



# PSC2065J

650 V, 20 A SiC Schottky diode in D2PAK R2P

10 June 2024

Product data sheet

## 1. General description

Nexperia introduces leading edge Silicon Carbide (SiC) Schottky diode for ultra high performance, low loss, high efficiency power conversion applications. The SiC Schottky diode encapsulated in a Real-2-Pin D2PAK R2P (TO-263-2) Surface-Mounted Device (SMD) power plastic package offers temperature independent capacitive turn-off, zero recovery switching behavior combined with an outstanding figure-of-merit ( $Q_c \times V_F$ ). The Merged PiN Schottky (MPS) diode improves the robustness expressed in a high  $I_{F,SM}$ .

## 2. Features and benefits

- Zero forward and reverse recovery
- Temperature independent fast and smooth switching performance
- Outstanding figure of merit ( $Q_c \times V_F$ )
- High  $I_{F,SM}$  capability
- High power density
- Reduced system costs
- System miniaturization
- Reduced EMI

## 3. Applications

- Switch mode power Supply (SMPS)
- AC-DC and DC-DC converter
- Battery charging infrastructure
- Server and telecom power supply
- Uninterruptible power supply (UPS)
- Photovoltaic inverters

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_F$	forward current	$T_c \leq 111 \text{ }^\circ\text{C}$ ; $\delta = 1$		-	-	20	A
<b>Static characteristics</b>							
$V_{DC}$	DC blocking voltage			650	-	-	V
<b>Dynamic characteristics</b>							
$Q_c$	total capacitive charge	$V_R = 400 \text{ V}$ ; $dI_F/dt = 200 \text{ A}/\mu\text{s}$ ; $I_F = 20 \text{ A}$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	41	-	nC

## 5. Pinning information

**Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	K	mounting base; connected to cathode	 <b>D2PAK R2P (SOT8018)</b>	

## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
<a href="#">PSC2065J</a>	D2PAK R2P	Plastic, single-ended surface-mounted package (D2PAK R2P); Real-2-Pin configuration; 5.08 mm pitch; 8.8 mm x 10.35 mm x 4.46 mm body	<a href="#">SOT8018</a>

## 7. Marking

**Table 4. Marking codes**

Type number	Marking code
PSC2065J	PSC2065J

## 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	$T_j = 25^\circ\text{C}$		-	650	V
$dv/dt$	diode $dv/dt$ ruggedness	$0 \text{ V} \leq V_R \leq 480 \text{ V}$		-	100	V/ns
$I_F$	forward current	$T_c \leq 111^\circ\text{C}$ ; $\bar{\delta} = 1$		-	20	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10 \mu\text{s}$ ; square wave; $T_c = 25^\circ\text{C}$		-	780	A
		$t_p = 10 \text{ ms}$ ; half sine-wave; $T_c = 25^\circ\text{C}$		-	95	A
		$t_p = 10 \text{ ms}$ ; half sine-wave; $T_c = 150^\circ\text{C}$		-	80	A
$\int i^2 dt$	$i^2 t$ value	$t_p = 10 \text{ ms}$ ; $T_c = 25^\circ\text{C}$		-	45	A <sup>2</sup> s
		$t_p = 10 \text{ ms}$ ; $T_c = 150^\circ\text{C}$		-	32	A <sup>2</sup> s
$P_{tot}$	total power dissipation	$T_c \leq 25^\circ\text{C}$		-	98	W
$T_j$	junction temperature			-55	175	°C
$T_{amb}$	ambient temperature			-55	175	°C
$T_{stg}$	storage temperature			-65	175	°C

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-c)}$	thermal resistance from junction to case			-	1.2	1.5	K/W

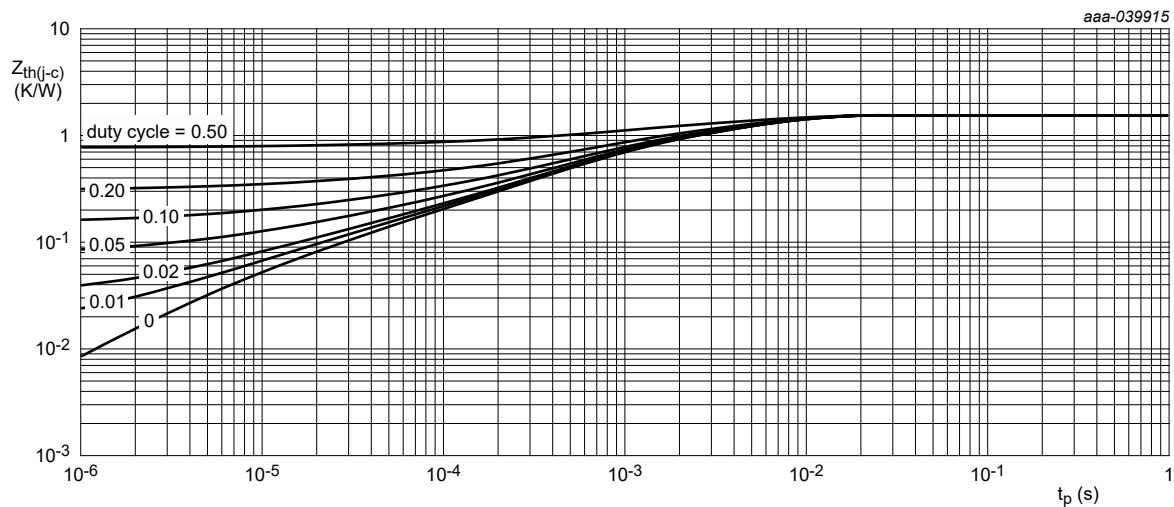


Fig. 1. Transient thermal impedance as a function of pulse duration; maximum values

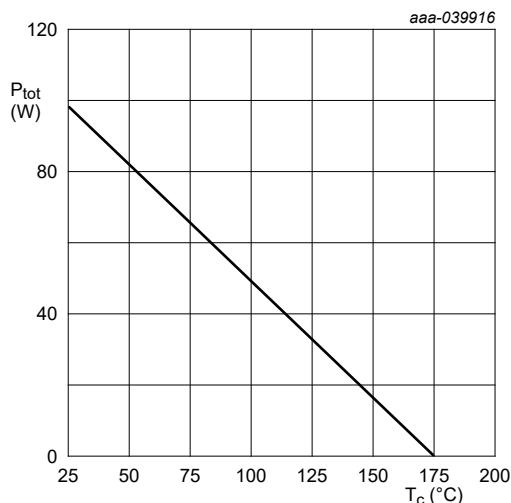


Fig. 2. Power dissipation; maximum values

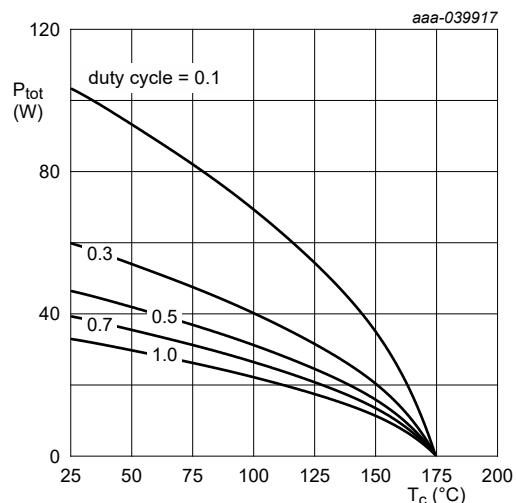


Fig. 3. Forward current as a function of case temperature; maximum values

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Static characteristics</b>							
$V_{DC}$	DC blocking voltage			650	-	-	V
$V_F$	forward voltage	$I_F = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$		-	1.5	1.8	V
		$I_F = 20 \text{ A}; T_j = 150 \text{ }^\circ\text{C}$		-	2	2.6	V
$I_R$	reverse current	$V_R = 650 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	1	180	$\mu\text{A}$
		$V_R = 650 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$		-	10	1250	$\mu\text{A}$
<b>Dynamic characteristics</b>							
$C_d$	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$		-	680	-	pF
		$V_R = 400 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$		-	73	-	pF
$Q_C$	total capacitive charge	$V_R = 400 \text{ V}; dI_F/dt = 200 \text{ A}/\mu\text{s}; I_F = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$		-	41	-	nC

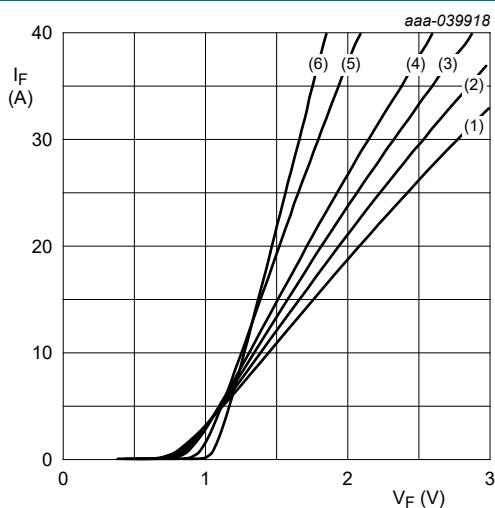


Fig. 4. Forward current as a function of forward voltage; typical values

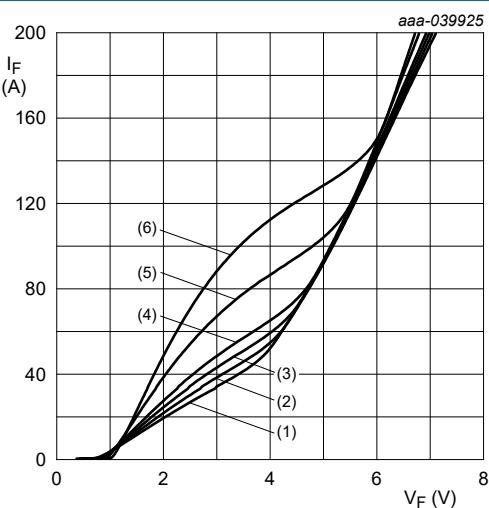
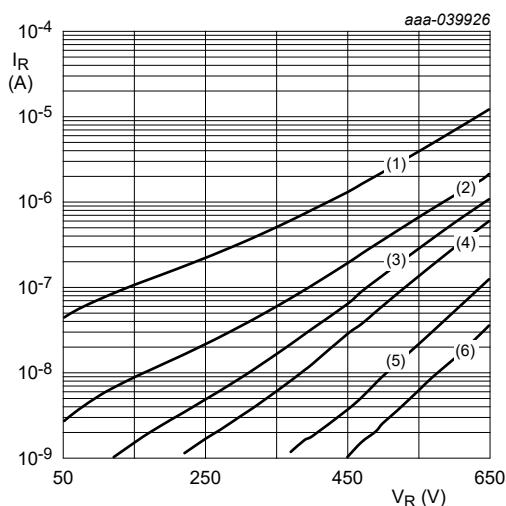


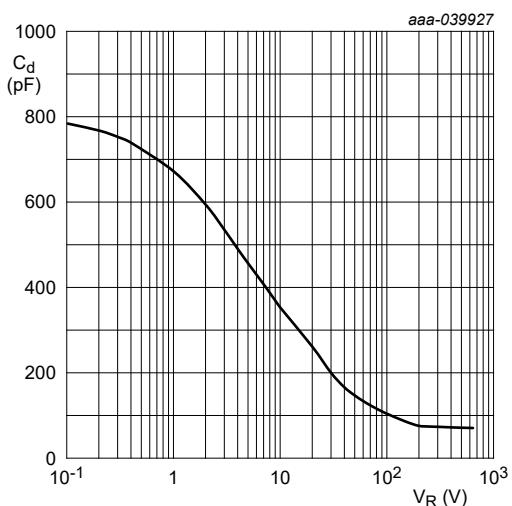
Fig. 5. Forward characteristics in surge current as a function of forward voltage; typical values



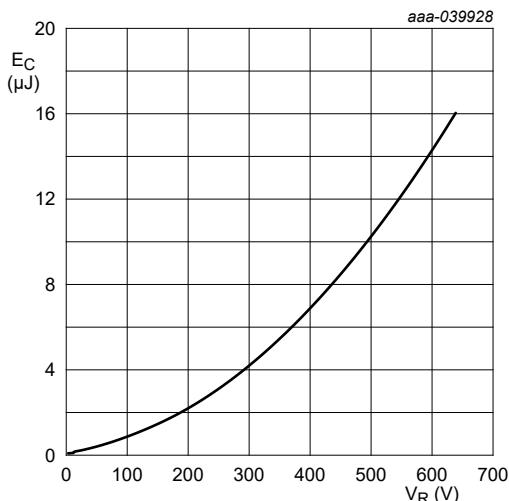
Pulsed condition:

- (1)  $T_j = 175 \text{ } ^\circ\text{C}$
- (2)  $T_j = 150 \text{ } ^\circ\text{C}$
- (3)  $T_j = 125 \text{ } ^\circ\text{C}$
- (4)  $T_j = 100 \text{ } ^\circ\text{C}$
- (5)  $T_j = 25 \text{ } ^\circ\text{C}$
- (6)  $T_j = -55 \text{ } ^\circ\text{C}$

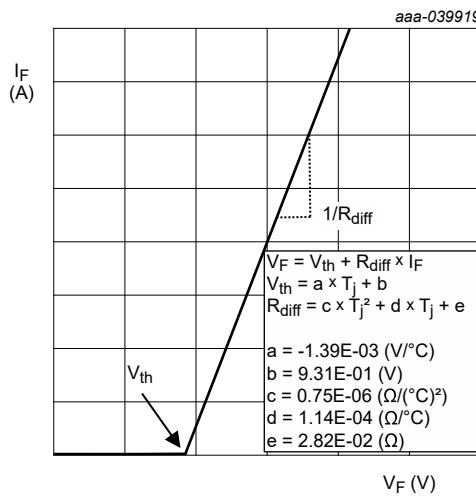
**Fig. 6. Reverse current as a function of reverse voltage; typical values**



**Fig. 7. Diode capacitance as a function of reverse voltage; typical values**



**Fig. 8. Capacitance stored energy as a function of reverse voltage; typical values**



**Fig. 9. Simplified forward characteristics mode**

## 11. Test information

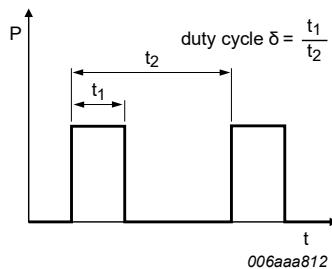


Fig. 10. Duty cycle definition

## 12. Package outline

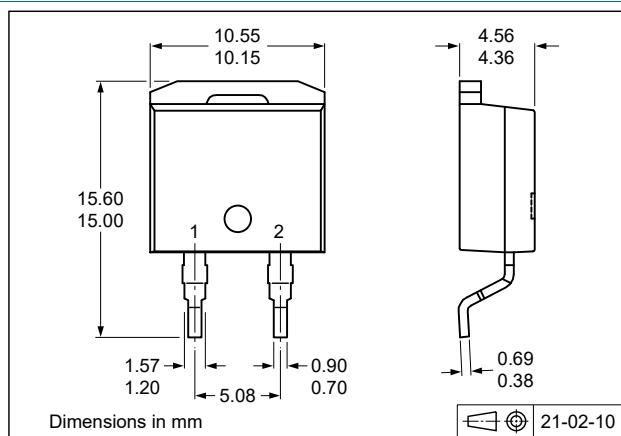


Fig. 11. Package outline D2PAK R2P (SOT8018)

## 13. Soldering

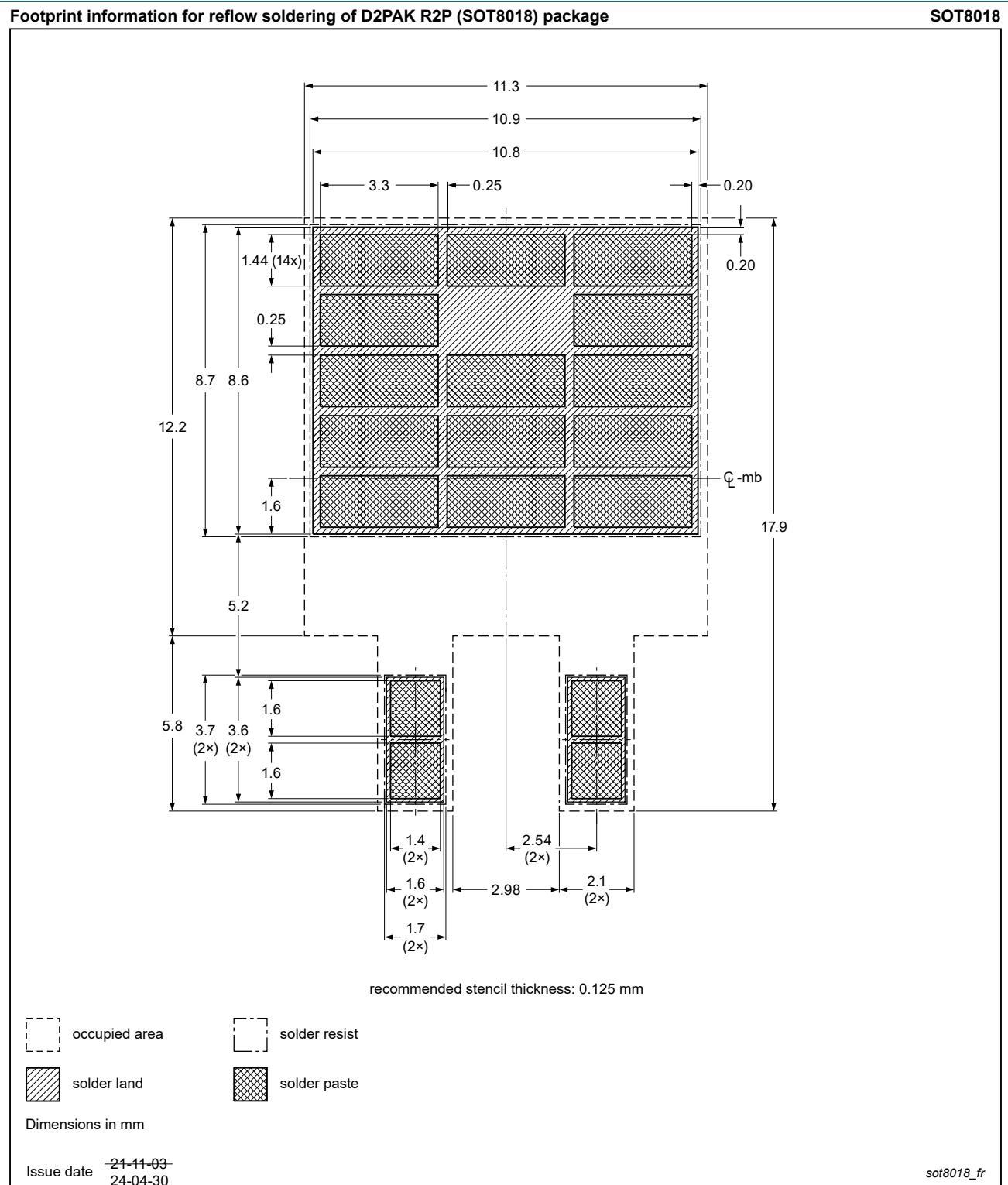


Fig. 12. Reflow soldering footprint for D2PAK R2P (SOT8018)

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PSC2065J v.1	20240610	Product data sheet	-	-

## 15. 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.
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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Date of release: 10 June 2024

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