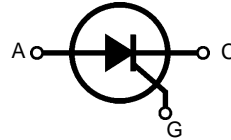


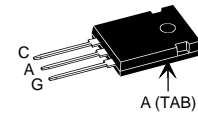
# Phase Control Thyristor

$V_{RRM} = 800-1600 \text{ V}$   
 $I_{T(RMS)} = 75 \text{ A}$   
 $I_{T(AV)M} = 48 \text{ A}$

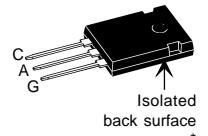
$V_{RSM}$	$V_{RRM}$	Type
$V_{DSM}$	$V_{DRM}$	
V	V	
900	800	CS 45-08io1
1300	1200	CS 45-12io1
1700	1600	CS 45-16io1 CS 45-16io1R



**TO-247 AD**  
Version io1



**ISOPLUS 247™**  
Version io1R



\* Patent pending

C = Cathode, A = Anode, G = Gate

Symbol	Conditions	Maximum Ratings	
$I_{T(RMS)}$	$T_{VJ} = T_{VJM}$	75	A
$I_{T(AV)M}$	$T_C = 75^\circ\text{C}; 180^\circ \text{ sine}$	48	A
$I_{TSM}$	$T_{VJ} = 45^\circ\text{C}$ $V_R = 0 \text{ V}$	$t = 10 \text{ ms (50 Hz), sine}$	520 A
		$t = 8.3 \text{ ms (60 Hz), sine}$	560 A
$I^2t$	$T_{VJ} = 45^\circ\text{C}$ $V_R = 0 \text{ V}$	$t = 10 \text{ ms (50 Hz), sine}$	1350 A <sup>2</sup> s
		$t = 8.3 \text{ ms (60 Hz), sine}$	1300 A <sup>2</sup> s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = \frac{2}{3} V_{DRM}$ $I_G = 0.3 \text{ A}$ $di_G/dt = 0.3 \text{ A}/\mu\text{s}$	repetitive, $I_T = 40 \text{ A}$	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)	$V_{DR} = \frac{2}{3} V_{DRM}$	1000 V/ $\mu\text{s}$
$P_{GM}$	$T_{VJ} = T_{VJM}$ $I_T = I_{T(AV)M}$	$t_p = 30 \mu\text{s}$	10 W
		$t_p = 300 \mu\text{s}$	5 W
$P_{G(AV)}$			0.5 W
$V_{RGM}$			10 V
$T_{VJ}$		-40...+140	°C
$T_{VJM}$		140	°C
$T_{stg}$		-40...+125	°C
$M_d$	Version io1: mounting torque M3	0.8...1.2	Nm
$F_C$	Version io1R: mounting force with clip	20...120	N
$V_{ISOL}^*$	50/60 Hz, RMS, $t = 1 \text{ minute, leads-to-tab}$	2500	V~
<b>Weight</b>		6	g

\* Version io1R only

Data according to IEC 60747  
IXYS reserves the right to change limits, test conditions and dimensions

## Features

- Thyristor for line frequency
- International standard package JEDEC TO-247
- Planar passivated chip
- Long-term stability of blocking currents and voltages
- Version AR isolated and UL registered E153432
- Epoxy meets UL 94V-0

## Applications

- Motor control
- Power converter
- AC power controller
- Switch-mode and resonant mode power supplies
- Light and temperature control

## Advantages

- Easy to mount with 1 screw (isolated mounting screw hole)
- Space and weight savings
- Simple mounting
- Improved temperature and power cycling

Symbol	Conditions	Characteristic Values
$I_R, I_D$	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	$\leq 5$ mA
$V_T$	$I_T = 80$ A; $T_{VJ} = 25^\circ\text{C}$	$\leq 1.64$ V
$V_{T0}$	For power-loss calculations only ( $T_{VJ} = 125^\circ\text{C}$ )	0.85 V
$r_T$		11 m $\Omega$
$V_{GT}$	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$	$\leq 1.5$ V
	$T_{VJ} = -40^\circ\text{C}$	$\leq 1.6$ V
$I_{GT}$	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$	$\leq 100$ mA
	$T_{VJ} = -40^\circ\text{C}$	$\leq 200$ mA
$V_{GD}$	$T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$	$\leq 0.2$ V
$I_{GD}$		$\leq 10$ mA
$I_L$	$T_{VJ} = 25^\circ\text{C}; t_p = 10$ $\mu\text{s}$ $I_G = 0.3$ A; $di_G/dt = 0.3$ A/ $\mu\text{s}$	$\leq 150$ mA
$I_H$	$T_{VJ} = 25^\circ\text{C}; V_D = 6$ V; $R_{GK} = \infty$	$\leq 100$ mA
$t_{gd}$	$T_{VJ} = 25^\circ\text{C}; V_D = \frac{1}{2} V_{DRM}$ $I_G = 0.3$ A; $di_G/dt = 0.3$ A/ $\mu\text{s}$	$\leq 2$ $\mu\text{s}$
$R_{thJC}$	DC current	0.62 K/W
$R_{thJH}$	DC current	0.82 K/W
$a$	Max. acceleration, 50 Hz	50 m/s <sup>2</sup>

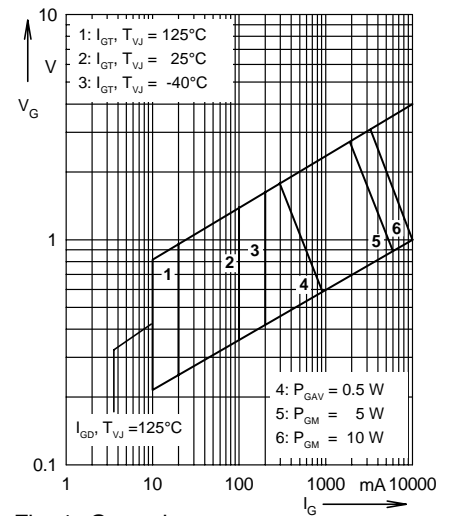


Fig. 1 Gate trigger range

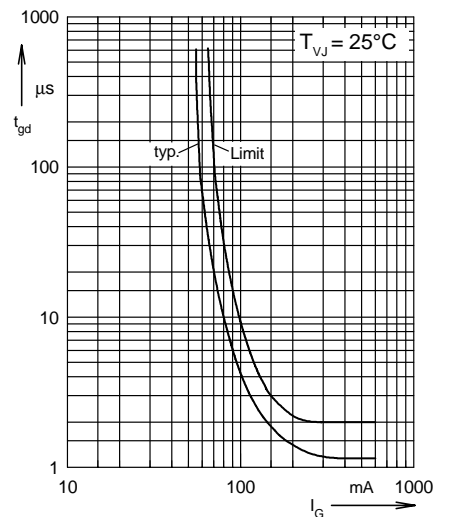


Fig. 2 Gate controlled delay time  $t_{gd}$

**TO-247 AD and ISOPLUS 247™**

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D*	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

\* ISOPLUS 247™ without hole

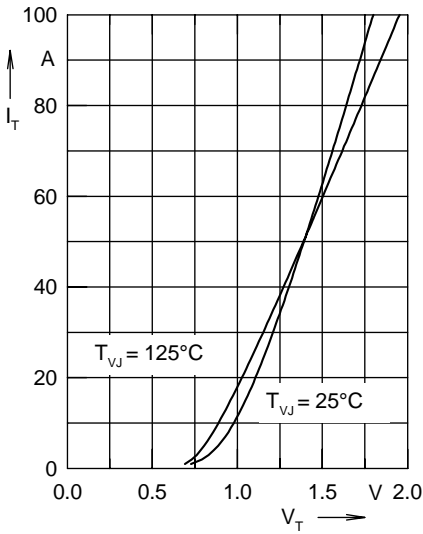


Fig. 3 Forward characteristics

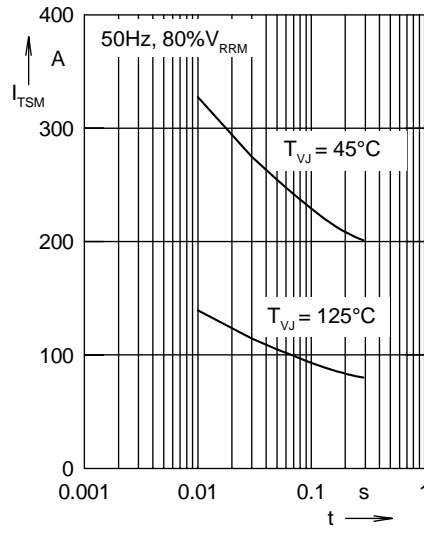


Fig. 4 Surge overload current  
 $I_{TSM}$ : crest value,  $t$ : duration

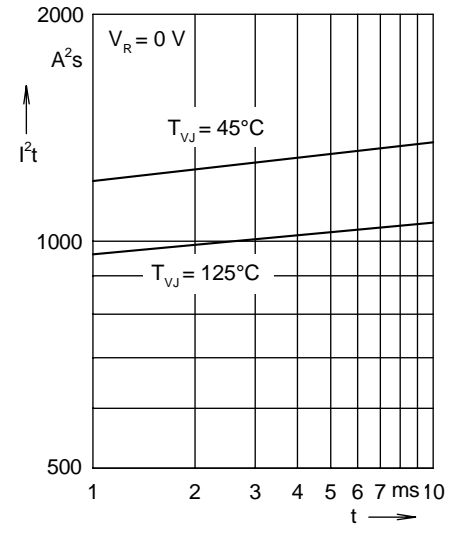


Fig. 5  $I^2t$  versus time (1-10 ms)

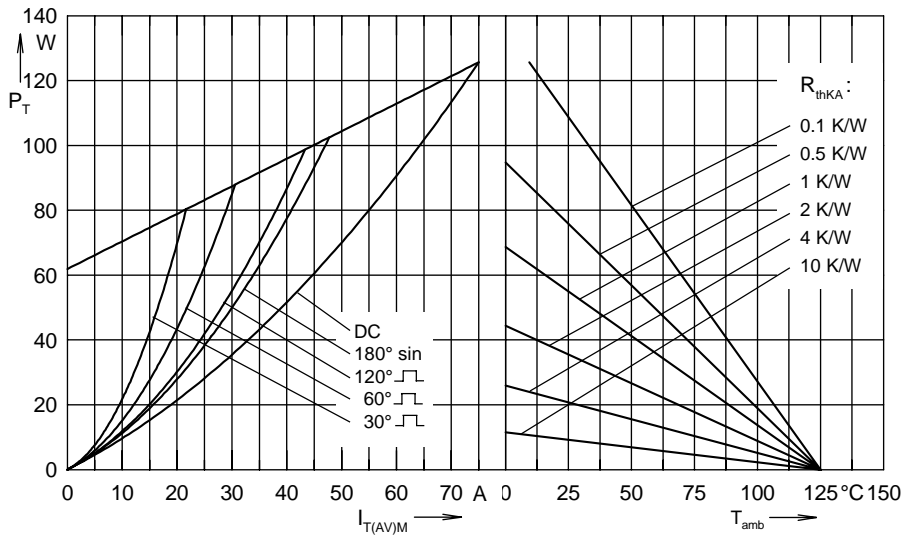


Fig. 6 Power dissipation versus forward current and ambient temperature

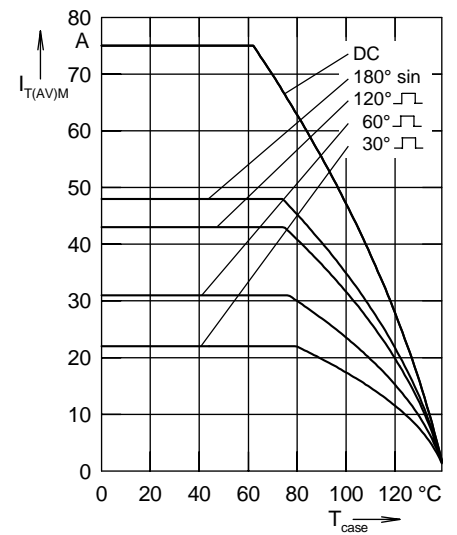


Fig. 7 Max. forward current at case temperature

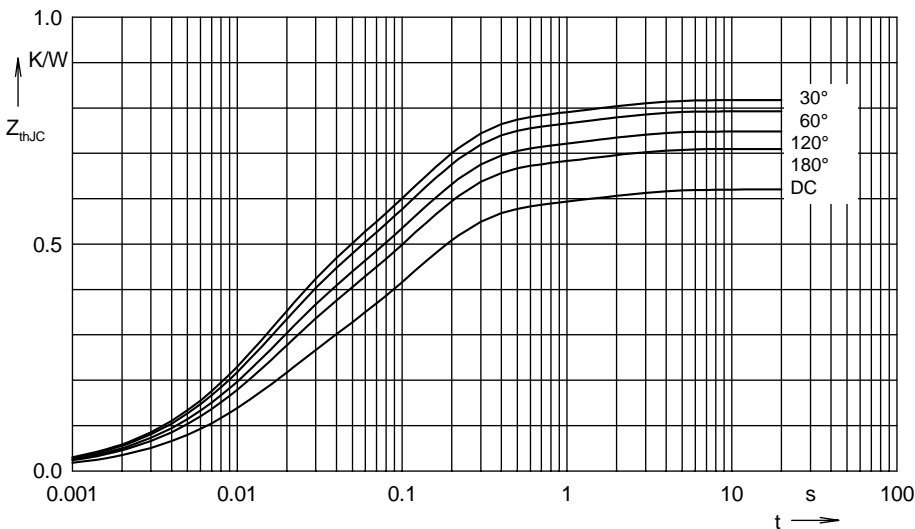


Fig. 8 Transient thermal impedance junction to case

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

$d$	$R_{thJC}$ (K/W)
DC	0.62
180°	0.71
120°	0.748
60°	0.793
30°	0.817

Constants for  $Z_{thJC}$  calculation:

$i$	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.206	0.013
2	0.362	0.118
3	0.052	1.488

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