Product data sheet

1. General description

Silicon Carbide Schottky diode in a TO263 (D2PAK) 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

3. Applications

- Power factor correction
- Telecom/Server SMPS
- UPS
- PV inverter
- PC Silverbox
- LED/OLED TV
- Motor Drives

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	-	650	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} \leq 106 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3; Fig. 4		-	-	12	Α
Static characte	Static characteristics						
V _F	forward voltage	I _F = 12 A; T _j = 25 °C; <u>Fig. 6</u>		-	1.5	1.7	V
		I _F = 12 A; T _j = 150 °C; <u>Fig. 6</u>		-	1.8	2.1	V

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected		K — A 001aaa020
2	K	cathode[1]	r	001aaa020
3	Α	anode		
mb	К	mounting base; connected to cathode	D2PAK (TO263N)	

^[1] It is not possible to connect to pin 2 of the TO263 package.

6. Ordering information

Table 3. Ordering information

Type number	Package						
	Name	Description	Version				
NXPSC12650B	D2PAK	plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)	TO263N				

7. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	650	V
V_{RWM}	crest working reverse voltage		-	650	V
V_R	reverse voltage	DC	-	650	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} ≤ 106 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3; Fig. 4	-	12	А
I _{FRM}	repetitive peak forward current	δ = 0.5 ; t _p = 25 µs; square-wave pulse	-	24	А
I _{FSM}	non-repetitive peak	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse	-	72	Α
	forward current	t_p = 10 μ s; $T_{j(init)}$ = 25 °C; square-wave pulse	-	620	Α
T _{stg}	storage temperature		-55	175	°C
Tj	junction temperature		-	175	°C

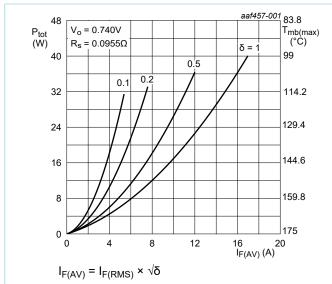


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

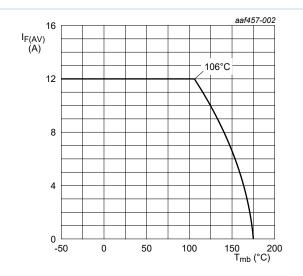


Fig. 2. Forward current as a function of mounting base temperature; maximum values

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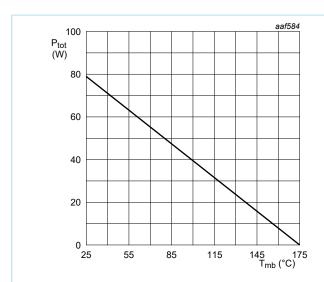


Fig. 3. Total power dissipation as a function of mounting base temperature

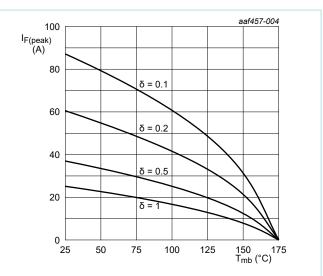


Fig. 4. Current derating as a function of mounting base temperature

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R _{th(j-mb)}	thermal resistance from junction to mounting base	Fig. 5	-	-	1.9	K/W
R _{th(j-a)}	thermal resistance from junction to ambient free air	Device mounted on an FR4 Printed- Circuit Board (PCB)	-	50	-	K/W

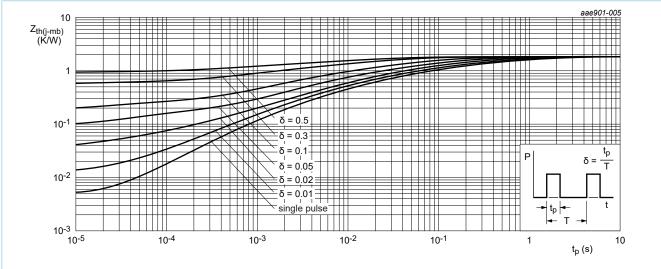
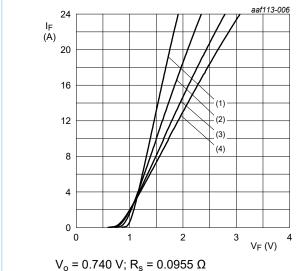


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit	
Static chara	Static characteristics							
V _F	forward voltage	I _F = 12 A; T _j = 25 °C; <u>Fig. 6</u>		-	1.5	1.7	V	
		I _F = 12 A; T _j = 150 °C; <u>Fig. 6</u>		-	1.8	2.1	V	
I _R	reverse current	V _R = 650 V; T _j = 25 °C		_	-	80	μA	
		V _R = 650 V; T _j = 150 °C		_	-	320	μA	
Dynamic cha	aracteristics						,	
Q _r	recovered charge	I_F = 12 A; dI_F/dt = 500 A/ μ s; V_R = 400 V; T_j = 25 °C; Fig. 7		-	18	-	nC	
C _d	diode capacitance	f = 1 MHz; V _R = 1 V; T _j = 25 °C		-	380	-	pF	
		f = 1 MHz; V _R = 300 V; T _j = 25 °C		-	60	-	pF	
		f = 1 MHz; V _R = 600 V; T _j = 25 °C		-	58	-	pF	



(1) $T_j = 25$ °C; typical values (2) $T_j = 100$ °C; typical values (3) $T_j = 150$ °C; typical values (4) $T_j = 175$ °C; typical values

Fig. 6. Forward current as a function of forward voltage; typical values

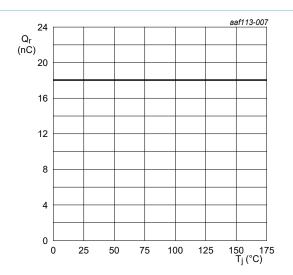


Fig. 7. Recovered charge as a function of junction temperature

10. Package outline

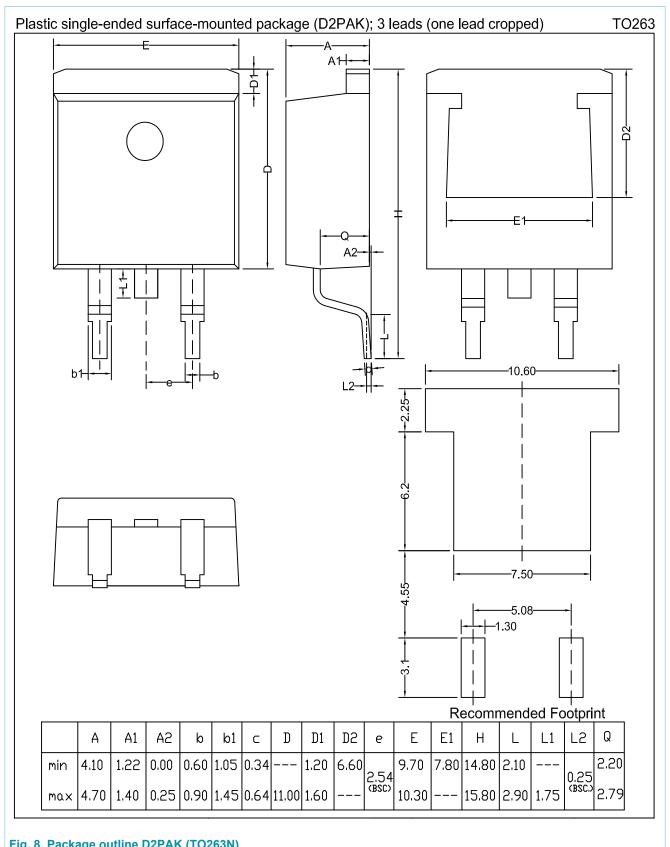


Fig. 8. Package outline D2PAK (TO263N)

11. Legal information

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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