

1. General description

EEPP™ - Efficiency Enhanced Pt Planar diode in a SOD142 (2-leads TO247) 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

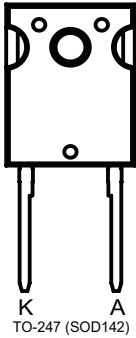
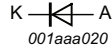
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		1200			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 95^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	30			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25 \mu\text{s}$; $T_{mb} \leq 95^{\circ}\text{C}$; square-wave pulse	60			A
I_{FSM}	non-repetitive peak forward current	$t_p = 10 \text{ ms}$; $T_{j(init)} = 25^{\circ}\text{C}$; sine-wave pulse; Fig. 4	270			A
		$t_p = 8.3 \text{ ms}$; $T_{j(init)} = 25^{\circ}\text{C}$; sine-wave pulse;	300			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 30 \text{ A}$; $T_j = 25^{\circ}\text{C}$; Fig. 6	-	2.7	3.3	V
		$I_F = 30 \text{ A}$; $T_j = 150^{\circ}\text{C}$; Fig. 6	-	2.1	-	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}$; $V_R = 30 \text{ V}$; $di_F/dt = 100 \text{ A}/\mu\text{s}$; $T_j = 25^{\circ}\text{C}$; Fig. 7	-	-	65	ns
		$I_F = 30 \text{ A}$; $V_R = 400 \text{ V}$; $di_F/dt = 500 \text{ A}/\mu\text{s}$; $T_j = 25^{\circ}\text{C}$; Fig. 7	-	70	-	ns
		$I_F = 30 \text{ A}$; $V_R = 400 \text{ V}$; $di_F/dt = 500 \text{ A}/\mu\text{s}$; $T_j = 125^{\circ}\text{C}$; Fig. 7	-	153	-	ns
		$I_F = 30 \text{ A}$; $V_R = 400 \text{ V}$; $di_F/dt = 500 \text{ A}/\mu\text{s}$; $T_j = 150^{\circ}\text{C}$; Fig. 7	-	173	-	ns
Avalanche energy						
E_{AS}	non-repetitive avalanche energy	$T_{j(init)} = 25^{\circ}\text{C}$	30	-	-	mJ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>K A TO-247 (SOD142)</p>	 <p>K A 001aaa020</p>
2	A	anode		
mb	mb	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BYC30W-1200P	TO-247	plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 2-leads TO-247	SOD142

7. Marking

Table 4. Marking codes

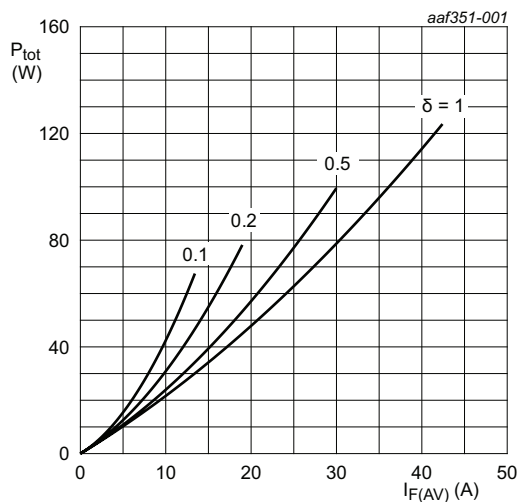
Type number	Marking codes
BYC30W-1200P	BYC30W-1200P

8. Limiting values

Table 5. Limiting values

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

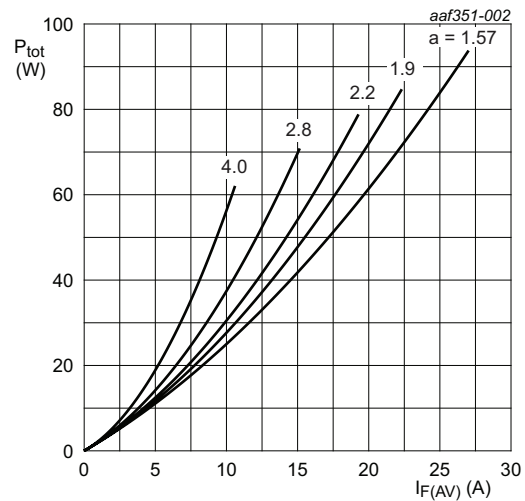
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		1200	V
V_{RWM}	crest working reverse voltage		1200	V
V_R	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 95\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	30	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 95\text{ }^\circ\text{C}$; square-wave pulse	60	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse; Fig. 4	270	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse;	300	A
T_{stg}	storage temperature		-65 to 175	$^\circ\text{C}$
T_j	junction temperature		175	$^\circ\text{C}$



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

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

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



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

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

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

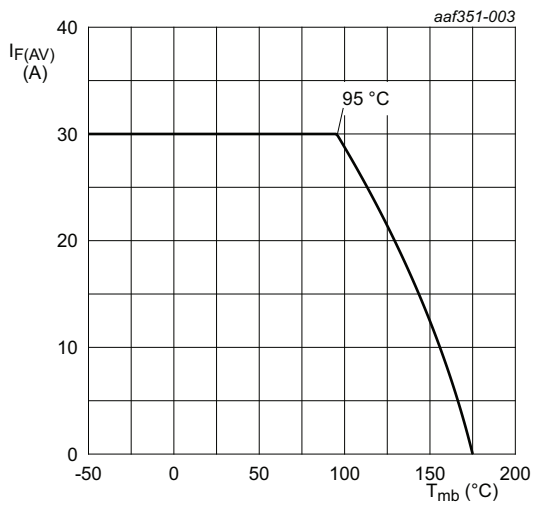


Fig. 3. Forward current as a function of mounting base temperature; maximum values

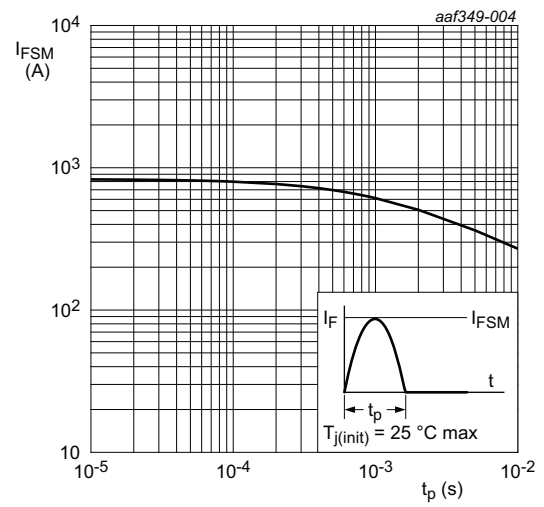


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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	Fig. 5	-	-	0.8	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

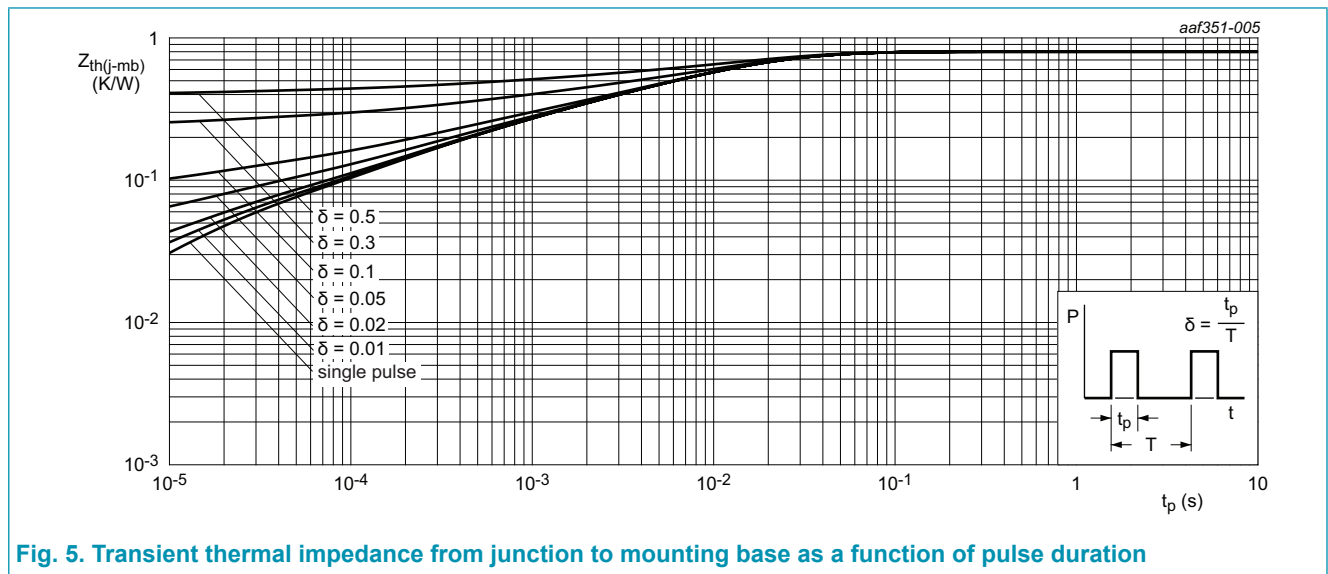
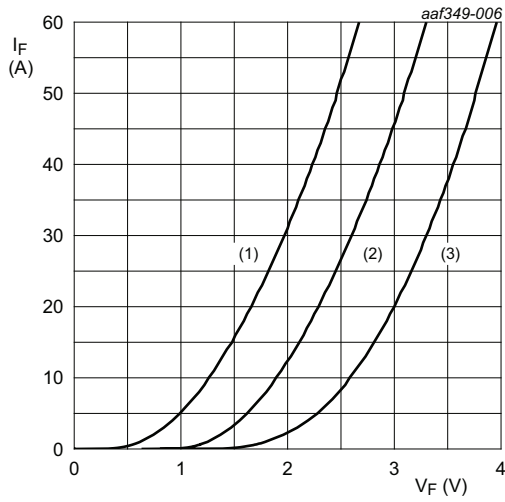


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward current	$I_F = 30 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	2.7	3.3	V
		$I_F = 30 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	2.1	-	V
I_R	reverse current	$V_R = 1200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	250	μA
		$V_R = 1200 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	1	mA
Dynamic characteristics						
Q_r	reverse charge	$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	572	-	nC
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	1573	-	nC
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	1940	-	nC
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; di_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	-	65	ns
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	70	-	ns
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	153	-	ns
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	173	-	ns
I_{RM}	peak reverse recovery current	$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	16	-	A
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 125 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	21	-	A
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 150 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	22	-	A
Avalanche energy						
E_{AS}	non-repetitive avalanche energy	$T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$	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

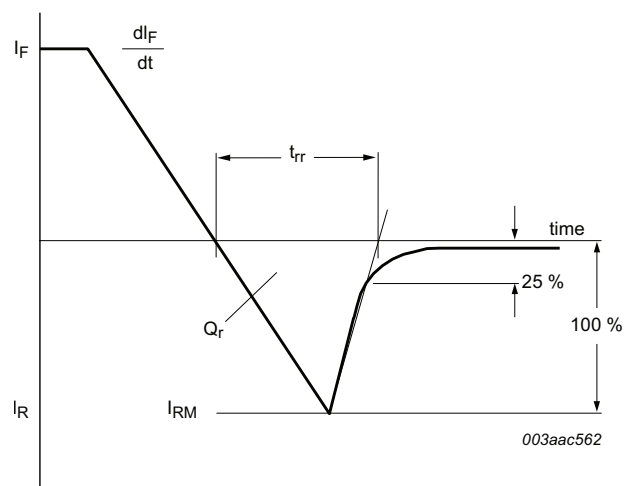
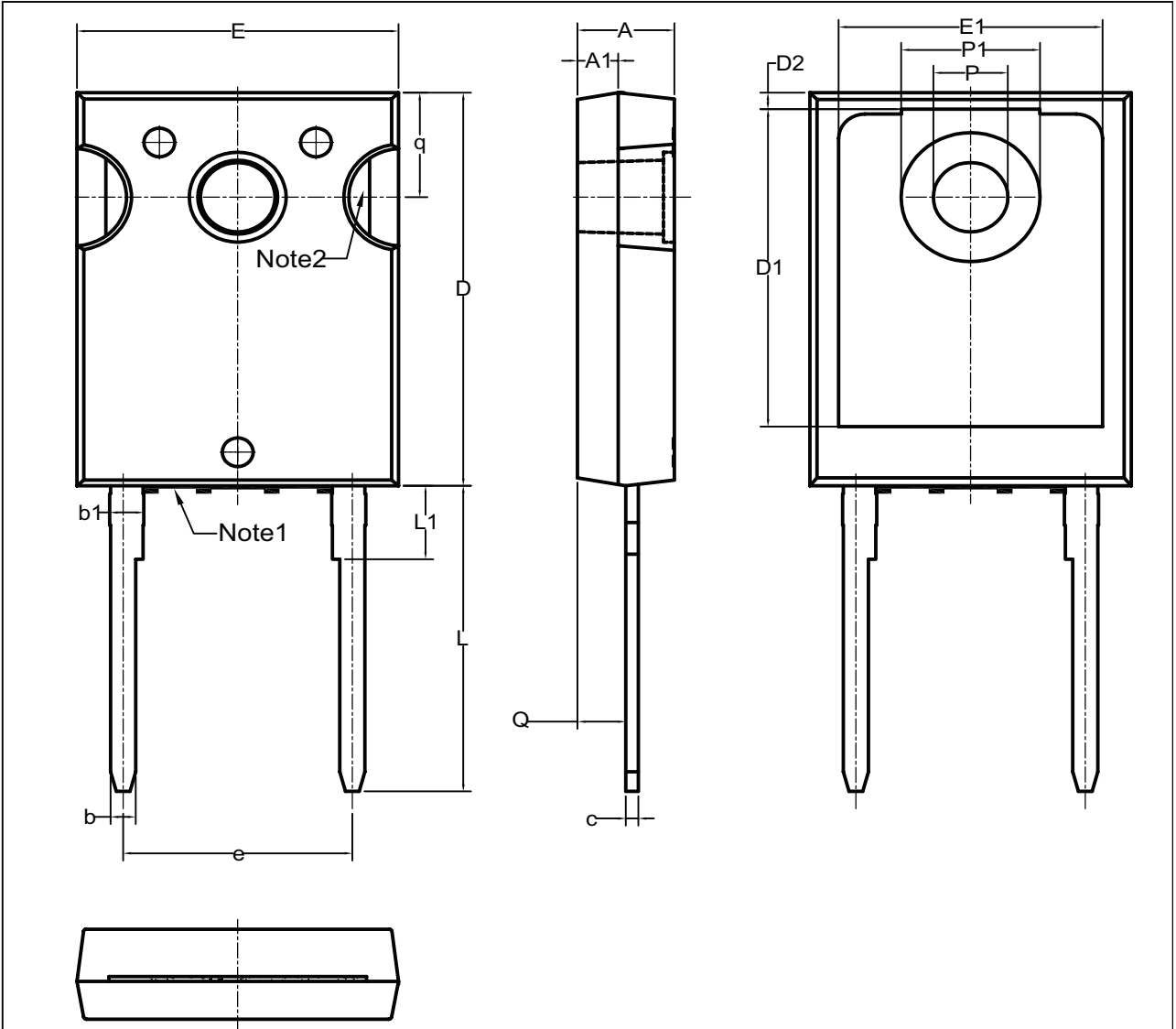


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 2 leads TO-247

TO247-2L



Unit	A	A1	b	b1	c	D	D1	D2	E	E1	e	L	L1	P	P1	Q	q	
MM	min	4.58	1.83	1.17	1.53	0.51	20.32	13.08	0.51	15.37	12.81	11.126	15.75	3.69	3.51	6.61	2.29	5.34
	max	4.82	2.13	1.35	1.77	0.71	20.82	---	1.35	15.87	---	16.25	3.93	3.65	6.85	2.66	5.58	

Note:
 1. Mold resin protrusion.
 2. Metal exposed with Sn plating.

Fig. 8. Package outline SOD142 (TO247)

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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Date of release: 27 August 2018
