

1. General description

Ultrafast, epitaxial rectifier diode in a SOT428 (DPAK) surface-mountable package.

2. Features and benefits

- Low forward voltage drop
- Fast switching
- Soft recovery characteristic
- Surface-mountable package
- High thermal cycling performance
- Low thermal resistance

3. Applications

- High-frequency switched-mode power supplies
- Low loss rectification

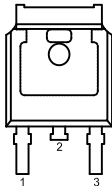
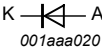
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _R	reverse voltage	DC		-	-	200	V
V _{RRM}	repetitive peak reverse voltage			-	-	200	V
I _{F(AV)}	average forward current	δ = 0.5 ; T _{mb} ≤ 128 °C; square-wave pulse; Fig. 1 ; Fig. 2		-	-	8	A
I _{FSM}	non-repetitive peak forward current	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse; with reapplied V _{RRM(Max)}		-	-	80	A
Static characteristics							
V _F	forward voltage	I _F = 8 A; T _j = 25 °C; Fig. 5		-	0.92	1.05	V
		I _F = 20 A; T _j = 25 °C; Fig. 5		-	1.1	1.3	V
		I _F = 8 A; T _j = 150 °C; Fig. 5		-	0.8	0.895	V
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/μs; T _j = 25 °C; ramp recovery; Fig. 6 ; Fig. 7 ; Fig. 8		-	20	25	ns
		step recovery; when switched from I _F = 0.5 A to I _R = 1 A measured at I _R = 0.25 A		-	15	20	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	no connection	 DPAK (SOT428)	
2	K	cathode[1]		
3	A	anode		
mb	K	mounting base; cathode		

[1] it is not possible to make connection with Pin 2 of the SOT428 package

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYW29ED-200	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

7. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	200	V
V_{RWM}	crest working reverse voltage		-	200	V
V_R	reverse voltage	DC	-	200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 128^\circ\text{C}$; square-wave pulse; Fig. 1; Fig. 2	-	8	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 128^\circ\text{C}$	-	16	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse; with reapplied $V_{RRM(\text{Max})}$	-	80	A
		$t_p = 8.3\ \text{ms}$; $T_{j(\text{init})} = 25^\circ\text{C}$; sine-wave pulse; with reapplied $V_{RRM(\text{Max})}$	-	88	A
I_{RRM}	repetitive peak reverse current	$\delta = 0.001$; $t_p = 2\ \mu\text{s}$	-	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\ \mu\text{s}$	-	0.2	A
T_{stg}	storage temperature		-40	150	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$
V_{ESD}	electrostatic discharge voltage	$C = 250\ \text{pF}$; $R = 1.5\ \text{k}\Omega$; all pins; human body model	-	8	kV

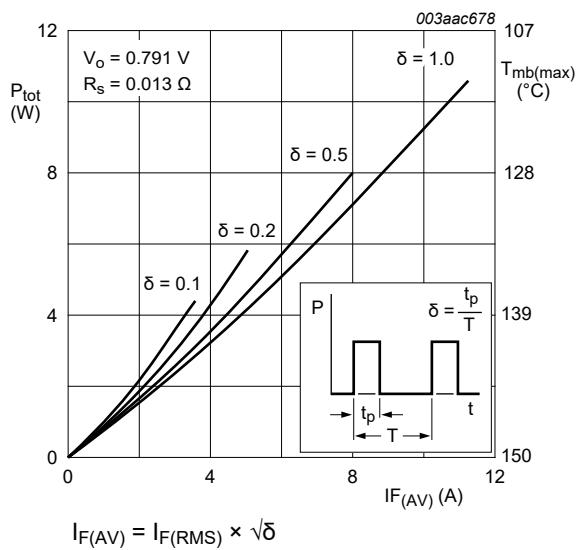


Fig. 1. Total power dissipation and permissible mounting base temperature as a function of average forward current; square waveform; maximum values

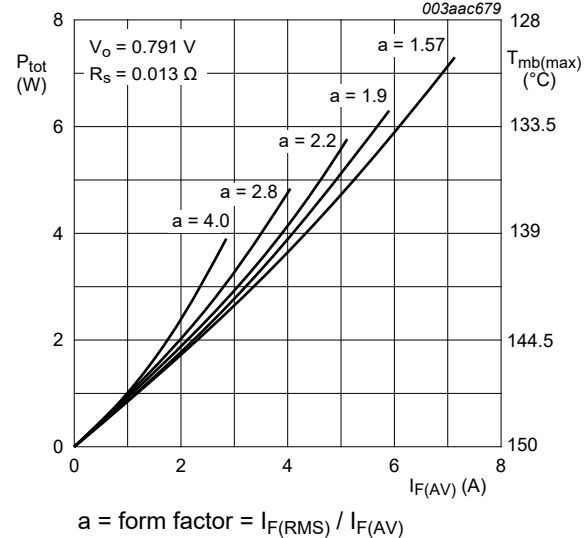


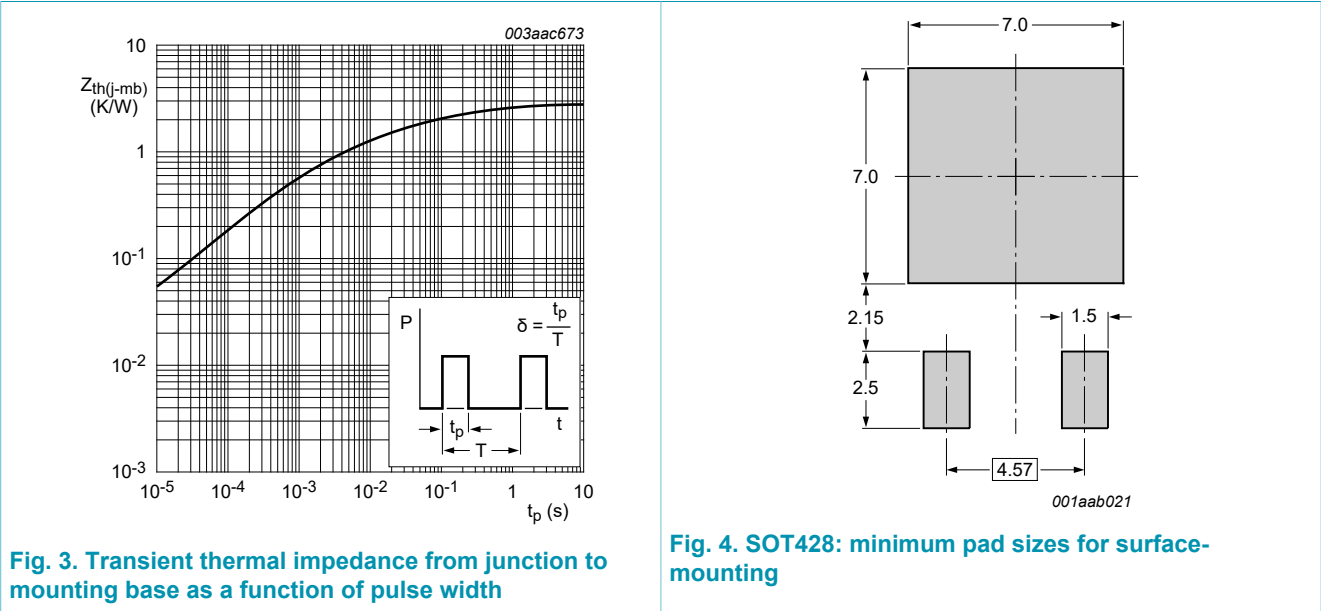
Fig. 2. Total power dissipation and permissible mounting base temperature as a function of average forward current; sinusoidal waveform; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; Fig. 3		-	-	2.7	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air; Fig. 4	[1]	-	50	-	K/W

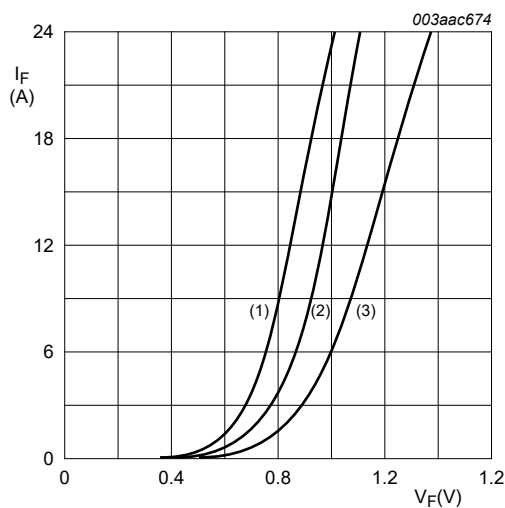
[1] Device mounted on an FR4 PCB, single-sided copper, tin plated and standard footprint



9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 8 A; T _j = 25 °C; Fig. 5		-	0.92	1.05	V
		I _F = 20 A; T _j = 25 °C; Fig. 5		-	1.1	1.3	V
		I _F = 8 A; T _j = 150 °C; Fig. 5		-	0.8	0.895	V
I _R	reverse current	V _R = 200 V; T _j = 25 °C		-	2	10	µA
		V _R = 200 V; T _j = 100 °C		-	0.2	0.6	mA
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 100 A/µs; T _j = 25 °C; ramp recovery; Fig. 6 ; Fig. 7 ; Fig. 8		-	20	25	ns
		step recovery; when switched from I _F = 0.5 A to I _R = 1 A measured at I _R = 0.25 A		-	15	20	ns
I _{RM}	peak reverse recovery current	I _F = 10 A; V _R = 30 V; dI _F /dt = 50 A/µs; T _j = 25 °C; Fig. 9		-	-	1.8	A
Q _r	recovered charge	I _F = 2 A; V _R = 30 V; dI _F /dt = 20 A/µs; T _j = 25 °C; Fig. 10		-	4	11	nC
V _{FR}	forward recovery voltage	I _F = 1 A; dI _F /dt = 10 A/µs; Fig. 11		-	1	-	V



$V_o = 0.791 \text{ V}$; $R_s = 0.013 \Omega$

- (1) $T_j = 150^\circ\text{C}$; typical values
- (2) $T_j = 150^\circ\text{C}$; maximum values
- (3) $T_j = 25^\circ\text{C}$; maximum values

Fig. 5. Forward current as a function of forward voltage

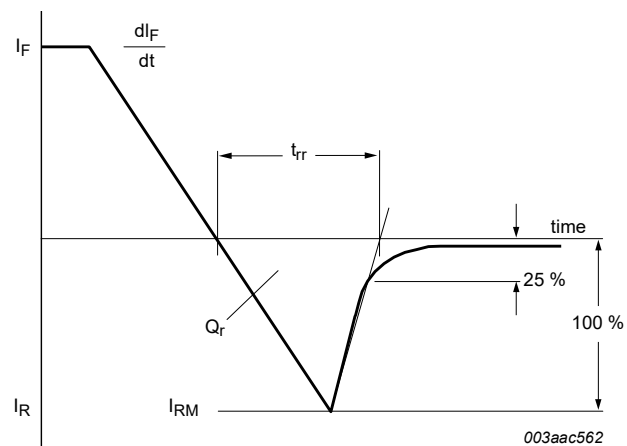


Fig. 6. Reverse recovery definitions; ramp recovery

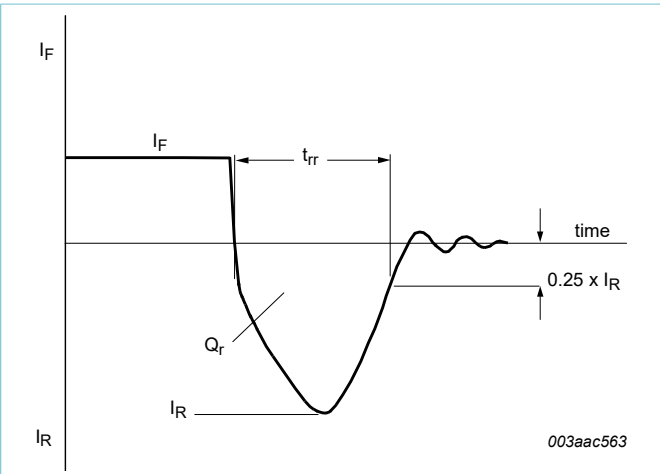
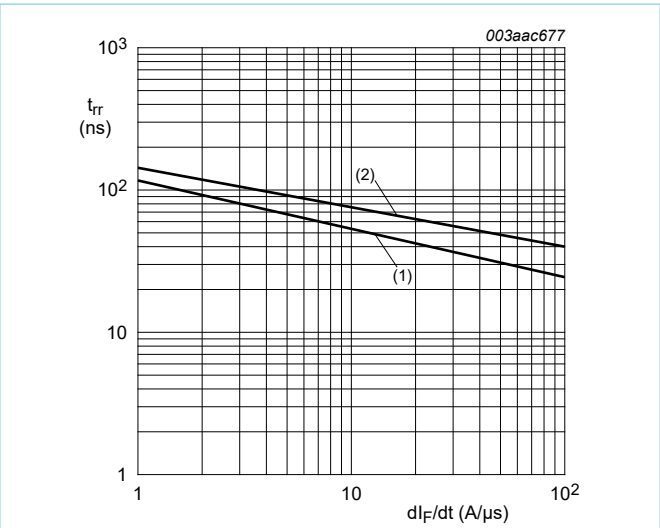
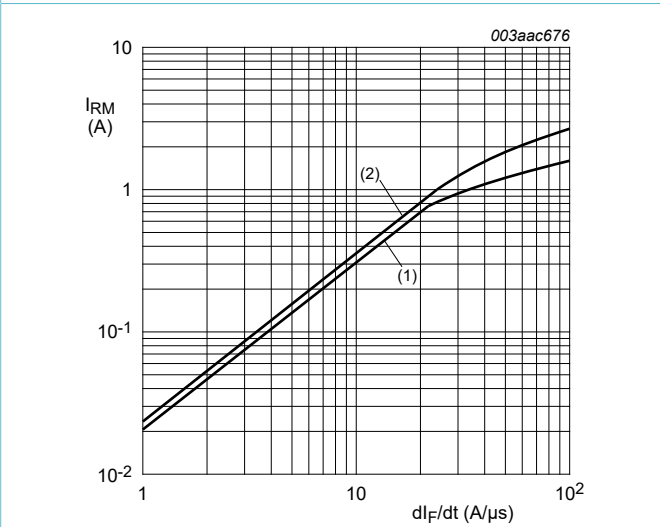


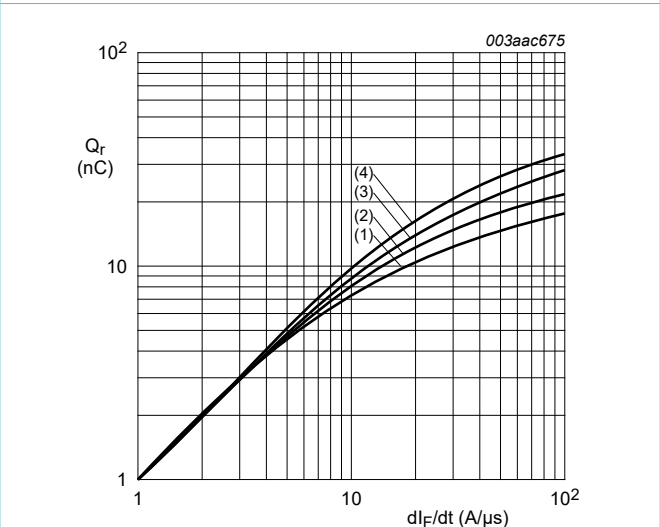
Fig. 7. Reverse recovery definitions; step recovery



(1) $I_F = 1\text{ A}$
(2) $I_F = 10\text{ A}$
Fig. 8. Reverse recovery time as a function of rate of change of forward current and initial forward current; maximum values



(1) $I_F = 1\text{ A}$
(2) $I_F = 10\text{ A}$
Fig. 9. Peak reverse recovery current as a function of rate of change of forward current and initial forward current; maximum values



(1) $I_F = 1\text{ A}$
(2) $I_F = 2\text{ A}$
(3) $I_F = 5\text{ A}$
(4) $I_F = 10\text{ A}$
Fig. 10. Recovered charge as a function of rate of change of forward current; maximum values

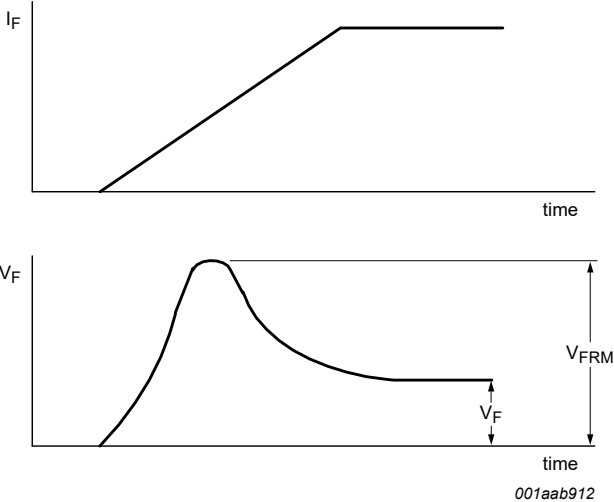
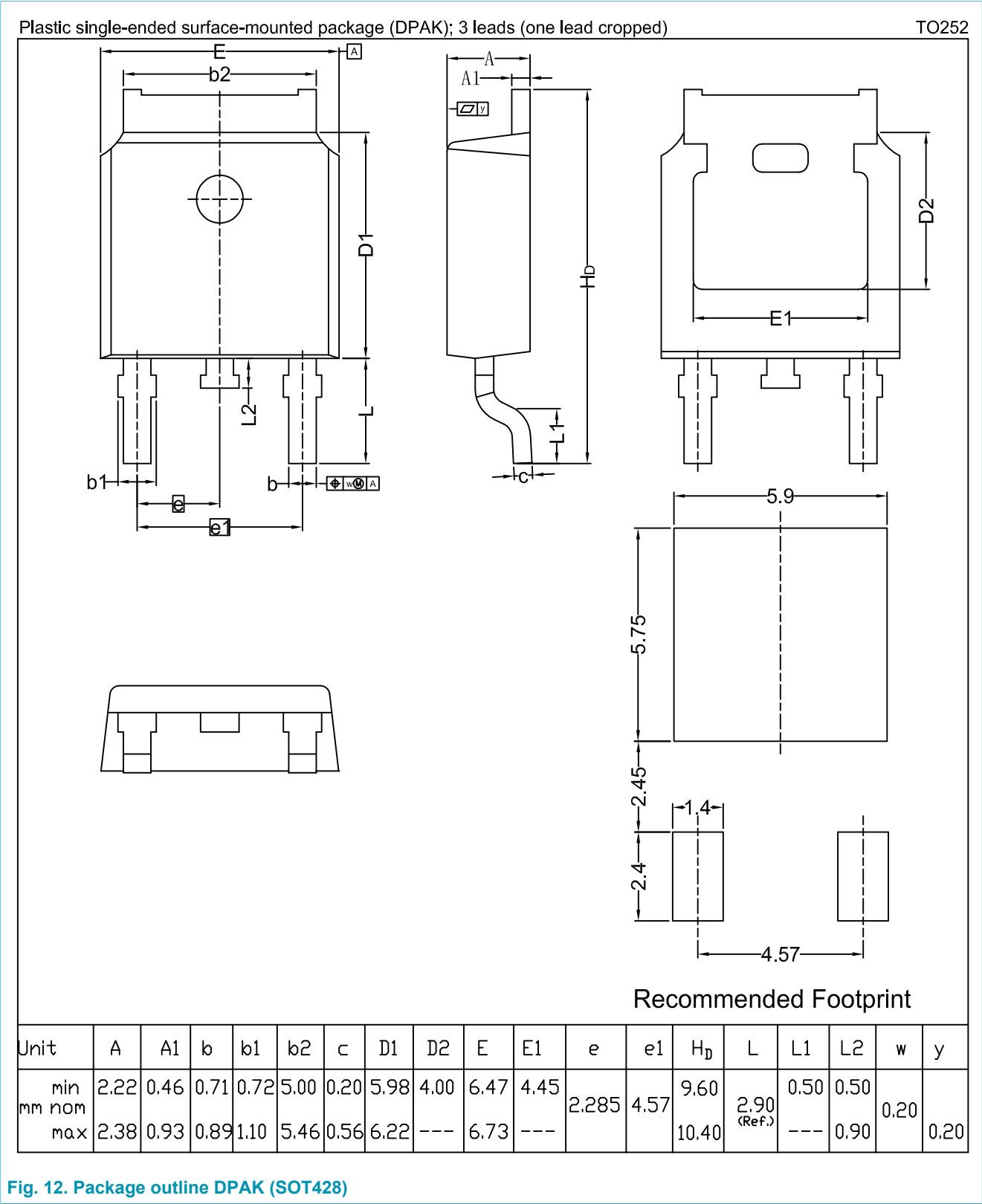


Fig. 11. Forward recovery definitions

10. Package outline



11. 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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- [2] The term 'short data sheet' is explained in section "Definitions".
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12. Contents

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. Limiting values..... 3

8. Thermal characteristics..... 4

9. Characteristics..... 5

10. Package outline..... 8

11. Legal information..... 9

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Date of release: 21 August 2017