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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





NURS360B

Ultrafast power diode

30 August 2013

Product data sheet

1. General description

Ultrafast power diode in a SOD132 (SMB) surface-mountable plastic package.

2. Features and benefits

- Low on-state loss
- Low leakage current
- Low thermal resistance
- Surface-mountable package
- Reduces switching losses in associated MOSFET or IGBT

3. Applications

- Buck and Boost converter
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- Inverter freewheeling and protection diode

4. Quick reference data


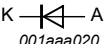
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{lead} \leq 115$ °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	3	A
Static characteristics						
V_F	forward voltage	$I_F = 3$ A; $T_J = 150$ °C; Fig. 7	-	0.8	1	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 50$ A/ μ s; $T_J = 25$ °C; Ramp Recovery; Fig. 8	-	-	75	ns



5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>SOD132</p>	
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
NURS360B	SOD132	Hermetically sealed plastic package; SMB; 2 leads	SOD132

7. Marking

Table 4. Marking codes

Type number	Marking code
NURS360B	NURS360B

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	$\delta = 0.5$; $T_{lead} \leq 115$ °C; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	3	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ s; square-wave pulse	-	6	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4	-	100	A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; Fig. 4	-	110	A
T_{stg}	storage temperature		-65	175	°C
T_j	junction temperature		-	175	°C

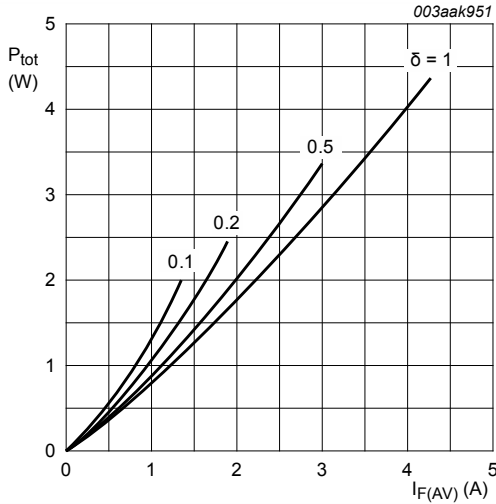


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

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

$$V_O = 0.804 \text{ V}; R_S = 0.051 \Omega$$

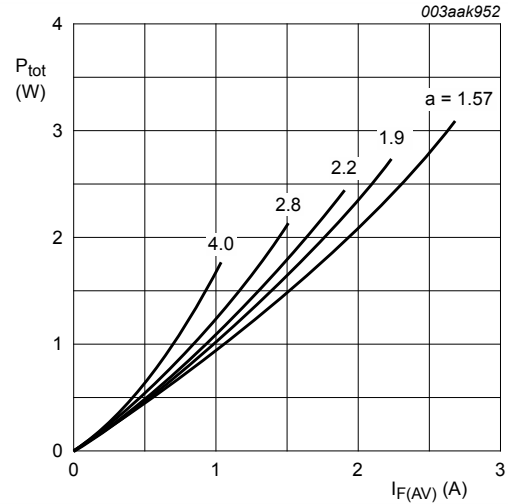


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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

$$V_O = 0.804 \text{ V}; R_S = 0.051 \Omega$$

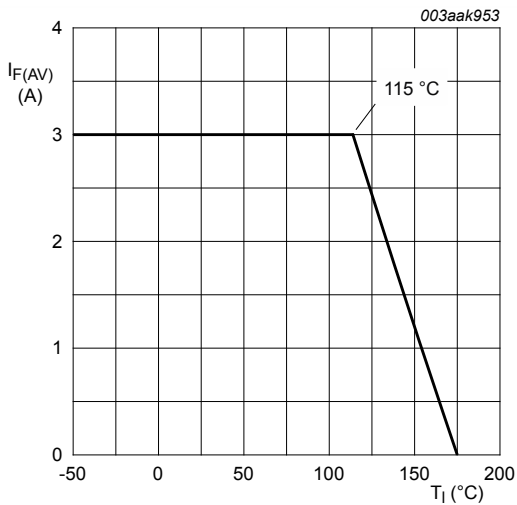


Fig. 3. Forward current as a function of lead temperature; maximum values

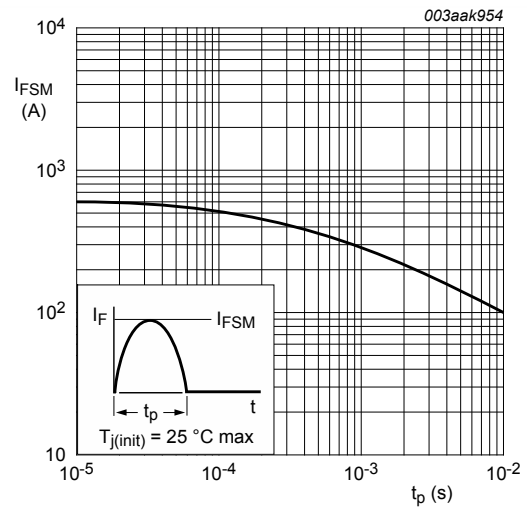


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	mounted on a minimum footprint printed-circuit board (FR4); Fig. 5	-	14	-	K/W

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	mounted on a minimum footprint printed-circuit board (FR4); Fig. 6	-	125	-	K/W

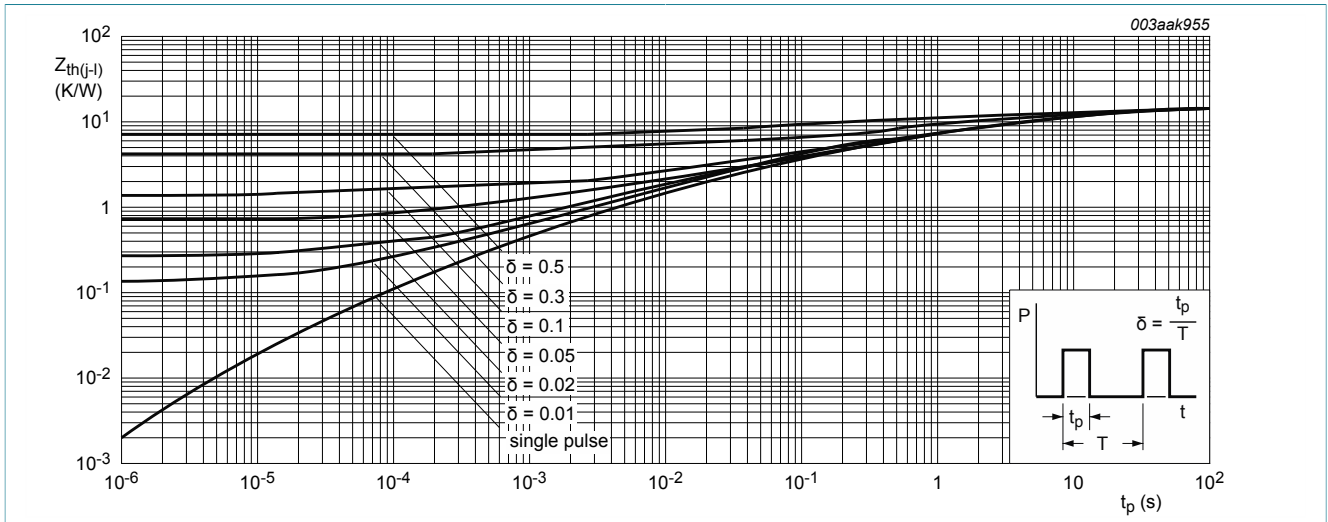


Fig. 5. Transient thermal impedance from junction to lead as a function of pulse duration; typical values

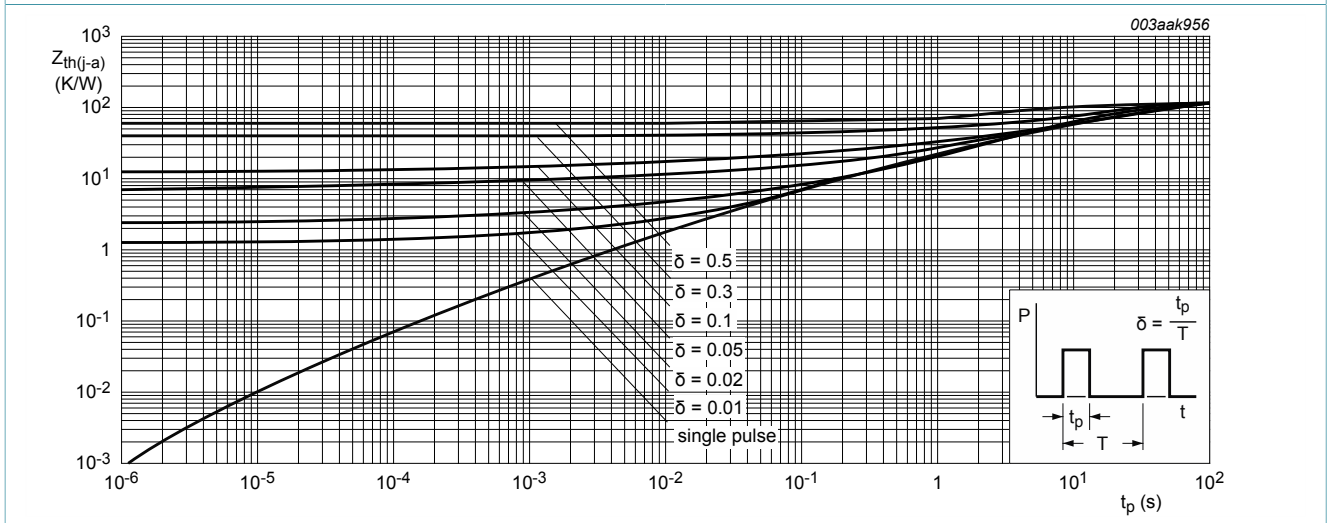


Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 3 \text{ A}; T_j = 25 \text{ }^\circ\text{C};$ Fig. 7	-	-	1.25	V
		$I_F = 3 \text{ A}; T_j = 150 \text{ }^\circ\text{C};$ Fig. 7	-	0.8	1	V
I_R	reverse current	$V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	-	2.5	μA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$V_R = 600 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	250	μA
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{Ramp Recovery}; \text{Fig. 8}$	-	-	75	ns
		$I_F = 0.5 \text{ A}; I_R = 1 \text{ A}; I_{R(\text{meas})} = 0.25 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{Step Recovery}; \text{Fig. 9}$	-	-	50	ns

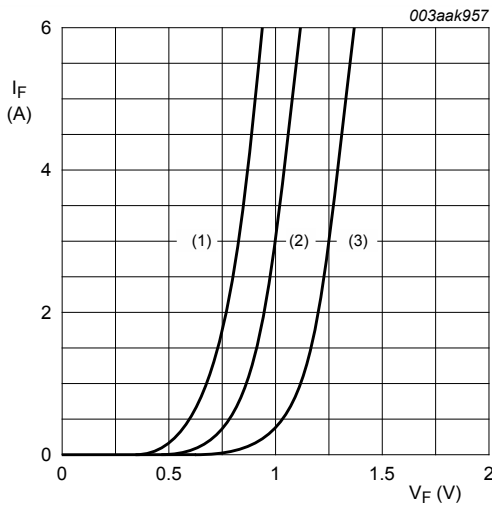


Fig. 7. Forward current as a function of forward voltage

- (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;
- $V_O = 0.804 \text{ V}; R_S = 0.051 \text{ } \Omega$

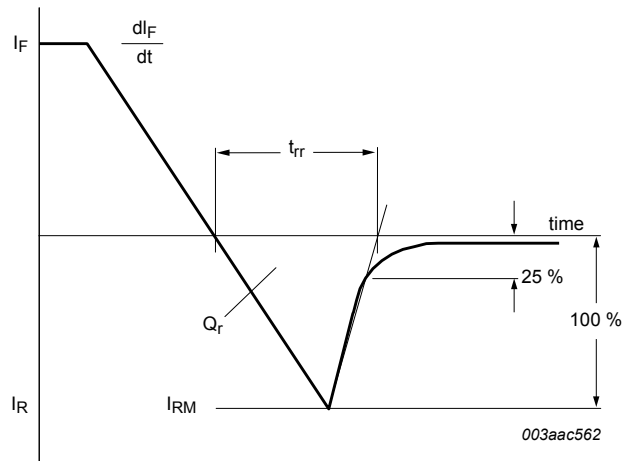


Fig. 8. Reverse recovery definitions; ramp recovery

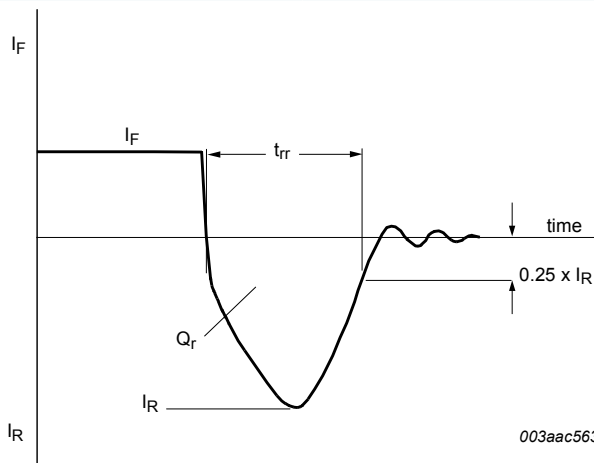


Fig. 9. Reverse recovery definitions; step recovery

11. Package outline

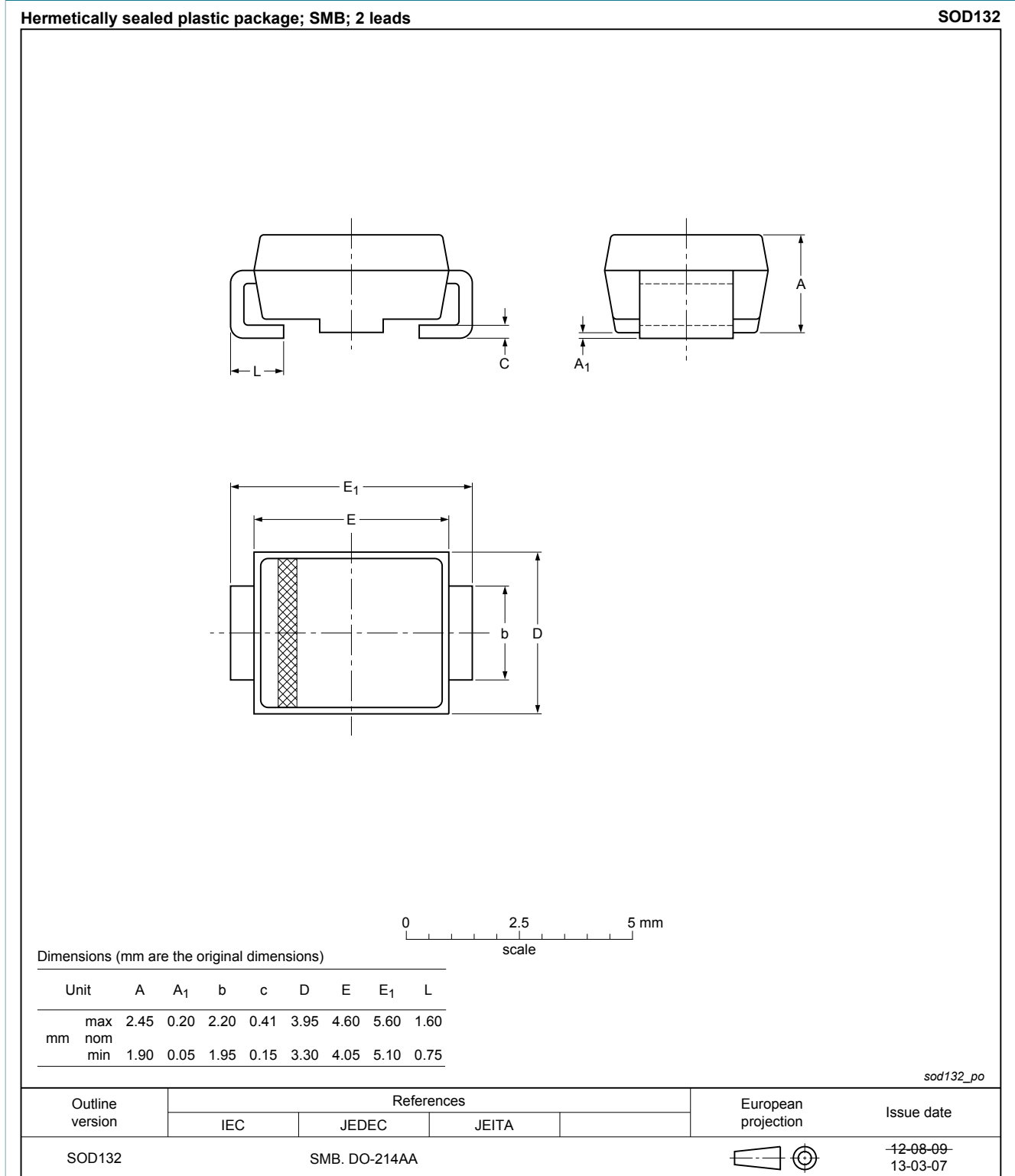


Fig. 10. Package outline SOD132

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.
Product [short] data sheet	Production	This document contains the product specification.

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