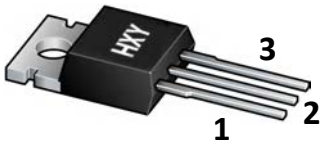
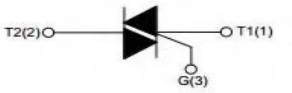
MAIN FEATURES

Symbol	value	unit
$I_{T(RMS)}$	16	A
V_{DRM}/V_{RRM}	600	V
I_{TSM}	160	A



1. ANODE
2. ANODE
3. GATE

TO-220



Description

Available either in through-hole or surface mount packages, the BTA16, BTB16 and T1610, T1635 and T1650 Triac series are suitable for general purpose mains power AC switching. They can be used as ON/OFF function in applications such as static relays, heating regulation or induction motor starting circuit. They are also recommended for phase control operations in light dimmers and appliance motors speed controllers.

The Snubberless™ versions (W suffix and T1610, T1635, T1650) are especially recommended for use on inductive loads, because of their high commutation performance.

By using an internal ceramic pad, the Snubberless™ series provide an insulated tab (rated at 2500 V_{RMS}) complying with UL standards (file reference: E81734).

Absolute maximum ratings

Symbol	Parameters			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)		T_c = 100 °C	16	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t_p = 20 ms	160	A
		F = 60 Hz	t_p = 16.7 ms	168	
I^2t	I^2t value for fusing	t_p = 10 ms		144	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , t_r ≤ 100 ns	F = 120 Hz	T_j = 125 °C	50	A/µs
V_{DSM}/V_{RSM}	Non repetitive surge peak off-state voltage	t_p = 10 ms	T_j = 25 °C	V_{DRM}/V_{RRM} + 100	V
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	4	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °C	1	W
T_{stg}	Storage junction temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +125	°C

Static electrical characteristics

Symbol	Test conditions	T_j		Value	Unit
V_T(1)	I_{TM} = 22.5 A, t_p = 380 µs	25 °C	Max.	1.55	V
V_{TO}(1)	threshold on-state voltage	125 °C	Max.	0.85	V
R_D(1)	Dynamic resistance	125 °C	Max.	25	mΩ
I_{DRM}/I_{RRM}	V_{DRM} = V_{RRM}	25 °C	Max.	5	µA
		125 °C		2	mA

1. *For both polarities of A2 referenced to A1*

Electrical characteristics (T_j = 25 °C, unless otherwise specified) - standard (4 quadrants)

Symbol	Parameters	Quadrant		BTA16 BTB16		Unit
				C	B	
I_{GT}(1)	V_D = 12 V, R_L = 33 Ω	I - II - III	Max.	25	50	mA
		IV		50	100	
V_{GT}		All	Max.	1.3		V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, T_j = 125 °C	All	Min.	0.2		V
I_H(2)	I_T = 500 mA		Max.	25	50	mA
I_L	I_G = 1.2 I_{GT}	I - III - IV	Max.	40	60	mA
		II	Max.	80	120	

Symbol	Parameters	Quadrant		BTA16 BTB16		Unit
				C	B	
dV/dt(2)	V_D = 67 % V_{DRM} gate open, T_j = 125 °C		Min.	200	400	V/µs
(dV/dt)c(2)	(dI/dt)c = 7 A/ms, T_j = 125 °C		Min.	5	10	V/µs

1. *Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.*
2. *For both polarities of A2 referenced to A1*

Electrical characteristics (T_j = 25 °C, unless otherwise specified) - Snubberless and logic level (3quadrants)

Symbol	Parameters	Quadrant		T1610 / BTA16-SW / BTB16-SW	T1635 / BTA16-CW / BTB16-CW	T1650 / BTA16-BW / BTB16-BW	Unit
I_{GT}(1)	V_D = 12 V, R_L = 30 Ω	I - II - III	Max.	10	35	50	mA
V_{GT}			Max.	1.3			V
V_{GD}	V_D = V_{DRM}, R_L = 3,3 kΩ, T_j = 125 °C		Min.	0.2			V
I_H(2)	I_T = 500 mA		Max.	15	35	50	mA
I_L	I_G = 1.2 I_{GT}	I - III	Max.	25	50	70	mA
		II	Max.	30	60	80	
(dV/dt)(2)	VD = 67 % V_{DRM} gate open, T_j = 125 °C		Min.	40	500	1000	V/µs
(dI/dt)c(2)	(dV/dt)c = 0.1 V/µs, T_j = 125 °C		Min.	8.5			A/ms
	(dV/dt)c = 10 V/µs, T_j = 125 °C			3.0			
	Without snubber, T_j = 125 °C				8.5	14	

1. *Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.*
2. *For both polarities of A2 referenced to A1*

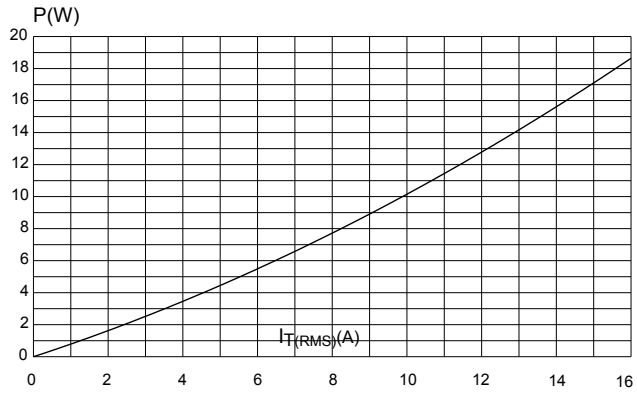
Thermal resistance

Symbol	Parameters		Value	Unit
$R_{th(j-c)}$	Max. junction to case (AC)	TO-220AB / D²PAK	1.2	°C/W
		TO-220AB insulated	2.1	
$R_{th(j-a)}$	Junction to ambient (S = 2 cm²)	D²PAK	45	
	Junction to ambient	TO-220AB / TO-220AB ins	60	

1. *Copper surface under tab.*

Characteristics (curves)

Maximum power dissipation versus on-state RMS current (full cycle)



RMS on-state current versus case temperature (full cycle)

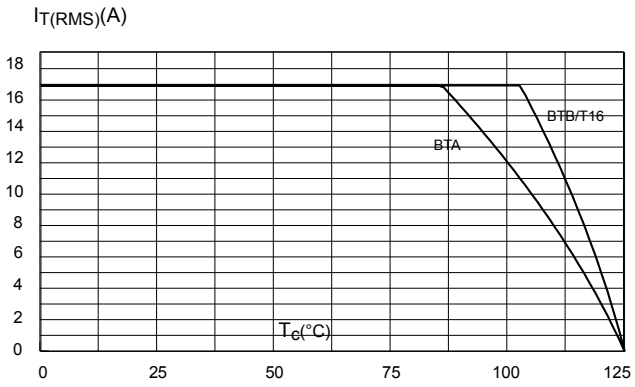


Figure 4. On-state rms current versus ambient temperature (full cycle)

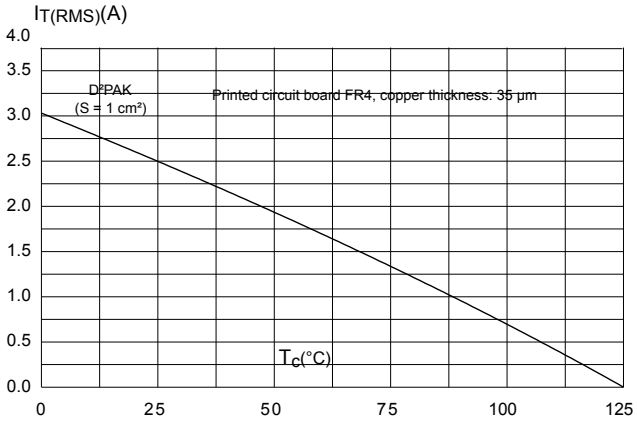
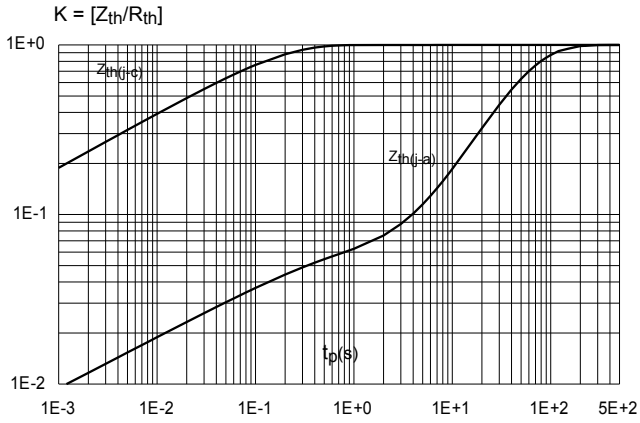
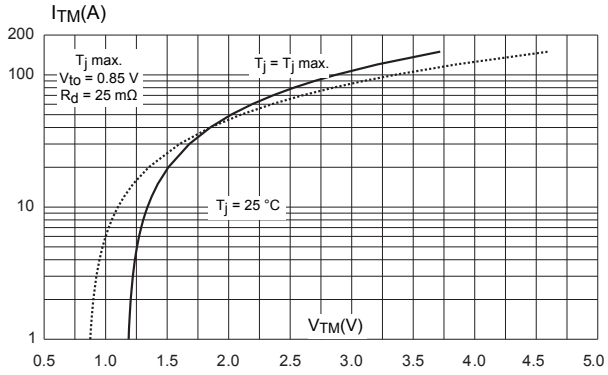


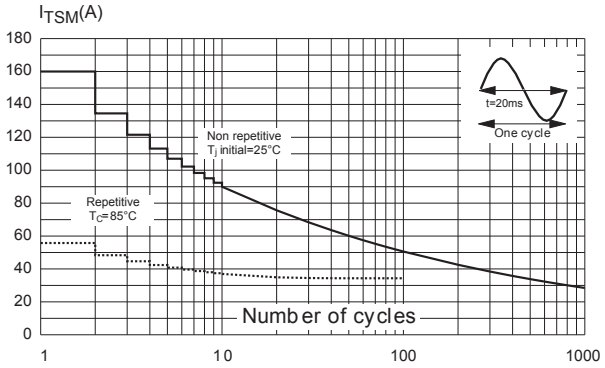
Figure 5. Relative variation of thermal impedance versus pulse duration



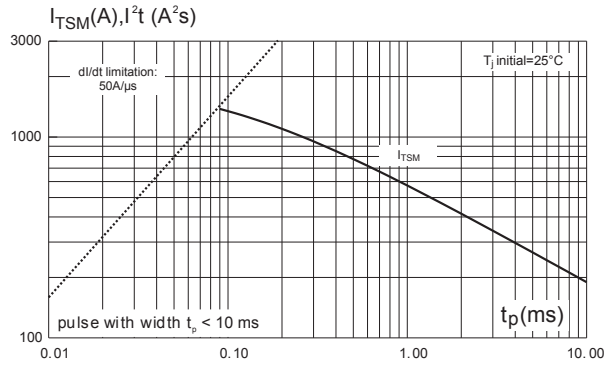
On-state characteristics (maximum values)



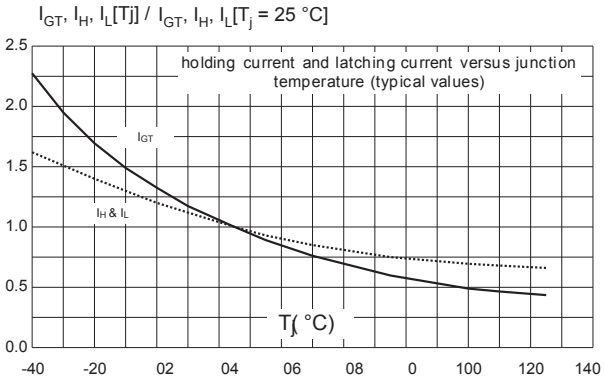
Surge peak on-state current versus number of cycles



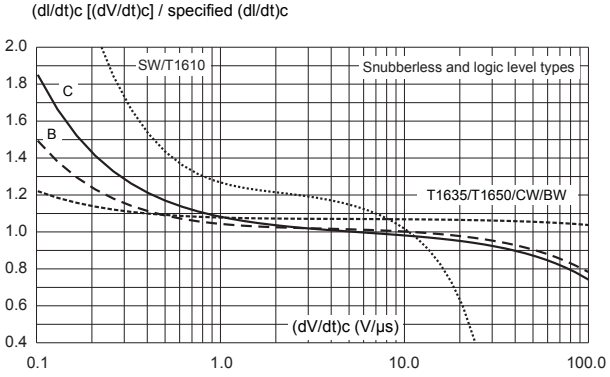
Non-repetitive surge peak on-state current for a sinusoidal



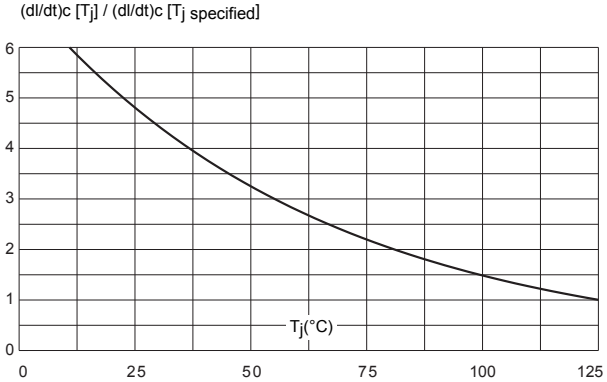
Relative variation of gate trigger current



Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

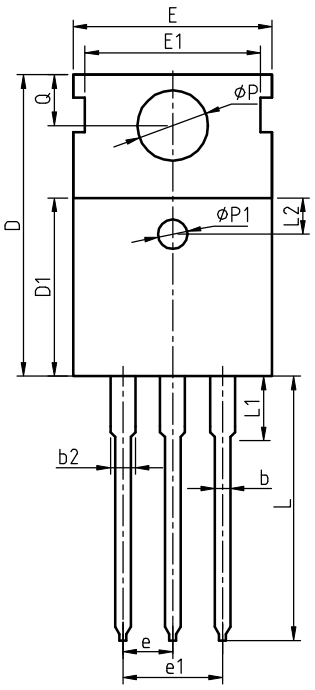


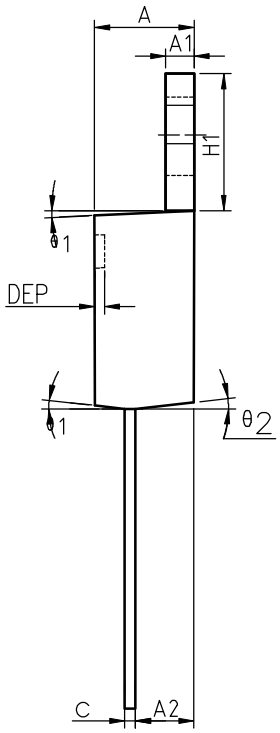
Relative variation of critical rate of decrease of main current versus (junction temperature (typical values)

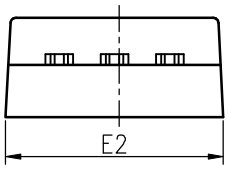


Package Information

TO-220







COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.33	0.050	0.051	0.052
A2	2.35	2.40	2.50	0.093	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	-	8.70	-	-	0.343	-
E2	9.80	10.00	10.20	0.386	0.394	0.402
e		2.54	BSC		0.100	BSC
e1		5.08	BSC		0.200	BSC
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	-	3.10	3.30	-	0.122	0.130
L2		2.50	REF		0.098	REF
P	3.50	3.60	3.63	0.138	0.142	0.143
P1	3.50	3.60	3.63	0.138	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.113
θ1	5°	7°	9°	5°	7°	9°
θ2	1°	3°	5°	1°	3°	5°
θ3	1°	3°	5°	1°	3°	5°

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