Product data sheet

1. General description

Planar passivated three quadrant triac in a SOT78 (TO-220AB) plastic package. This "series D" triac balances the requirements of commutation performance and gate sensitivity and is intended for interfacing with low power drivers and logic ICs including microcontrollers.

2. Features and benefits

- 3Q technology for improved noise immunity
- Direct gate triggering from low power drivers and logic ICs
- · High blocking voltage capability
- High commutation capability
- Planar passivated for voltage ruggedness and reliability
- Triggering in three quadrants only
- Very sensitive gate for easy logic level triggering

3. Applications

- AC solenoids
- · General purpose motor control circuits
- Home appliances

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{DRM}	repetitive peak off- state voltage		-	-	600	V
I _{T(RMS)}	RMS on-state current	full sine wave; $T_{mb} \le 107 ^{\circ}\text{C}$; $\overline{\text{Fig. 1}}$; $\overline{\text{Fig. 2}}$; $\overline{\text{Fig. 3}}$	-	-	4	А
I _{TSM}	non-repetitive peak on- state current	full sine wave; $T_{j(init)} = 25 \text{ °C}$; $t_p = 20 \text{ ms}$; Fig. 4; Fig. 5	-	-	25	А
		full sine wave; $T_{j(init)}$ = 25 °C; t_p = 16.7 ms	-	-	27	А
Tj	junction temperature		-	-	125	°C
Static charac	teristics					
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; <u>Fig. 7</u>	-	-	5	mA
		$V_D = 12 \text{ V; } I_T = 0.1 \text{ A; } T2 + G-;$ $T_j = 25 \text{ °C; } Fig. 7$	-	-	5	mA

3Q Hi-Com Triac

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
		$V_D = 12 \text{ V}; I_T = 0.1 \text{ A}; \text{ T2- G-};$ $T_j = 25 \text{ °C}; \frac{\text{Fig. 7}}{}$	-	-	5	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; <u>Fig. 9</u>	-	-	6	mA
V_{T}	on-state voltage	I _T = 5 A; T _j = 25 °C; <u>Fig. 10</u>	-	1.4	1.7	V
Dynamic chara	acteristics					
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	20	-	-	V/µs
dI _{com} /dt	rate of change of commutating current	V_D = 400 V; T_j = 125 °C; $I_{T(RMS)}$ = 4 A; dV_{com}/dt = 10 V/µs; gate open circuit	1.1	-	-	A/ms
		V_D = 400 V; T_j = 125 °C; $I_{T(RMS)}$ = 4 A; dV_{com}/dt = 0.1 V/µs; gate open circuit	4.5	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	mb	T2——T1
2	T2	main terminal 2		G sym051
3	G	gate		Symost
mb	T2	mounting base; main terminal 2		
			TO-220AB (SOT78)	

6. Ordering information

Table 3. Ordering information

Type number	Package					
	Name	Description	Version			
BTA204-600D	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78			

2/13

3Q Hi-Com Triac

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; $T_{mb} \le 107 ^{\circ}\text{C}$; Fig. 2; Fig. 3	-	4	Α
I _{TSM}	non-repetitive peak on- state current	full sine wave; $T_{j(init)}$ = 25 °C; t_p = 20 ms; Fig. 4; Fig. 5	-	25	А
		full sine wave; T _{j(init)} = 25 °C; t _p = 16.7 ms	-	27	Α
l ² t	I ² t for fusing	t _p = 10 ms; SIN	-	3.1	A²s
dl _T /dt	rate of rise of on-state current	I _G = 0.2 A	-	100	A/µs
I _{GM}	peak gate current		-	2	Α
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

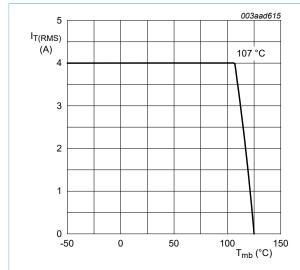


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

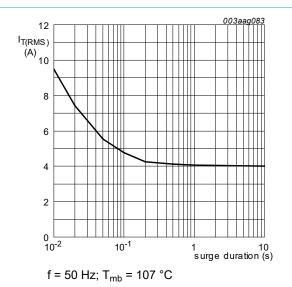


Fig. 2. RMS on-state current as a function of surge duration; maximum values

3Q Hi-Com Triac

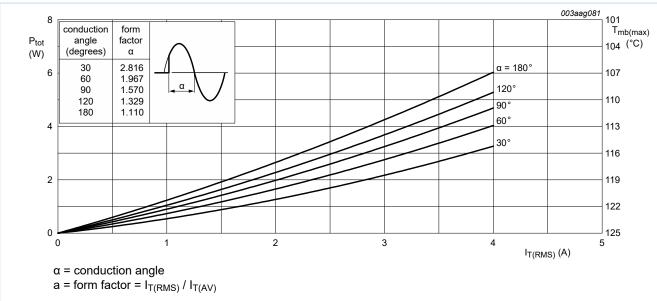


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

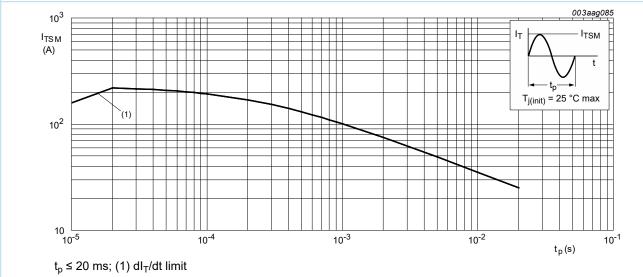


Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values

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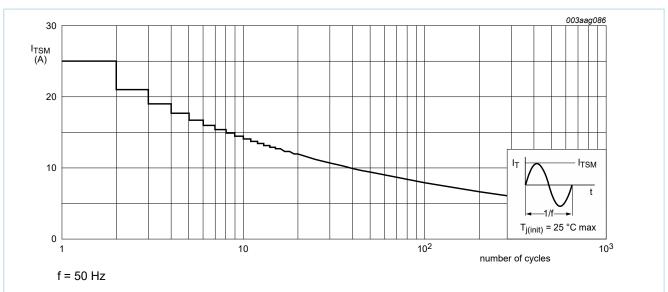


Fig. 5. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

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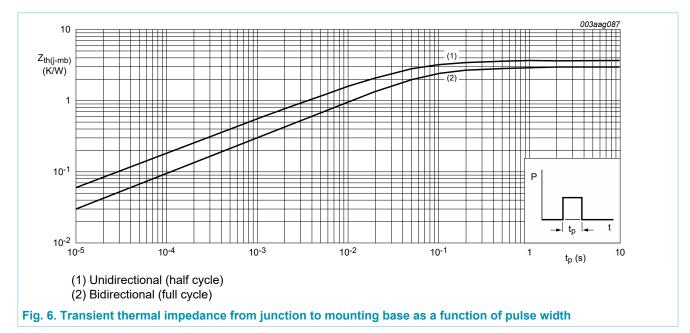
BTA204-600D

3Q Hi-Com Triac

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
uig-iiib)	thermal resistance	full cycle; Fig. 6	-	-	3	K/W
	from junction to mounting base	half cycle; Fig. 6	-	-	3.7	K/W
R _{th(j-a)}	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W



6 / 13

3Q Hi-Com Triac

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static char	acteristics					
l _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; <u>Fig. 7</u>	-	-	5	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; <u>Fig. 7</u>	-	-	5	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; <u>Fig. 7</u>	-	-	5	mA
L	latching current	V _D = 12 V; I _G = 0.1 A; T2+ G+; T _j = 25 °C; <u>Fig. 8</u>	-	-	6	mA
		$V_D = 12 \text{ V; } I_G = 0.1 \text{ A; } T2 + G-;$ $T_j = 25 \text{ °C; } \frac{\text{Fig. 8}}{}$	-	-	9	mA
		$V_D = 12 \text{ V; } I_G = 0.1 \text{ A; T2- G-;}$ $T_j = 25 \text{ °C; } \frac{\text{Fig. 8}}{}$	-	-	6	mA
Н	holding current	V _D = 12 V; T _j = 25 °C; <u>Fig. 9</u>	-	-	6	mA
V _T	on-state voltage	I _T = 5 A; T _j = 25 °C; <u>Fig. 10</u>	-	1.4	1.7	V
V_{GT}	gate trigger voltage	$V_D = 12 \text{ V}; I_T = 0.1 \text{ A}; T_j = 25 \text{ °C};$ 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
l _D	off-state current	V _D = 600 V; T _j = 125 °C	-	0.1	0.5	mA
Dynamic cl	naracteristics					
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	20	-	-	V/µs
dI _{com} /dt	rate of change of commutating current	V_D = 400 V; T_j = 125 °C; $I_{T(RMS)}$ = 4 A; dV_{com}/dt = 10 V/µs; gate open circuit	1.1	-	-	A/ms
		$V_D = 400 \text{ V}; T_j = 125 \text{ °C}; I_{T(RMS)} = 4 \text{ A};$ $dV_{com}/dt = 0.1 \text{ V/}\mu\text{s}; gate open circuit}$	4.5	-	-	A/ms

3Q Hi-Com Triac

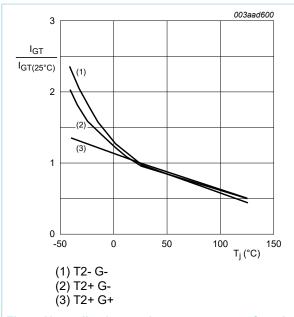


Fig. 7. Normalized gate trigger current as a function of junction temperature

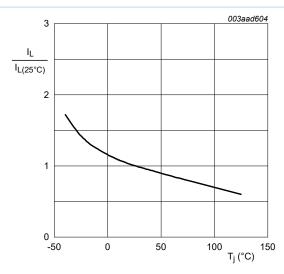


Fig. 8. Normalized latching current as a function of junction temperature

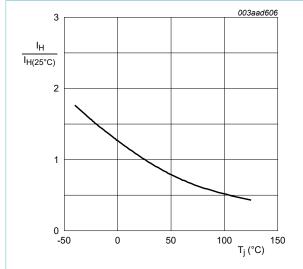
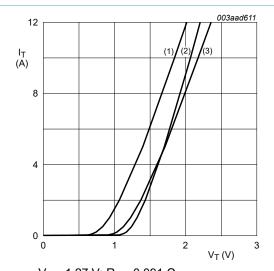


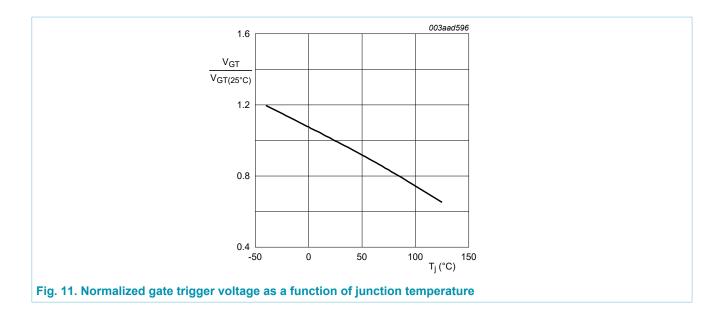
Fig. 9. Normalized holding current as a function of junction temperature



 $\begin{array}{l} \text{V}_{\text{o}} = 1.27 \text{ V}; \text{ R}_{\text{s}} = 0.091 \ \Omega \\ \text{(1)} \text{ T}_{\text{j}} = 125 \ ^{\circ}\text{C}; \text{ typical values} \\ \text{(2)} \text{ T}_{\text{j}} = 125 \ ^{\circ}\text{C}; \text{ maximum values} \\ \text{(3)} \text{ T}_{\text{j}} = 25 \ ^{\circ}\text{C}; \text{ maximum values} \end{array}$

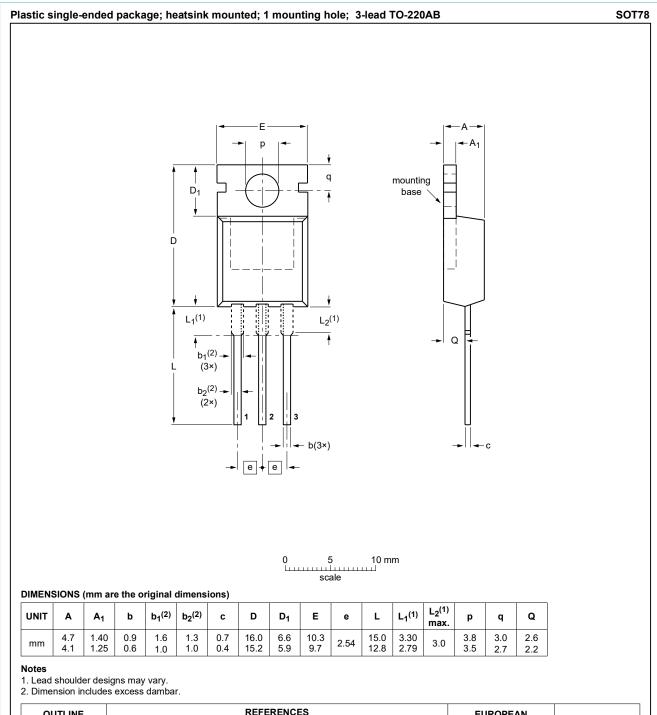
Fig. 10. On-state current as a function of on-state voltage

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10. Package outline



	EUROPEAN	ISSUE DATE
VERSION IEC JEDEC JEITA	PROJECTION	ISSUE DATE
SOT78 3-lead TO-220AB SC-46		08-04-23 08-06-13

Fig. 12. Package outline TO-220AB (SOT78)

3Q Hi-Com Triac

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Data sheet status

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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12. 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.	Limiting values	3
8.	Thermal characteristics	6
9.	Characteristics	7
10.	. Package outline	10
11.	Legal information	11

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