BTA208S-600B

3Q Hi-Com Triac

Rev.02 - 19 March 2025 Product data sheet

1. General description

Planar passivated high commutation three quadrant triac in a SOT428 (DPAK) surface mountable plastic package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This "series B" triac will commutate the full rated RMS current at the maximum rated junction temperature without the aid of a snubber.

2. Features and benefits

- 3Q technology for improved noise immunity
- High commutation capability with maximum false trigger immunity
- High immunity to false turn-on by dV/dt
- High voltage capability
- Less sensitive gate for very high noise immunity
- Planar passivated for voltage ruggedness and reliability
- Surface mountable package
- Triggering in three quadrants only

3. Applications

- Electronic thermostats
- General purpose motor controls
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

4. Quick reference data

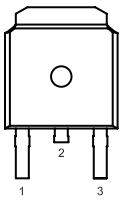
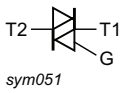
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 102$ °C; Fig. 1; Fig. 2; Fig. 3		-	-	8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25$ °C; $t_p = 20$ ms; Fig. 4; Fig. 5		-	-	65	A
		full sine wave; $T_{j(init)} = 25$ °C; $t_p = 16.7$ ms		-	-	72	A
T_j	junction temperature			-	-	125	°C
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12$ V; $I_T = 0.1$ A; T2+ G+; $T_j = 25$ °C; Fig. 7		2	18	50	mA

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		V_D = 12 V; I_T = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 7		2	21	50	mA
		V_D = 12 V; I_T = 0.1 A; T2- G-; T_j = 25 °C; Fig. 7		2	34	50	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 9		-	31	60	mA
V_T	on-state voltage	I_T = 10 A; T_j = 25 °C; Fig. 10		-	1.3	1.65	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 402 V; T_j = 125 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit		1000	4000	-	V/µs
dI_{com}/dt	rate of change of commutating current	V_D = 400 V; T_j = 125 °C; $I_{T(RMS)}$ = 8 A; dV_{com}/dt = 20 V/µs; snubberless condition; gate open circuit; Fig. 12		-	14	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1		
2	T2	main terminal 2		
3	G	gate		
mb	T2	mounting base; connected to main terminal 2		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BTA208S-600B	TO252	BTA208S-600B,118	Reel	2500	TO252N	07-Mar-2025
					TO252Q	05-Mar-2025

Type number	Marking codes	
	Assembly factory: N	Assembly factory: Q
BTA208S-600B	208S6B PJNxxxx xx	208S6B PJQxxxx xx

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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
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq$ 102 °C; Fig. 1; Fig. 2; Fig. 3		-	8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)}$ = 25 °C; t_p = 20 ms; Fig. 4; Fig. 5		-	65	A
		full sine wave; $T_{j(init)}$ = 25 °C; t_p = 16.7 ms		-	72	A
I^2t	I^2t for fusing	t_p = 10 ms; SIN		-	21	A²s
dI_T/dt	rate of rise of on-state current	I_G = 100 mA		-	100	A/µs
I_{GM}	peak gate current			-	2	A
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			-	125	°C

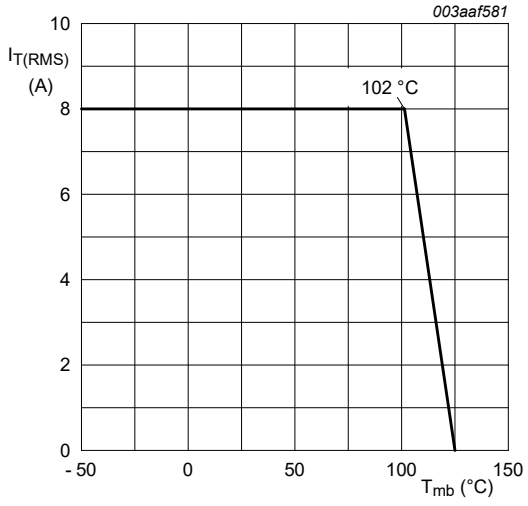
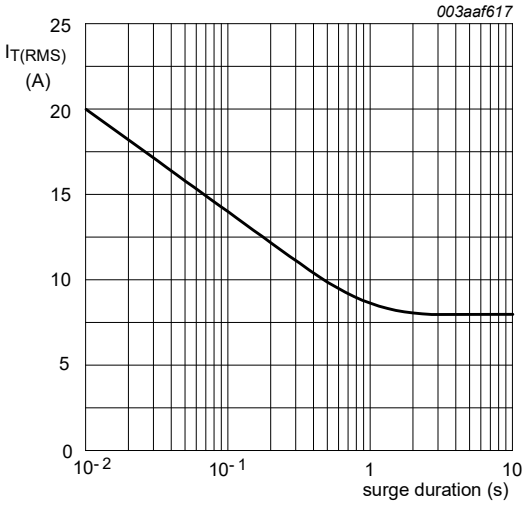


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



f = 50 Hz; T_{mb} = 102 °C

Fig. 2. RMS on-state current as a function of surge duration; maximum values

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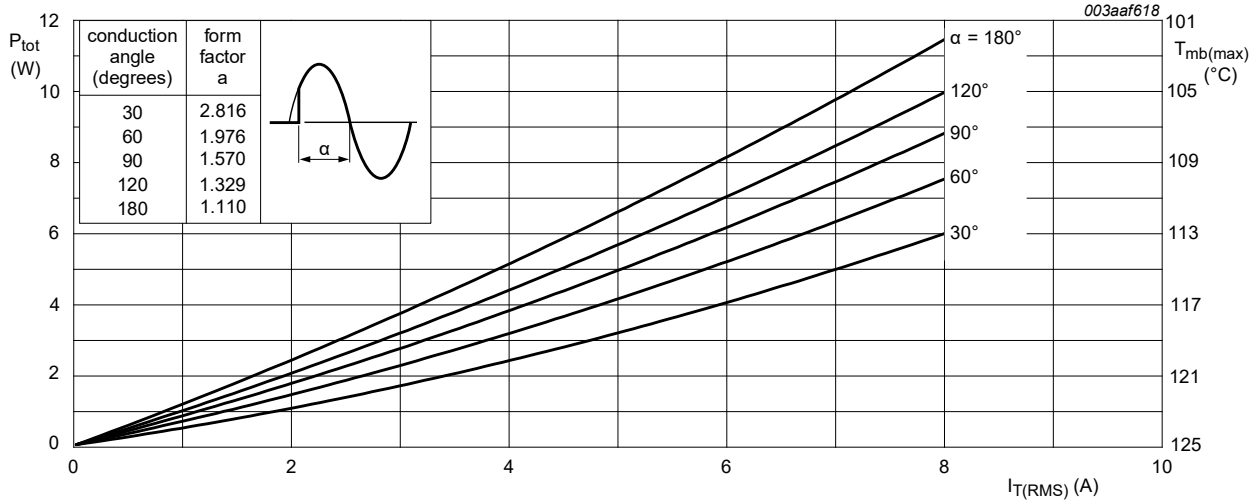
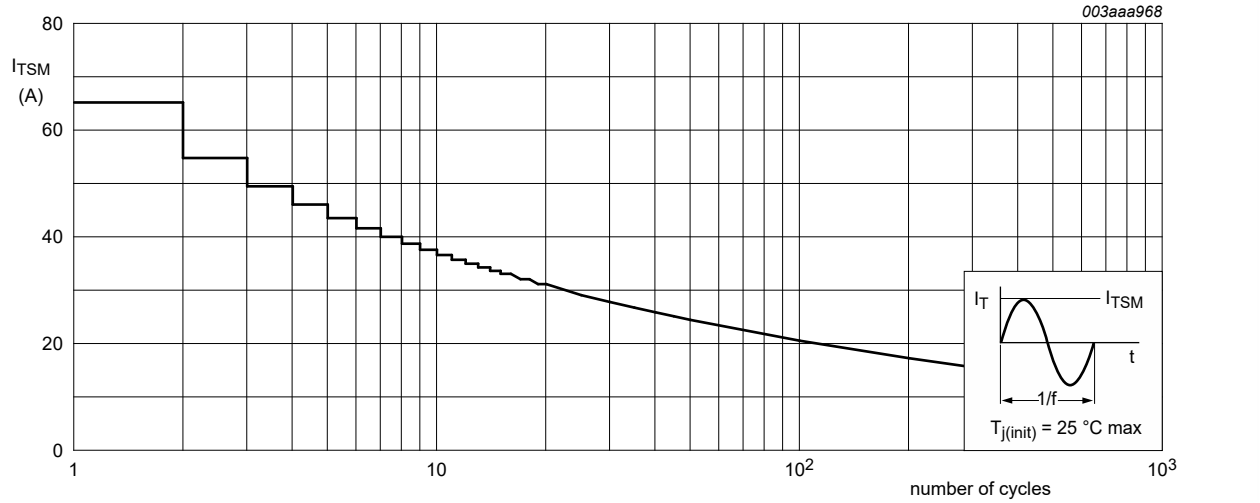


α = conduction angle

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

Fig. 3. Total power dissipation as a function of RMS on-state current; 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

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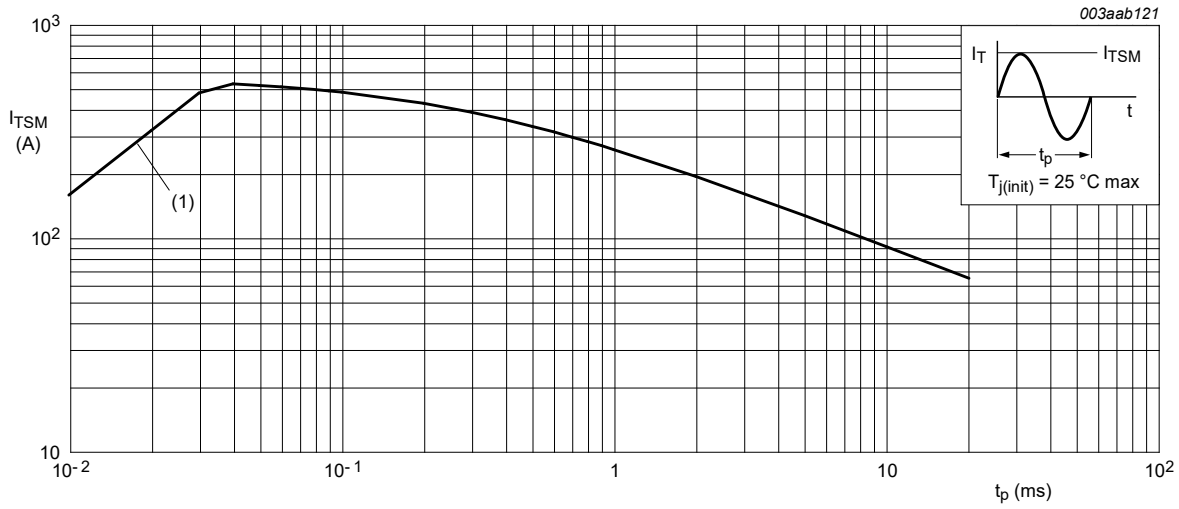

$t_p \leq 20$ ms
(1) dI_T/dt limit

Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

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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	full cycle; Fig. 6		-	-	2	K/W
		half cycle; Fig. 6		-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	printed circuit board (FR4) mounted		-	75	-	K/W

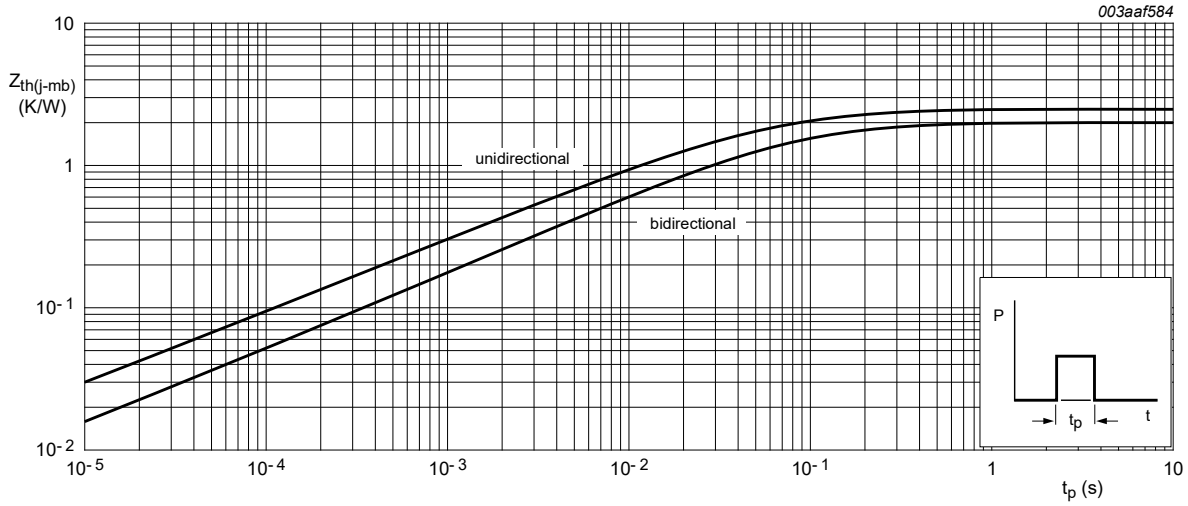

Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

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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; T2+ G+; T_j = 25 °C; Fig. 7		2	18	50	mA
		V_D = 12 V; I_T = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 7		2	21	50	mA
		V_D = 12 V; I_T = 0.1 A; T2- G-; T_j = 25 °C; Fig. 7		2	34	50	mA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T2+ G+; T_j = 25 °C; Fig. 8		-	31	60	mA
		V_D = 12 V; I_G = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 8		-	34	90	mA
		V_D = 12 V; I_G = 0.1 A; T2- G-; T_j = 25 °C; Fig. 8		-	30	60	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 9		-	31	60	mA
V_T	on-state voltage	I_T = 10 A; T_j = 25 °C; Fig. 10		-	1.3	1.65	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 11		-	0.7	1	V
		V_D = 400 V; I_T = 0.1 A; T_j = 125 °C; Fig. 11		0.25	0.4	-	V
I_D	off-state current	V_D = 600 V; T_j = 125 °C		-	0.1	0.5	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 402 V; T_j = 125 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit		1000	4000	-	V/µs
dI_{com}/dt	rate of change of commutating current	V_D = 400 V; T_j = 125 °C; $I_{T(RMS)}$ = 8 A; dV_{com}/dt = 20 V/µs; snubberless condition; gate open circuit; Fig. 12		-	14	-	A/ms
t_{gt}	gate-controlled turn-on time	I_{TM} = 12 A; V_D = 600 V; I_G = 0.1 A; dI_G/dt = 5 A/µs		-	2	-	µs

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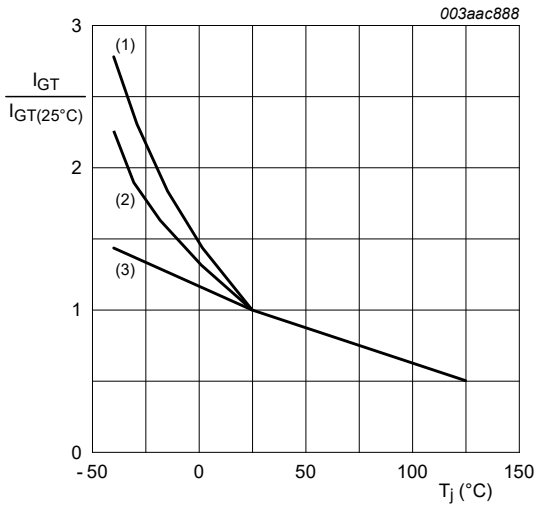


(1) T2- G-
(2) T2+ G-
(3) T2+ G+

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

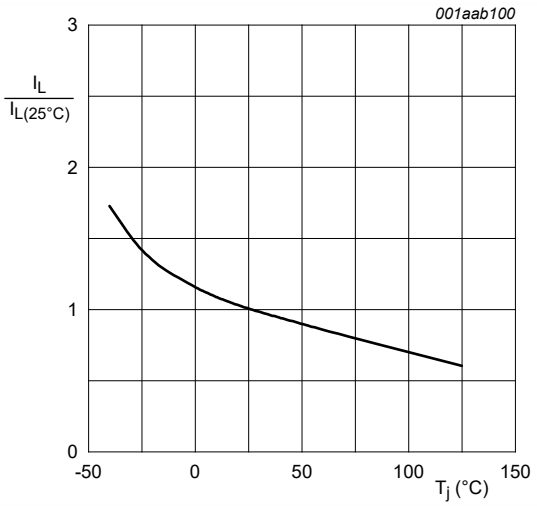


Fig. 8. Normalized latching current as a function of junction temperature

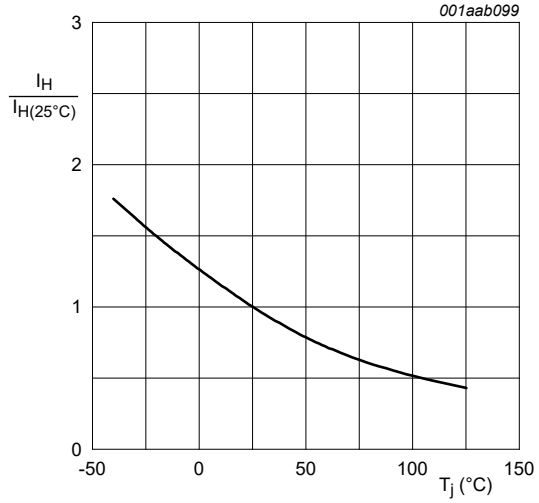
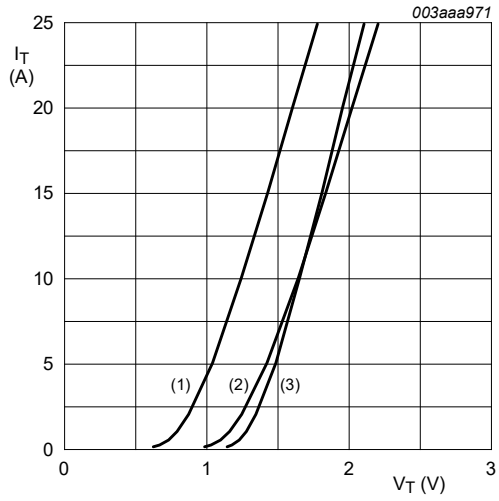


Fig. 9. Normalized holding current as a function of junction temperature



V_o = 1.264 V; R_s = 0.0378 Ω
(1) T_j = 125 °C; typical values
(2) T_j = 125 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 10. On-state current as a function of on-state voltage

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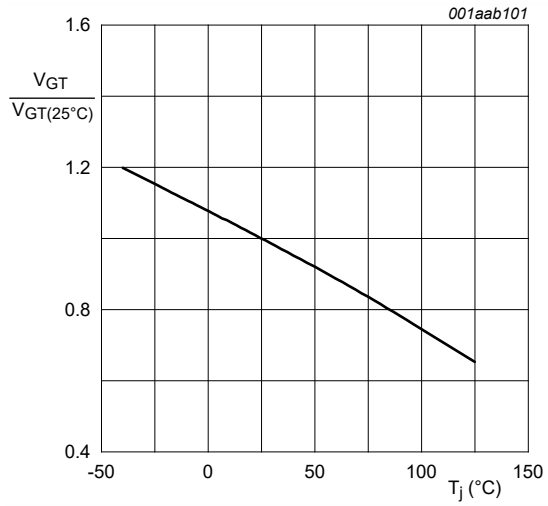

Fig. 11. Normalized gate trigger voltage as a function of junction temperature

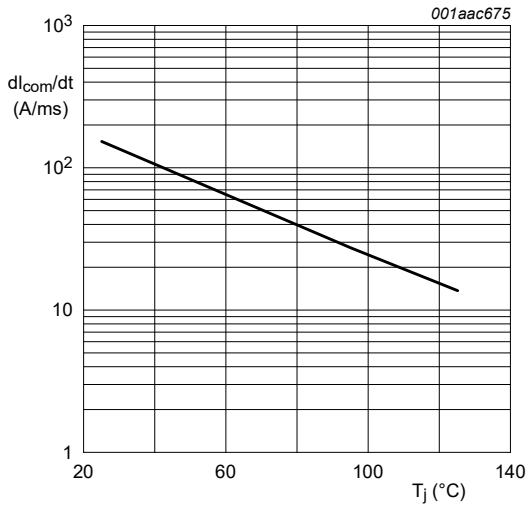

Fig. 12. Rate of rise of commutating current as a function of junction temperature; typical values

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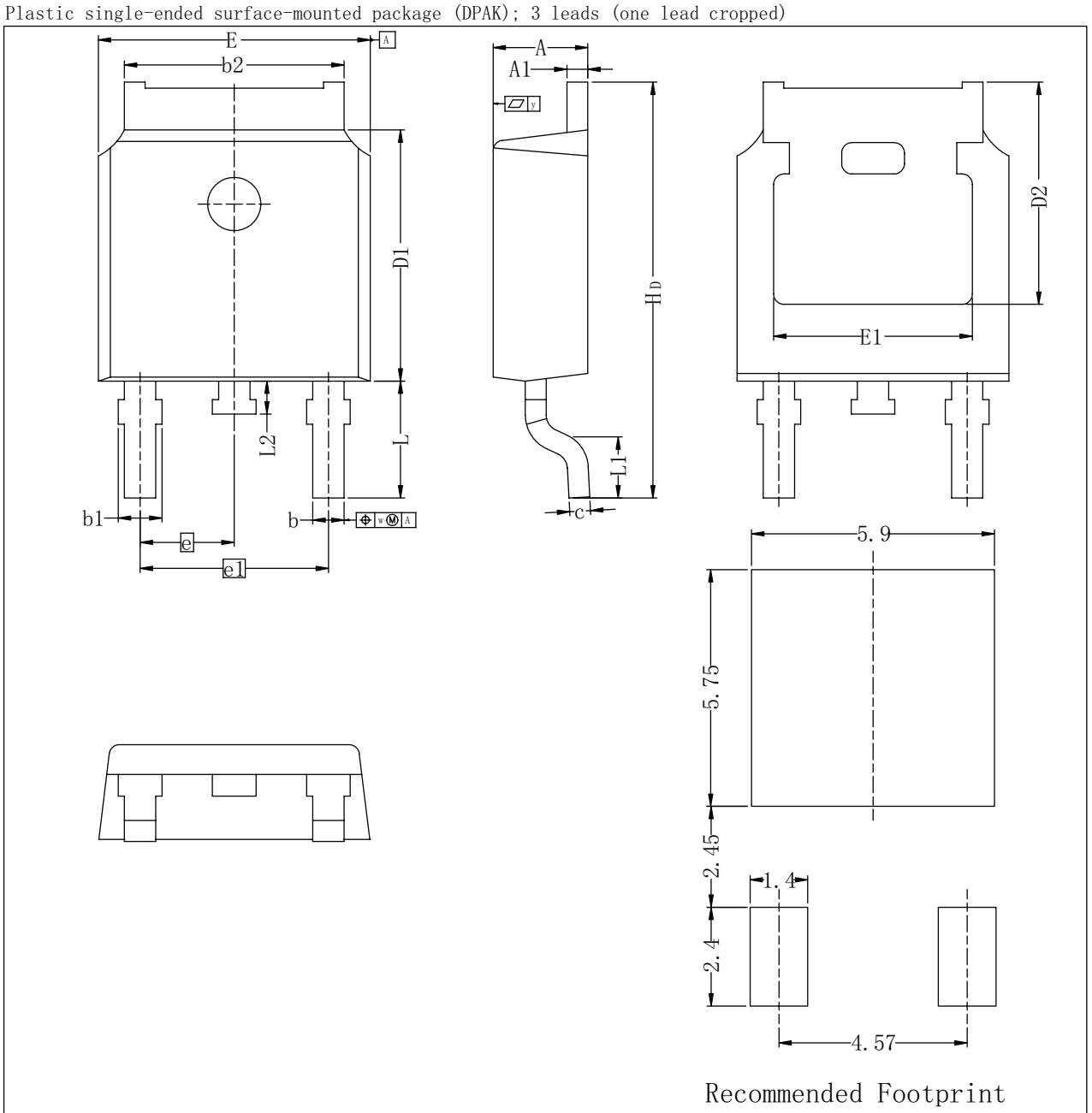
10. Package outline

Assembly factory: N

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



Unit	A	A1	b	b1	b2	c	D1	D2	E	E1	e	e1	H_D	L	L1	L2	w	y
mm 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																		
mm max	2.38	0.93	0.89	1.10	5.46	0.56	6.22	---	6.73	---			10.40		---	0.90		0.20

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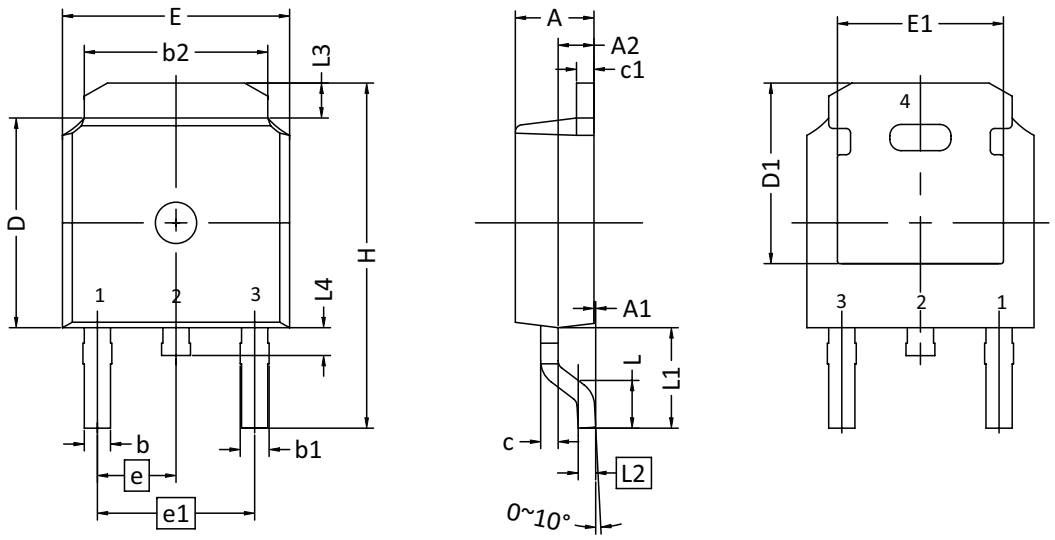
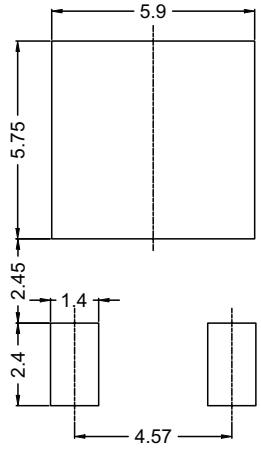
Assembly factory: Q

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





Recommended Footprint

SYMBOLS	DIMENSION IN MM		
	MIN	NOM	MAX
A	2.184	2.286	2.400
A1	0.000	---	0.200
A2	0.889	1.041	1.170
b	0.635	0.762	0.889
b1	0.680	0.840	1.143
b2	4.953	5.340	5.500
c	0.450	0.508	0.610
c1	0.450	0.508	0.630
D	5.969	6.096	6.223
D1	5.210	5.249	5.380
E	6.350	6.604	6.800
E1	4.318	4.826	4.920
e	2.286BSC		
e1	4.572BSC		
H	9.398	10.033	10.500
L	1.270	1.520	2.032
L1	2.921REF		
L2	0.408	0.508	0.608
L3	0.889	1.016	1.270
L4	0.600	---	1.016

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11. Legal information

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Document status [1][2]	Product status [3]	Definition
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Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.ween-semi.com.

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