



# BYT79-600

Rectifier diode ultrafast

27 May 2015

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

## 3. Application information

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

## 4. Quick reference data

Table 1. Quick reference data

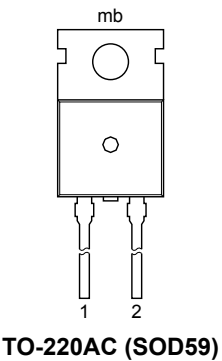
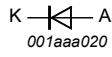
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 108$ °C; SQW; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	-	-	15	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 108$ °C; Square-wave	-	-	30	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; Sinusoidal waveform	-	-	130	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; Sinusoidal waveform	-	-	143	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15$ A; $T_j = 150$ °C; <a href="#">Fig. 4</a>	-	1	1.2	V
		$I_F = 15$ A; $T_j = 25$ °C; <a href="#">Fig. 4</a>	-	1.17	1.38	V



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R \geq 30\text{ V}$ ; $dI_F/dt = 100\text{ A}/\mu\text{s}$ ; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 5</a>	-	50	60	ns

## 5. Pinning information

Table 2. Pinning information

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

## 6. Ordering information

Table 3. Ordering information

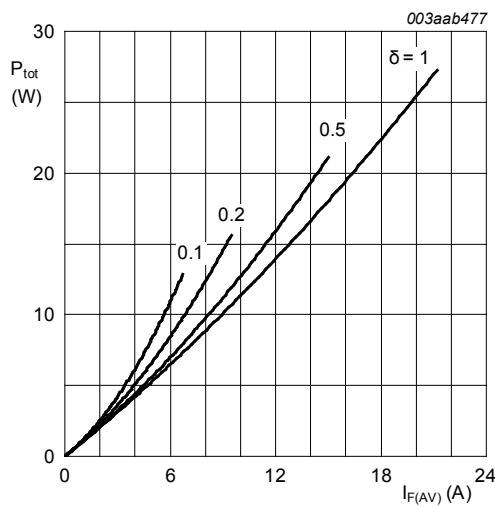
Type number	Package		
	Name	Description	Version
BYT79-600	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

## 7. Limiting values

**Table 4. Limiting values**

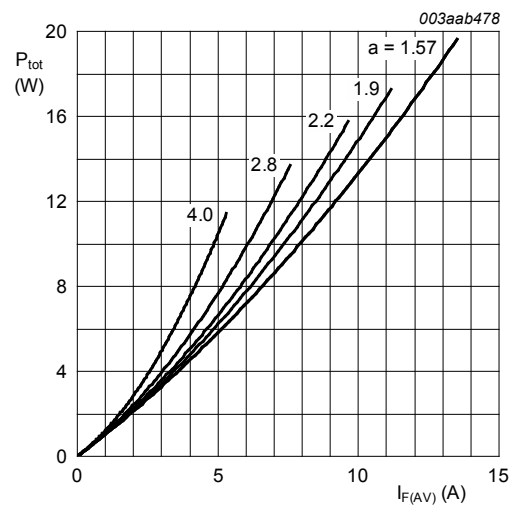
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$V_{RWM}$	crest working reverse voltage		-	600	V
$V_R$	reverse voltage	Square-wave; $\delta = 1.0$	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 108\text{ }^\circ\text{C}$ ; SQW; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	-	15	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 108\text{ }^\circ\text{C}$ ; Square-wave	-	30	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; Sinusoidal waveform	-	130	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; Sinusoidal waveform	-	143	A
$T_{stg}$	storage temperature		-55	150	$^\circ\text{C}$
$T_j$	junction temperature		-	150	$^\circ\text{C}$



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

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



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

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

## 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; <a href="#">Fig. 3</a>	-	-	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	60	-	K/W

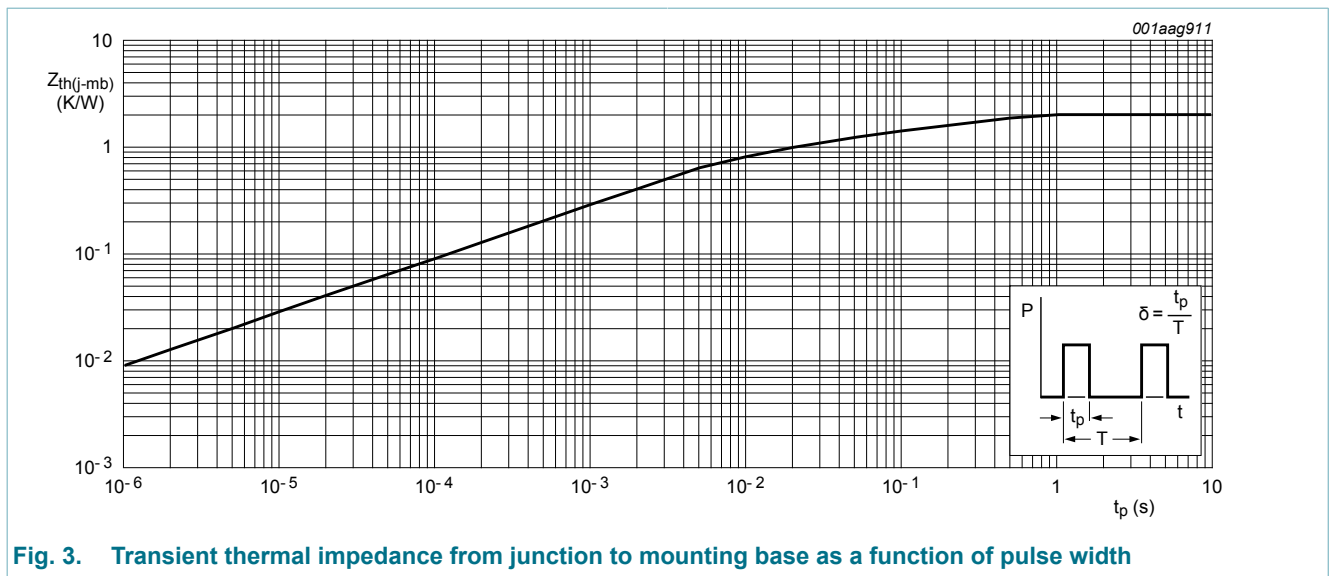
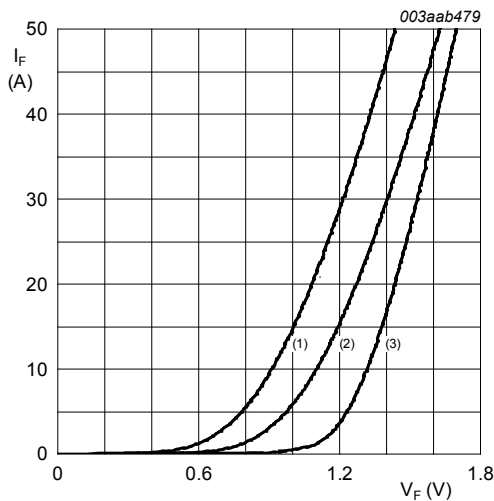


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

## 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 4}$	-	1	1.2	V
		$I_F = 15 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 4}$	-	1.17	1.38	V
$I_R$	reverse current	$V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	5	50	$\mu\text{A}$
		$V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	0.2	0.8	mA
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 2 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s}; \text{ Fig. 5}$	-	40	70	nC
$t_{rr}$	reverse recovery time	$I_F = 1 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	50	60	ns
$I_{RM}$	peak reverse recovery current	$I_F = 10 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 100 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	3	5.2	A
$V_{FR}$	forward recovery voltage	$I_F = 10 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}; \text{ Fig. 6}$	-	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. 4. Forward current as a function of forward voltage

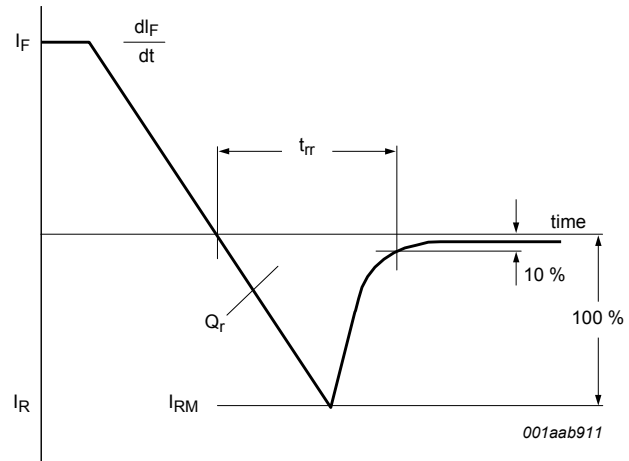


Fig. 5. Forward recovery definitions

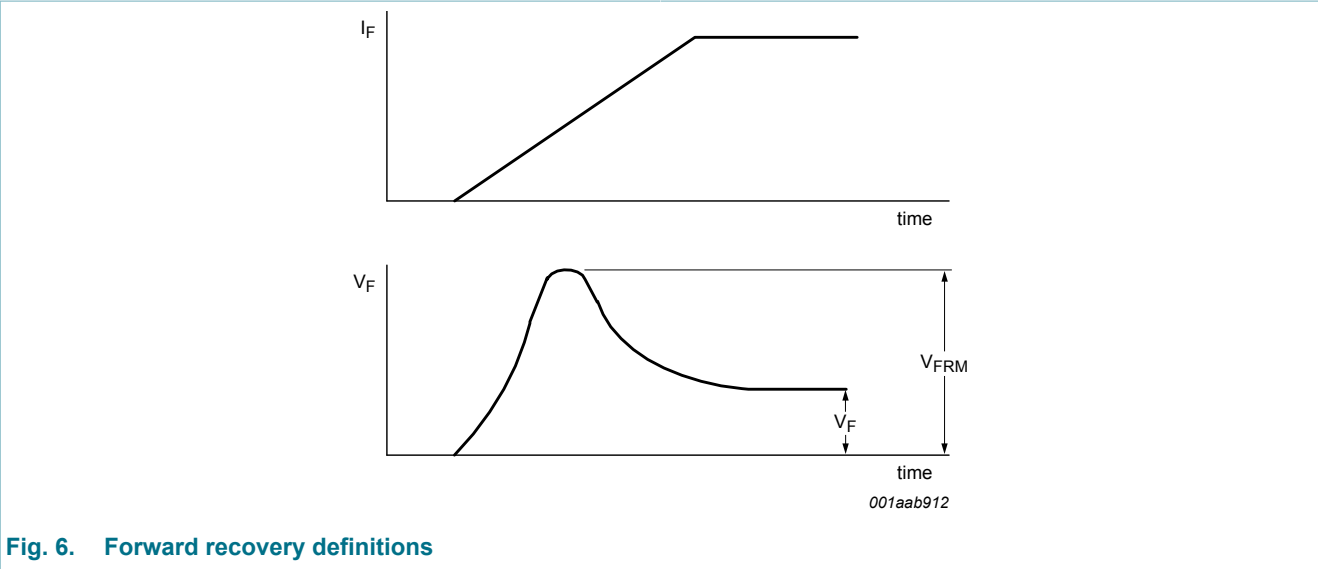


Fig. 6. Forward recovery definitions

### 10. Package outline

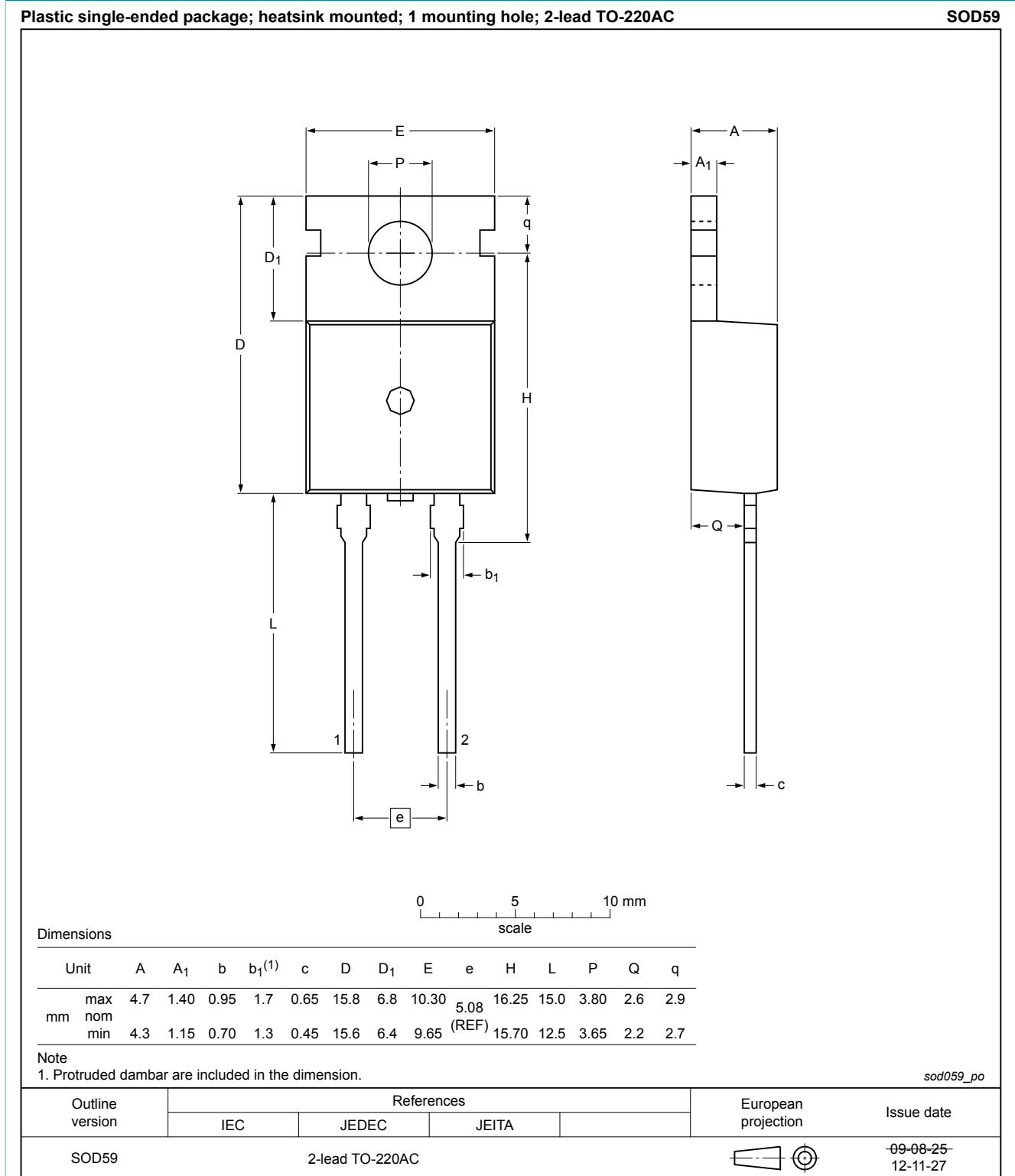


Fig. 7. Package outline TO-220AC (SOD59)

## 11. Legal information

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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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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