

1. General description

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

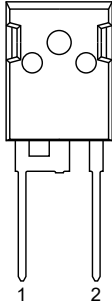
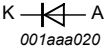
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{RRM}	repetitive peak reverse voltage			-	-	600	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} ≤ 56 °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3		-	-	75	A
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t _p = 25 μs; T _{mb} ≤ 56 °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; Fig. 4		-	-	750	A
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	 TO-247 (SOD142)	
2	A	anode		
mb	mb	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BYC75W-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
BYC75W-600P	BYC75W-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	$\delta = 0.5$; $T_{mb} \leq 56^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	75	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 56^\circ\text{C}$; 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; Fig. 4	-	750	A
T_{stg}	storage temperature		-55	175	$^\circ\text{C}$
T_j	junction temperature		-	175	$^\circ\text{C}$

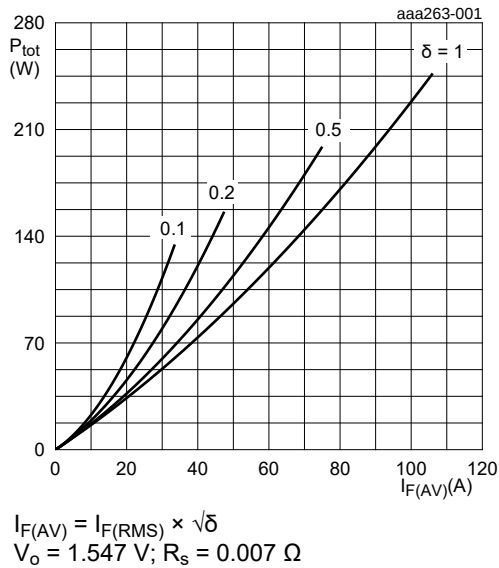


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

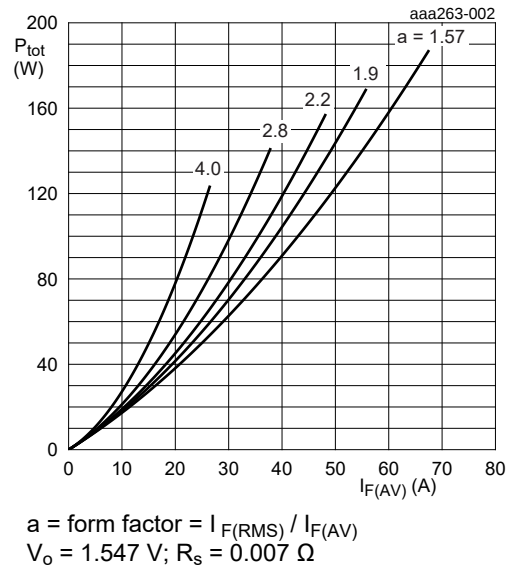


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

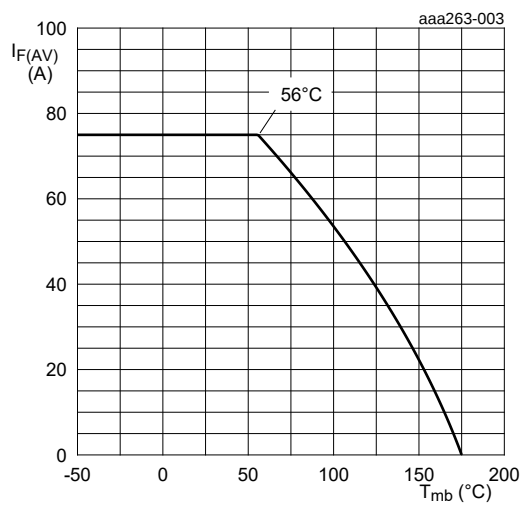


Fig. 3. Forward current as a function of mounting base temperature; maximum values

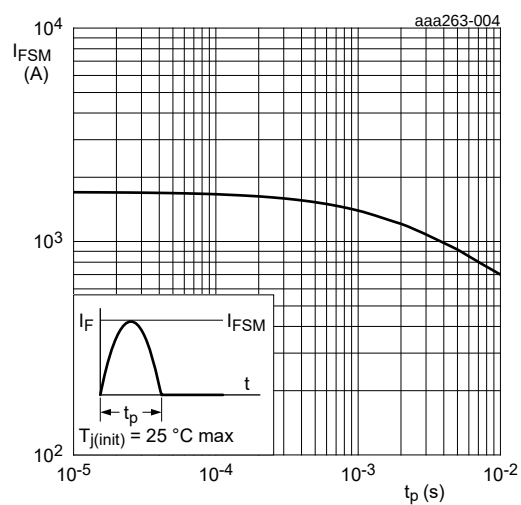


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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	full cycles; Fig. 5	-	-	0.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W

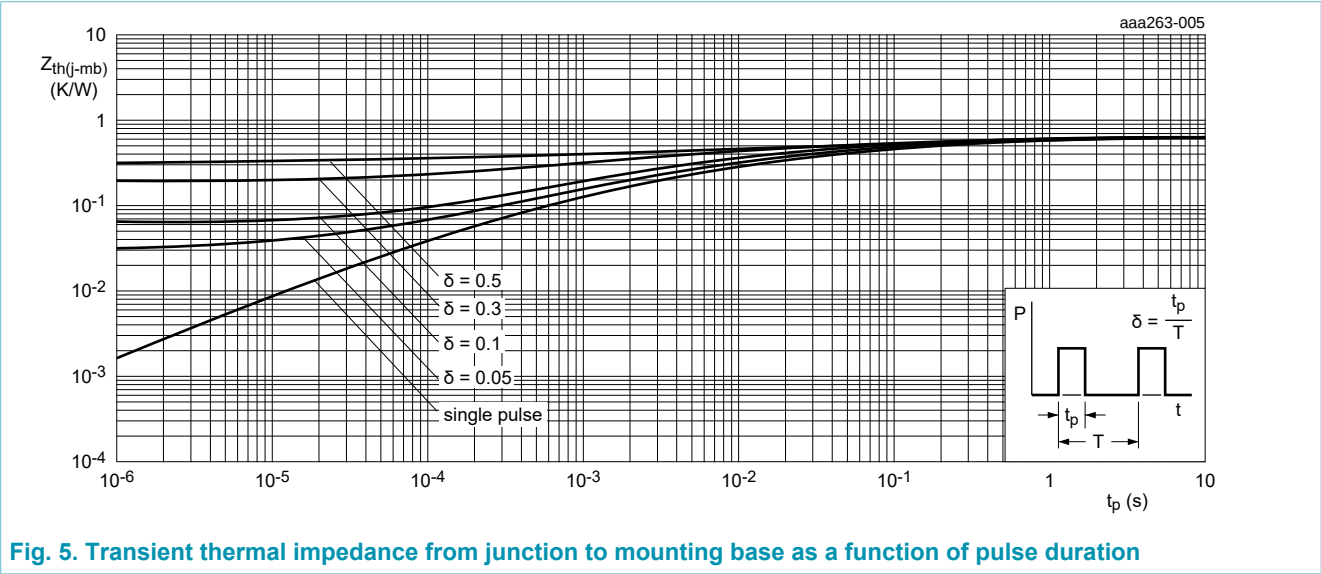


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

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	recovered 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 = 60 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _j = 125 °C; Fig. 7		-	12.2	-	A

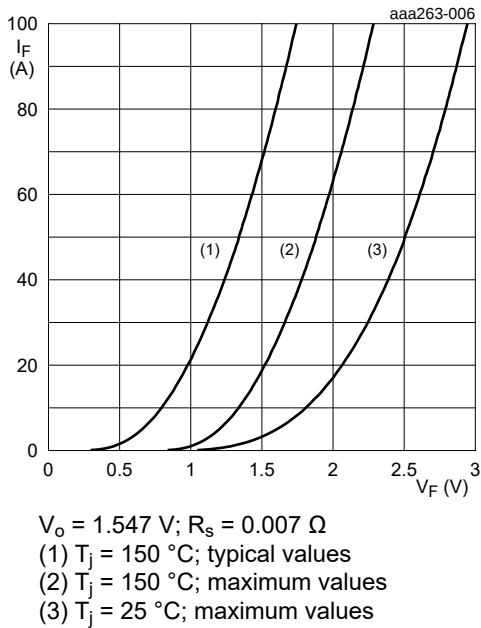


Fig. 6. Forward current as a function of forward voltage

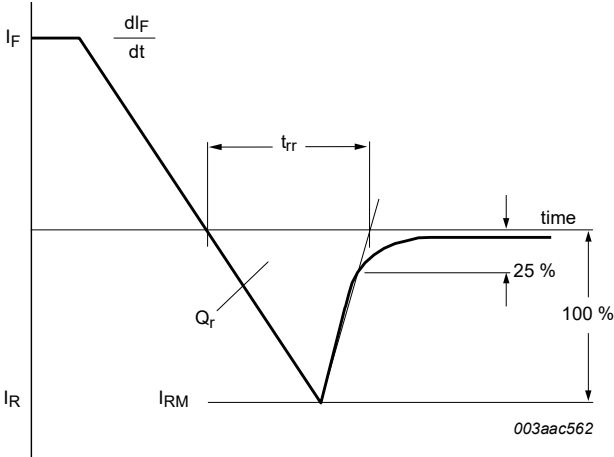


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

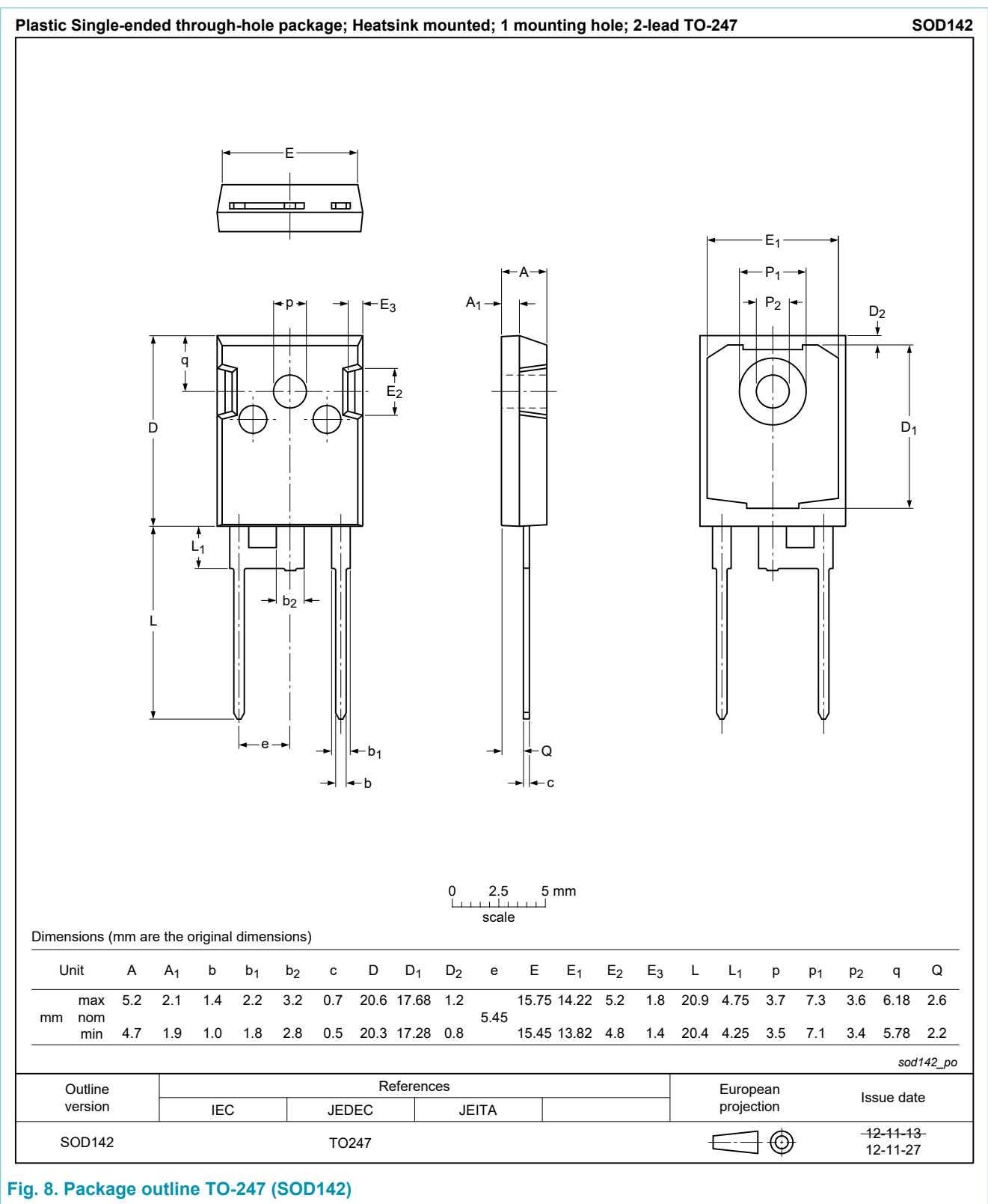


Fig. 8. Package outline TO-247 (SOD142)

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.
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