

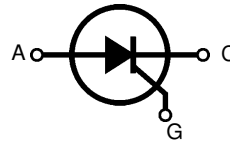
Phase Control Thyristor

$$V_{RRM} = 800-1600 \text{ V}$$

$$I_{T(RMS)} = 75 \text{ A}$$

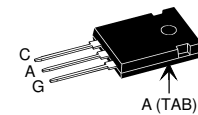
$$I_{T(AV)M} = 48 \text{ A}$$

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



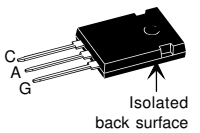
TO-247 AD

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}	$T_{VJ} = 45^\circ\text{C}$	$t = 10 \text{ ms (50 Hz), sine}$ 520 A
	$V_R = 0 \text{ V}$	$t = 8.3 \text{ ms (60 Hz), sine}$ 560 A
	$T_{VJ} = T_{VJM}$	$t = 10 \text{ ms (50 Hz), sine}$ 460 A
	$V_R = 0 \text{ V}$	$t = 8.3 \text{ ms (60 Hz), sine}$ 500 A
I^2t	$T_{VJ} = 45^\circ\text{C}$	$t = 10 \text{ ms (50 Hz), sine}$ 1350 A ² s
	$V_R = 0 \text{ V}$	$t = 8.3 \text{ ms (60 Hz), sine}$ 1300 A ² s
	$T_{VJ} = T_{VJM}$	$t = 10 \text{ ms (50 Hz), sine}$ 1050 A ² s
	$V_R = 0 \text{ V}$	$t = 8.3 \text{ ms (60 Hz), sine}$ 1030 A ² s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$	repetitive, $I_T = 40 \text{ A}$ 150 A/ μs
	$V_D = \frac{2}{3} V_{DRM}$ $I_G = 0.3 \text{ A}$ $di_G/dt = 0.3 \text{ A}/\mu\text{s}$	non repetitive, $I_T = I_{T(AV)M}$ 500 A/ μs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM};$ $R_{GK} = \infty; \text{ method 1 (linear voltage rise)}$	$V_{DR} = \frac{2}{3} V_{DRM}$ 1000 V/ μs
P_{GM}	$T_{VJ} = T_{VJM}$	$t_p = 30 \mu\text{s}$ 10 W
	$I_T = I_{T(AV)M}$	$t_p = 300 \mu\text{s}$ 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~
Weight		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	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	≤ 5 mA
V_T	$I_T = 80$ A; $T_{VJ} = 25^\circ\text{C}$	≤ 1.64 V
V_{T0}	For power-loss calculations only ($T_{VJ} = 125^\circ\text{C}$)	0.85 V
r_T		11 mΩ
V_{GT}	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$	≤ 1.5 V
	$T_{VJ} = -40^\circ\text{C}$	≤ 1.6 V
I_{GT}	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$	≤ 100 mA
	$T_{VJ} = -40^\circ\text{C}$	≤ 200 mA
V_{GD}	$T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$	≤ 0.2 V
I_{GD}		≤ 10 mA
I_L	$T_{VJ} = 25^\circ\text{C}; t_p = 10$ μs $I_G = 0.3$ A; $di_G/dt = 0.3$ A/μs	≤ 150 mA
I_H	$T_{VJ} = 25^\circ\text{C}; V_D = 6$ V; $R_{GK} = \infty$	≤ 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/μs	≤ 2 μs
R_{thJC}	DC current	0.62 K/W
R_{thJH}	DC current	0.82 K/W
a	Max. acceleration, 50 Hz	50 m/s ²

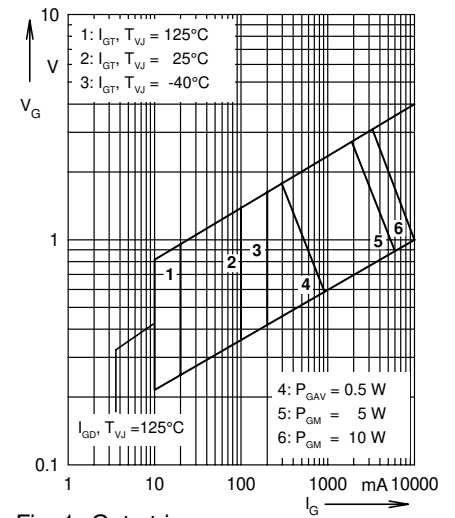


Fig. 1 Gate trigger range

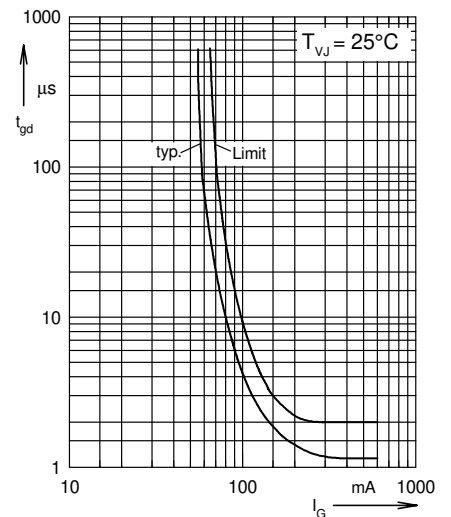
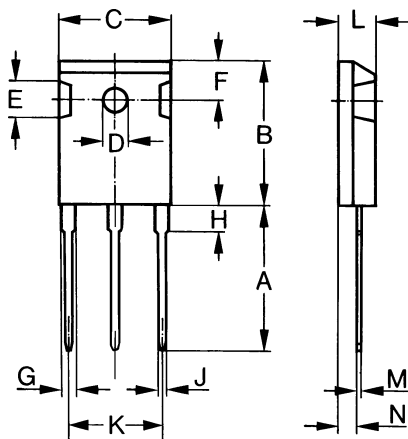


Fig. 2 Gate controlled delay time t_{gd}

TO-247 AD and ISOPLUS 247™



Dim.	Millimeter Min. Max.	Inches 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

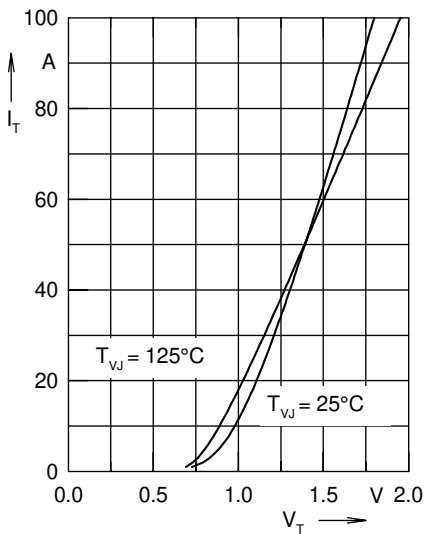


Fig. 3 Forward characteristics

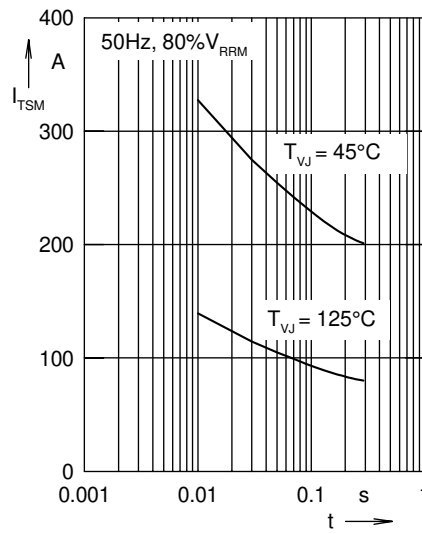


Fig. 4 Surge overload current
 I_{TSM} : crest value, t : duration

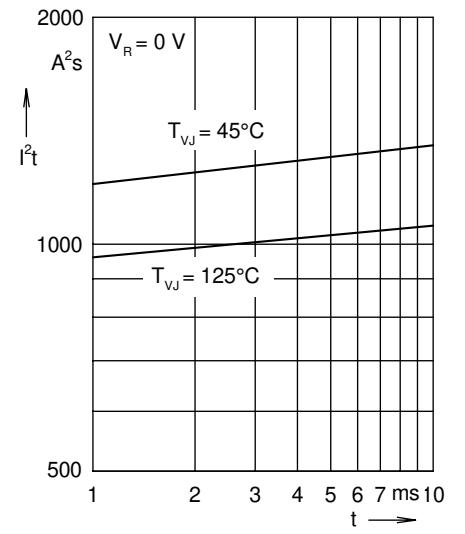


Fig. 5 I^2t versus time (1-10 ms)

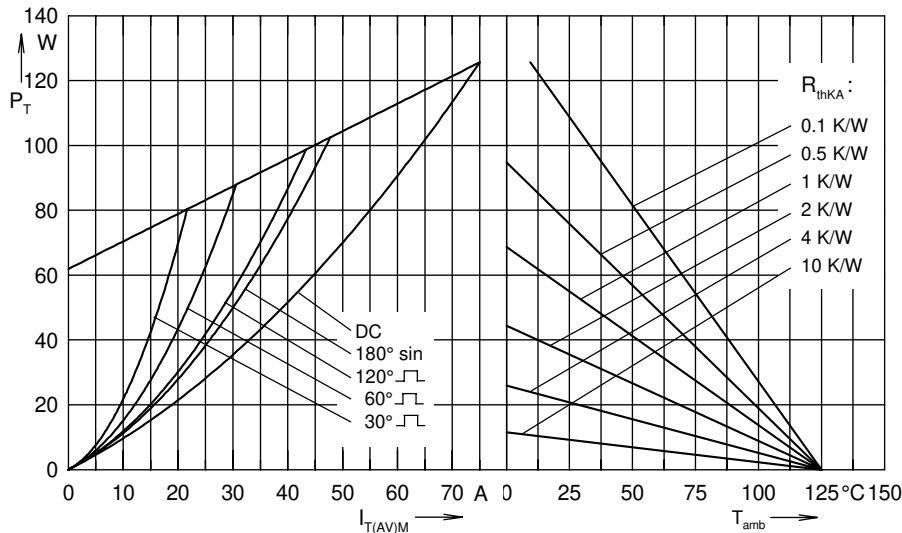


Fig. 6 Power dissipation versus forward current and ambient temperature

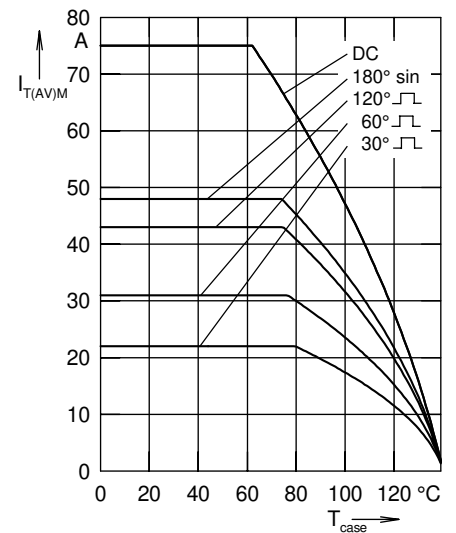


Fig. 7 Max. forward current at case temperature

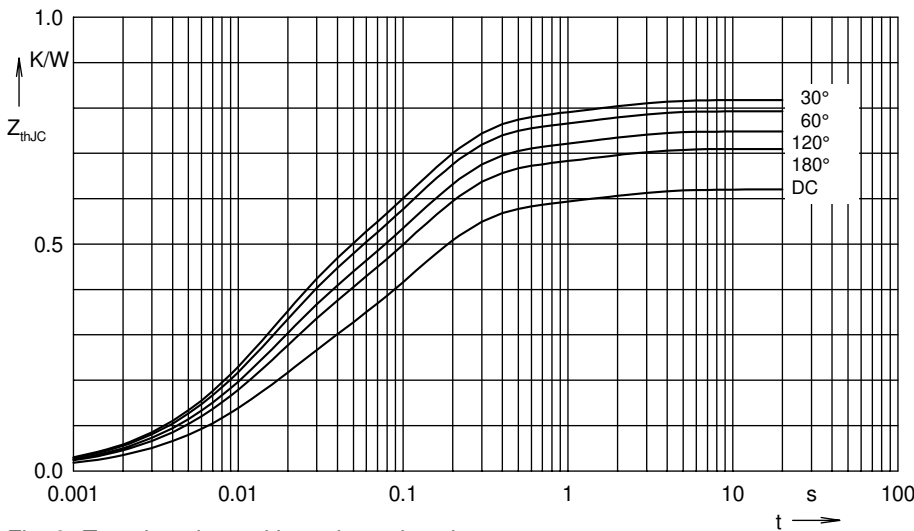


Fig. 8 Transient thermal impedance junction to case

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