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# 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 <sub>RRM</sub>	repetitive peak reverse voltage			-	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>mb</sub> ≤ 108 °C; SQW; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>		-	-	15	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 108 °C; Square-wave		-	-	30	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; Sinusoidal waveform		-	-	130	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; Sinusoidal waveform		-	-	143	A
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 4</a>		-	1	1.2	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 4</a>		-	1.17	1.38	V



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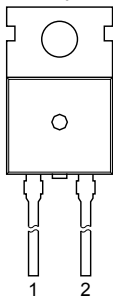
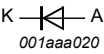
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Rectifier diode ultrafast

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>	
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

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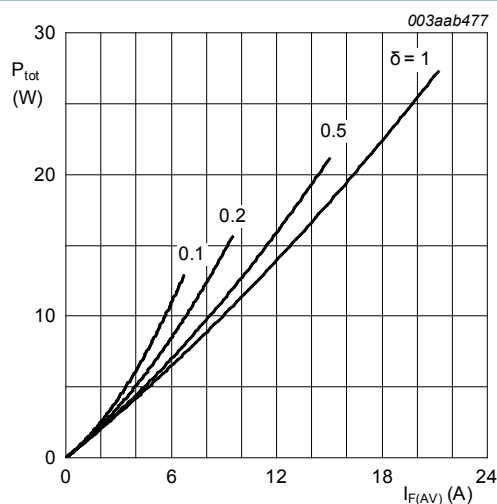
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### 7. Limiting values

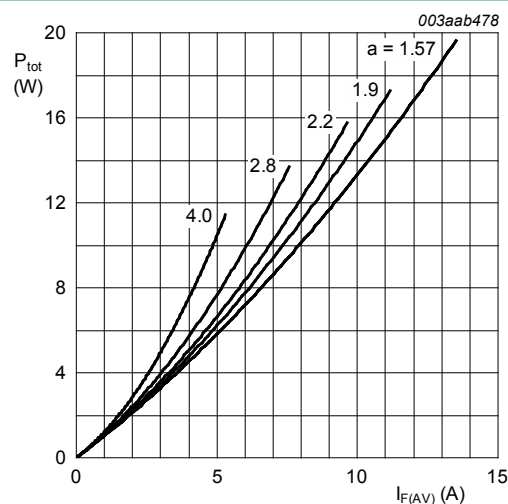
**Table 4. Limiting values**

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	$\delta = 0.5$ ; $T_{mb} \leq 108^\circ\text{C}$ ; SQW; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	-	15	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 108^\circ\text{C}$ ; Square-wave	-	30	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25^\circ\text{C}$ ; Sinusoidal waveform	-	130	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25^\circ\text{C}$ ; Sinusoidal waveform	-	143	A
$T_{stg}$	storage temperature		-55	150	$^\circ\text{C}$
$T_j$	junction temperature		-	150	$^\circ\text{C}$



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



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

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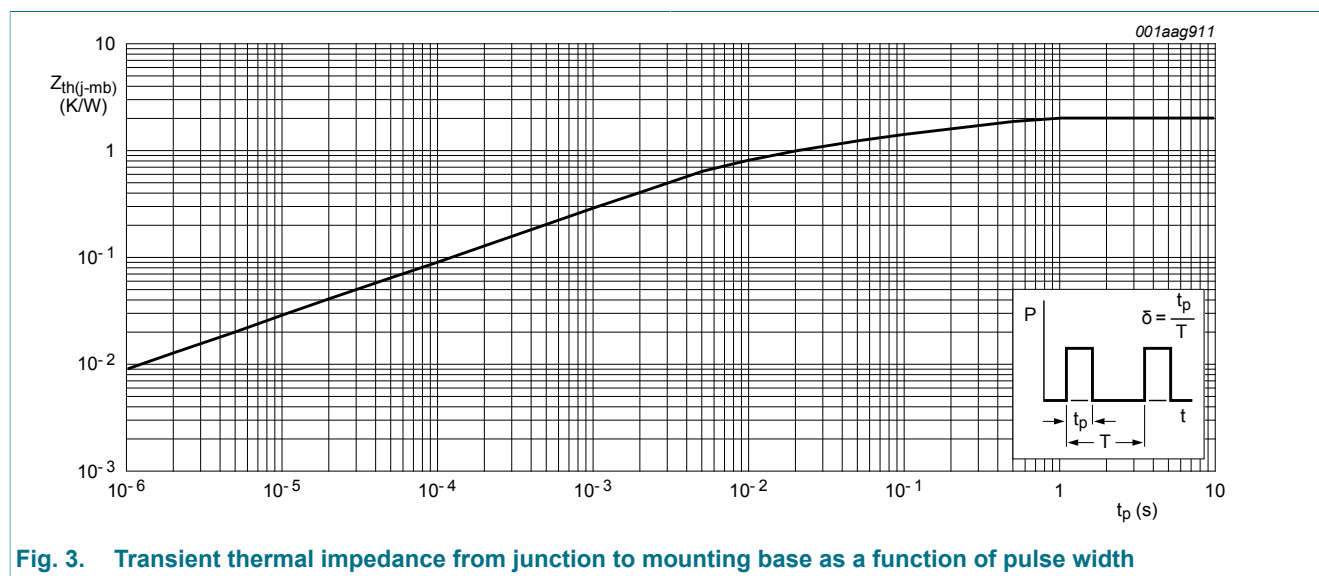
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Rectifier diode ultrafast

### 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**

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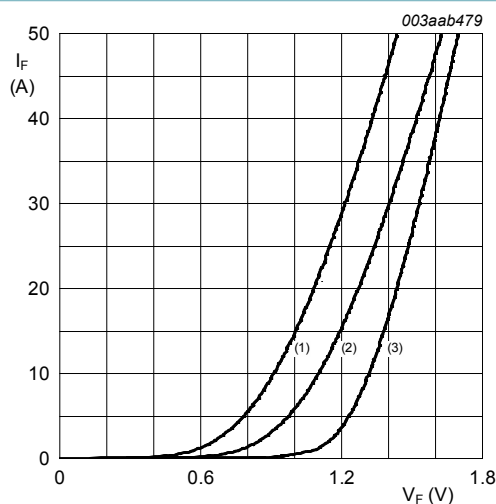
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Rectifier diode ultrafast

### 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 4</a>		-	1	1.2	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 4</a>		-	1.17	1.38	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C		-	5	50	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 100 °C		-	0.2	0.8	mA
Dynamic characteristics							
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 2 A; V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 20 A/μs; <a href="#">Fig. 5</a>		-	40	70	nC
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 5</a>		-	50	60	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 10 A; V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 100 °C; <a href="#">Fig. 5</a>		-	3	5.2	A
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 10 A/μs; <a href="#">Fig. 6</a>		-	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

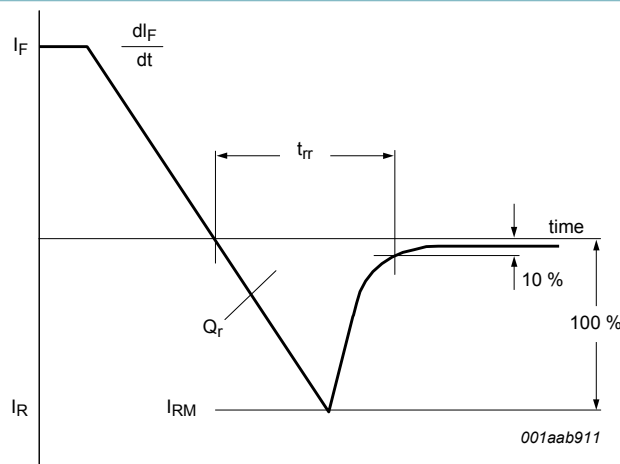


Fig. 5. Forward recovery definitions

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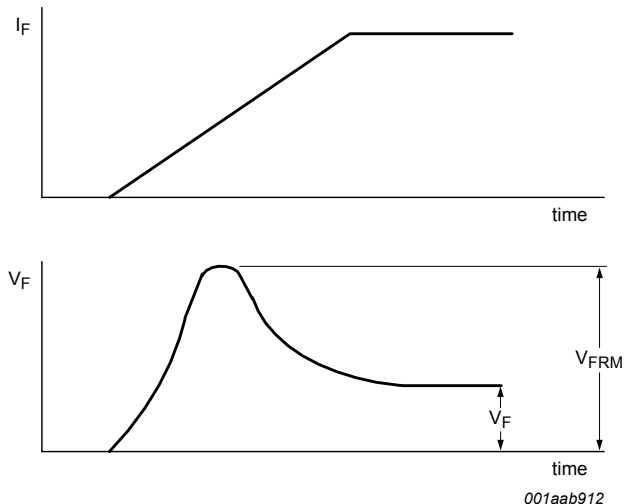


Fig. 6. Forward recovery definitions

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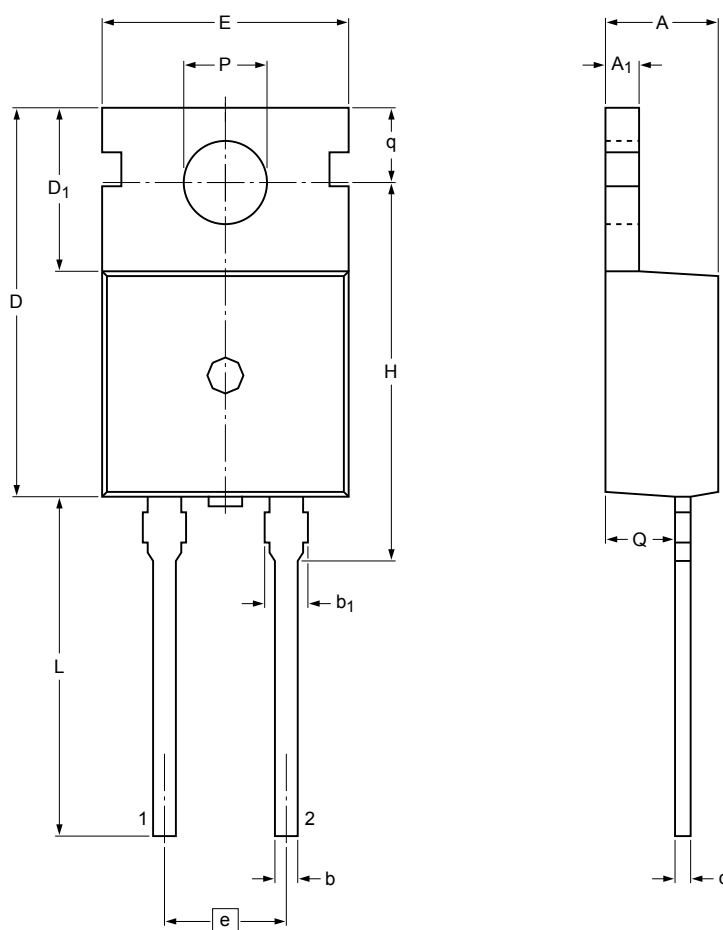
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### 10. Package outline

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

SOD59



#### Dimensions

Unit	A	A <sub>1</sub>	b	b <sub>1</sub> ( <sup>1</sup> )	c	D	D <sub>1</sub>	E	e	H	L	P	Q	q
max	4.7	1.40	0.95	1.7	0.65	15.8	6.8	10.30	5.08	16.25	15.0	3.80	2.6	2.9
nom									(REF)					
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

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



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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.
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## BYT79-600

Rectifier diode ultrafast

### 12. Contents

1	General description .....	1
2	Features and benefits .....	1
3	Application information .....	1
4	Quick reference data .....	1
5	Pinning information .....	2
6	Ordering information .....	2
7	Limiting values .....	3
8	Thermal characteristics .....	4
9	Characteristics .....	5
10	Package outline .....	7
11	Legal information .....	8
11.1	Data sheet status .....	8
11.2	Definitions .....	8
11.3	Disclaimers .....	8
11.4	Trademarks .....	9

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