

BYV34-600

Dual rectifier diode ultrafast

Rev. 01 — 4 October 2007

Product data sheet

1. Product profile

1.1 General description

Ultrafast, dual common cathode, epitaxial rectifier diode in a SOT78 (TO-220AB) plastic package.

1.2 Features

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

1.3 Applications

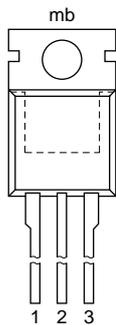
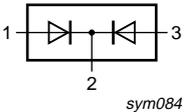
- Output rectifiers in high frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

1.4 Quick reference data

- $V_{RRM} \leq 600 \text{ V}$
- $V_F \leq 1.16 \text{ V}$
- $I_{O(AV)} \leq 20 \text{ A}$
- $t_{rr} \leq 60 \text{ ns}$

2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Symbol
1	anode 1		
2	cathode		
3	anode 2		
mb	mounting base; cathode		

SOT78 (3-lead TO-220AB)

3. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
BYV34-600	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

4. Limiting values

Table 3. 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	square waveform; $\delta = 1.0$; $T_{mb} \leq 138\text{ °C}$	-	600	V
$I_{O(AV)}$	average output current	square waveform; $\delta = 0.5$; $T_{mb} \leq 107\text{ °C}$; both diodes conducting	-	20	A
I_{FRM}	repetitive peak forward current	$t = 25\text{ }\mu\text{s}$; square waveform; $\delta = 0.5$; $T_{mb} \leq 107\text{ °C}$; per diode	-	20	A
I_{FSM}	non-repetitive peak forward current	$t = 10\text{ ms}$; sinusoidal waveform; per diode	-	120	A
		$t = 8.3\text{ ms}$; sinusoidal waveform; per diode	-	132	A
T_{stg}	storage temperature		-40	+150	°C
T_j	junction temperature		-	150	°C

5. Thermal characteristics

Table 4. 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; see Figure 1	-	-	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

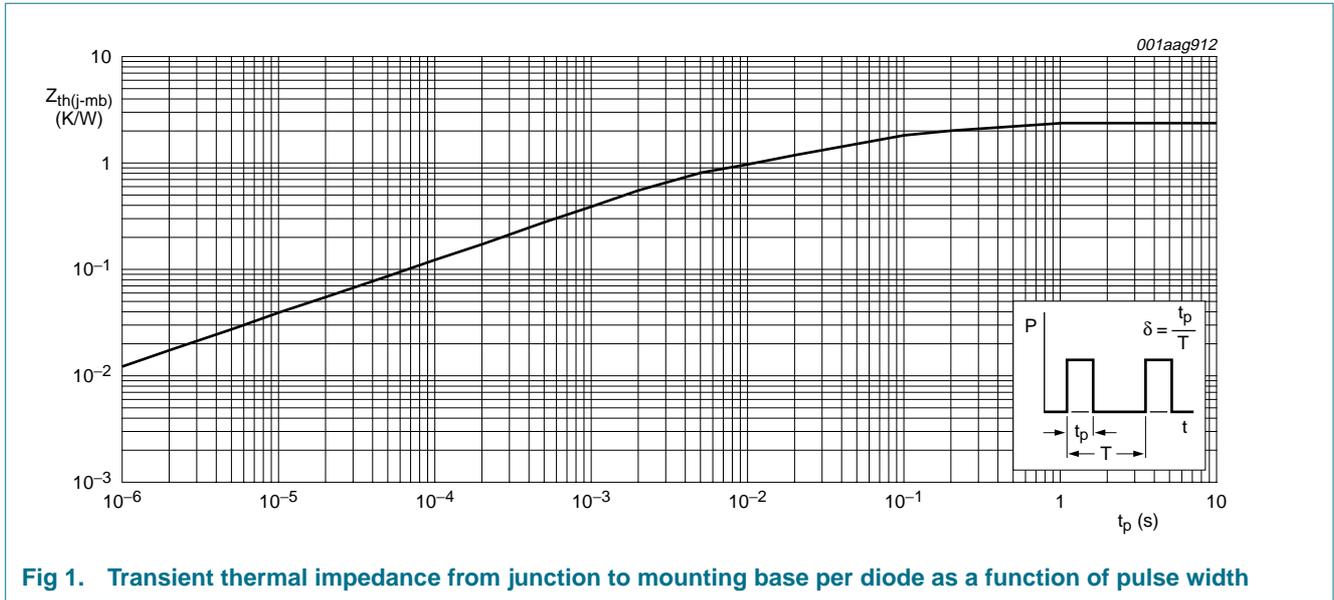


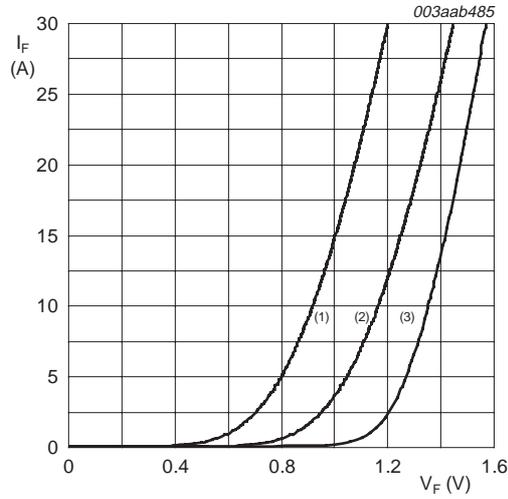
Fig 1. Transient thermal impedance from junction to mounting base per diode as a function of pulse width

6. Characteristics

Table 5. Characteristics

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 10\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; see Figure 2	-	0.92	1.16	V
		$I_F = 20\text{ A}$; see Figure 2	-	1.07	1.48	V
I_R	reverse current	$V_R = 600\text{ V}$	-	10	50	μA
		$V_R = 600\text{ V}$; $T_j = 100\text{ }^\circ\text{C}$	-	0.2	0.6	mA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 2\text{ A}$ to $V_R \geq 30\text{ V}$; $di_F/dt = 20\text{ A}/\mu\text{s}$; see Figure 3	-	40	70	nC
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$ to $V_R \geq 30\text{ V}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; see Figure 3	-	50	60	ns
I_{RM}	peak reverse recovery current	$I_F = 10\text{ A}$ to $V_R \geq 30\text{ V}$; $di_F/dt = 50\text{ A}/\mu\text{s}$; $T_j = 100\text{ }^\circ\text{C}$; see Figure 3	-	3	5	A
V_{FR}	forward recovery voltage	$I_F = 10\text{ A}$; $di_F/dt = 10\text{ A}/\mu\text{s}$; see Figure 4	-	3.2	-	V



- (1) $T_j = 150\text{ }^\circ\text{C}$; typical values
- (2) $T_j = 150\text{ }^\circ\text{C}$; maximum values
- (3) $T_j = 25\text{ }^\circ\text{C}$; maximum values

Fig 2. Forward current as a function of forward voltage

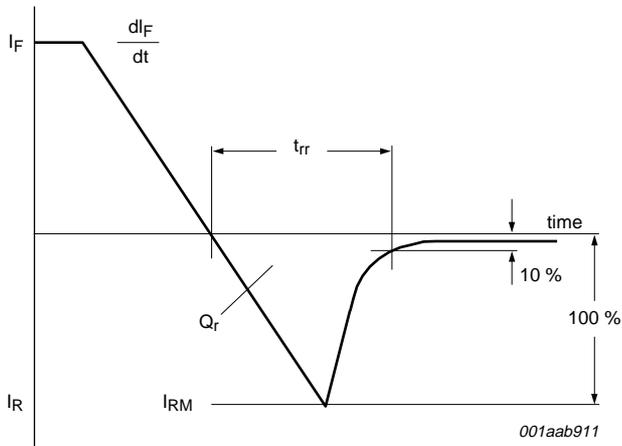


Fig 3. Reverse recovery definitions

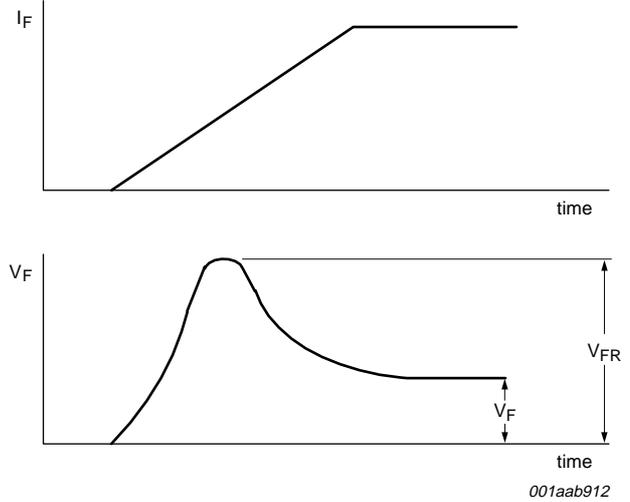
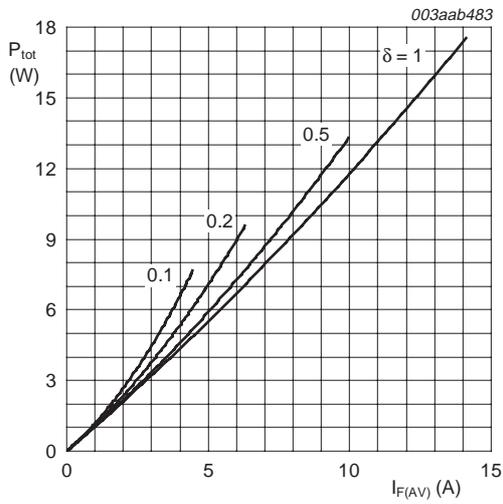
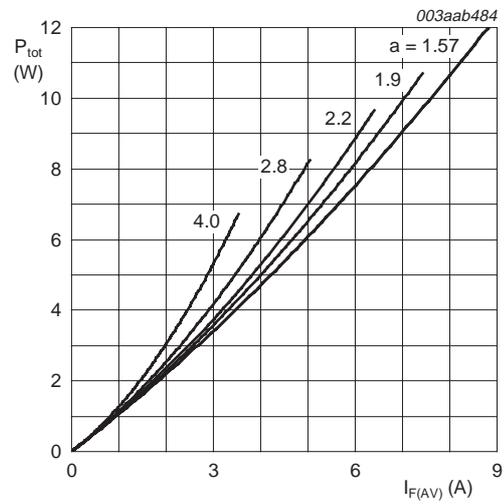


Fig 4. Forward recovery definitions



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

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



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

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

7. Package outline

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

SOT78

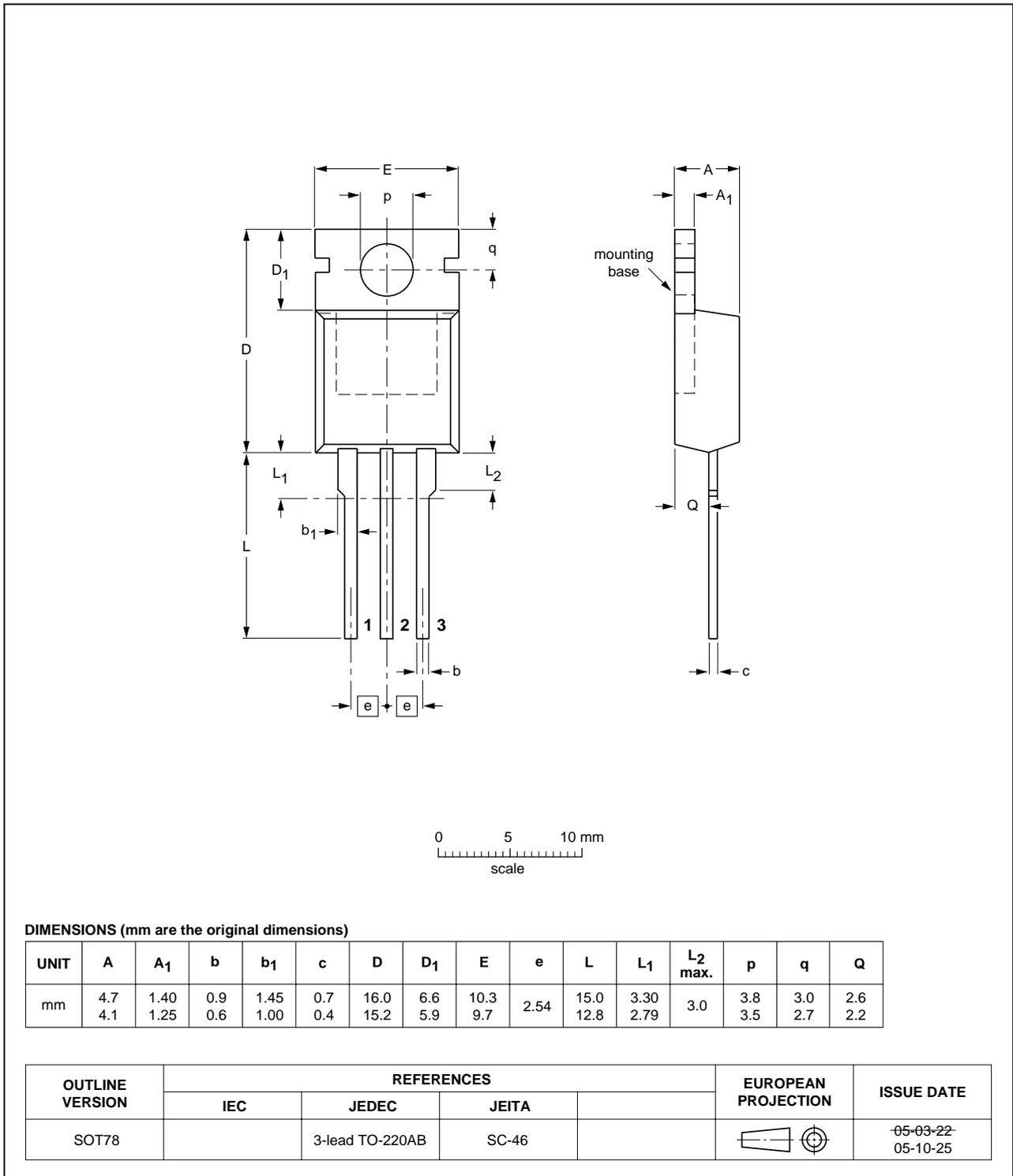


Fig 7. Package outline SOT78 (3-lead TO-220AB)

8. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV34-600_1	20071004	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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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