

## 1. General description

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



## 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

## 3. Applications

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

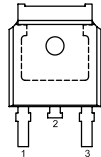

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
<b>Absolute maximum rating</b>							
$V_{RRM}$	repetitive peak reverse voltage			650			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 162$ °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</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	$I_F = 2$ A; $T_j = 25$ °C; <a href="#">Fig. 5</a>		-	1.26	1.40	V
		$I_F = 2$ A; $T_j = 150$ °C; <a href="#">Fig. 5</a>		-	1.35	1.55	V
<b>Dynamic characteristics</b>							
$Q_r$	recovered charge	$I_F = 2$ A; $dI_F/dt = 500$ A/ $\mu$ s; $V_R = 400$ V; $T_j = 25$ °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	TO252	WNSC6D02650D6J	Reel	2500	TO252NS	14-Nov-2016

## 7. Marking

Table 4. Marking codes

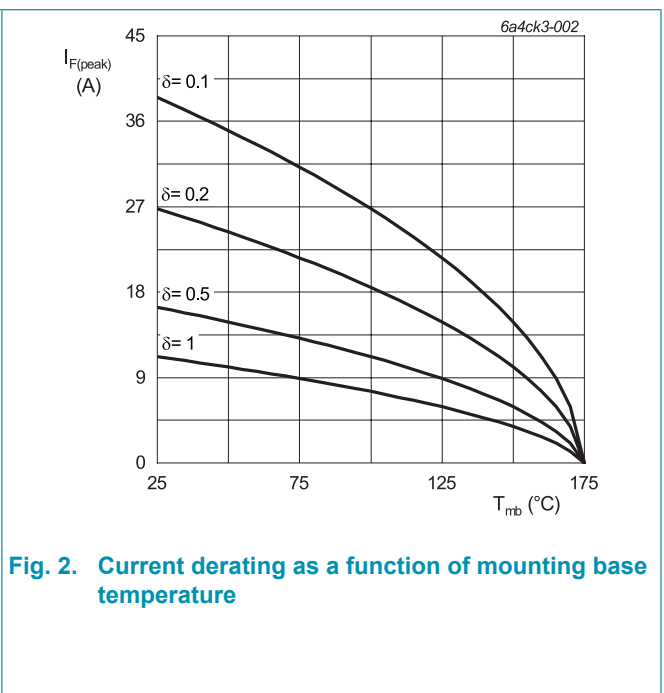
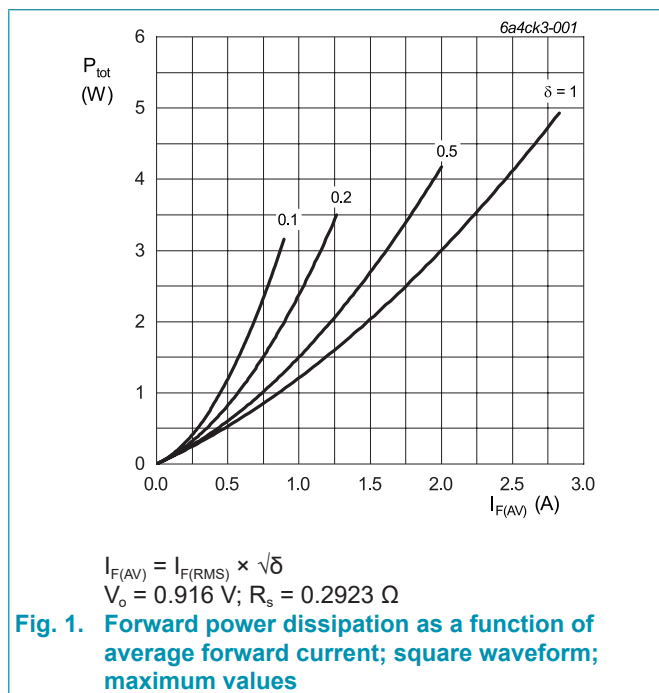
Type number	Marking codes
WNSC6D02650D	WNSC6D 02650D

## 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
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 162\text{ }^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		2	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 162\text{ }^\circ\text{C}$ ; square-wave pulse		4	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		22	A
		$t_p = 10\text{ }\mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; square-wave pulse		240	A
$I^2t$	$I^2t$ for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; $t_p = 10\text{ ms}$		2.42	$\text{A}^2\text{s}$
$T_{stg}$	storage temperature			-55 to 175	$^\circ\text{C}$
$T_j$	junction temperature			-55 to 175	$^\circ\text{C}$



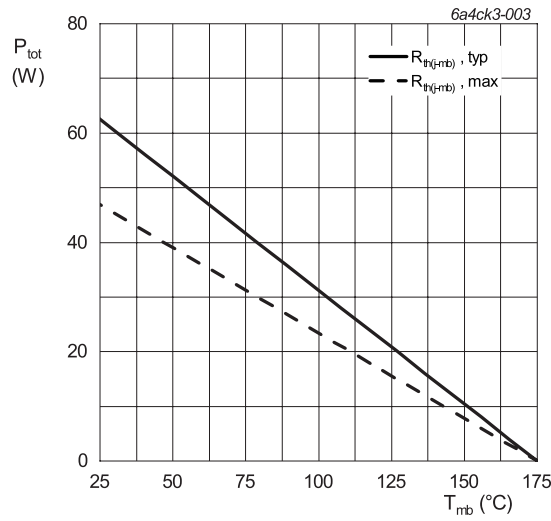


Fig. 3. Total power dissipation as a function of mounting base temperature

### 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>		-	2.4	3.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

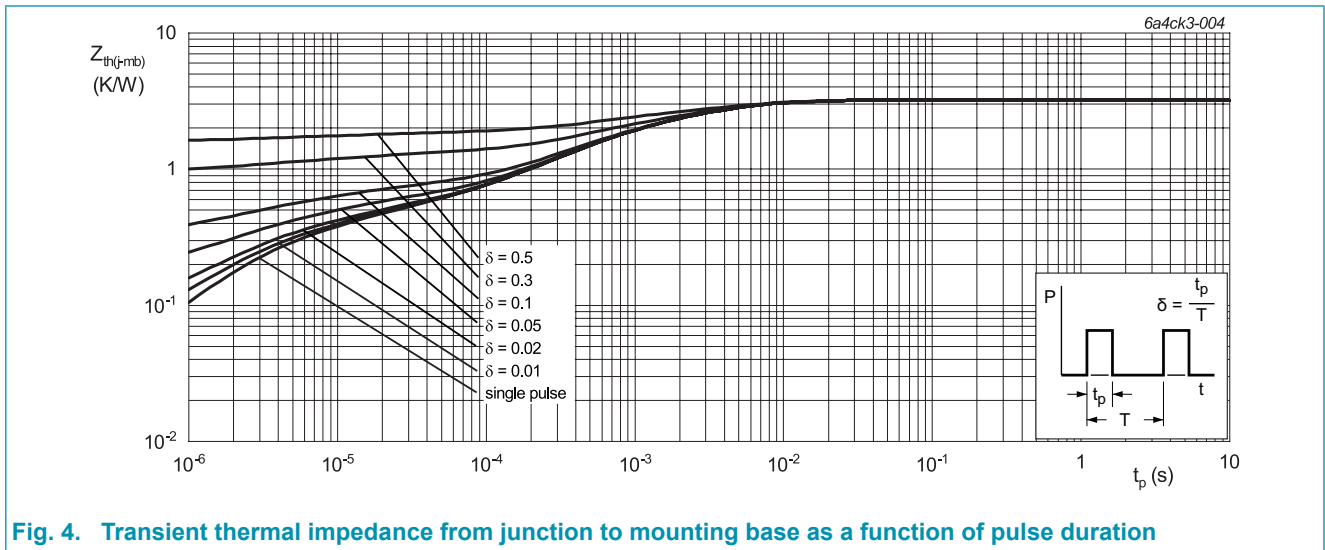
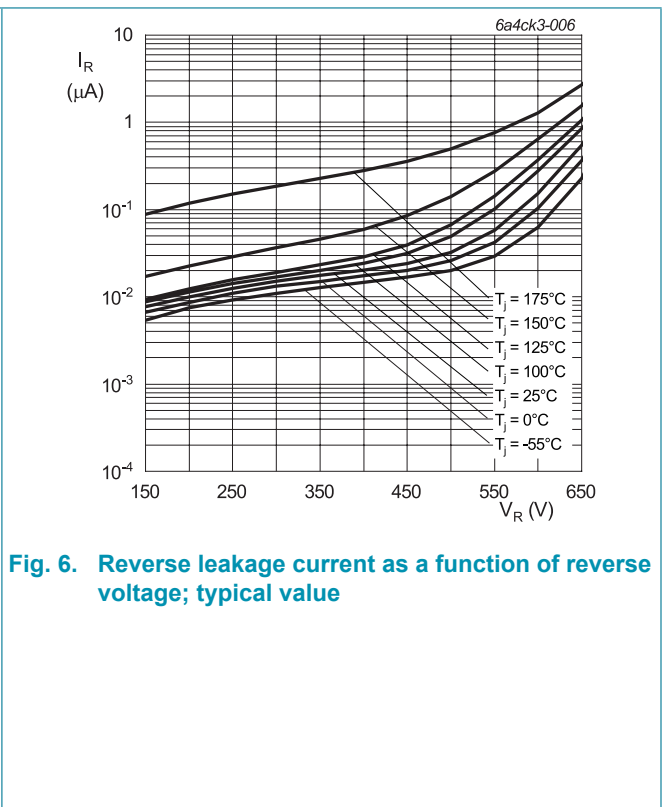
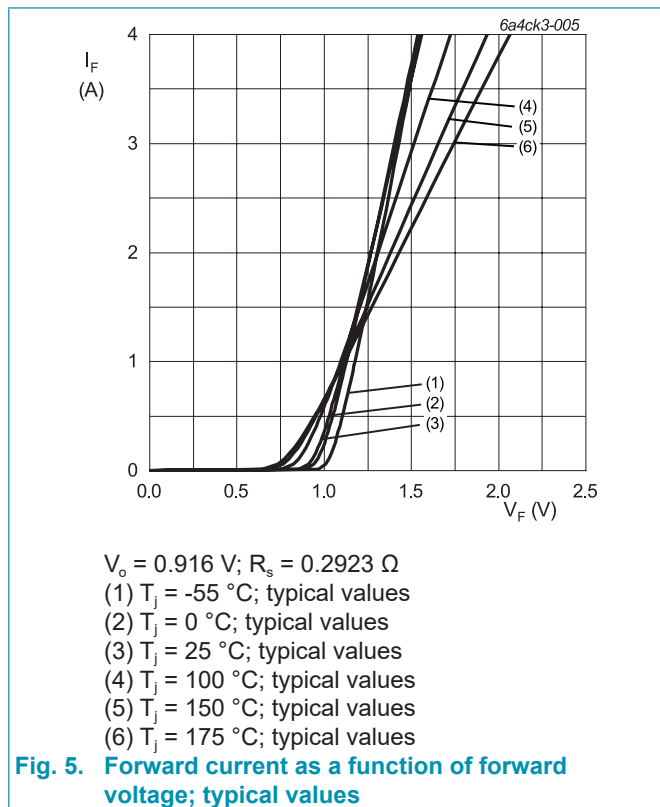


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
$V_F$	forward voltage	$I_F = 2\text{ A}; T_j = 25\text{ }^\circ\text{C}; \text{Fig. 5}$		-	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



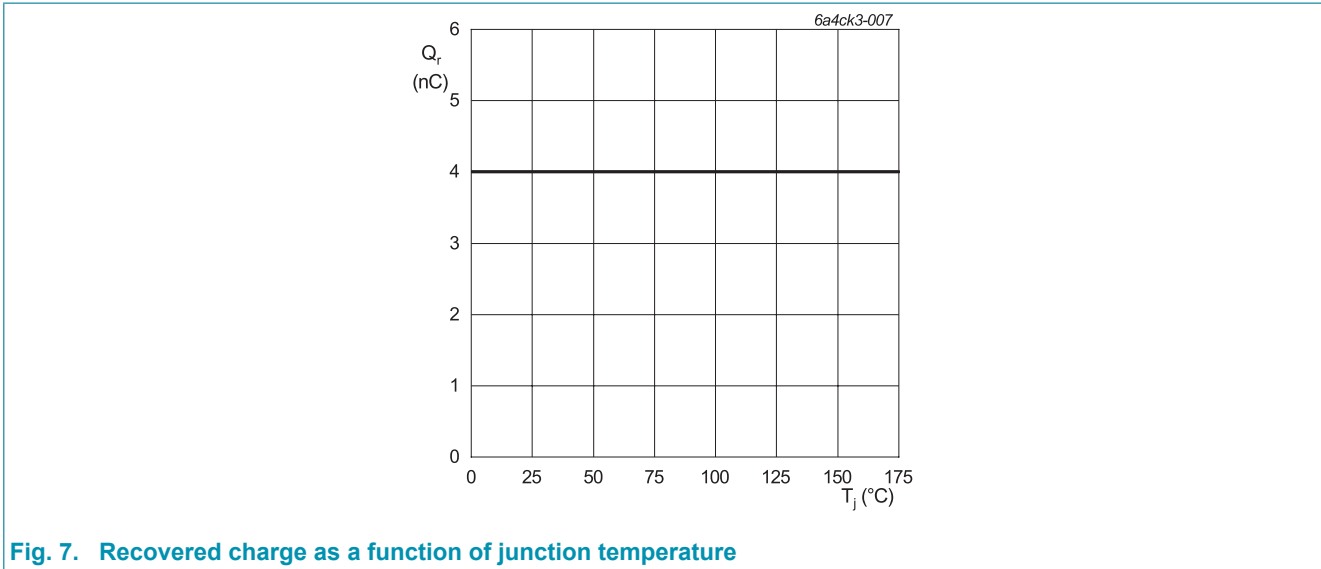
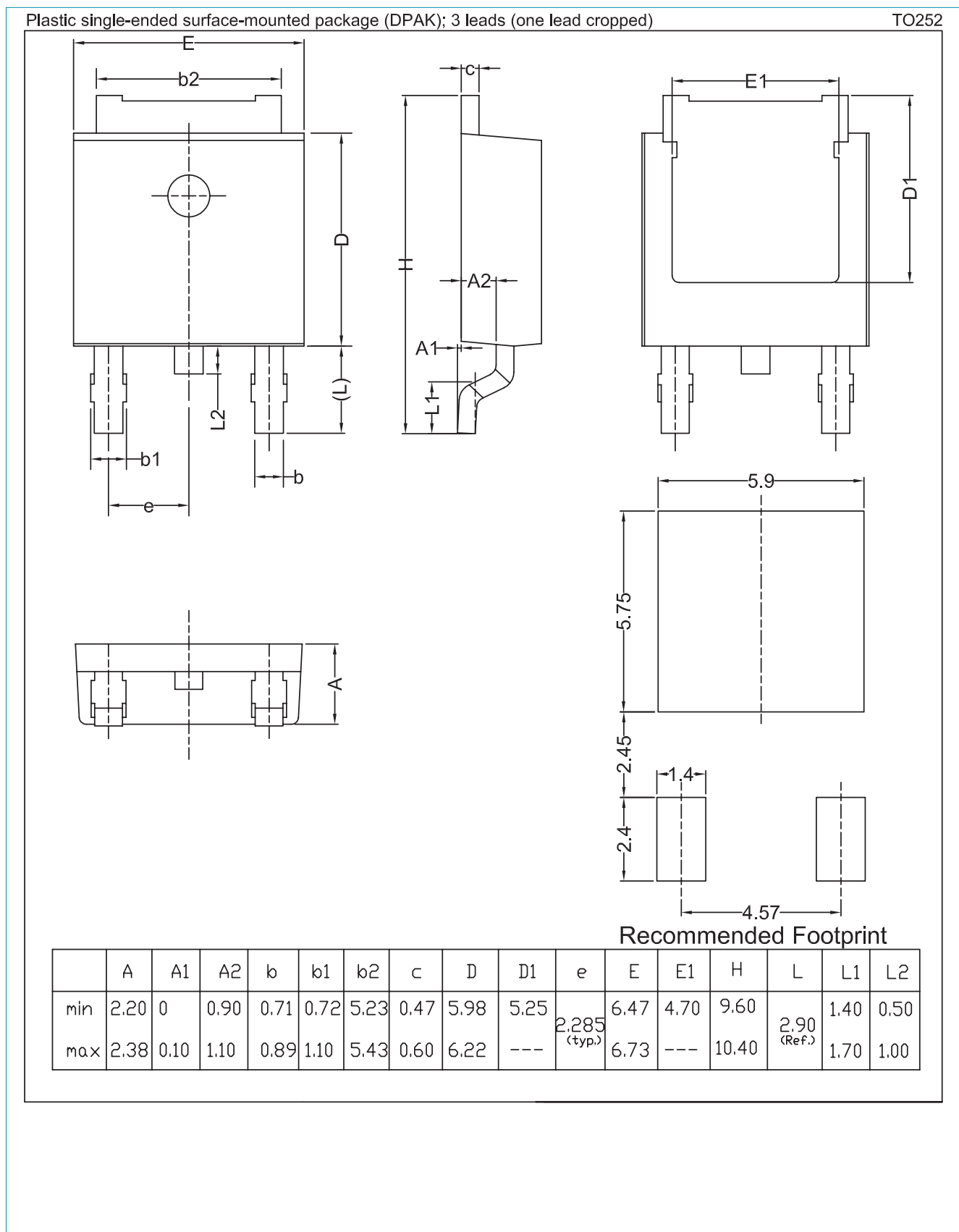


Fig. 7. Recovered charge as a function of junction temperature

### 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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### 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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