Product data sheet

1. General description

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

2. Features and benefits

- Fast switching
- Low forward voltage drop
- Low thermal resistance
- Soft recovery characteristic
- Reduces switching losses in associated MOSFET or IGBT
- · Planar passivated for voltage ruggedness and reliability

3. Applications

- Switched-Mode Power Supplies
- Power factor correction diode
- Uninterrupted Power Supply
- · Motor drive and SMPS freewheeling diode

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	-	1200	V
I _{F(AV)}	average forward current	δ = 0.5; T _{mb} ≤ 98 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3		-	-	16	A
Static charact	eristics						
V _F	forward voltage	I _F = 16 A; T _j = 125 °C; <u>Fig. 6</u>		-	1.8	2.7	V
Dynamic characteristics							
t _{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; Fig. 7$		-	50	-	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			
	BYR16W-1200	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
BYR16W-1200	BYR16W-1200

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		-	1200	V
V_{RWM}	crest working reverse voltage		-	1200	V
V _R	reverse voltage	DC	-	1200	V
I _{F(AV)}	average forward current	δ = 0.5; T _{mb} ≤ 98 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	16	А
I _{FRM}	repetitive peak forward current	$δ = 0.5$; $t_p = 25 \mu s$; $T_{mb} \le 98 °C$; square-wave pulse	-	32	А

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Symbol	Parameter	Conditions	Min	Max	Unit
I _{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; <u>Fig. 4</u>	-	150	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	-	165	A
T _{stg}	storage temperature		-55	150	°C
T _j	junction temperature		-	150	°C

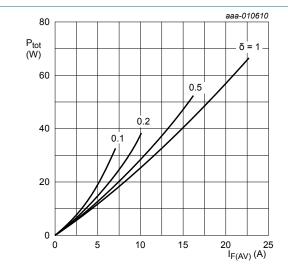


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

$$\begin{split} I_{\textit{F(AV)}} = I_{\textit{F(RMS)}} \times \sqrt{\delta} \\ V_{\text{O}} = 2.210 \text{ V; R}_{\text{S}} = 0.032 \text{ } \Omega \end{split}$$

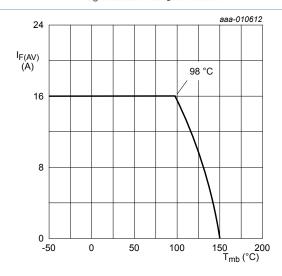


Fig. 3. Forward current as a function of mounting base temperature; maximum values

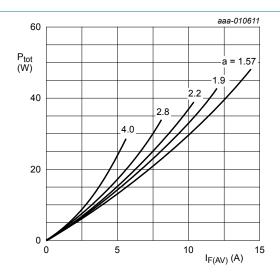


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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

 V_{\odot} = 2.210 V; R_{S} = 0.032 Ω

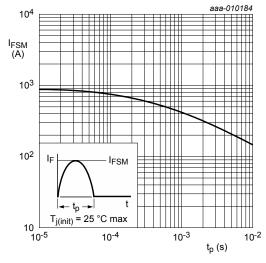
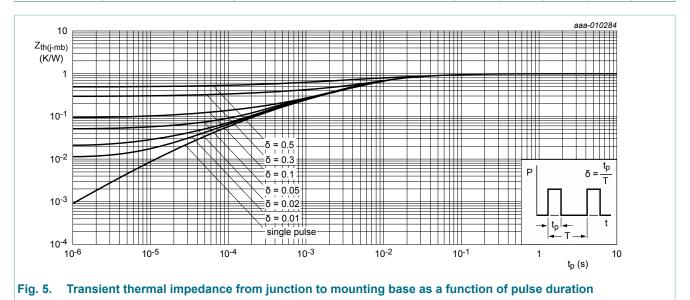


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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	in free air	-	45	-	K/W



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static char	acteristics					
V _F	forward voltage	I _F = 16 A; T _j = 25 °C; <u>Fig. 6</u>	-	2.3	3	V
		I _F = 32 A; T _j = 25 °C; <u>Fig. 6</u>	-	2.8	3.9	V
		I _F = 16 A; T _j = 125 °C; <u>Fig. 6</u>	-	1.8	2.7	V
I _R	reverse current	V _R = 1200 V; T _j = 25 °C	-	3	100	μA
		V _R = 1200 V; T _j = 125 °C	-	0.2	2	mA
Dynamic cl	haracteristics					
Q _r recovered charge		I _F = 16 A; V _R = 200 V; dI _F /dt = 200 A/ μs; T _j = 25 °C; <u>Fig. 7</u>	-	520	-	nC
		$I_F = 16 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ $\mu s; T_j = 125 ^{\circ}\text{C}; Fig. 7$	-	1200	-	nC
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Symbol	Parameter	Conditions	Min	Тур	Max	Unit
		$I_F = 16 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A/}$ $\mu s; T_j = 25 \text{ °C}; Fig. 7$	-	605	-	nC
		$I_F = 16 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A/}$ $\mu s; T_j = 125 \text{ °C}; Fig. 7$	-	1600	-	nC
t _{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 200 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; Fig. 7$	-	40	-	ns
		$I_F = 16 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ $\mu s; T_j = 25 \text{ °C}; Fig. 7$	-	90	-	ns
		$I_F = 16 \text{ A}; V_R = 200 \text{ V}; dI_F/dt = 200 \text{ A}/$ $\mu s; T_j = 125 \text{ °C}; Fig. 7$	-	150	-	ns
		$I_F = 16 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A/}$ $\mu s; T_j = 25 ^{\circ}\text{C}; Fig. 7$	-	105	-	ns
		$I_F = 16 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A/}$ $\mu s; T_j = 125 \text{ °C}; Fig. 7$	-	200	-	ns
		$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A/}\mu\text{s};$ $T_j = 25 \text{ °C}; Fig. 7$	-	50	-	ns
RM	peak reverse recovery current	I_F = 16 A; V_R = 200 V; dI_F/dt = 200 A/ μ s; T_j = 25 °C; <u>Fig. 7</u>	-	11.2	-	Α
		I_F = 16 A; V_R = 200 V; dI_F/dt = 200 A/ μ s; T_j = 125 °C; <u>Fig. 7</u>	-	16	-	A
		I_F = 16 A; V_R = 400 V; dI_F/dt = 200 A/ μ s; T_j = 25 °C; $Fig. 7$	-	11.2	-	A
		$I_F = 16 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/$ μ s; $T_j = 125 \text{ °C}; Fig. 7$	-	16.2	-	A

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Ultrafast power diode

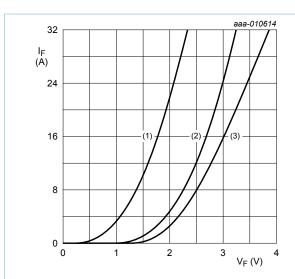


Fig. 6. Forward current as a function of forward voltage

(1) $T_j = 125$ °C; typical values;

(2) $T_j = 125$ °C; maximum values;

(3) $T_j = 25$ °C; maximum values;

 $V_{O} = 2.210 \text{ V}; R_{S} = 0.032 \Omega$

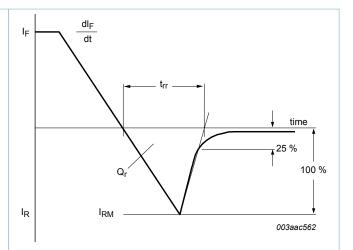
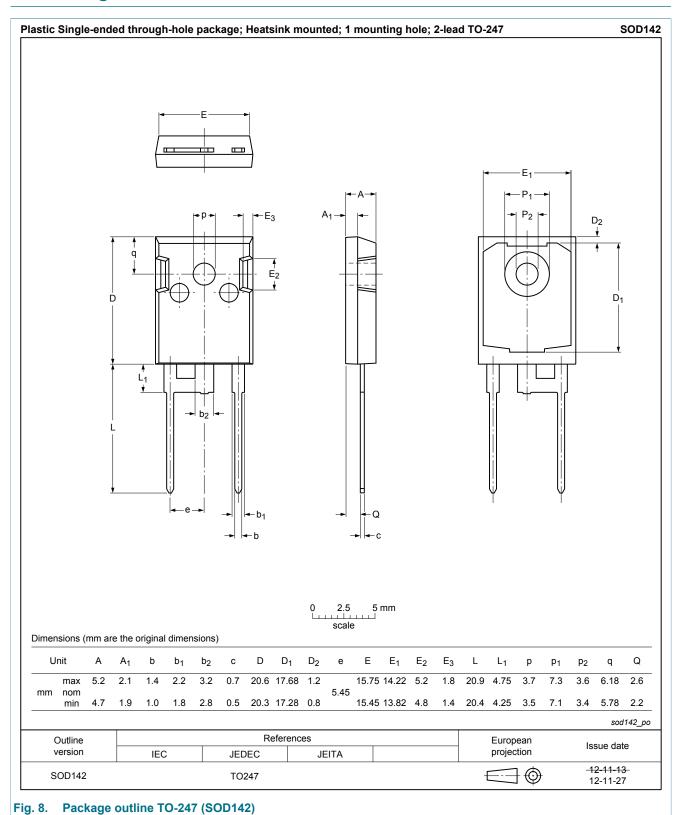


Fig. 7. Reverse recovery definitions; ramp recovery

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11. Package outline



12. Legal information

12.1 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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