

## 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
- 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

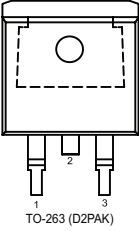
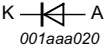
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
<b>Absolute maximum rating</b>							
$V_{RRM}$	repetitive peak reverse voltage			650			V
$I_F$	continuous forward current	$T_{mb} \leq 138\text{ °C}$ , DC; <a href="#">Fig. 2</a>		10			A
$T_j$	junction temperature			-55 to 175			°C
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
$V_F$	forward voltage	$I_F = 10\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 5</a>		-	1.45	1.70	V
		$I_F = 10\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 5</a>		-	1.80	2.20	V
<b>Dynamic characteristics</b>							
$Q_r$	recovered charge	$I_F = 10\text{ A}$ ; $di_F/dt = 500\text{ A}/\mu\text{s}$ ; $V_R = 400\text{ V}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>		-	14.5	-	nC

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	not connected		
2	K	cathode [1]		
3	A	anode		
mb	K	mounting base; connected to cathode		

[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	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
WNSC5D10650B	TO263	WNSC5D10650B6J	Reel	800	TO263N	26-Sep-2016

## 7. Marking

Table 4. Marking codes

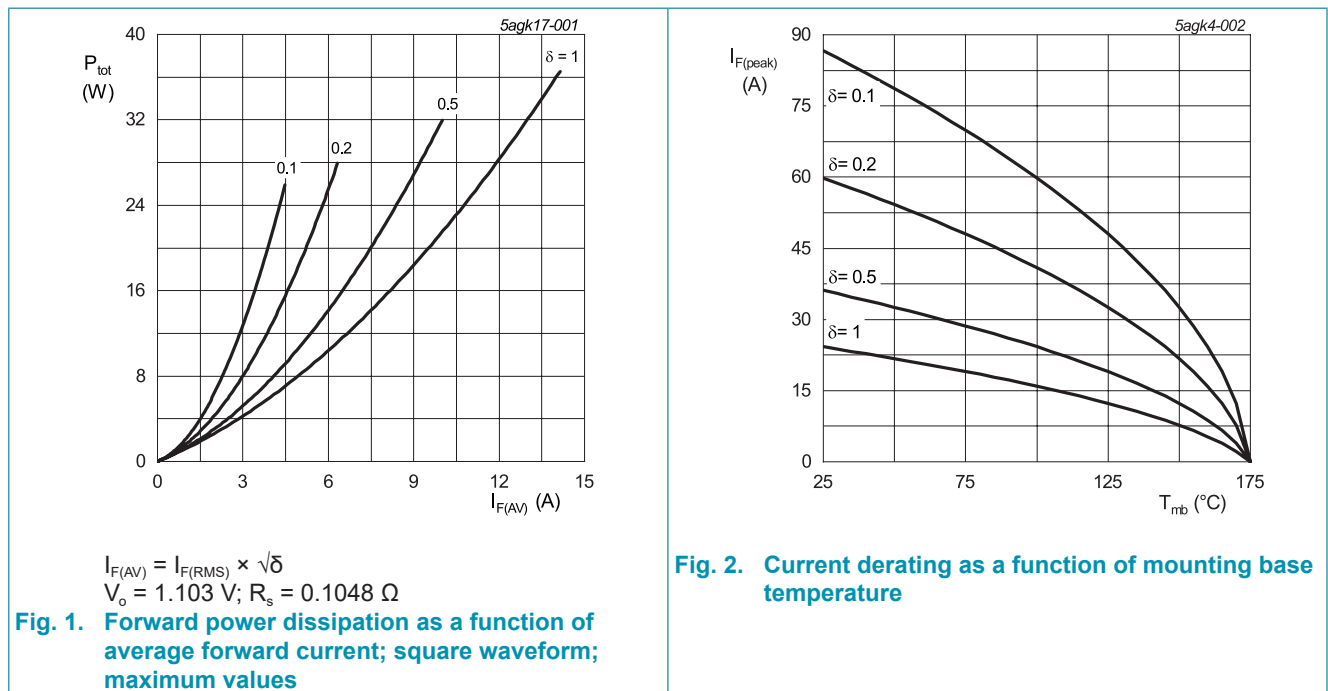
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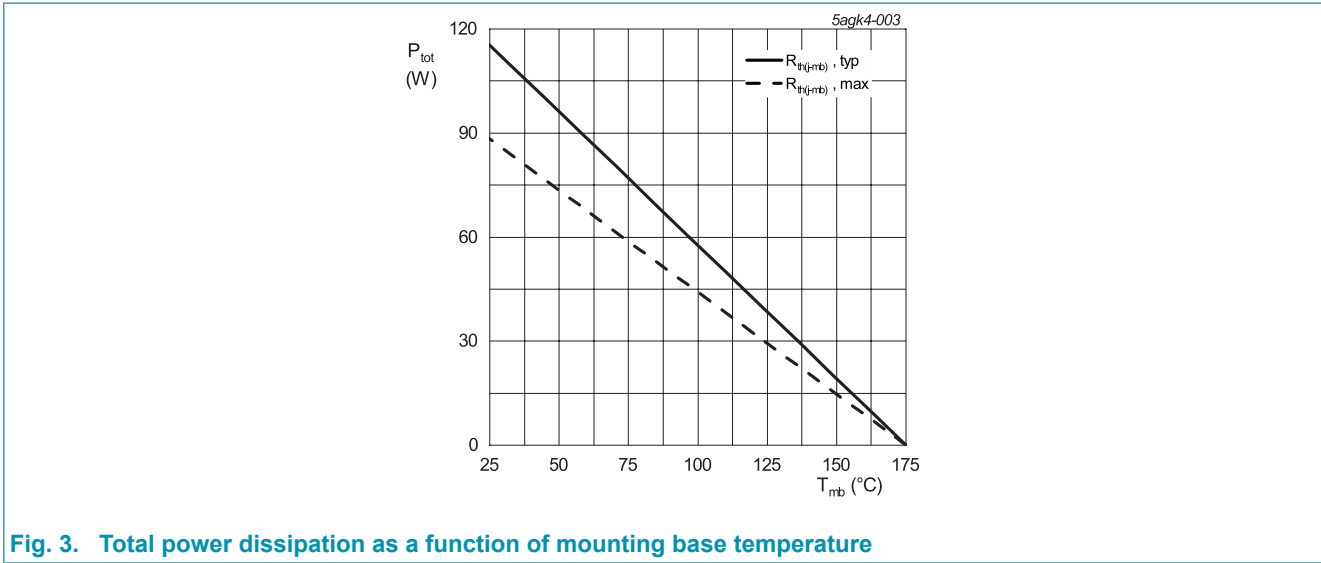
## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Notes	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
$I_F$	continuous forward current	$T_{mb} \leq 138\text{ °C}$ , DC; <a href="#">Fig. 2</a>		10	A
		$T_{mb} \leq 125\text{ °C}$ , DC; <a href="#">Fig. 2</a>		12	A
		$T_{mb} \leq 25\text{ °C}$ , DC; <a href="#">Fig. 2</a>		24	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\ \mu\text{s}$ ; $T_{mb} \leq 125\text{ °C}$ ; square-wave pulse		19	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse		60	A
		$t_p = 10\ \mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square-wave pulse		550	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse		18	A <sup>2</sup> s
$T_{stg}$	storage temperature			-55 to 175	°C
$T_j$	junction temperature			-55 to 175	°C





### 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	<a href="#">Fig. 4</a>		-	1.3	1.7	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

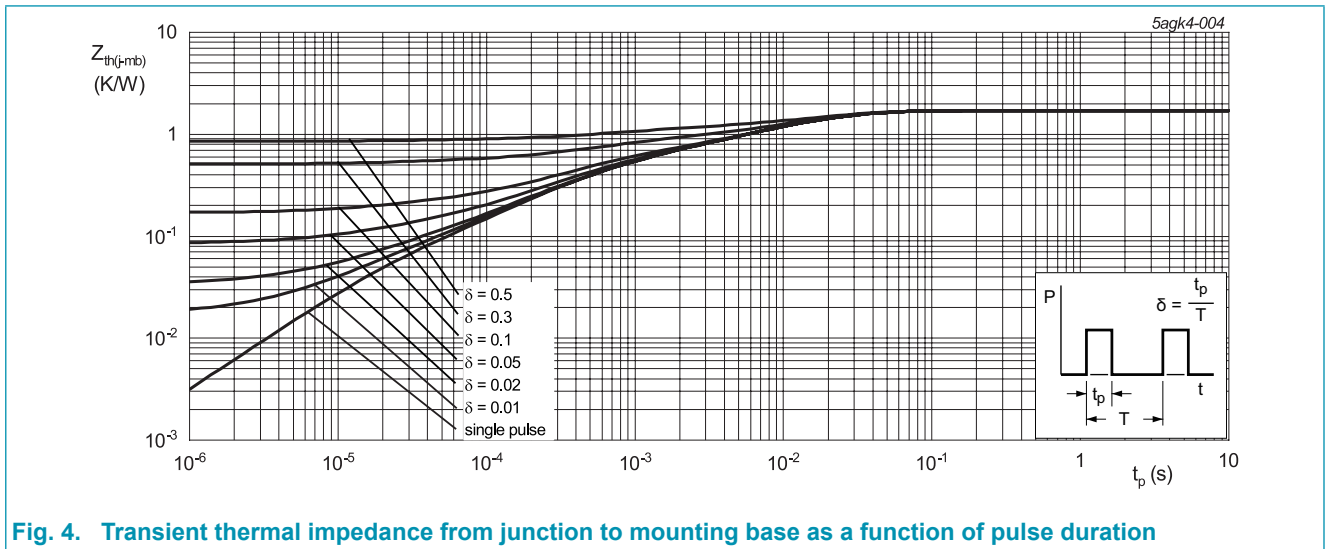
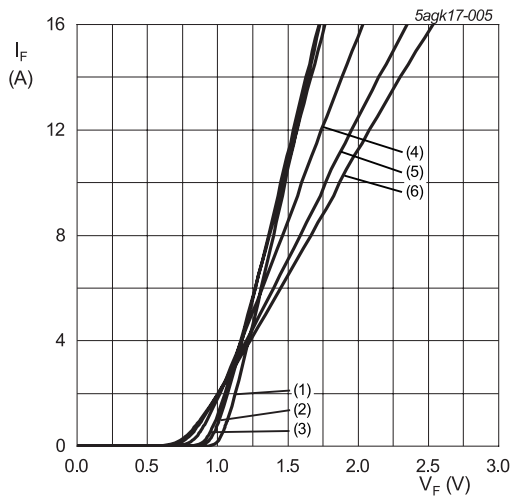


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
$V_F$	forward voltage	$I_F = 10\text{ A}; T_J = 25\text{ °C}; \text{Fig. 5}$		-	1.45	1.70	V
		$I_F = 10\text{ A}; T_J = 150\text{ °C}; \text{Fig. 5}$		-	1.80	2.20	V
		$I_F = 10\text{ A}; T_J = 175\text{ °C}; \text{Fig. 5}$		-	2.00	2.30	V
$I_R$	reverse current	$V_R = 650\text{ V}; T_J = 25\text{ °C}; \text{Fig. 6}$		-	0.5	50	$\mu\text{A}$
		$V_R = 650\text{ V}; T_J = 175\text{ °C}; \text{Fig. 6}$		-	25	250	$\mu\text{A}$
<b>Dynamic characteristics</b>							
$Q_r$	recovered charge	$I_F = 10\text{ A}; V_R = 400\text{ V}; di_F/dt = 500\text{ A}/\mu\text{s}; T_J = 25\text{ °C}; \text{Fig. 7}$		-	14.5	-	nC
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 1\text{ V}; T_J = 25\text{ °C}$		-	323	-	pF
		$f = 1\text{ MHz}; V_R = 300\text{ V}; T_J = 25\text{ °C}$		-	38	-	pF
		$f = 1\text{ MHz}; V_R = 600\text{ V}; T_J = 25\text{ °C}$		-	35	-	pF
$E_{as}$	non-repetitive avalanche energy	$I_R = 4.9\text{ A}; T_{j(\text{init})} = 25\text{ °C}; L = 5\text{ mH}$		60	-	-	mJ



$V_o = 1.103\text{ V}; R_s = 0.1048\ \Omega$   
 (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

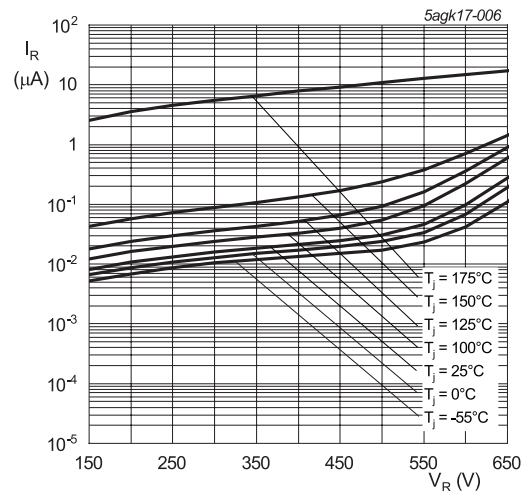


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

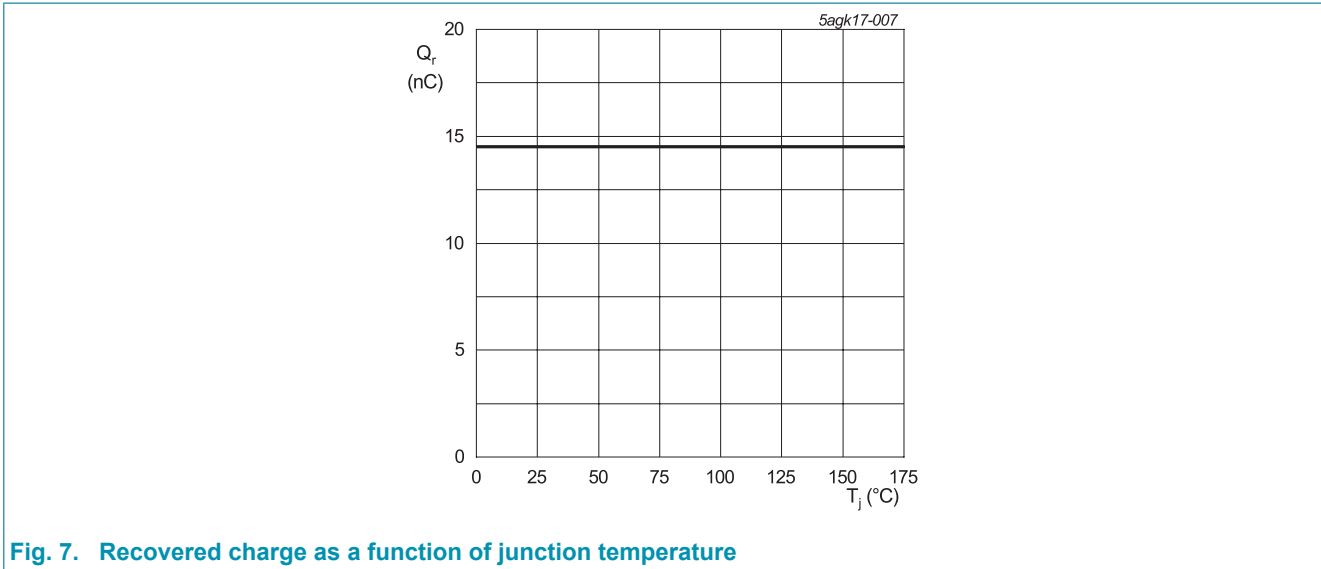
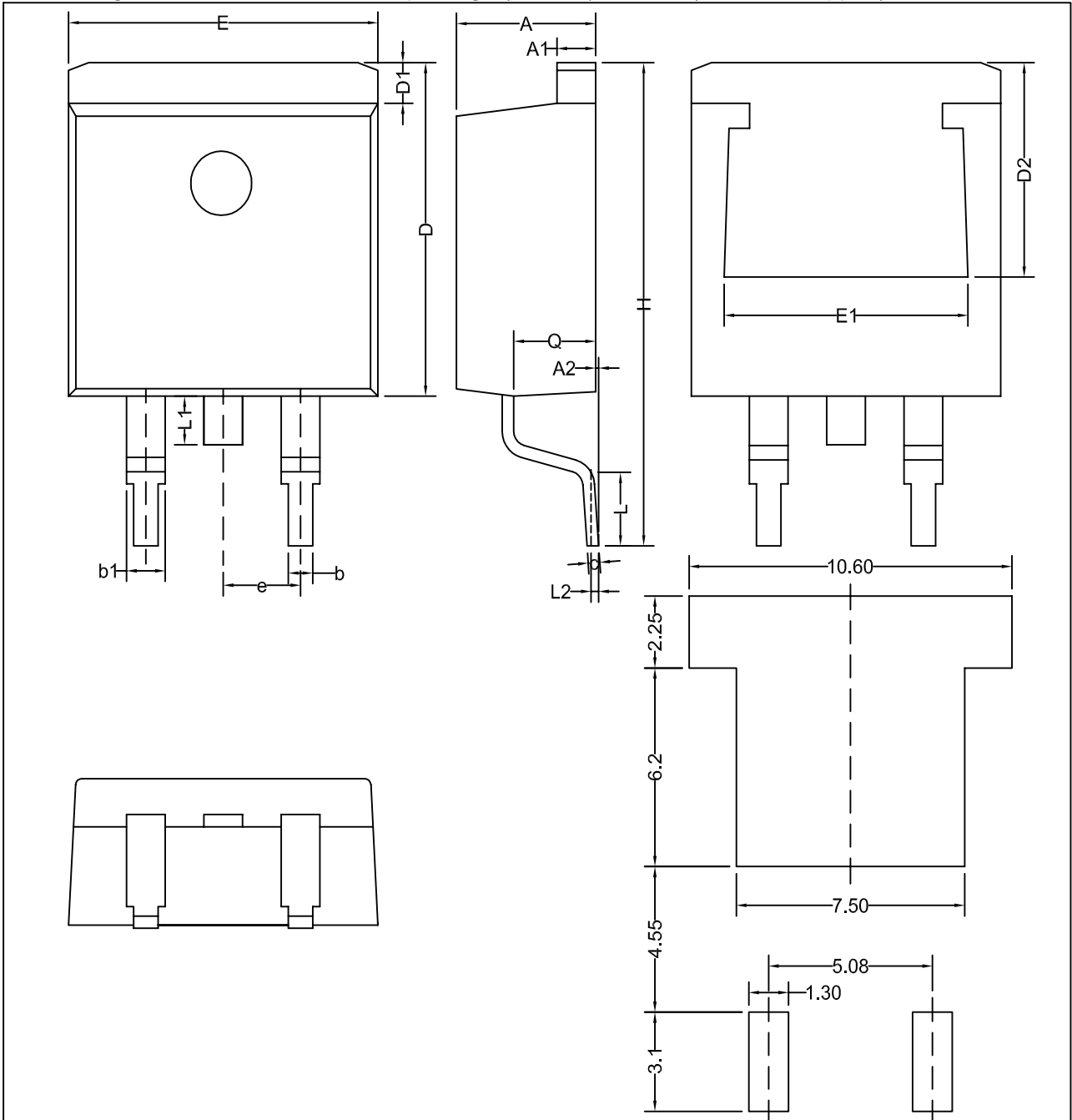


Fig. 7. Recovered charge as a function of junction temperature

### 11. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) TO263



Recommended Footprint

Unit	A	A1	A2	b	b1	c	D	D1	D2	e	E	E1	H	L	L1	L2	Q
min	4.10	1.22	0.00	0.60	1.05	0.34	---	1.20	6.60	---	9.70	7.80	14.80	2.10	---	---	2.20
max	4.70	1.40	0.25	0.90	1.45	0.64	11.00	1.60	---	2.54 (BSC)	10.30	---	15.80	2.90	1.75	---	2.79



## 12. Legal information

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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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Date of release: 27 December 2023

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