

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

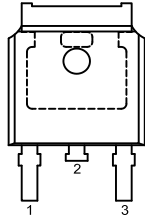
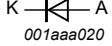
4. Quick reference data

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	$\delta = 0.5$; $T_{mb} \leq 128$ °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/ μ s; $T_j = 25$ °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	 <p>DPAK (SOT428)</p>	
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

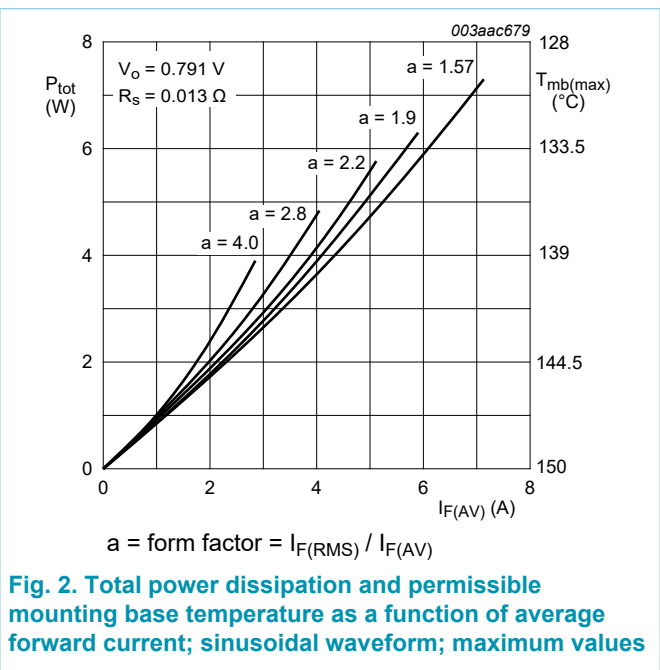
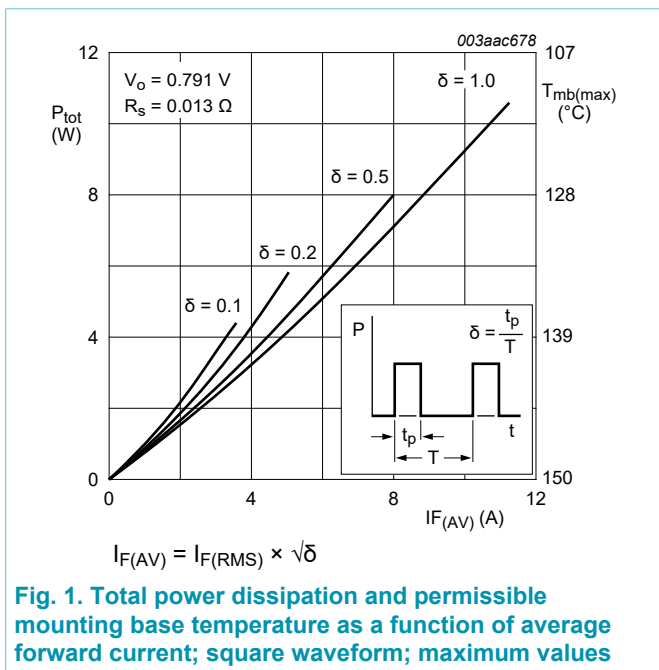
Type number	Package		
	Name	Description	Version
BYW29ED-200	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

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	$\delta = 0.5$; $T_{mb} \leq 128\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1; Fig. 2	-	8	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 128\text{ }^\circ\text{C}$	-	16	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; with reapplied $V_{RRM(\text{Max})}$	-	80	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse; with reapplied $V_{RRM(\text{Max})}$	-	88	A
I_{RRM}	repetitive peak reverse current	$\delta = 0.001$; $t_p = 2\text{ }\mu\text{s}$	-	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\text{ }\mu\text{s}$	-	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 pF; R = 1.5 k Ω ; all pins; human body model	-	8	kV



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

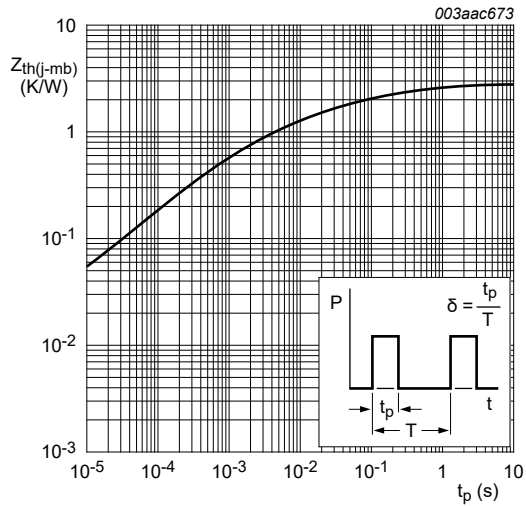


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

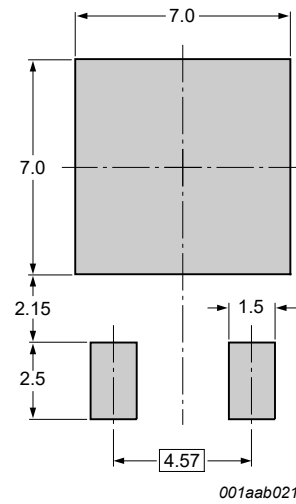
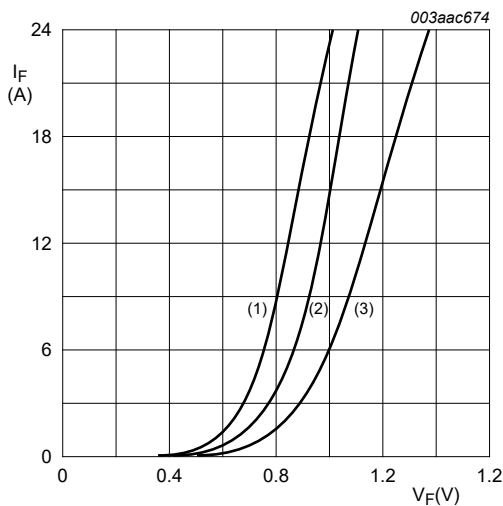


Fig. 4. SOT428: minimum pad sizes for surface-mounting

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 8 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	0.92	1.05	V
		$I_F = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	1.1	1.3	V
		$I_F = 8 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	0.8	0.895	V
I_R	reverse current	$V_R = 200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	2	10	μA
		$V_R = 200 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	0.2	0.6	mA
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ ramp recovery}; \text{ Fig. 6}; \text{ Fig. 7}; \text{ Fig. 8}$	-	20	25	ns
		step recovery; when switched from $I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$ measured at $I_R = 0.25 \text{ A}$	-	15	20	ns
I_{RM}	peak reverse recovery current	$I_F = 10 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 9}$	-	-	1.8	A
Q_r	recovered charge	$I_F = 2 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 10}$	-	4	11	nC
V_{FR}	forward recovery voltage	$I_F = 1 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}; \text{ Fig. 11}$	-	1	-	V



$V_o = 0.791 \text{ V}; R_s = 0.013 \text{ } \Omega$
 (1) $T_j = 150 \text{ }^\circ\text{C};$ typical values
 (2) $T_j = 150 \text{ }^\circ\text{C};$ maximum values
 (3) $T_j = 25 \text{ }^\circ\text{C};$ maximum values

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

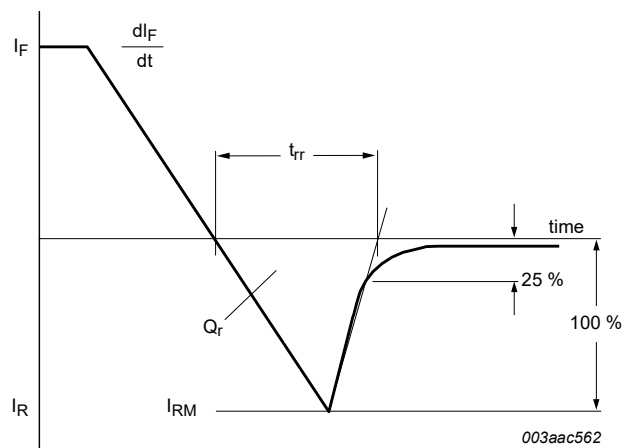


Fig. 6. Reverse recovery definitions; ramp recovery

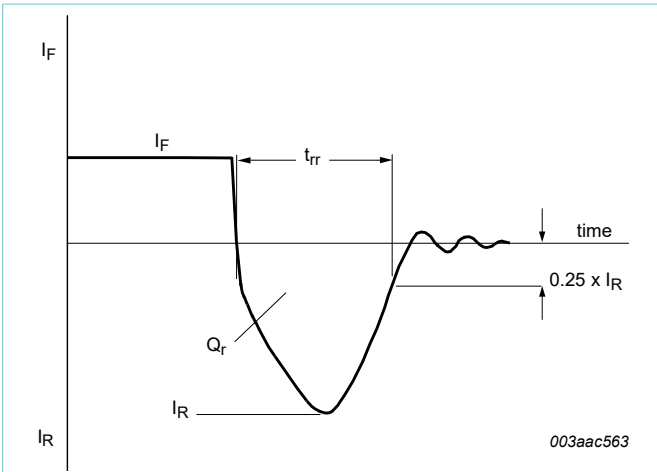
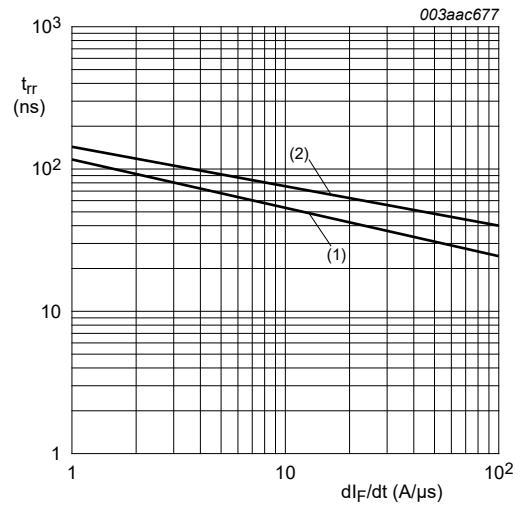
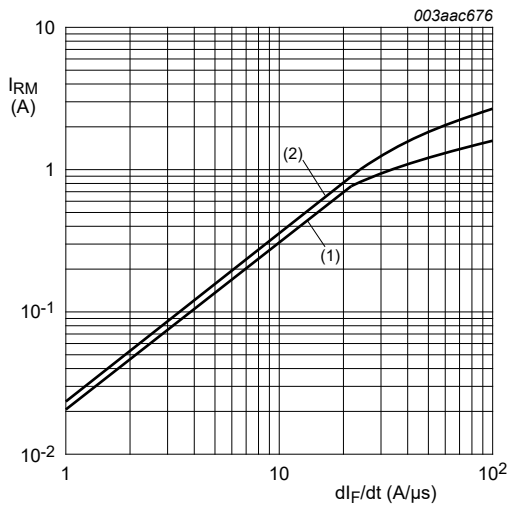


Fig. 7. Reverse recovery definitions; step recovery



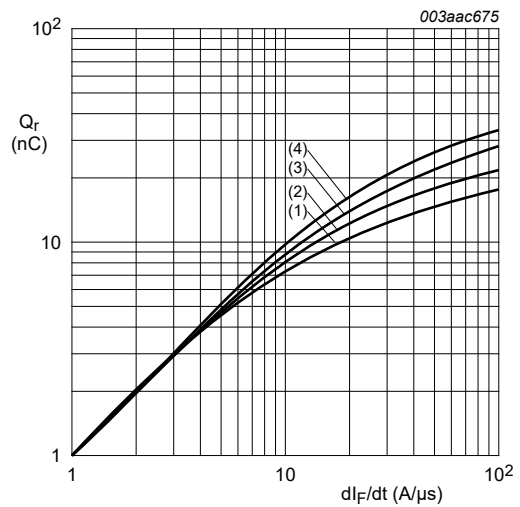
- (1) $I_F = 1 \text{ A}$
- (2) $I_F = 10 \text{ A}$

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

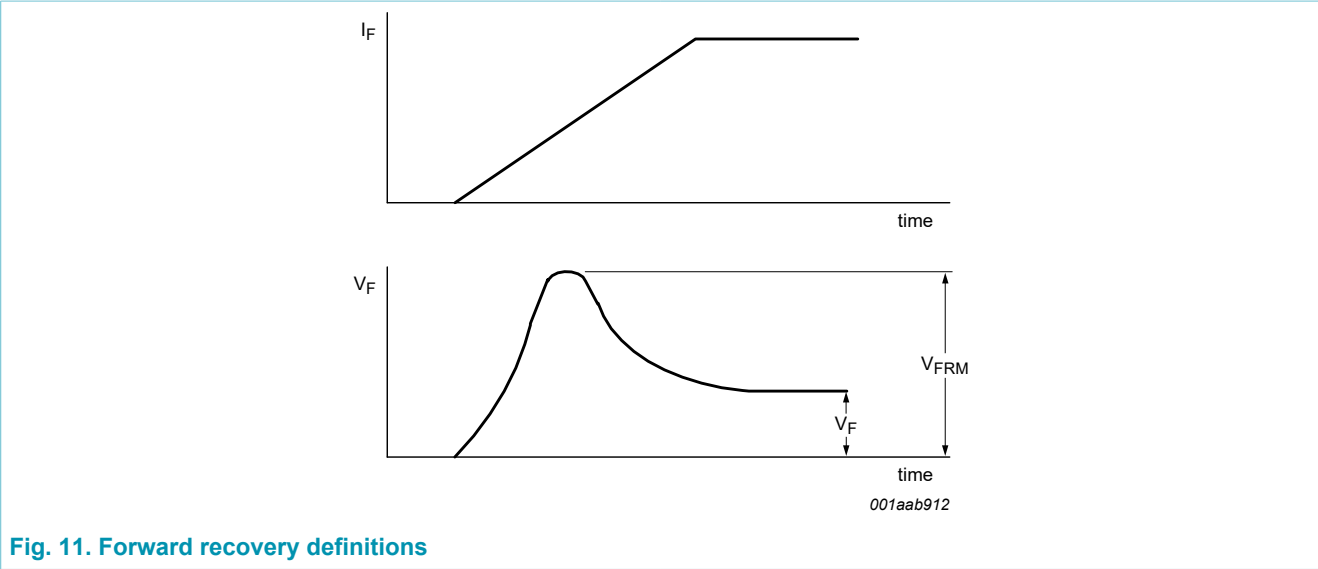


Fig. 11. Forward recovery definitions

10. Package outline

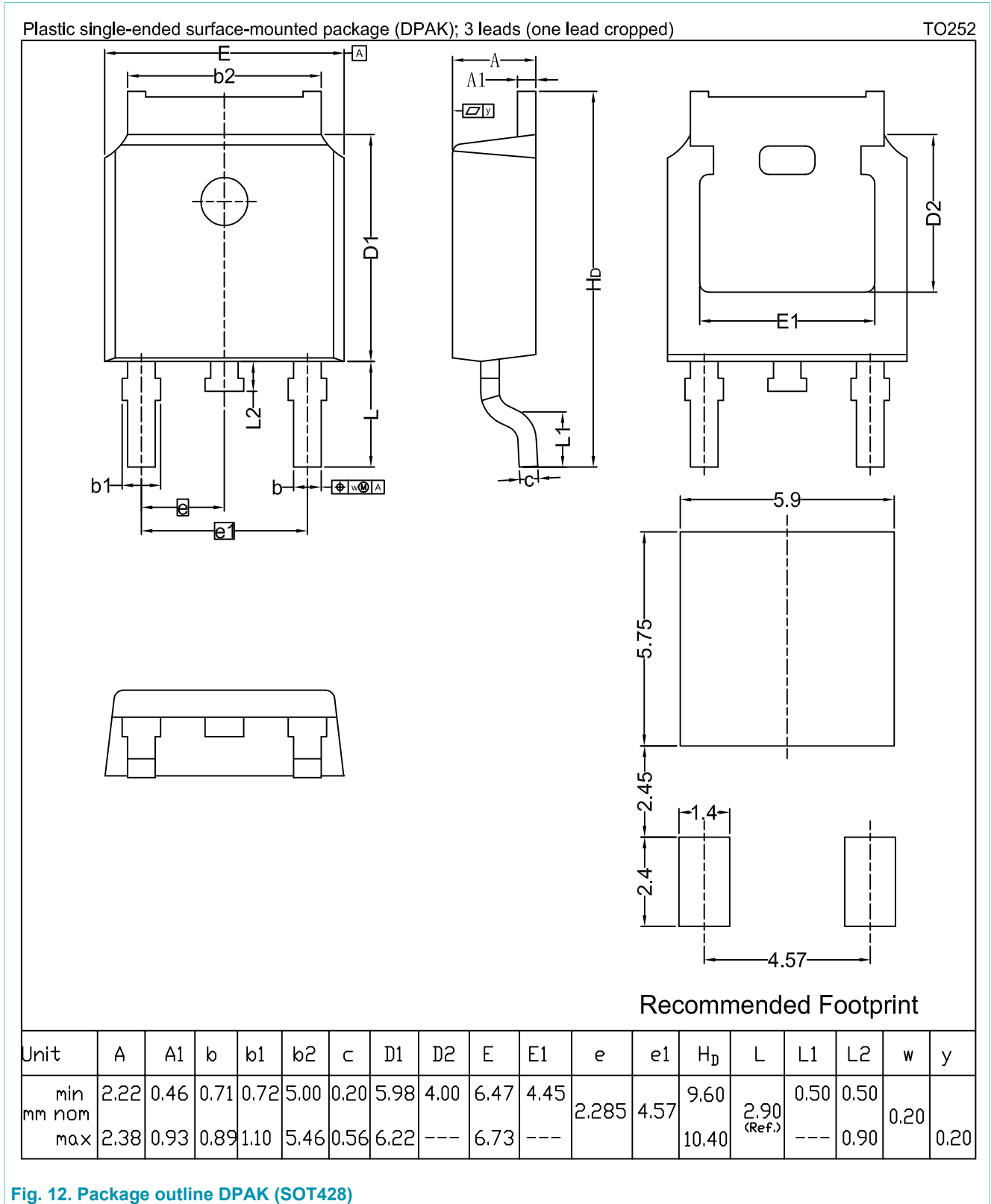


Fig. 12. Package outline DPAK (SOT428)

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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Product [short] data sheet	Production	This document contains the product specification.

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