



BYV34-500

Dual ultrafast power diodes

Rev. 4 — 20 March 2012

Product data sheet

1. Product profile

1.1 General description

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

1.2 Features and benefits

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

1.3 Applications

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

1.4 Quick reference data

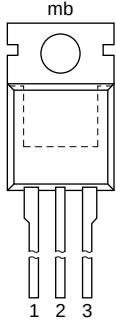
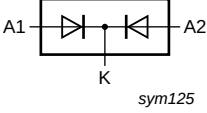
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	500	V
$I_{O(AV)}$	average output current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 115\text{ }^{\circ}\text{C}$; both diodes conducting; see Figure 1 ; see Figure 2	-	-	20	A
Static characteristics						
V_F	forward voltage	$I_F = 10\text{ A}$; $T_j = 150\text{ }^{\circ}\text{C}$; see Figure 4	-	0.87	1.05	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $dI_F/dt = 100\text{ A/s}$; $T_j = 25\text{ }^{\circ}\text{C}$; see Figure 6 ; see Figure 7	-	50	60	ns



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1		
2	K	cathode		
3	A2	anode 2		
mb	K	mounting base; cathode		

SOT78 (TO-220AB)

3. 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

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		-	500	V
V_{RWM}	crest working reverse voltage		-	500	V
V_R	reverse voltage	$T_{mb} \leq 138\text{ °C}$; DC	-	500	V
$I_{O(AV)}$	average output current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 115\text{ °C}$; both diodes conducting; see Figure 1 ; see Figure 2	-	20	A
I_{FRM}	repetitive peak forward current	square-wave pulse; $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 115\text{ °C}$; per diode	-	20	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; sine-wave pulse; $T_{j(init)} = 25\text{ °C}$; per diode	-	120	A
		$t_p = 8.3\text{ ms}$; sine-wave pulse; $T_{j(init)} = 25\text{ °C}$; per diode	-	132	A
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C

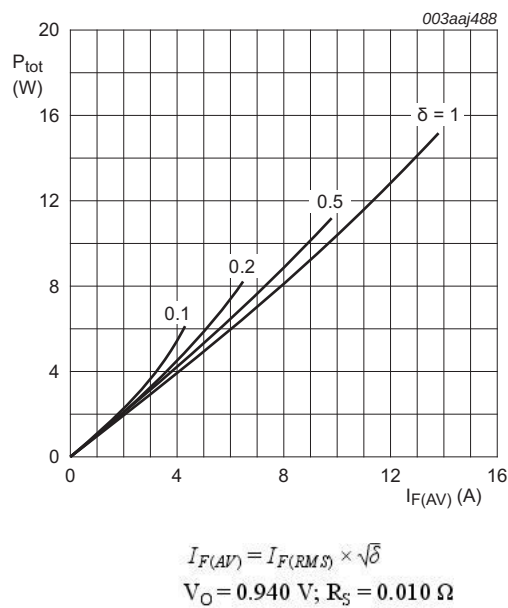


Fig 1. Forward power dissipation as a function of average forward current; square waveform; per diode; maximum values

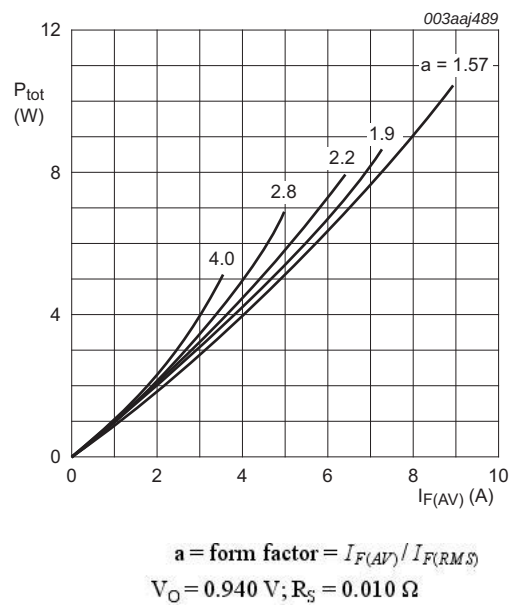
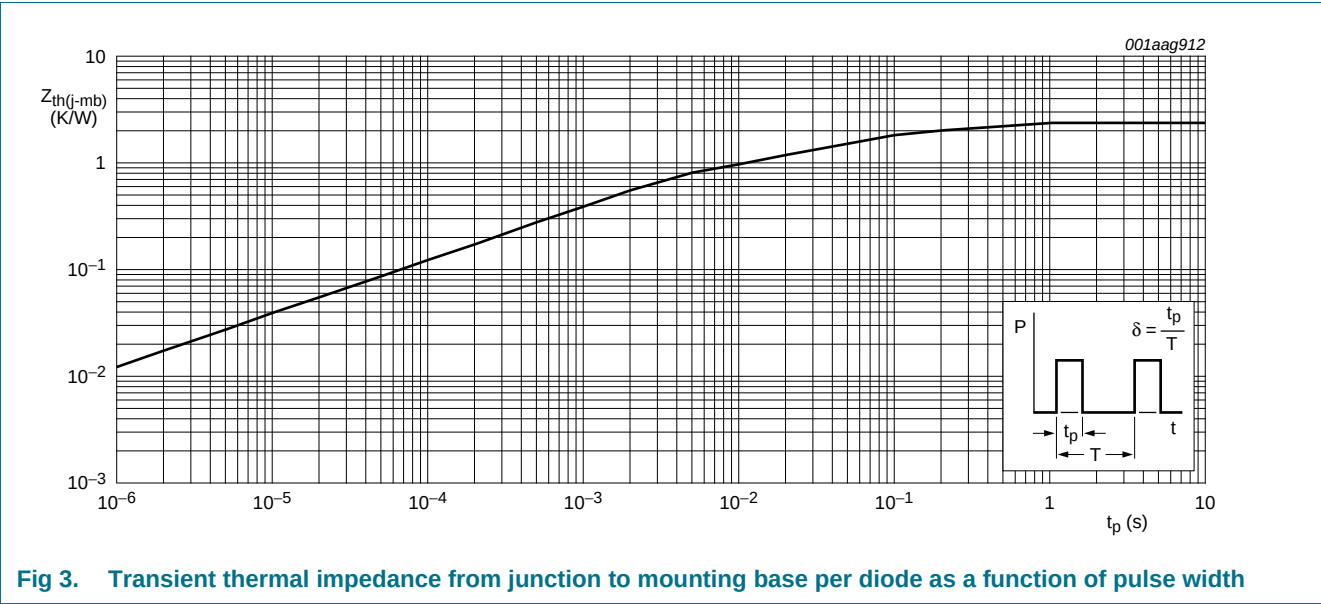


Fig 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values

5. Thermal characteristics

Table 5. Thermal characteristics

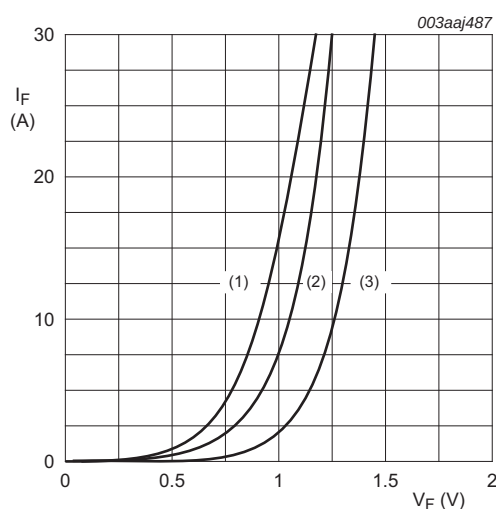
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; per diode; see Figure 3	-	-	2.4	K/W
		with heatsink compound; both diodes conducting	-	-	1.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W



6. Characteristics

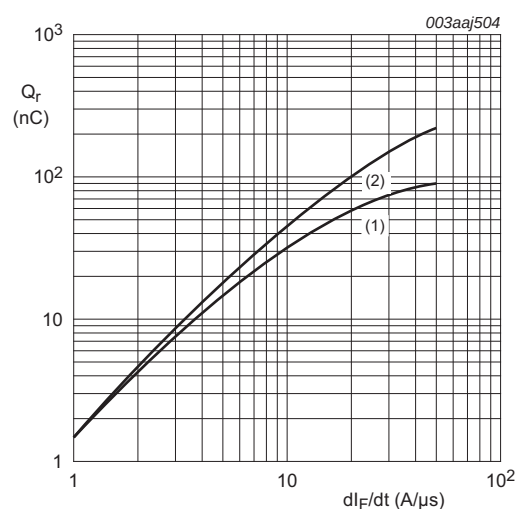
Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V _F	forward voltage	I _F = 20 A; T _j = 25 °C; see Figure 4	-	1.1	1.35	V
		I _F = 10 A; T _j = 150 °C; see Figure 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; see Figure 5 ; see Figure 6	-	50	60	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/s; T _j = 25 °C; see Figure 6 ; see Figure 7	-	50	60	ns
I _{RM}	peak reverse recovery current	I _F = 10 A; V _R = 30 V; dI _F /dt = 50 A/s; T _j = 100 °C; see Figure 6 ; see Figure 8	-	4	5	A
V _{FRM}	forward recovery voltage	I _F = 10 A; dI _F /dt = 10 A/s; T _j = 25 °C; see Figure 9	-	2.5	-	V



- (1) $T_j = 150\text{ °C}$; typical values;
 (2) $T_j = 150\text{ °C}$; maximum values;
 (3) $T_j = 25\text{ °C}$; maximum values;
 $V_O = 0.940\text{ V}$; $R_S = 0.010\text{ }\Omega$

Fig 4. Forward current as a function of forward voltage; per diode



- (1) $I_F = 2\text{ A}$; $T_j = 25\text{ °C}$
 (2) $I_F = 20\text{ A}$; $T_j = 25\text{ °C}$

Fig 5. Recovered charge as a function of rate of change of forward current; per diode; maximum values

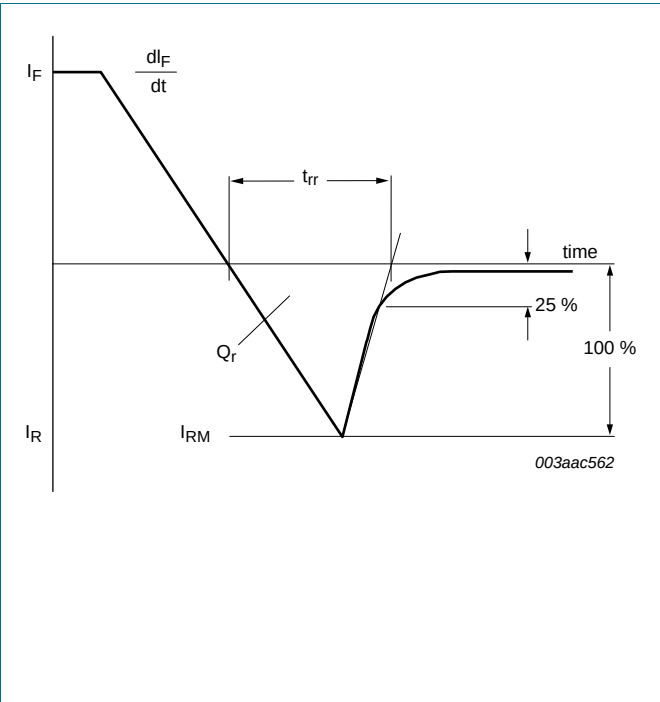


Fig 6. Reverse recovery definitions; ramp recovery

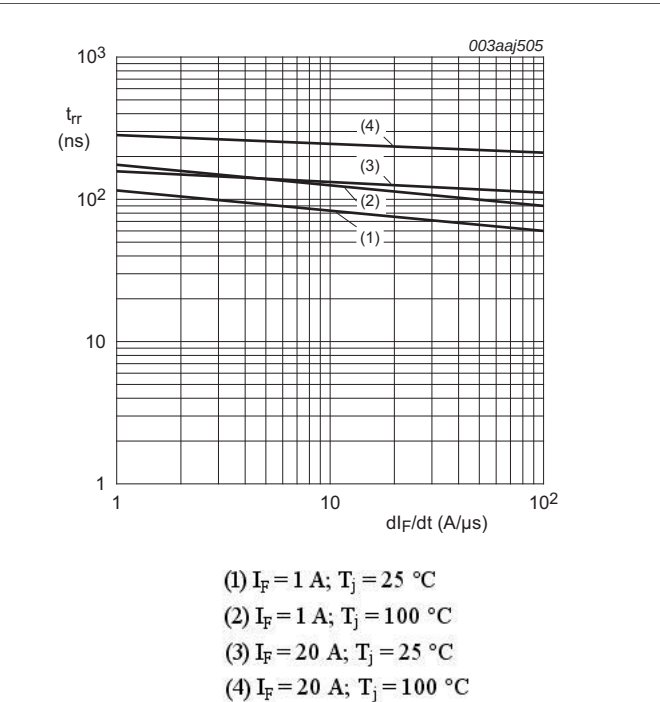


Fig 7. Reverse recovery time as a function of rate of change of forward current; per diode; maximum values

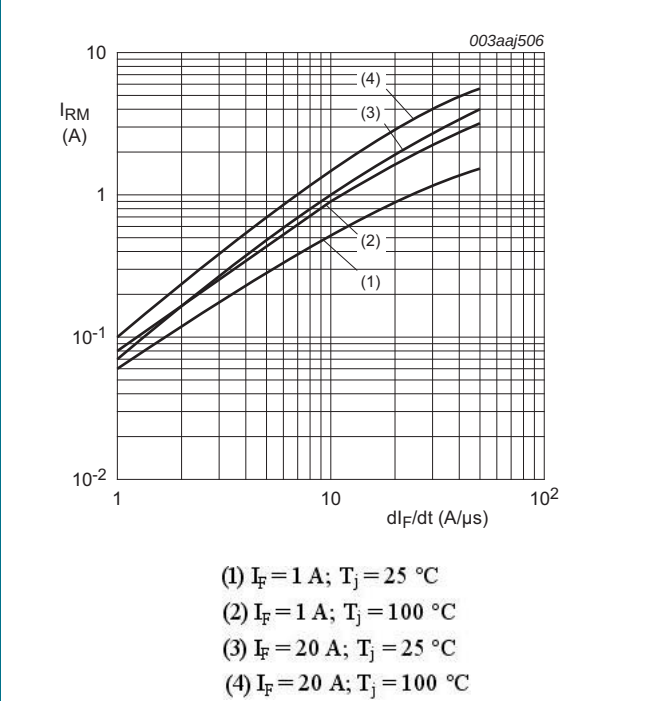


Fig 8. Peak reverse recovery current as a function of rate of change of forward current; per diode; maximum values

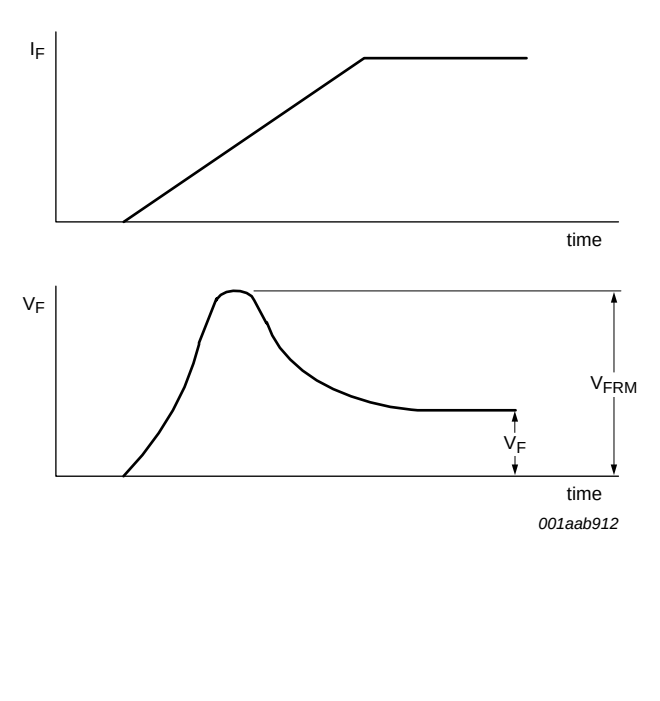


Fig 9. Forward recovery definitions

7. Package outline

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

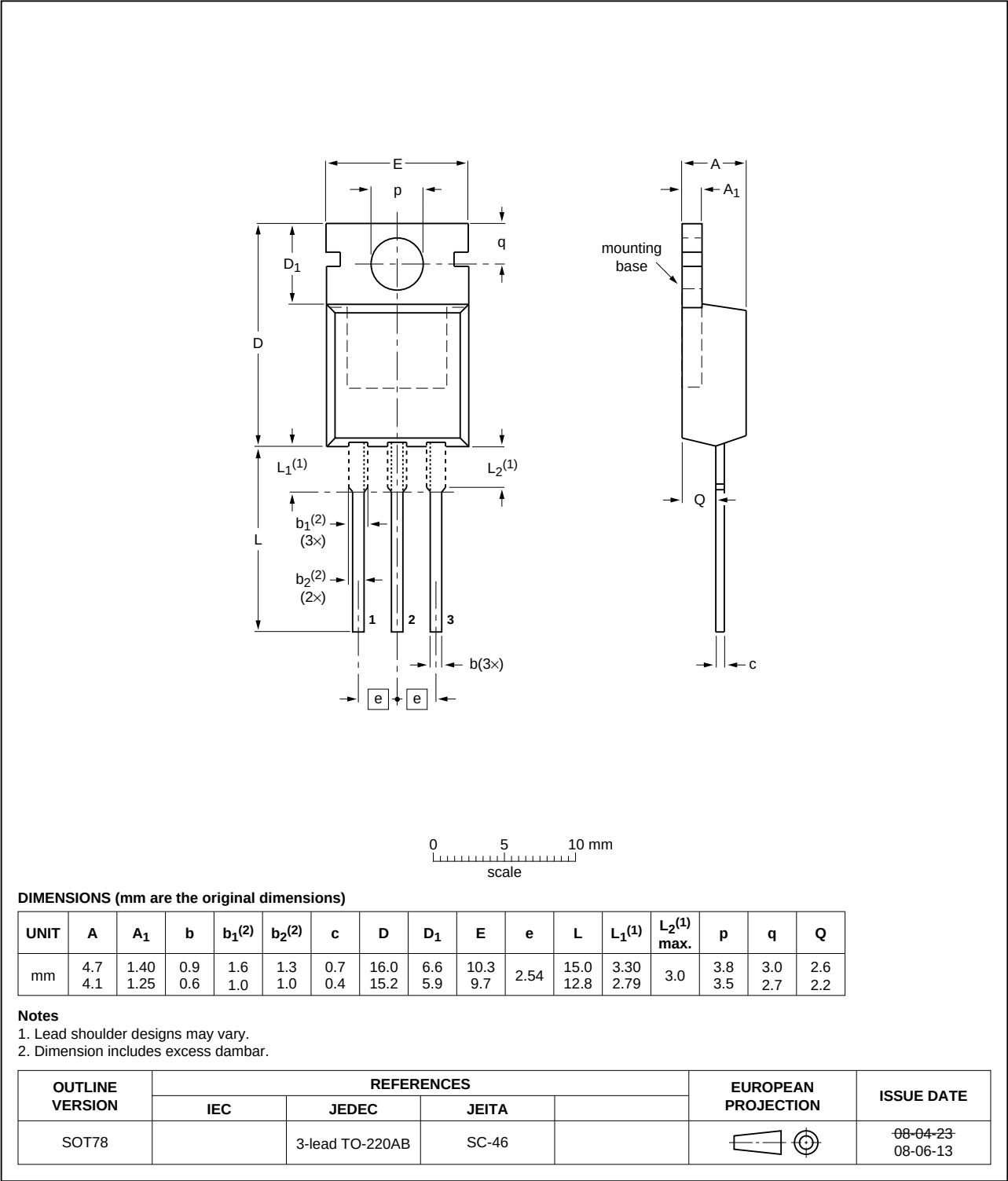


Fig 10. Package outline SOT78 (TO-220AB)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV34-500 v.4	20120320	Product data sheet	-	BYV34_SERIES v.3
Modifications:	• The format of this document 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.			
BYV34_SERIES v.3	19981001	Product data sheet	-	BYV34_SERIES v.2

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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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11. Contents

1	Product profile	1
1.1	General description	1
1.2	Features and benefits	1
1.3	Applications	1
1.4	Quick reference data	1
2	Pinning information	2
3	Ordering information	2
4	Limiting values	2
5	Thermal characteristics	4
6	Characteristics	5
7	Package outline	7
8	Revision history	8
9	Legal information	9
9.1	Data sheet status	9
9.2	Definitions	9
9.3	Disclaimers	9
9.4	Trademarks	10
10	Contact information	10

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