

## 1. General description

Dual Silicon Carbide Schottky diode in a TO247-3L 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
- High junction operating temperature capability ( $T_{j(max)} = 175\text{ °C}$ )

## 3. Applications

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

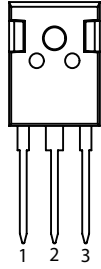
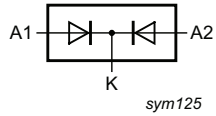
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_{RRM}$	repetitive peak reverse voltage		1200			V
$I_O$	limiting average forward current	$T_{mb} \leq 139\text{ °C}$ ; DC; both diodes	40			A
$T_j$	junction temperature		175			°C
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 20\text{ A}$ ; $T_j = 25\text{ °C}$ ; per diode; <a href="#">Fig. 5</a>	-	1.45	1.65	V
		$I_F = 20\text{ A}$ ; $T_j = 150\text{ °C}$ ; per diode; <a href="#">Fig. 5</a>	-	1.95	2.30	V
		$I_F = 20\text{ A}$ ; $T_j = 175\text{ °C}$ ; per diode; <a href="#">Fig. 5</a>	-	2.10	2.60	V
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 20\text{ A}$ ; $di_F/dt = 500\text{ A}/\mu\text{s}$ ; $V_R = 400\text{ V}$ ; $T_j = 25\text{ °C}$ ; per diode; <a href="#">Fig. 7</a>	-	44	-	nC

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode		
2	K	cathode		
3	A2	anode		
mb	mb	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
WN <sub>SC</sub> 2D401200CW	TO247	WN <sub>SC</sub> 2D401200CW6Q	Tube	30	SOT429 (L)	25-Mar-2013
					TO247P (P)	09-Mar-2023

## 7. Marking

Table 4. Marking codes

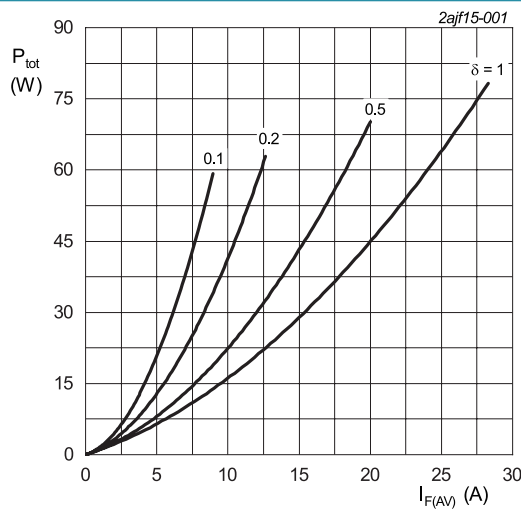
Type number	Marking codes
WN <sub>SC</sub> 2D401200CW	WN <sub>SC</sub> 2D 401200CW

## 8. Limiting values

**Table 5. Limiting values**

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

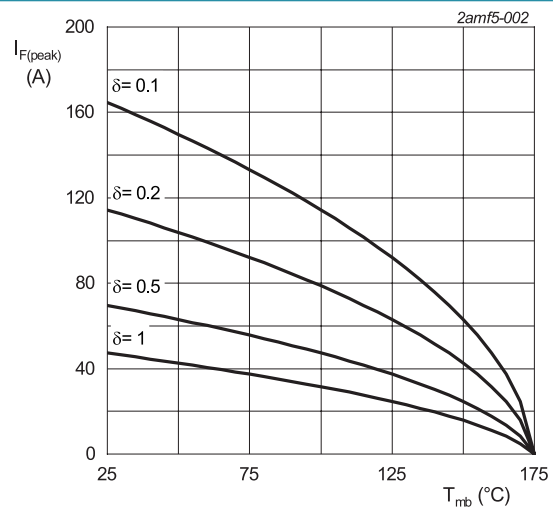
Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		1200	V
$V_{RWM}$	crest working reverse voltage		1200	V
$V_R$	reverse voltage	DC	1200	V
$I_O$	limiting average forward current	$T_{mb} \leq 139\text{ °C}$ ; DC; both diodes	40	A
		$T_{mb} \leq 125\text{ °C}$ ; DC; both diodes	49	A
		$T_{mb} \leq 25\text{ °C}$ ; DC; both diodes	84	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 125\text{ °C}$ ; square-wave pulse; per diode	37	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse; per diode	160	A
		$t_p = 10\text{ }\mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square-wave pulse; per diode	1000	A
$I^2t$	$I^2t$ for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 10\text{ ms}$	128	$\text{A}^2\text{s}$
$T_{stg}$	storage temperature		-55 to 175	$^{\circ}\text{C}$
$T_j$	junction temperature		-55 to 175	$^{\circ}\text{C}$



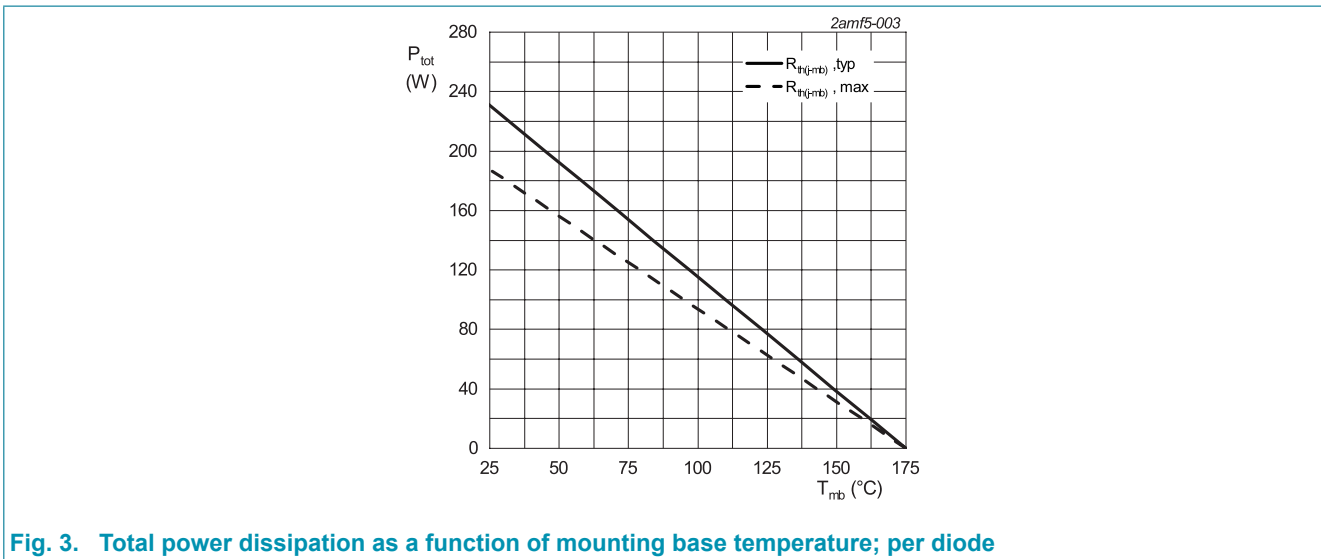
$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 0.981\text{ V}; R_s = 0.0631\text{ }\Omega$$

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



**Fig. 2. Current derating as a function of mounting base temperature; per diode**



### 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	per diode; <a href="#">Fig. 4</a>	-	0.65	0.8	K/W
		both diodes conducting	-	0.31	0.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	40	-	K/W

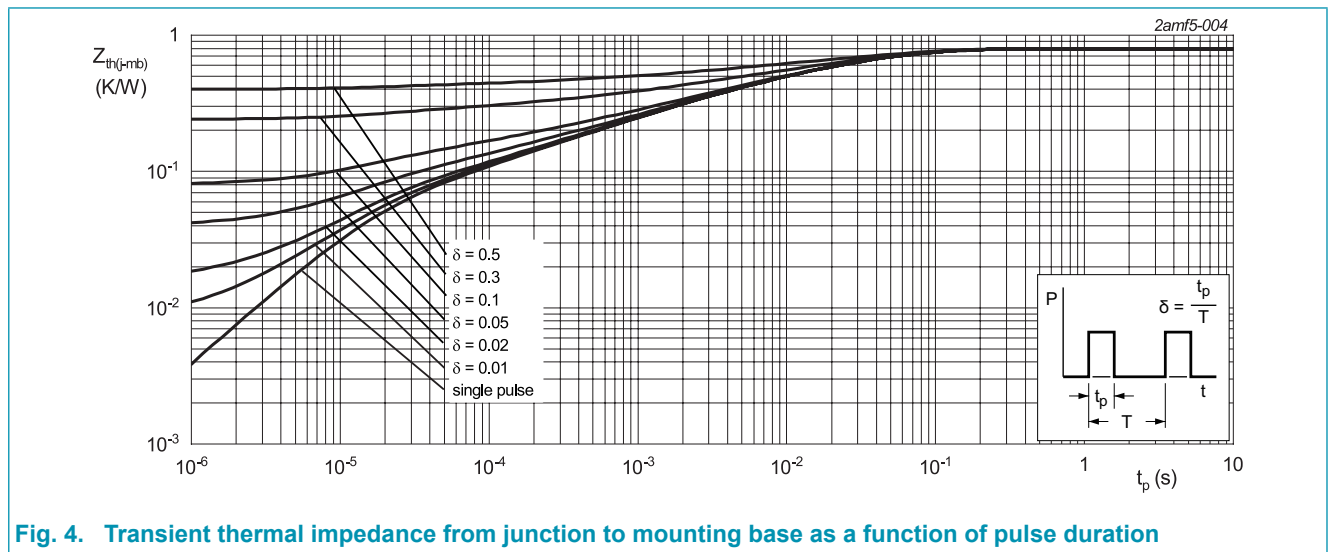
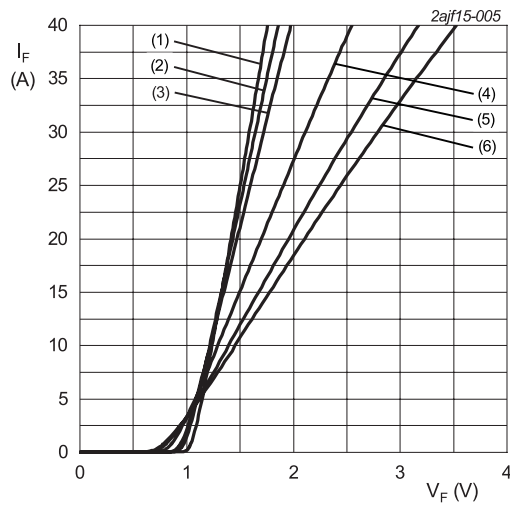


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward current	$I_F = 20\text{ A}; T_j = 25\text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 5</a>	-	1.45	1.65	V
		$I_F = 20\text{ A}; T_j = 150\text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 5</a>	-	1.95	2.30	V
		$I_F = 20\text{ A}; T_j = 175\text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 5</a>	-	2.10	2.60	V
$I_R$	reverse current	$V_R = 1200\text{ V}; T_j = 25\text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 6</a>	-	1	100	$\mu\text{A}$
		$V_R = 1200\text{ V}; T_j = 175\text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 6</a>	-	25	1000	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 20\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s};$ $T_j = 25\text{ }^\circ\text{C};$ per diode; <a href="#">Fig. 7</a>	-	44	-	nC
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 1\text{ V}; T_j = 25\text{ }^\circ\text{C};$ per diode	-	927	-	pF
		$f = 1\text{ MHz}; V_R = 400\text{ V}; T_j = 25\text{ }^\circ\text{C};$ per diode	-	84	-	pF
		$f = 1\text{ MHz}; V_R = 800\text{ V}; T_j = 25\text{ }^\circ\text{C};$ per diode	-	63	-	pF
$E_{as}$	non-repetitive avalanche energy	$I_R = 5.3\text{ A}; L = 10\text{ mH}; T_{j(\text{init})} = 25\text{ }^\circ\text{C};$ per diode	140	-	-	mJ



$V_o = 0.981\text{ V}; R_s = 0.0631\ \Omega$   
 (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; per diode

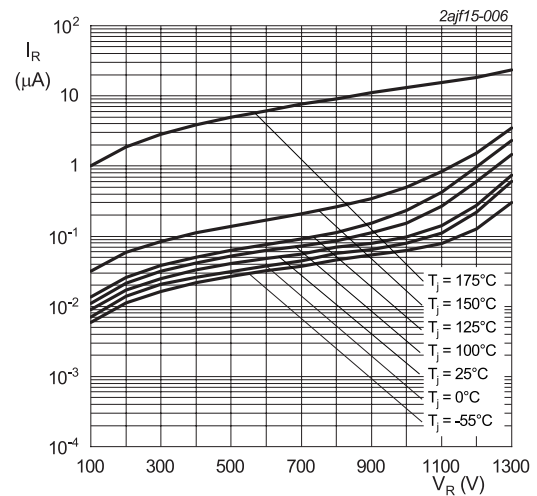


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value; per diode

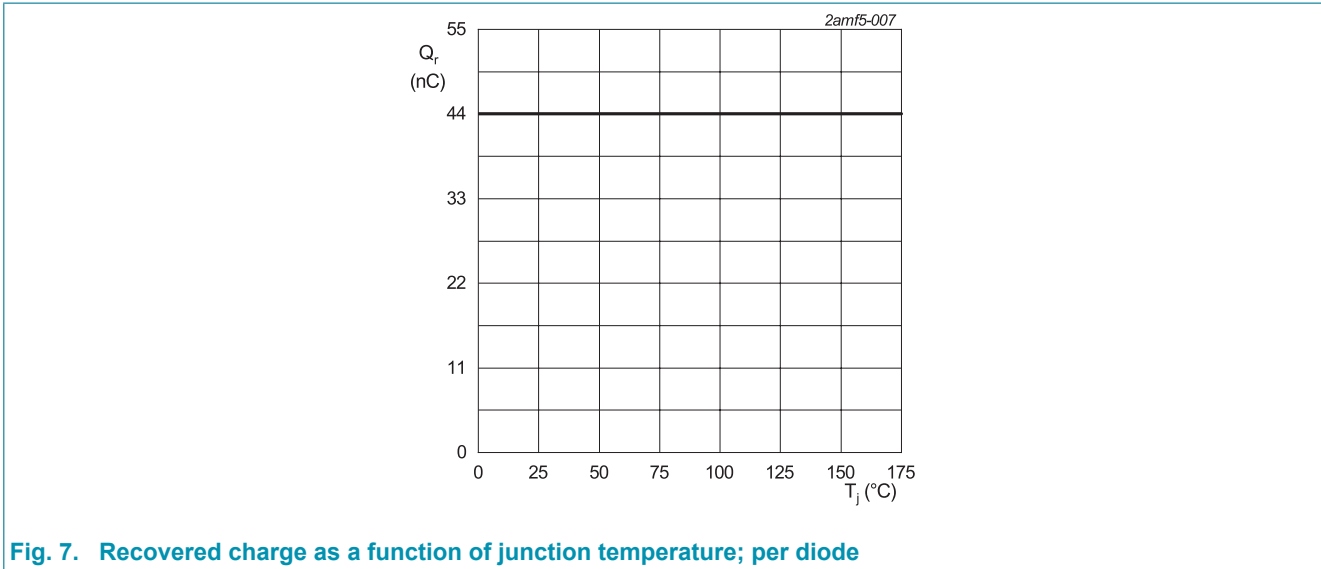
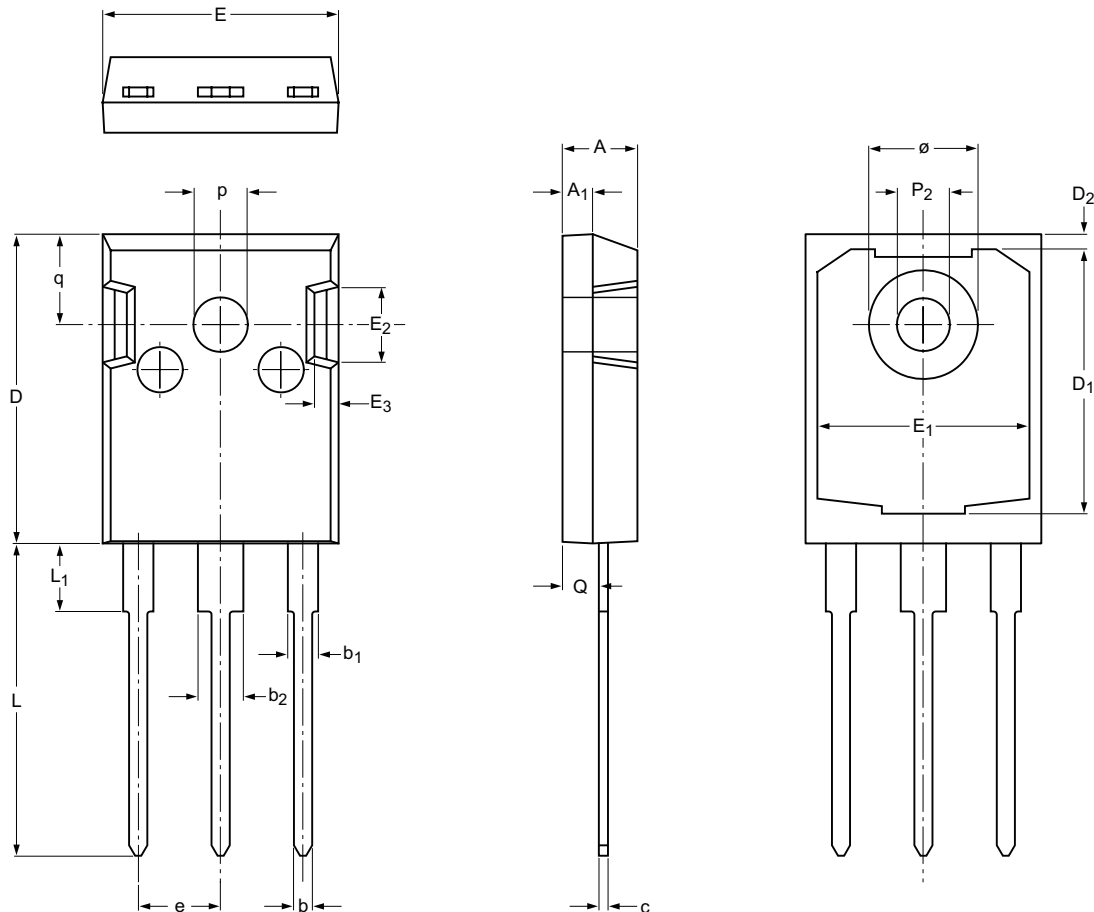


Fig. 7. Recovered charge as a function of junction temperature; per diode

### 11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247 SOT429



Dimensions (mm are the original dimensions)

Unit <sup>(1)</sup>	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	D	D <sub>1</sub>	D <sub>2</sub>	E	E <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>	e <sup>(1)</sup>	L	L <sub>1</sub>	P <sub>2</sub>	p	Q	q	ø	
max	5.20	2.10	1.40	2.20	3.20	0.70	20.6	17.68	1.20	15.75	14.22	5.20	1.80		20.90	4.75	3.60	3.70	2.60	6.18	7.30	
nom														5.45								
min	4.70	1.90	1.00	1.80	2.80	0.50	20.3	17.28	0.80	15.45	13.82	4.80	1.40		20.40	4.25	3.40	3.50	2.20	5.78	7.10	

Note

1. Basic spacing between centers.

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Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT429		TO-247			<del>04-09-14</del> 13-03-25



## 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.
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