BYC15-1200P

Hyperfast power diode

Rev.03 - 27 August 2018 Product data sheet

1. General description

EEPP™- Efficiency Enhanced Pt Planar rectifier in a SOD59 (2-lead 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
- Planar termination structure
- High operating temperature capability ($T_{j\,(max)}$ = 175°C)
- Higher I_{FSM} capability

3. Applications

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

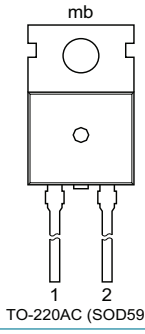
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		1200				V
$I_{F(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 120$ °C; Fig. 1; Fig. 2; Fig. 3	15				A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq 120$ °C; square-wave pulse	30				A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	180				A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse;	200				A
Symbol	**Parameter**	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 15 A; T_j = 25 °C; Fig. 6		-	2.5	3.2	V
		I_F = 15 A; T_j = 150 °C; Fig. 6		-	2.0	-	V
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; Fig. 7		-	45	-	ns
Avalanche energy							
E_{AS}	non-repetitive avalanche energy	$T_{j(init)}$ = 25 °C		20	-	-	mJ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 TO-220AC (SOD59)	 *001aaa020*
2	A	anode		
mb	mb	mounting base; connected to cathod		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC15-1200P	TO-220AC	Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

7. Marking

Table 4. Marking codes

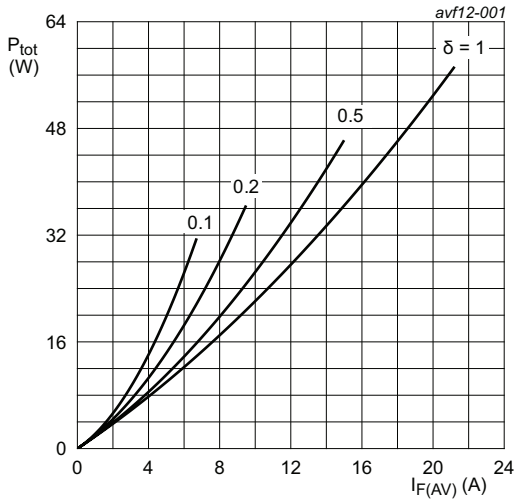
Type number	Marking codes
BYC15-1200P	BYC15-1200P

8. Limiting values

Table 5. Limiting values

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

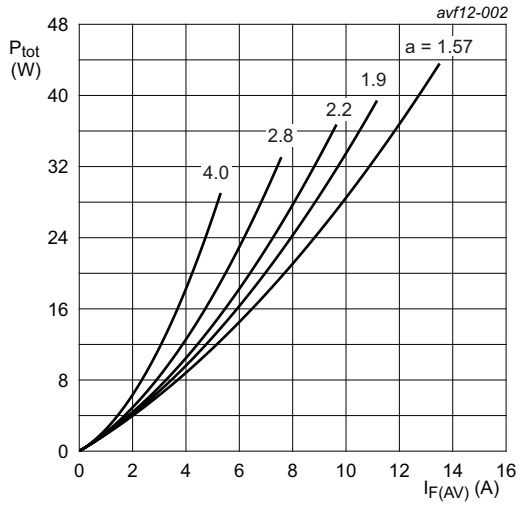
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		1200	V
V_{RWM}	crest working reverse voltage		1200	V
V_R	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	δ = 0.5 ; square-wave pulse; $T_{mb} \leq 120$ °C; Fig. 1; Fig. 2; Fig. 3	15	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{mb} \leq 120$ °C; square-wave pulse	30	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	180	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse;	200	A
T_{stg}	storage temperature		-65 to 175	°C
T_j	junction temperature		175	°C



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

V_o = 1.775 V; R_s = 0.0436 Ω

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



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

Vo = 1.775 V; Rs = 0.0436 Ω

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

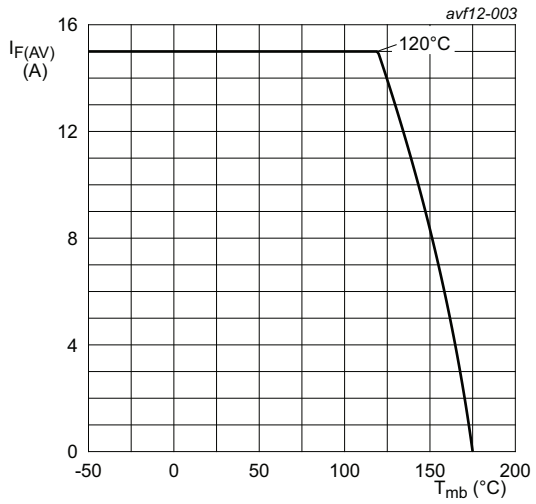


Fig. 3. Forward current as a function of mounting base temperature; maximum values

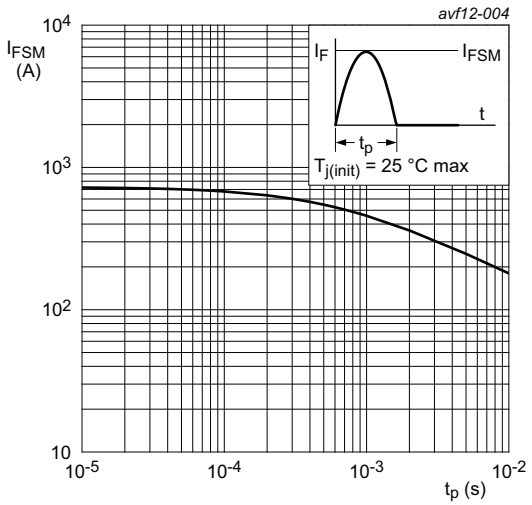


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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	Fig. 5		-	-	1.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

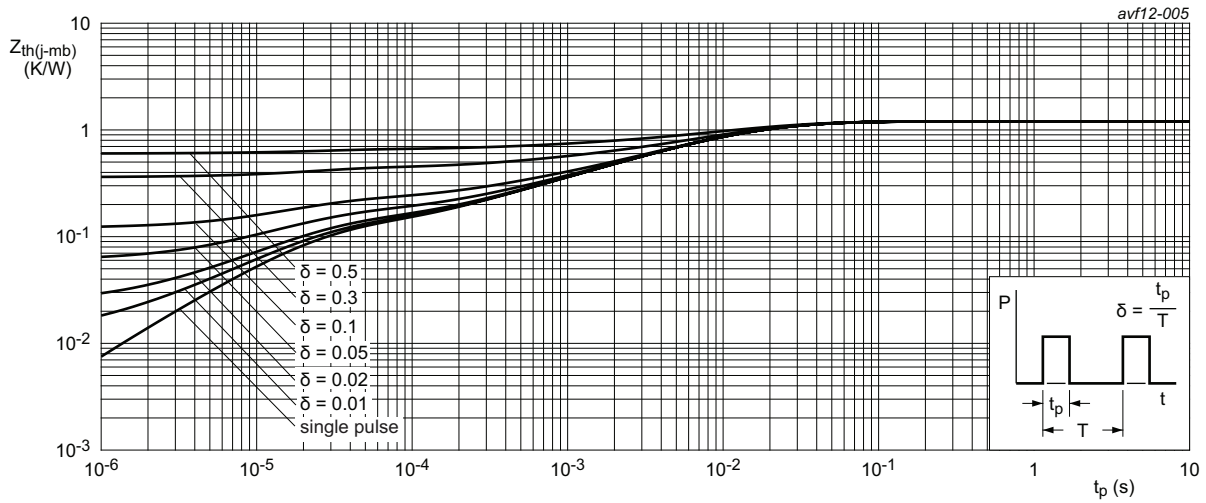
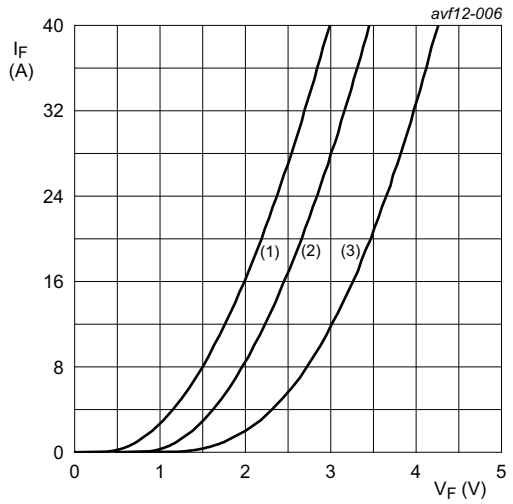


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_F	forward current	I_F = 15 A; T_j = 25 °C; Fig. 6		-	2.5	3.2	V
		I_F = 15 A; T_j = 150 °C; Fig. 6		-	2.0	-	V
I_R	reverse current	V_R = 1200 V; T_j = 25 °C		-	-	100	µA
		V_R = 1200 V; T_j = 150 °C		-	-	500	µA
Dynamic characteristics							
Q_r	reverse charge	I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 7		-	394	-	nC
		I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125 °C; Fig. 7		-	1003	-	nC
		I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 150 °C; Fig. 7		-	1143	-	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; Fig. 7		-	45	-	ns
		I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 7		-	61	-	ns
		I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125 °C; Fig. 7		-	120	-	ns
		I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 150 °C; Fig. 7		-	128	-	ns
I_{RM}	peak reverse recovery current	I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 7		-	12.6	-	A
		I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 125 °C; Fig. 7		-	16.7	-	A
		I_F = 15 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 150 °C; Fig. 7		-	17.8	-	A
Avalanche energy							
E_{AS}	non-repetitive avalanche energy	$T_{j(init)}$ = 25 °C		20	-	-	mJ



V_o = 1.775 V; R_s = 0.0436 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 6. Forward current as a function of forward voltage

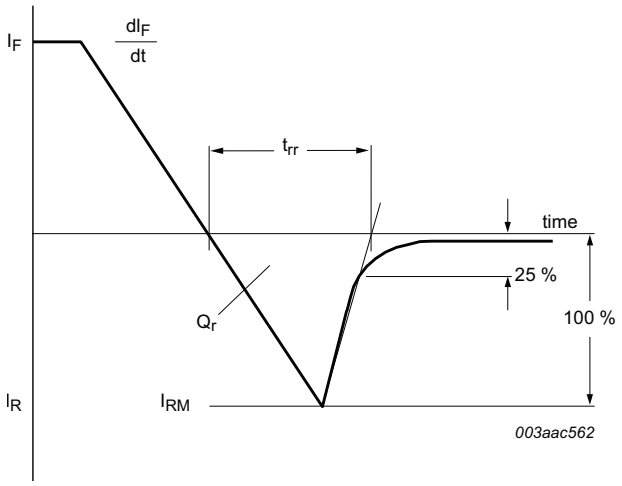
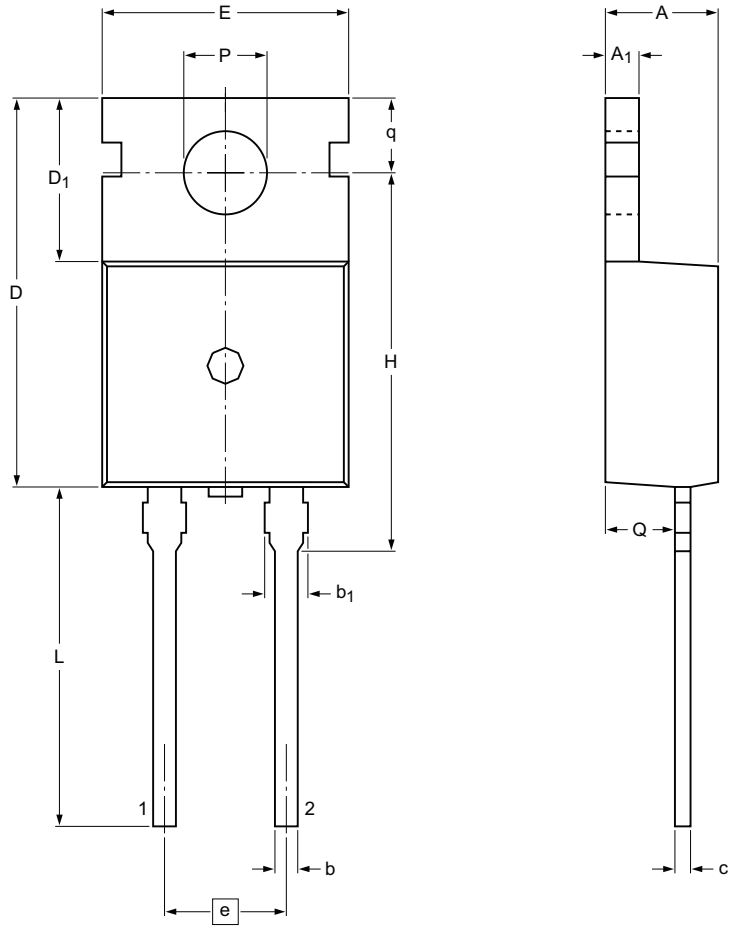


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC **SOD59**



0 5 10 mm

scale

Dimensions

Unit		A	A_1	b	b_1[1]	c	D	D_1	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	5.08 (REF)	16.25	15.0	3.80	2.6	2.9
	nom														
	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

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.

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

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