

1. General description

Silicon Carbide Schottky diode in a TSPAK plastic package, featured with top side cooling structure, designed for high frequency, high efficiency systems.



AEC - Q101 Qualified



2. Features and benefits

- Top side cooling structure
- New 6th Generation Technology
- Low Forward Voltage Drop
- Low Reverse Leakage Current
- High Forward Surge Capability I_{FSM}
- Reduced losses in associated MOSFET
- Reduced EMI
- Reduced cooling requirements
- RoHS compliant



3. Applications

- PC/Telecom/Server SMPS
- UPS & energy storage systems
- Battery formation systems
- EV chargers
- PV inverter and MPPT circuit
- Motor Drives

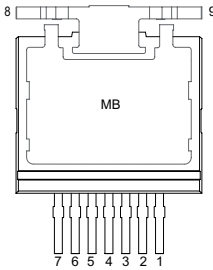
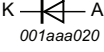
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		750			V
I_F	continuous forward current	$T_{mb} \leq 142\text{ °C}$, DC; Fig. 2	20			A
T_j	junction temperature		-55 to 175			°C
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 20\text{ A}$; $T_j = 25\text{ °C}$; Fig. 5	-	1.29	1.45	V
		$I_F = 20\text{ A}$; $T_j = 150\text{ °C}$; Fig. 5	-	1.45	1.65	V
Dynamic characteristics						
Q_r	recovered charge	$I_F = 20\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $V_R = 400\text{ V}$; $T_j = 25\text{ °C}$; Fig. 7	-	44	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1-2	n.c	n.c		
3-7	A	anode		
8-9 mb	K	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
WN6D20750TB-A	TSPAK	WN6D20750TB-A6Q	Reel	600	TSPAKH	06-Dec-2024

7. Marking

Table 4. Marking codes

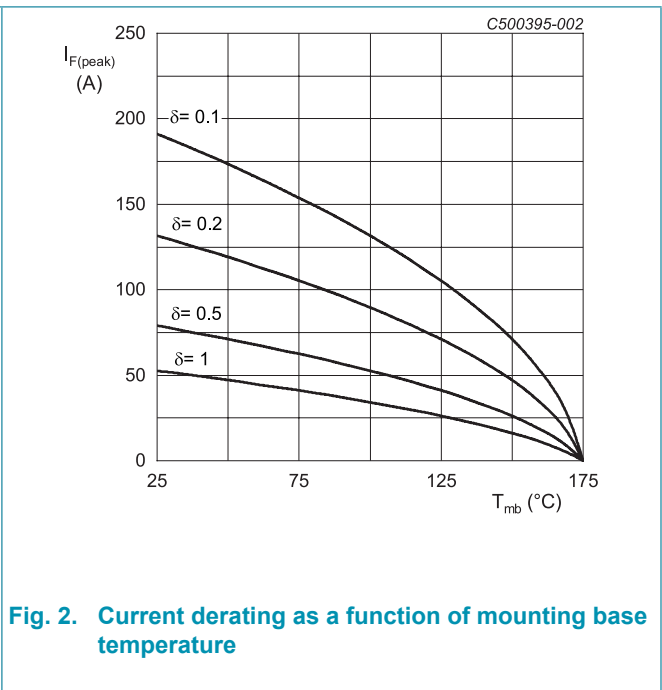
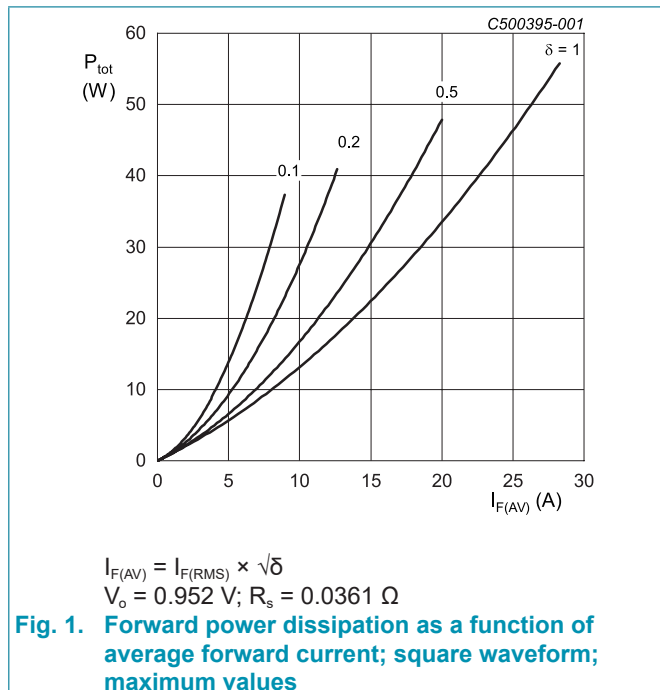
Type number	Marking codes
WN6D20750TB-A	WN6D 20750TB-A

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			750	V
V_{RWM}	crest working reverse voltage			750	V
V_R	reverse voltage	DC		750	V
I_F	continuous forward current	$T_{mb} \leq 142\text{ }^\circ\text{C}$; DC; Fig. 2		20	A
		$T_{mb} \leq 125\text{ }^\circ\text{C}$; DC; Fig. 2		26.3	A
		$T_{mb} \leq 25\text{ }^\circ\text{C}$; DC; Fig. 2		52.6	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 125\text{ }^\circ\text{C}$; square-wave pulse		41	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse		130	A
		$t_p = 10\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; square-wave pulse		860	A
I^2t	I^2t for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; $t_p = 10\text{ ms}$		84.5	A^2s
T_{stg}	storage temperature			-55 to 175	$^\circ\text{C}$
T_j	junction temperature			-55 to 175	$^\circ\text{C}$



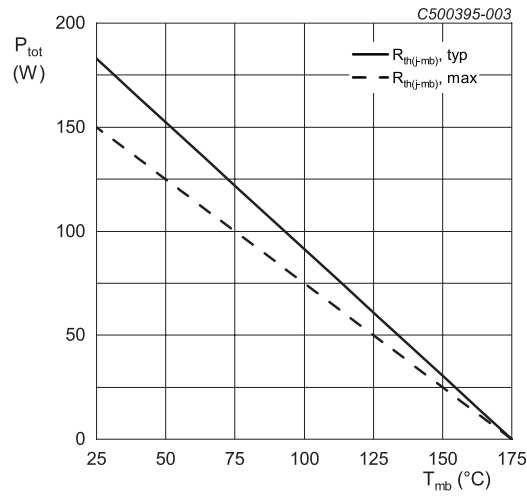


Fig. 3. Total power dissipation as a function of mounting base temperature

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 4	-	0.82	1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	40	-	K/W

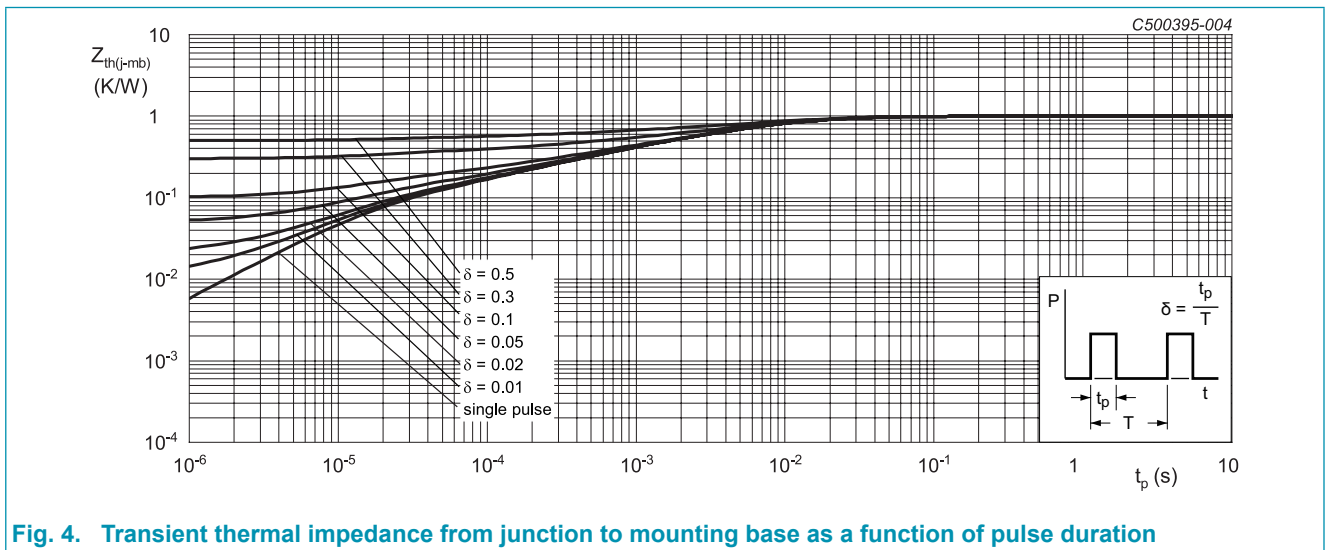
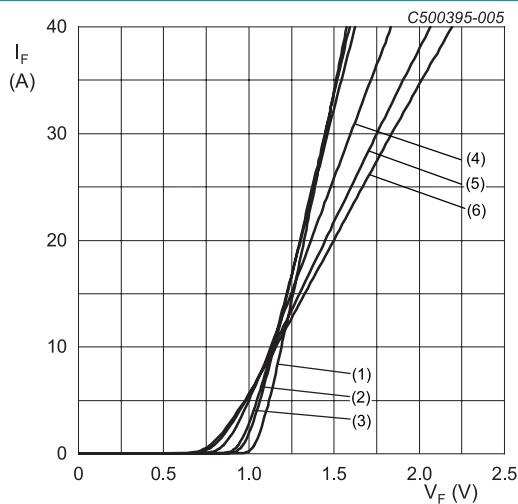


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 20\text{ A}; T_J = 25\text{ °C}; \text{Fig. 5}$	-	1.29	1.45	V
		$I_F = 20\text{ A}; T_J = 150\text{ °C}; \text{Fig. 5}$	-	1.45	1.65	V
		$I_F = 20\text{ A}; T_J = 175\text{ °C}; \text{Fig. 5}$	-	1.50	1.70	V
I_R	reverse current	$V_R = 750\text{ V}; T_J = 25\text{ °C}; \text{Fig. 6}$	-	2	100	μA
		$V_R = 750\text{ V}; T_J = 175\text{ °C}; \text{Fig. 6}$	-	30	400	μA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 20\text{ A}; V_R = 400\text{ V}; di_F/dt = 500\text{ A}/\mu\text{s}; T_J = 25\text{ °C}; \text{Fig. 7}$	-	44	-	nC
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 1\text{ V}; T_J = 25\text{ °C}$	-	1005	-	pF
		$f = 1\text{ MHz}; V_R = 300\text{ V}; T_J = 25\text{ °C}$	-	105	-	pF
		$f = 1\text{ MHz}; V_R = 600\text{ V}; T_J = 25\text{ °C}$	-	80	-	pF
E_{as}	non-repetitive avalanche energy	$I_R = 7.8\text{ A}; L = 5\text{ mH}; T_{j(\text{init})} = 25\text{ °C}$	150	-	-	mJ



$V_o = 0.952\text{ V}; R_s = 0.0361\ \Omega$
 (1) $T_J = -55\text{ °C}$; typical values
 (2) $T_J = 0\text{ °C}$; typical values
 (3) $T_J = 25\text{ °C}$; typical values
 (4) $T_J = 100\text{ °C}$; typical values
 (5) $T_J = 150\text{ °C}$; typical values
 (6) $T_J = 175\text{ °C}$; typical values

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

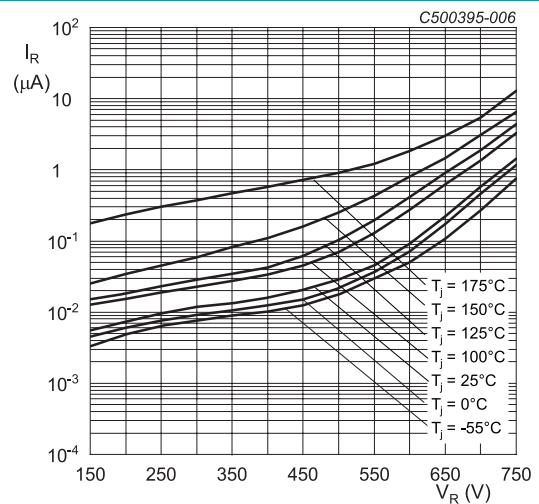


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

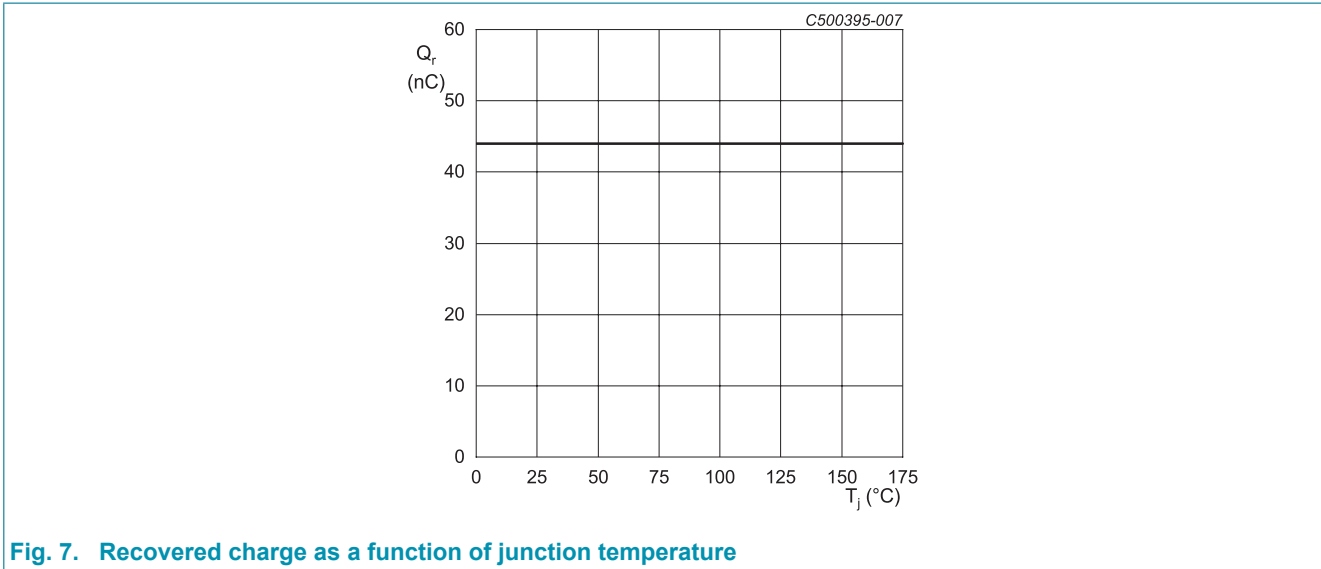
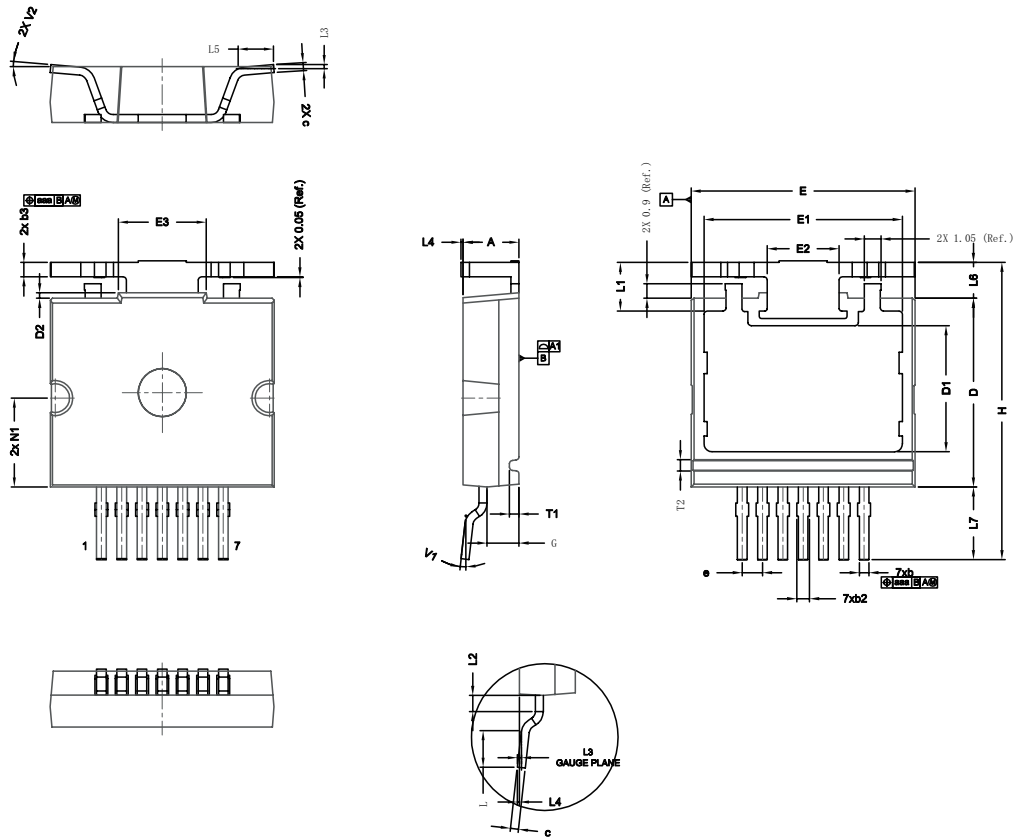
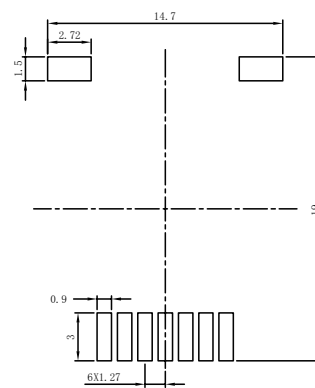


Fig. 7. Recovered charge as a function of junction temperature

11. Package outline



SYMBOL	DIMENSIONS MILLIMETER			SYMBOL	DIMENSIONS MILLIMETER		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	3.40	3.50	3.60	H	18.00	18.58	19.00
A1	0.05			L	2.185	2.285	2.385
b	0.50	0.60	0.70	L1	3.04		
b2	0.70	0.80	0.90	L2	0.90	1.00	1.10
b3	0.80	0.90	0.98	L3	0.26		
c	0.40	0.50	0.60	L4	0.075	0.125	0.175
D	11.70	11.80	11.90	L5	2.10	2.20	2.30
D1	7.78	7.88	7.98	L6	2.14	2.24	2.34
D2	0.24	0.34	0.44	L7	4.44	4.54	4.64
E	13.90	14.00	14.10	N1	5.46	5.56	5.66
E1	12.30	12.40	12.50	T1	0.6(Ref)		
E2	4.45	4.50	4.55	T2	0.7(Ref)		
E3	5.45	5.50	5.55	V1	0°		8°
e	1.27			V2	0°		8°
G	1.90	2.00	2.10	aaa	0.1		



Footprint(Only for reference)

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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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