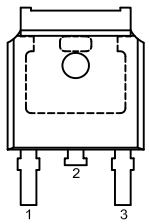
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 536 V; T_j = 125 °C; R_{GK} = 100 Ω; (V_{DM} = 67% of V_{DRM}); exponential waveform; Fig. 13		50	100	-	V/µs

[1] Operation above junction temperatures of 110 °C may require the use of a gate to cathode resistor of 1 kΩ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 DPAK (SOT428)	
2	A	anode		
3	G	gate		
mb	A	mounting base; connected to anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BT258S-800R	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

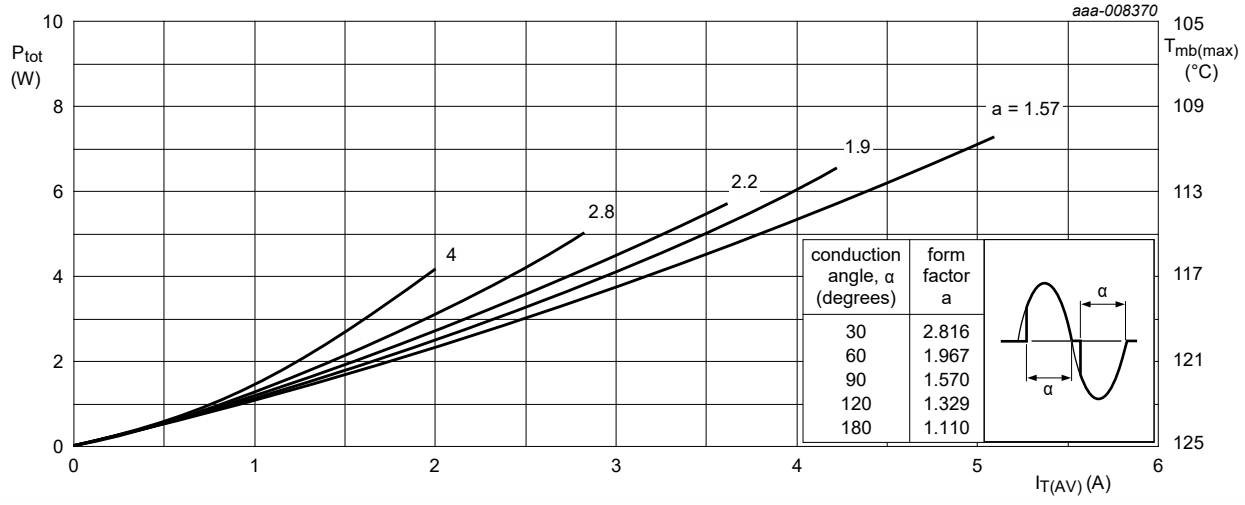
7. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	800	V
V_{RRM}	repetitive peak reverse voltage			-	800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq$ 111 °C; Fig. 1		-	5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq$ 111 °C; Fig. 2; Fig. 3		-	8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)}$ = 25 °C; t_p = 10 ms; Fig. 4; Fig. 5		-	75	A
		half sine wave; $T_{j(init)}$ = 25 °C; t_p = 8.3 ms		-	82	A
I^2t	I^2t for fusing	t_p = 10 ms; sine-wave pulse		-	28	A^2s
dI_T/dt	rate of rise of on-state current	I_G = 50 mA		-	50	A/µs
I_{GM}	peak gate current			-	2	A
V_{RGM}	peak reverse gate voltage			-	5	V
P_{GM}	peak gate power			-	5	W
$P_{G(AV)}$	average gate power	over any 20 ms period		-	0.5	W
T_{stg}	storage temperature			-40	150	°C
T_j	junction temperature		[1]	-	125	°C

[1] Operation above junction temperatures of 110 °C may require the use of a gate to cathode resistor of 1 kΩ



α = conduction angle

a = form factor = $I_{T(RMS)}$ / $I_{T(AV)}$

Fig. 1. Total power dissipation as a function of average on-state current; maximum values

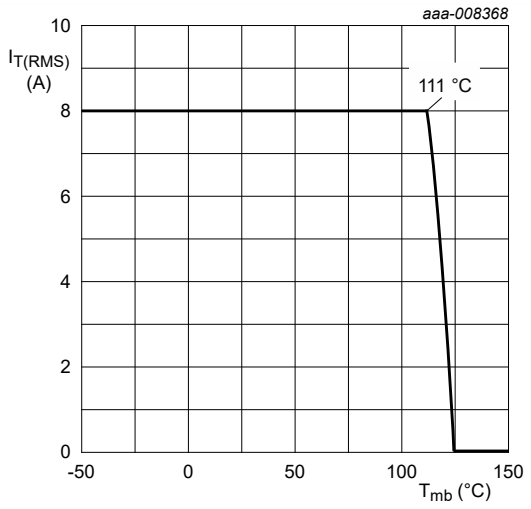
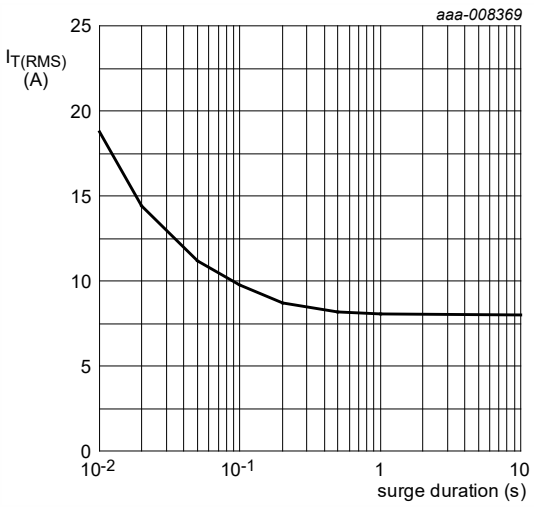
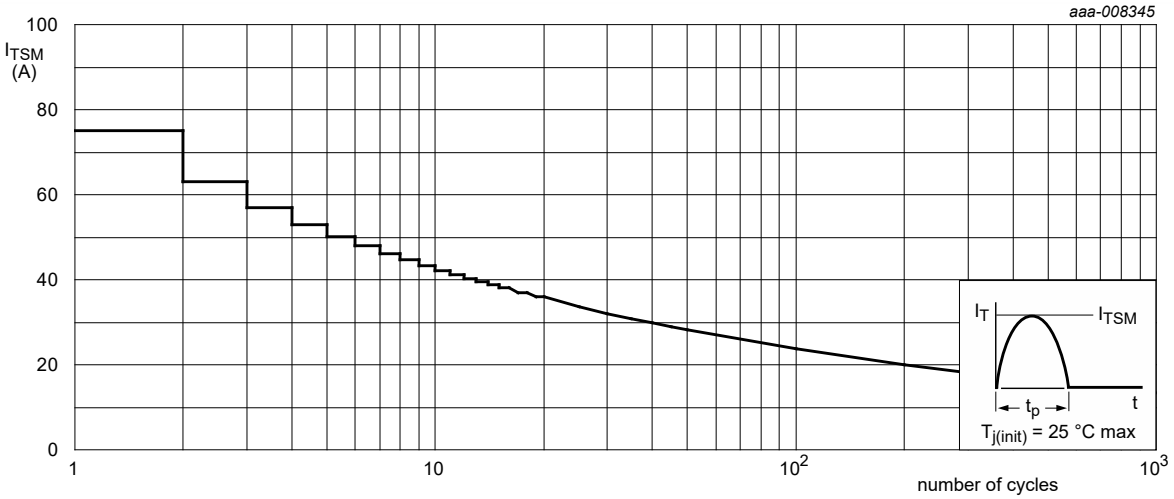


Fig. 2. RMS on-state current as a function of mounting base temperature; maximum values



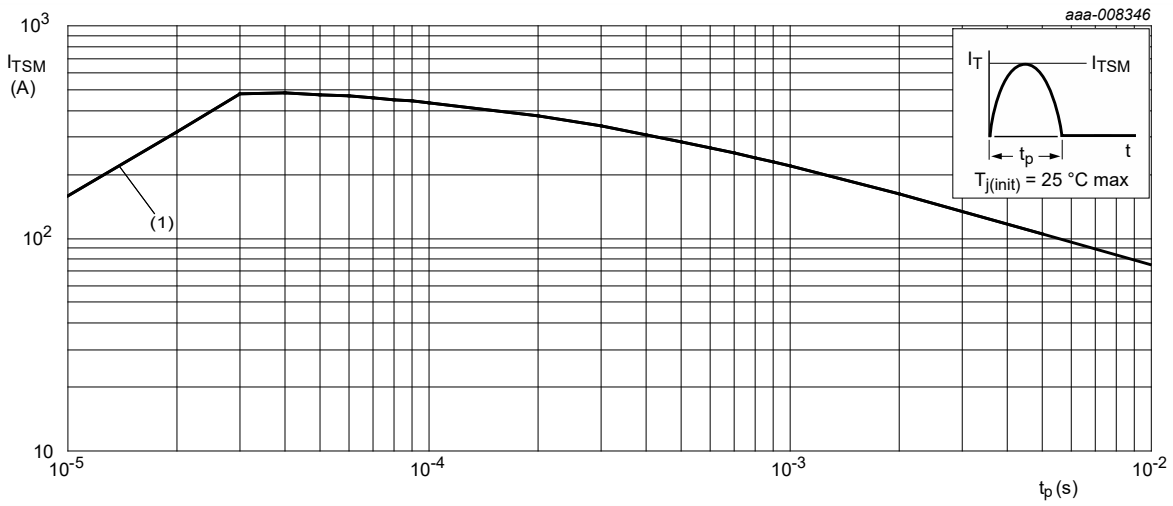
f = 50 Hz; T_{mb} = 111 °C

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



f = 50 Hz

Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



$t_p \leq 10$ ms
(1) dI_T/dt limit

Fig. 5. Non-repetitive peak on-state current as a function of pulse width; 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		-	-	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint; Fig. 7		-	75	-	K/W

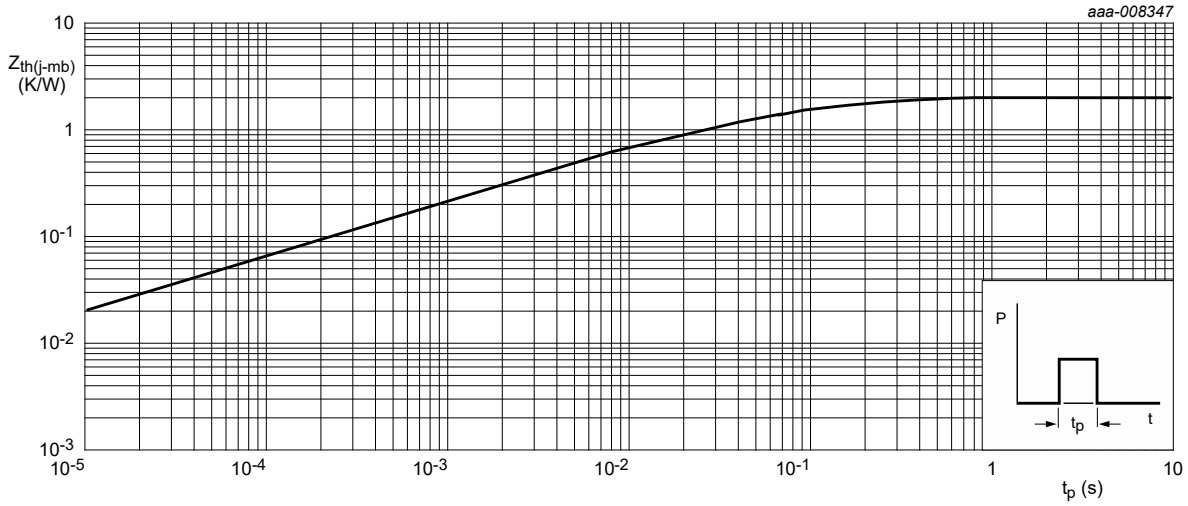
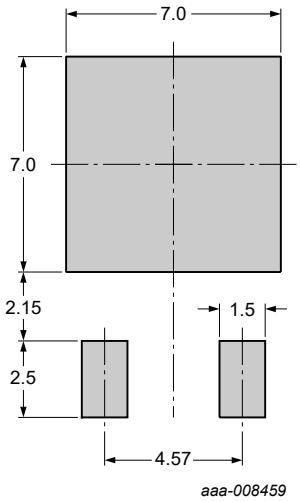


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width



All dimensions are in mm
Plastic meets requirements of UL94 V-O at 3.175 mm

Fig. 7. SOT428: minimum pad sizes for surface-mounting

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 8		-	50	200	µA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T_j = 25 °C; Fig. 9		-	0.4	10	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 10		-	0.3	6	mA
V_T	on-state voltage	I_T = 16 A; T_j = 25 °C; Fig. 11		-	1.3	1.6	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 12		-	0.4	1	V
		V_D = 800 V; I_T = 0.1 A; T_j = 110 °C; Fig. 12		0.1	0.2	-	V
I_D	off-state current	V_D = 800 V; T_j = 125 °C		-	0.1	0.5	mA
I_R	reverse current	V_R = 800 V; T_j = 125 °C		-	0.1	0.5	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 536 V; T_j = 125 °C; R_{GK} = 100 Ω; (V_{DM} = 67% of V_{DRM}); exponential waveform; Fig. 13		50	100	-	V/µs
t_{gt}	gate-controlled turn-on time	I_{TM} = 10 A; V_D = 800 V; I_G = 5 mA; dI_G/dt = 0.2 A/µs; T_j = 25 °C		-	2	-	µs
t_q	commutated turn-off time	V_{DM} = 536 V; T_j = 125 °C; I_{TM} = 12 A; V_R = 24 V; $(dI_T/dt)_M$ = 10 A/µs; dV_D/dt = 2 V/µs; $R_{GK(ext)}$ = 1 kΩ; (V_{DM} = 67% of V_{DRM})		-	100	-	µs

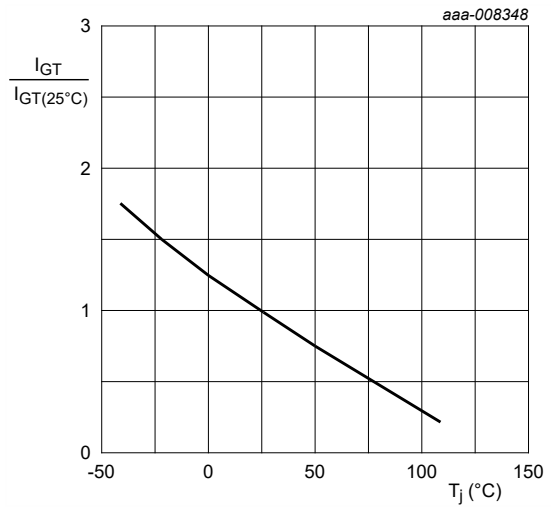


Fig. 8. Normalized gate trigger current as a function of junction temperature

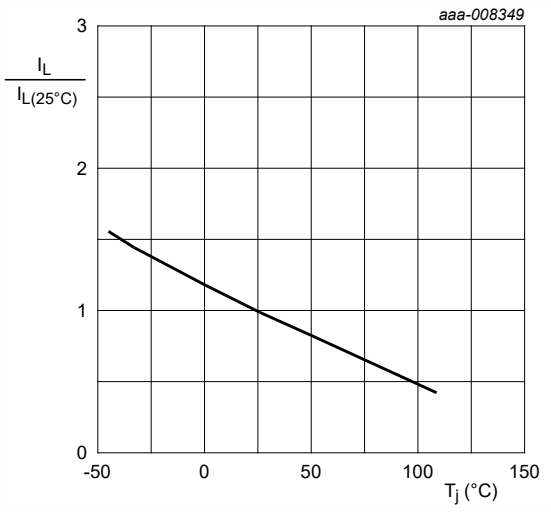


Fig. 9. Normalized latching current as a function of junction temperature

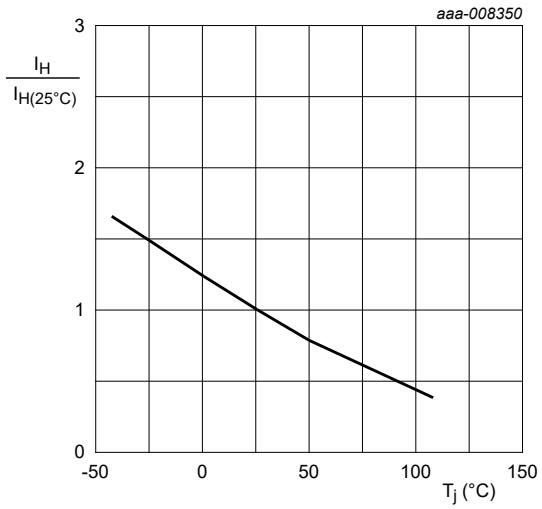
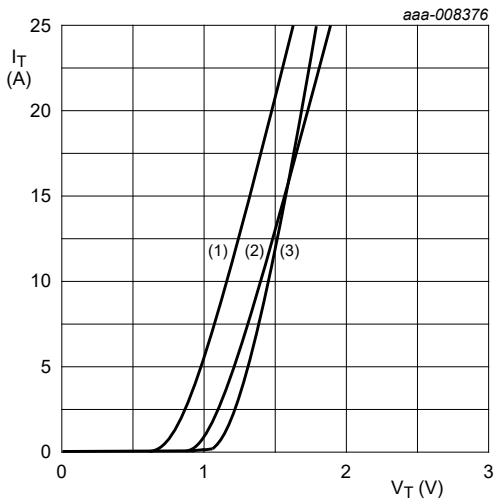


Fig. 10. Normalized holding current as a function of junction temperature



V_o = 1.0 V; R_s = 0.04 Ω
(1) T_j = 125 °C; typical values
(2) T_j = 125 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 11. On-state current as a function of on-state voltage

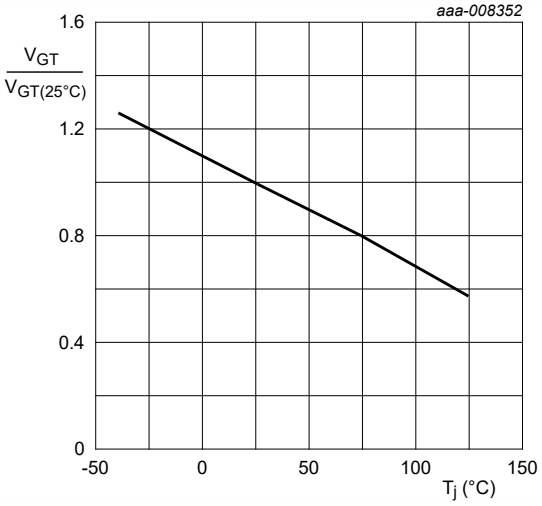
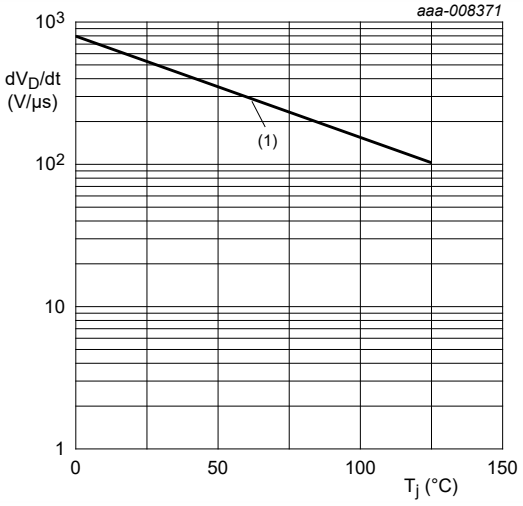


Fig. 12. Normalized gate trigger voltage as a function of junction temperature

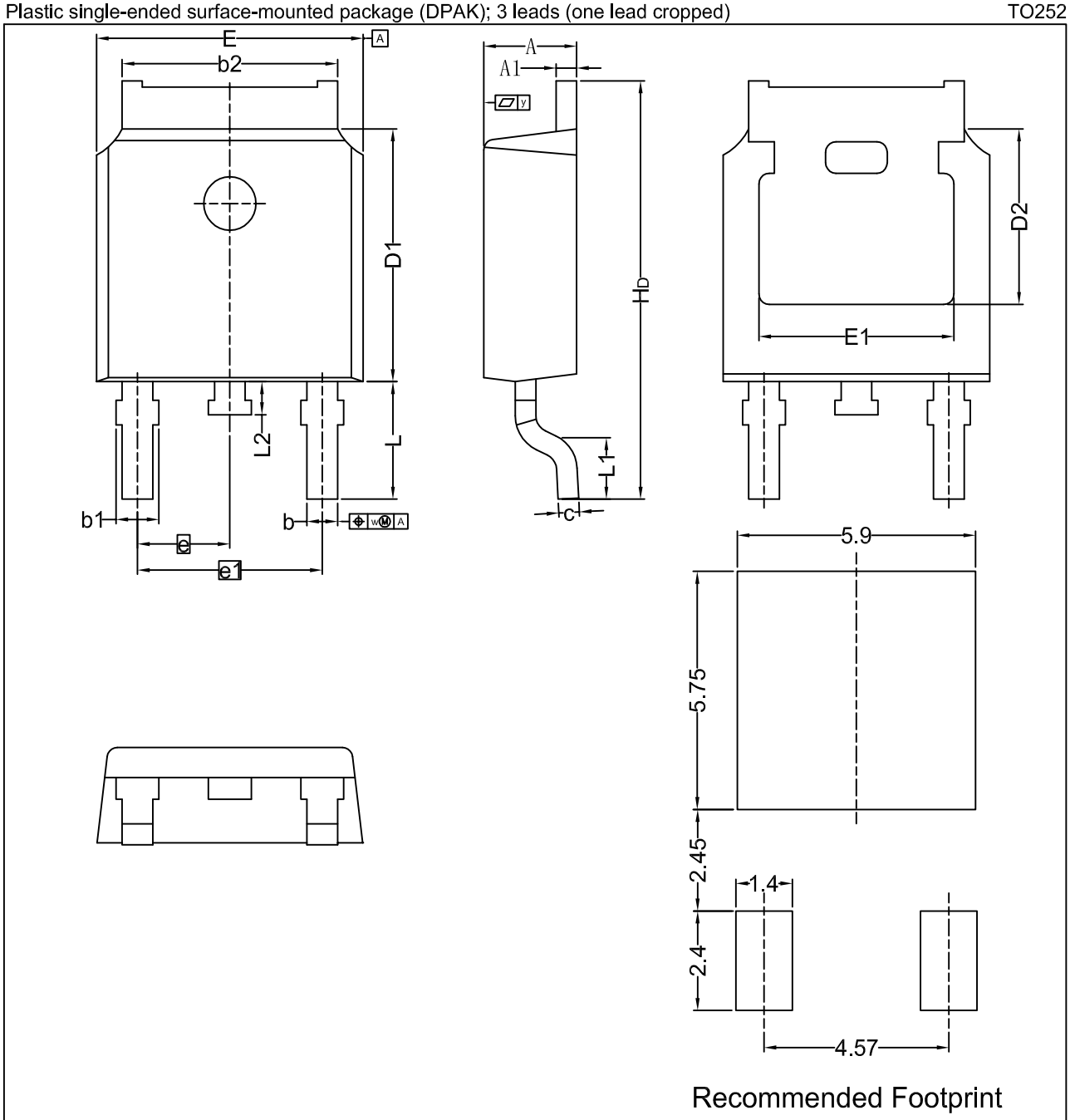


(1) R_{GK} = 100 Ω

Fig. 13. Critical rate of rise of off-state voltage as a function of junction temperature; typical values

10. Package outline

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped) TO252



Unit	A	A1	b	b1	b2	c	D1	D2	E	E1	e	e1	H_D	L	L1	L2	w	y
min	2.22	0.46	0.71	0.72	5.00	0.20	5.98	4.00	6.47	4.45	2.285	4.57	9.60	2.90 (Ref.)	0.50	0.50	0.20	
mm nom																		
max	2.38	0.93	0.89	1.10	5.46	0.56	6.22	---	6.73	---			10.40		---	0.90		0.20

Fig. 14. 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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