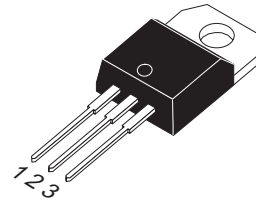


## Simplified outline TO-220AB

### Description

Glass passivated, sensitive gate thyristors in a plastic envelope, intended for use in general purpose switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.



### Symbol



### Features

- Blocking voltage to 800 V
- On-state RMS current to 10 A
- Ultra low gate trigger current

### Applications

- Motor control
- Industrial and domestic lighting
- Heating
- Static switching

Pin	Description
1	cathode
2	anode
3	gate
TAB	anode

SYMBOL	PARAMETER		Value	UNIT
$V_{DRM}$	Repetitive peak off-state voltages ( $T_j = -40$ to $110^\circ\text{C}$ $1/2$ Sine Wave, $R_{GK} = 1\text{K}\Omega$ )	MCR310-6	400	V
		MCR310-8	600	
		MCR310-10	800	V
$I_T$ (RMS)	On-state rms current		10	A
$I_{TSM}$	Peak non-repetitive surge current		100	A

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
$R_{th\ j-c}$	Thermal resistance Junction to Case		-	-	2.2	$^\circ\text{C}/\text{W}$
$R_{th\ j-a}$	Thermal resistance Junction to ambient		-	-	60	$^\circ\text{C}/\text{W}$

**Limiting values in accordance with the Maximum system(IEC 134)**

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state Voltages	$T_j = -40$ to $110$ , 1/2 Sine Wave, $R_{GK} = 1k\Omega$ ) MCR310-6 MCR310-8 MCR310-10	-	400 600 800	V
$I_{T(RMS)}$	RMS on-state current	$180^\circ C$ conduction angles; $TC = 75^\circ C$	-	10	A
$I_{TSM}$	Non-repetitive peak On-state current	1/2 Cycle, 60 Hz, $T_j = -40$ to $110^\circ C$	-	100	A
$I^2t$	$I^2t$ for fusing	$T = 8.3ms$	-	40	$A^2S$
$I_{GM}$	Forward peak gate current	$T < 10\mu s$ , $TC = 83^\circ C$	-	1.0	A
$V_{GM}$	Peak gate voltage	$T < 10\mu s$ , $TC = 83^\circ C$	-	$\pm 5$	V
$P_{GM}$	Peak gate power	$T < 10\mu s$ , $TC = 83^\circ C$	-	5	W
$P_{G(AV)}$	Average gate power	$T < 10\mu s$ , $TC = 83^\circ C$	-	0.75	W
$T_{stg}$	Storage temperature		-40	+150	$^\circ C$
$T_j$	Operating junction Temperature Range		-40	+110	$^\circ C$

 **$T_j = 25^\circ C$  unless otherwise stated**

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Static characteristics						
$I_{GT}$	Gate trigger current	$V_D = 12V$ ; $R_L = 100\Omega$	-	30	200	$\mu A$
$I_{DRM}$	Peak Forward Blocking current	$TC = 110^\circ C$ $T_j = 110^\circ C$ , $V_D = \text{Rated } V_{DRM}$ $TC = 25^\circ C$	-	-	500 10	$\mu A$
$I_{RRM}$	Peak Reverse Blocking current	$TC = 110^\circ C$ $T_j = 110^\circ C$ , $V_R = \text{Rated } V_{RRM}$ $TC = 25^\circ C$	-	-	500 10	$\mu A$
$I_H$	Holding current	$V_D = 12V$ ; $I_{TM} = 100mA$	-	-	6	mA
$V_{TM}$	Peak forward on-state voltage	$I_{TM} = 20A$ peak, pulse width $\leq 1ms$	-	1.7	2.2	V
$V_{GT}$	Gate trigger voltage	$V_D = 12V$ ; $R_L = 100\Omega$	-	0.5	1.5	V
$V_{GD}$	Gate non-trigger voltage	$V_D = \text{Rated } V_{DRM}$ ; $R_L = 10K\Omega$ $T_j = 110^\circ C$	0.1	-	-	V

**Dynamic Characteristics**

$D_V/dt$	Critical rate of rise of Off-state voltage	$V_D = \text{Rated } V_{DRM}$ ; $R_{GK} = 1K$ ; $T_j = 110^\circ C$ ; Exponential waveform;	-	10	-	V/ $\mu s$
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 16A$ ; $V_D = \text{Rated } V_{DRM}$ ; $I_G = 2mA$	-	1	-	$\mu s$
$t_g$	Crcuit commutated tum-off time		-	-	-	$\mu s$

## Description

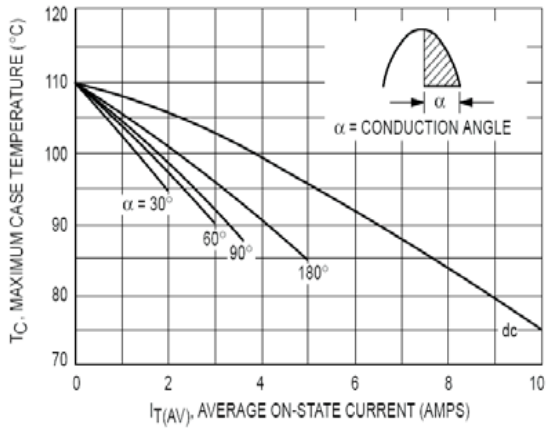


Figure 1. Average Current Derating

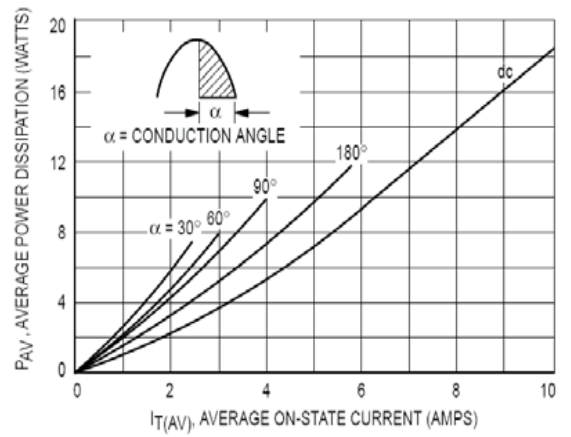


Figure 2. On-State Power Dissipation

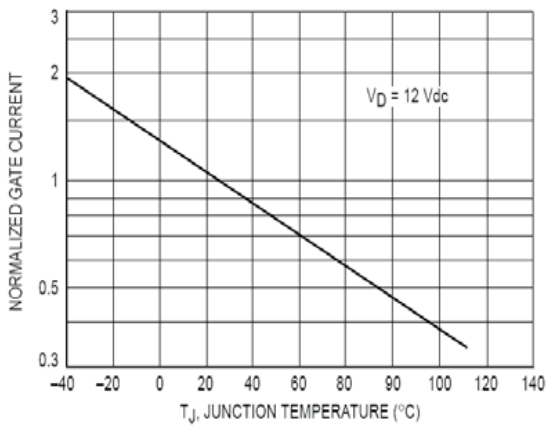


Figure 3. Normalized Gate Current

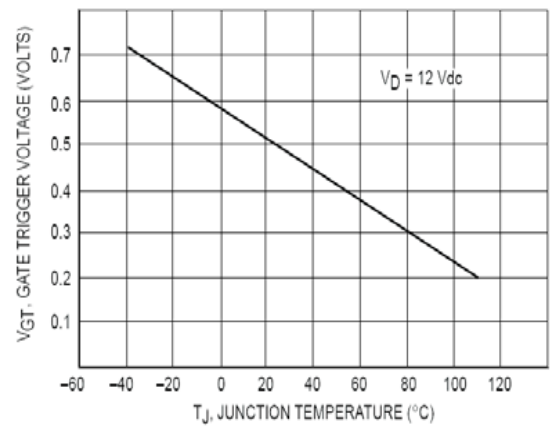
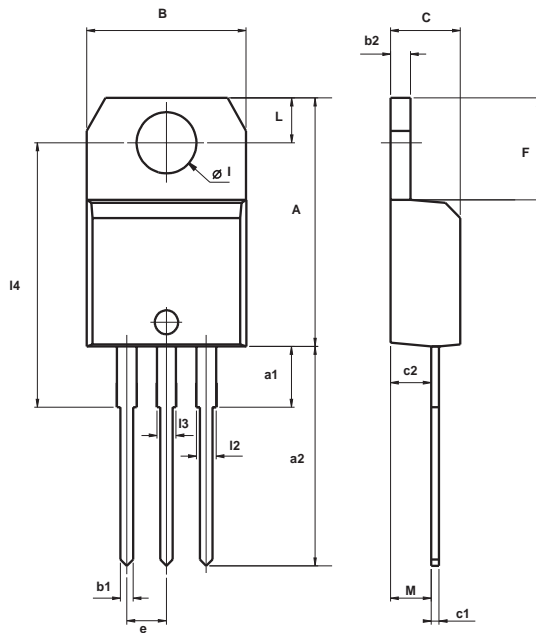


Figure 4. Gate Voltage

## Package Mechanical Data

### TO-220AB (Plastic)



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
I	3.75		3.85	0.147		0.151
l4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
l2	1.14		1.70	0.044		0.066
l3	1.14		1.70	0.044		0.066
M		2.60			0.102	