

SiC Schottky Diode Datasheet

ATN-CNM-300S-X



Features

The CNM & ALTER Silicon Carbide (SiC) Schottky diodes exhibit low forward voltage and superb very high temperature performance. These diodes are suitable for high-frequency and / or hard switching power space applications. Two different die combinations inside and hermetic TO254 metallic case are available, single channel ATN-CNM-300S-2 and two channels ATN-CNM-300S-4. The radiation tolerance, both for protons and gamma, of these diodes has been proved. Each channel has two SiC Schottky diodes in series increasing the maximum safe blocking voltage of the device while operating under heavy ions, real flight radiation conditions can be tested under request as already performed successfully for ESA-BepiColombo mission with single die previous version.

Absolute maximum ratings (per channel)

Characteristics	Symbols	Maximum ratings	Unit	Remarks
Continuous Forward Current	IF	2.5	A	Note 1
Reverse Voltage	VR	300	V	Note 2
Forward Surge Current	IFSM	25	A	Note 3
Repetitive Forward Surge Current	IRFSM	15	A	Note 4
Operating Temperature Range	Top	-170 to +270	°C	Tcase
Junction Temperature	Tj(max)	+285	°C	
Storage Temperature Range	Tstg	-170 to +270	°C	

NOTES:

1. Continuous constant current over full operating temperature range.
2. Continuous constant bias over full operating temperature range. Higher values achievable depending on the heavy ions radiation requirements of final application.
3. Single 10ms half sine pulse
4. Square pulses, 1kHz, 2% duty cycle

Electrical and Thermal Characteristics (room temperature)

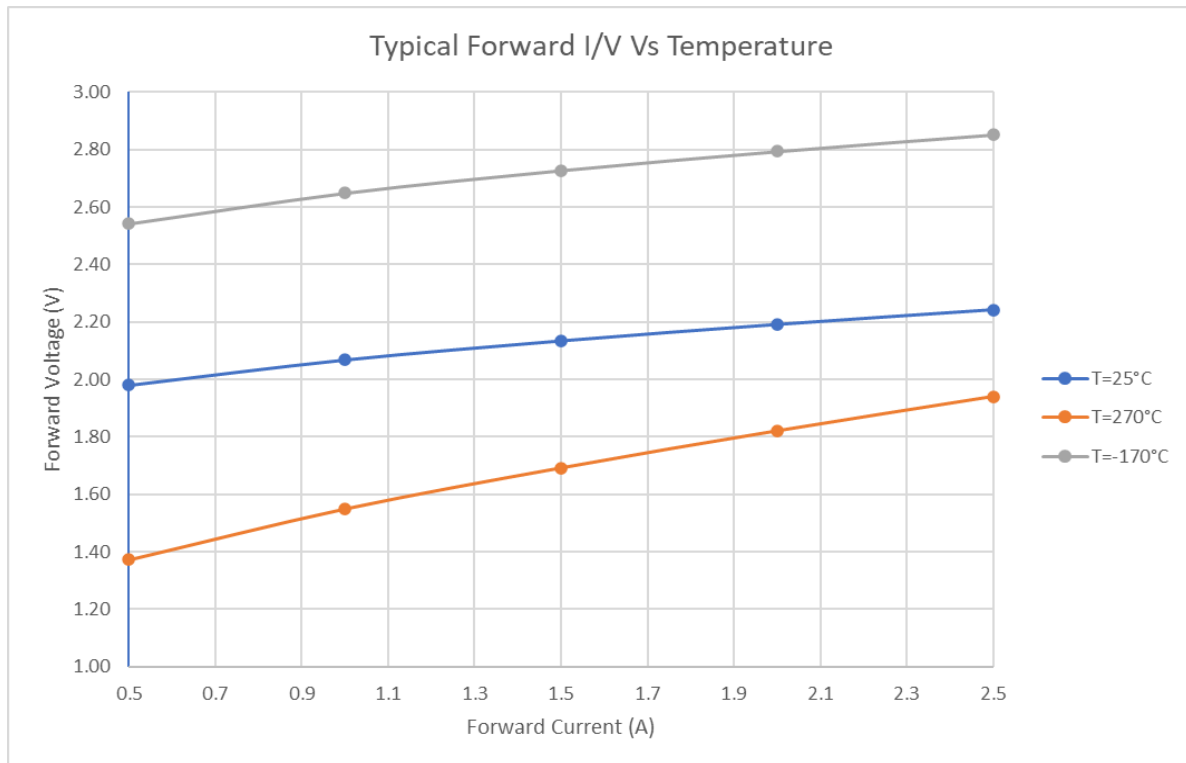
Characteristics	Symbols	Test Conditions	Lim. Min	Lim. Max	Units
Reverse Current	IR_A-K	VR = 300V, DC	-	10	µA
Forward Voltage	VF1_A-K	IF = 0.5A, Note 1	-	2.6	V
	VF2_A-K	IF = 1.5A, Note 1	-	3.0	V
	VF3_A-K	IF = 2.5A, Note 1	-	3.2	V
Capacitance	CA-K	VR = 2V, f = 1MHz	-	0.5	nF
Thermal Resistance	Rth(j-c)	EIA-531	3 (TBC) (Note2)		°C/W

NOTES:

1. Pulsed measurement, Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.
2. TBC, typical value of the single die TO-257 version.

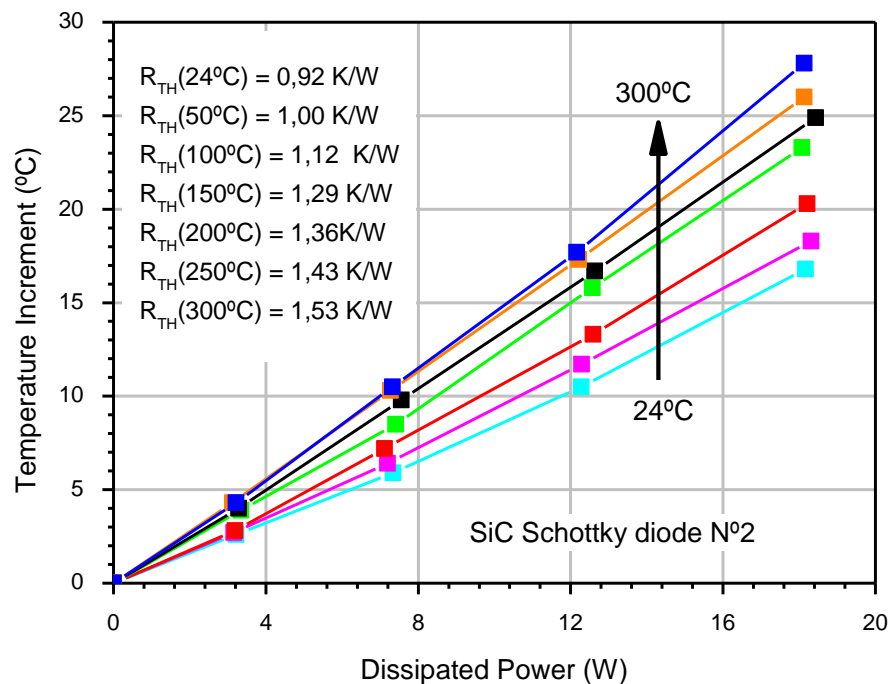
Typical I-V Characteristics

The following picture shows the typical I-V characteristics over the entire temperature range



Thermal Impedance (typical TO-257 single die version)

The following picture shows the typical thermal impedance results



Radiation Tests (single die results)

Radiation Type	Conditions
Gamma	Co60, 550Krad @250V
Protons	1.6 [°] 11p tested at 15, 60 & 100MeV
Heavy Ions	Up to 200V @32MeV/mg/cm2 for single die version. Additional testing under customer request available

Reliability Tests (single die TO-257 results TBC for TO-254)

TEST	CONDITIONS	REMARKS
Temperature Step Stress	Up to 370°C for 96 hours	No failures
Endurance	2000 hours, 5A, 285°C	No failures
	1000 hours, 2.5A, 265°C	No failures
	500 hours HTRB, 300VR, 265°C	
	500 hours, 2.5A, 265°C	
	1000 hours, 5A, 300°C	No failures
500 hours, 5A, 320°C	No failures	
Thermal cycling	More than 4000 cycles (-170°C to 270°C)	No failures
Power Step Stress	11A continuous current at 230°C	No failures

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