BYV25G-600

Ultrafast rectifier diode

Rev. 01 — 4 February 2010 Product data sheet

1. Product profile

1.1 General description

Ultrafast epitaxial rectifier diode in a SOT226 (I2PAK) plastic package.

1.2 Features and benefits

- Fast switching
- High thermal cycling performance
- Low forward voltage drop
- Low profile package facilitates compact/slim designs
- Low switching losses
- Low thermal resistance
- Soft recovery minimizes power-consuming oscillations

1.3 Applications

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

1.4 Quick reference data

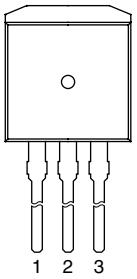
Table 1. Quick reference

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; δ = 0.5; T_{mb} ≤ 135 °C; see Figure 1 and 2	-	-	5	A
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; see Figure 5	-	50	60	ns

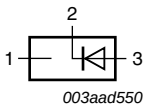
2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected		
2	K	cathode		
3	A	anode		
mb	K	mounting base; cathode		



SOT226A (I2PAK)



3. Ordering information

Table 3. Ordering information

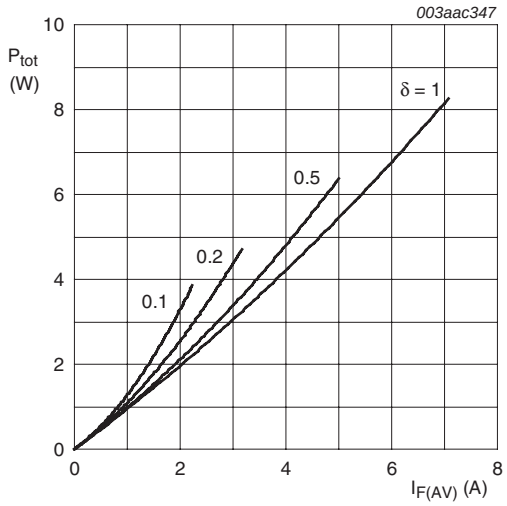
Type number	Package		
	Name	Description	Version
BYV25G-600	I2PAK	plastic single-ended package (I2PAK); TO-262	SOT226A

4. Limiting values

Table 4. Limiting values

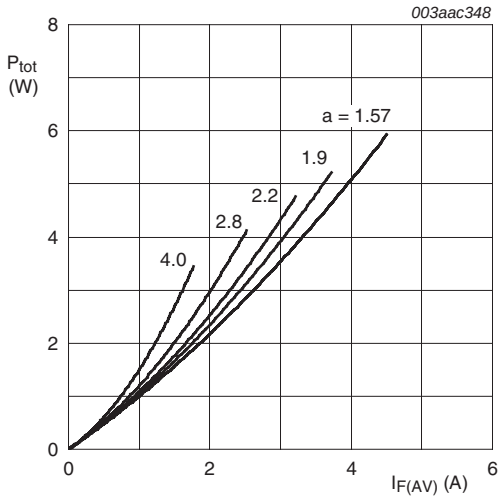
In accordance with the Absolute Maximum Rating System (IEC 60134).

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	$T_{mb} \leq 100$ °C; DC	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 135$ °C; see Figure 1 and 2	-	5	A
I_{FRM}	repetitive peak forward current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 135$ °C	-	10	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8.3$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C	-	66	A
		$t_p = 10$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C	-	60	A
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C



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

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



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

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

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j\text{-}mb)}$	thermal resistance from junction to mounting base	with heatsink compound; see Figure 3	-	-	2.5	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient free air		-	60	-	K/W

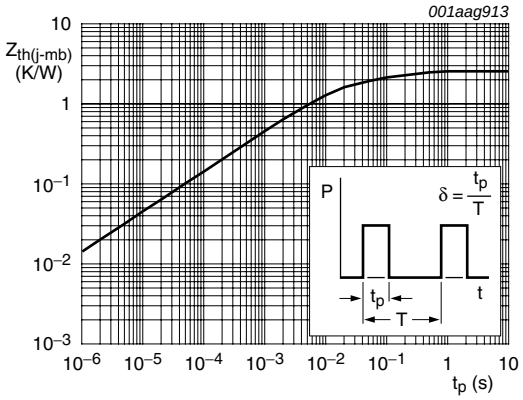
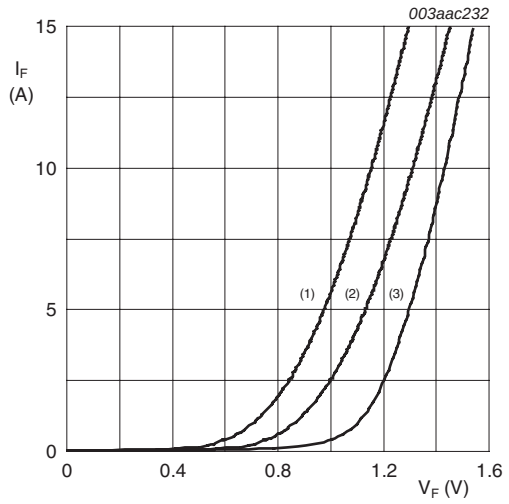


Fig 3. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	I_F = 5 A; see Figure 4	-	1.12	1.3	V
		I_F = 5 A; T_{mb} ≤ 150 °C; see Figure 4	-	0.97	1.11	V
I_R	reverse current	V_R = 600 V; T_j = 100 °C	-	0.1	0.35	mA
		V_R = 600 V	-	2	50	µA
Dynamic characteristics						
Q_r	recovered charge	I_F = 2 A; V_R ≥ 30 V; dI_F/dt = 20 A/µs; see Figure 5	-	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; see Figure 5	-	50	60	ns
V_{FR}	forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs; see Figure 6	-	3.2	-	V
I_{RM}	peak reverse recovery current	I_F = 10 A; V_R ≤ 30 V; dI_F/dt = 50 A/µs; T_j = 100 °C; see Figure 5	-	3	5.5	A



(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

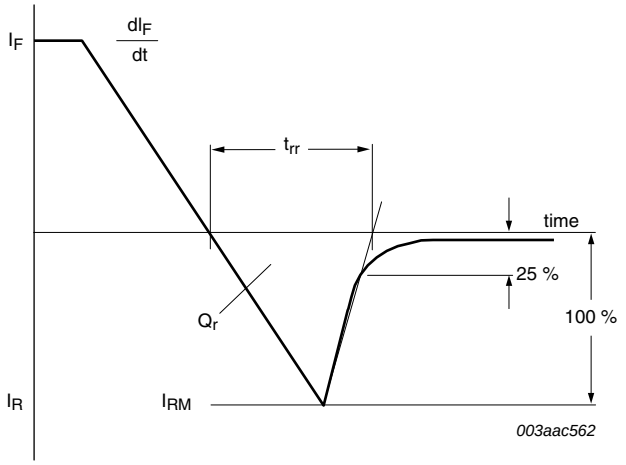


Fig 5. Reverse recovery definitions; ramp recovery

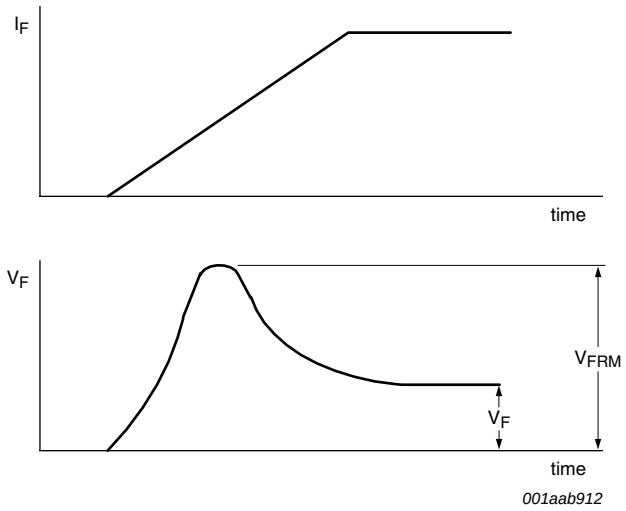
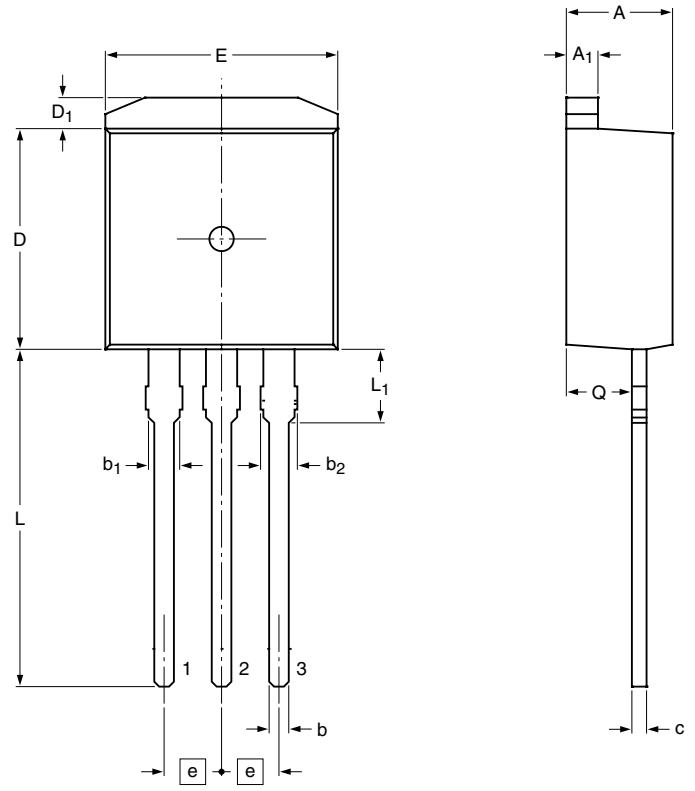


Fig 6. Forward recovery definitions

7. Package outline

Plastic single-ended package (I2PAK); low-profile 3-lead TO-262 **SOT226A**



0 5 10 mm

scale

Dimensions

Unit		A	A_1	b	b_1	b_2	c	D	D_1	E	e	L	L_1	Q
mm	max	4.7	1.40	0.95	1.40	1.7	0.65	9.4	1.32	10.30	2.54 (REF)	15.0	3.0 (REF)	2.6
	nom													
	min	4.3	1.15	0.70	1.14	1.3	0.45	8.6	1.02	9.65		12.5		2.2

sot226a_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT226A		TO-262				~~09-08-17~~ 09-08-25

Fig 7. Package outline SOT226A (I2PAK)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV25G-600_1	20100204	Product data sheet	-	-

9. Legal information

9.1 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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