Product data sheet

1. General description

Hyperfast power diode in a SOD142 (2-lead TO247) plastic package.

2. Features and benefits

- Low leakage current
- Low thermal resistance
- · Low reverse recovery current
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

- Active PFC in air conditioner
- Continuous Current Mode (CCM) Power Factor Correction (PFC)
- Half-bridge/full-bridge switched-mode power supplies

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V_R	reverse voltage	DC		-	-	600	V
I _{F(AV)}	average forward current	δ = 0.5; T _{mb} ≤ 115 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3		-	-	30	A
I _{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4		-	-	270	Α
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse		-	-	300	A
Static characte	eristics						
V _F	forward voltage	I _F = 30 A; T _j = 25 °C; <u>Fig. 6</u>		-	2	2.75	V
		I _F = 30 A; T _j = 150 °C; <u>Fig. 6</u>		-	1.38	1.8	V
Dynamic characteristics							
t _{rr}	reverse recovery time	$I_F = 1 \text{ A}$; $V_R = 30 \text{ V}$; $dI_F/dt = 200 \text{ A/}\mu\text{s}$; $T_j = 25 \text{ °C}$; Fig. 7		-	18	22	ns

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package					
	Name	Description	Version			
BYC30W-600P	TO-247	Plastic Single-ended through-hole package; Heatsink mounted; 1 mounting hole; 2-lead TO-247	SOD142			

7. Marking

Table 4. Marking codes

Type number	Marking code
BYC30W-600P	BYC30W-600P

8. Limiting values

Table 5. 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	DC	-	600	V
I _{F(AV)}	average forward current	$δ = 0.5$; $T_{mb} \le 115$ °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	30	Α
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 μ s; $T_{mb} \le 115$ °C; square-wave pulse	-	60	Α
I _{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	-	270	Α
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse	-	300	Α
T _{stg}	storage temperature		-65	175	°C
T _j	junction temperature		-	175	°C

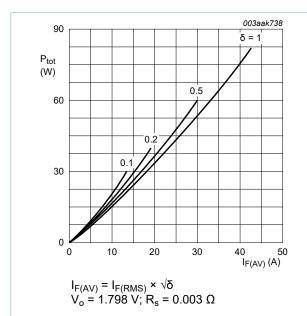


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

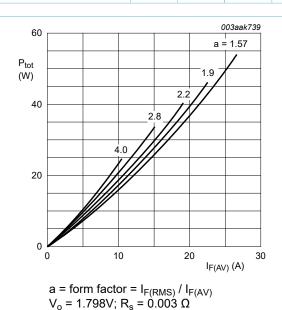


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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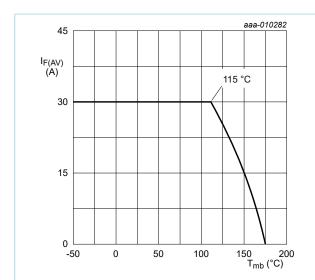


Fig. 3. Forward current as a function of mounting base temperature; maximum values

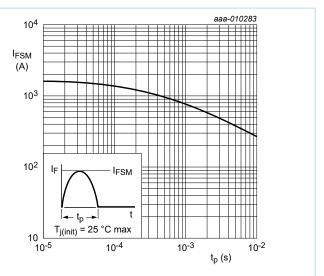
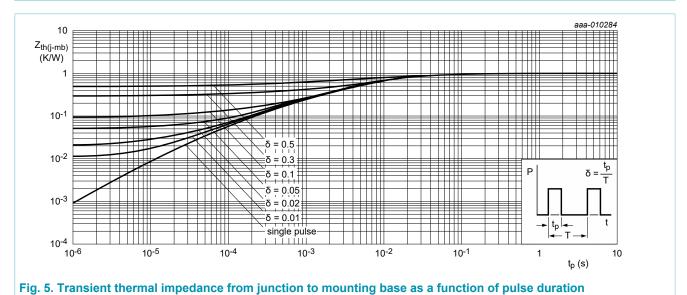


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R _{th(j-mb)}	thermal resistance from junction to mounting base	with heatsink compound; Fig. 5	-	-	1	K/W
R _{th(j-a)}	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W



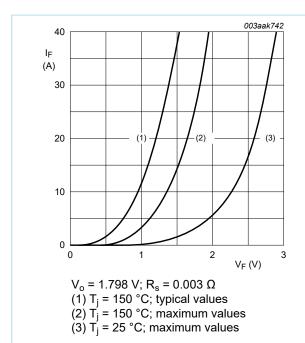
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static chara	acteristics		,			
V _F	forward voltage	I _F = 30 A; T _j = 25 °C; <u>Fig. 6</u>	-	2	2.75	V
		I _F = 30 A; T _j = 150 °C; <u>Fig. 6</u>	-	1.38	1.8	V
I _R	reverse current	V _R = 600 V; T _j = 25 °C	-	-	10	μΑ
		V _R = 600 V; T _j = 150 °C	-	-	1	mA
Dynamic ch	naracteristics					
t _{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 200 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; Fig. 7$	-	18	22	ns
		$I_F = 30 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_j = 25 ^{\circ}\text{C}; Fig. 7$	-	35	-	ns
		$I_F = 30 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_j = 125 ^{\circ}\text{C}; Fig. 7$	-	70	-	ns
		$I_F = 30 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/$ μ s; $T_j = 25 ^{\circ}\text{C}; Fig. 7$	-	29	-	ns
I _{RM}	peak reverse recovery current	$I_F = 30 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_j = 25 ^{\circ}\text{C}; Fig. 7$	-	3.5	-	A
		$I_F = 30 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_j = 125 ^{\circ}\text{C}; Fig. 7$	-	7.6	-	A
Q _r	recovered charge	$I_F = 30 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_j = 25 ^{\circ}\text{C}; Fig. 7$	-	50	-	nC
		$I_F = 30 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_i = 125 ^{\circ}\text{C}; Fig. 7$	-	280	-	nC

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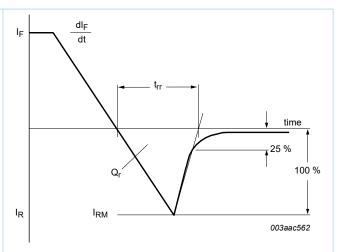
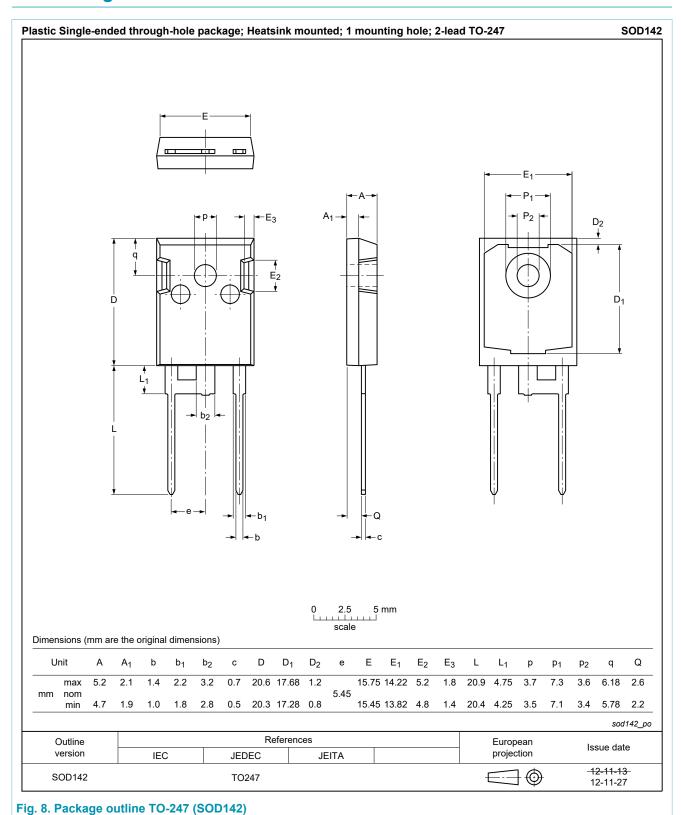


Fig. 7. Reverse recovery definitions; ramp recovery

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11. Package outline



12. 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.
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