

## 1. General description

Ultrafast 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

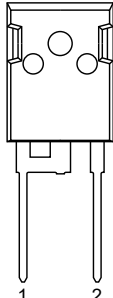
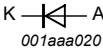
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V <sub>R</sub>	reverse voltage	DC		-	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>mb</sub> ≤ 70 °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		-	-	60	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; <a href="#">Fig. 4</a>		-	-	600	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; <a href="#">Fig. 4</a>		-	-	660	A
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 60 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.55	2	V
		I <sub>F</sub> = 60 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1.2	1.6	V
Dynamic characteristics							
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	-	55	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		
	Name	Description	Version
BYV60W-600P	TO-247	Plastic Single-ended through-hole package; Heatsink mounted; 1 mounting hole; 2-lead TO-247	SOD142

7. Limiting values

Table 4. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>RRM</sub>	repetitive peak reverse voltage		-	600	V
V <sub>RWM</sub>	crest working reverse voltage		-	600	V
V <sub>R</sub>	reverse voltage	DC	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>mb</sub> ≤ 70 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	60	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 70 °C; square-wave pulse	-	120	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; Fig. 4	-	600	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; Fig. 4	-	660	A
T <sub>stg</sub>	storage temperature		-55	175	°C
T <sub>j</sub>	junction temperature		-	175	°C

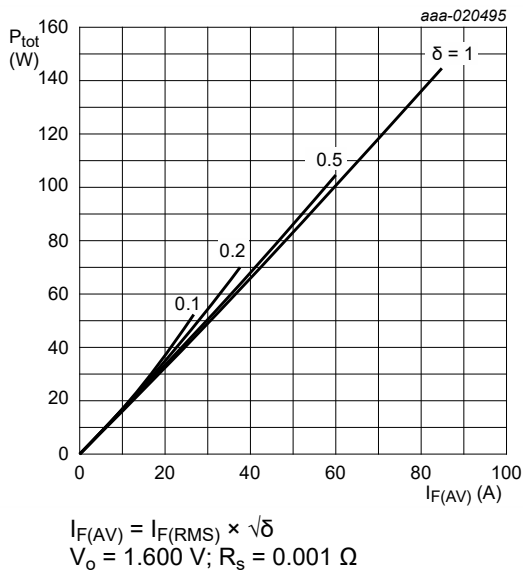


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

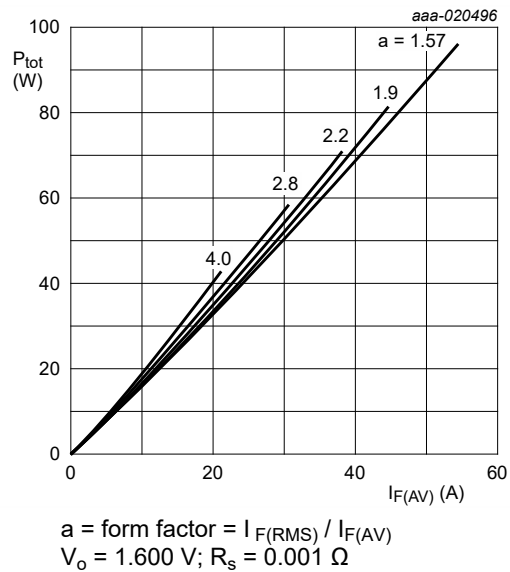


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

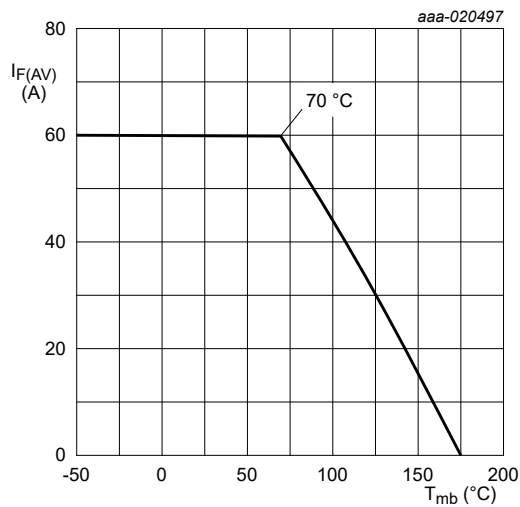


Fig. 3. Forward current as a function of mounting base temperature; maximum values

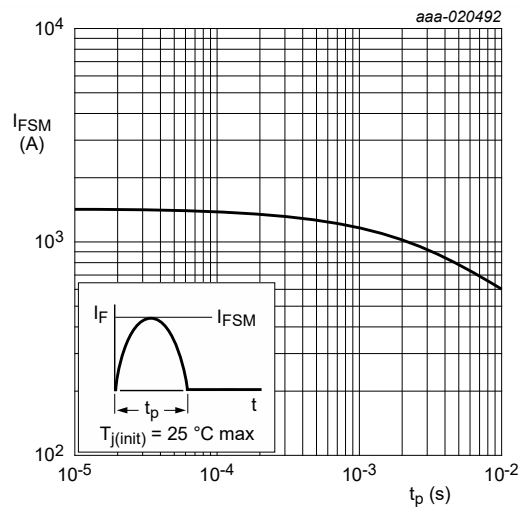
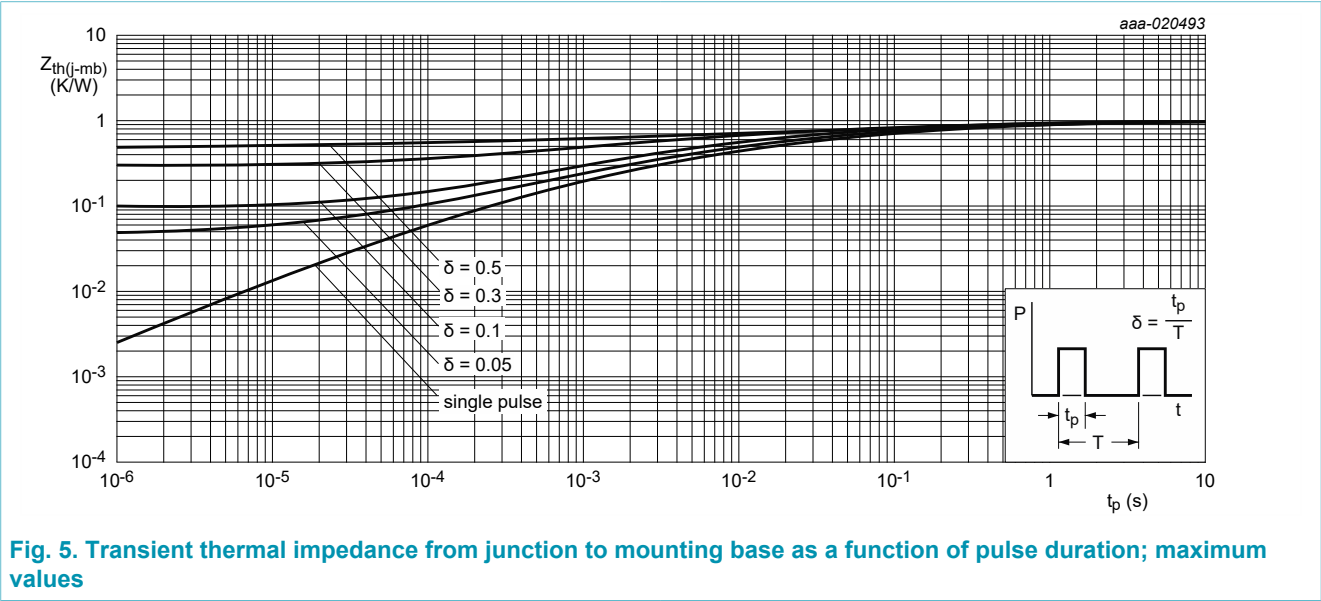


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

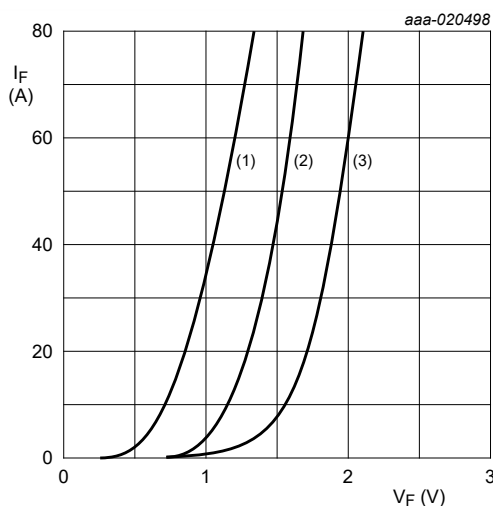
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; <a href="#">Fig. 5</a>	-	-	1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	45	-	K/W



## 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 60 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.55	2	V
		I <sub>F</sub> = 60 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1.2	1.6	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C		-	-	10	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 125 °C		-	-	500	μA
Dynamic characteristics							
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	-	55	ns
		I <sub>F</sub> = 60 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	53	-	ns
		I <sub>F</sub> = 60 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	120	-	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 60 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	5.4	-	A
		I <sub>F</sub> = 60 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	14.5	-	A
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 60 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	143	-	nC
		I <sub>F</sub> = 60 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 125 °C; <a href="#">Fig. 7</a>		-	876	-	nC
E <sub>AS</sub>	non-repetitive avalanche energy	I <sub>R</sub> = 2.2 A; T <sub>j(init)</sub> = 25 °C; L = 40 mH		-	97	-	mJ



$V_o = 1.600\text{ V}$ ;  $R_s = 0.001\text{ }\Omega$   
 (1)  $T_j = 150\text{ °C}$ ; typical values  
 (2)  $T_j = 150\text{ °C}$ ; maximum values  
 (3)  $T_j = 25\text{ °C}$ ; maximum values

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

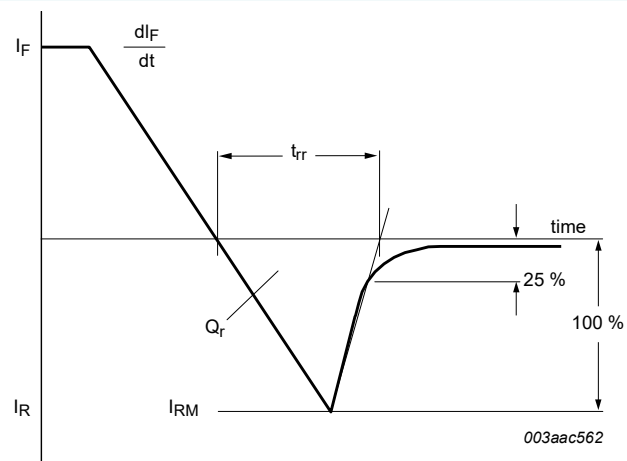


Fig. 7. Reverse recovery definitions; ramp recovery

10. Package outline

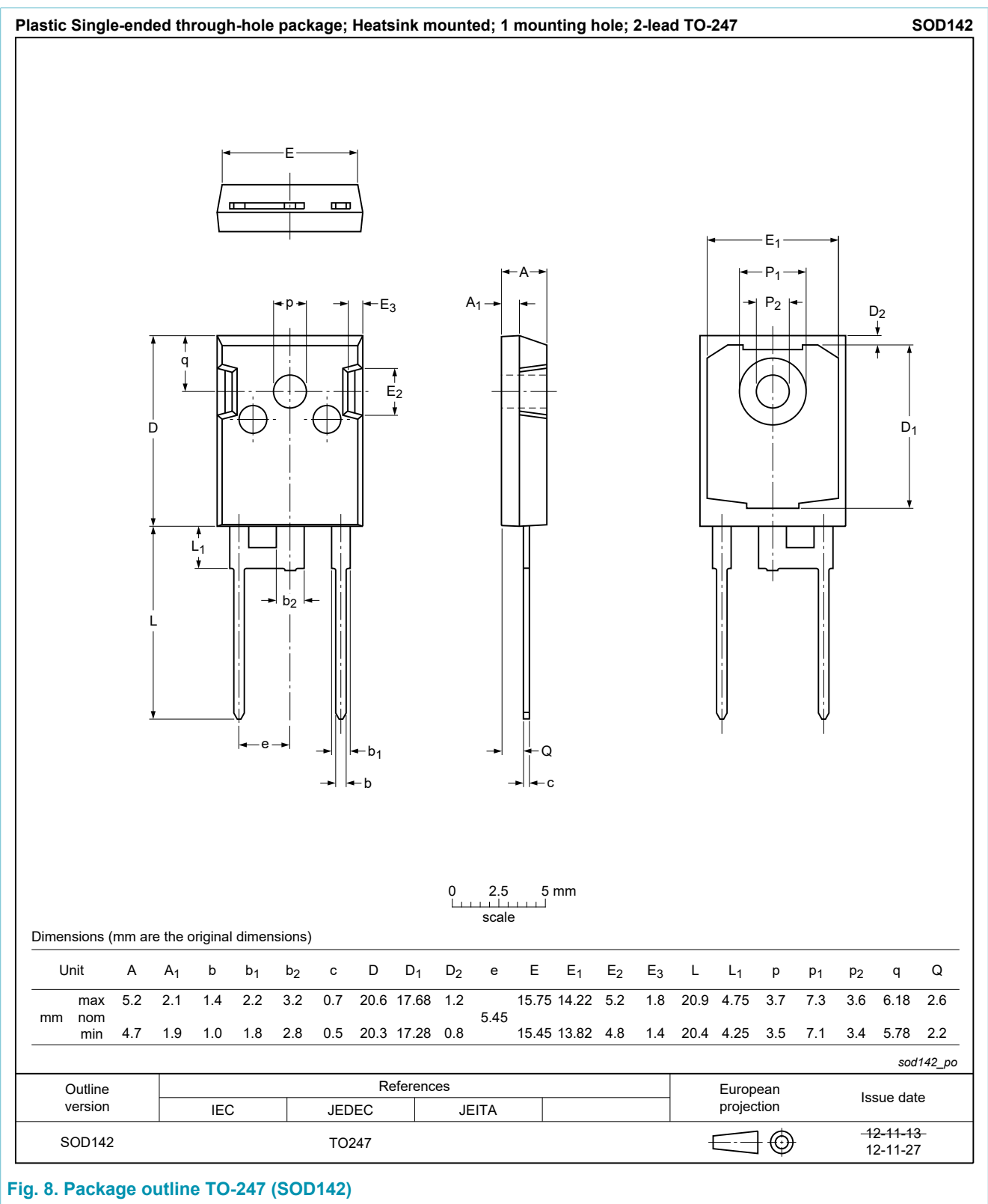


Fig. 8. Package outline TO-247 (SOD142)

## 11. 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.
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