

1. General description

Silicon Carbide Schottky diode in a DFN 8*8 plastic package, designed for high frequency switched-mode power supplies.



2. Features and benefits

- Highly stable switching performance
- 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

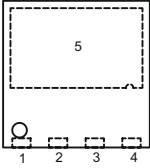
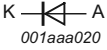
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		650			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_c \leq 138$ °C; Fig. 1 ; Fig. 2 ; Fig. 3	10			A
T_j	junction temperature		175			°C
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 10$ A; $T_j = 25$ °C; Fig. 5	-	1.5	1.7	V
		$I_F = 10$ A; $T_j = 150$ °C; Fig. 5	-	1.8	2.2	V
Dynamic characteristics						
Q_r	recovered charge	$I_F = 10$ A; $di_F/dt = 500$ A/ μ s; $V_R = 400$ V; $T_j = 25$ °C; Fig. 7	-	14	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected		
2	n.c.	not connected		
3	A	anode		
4	A	anode		
5	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
WNSC2D10650T	DFN8*8	WNSC2D10650TJ	Tape	3000	DFN8X8N	25-Dec-2019

7. Marking

Table 4. Marking codes

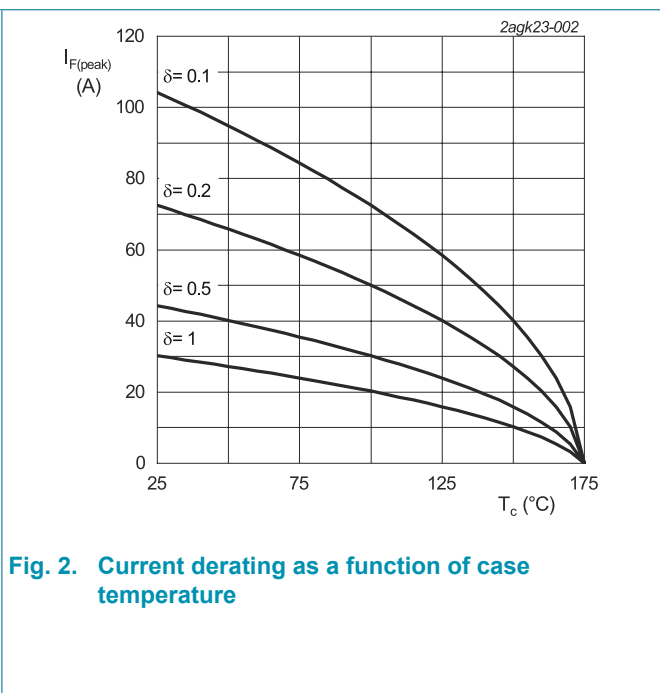
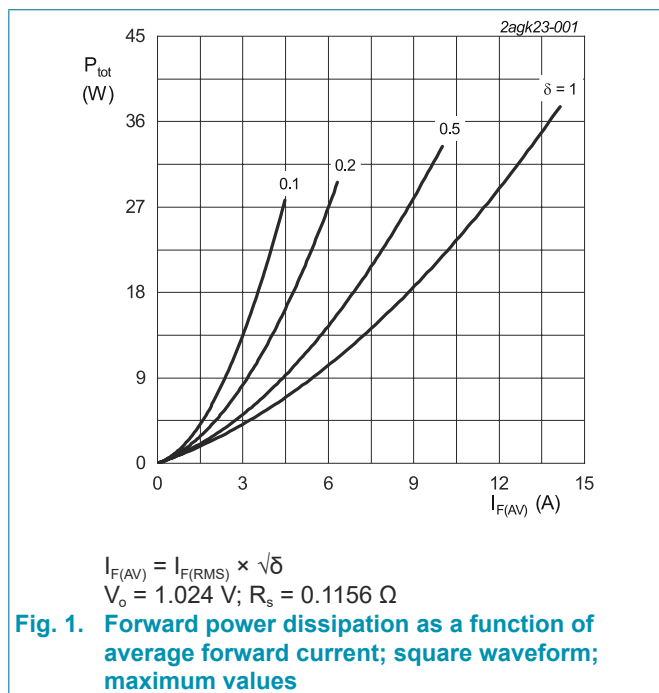
Type number	Marking codes
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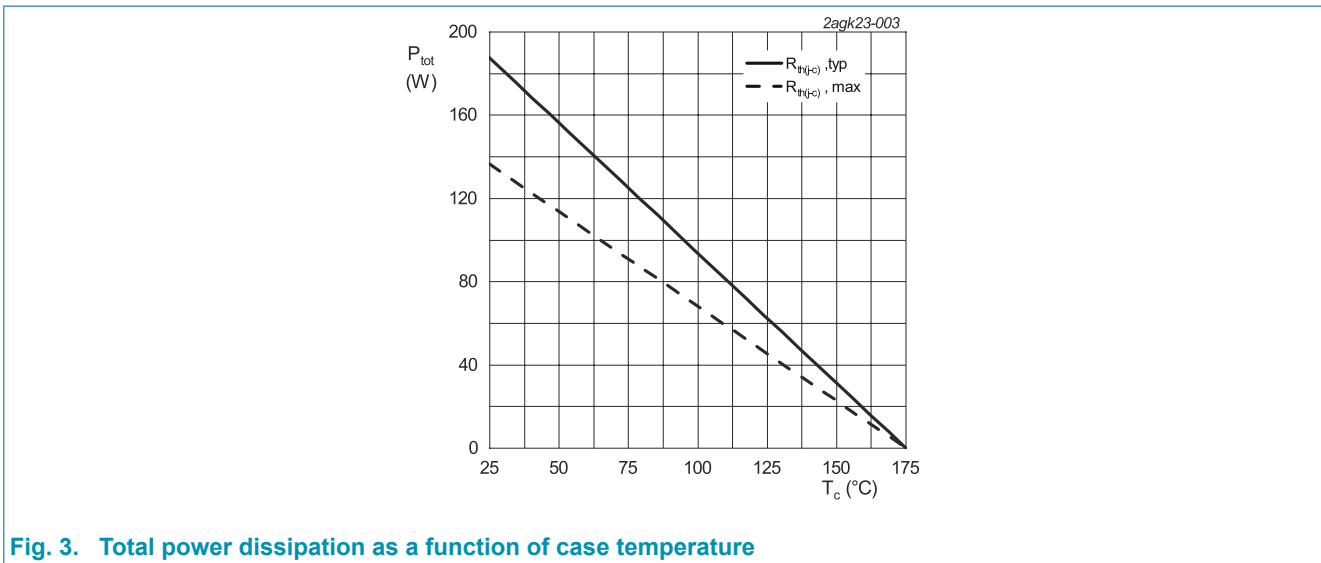
8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Values	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	$\delta = 0.5$; square-wave pulse; $T_c \leq 138\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	10	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_c \leq 138\text{ }^\circ\text{C}$; square-wave pulse	20	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	50	A
		$t_p = 10\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; square-wave pulse	450	A
I^2t	I^2t for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; $t_p = 10\text{ ms}$	12.5	A^2s
T_{stg}	storage temperature		-55 to 175	$^\circ\text{C}$
T_j	junction temperature		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	Fig. 4	-	0.8	1.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	50	-	K/W

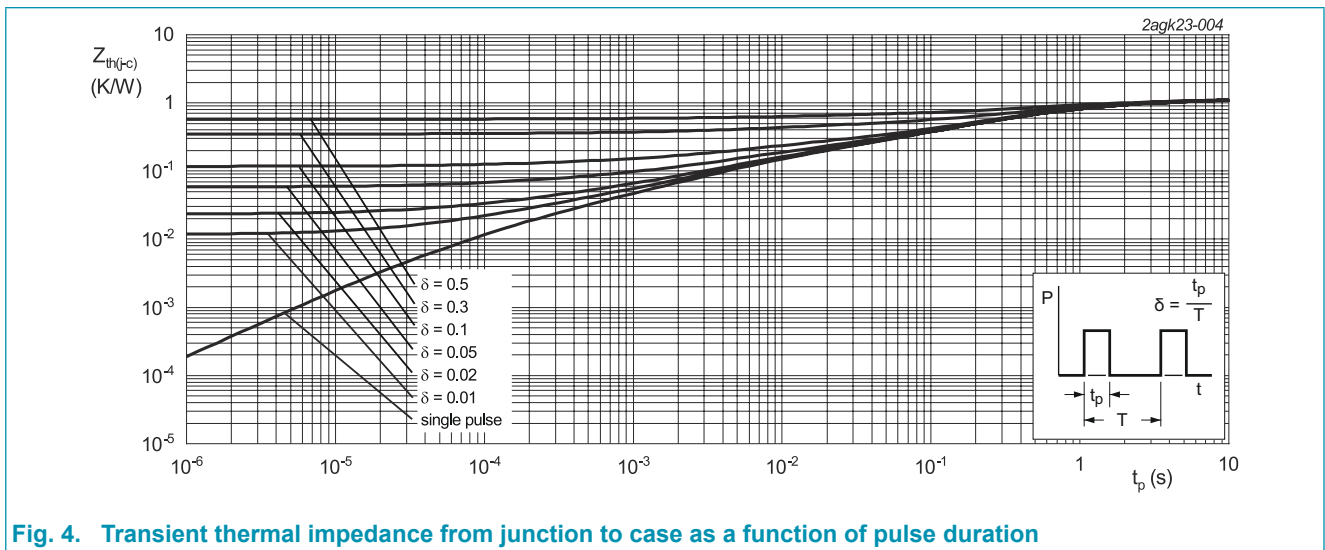
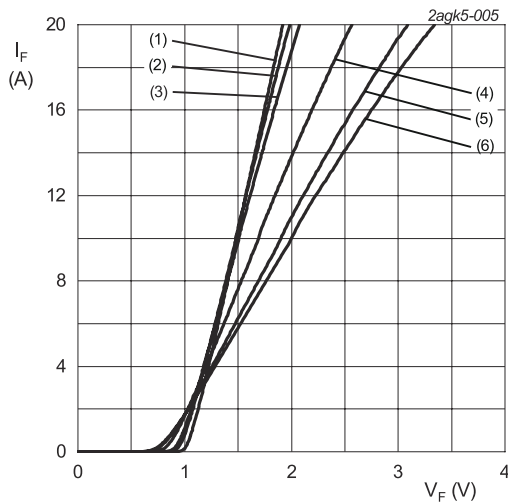


Fig. 4. Transient thermal impedance from junction to case as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward current	$I_F = 10 \text{ A}; T_J = 25 \text{ }^\circ\text{C}; \text{Fig. 5}$	-	1.5	1.7	V
		$I_F = 10 \text{ A}; T_J = 150 \text{ }^\circ\text{C}; \text{Fig. 5}$	-	1.8	2.2	V
		$I_F = 10 \text{ A}; T_J = 175 \text{ }^\circ\text{C}; \text{Fig. 5}$	-	2	2.3	V
I_R	reverse current	$V_R = 650 \text{ V}; T_J = 25 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	0.5	50	μA
		$V_R = 650 \text{ V}; T_J = 175 \text{ }^\circ\text{C}; \text{Fig. 6}$	-	25	250	μA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 10 \text{ A}; V_R = 400 \text{ V}; di_F/dt = 500 \text{ A}/\mu\text{s}; T_J = 25 \text{ }^\circ\text{C}; \text{Fig. 7}$	-	14	-	nC
C_d	diode capacitance	$f = 1 \text{ MHz}; V_R = 1 \text{ V}; T_J = 25 \text{ }^\circ\text{C}$	-	310	-	pF
		$f = 1 \text{ MHz}; V_R = 300 \text{ V}; T_J = 25 \text{ }^\circ\text{C}$	-	36	-	pF
		$f = 1 \text{ MHz}; V_R = 600 \text{ V}; T_J = 25 \text{ }^\circ\text{C}$	-	32	-	pF
E_{as}	non-repetitive avalanche energy	$I_R = 5.5 \text{ A}; L = 5 \text{ mH}; T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$	75	-	-	mJ



$V_o = 1.024 \text{ V}; R_s = 0.1156 \text{ } \Omega$
 (1) $T_J = -55 \text{ }^\circ\text{C};$ typical values
 (2) $T_J = 0 \text{ }^\circ\text{C};$ typical values
 (3) $T_J = 25 \text{ }^\circ\text{C};$ typical values
 (4) $T_J = 100 \text{ }^\circ\text{C};$ typical values
 (5) $T_J = 150 \text{ }^\circ\text{C};$ typical values
 (6) $T_J = 175 \text{ }^\circ\text{C};$ typical values

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

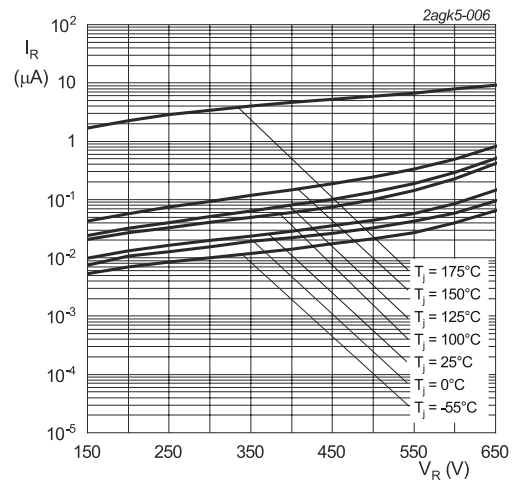


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

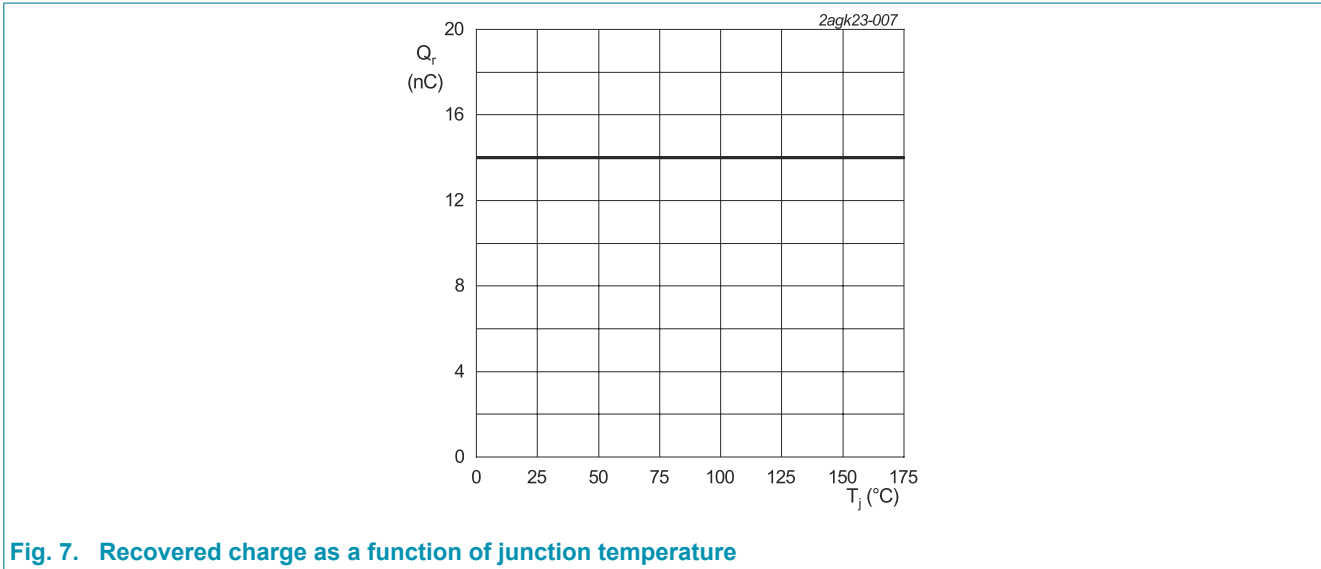
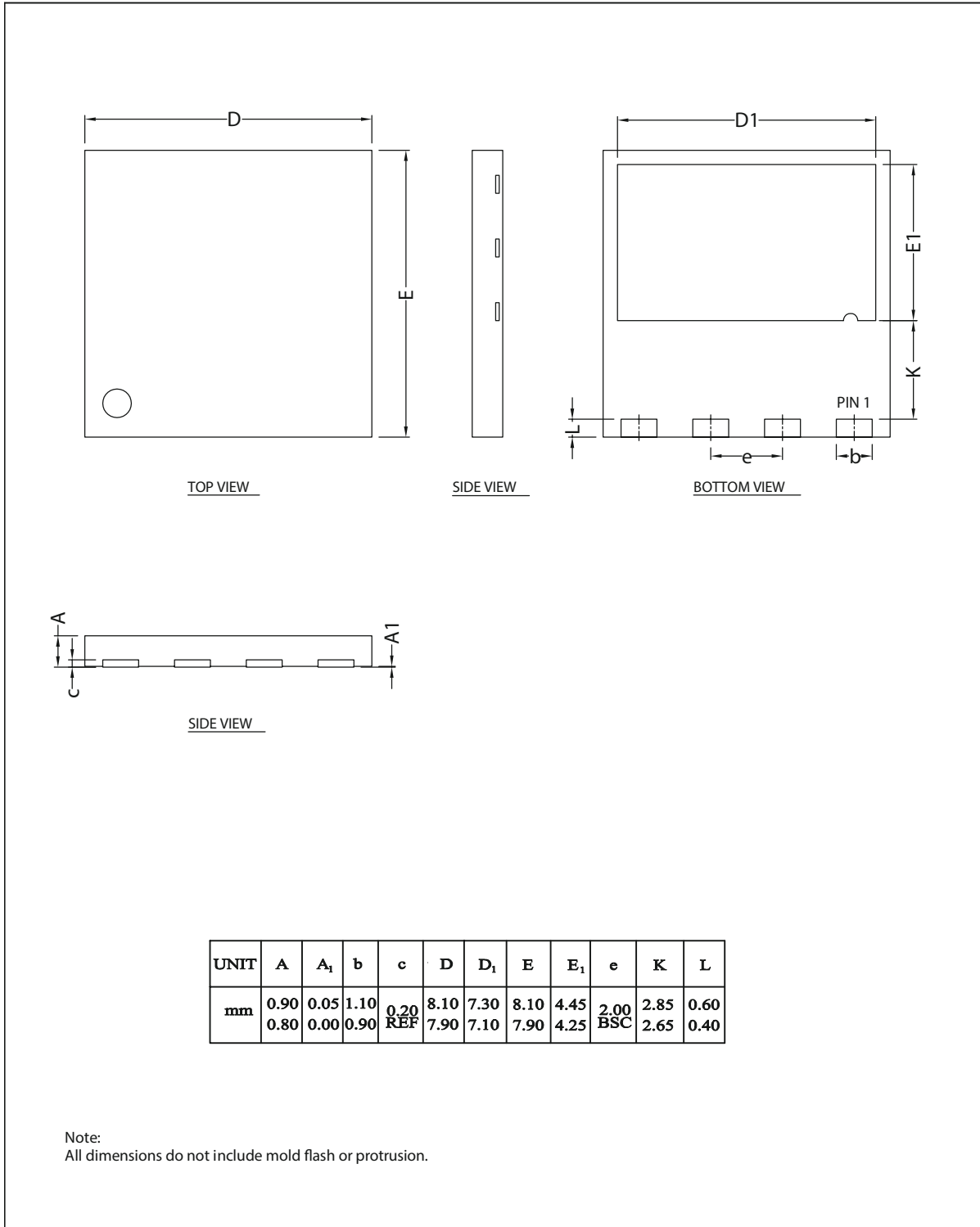


Fig. 7. Recovered charge as a function of junction temperature

11. Package outline



12. 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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Date of release: 21 January 2021
