



PSC20120J

1200 V, 20 A SiC Schottky diode in D2PAK R2P

30 April 2025

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_{FSM} .

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_{FSM} 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

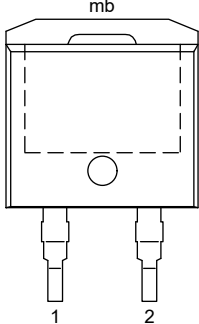
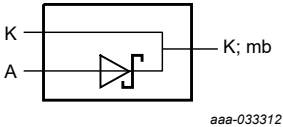
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_F	forward current	$T_c \leq 135\text{ °C}$; $\delta = 1$	-	-	20	A
Static characteristics						
V_{DC}	DC blocking voltage	$T_j = 25\text{ °C}$	1200	-	-	V
Dynamic characteristics						
Q_C	total capacitive charge	$V_R = 800\text{ V}$; $di_F/dt = 200\text{ A/}\mu\text{s}$; $I_F = 20\text{ A}$; $T_j = 25\text{ °C}$	-	85	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>D2PAK R2P (SOT8018)</p>	 <p>aaa-033312</p>
2	A	anode		
mb	K	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PSC20120J	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	SOT8018

7. Marking

Table 4. Marking codes

Type number	Marking code
PSC20120J	PSC20120J

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	$T_J = 25\text{ }^{\circ}\text{C}$		-	1200	V
I_F	forward current	$T_c \leq 135\text{ }^{\circ}\text{C}$; $\delta = 1$		-	20	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ }\mu\text{s}$; square wave; $T_c = 25\text{ }^{\circ}\text{C}$		-	710	A
		$t_p = 10\text{ ms}$; half sine-wave; $T_c = 25\text{ }^{\circ}\text{C}$		-	135	A
		$t_p = 10\text{ ms}$; half sine-wave; $T_c = 150\text{ }^{\circ}\text{C}$		-	100	A
$\int i^2 dt$	$i^2 t$ value	$t_p = 10\text{ ms}$; $T_c = 25\text{ }^{\circ}\text{C}$		-	91	A ² s
		$t_p = 10\text{ ms}$; $T_c = 150\text{ }^{\circ}\text{C}$		-	50	A ² s
P_{tot}	total power dissipation	$T_c \leq 25\text{ }^{\circ}\text{C}$		-	200	W
T_J	junction temperature			-55	175	$^{\circ}\text{C}$
T_{amb}	ambient temperature			-55	175	$^{\circ}\text{C}$
T_{stg}	storage temperature			-65	175	$^{\circ}\text{C}$

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-c)}$	thermal resistance from junction to case			-	0.6	0.75	K/W

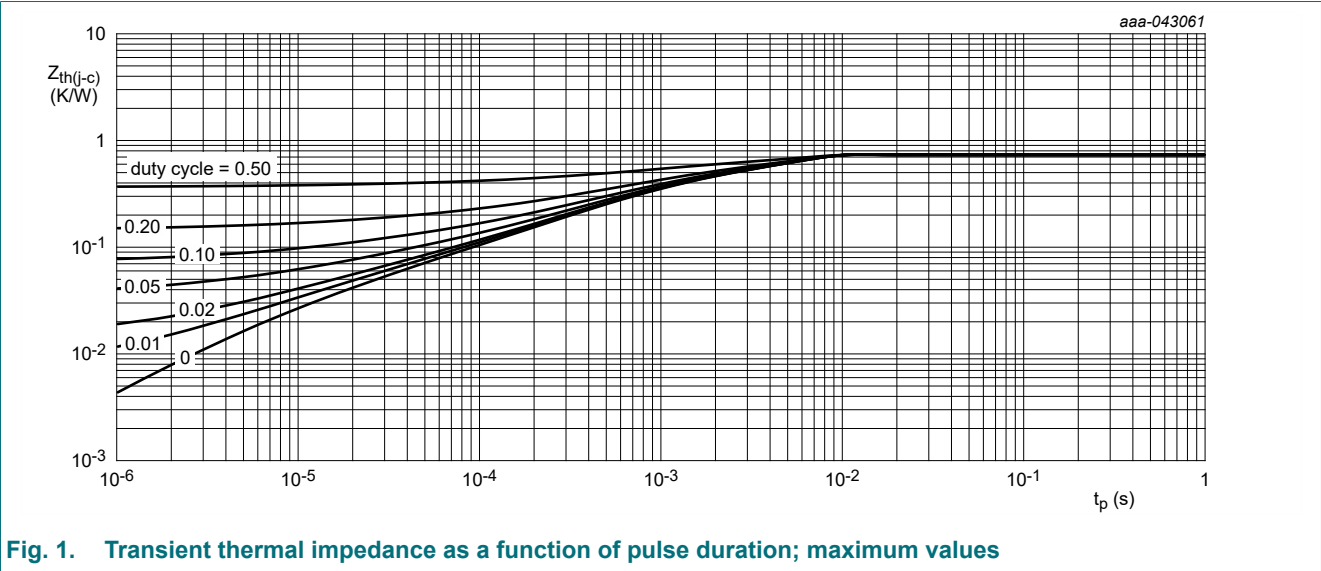


Fig. 1. Transient thermal impedance as a function of pulse duration; maximum values

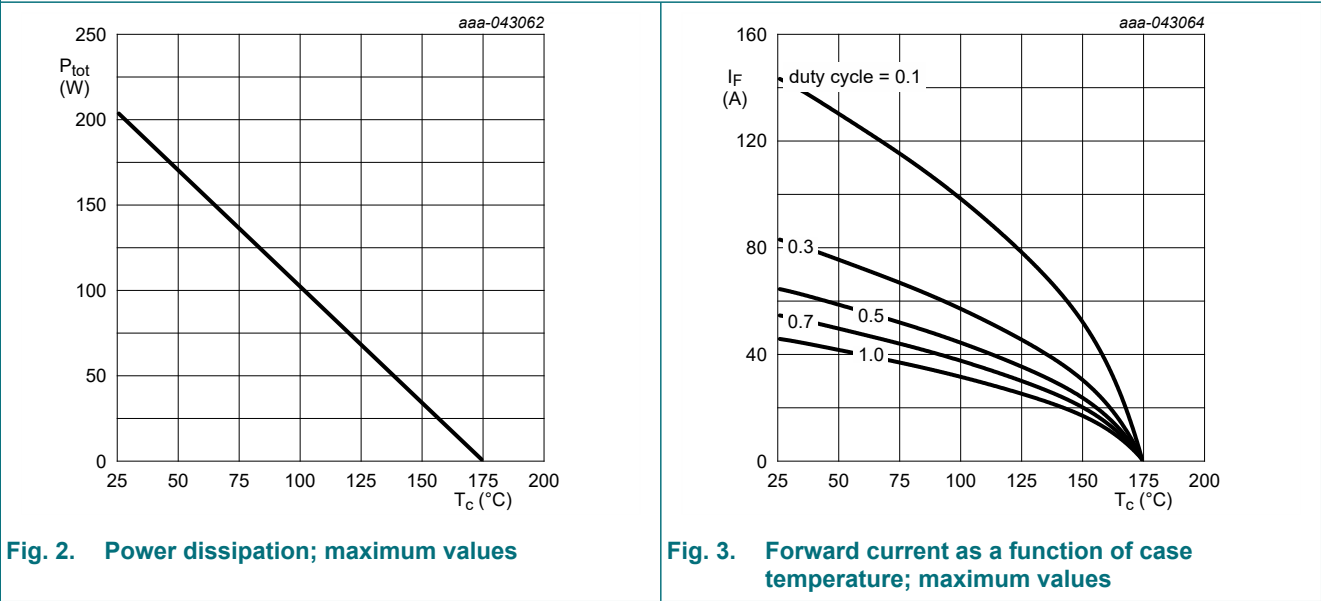


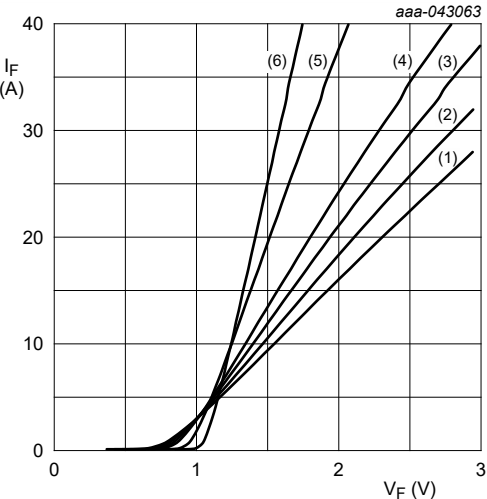
Fig. 2. Power dissipation; maximum values

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

10. Characteristics

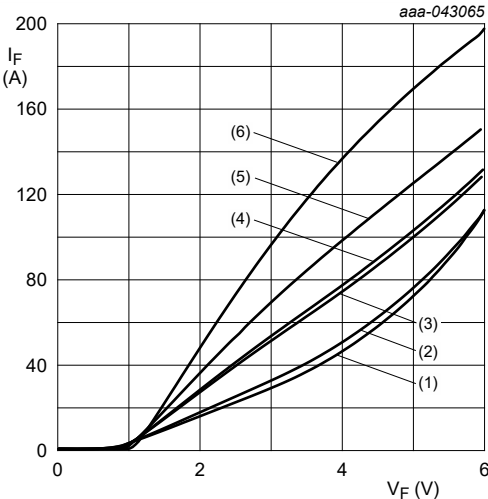
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _{DC}	DC blocking voltage	T _j = 25 °C		1200	-	-	V
V _F	forward voltage	I _F = 20 A; T _j = 25 °C		-	1.5	1.8	V
		I _F = 20 A; T _j = 150 °C		-	2.2	2.6	V
I _R	reverse current	V _R = 1200 V; T _j = 25 °C		-	1	180	μA
		V _R = 1200 V; T _j = 150 °C		-	10	500	μA
Dynamic characteristics							
C _d	diode capacitance	V _R = 1 V; f = 1 MHz; T _j = 25 °C		-	1150	-	pF
		V _R = 800 V; f = 1 MHz; T _j = 25 °C		-	70	-	pF
Q _C	total capacitive charge	V _R = 800 V; dI _F /dt = 200 A/μs; I _F = 20 A; T _j = 25 °C		-	85	-	nC



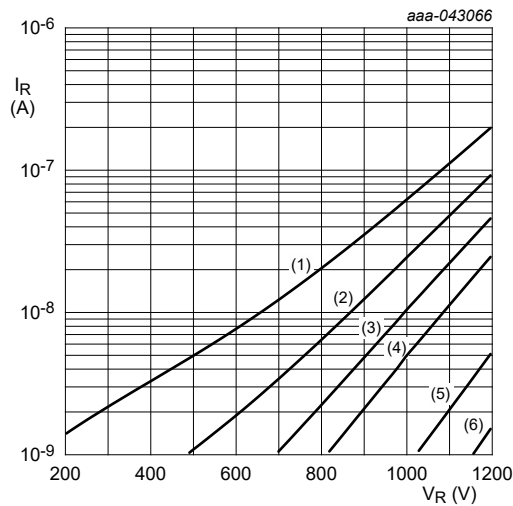
Pulsed condition: t_p = 100 μs
(1) T_j = 175 °C
(2) T_j = 150 °C
(3) T_j = 125 °C
(4) T_j = 100 °C
(5) T_j = 25 °C
(6) T_j = -55 °C

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



Pulsed condition: t_p = 100 μs
(1) T_j = 175 °C
(2) T_j = 150 °C
(3) T_j = 125 °C
(4) T_j = 100 °C
(5) T_j = 25 °C
(6) T_j = -55 °C

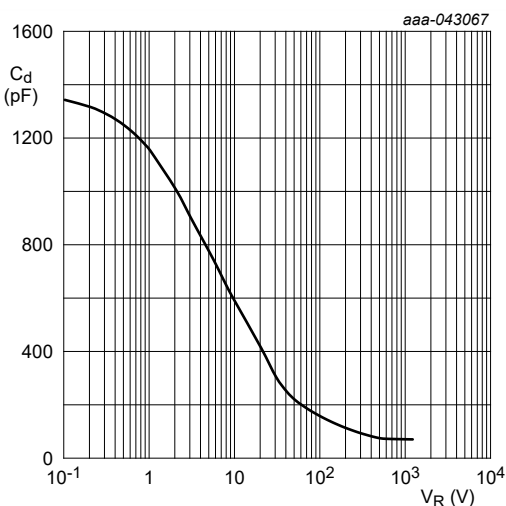
Fig. 5. Forward characteristics in surge current as a function of forward voltage; typical values



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



$f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$

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

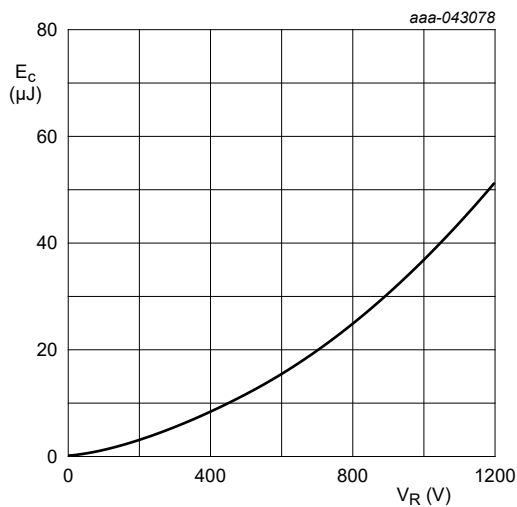


Fig. 8. Capacitance stored energy as a function of reverse voltage; typical values

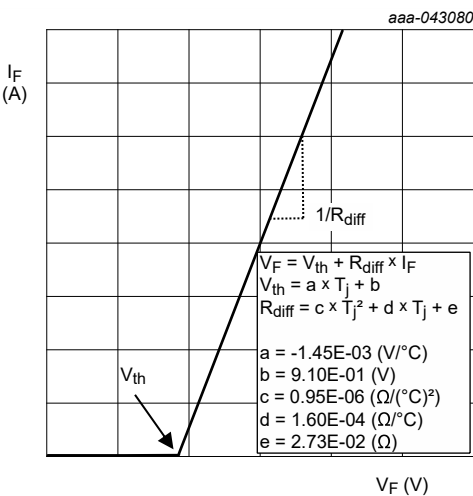


Fig. 9. Simplified forward characteristics mode

11. Test information

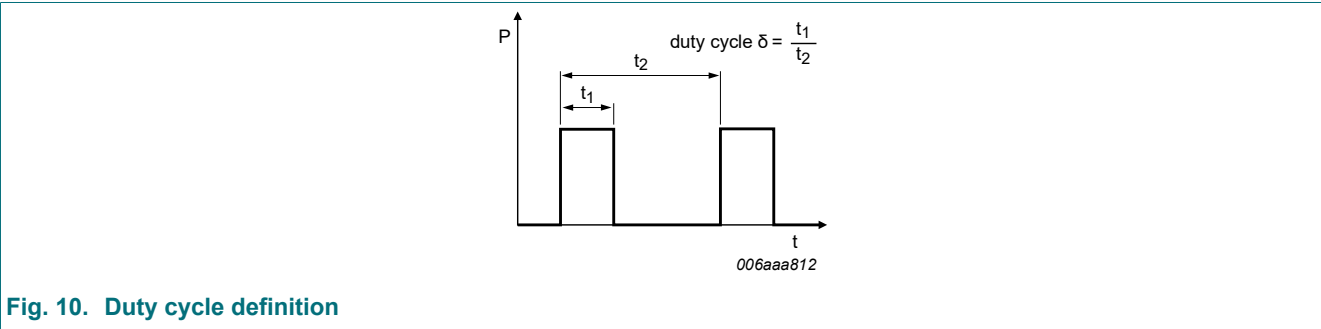


Fig. 10. Duty cycle definition

12. Package outline

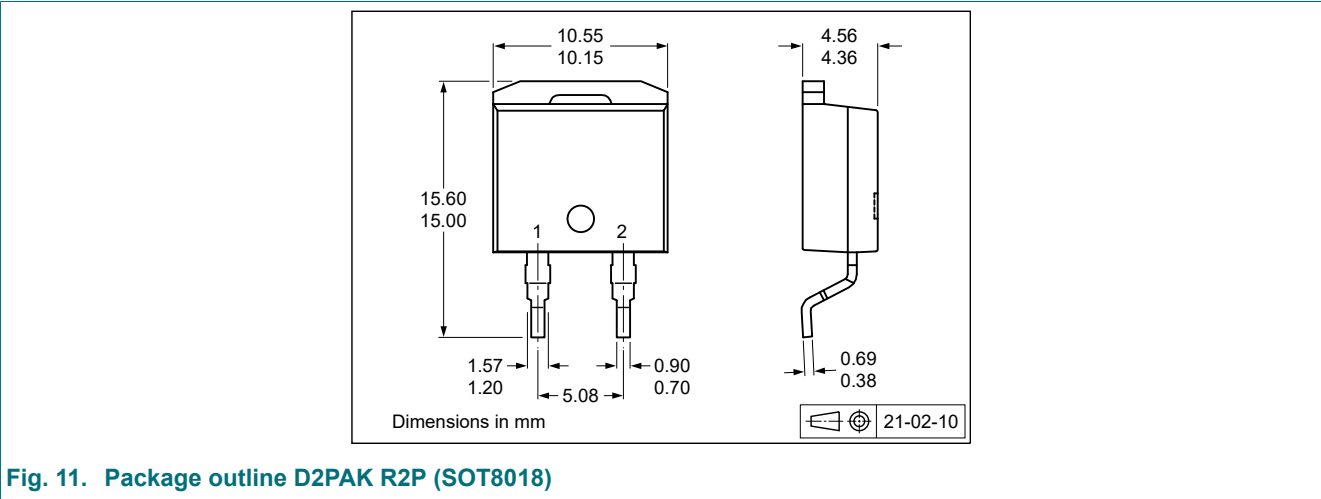
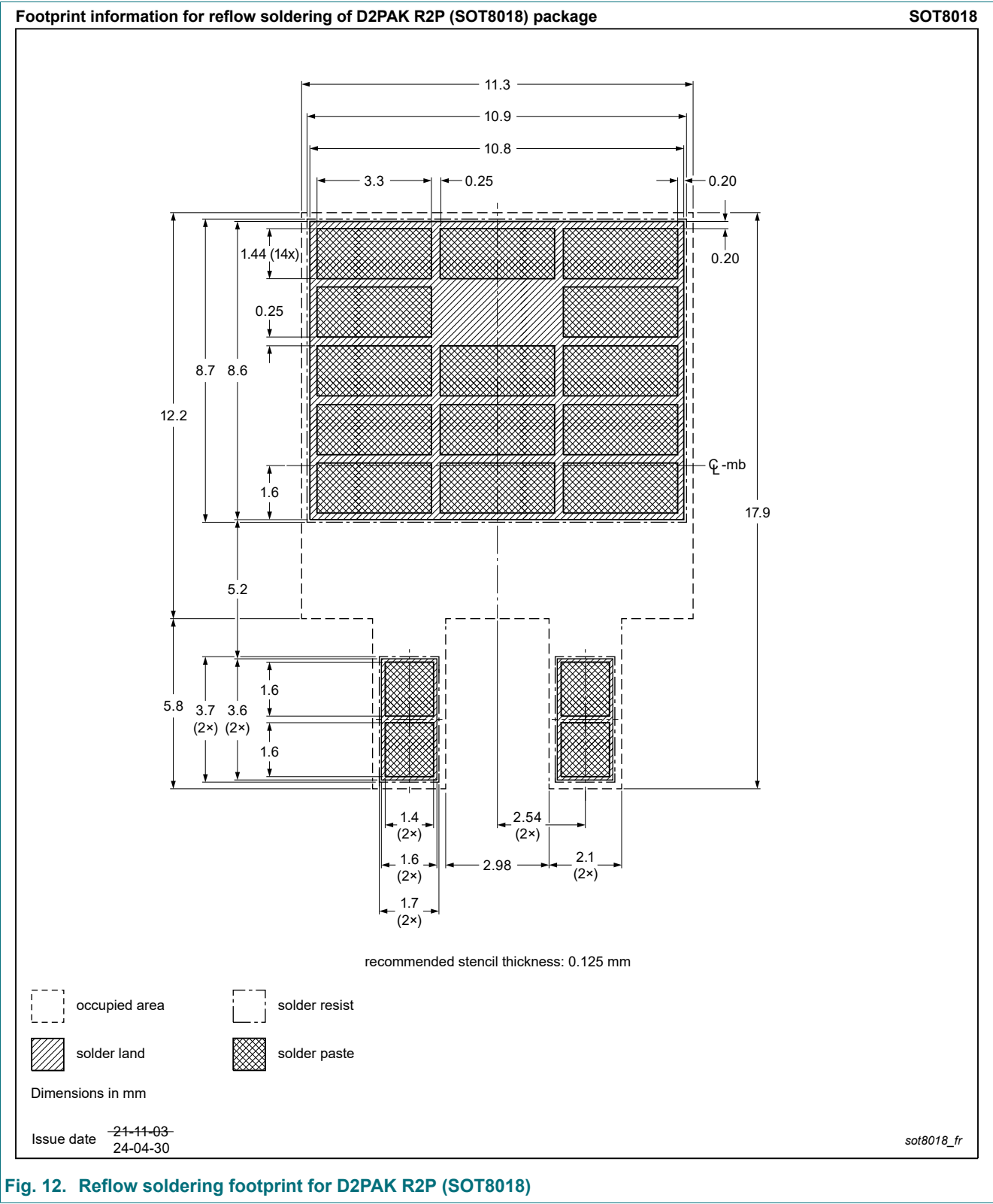


Fig. 11. Package outline D2PAK R2P (SOT8018)

13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PSC20120J v.1	20250430	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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- [2] The term 'short data sheet' is explained in section "Definitions".
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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 4

10. Characteristics..... 5

11. Test information..... 7

12. Package outline..... 7

13. Soldering..... 8

14. Revision history.....9

15. Legal information.....10

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