

## 1. General description

Silicon Carbide Schottky diode in a TO252 (DPAK) plastic package, designed for high frequency switched-mode power supplies.



AEC - Q101 Qualified



## 2. Features and benefits

- New 6th Generation Technology
- Low Forward Voltage Drop
- Low Reverse Leakage Current
- High Forward Surge Capability  $I_{FSM}$
- Reduced Losses in Associated MOSFET
- Reduced EMI
- Reduced Cooling Requirements
- RoHS Compliant
- AEC-Q101 qualified

## 3. Applications

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

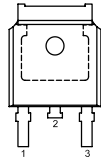

## 4. Quick reference data

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	$T_{mb} \leq 160\text{ °C}$ , DC; <a href="#">Fig. 2</a>		2			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	$I_F = 2\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 5</a>		-	1.26	1.40	V
		$I_F = 2\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 5</a>		-	1.35	1.55	V
<b>Dynamic characteristics</b>							
$Q_r$	recovered charge	$I_F = 2\text{ A}$ ; $dI_F/dt = 500\text{ A}/\mu\text{s}$ ; $V_R = 400\text{ V}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>		-	4	-	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 TO252 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
WNSC6D02650D-A	TO252	WNSC6D02650D-A6J	Reel	2500	TO252NS	14-Nov-2016

## 7. Marking

Table 4. Marking codes

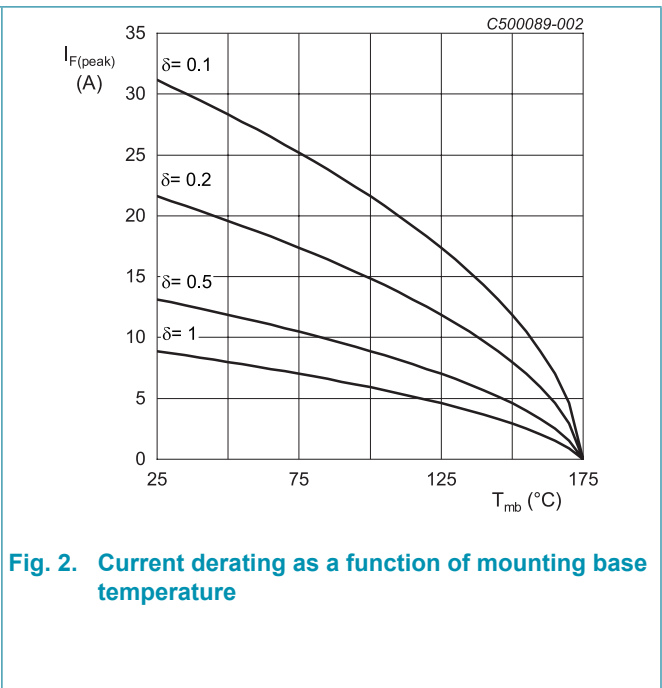
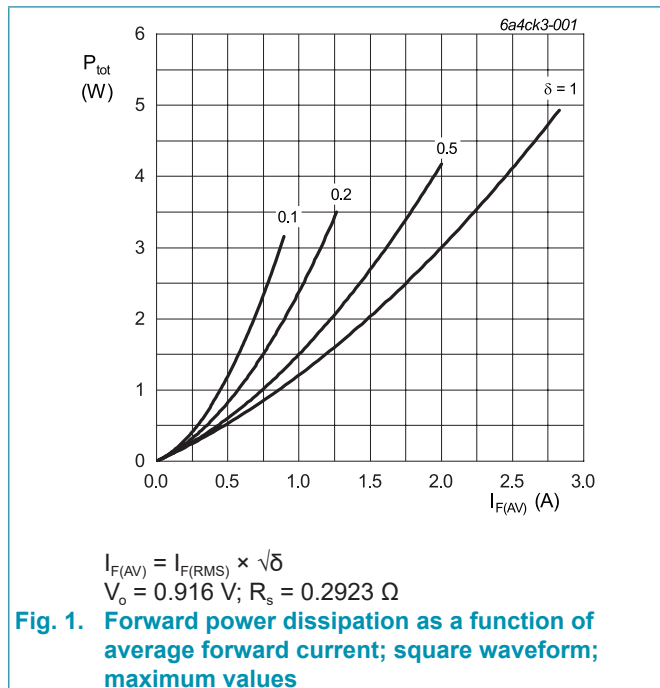
Type number	Marking codes
WNSC6D02650D-A	WNSC6D 0265DA

## 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	$T_{mb} \leq 160\text{ }^\circ\text{C}$ , DC; Fig. 2		2	A
		$T_{mb} \leq 125\text{ }^\circ\text{C}$ , DC; Fig. 2		4.6	A
		$T_{mb} \leq 25\text{ }^\circ\text{C}$ , DC; Fig. 2		8.9	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 125\text{ }^\circ\text{C}$ ; square-wave pulse		7	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		15	A
		$t_p = 10\text{ }\mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; square-wave pulse		220	A
$I^2t$	$I^2t$ for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; $t_p = 10\text{ ms}$		1.125	$\text{A}^2\text{s}$
$T_{stg}$	storage temperature			-55 to 175	$^\circ\text{C}$
$T_j$	junction temperature			-55 to 175	$^\circ\text{C}$



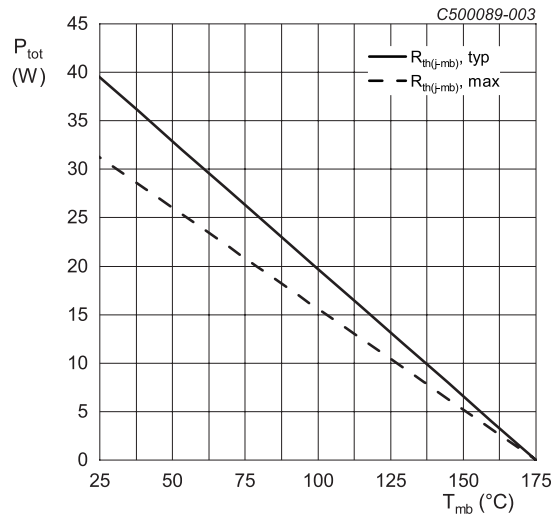


Fig. 3. Total power dissipation as a function of mounting base temperature

### 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	with heatsink compound; <a href="#">Fig. 4</a>		-	3.8	4.8	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

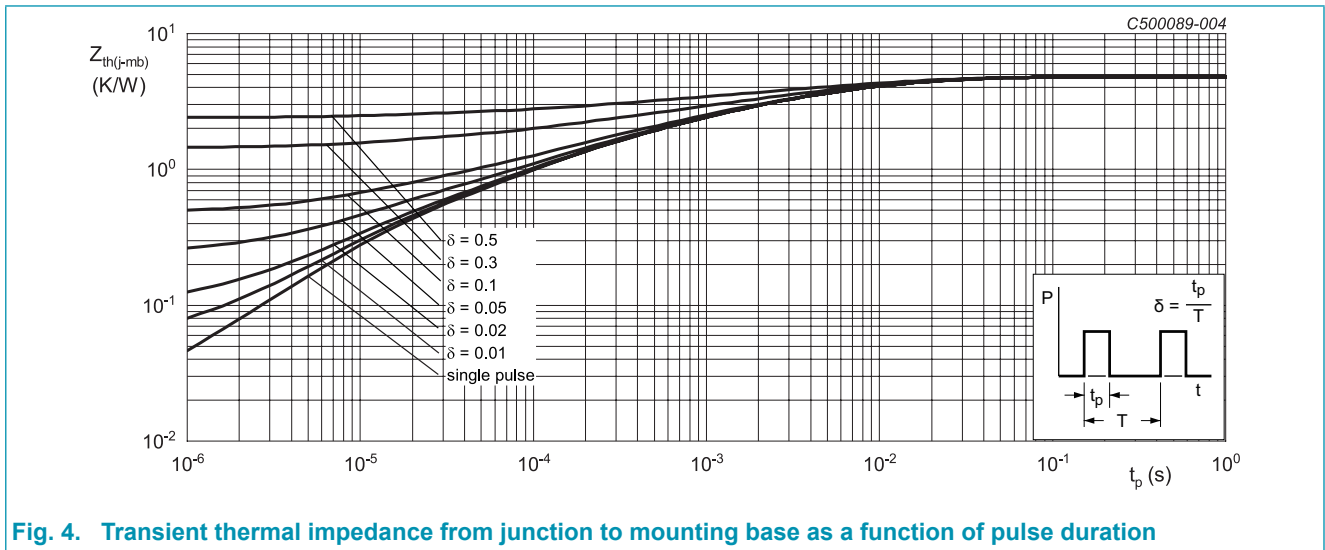
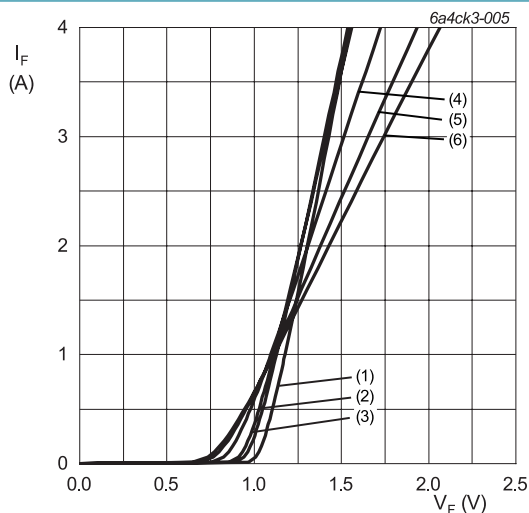


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
$I_F$	forward current	$I_F = 2 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$		-	1.26	1.40	V
		$I_F = 2 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 5}$		-	1.35	1.55	V
		$I_F = 2 \text{ A}; T_j = 175 \text{ }^\circ\text{C}; \text{ Fig. 5}$		-	1.40	1.60	V
$I_R$	reverse current	$V_R = 650 \text{ V}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$		-	0.2	10	$\mu\text{A}$
		$V_R = 650 \text{ V}; T_j = 175 \text{ }^\circ\text{C}; \text{ Fig. 6}$		-	3	40	$\mu\text{A}$
<b>Dynamic characteristics</b>							
$Q_r$	recovered charge	$I_F = 2 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$		-	4	-	nC
$C_d$	diode capacitance	$f = 1 \text{ MHz}; V_R = 1 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	98	-	pF
		$f = 1 \text{ MHz}; V_R = 300 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	12	-	pF
		$f = 1 \text{ MHz}; V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	10	-	pF
$E_{as}$	non-repetitive avalanche energy	$I_R = 2 \text{ A}; L = 5 \text{ mH}; T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$		9	-	-	mJ



$V_o = 0.916 \text{ V}; R_s = 0.2923 \text{ } \Omega$   
 (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

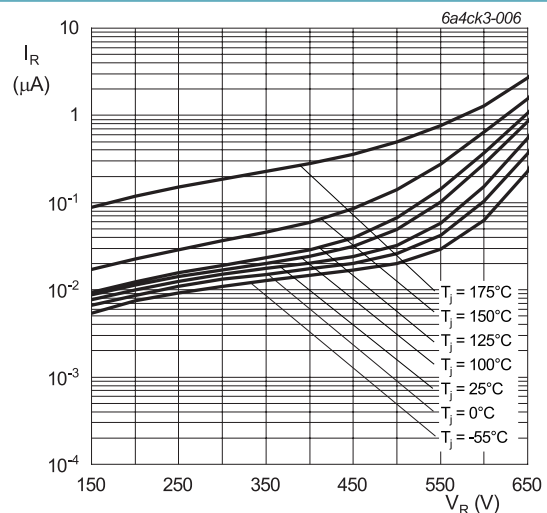


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

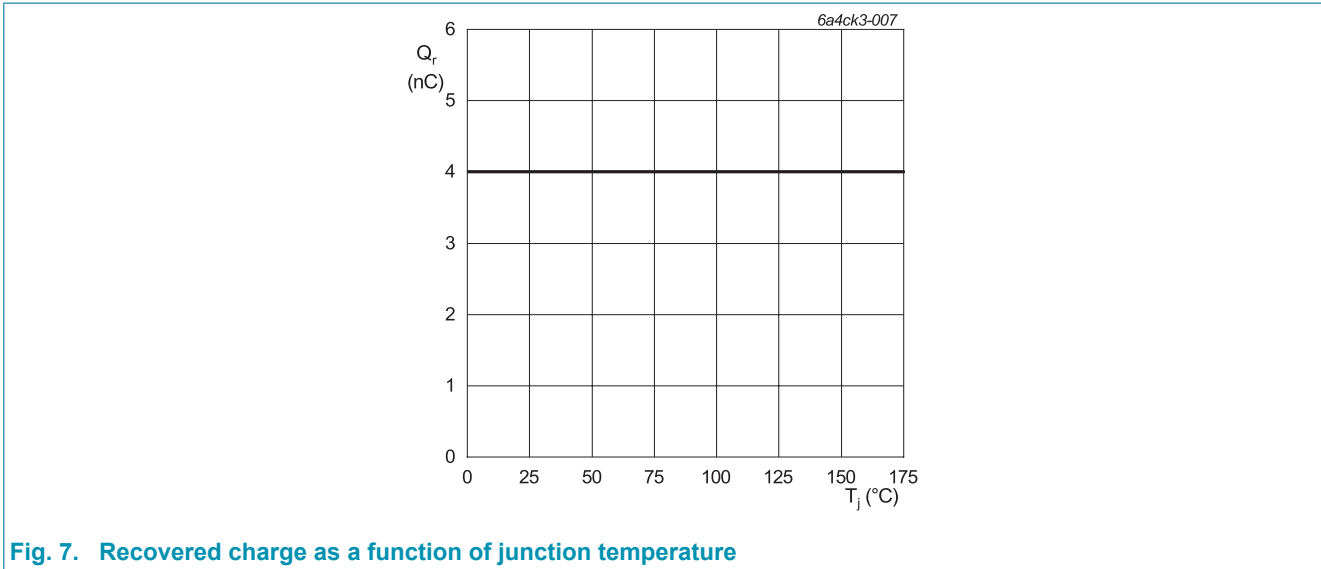
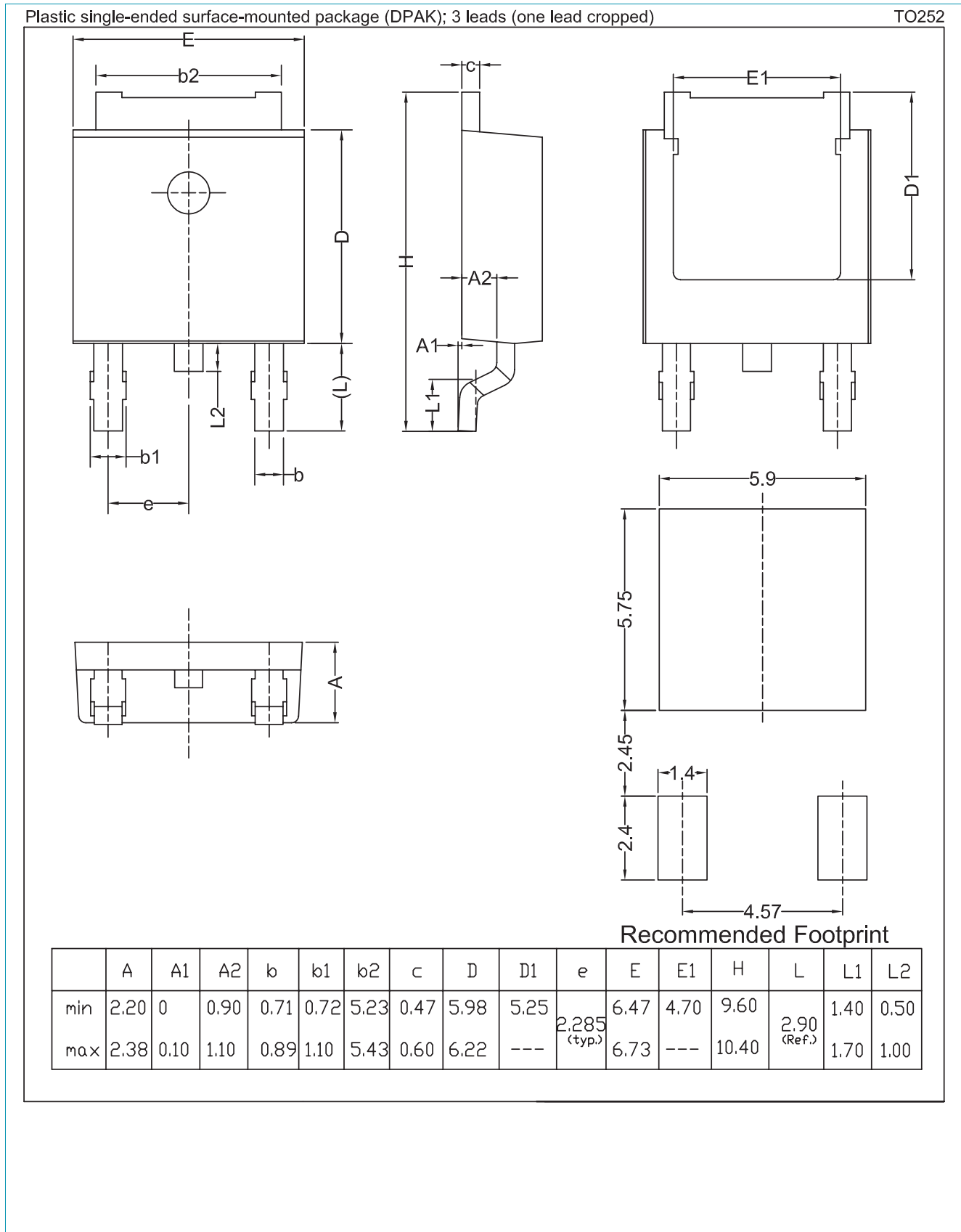


Fig. 7. Recovered charge as a function of junction temperature

### 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.
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### 13. Contents

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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 .....	5
10. Characteristics.....	6
11. Package outline .....	8
12. Legal information .....	9
13. Contents .....	11

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