

## 1. General description

EEPP™ - Efficiency Enhanced Pt Planar diode in a SOD59 (2-leads TO-220AC) plastic package.

## 2. Features and benefits

- Fast switching
- Reduces switching losses with improved lower reverse recovery charge
- Soft recovery characteristics
- Low thermal resistance
- Low leakage current
- High operating temperature capability ( $T_{j(max)} = 175^{\circ}\text{C}$ )
- Higher  $I_{FSM}$  capability
- Planar termination structure

## 3. Applications

- Switched-Mode Power Supplies
- Power factor correction diode
- Uninterrupted Power Supply

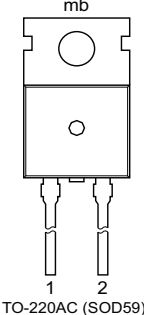

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V <sub>RRM</sub>	repetitive peak reverse voltage		1200				V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; square-wave pulse; T <sub>mb</sub> ≤ 85 °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	30				A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 85 °C; square-wave pulse	60				A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; <a href="#">Fig. 4</a>	270				A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse	300				A
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 30 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	2.7	3.3	V
		I <sub>F</sub> = 30 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	2.1	-	V
Dynamic characteristics							
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. 7</a>		-	-	65	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	70	-	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	153	-	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 150 °C; <a href="#">Fig. 7</a>		-	173	-	ns
Avalanche energy							
E <sub>AS</sub>	non-repetitive avalanche energy	T <sub>j(init)</sub> = 25 °C		30	-	-	mJ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	mb	mounting base; connected to cathod		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC30-1200P	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-leads TO-220AC	SOD59

7. Marking

Table 4. Marking codes

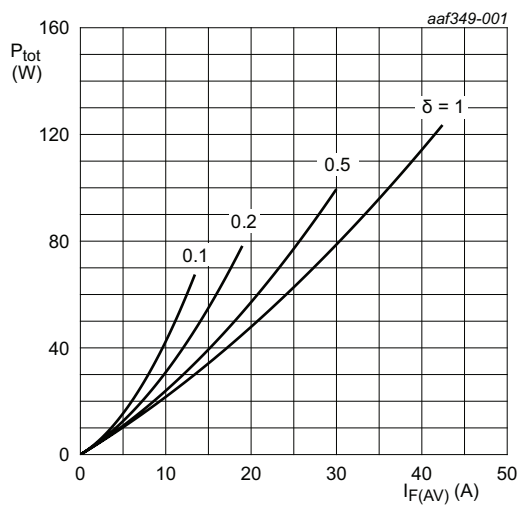
Type number	Marking codes
BYC30-1200P	BYC30-1200P

## 8. Limiting values

**Table 5. Limiting values**

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

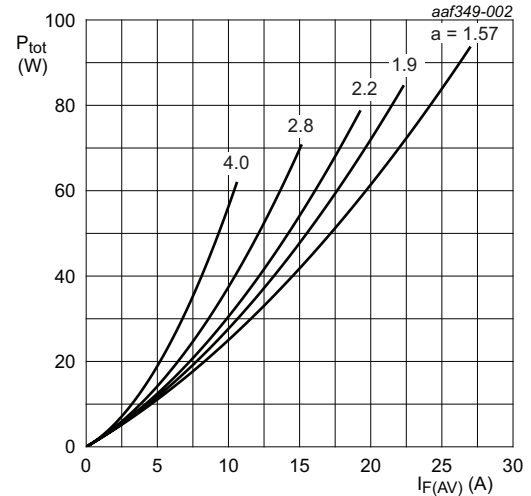
Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		1200	V
$V_{RWM}$	crest working reverse voltage		1200	V
$V_R$	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 85^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	30	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\ \mu\text{s}$ ; $T_{mb} \leq 85^\circ\text{C}$ ; square-wave pulse	60	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\ \text{ms}$ ; $T_{j(\text{init})} = 25^\circ\text{C}$ ; sine-wave pulse; <a href="#">Fig. 4</a>	270	A
		$t_p = 8.3\ \text{ms}$ ; $T_{j(\text{init})} = 25^\circ\text{C}$ ; sine-wave pulse	300	A
$T_{stg}$	storage temperature		-65 to 175	$^\circ\text{C}$
$T_j$	junction temperature		175	$^\circ\text{C}$



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

$$V_o = 1.932\ \text{V}; R_s = 0.0231\ \Omega$$

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



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

$$V_o = 1.932\ \text{V}; R_s = 0.0231\ \Omega$$

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

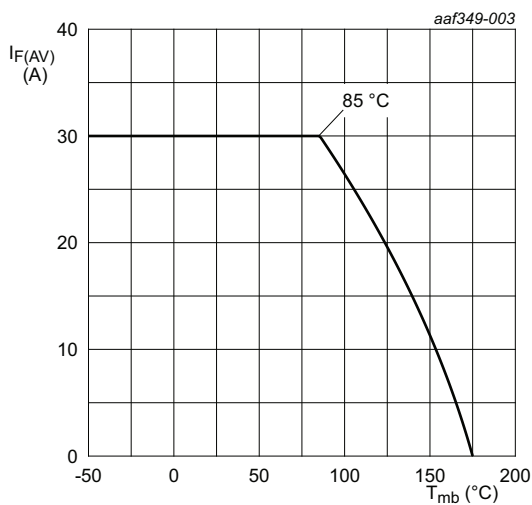


Fig. 3. Forward current as a function of mounting base temperature; maximum values

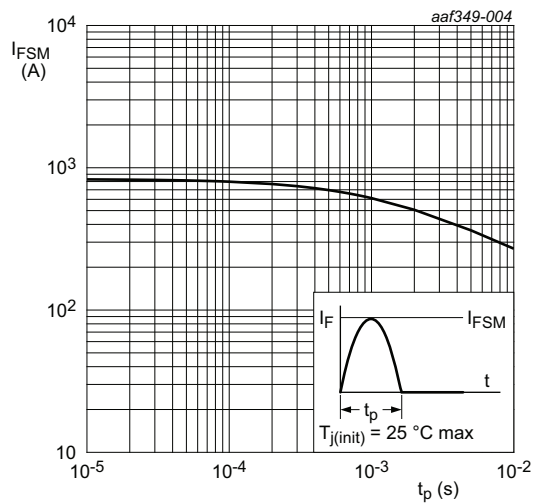
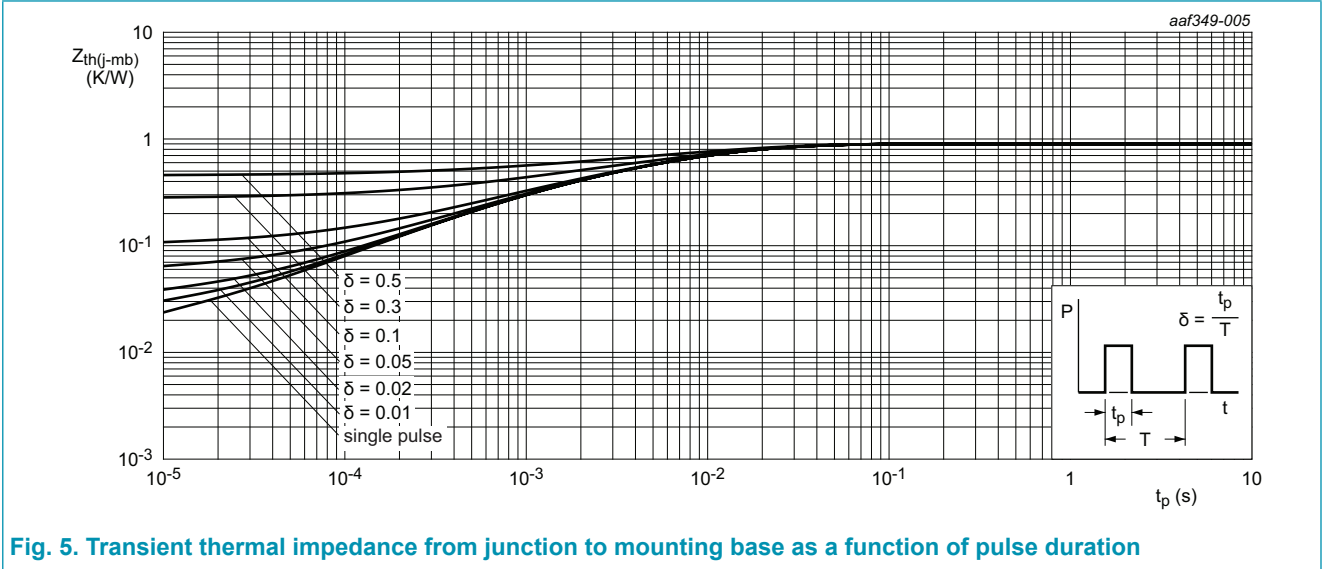


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

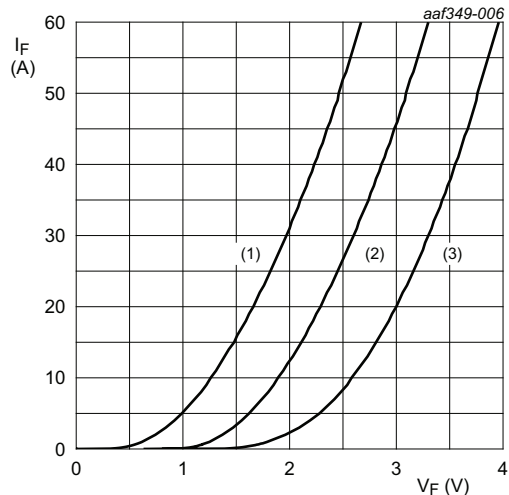
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	<a href="#">Fig. 5</a>	-	-	0.9	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W



## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward current	I <sub>F</sub> = 30 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	2.7	3.3	V
		I <sub>F</sub> = 30 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	2.1	-	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 1200 V; T <sub>j</sub> = 25 °C		-	-	250	μA
		V <sub>R</sub> = 1200 V; T <sub>j</sub> = 150 °C		-	-	1	mA
Dynamic characteristics							
Q <sub>r</sub>	reverse charge	I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	572	-	nC
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	1573	-	nC
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 150 °C; <a href="#">Fig. 7</a>		-	1940	-	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. 7</a>		-	-	65	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	70	-	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	153	-	ns
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 150 °C; <a href="#">Fig. 7</a>		-	173	-	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	16	-	A
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	21	-	A
		I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 150 °C; <a href="#">Fig. 7</a>		-	22	-	A
Avalanche energy							
E <sub>AS</sub>	non-repetitive avalanche energy	T <sub>j(init)</sub> = 25 °C		30	-	-	mJ



$V_o = 1.932\text{ V}; R_s = 0.0231\ \Omega$   
(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. 6. Forward current as a function of forward voltage

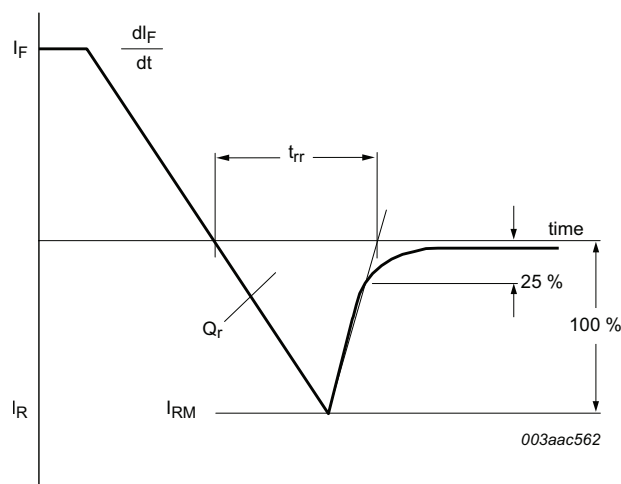
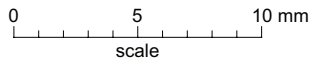
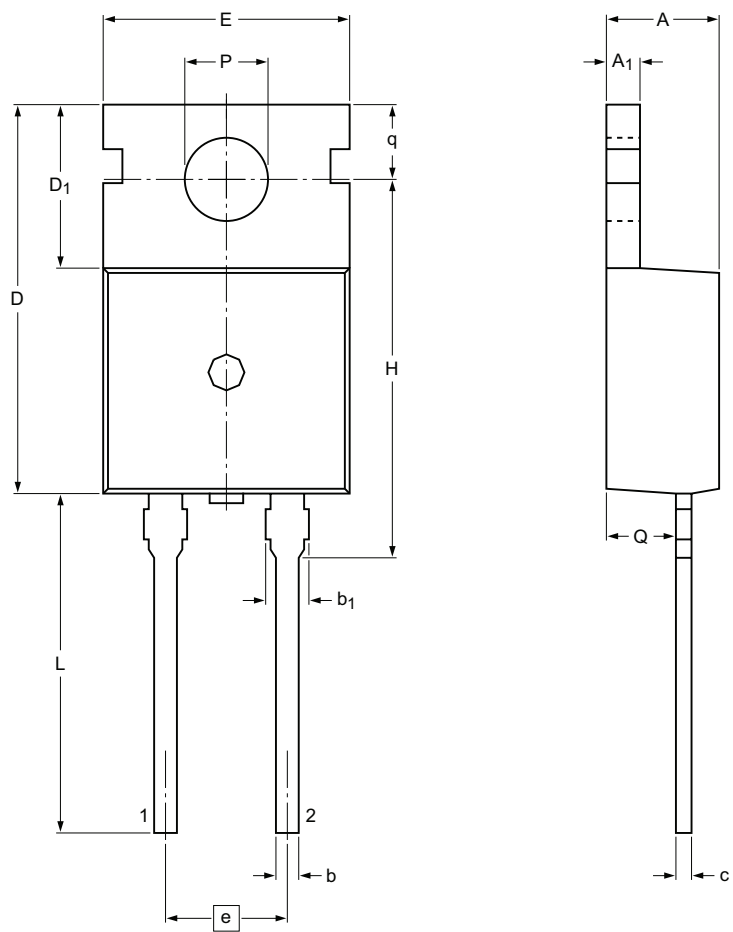


Fig. 7. Reverse recovery definitions; ramp recovery

11. 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
mm	max	4.7	1.40	0.95	1.7	0.65	15.8	6.8	10.30	16.25	15.0	3.80	2.6	2.9
	nom								5.08					
	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. 8. Package outline SOD59



## 12. Legal information

### 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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