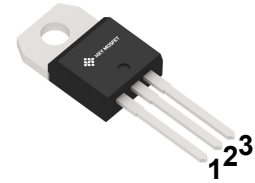




Features

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
V_{DRM} / V_{RRM}	600/800	V
$I_{GT(Q1)}$	50	mA



1. A1
2. A2
3. GATE

TO-220A

Maximum Ratings (Ta=25 °C unless otherwise noted)

Symbol	Parameters			Value	Unit
I _{T(RMS)}	RMS on-state current (full sine wave)		T _c = 100 °C	12	A
			T _c = 90 °C		
I _{TSM}	Non repetitive surge peak on-state current (full cycle, T _j initial = 25 °C)	f = 50 Hz	t _p = 20 ms	120	A
		f = 60 Hz	t _p = 16.7ms	126	
I ² t	I ² t value for fusing	t _p = 10 ms		78	A ² s
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

Electrical Characteristics (Tj=25°C unless otherwise specified)

-Snubberless™ and logic level 3 quadrants) T25

Symbol	Parameters	Quadrant		BTA12	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}, R_L = 33\text{ }\Omega$	I - II - III	Max.	50	mA
V_{GT}		I - II - III	Max.	1.3	V
V_{GD}	$V_D = V_{DRM}, R_L = 3.3\text{ k}\Omega, T_j = 125\text{ }^{\circ}\text{C}$	I - II - III	Min.	0.2	V
$I_H^{(2)}$	$I_T = 100\text{ mA}$		Max.	50	mA
I_L	$I_G = 1.2 I_{GT}$	I - III	Max.	70	mA
		II	Max.	80	
$dV/dt^{(2)}$	$V_D = 67\text{ }\% V_{DRM}$ gate open, $T_j = 125\text{ }^{\circ}\text{C}$		Min.	1000	V/ μ s
$(di/dt)_c^{(2)}$	Without snubber		Min.	12	A/ms

1. Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.

2. For both polarities of A2 referenced to A1



Electrical Characteristics ($T_j=25^{\circ}\text{C}$ unless otherwise specified)

Standard Triac(4 quadrants)

Symbol	Parameters	Quadrant		Value	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}, R_L = 30\ \Omega$	I - II - III	Max.	50	mA
		IV		100	
V_{GT}		All	Max.	1.3	V
V_{GD}	$V_D = V_{DRM}, R_L = 33\text{ k}\Omega, T_j = 125^{\circ}\text{C}$	All	Min.	0.2	V
$I_H^{(2)}$	$I_T = 500\text{ mA}$		Max.	50	mA
I_L	$I_G = 1.2 I_{GT}$	I - III - IV	Max.	50	mA
		II	Max.	100	
$dV/dt^{(2)}$	$V_D = 67\% V_{DRM}$ gate open, $T_j = 125^{\circ}\text{C}$		Min.	500	V/ μs
$(dV/dt)_C^{(2)}$	$(dI/dt)_C = 5.3\text{ A/ms}, T_j = 125^{\circ}\text{C}$		Min.	10	V/ μs

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

Static electrical characteristics

Symbol		T_j		Value	Unit
$V_{TM}^{(1)}$	$I_{TM} = 17\text{ A}, t_p = 380\ \mu\text{s}$	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.	35	m Ω
I_{DRM}/I_{RRM}	$V_T = V_{DRM}, V_T = V_{RRM}$	25°C	Max.	5	μA
		125°C		1	mA

1. For both polarities of A2 referenced to A1

Thermal resistance

Symbol	Parameters			Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	TO-220AB insulated	Max.	2.3	$^{\circ}\text{C/W}$
$R_{th(j-a)}$	Junction to ambient	TO-220AB / TO-220AB insulated	Typ.	60	

1. S = Copper surface under tab.



Typical Characteristics

Figure 1. Maximum power dissipation versus on-state RMS current (full cycle)

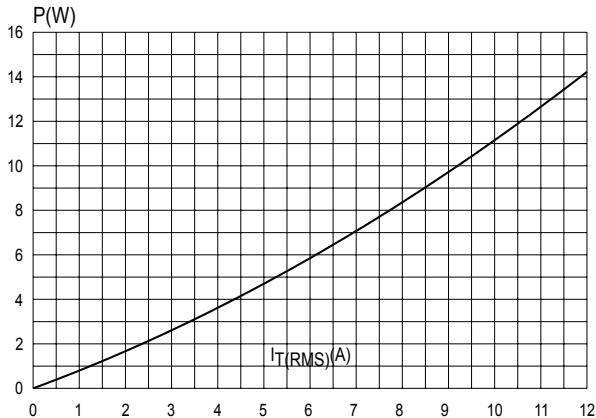


Figure 2. RMS on-state current versus case temperature (full cycle)

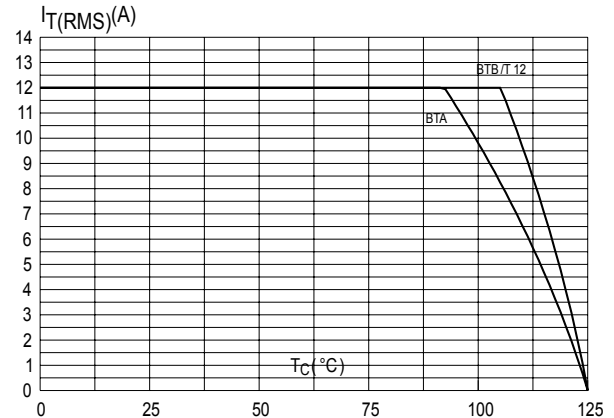


Figure 3. RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 μ m) (full cycle)

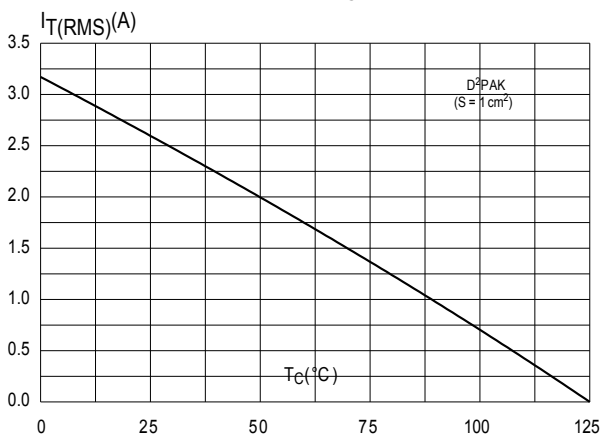


Figure 4. Relative variation of thermal impedance versus pulse duration

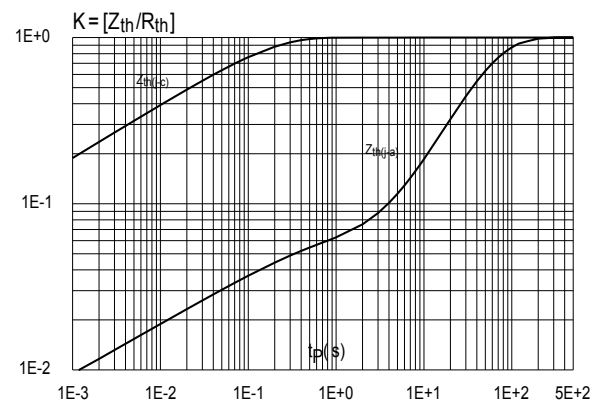


Figure 5. On-state characteristics (maximum values)

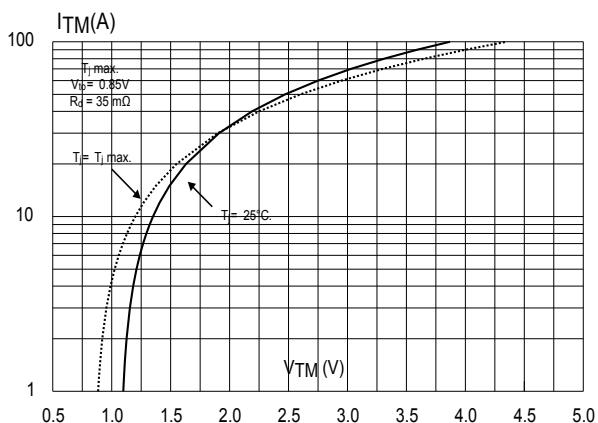


Figure 6. Surge peak on-state current versus number of cycles

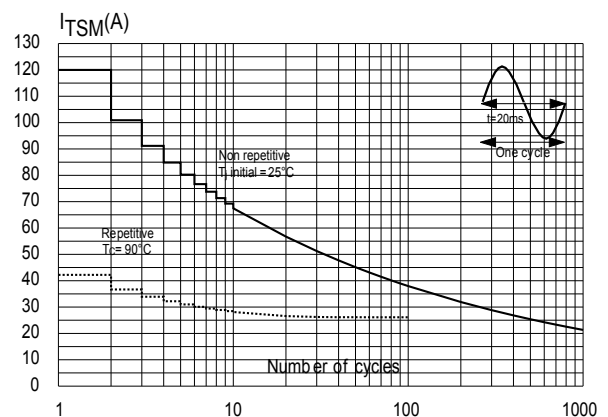




Figure 7. Non repetitive surge peak on-state current for a sinusoidal pulse

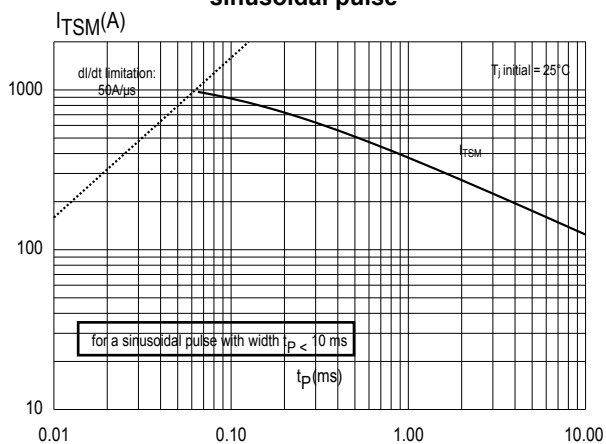


Figure 8. Relative variation of gate trigger current holding current and latching current versus junction temperature (typical values)

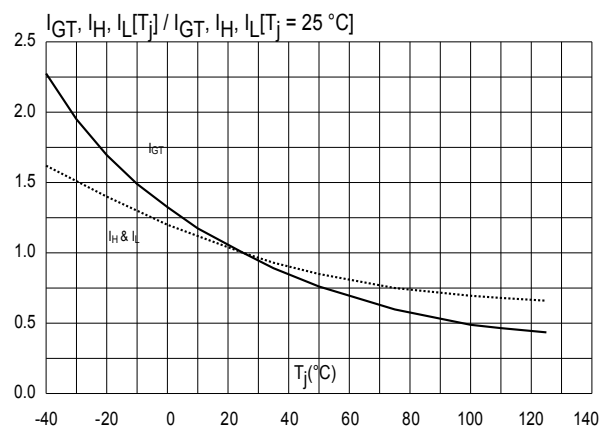


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)_c (typical values)

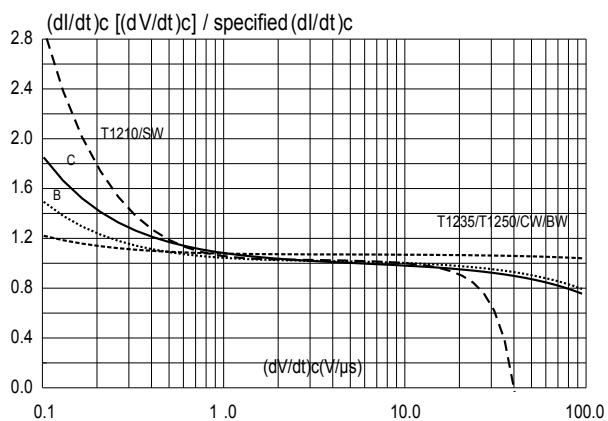


Figure 10. Relative variation of critical rate of decrease of main current versus (dV/dt)_c (typical values)(TW)

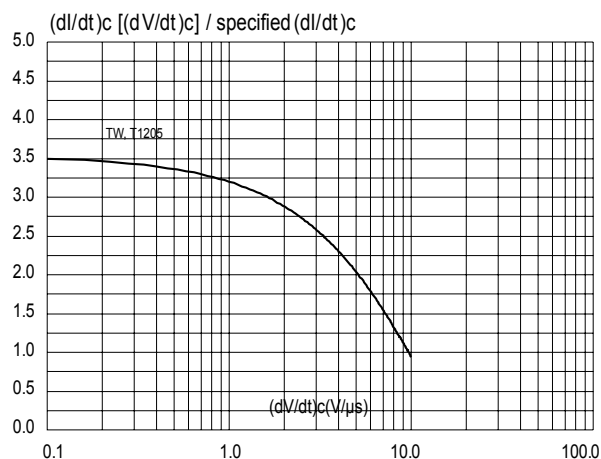


Figure 11. Relative variation of critical rate of decrease of main current versus junction temperature

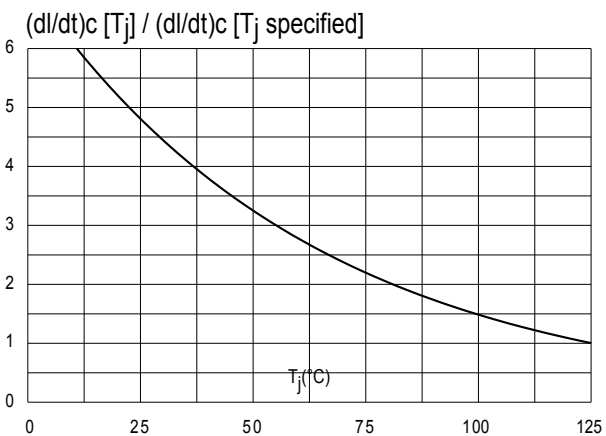
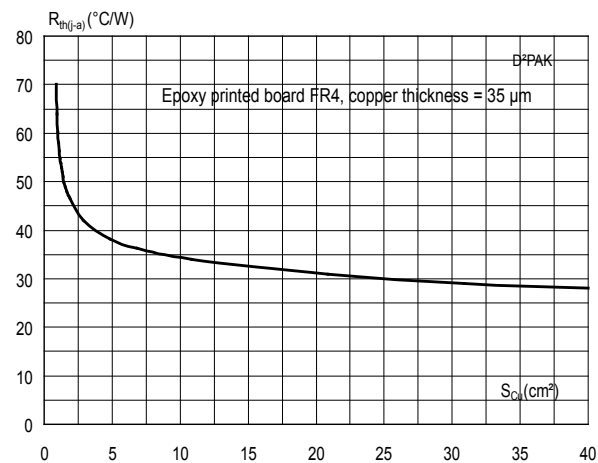
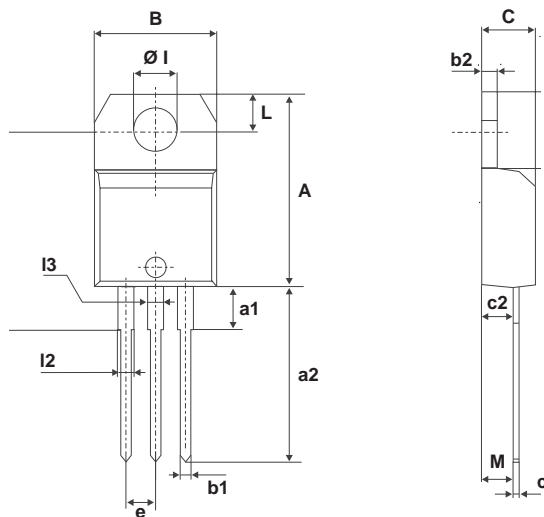


Figure 12. D²PAK thermal resistance junction to ambient versus copper surface under tab





Package Information TO-220A



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	



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