



BTA425Y-800CT

3Q Hi-Com Triac

23 June 2014

Product data sheet

1. General description

Planar passivated high commutation three quadrant triac in a SOT78D (TO-220AB) internally insulated plastic package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This "series CT" triac will commute the full RMS current at the maximum rated junction temperature ($T_{j(max)} = 150\text{ }^{\circ}\text{C}$) without the aid of a snubber. It is used in applications where "high junction operating temperature capability" is required.

2. Features and benefits

- 3Q technology for improved noise immunity
- 2500 V RMS isolation voltage capability
- High commutation capability with maximum false trigger immunity
- High immunity to false turn-on by dV/dt
- High junction operating temperature capability
- High voltage capability
- High current capability
- Less sensitive gate for high noise immunity
- Internally insulated package
- Internally isolated mounting base
- Planar passivated for voltage ruggedness and reliability
- Triggering in three quadrants only

3. Applications

- Applications subject to high temperature
- Heating controls
- High power motor control
- High power switching

4. Quick reference data

Table 1. Quick reference data

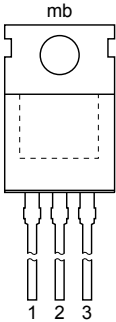

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	800	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5	-	-	250	A
T_j	junction temperature		-	-	150	$^{\circ}\text{C}$



Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I _{T(RMS)}	RMS on-state current	full sine wave; T _{mb} ≤ 101 °C; Fig. 1 ; Fig. 2 ; Fig. 3		-	-	25	A
Static characteristics							
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 7		-	-	35	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 7		-	-	35	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 7		-	-	35	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 536 V; T _j = 150 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		1000	-	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 25 A; dV _{com} /dt = 20 V/μs; (snubberless condition); gate open circuit		13	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 <p>TO-220AB (SOT78D)</p>	 <p>sym051</p>
2	T2	main terminal 2		
3	G	gate		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA425Y-800CT	TO-220AB	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220	SOT78D

7. Marking

Table 4. Marking codes

Type number	Marking code
BTA425Y-800CT	BTA425Y-800CT

8. Limiting values

Table 5. 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
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{mb}} \leq 101\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		-	25	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 20\text{ ms}$; Fig. 4 ; Fig. 5		-	250	A
		full sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 16.7\text{ ms}$		-	275	A
I^2t	I^2t for fusing	$t_{\text{p}} = 10\text{ ms}$; sine-wave pulse		-	312.5	A^2s
dI_{T}/dt	rate of rise of on-state current	$I_{\text{T}} = 30\text{ A}$; $I_{\text{G}} = 0.2\text{ A}$; $dI_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$		-	100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current			-	2	A
P_{GM}	peak gate power			-	5	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period		-	0.5	W
T_{stg}	storage temperature			-40	150	$^{\circ}\text{C}$
T_{j}	junction temperature			-	150	$^{\circ}\text{C}$

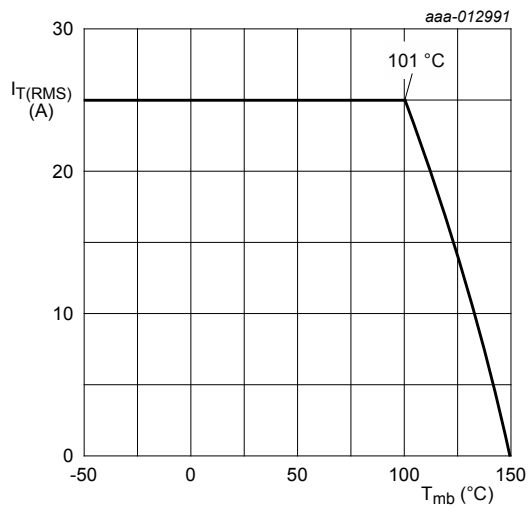
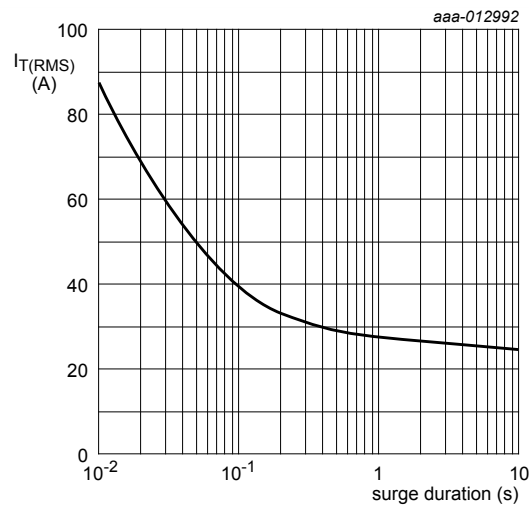


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



f = 50 Hz; T_{mb} = 101 °C

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

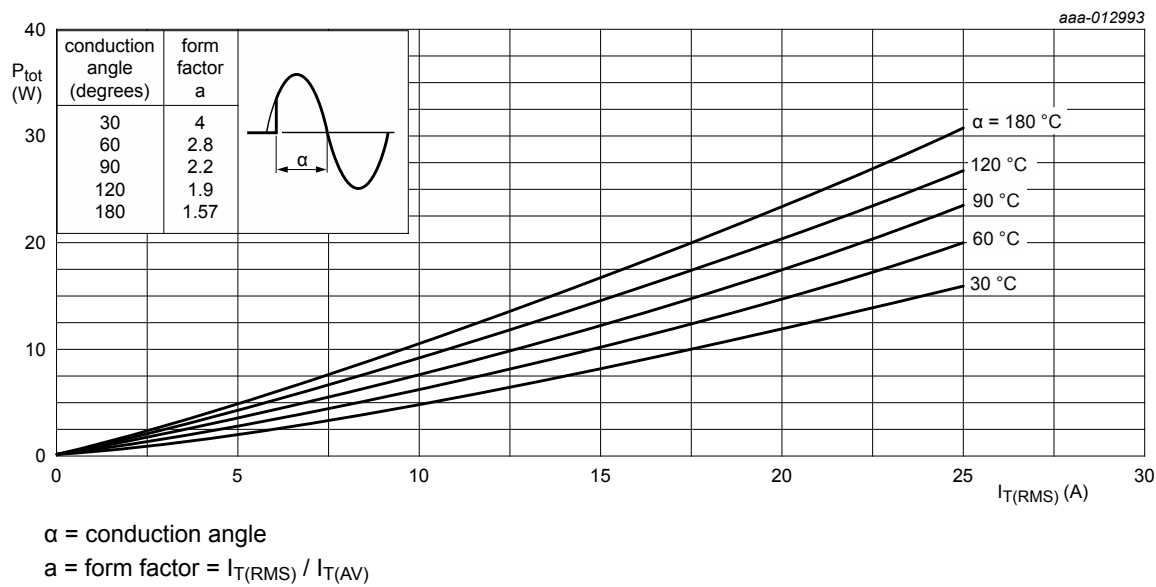


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

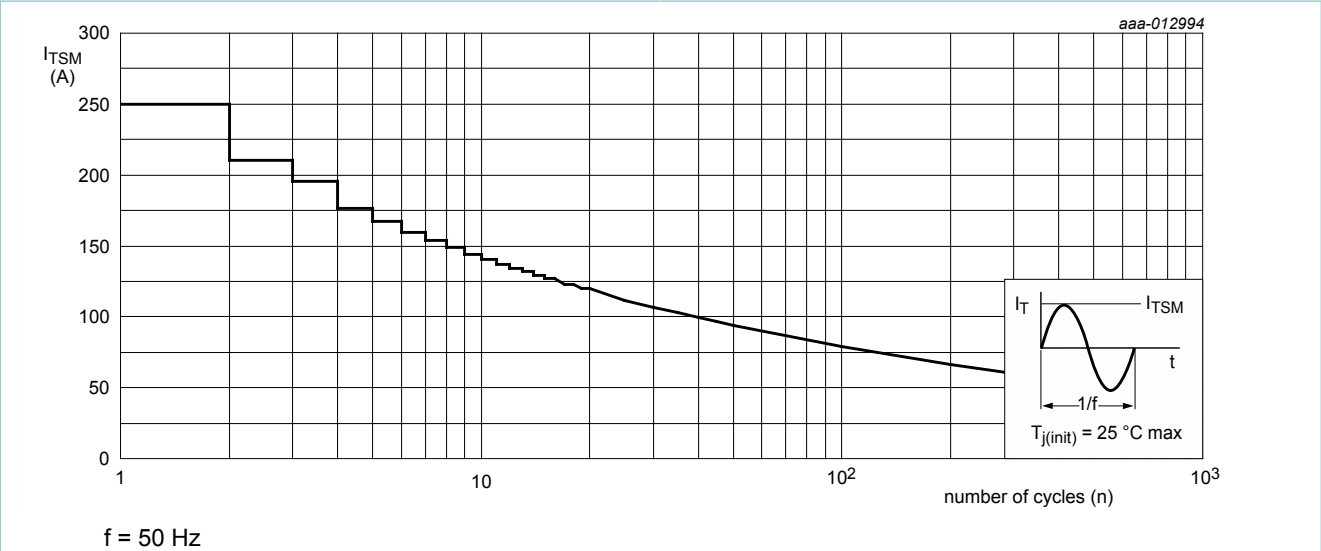


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

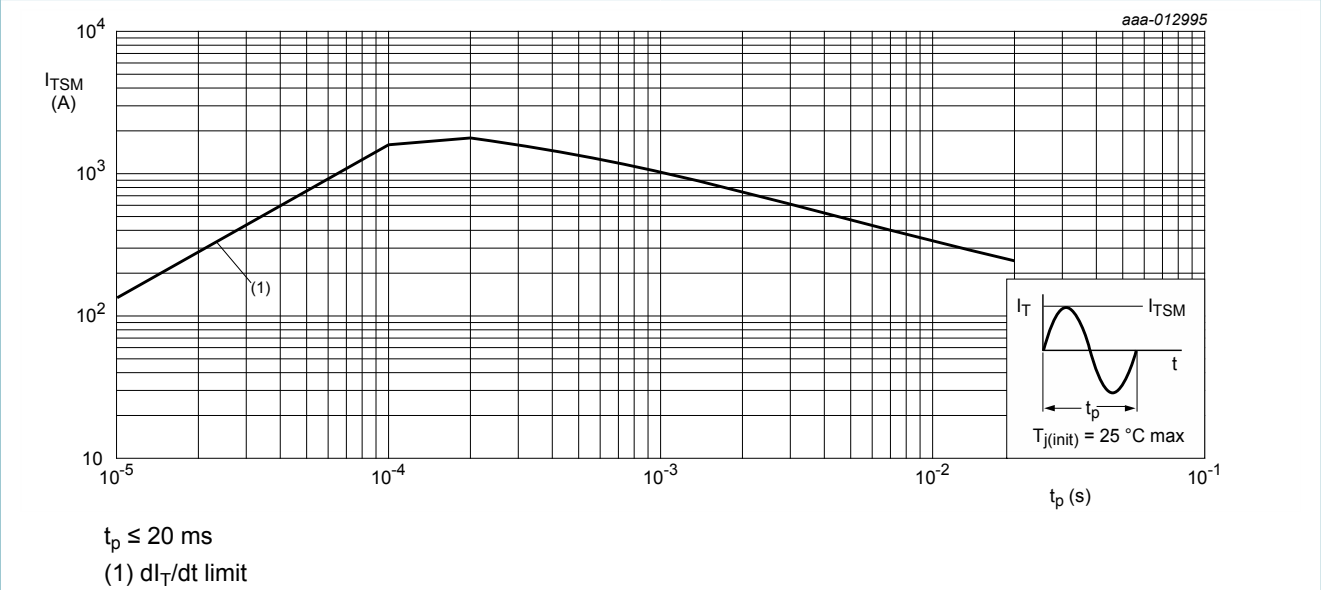
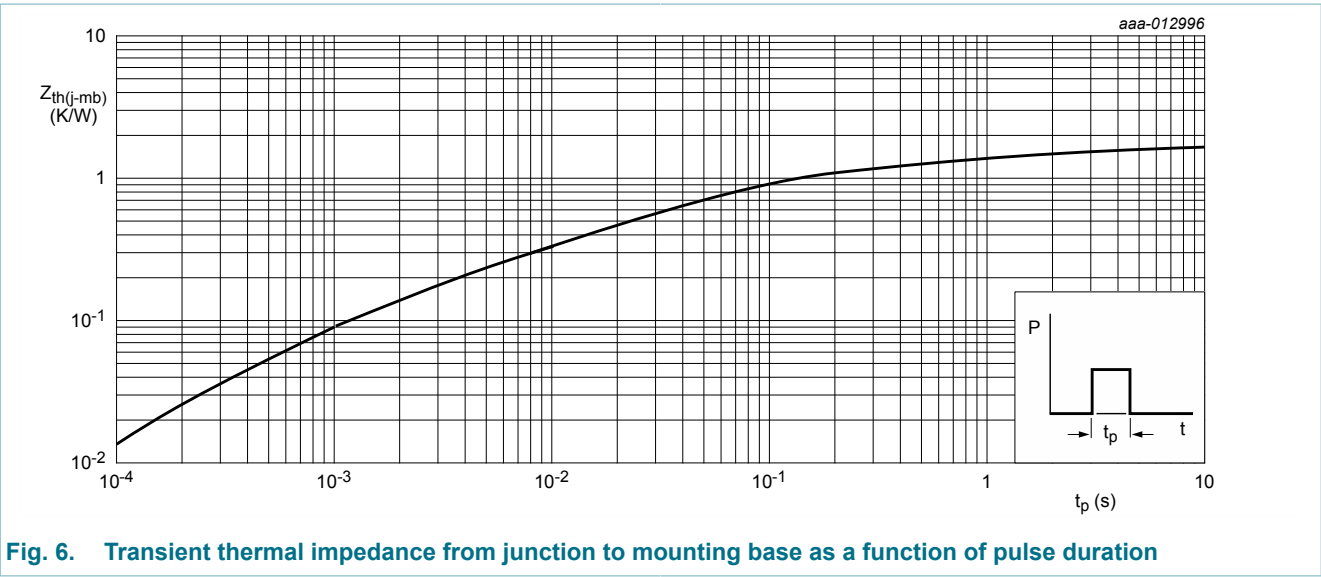


Fig. 5. Non-repetitive peak on-state current as a function of pulse duration; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	full cycle; Fig. 6	-	-	1.7	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W



10. Isolation characteristics

Table 7. Isolation characteristics

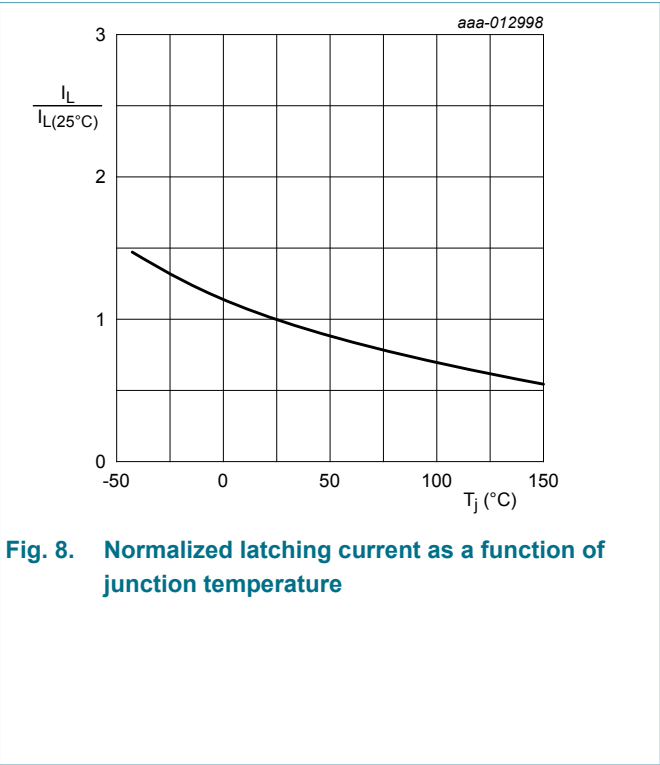
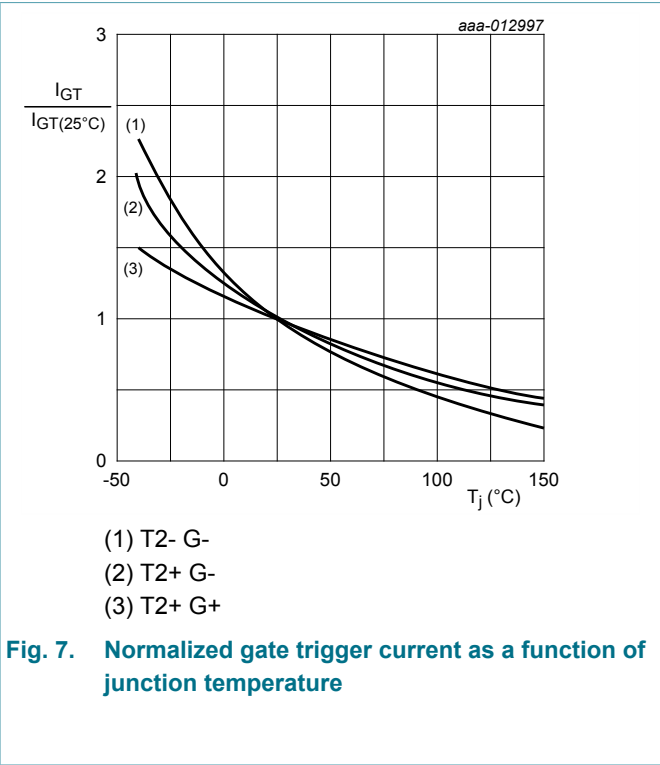
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminals to external heatsink; sinusoidal waveform; clean and dust free; $50\text{ Hz} \leq f \leq 60\text{ Hz}$; $RH \leq 65\%$; $T_{mb} = 25\text{ }^{\circ}\text{C}$	-	-	2500	V
C_{isol}	isolation capacitance	from main terminal 2 to external heatsink; $f = 1\text{ MHz}$; $T_{mb} = 25\text{ }^{\circ}\text{C}$	-	10	-	pF

11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 7	-	-	35	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 7	-	-	35	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 7	-	-	35	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 8	-	-	70	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 8	-	-	80	mA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 8	-	-	70	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 9	-	-	50	mA
V_T	on-state voltage	$I_T = 35\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 10	-	1.2	1.5	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 11	-	0.9	1.3	V
		$V_D = 400\text{ V}$; $T_j = 150\text{ }^{\circ}\text{C}$; Fig. 11	0.2	0.45	-	V
I_D	off-state current	$V_D = 800\text{ V}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	0.4	2	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_j = 150\text{ }^{\circ}\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit	1000	-	-	V/ μs
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_j = 150\text{ }^{\circ}\text{C}$; $I_{T(RMS)} = 25\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; (snubberless condition); gate open circuit	13	-	-	A/ms



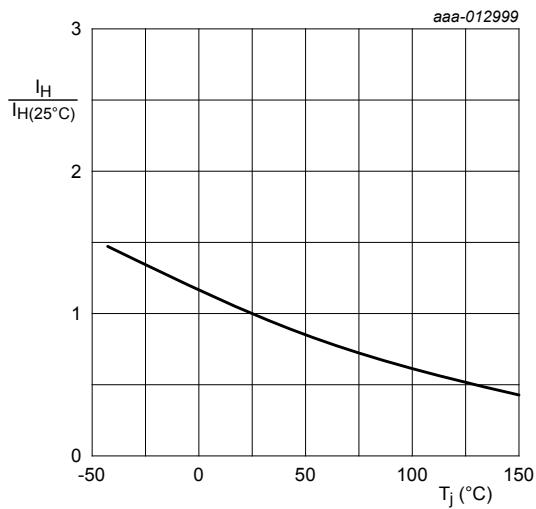
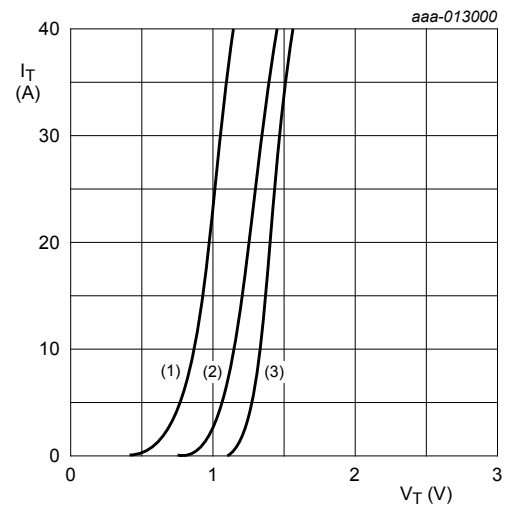


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.072 \text{ V}$; $R_s = 0.010 \text{ }\Omega$
(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. 10. On-state current as a function of on-state voltage

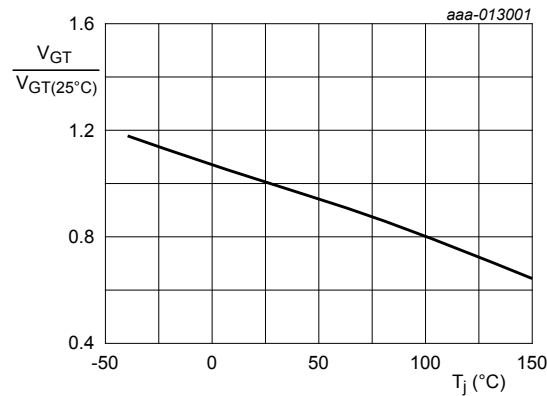


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

12. Package outline

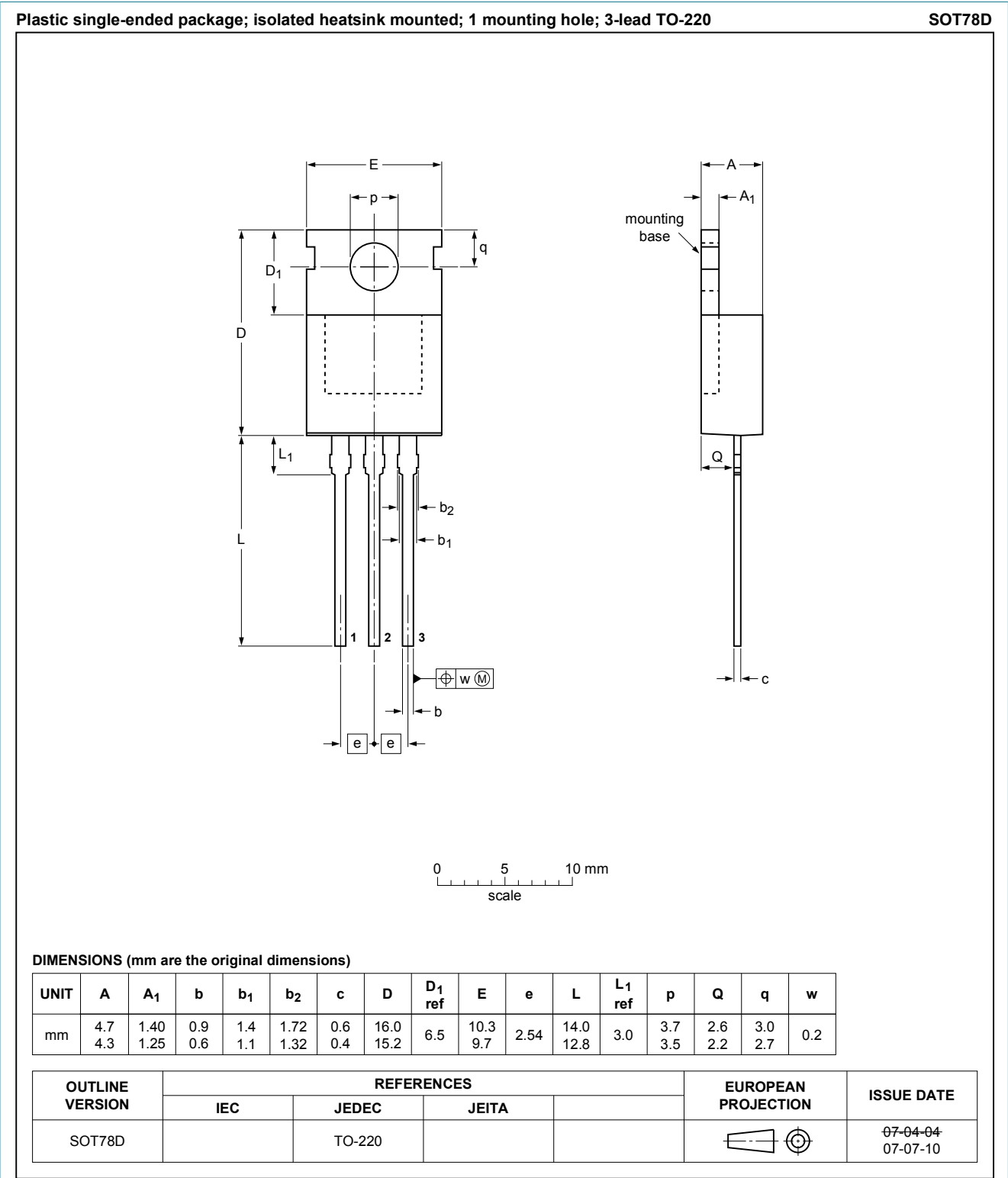


Fig. 12. Package outline TO-220AB (SOT78D)

13. Legal information

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14. Contents

1 General description 1

2 Features and benefits 1

3 Applications 1

4 Quick reference data 1

5 Pinning information 2

6 Ordering information 2

7 Marking 3

8 Limiting values 3

9 Thermal characteristics 5

10 Isolation characteristics 6

11 Characteristics 6

12 Package outline 9

13 Legal information 10

13.1 Data sheet status 10

13.2 Definitions 10

13.3 Disclaimers 10

13.4 Trademarks 11

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