BTA204W-600F

3Q Hi-Com Triac

Rev.02 - 25 February 2025 Product data sheet

1. General description

Planar passivated three quadrant high commutation triac in a SOT223 surface mountable plastic package for use in motor control circuits or with other highly inductive loads. This triac balances the requirements of commutation performance and gate sensitivity.

2. Applications

- General purpose motor controls
- Small loads in washing machines
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

3. Quick reference data

Table 1. Quick reference data

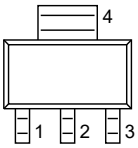
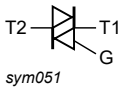
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq$ 108 °C; Fig. 1; Fig. 2; Fig. 3		-	-	1	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)}$ = 25 °C; t_p = 16.7 ms		-	-	11	A
		full sine wave; $T_{j(init)}$ = 25 °C; t_p = 20 ms; Fig. 4; Fig. 5		-	-	10	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. 9		-	-	25	mA
		V_D = 12 V; I_T = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 9		-	-	25	mA
		V_D = 12 V; I_T = 0.1 A; T2- G-; T_j = 25 °C; Fig. 9		-	-	25	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 11		-	-	30	mA
V_T	on-state voltage	I_T = 2 A; T_j = 25 °C; Fig. 12		-	1.2	1.5	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 402 V; T_j = 125 °C; (67% of V_{DRM}); exponential waveform; gate open circuit		50	-	-	V/µs

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Symbol	Parameter	Conditions		Min	Typ	Max	Unit
dI_{com}/dt	rate of change of commutating current	V_D = 400 V; T_j = 125 °C; $I_{T(RMS)}$ = 1 A; dV_{com}/dt = 20 V/µs; (snubberless condition); gate open circuit		2.5	-	-	A/ms

4. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 SC-73 (SOT223)	 sym051
2	T2	main terminal 2		
3	G	gate		
4	mb	mounting base; connected to main terminal 2		

5. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BTA204W-600F	SOT223	BTA204W-600F, 135	Reel	4000	SOT223	16-Mar-2006

Type number	Marking codes	
	Assembly factory: d	Assembly factory: L
BTA204W-600F	Jdxxx 6F BTA204	JLxxx 6F BTA204

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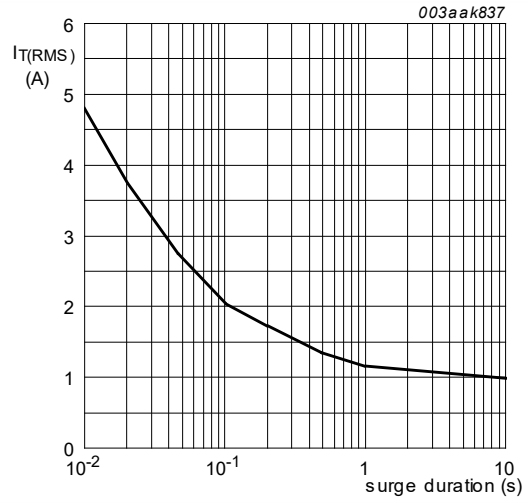
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6. Limiting values

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; $T_{sp} \leq$ 108 °C; Fig. 1; Fig. 2; Fig. 3		-	1	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)}$ = 25 °C; t_p = 16.7 ms		-	11	A
		full sine wave; $T_{j(init)}$ = 25 °C; t_p = 20 ms; Fig. 4; Fig. 5		-	10	A
I^2t	I^2t for fusing	t_p = 10 ms; SIN		-	0.5	A²s
dI_T/dt	rate of rise of on-state current	I_G = 0.2 A		-	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 20ms period		-	0.5	W
T_{stg}	storage temperature			-40	150	°C
T_j	junction temperature			-	125	°C



f = 50 Hz; T_{sp} = 108 °C

Fig. 1. RMS on-state current as a function of surge duration; maximum values

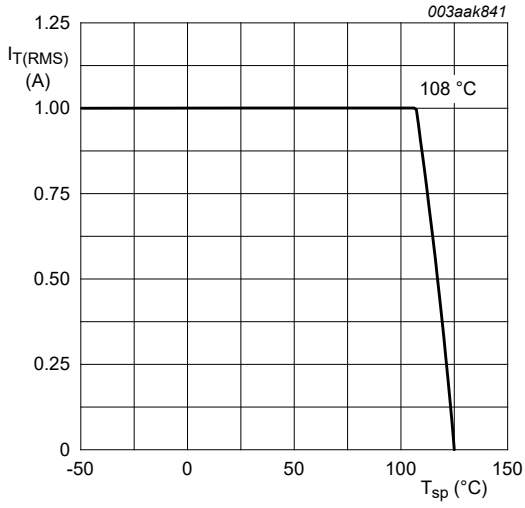
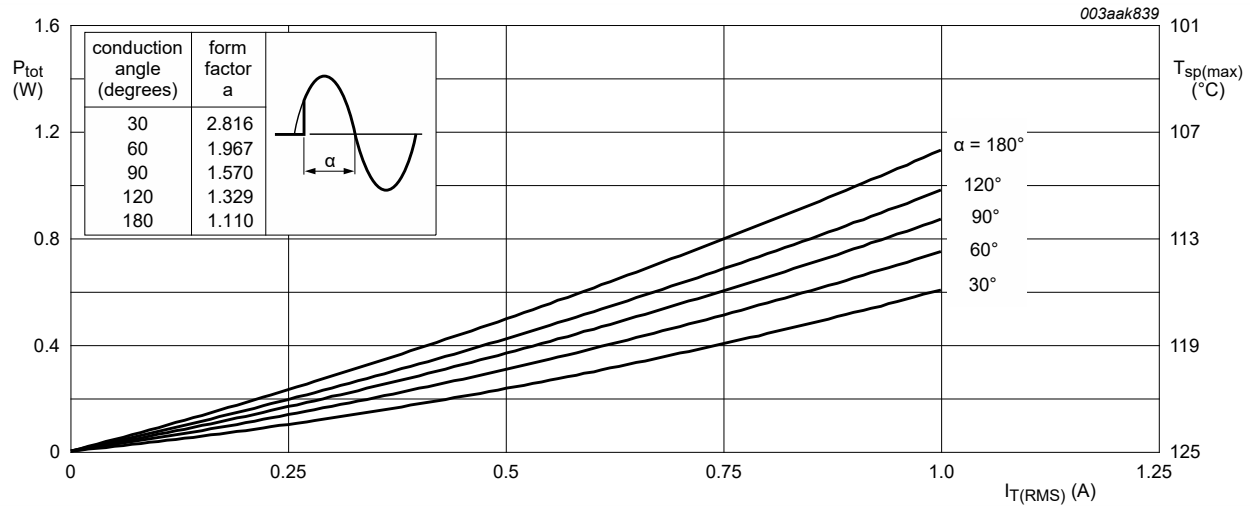


Fig. 2. RMS on-state current as a function of solder point temperature; maximum values

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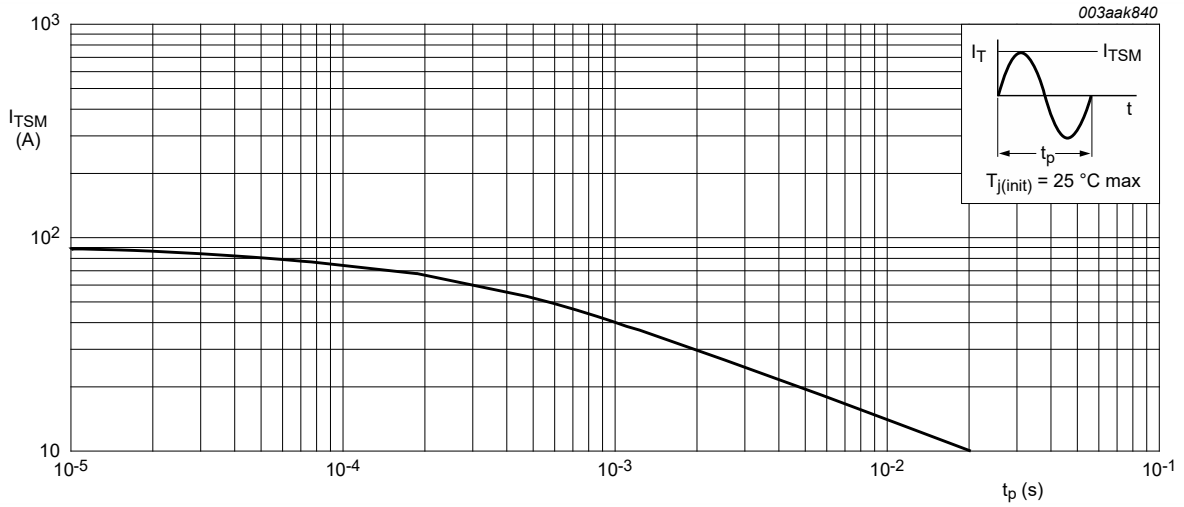
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α = conduction angle

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

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



$t_p \leq 20$ ms

Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values

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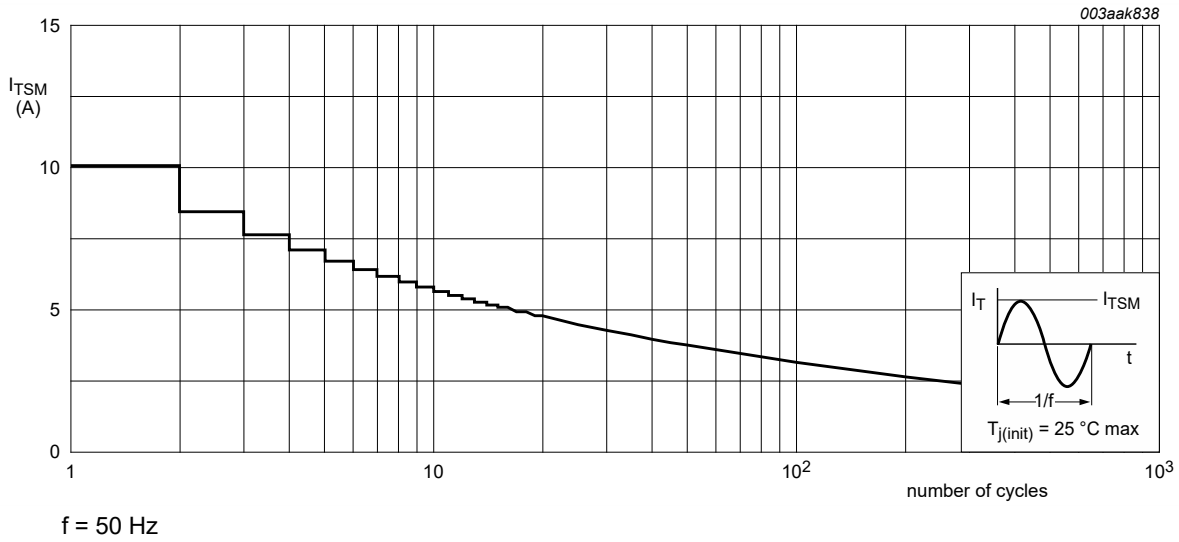


Fig. 5. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

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7. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	full cycle or half cycle; Fig. 6		-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air; printed circuit board mounted: minimum pad area; Fig. 7		-	70	-	K/W
		in free air; printed circuit board mounted: minimum footprint; Fig. 8		-	156	-	K/W

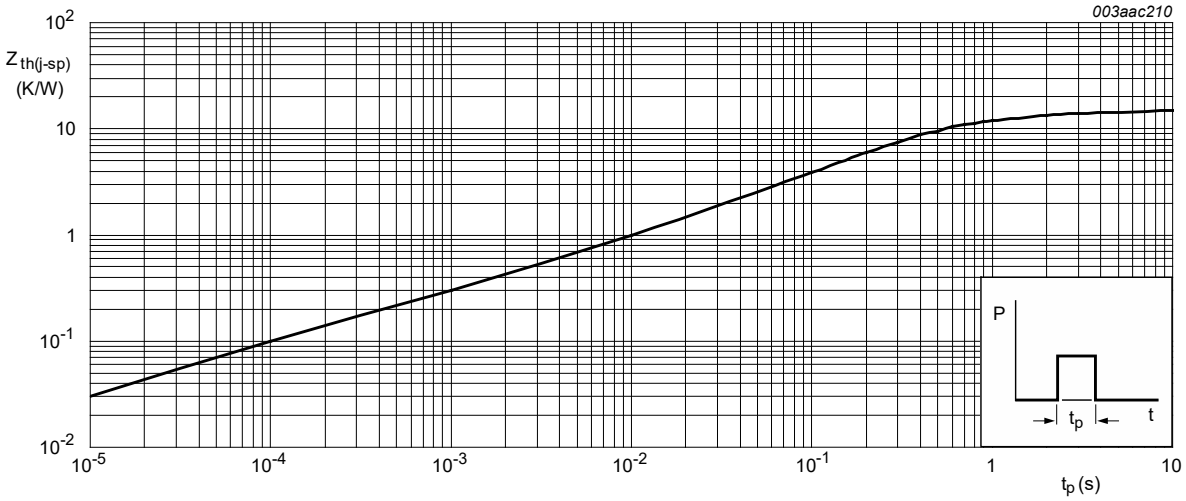
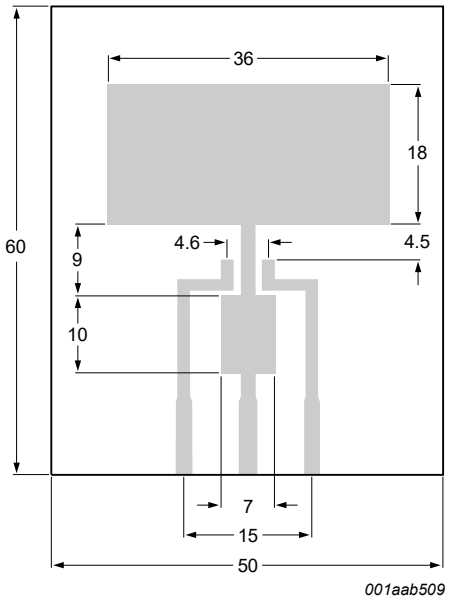


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width

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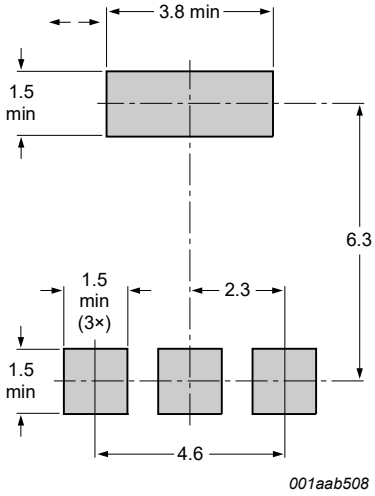
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All dimensions are in mm
Printed circuit board:
FR4 epoxy glass (1.6 mm thick), copper laminate (35 um thick)

Fig. 7. Printed circuit board pad area: SOT223



All dimensions are in mm

Fig. 8. Minimum footprint SOT223

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8. Characteristics

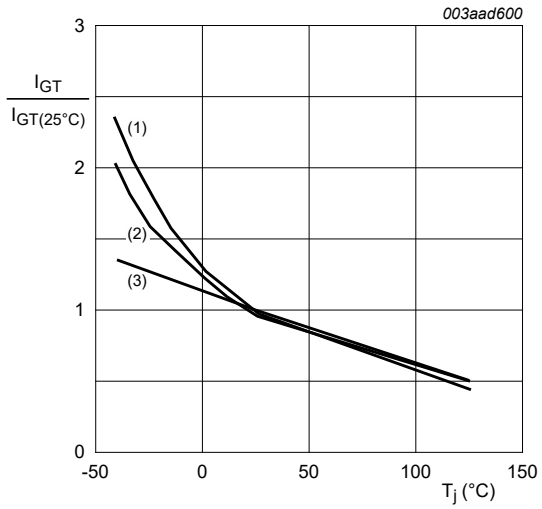
Table 6. Characteristics

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. 9		-	-	25	mA
		V_D = 12 V; I_T = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 9		-	-	25	mA
		V_D = 12 V; I_T = 0.1 A; T2- G-; T_j = 25 °C; Fig. 9		-	-	25	mA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 10		-	-	20	mA
		V_D = 12 V; I_G = 0.1 A; T2+ G+; T_j = 25 °C; Fig. 10		-	-	30	mA
		V_D = 12 V; I_G = 0.1 A; T2- G-; T_j = 25 °C; Fig. 10		-	-	20	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 11		-	-	30	mA
V_T	on-state voltage	I_T = 2 A; T_j = 25 °C; Fig. 12		-	1.2	1.5	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 13		-	0.7	1	V
		V_D = 400 V; I_T = 0.1 A; T_j = 125 °C; Fig. 13		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; (67% of V_{DRM}); exponential waveform; gate open circuit		50	-	-	V/µs
dI_{com}/dt	rate of change of commutating current	V_D = 400 V; T_j = 125 °C; $I_{T(RMS)}$ = 1 A; dV_{com}/dt = 20 V/µs; (snubberless condition); gate open circuit		2.5	-	-	A/ms

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

Fig. 9. Normalized gate trigger current as a function of junction temperature

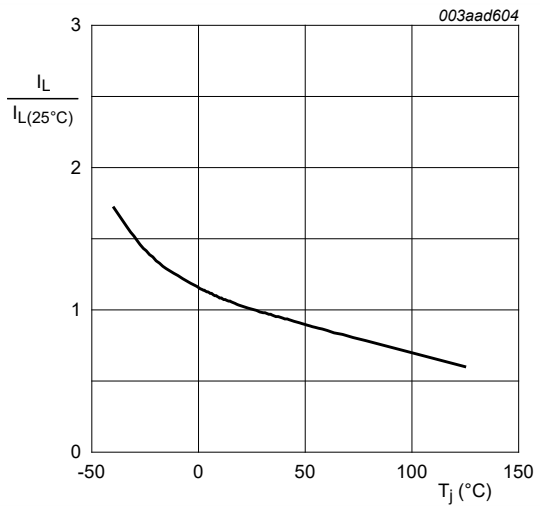


Fig. 10. Normalized latching current as a function of junction temperature

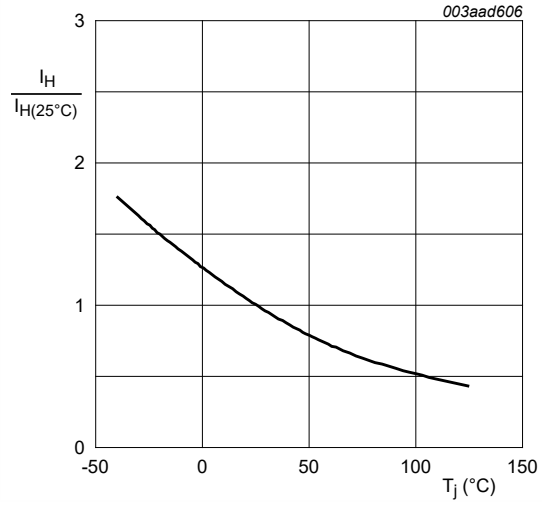
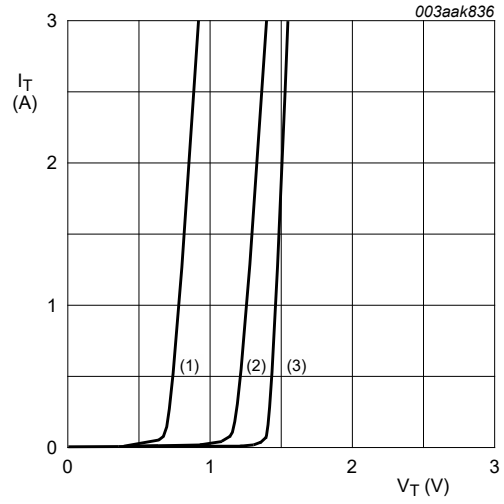


Fig. 11. Normalized holding current as a function of junction temperature



V_o = 1.27 V; R_s = 0.091 Ω
(1) T_j = 125 °C; typical values
(2) T_j = 125 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 12. On-state current as a function of on-state voltage

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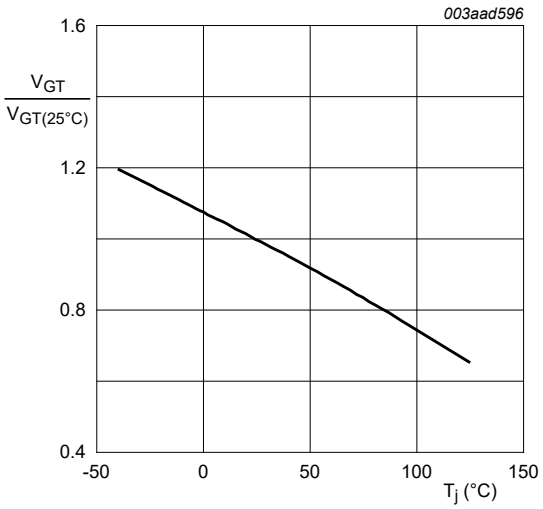


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

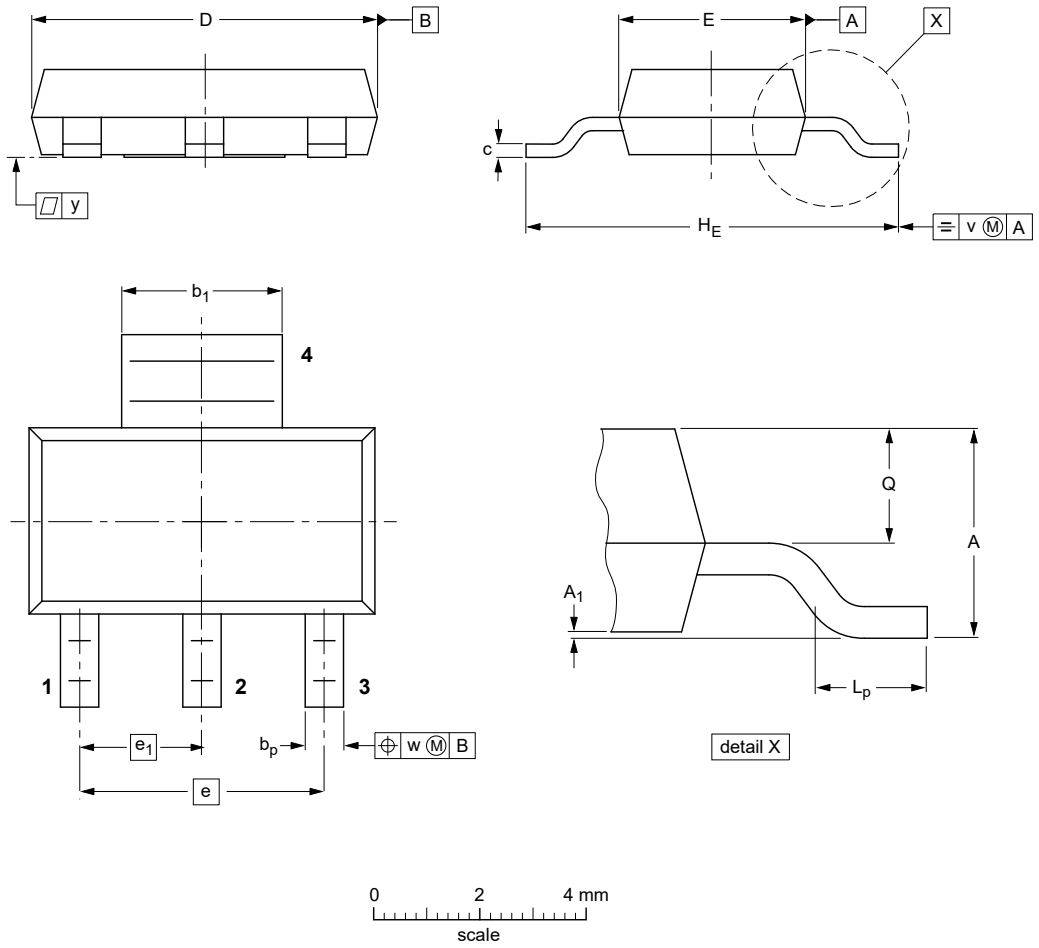
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9. Package outline

Plastic surface-mounted package with increased heatsink; 4 leads **SOT223**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT223			SC-73			~~04-11-10~~ 06-03-16

Fig. 14. Package outline SC-73 (SOT223)

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