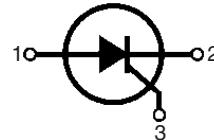


# Phase Control Thyristors

$V_{RRM} = 800-1600 \text{ V}$   
 $I_{T(RMS)} = 50 \text{ A}$   
 $I_{T(AV)M} = 32 \text{ A}$

Type	Replacements
<b>CS23-08io2</b>	MCO25-12io1; MCO50-12io1; CLA50E1200HB
<b>CS23-12io2</b>	MCO25-12io1; MCO50-12io1; CLA50E1200HB
<b>CS23-16io2</b>	MCO25-16io1; MCO50-16io1; CMA50E1600HB

$V_{RSM}$ $V_{DSM}$ V	$V_{RRM}$ $V_{DRM}$ V	Type
900	800	CS 23-08io2
1300	1200	CS 23-12io2
1700	1600	CS 23-16io2



TO-208AA  
(TO-48)



1 = Anode, 2 = Cathode, 3 = Gate

Symbol	Test Conditions	Maximum Ratings	
$I_{T(RMS)}$	$T_{VJ} = T_{VJM}$	50 A	
	$T_{case} = 85^{\circ}\text{C}; 180^{\circ}$ sine	25 A	
$I_{T(AV)M}$	$T_{case} = 69^{\circ}\text{C}; 180^{\circ}$ sine	32 A	
$I_{TSM}$	$T_{VJ} = 45^{\circ}\text{C}; V_R = 0$	t = 10 ms (50 Hz), sine: 450 A t = 8.3 ms (60 Hz), sine: 480 A	
	$T_{VJ} = T_{VJM}; V_R = 0$	t = 10 ms (50 Hz), sine: 400 A t = 8.3 ms (60 Hz), sine: 430 A	
	$I^2t$	$T_{VJ} = 45^{\circ}\text{C}; V_R = 0$	t = 10 ms (50 Hz), sine: 1010 A <sup>2</sup> s t = 8.3 ms (60 Hz), sine: 970 A <sup>2</sup> s
		$T_{VJ} = T_{VJM}; V_R = 0$	t = 10 ms (50 Hz), sine: 800 A <sup>2</sup> s t = 8.3 ms (60 Hz), sine: 770 A <sup>2</sup> s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}; f = 50 \text{ Hz}; t_p = 200 \mu\text{s}; V_D = 2/3 V_{DRM}; I_G = 0.3 \text{ A}$	repetitive, $I_T = 75 \text{ A}$ : 150 A/ $\mu\text{s}$	
		non repetitive, $I_T = I_{T(AV)M}$ : 500 A/ $\mu\text{s}$	
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}; R_{GK} = \infty$ ; method 1 (linear voltage rise)	$V_{DR} = 2/3 V_{DRM}$ : 1000 V/ $\mu\text{s}$	
$P_{GM}$	$T_{VJ} = T_{VJM}; t_p = 30 \mu\text{s}$	10 W	
$P_{G(AV)}$	$I_T = I_{T(AV)M}; t_p = 300 \mu\text{s}$	5 W	
		0.5 W	
$V_{RGM}$		10 V	
$T_{VJ}$		-40...+125 °C	
$T_{VJM}$		125 °C	
$T_{stg}$		-40...+125 °C	
$M_d$	Mounting torque	2.7-3.3 Nm	
		24-29 lb.in.	
<b>Weight</b>		12 g	

### Features

- Thyristor for line frequencies
- International standard package JEDEC TO-208AA
- Planar glassivated chip
- Long-term stability of blocking currents and voltages

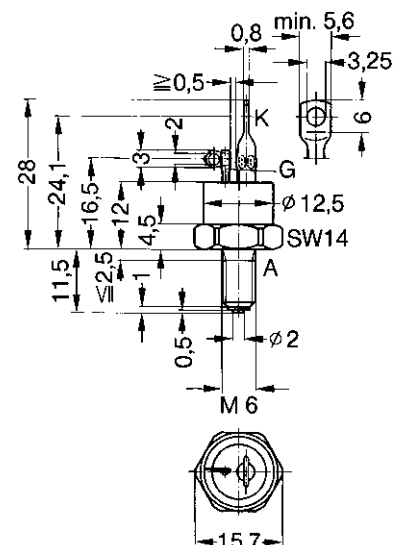
### Applications

- Motor control
- Power converter
- AC power controller

### Advantages

- Space and weight savings
- Simple mounting
- Improved temperature and power cycling

Dimensions in mm (1 mm = 0.0394")



Data according to IEC 60747

IXYS reserves the right to change limits, test conditions and dimensions.

Symbol	Test Conditions	Characteristic
$I_{R'} I_D$	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	$\leq 3$ mA
$V_T$	$I_T = 80$ A; $T_{VJ} = 25^\circ\text{C}$	$\leq 1.8$ V
$V_{T0}$	For power-loss calculations only ( $T_{VJ} = 125^\circ\text{C}$ )	1.0 V
$r_T$		10 m $\Omega$
$V_{GT}$	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = -40^\circ\text{C}$	$\leq 2.5$ V $\leq 3.5$ V
$I_{GT}$	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = -40^\circ\text{C}$	$\leq 50$ mA $\leq 80$ mA
$V_{GD}$	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	$\leq 0.2$ V
$I_{GD}$		$\leq 1$ mA
$I_L$	$T_{VJ} = 25^\circ\text{C}; t_p = 10$ $\mu\text{s}$ $I_G = 0.15$ A; $di_G/dt = 0.15$ A/ $\mu\text{s}$	$\leq 200$ mA
$I_H$	$T_{VJ} = 25^\circ\text{C}; V_D = 6$ V; $R_{GK} = \infty$	$\leq 100$ mA
$t_{gd}$	$T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$ $I_G = 0.15$ A; $di_G/dt = 0.15$ A/ $\mu\text{s}$	$\leq 2$ $\mu\text{s}$
$t_q$	$T_{VJ} = T_{VJM}; I_T = 25$ A; $t_p = 300$ $\mu\text{s}$ ; $di/dt = -20$ A/ $\mu\text{s}$ $V_R = 100$ V; $dv/dt = 20$ V/ $\mu\text{s}$ ; $V_D = 2/3 V_{DRM}$	typ. 60 $\mu\text{s}$
$R_{thJC}$	DC current	1.0 K/W
$R_{thJH}$	DC current	1.61 K/W
$d_s$	Creepage distance on surface	1.5 mm
$d_A$	Strike distance through air	1.5 mm
$a$	Max. acceleration, 50 Hz	50 m/s <sup>2</sup>

**Accessories:**

Nut M6 DIN 439/SW14

Lock washer A6 DIN 128

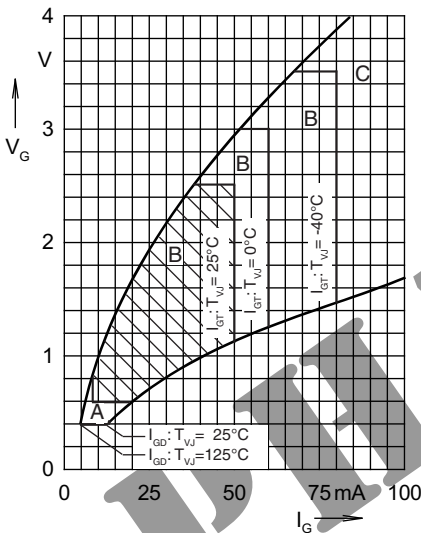


Fig. 1 Gate voltage and gate current  
Triggering:  
A = no; B = possible; C = safe

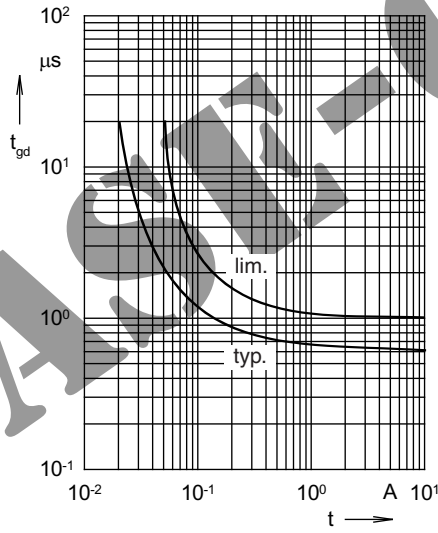


Fig. 2 Gate controlled delay time  $t_{gd}$

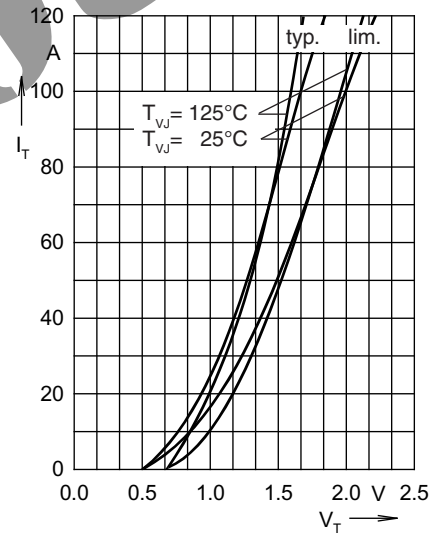


Fig. 3 On-state characteristics

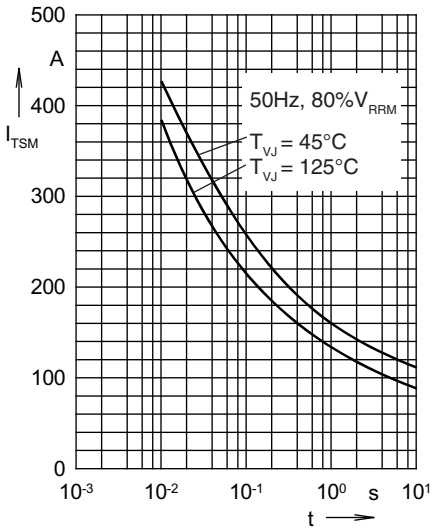


Fig. 4 Surge overload current  
 $I_{TSM}$ : crest value, t: duration

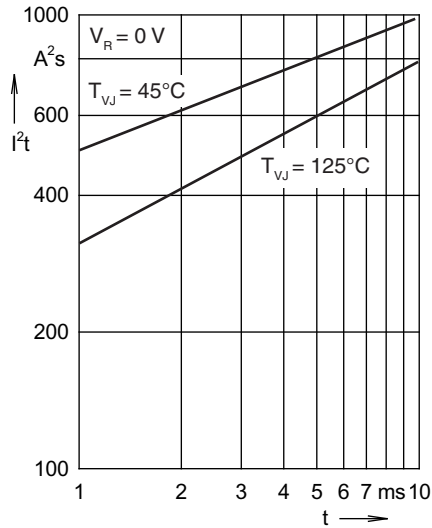


Fig. 5  $I^2t$  versus time (1-10 ms)

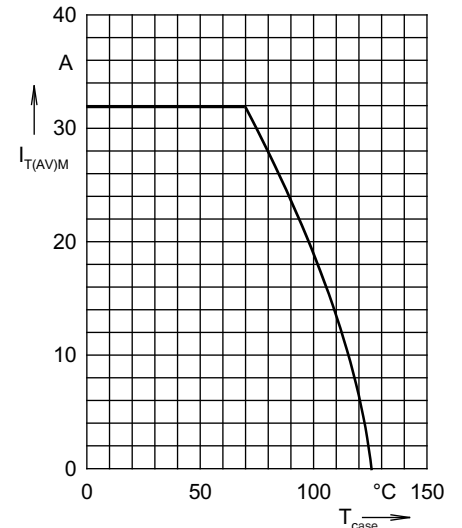


Fig. 6 Maximum forward current at case temperature 180° sine

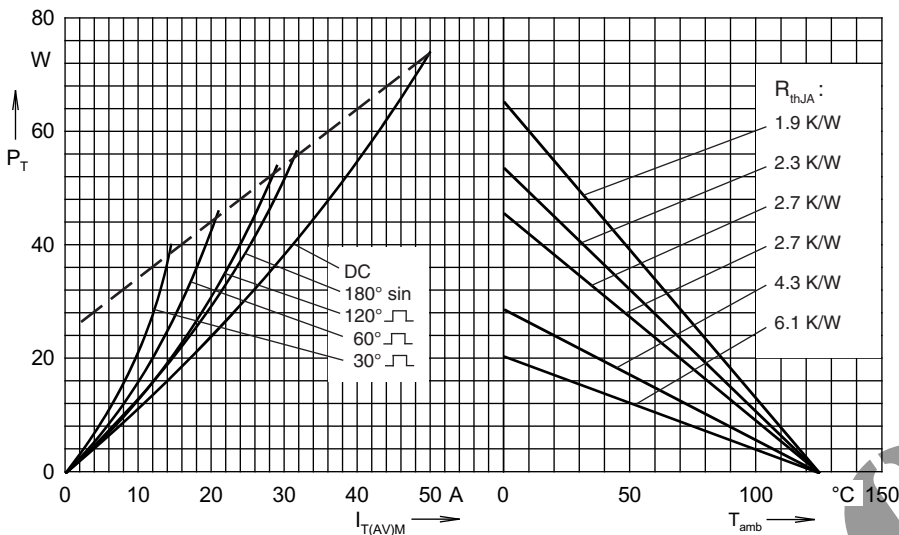


Fig. 7 Power dissipation versus on-state current and ambient temperature

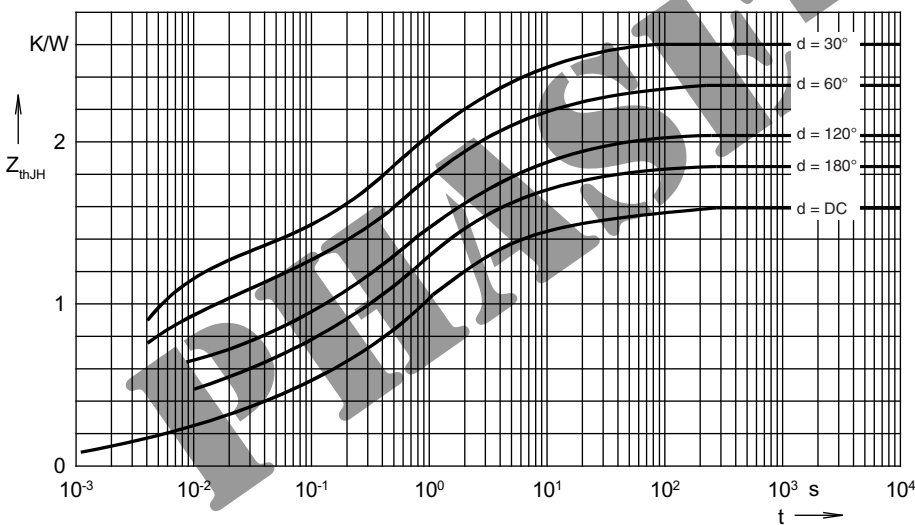


Fig. 8 Transient thermal impedance junction to heatsink

$R_{thJH}$  for various conduction angles d:

d	$R_{thJH}$ (K/W)
DC	1.61
180°	1.85
120°	2.03
60°	2.35
30°	2.60

Constants for  $Z_{thJH}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.224	0.003
2	0.132	0.028
3	0.321	0.216
4	0.522	1.1
5	0.249	4.2
6	0.162	43.2