WNSC2D021200MB

Silicon Carbide Diode

Rev.01 - 16 August 2024 Product data sheet

1. General description

Silicon Carbide Schottky diode in a SMB plastic package, designed for high frequency switched-mode power supplies.

2. Features and benefits

- Highly stable switching performance
- High forward surge capability I_{FSM}
- Extremely fast reverse recovery time
- Superior in efficiency to Silicon Diode alternatives
- Reduced losses in associated MOSFET
- Reduced EMI
- Reduced cooling requirements
- RoHS compliant
- High junction operating temperature capability ($T_{j(max)}$ = 175 °C)

3. Applications

- Gate driver boot-strap circuit
- Noise snubber
- Medical instruments
- LED / OLED drivers
- General power converters

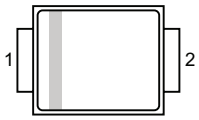
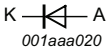
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage			1200			V
I_F	continuous forward current	T_{lead} ≤ 100 °C, DC; Fig. 2		2			A
T_j	junction temperature			175			°C
Symbol	**Parameter**	**Conditions**	**Notes**	**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 2 A; T_j = 25 °C; Fig. 5		-	1.42	1.60	V
		I_F = 2 A; T_j = 150 °C; Fig. 5		-	1.90	2.30	V
Dynamic characteristics							
Q_r	recovered charge	I_F = 2 A; dI_F/dt = 500 A/µs; V_R = 400 V; T_j = 25 °C; Fig. 7		-	4	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
WNSC2D021200MB	SMB	WNSC2D021200MB6J	Reel	3000	SMB	20-Feb-2017

7. Marking

Table 4. Marking codes

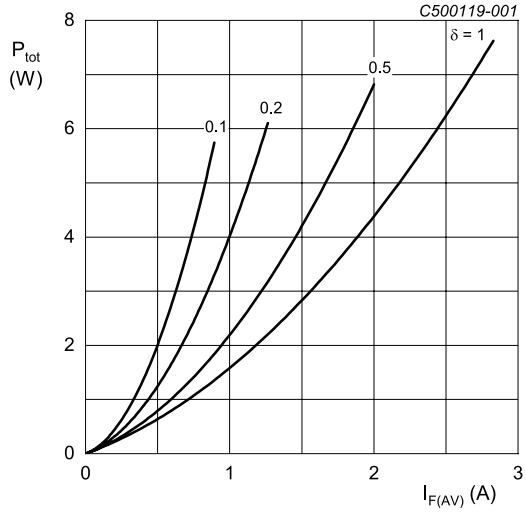
Type number	Marking codes
WNSC2D021200MB	2212GE

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Notes	Values	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	continuous forward current	$T_{lead} \leq 100$ °C, DC; Fig. 2		2	A
		$T_{lead} \leq 125$ °C, DC; Fig. 2		1.5	A
		$T_{lead} \leq 25$ °C, DC; Fig. 2		3.1	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ µs; $T_{lead} = 125$ °C; square-wave pulse		2.4	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse		26	A
		$t_p = 10$ µs; $T_{j(init)} = 25$ °C; square-wave pulse		200	A
I^2t	I^2t for fusing	sine-wave pulse; $T_{j(init)} = 25$ °C; $t_p = 10$ ms		3.38	A^2s
T_{stg}	storage temperature			-55 to 175	°C
T_j	junction temperature			-55 to 175	°C



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

$V_o = 0.972$ V; $R_s = 0.6094$ Ω

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

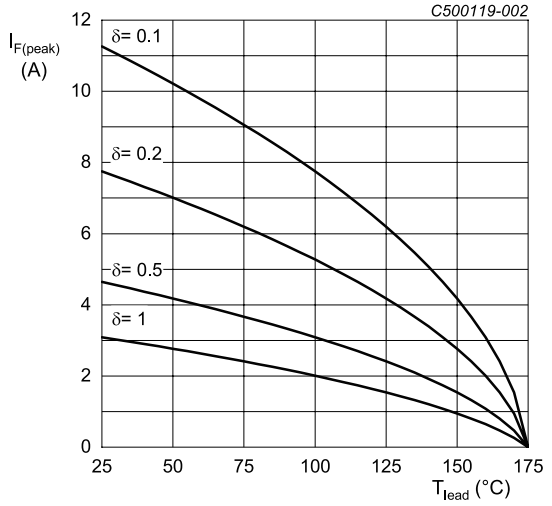


Fig. 2. Current derating as a function of lead temperature

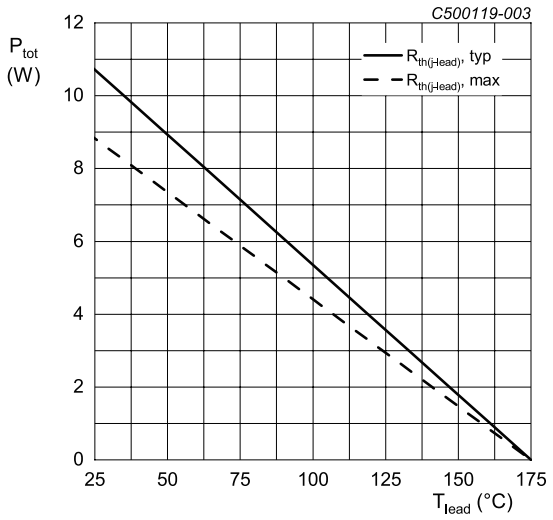


Fig. 3. Total power dissipation as a function of lead temperature

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j\text{-}lead)}$	thermal resistance from junction to lead	with heatsink compound; Fig. 4		-	14	17	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient free air	in free air		-	90	-	K/W

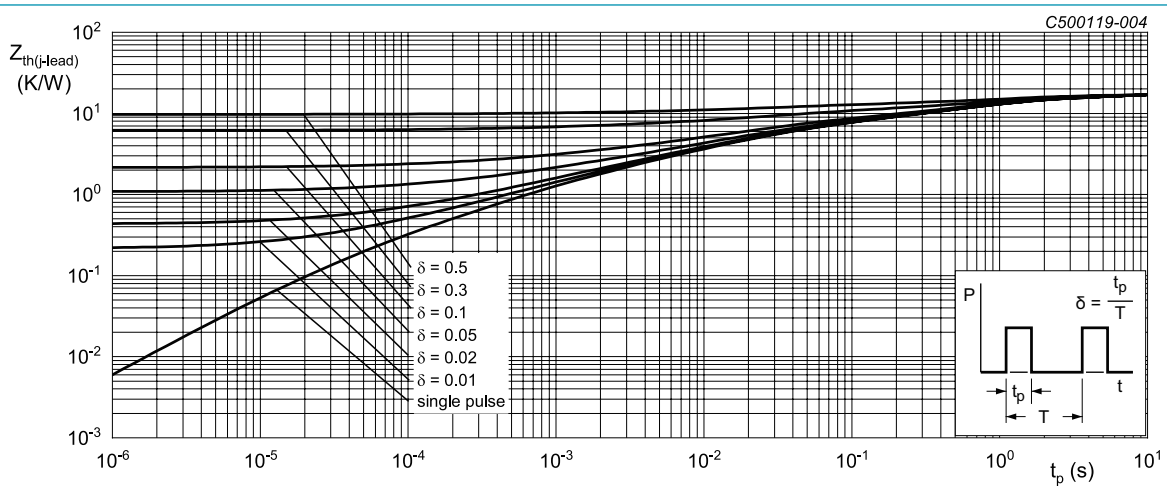
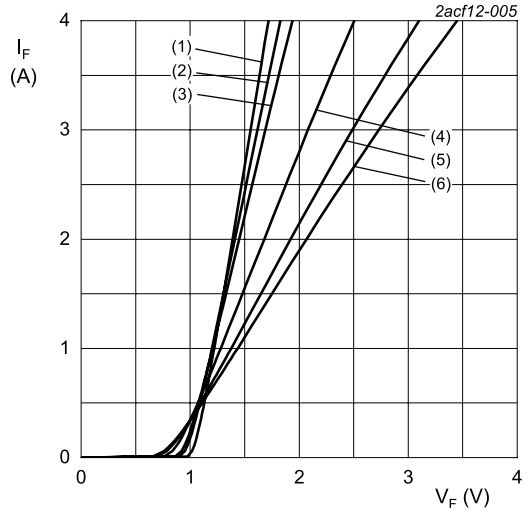


Fig. 4. Transient thermal impedance from junction to lead as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 2 A; T_j = 25 °C; Fig. 5		-	1.42	1.60	V
		I_F = 2 A; T_j = 150 °C; Fig. 5		-	1.90	2.30	V
		I_F = 2 A; T_j = 175 °C; Fig. 5		-	2.00	2.50	V
I_R	reverse current	V_R = 1200 V; T_j = 25 °C; Fig. 6		-	0.5	10	µA
		V_R = 1200 V; T_j = 175 °C; Fig. 6		-	25	-	µA
Dynamic characteristics							
Q_r	recovered charge	I_F = 2 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 7		-	4	-	nC
C_d	diode capacitance	f = 1 MHz; V_R = 1 V; T_j = 25 °C		-	95	-	pF
		f = 1 MHz; V_R = 400 V; T_j = 25 °C		-	10	-	pF
		f = 1 MHz; V_R = 800 V; T_j = 25 °C		-	8	-	pF
E_{as}	non-repetitive avalanche energy	I_R = 2 A; L = 10 mH; $T_{j(init)}$ = 25 °C		18	-	-	mJ



V_o = 0.972 V; R_s = 0.6094 Ω
(1) T_j = -55 °C; typical values
(2) T_j = 0 °C; typical values
(3) T_j = 25 °C; typical values
(4) T_j = 100 °C; typical values
(5) T_j = 150 °C; typical values
(6) T_j = 175 °C; typical values

Fig. 5. Forward current as a function of forward voltage; typical values

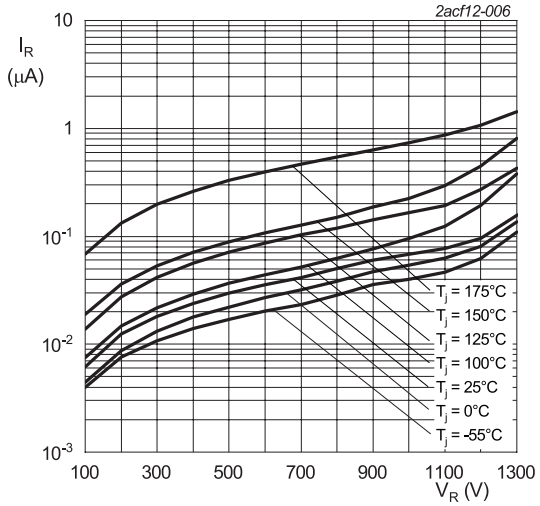


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

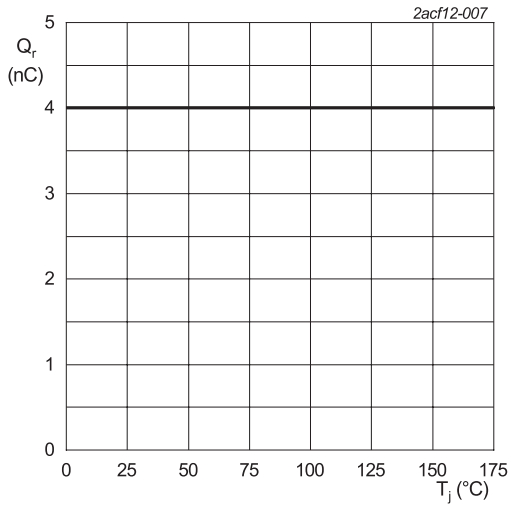
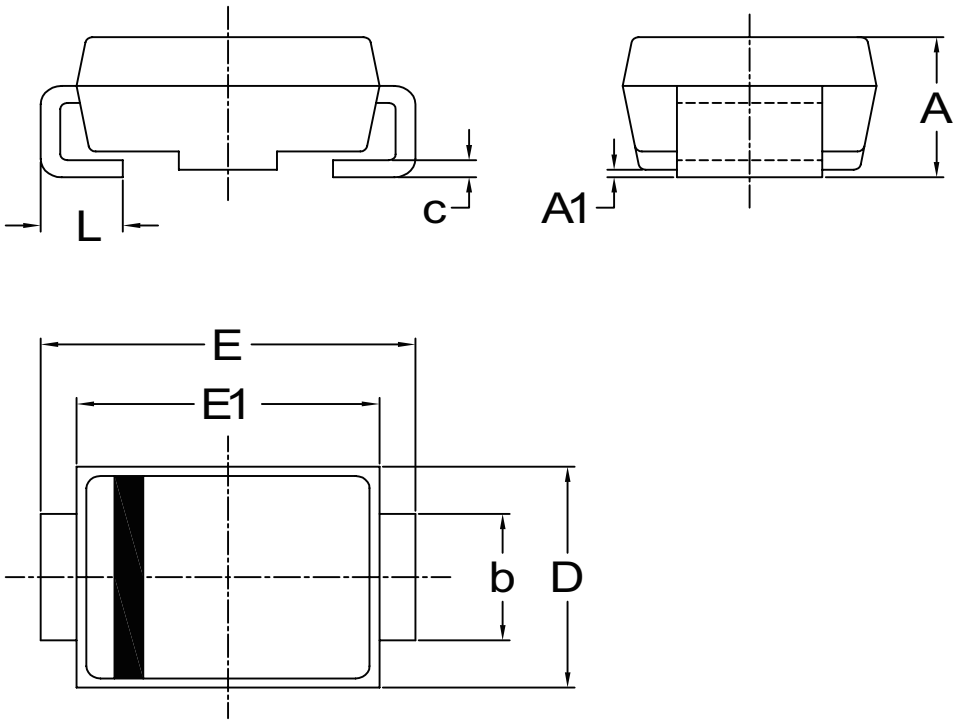


Fig. 7. Recovered charge as a function of junction temperature

11. Package outline



UNIT		A	A1	b	c	D	E	E1	L
mm	Max	2.50	0.20	2.21	0.31	3.95	5.60	4.60	1.60
	Min	2.00	0.05	1.96	0.15	3.30	5.20	4.05	0.75

Remark: Dimensions D and E1 do not include mold flash.

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

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13. Contents

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