

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a TO252 (DPAK) plastic package intended for use in applications requiring high thermal cycling performance and high junction temperature capability ($T_{j(max)} = 150\text{ °C}$).

2. Features and benefits

- High junction operating temperature capability
- High thermal cycling performance
- High voltage capability
- Planar passivated for voltage ruggedness and reliability
- High bidirectional blocking voltage capability
- Surface mountable package
- Very high current surge capability

3. Applications

- Ignition circuits
- Motor control
- Protection circuits e.g. SMPS inrush current
- Voltage regulation
- Crowbar protection

4. Quick reference data

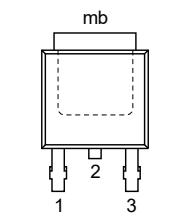

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	600	V
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	-	180	A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$	-	-	198	A
T_j	junction temperature		-	-	150	°C
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 133\text{ °C}$; Fig. 1	-	-	10.2	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 133\text{ °C}$; Fig. 2 ; Fig. 3	-	-	16	A

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ °C}$; Fig. 7	1.5	-	6	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_j = 125\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit	300	-	-	V/ μ s

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p style="text-align: center;">DPAK (TO252N)</p>	 <p style="text-align: center;">sym037</p>
2	A	anode		
3	G	gate		
mb	mb	mounting base; connected to anode		

6. Ordering information

Table 3. Ordering information

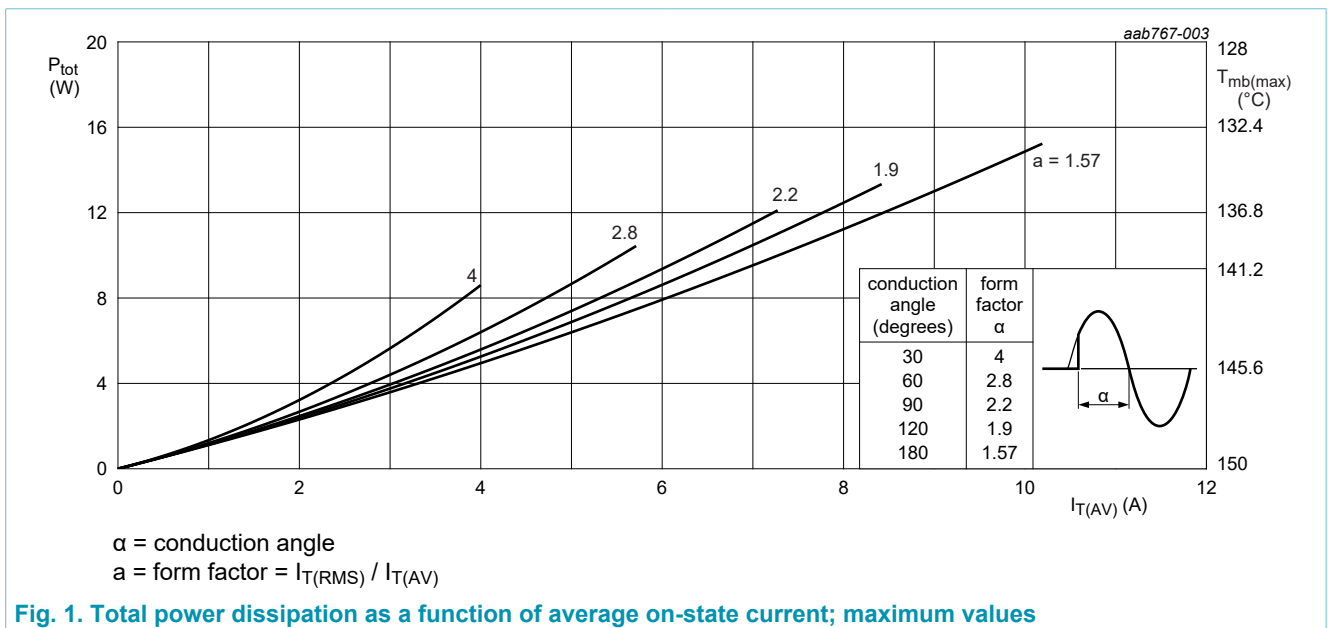
Type number	Package		
	Name	Description	Version
TYN16S-600CT	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	TO252N

7. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	600	V
V_{RRM}	repetitive peak reverse voltage		-	600	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 133\text{ °C}$; Fig. 1	-	10.2	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 133\text{ °C}$; Fig. 2 ; Fig. 3	-	16	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	180	A
		half sine wave; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$	-	198	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN	-	162	A ² s
di_T/dt	rate of rise of on-state current	$I_G = 30\text{ mA}$	-	50	A/ μ s
I_{GM}	peak gate current		-	4	A
V_{RGM}	peak reverse gate voltage		-	5	V
P_{GM}	peak gate power		-	10	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	1	W
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C



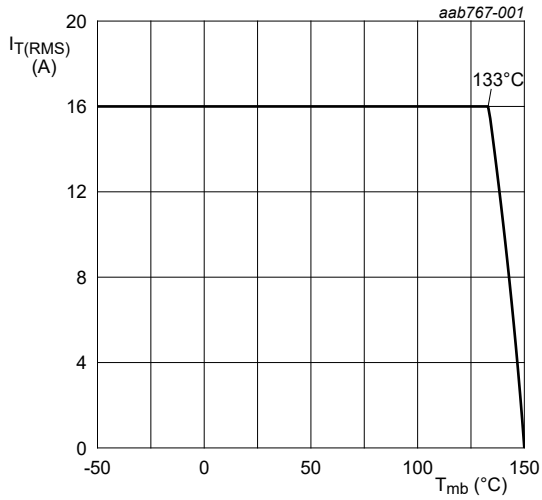
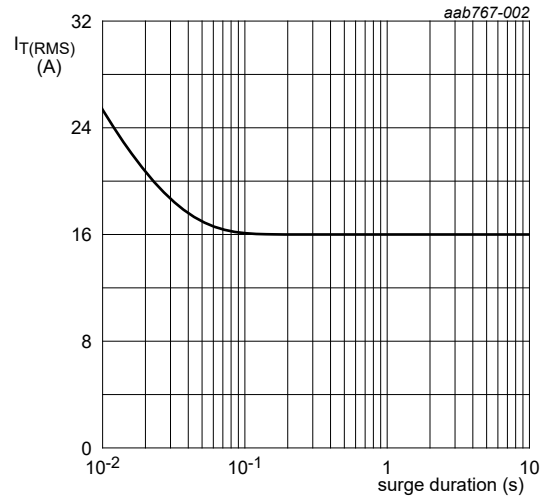
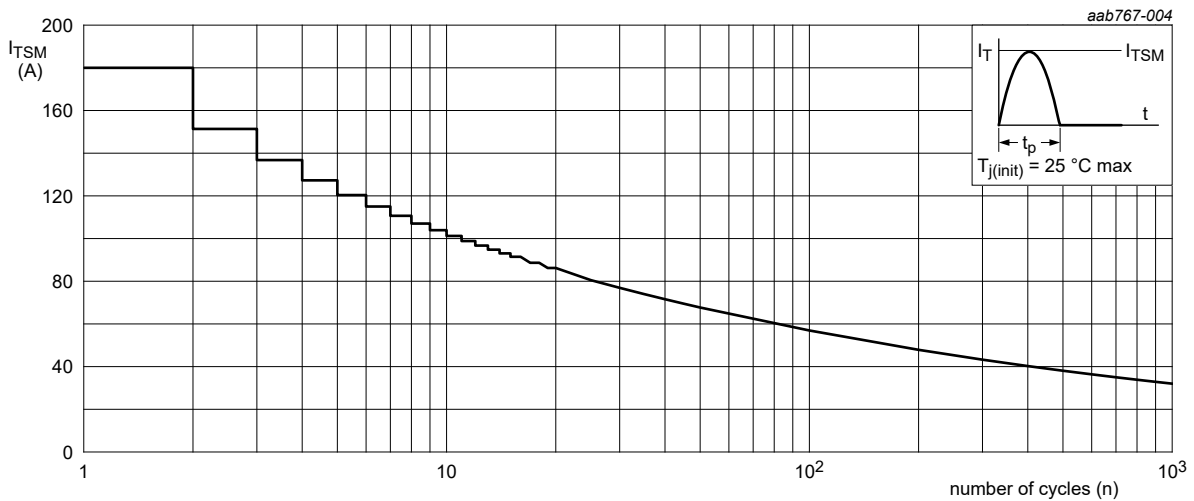


Fig. 2. RMS on-state current as a function of mounting base temperature; maximum values



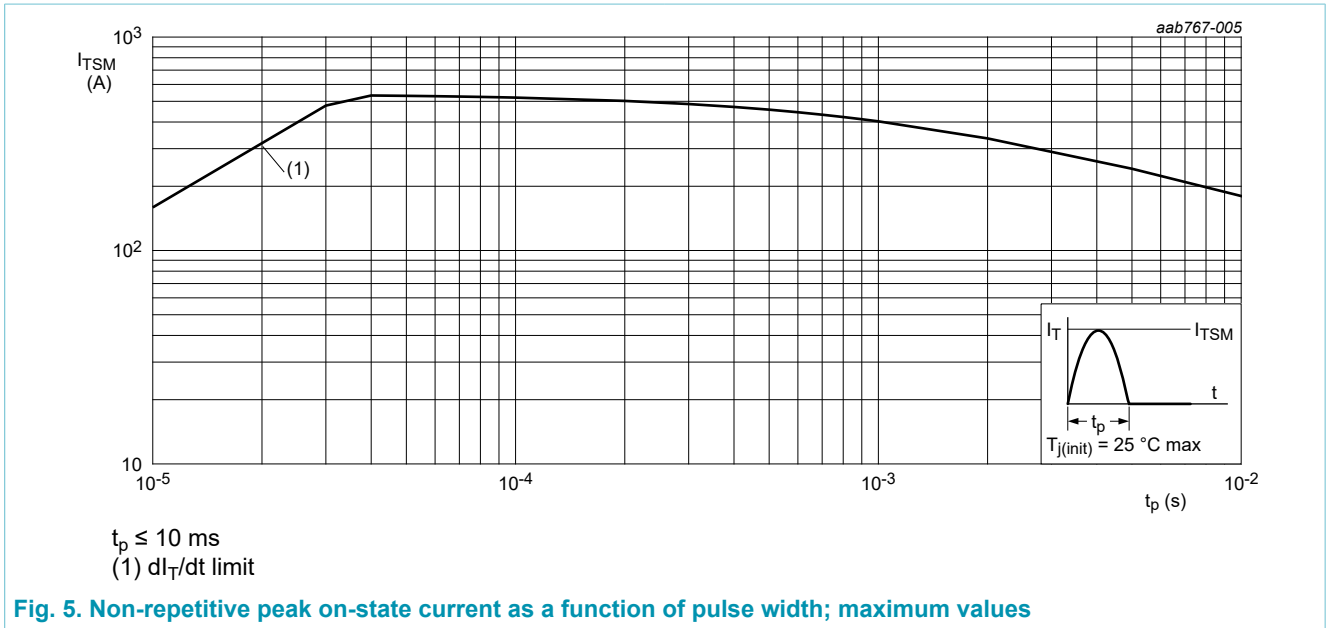
$f = 50 \text{ Hz}; T_{mb} = 133 \text{ }^\circ\text{C}$

Fig. 3. RMS on-state current as a function of surge duration; maximum values



$f = 50 \text{ Hz}$

Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; 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	Fig. 6	-	-	1.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	mounted on a minimum footprint FR4 board	-	55	-	K/W

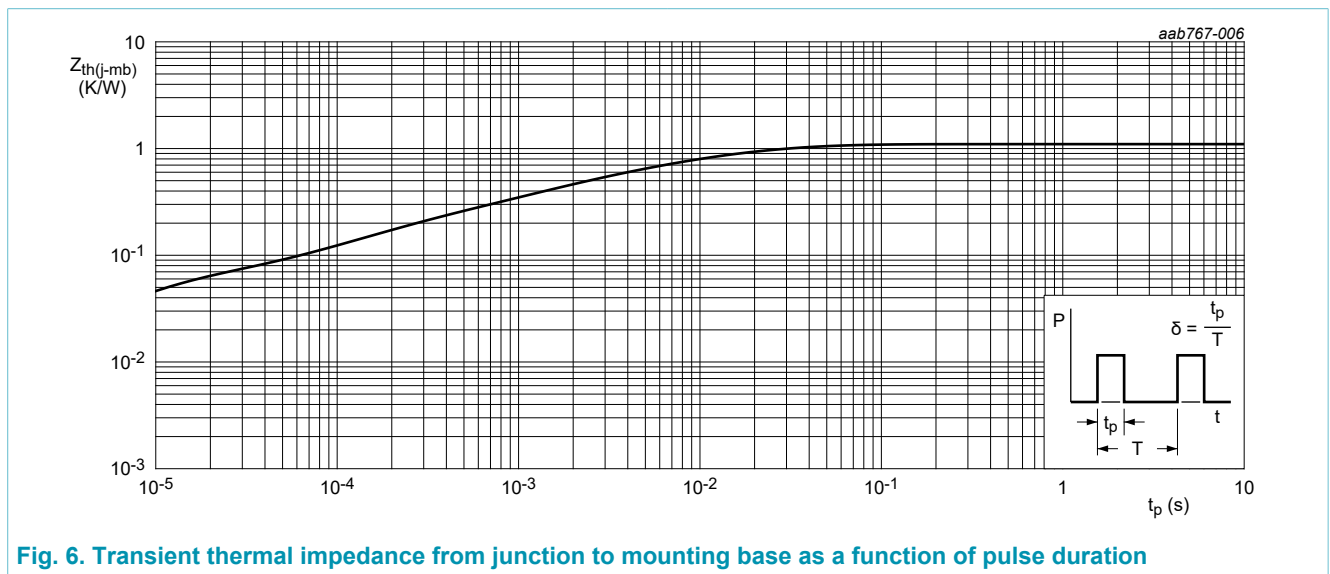


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 7	1.5	-	6	mA
I_L	latching current	$V_D = 12\text{ V}; I_G = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 8	-	-	60	mA
I_H	holding current	$V_D = 12\text{ V}; T_j = 25\text{ }^\circ\text{C};$ Fig. 9	-	-	40	mA
V_T	on-state voltage	$I_T = 32\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 10	-	1.2	1.6	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 11	-	0.7	1.3	V
		$V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_j = 150\text{ }^\circ\text{C};$ Fig. 11	0.2	0.4	-	V
I_D	off-state current	$V_D = 600\text{ V}; T_j = 150\text{ }^\circ\text{C}$	-	-	1	mA
I_R	reverse current	$V_R = 600\text{ V}; T_j = 150\text{ }^\circ\text{C}$	-	-	1	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}; T_j = 125\text{ }^\circ\text{C}; (V_{DM} = 67\%$ of $V_{DRM});$ exponential waveform; gate open circuit	300	-	-	V/ μs
		$V_{DM} = 402\text{ V}; T_j = 150\text{ }^\circ\text{C}; (V_{DM} = 67\%$ of $V_{DRM});$ exponential waveform; gate open circuit	100	-	-	V/ μs

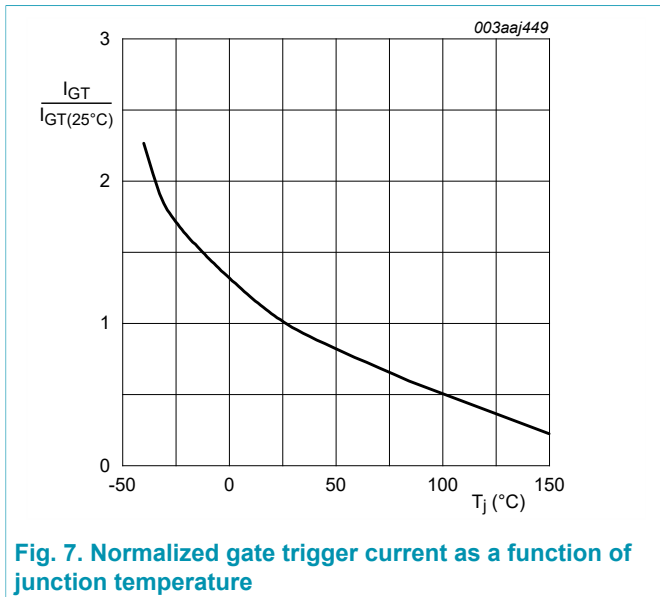


Fig. 7. Normalized gate trigger current as a function of junction temperature

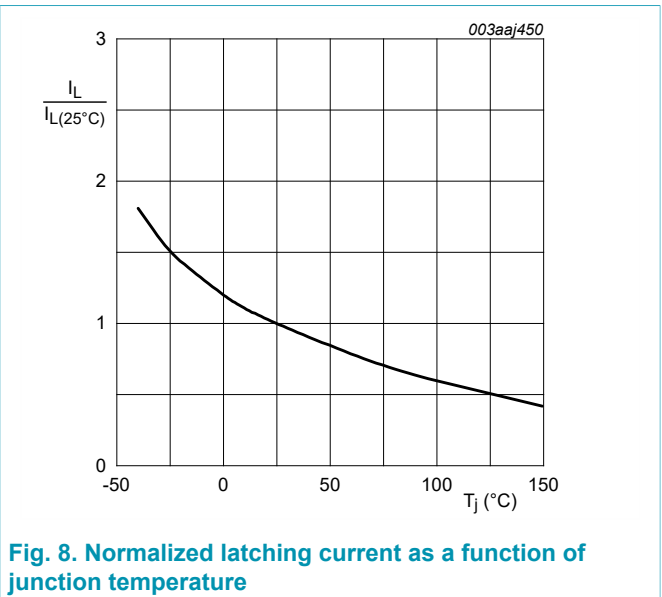


Fig. 8. Normalized latching current as a function of junction temperature

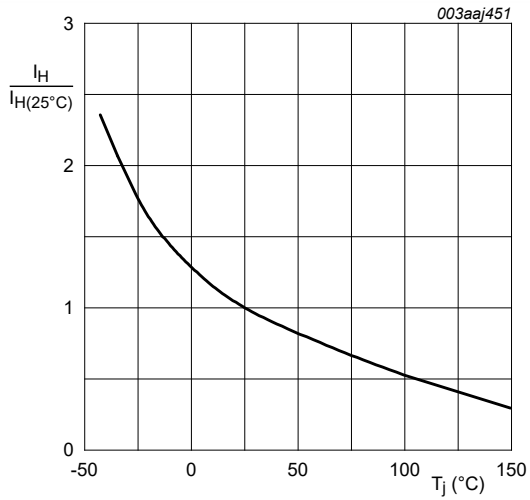
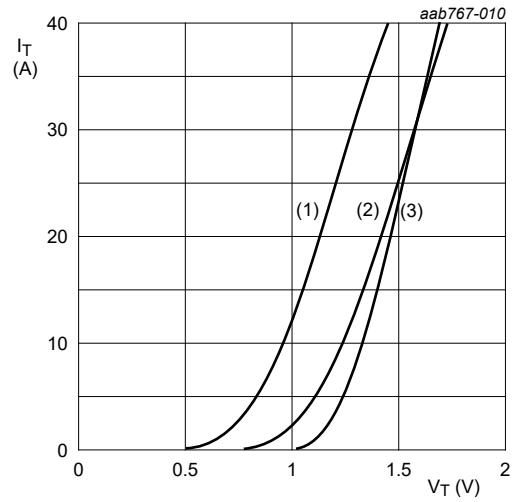


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.071 \text{ V}; R_s = 0.0169 \Omega$
 (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. 10. On-state current as a function of on-state voltage

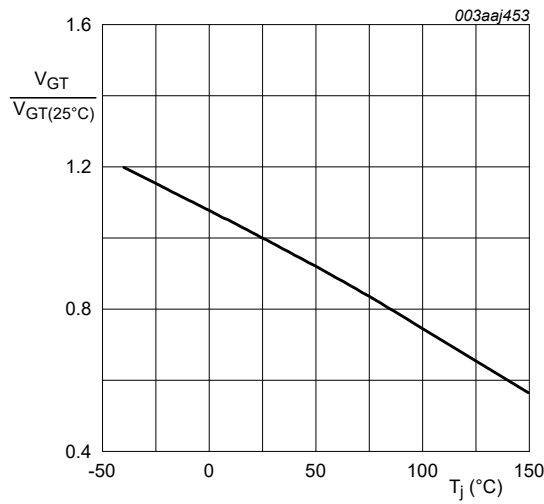


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

10. Package outline

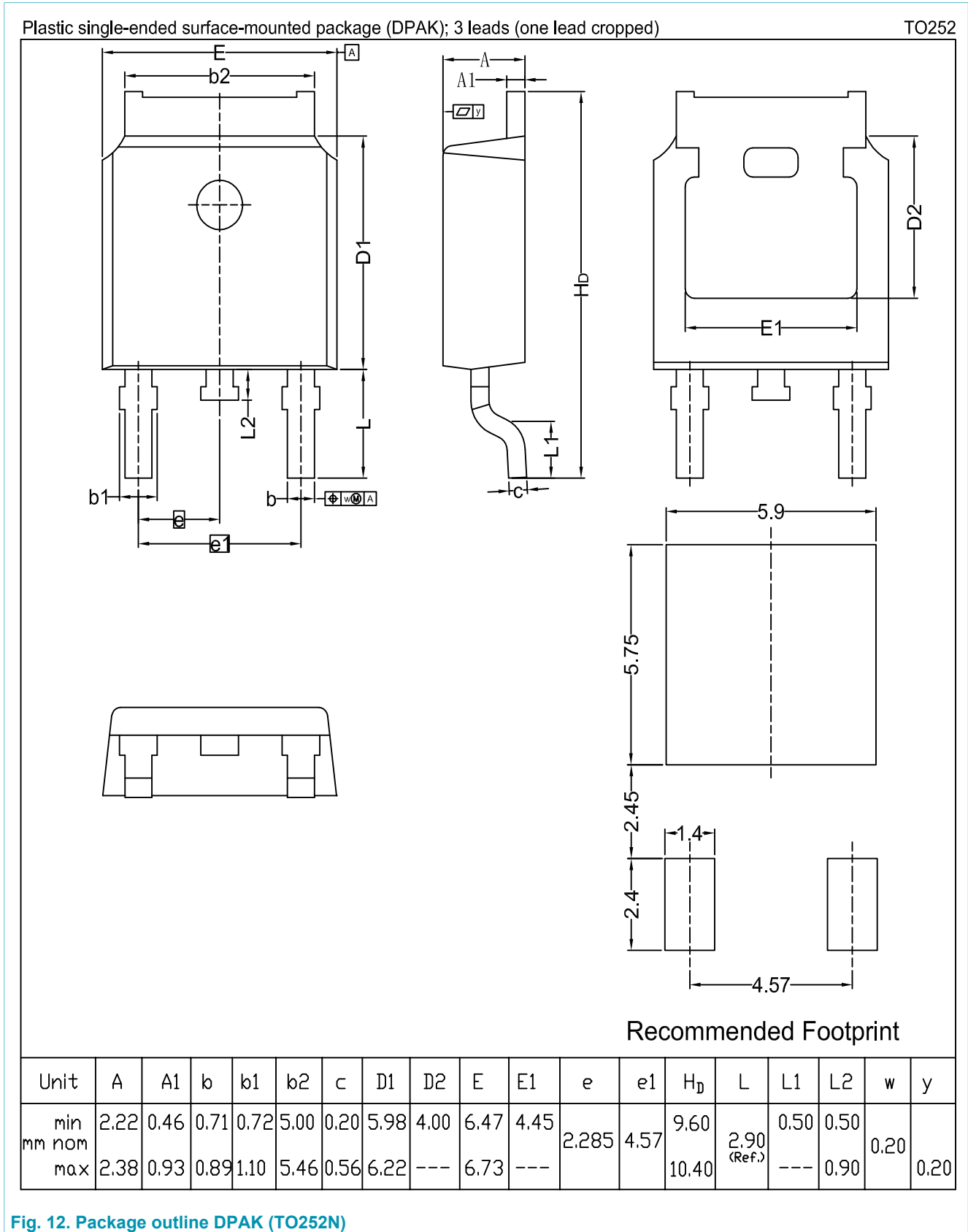


Fig. 12. Package outline DPAK (TO252N)

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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