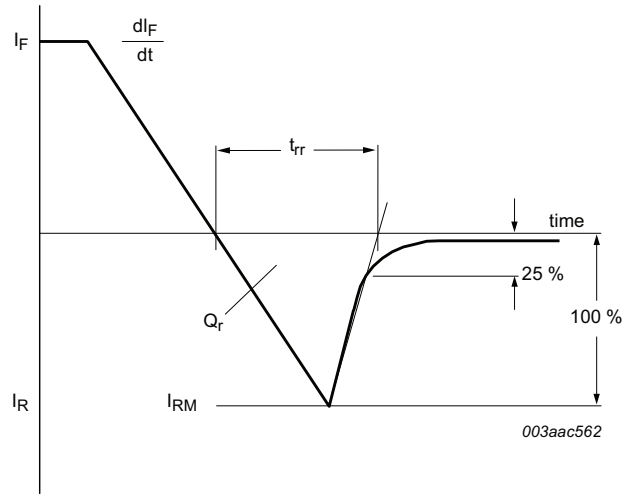


Fig. 3. Reverse recovery definitions; ramp recovery

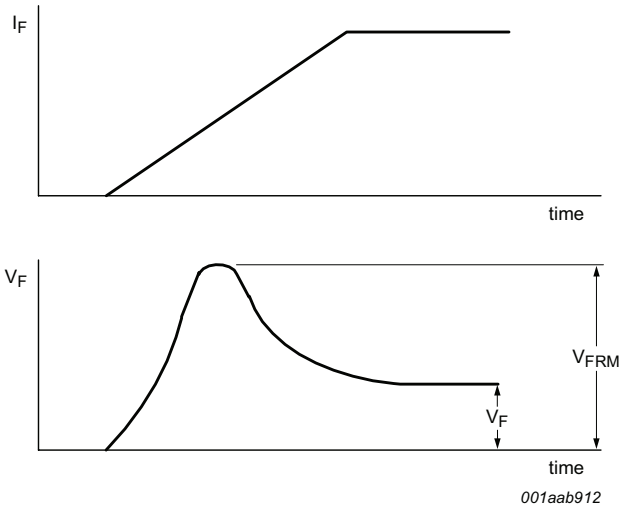
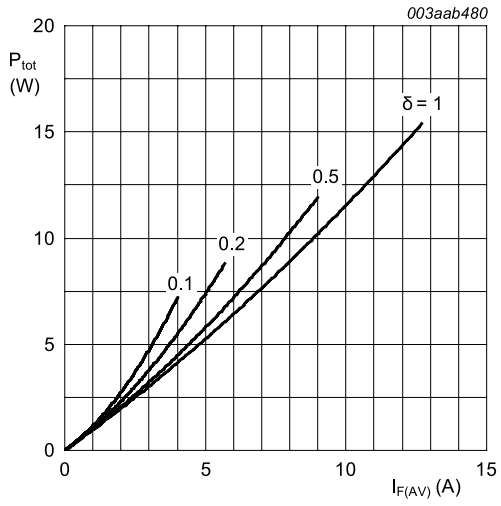
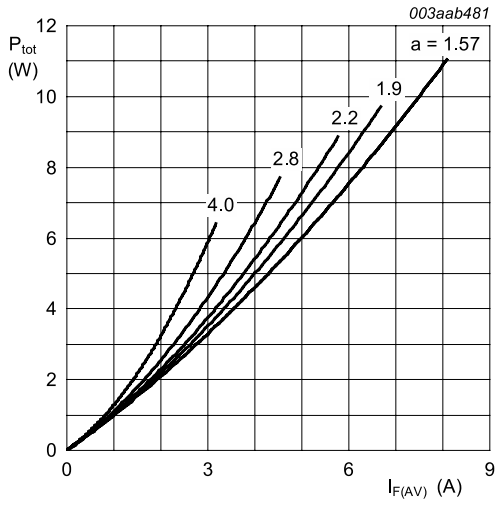


Fig. 4. Forward recovery definitions



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

Fig. 5. Forward power dissipation as a function of average forward current; square waveform; maximum values



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

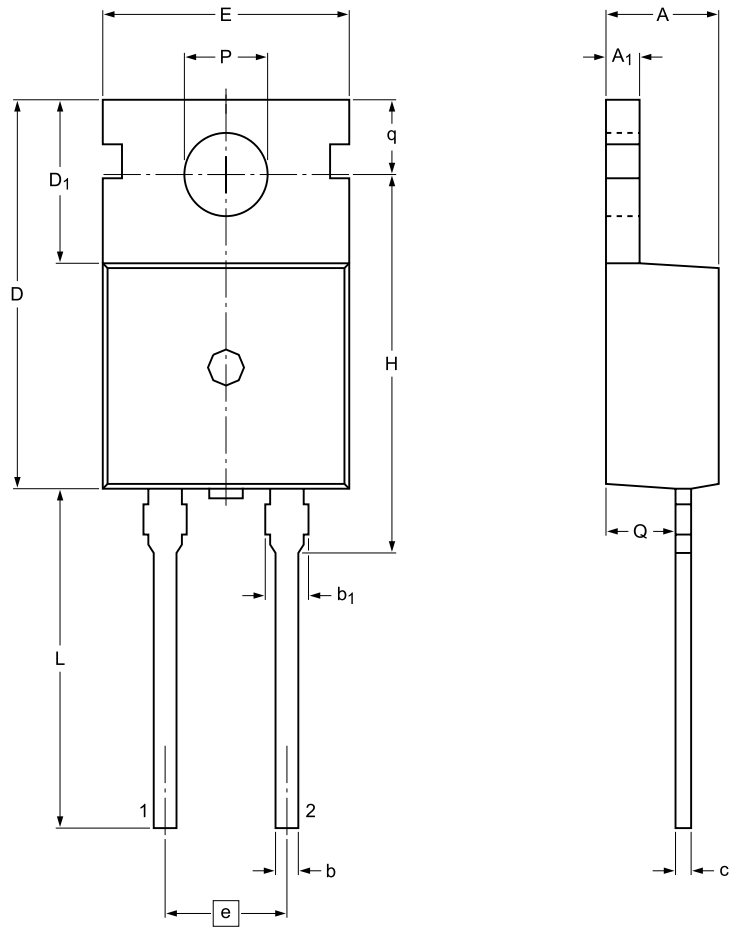
Fig. 6. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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11. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC **SOD59**



0 5 10 mm

scale

Dimensions

Unit		A	A_1	b	b_1 (1)	c	D	D_1	E	e	H	L	P	Q	q
mm	max	4.7	1.40	0.95	1.7	0.65	15.8	6.8	10.30	5.08 (REF)	16.25	15.0	3.80	2.6	2.9
	nom														
	min	4.3	1.15	0.70	1.3	0.45	15.6	6.4	9.65		15.70	12.5	3.65	2.2	2.7

Note

1. Protruded dambar are included in the dimension.

sod059_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD59	2-lead TO-220AC					~~09-08-25~~ 12-11-27

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12. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYC29-600 v.3	20180307	Product data sheet	-	BYV29-600_2
Modifications:	Change from NXP version to WeEn version			
BYV29-600_2	20071024	Product data sheet	-	BYV29-600_1
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. • Table 5 “Characteristics” on page 3: VF values updated.			
BYV29-600_1	20000201	Product specification	-	-

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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".
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