

1. General description

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

2. Features and benefits

- Fast switching and soft reverse recovery characteristics
- Low forward voltage drop
- Low leakage current
- Low reverse recovery current
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

- UPS
- EV Charger
- Welding Machine
- Air Conditioner

4. Quick reference data

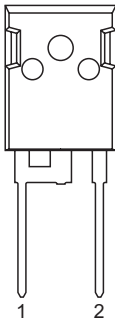
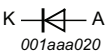
Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V _{RRM}	repetitive peak reverse voltage		600				V
I _{F(AV)}	average forward current	δ = 0.5 ; square-wave pulse; T _{mb} ≤ 88 °C; Fig. 1 ; Fig. 2 ; Fig. 3	75				A
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t _p = 25 μs; T _{mb} ≤ 88 °C; square-wave pulse	150				A
I _{FSM}	non-repetitive peak forward current	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse; Fig. 4	700				A
		t _p = 8.3 ms; T _{j(init)} = 25 °C; sine-wave pulse	750				A
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 75 A; T _j = 25 °C; Fig. 6		-	2.2	2.75	V
		I _F = 75 A; T _j = 150 °C; Fig. 6		-	1.6	2.1	V
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 50 A/μs; T _j = 25 °C; Fig. 7		-	-	50	ns

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		$I_F = 75\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7		-	42	-	ns
		$I_F = 75\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 200\text{ A}/\mu\text{s}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 7		-	106	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		 001aaa020
2	A	anode		
mb	mb	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYC75W-600P	TO247-2L	BYC75W-600PQ	Tube	30	SOD142	8-Aug-2019

7. Marking

Table 4. Marking codes

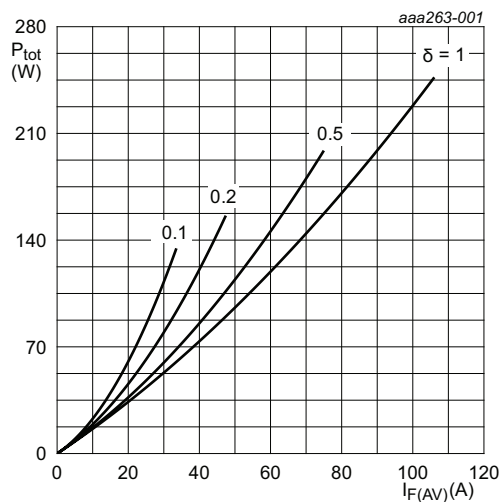
Type number	Marking codes
BYC75W-600P	BYC75W 600P

8. Limiting values

Table 5. Limiting values

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

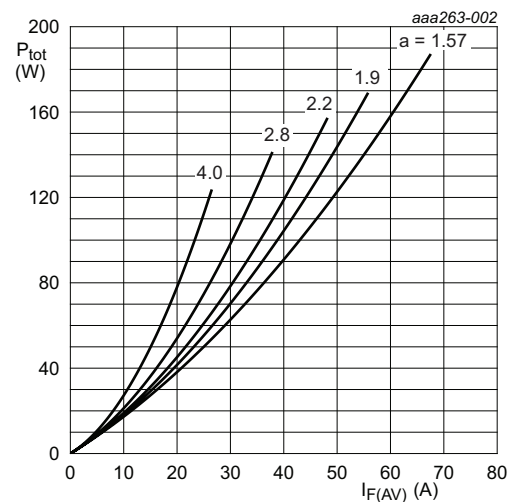
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 88^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	75	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 88^\circ\text{C}$; square-wave pulse	150	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse; Fig. 4	700	A
		$t_p = 8.3\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse	750	A
T_{stg}	storage temperature		-55 to 175	$^\circ\text{C}$
T_j	junction temperature		-55 to 175	$^\circ\text{C}$



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

$$V_o = 1.547\ \text{V}; R_s = 0.0074\ \Omega$$

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



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

$$V_o = 1.547\ \text{V}; R_s = 0.0074\ \Omega$$

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

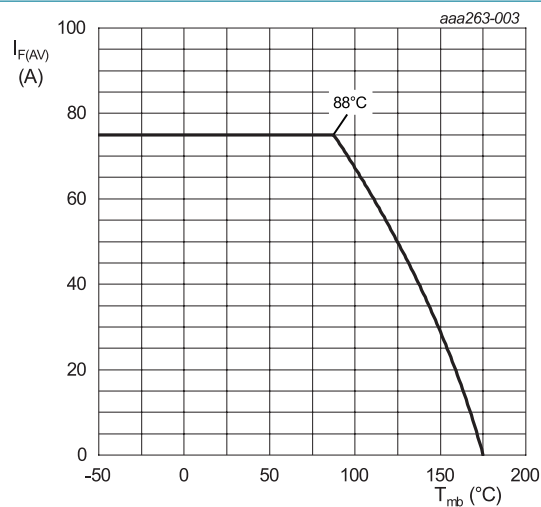


Fig. 3. Forward current as a function of mounting base temperature; typical values

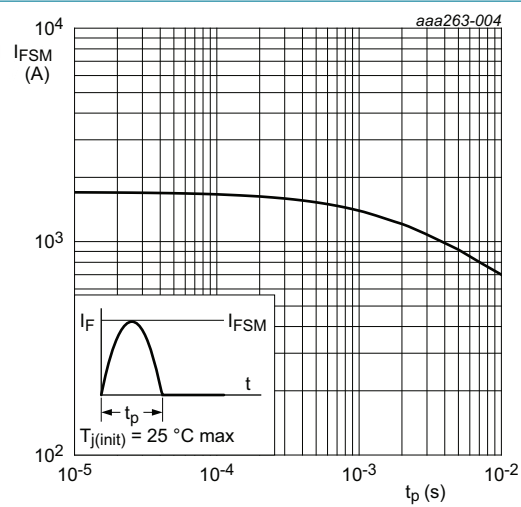


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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

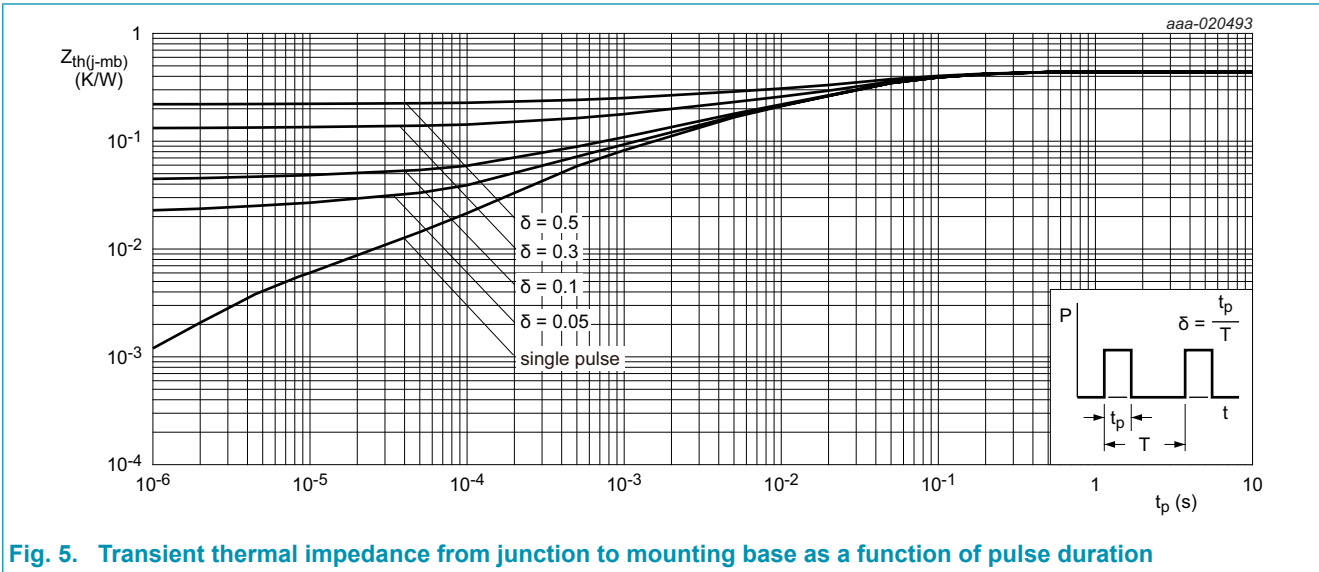
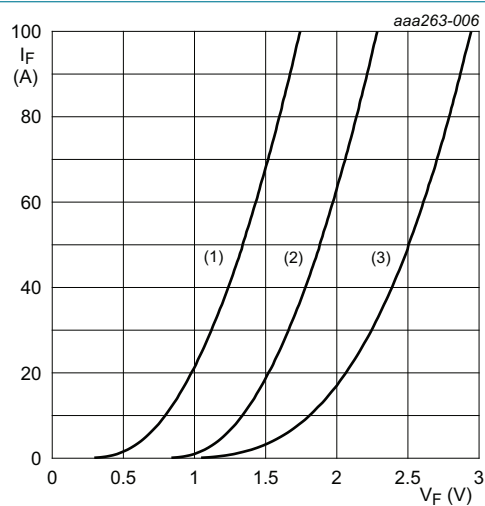


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 75 A; T _J = 25 °C; Fig. 6		-	2.2	2.75	V
		I _F = 75 A; T _J = 150 °C; Fig. 6		-	1.6	2.1	V
I _R	reverse current	V _R = 600 V; T _J = 25 °C		-	-	10	μA
		V _R = 600 V; T _J = 125 °C		-	-	1	mA
Dynamic characteristics							
Q _r	reverse charge	I _F = 75 A; V _R = 400 V; dI _F /dt = 200 A/μs; T _J = 25 °C; Fig. 7		-	85	-	nC
		I _F = 75 A; V _R = 400 V; dI _F /dt = 200 A/μs; T _J = 125 °C; Fig. 7		-	640	-	nC
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 50 A/μs; T _J = 25 °C; Fig. 7		-	-	50	ns
		I _F = 75 A; V _R = 400 V; dI _F /dt = 200 A/μs; T _J = 25 °C; Fig. 7		-	42	-	ns
		I _F = 75 A; V _R = 400 V; dI _F /dt = 200 A/μs; T _J = 125 °C; Fig. 7		-	106	-	ns
I _{RM}	peak reverse recovery current	I _F = 75 A; V _R = 400 V; dI _F /dt = 200 A/μs; T _J = 25 °C; Fig. 7		-	4.1	-	A
		I _F = 75 A; V _R = 400 V; dI _F /dt = 200 A/μs; T _J = 125 °C; Fig. 7		-	12.2	-	A
E _{as}	non-repetitive avalanche energy	I _R = 1 A; L = 40 mH; T _J (init) = 25 °C		20	-	-	mJ



$V_o = 1.547 \text{ V}; R_s = 0.0074 \text{ } \Omega$

(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

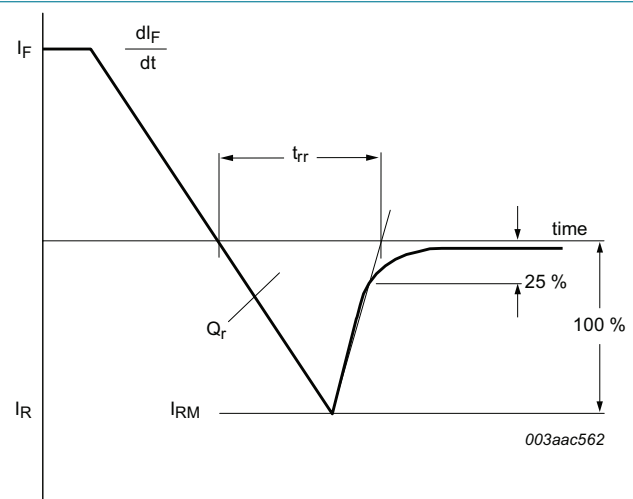
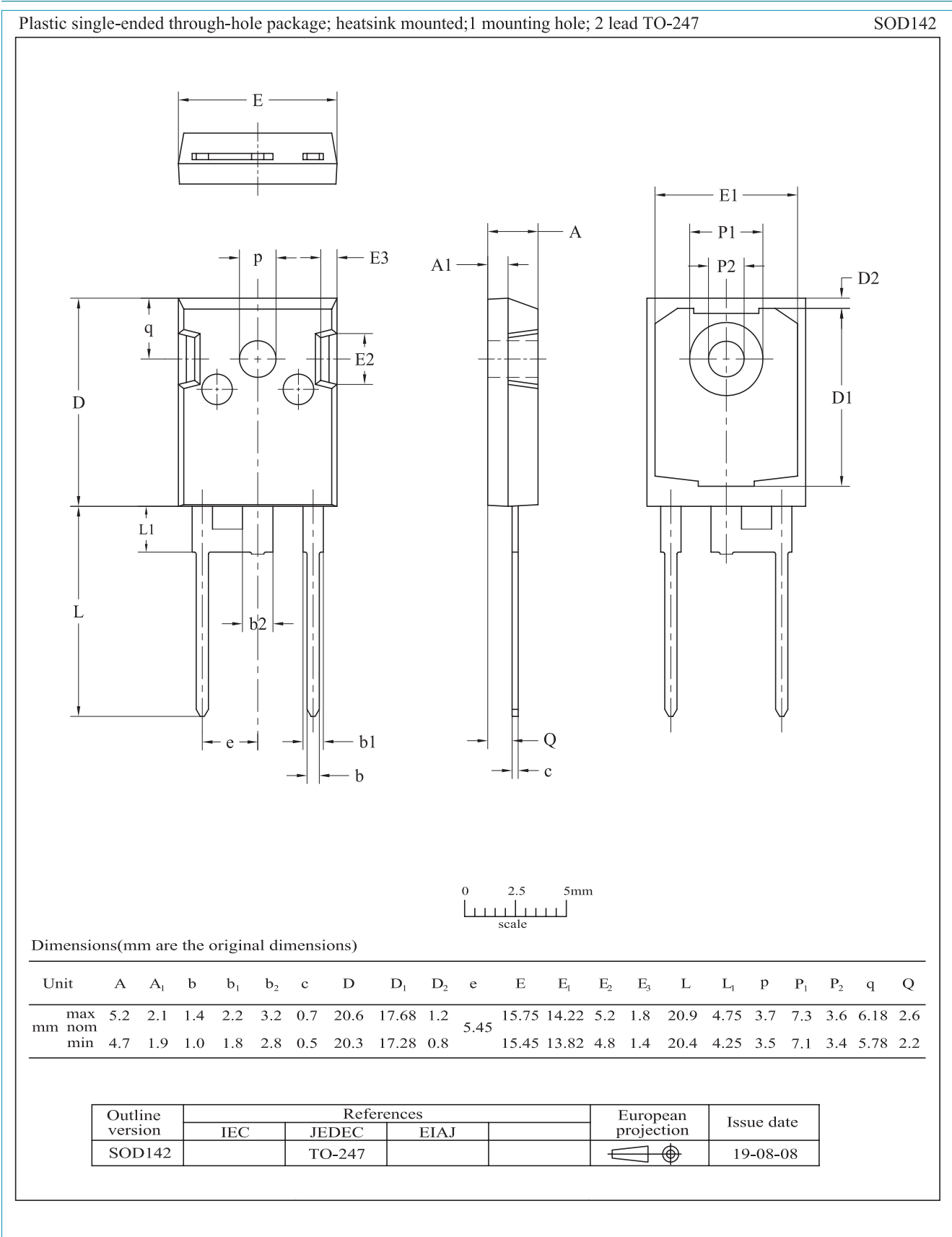


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline



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

1. General description.....	1
2. Features and benefits	1
3. Applications	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values	3
9. Thermal characteristics	5
10. Characteristics.....	6
11. Package outline	7
12. Legal information	8
13. Contents	10

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