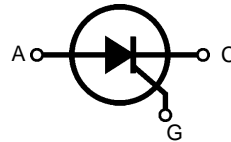
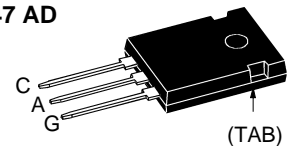


# Phase Control Thyristor

$V_{RRM} = 1200-1600 \text{ V}$   
 $I_{T(RMS)} = 30 \text{ A}$   
 $I_{T(AV)M} = 19 \text{ A}$

$V_{RSM}$ $V_{DSM}$ V	$V_{RRM}$ $V_{DRM}$ V	Type
1200	1200	CS 20-12io1
1400	1400	CS 20-14io1
1600	1600	CS 20-16io1


**TO-247 AD**


C = Cathode, A = Anode, G = Gate  
TAB = Anode

Symbol	Test Conditions	Maximum Ratings	
$I_{T(RMS)}$	$T_{VJ} = T_{VJM}$	30 A	
$I_{T(AV)M}$	$T_{case} = 85^{\circ}\text{C}; 180^{\circ}$ sine	19 A	
$I_{TSM}$	$T_{VJ} = 45^{\circ}\text{C};$ $V_R = 0 \text{ V}$	t = 10 ms (50 Hz), sine	200 A
		t = 8.3 ms (60 Hz), sine	215 A
$I^2t$	$T_{VJ} = T_{VJM}$ $V_R = 0 \text{ V}$	t = 10 ms (50 Hz), sine	180 A
		t = 8.3 ms (60 Hz), sine	195 A
$I^2t$	$T_{VJ} = 45^{\circ}\text{C}$ $V_R = 0 \text{ V}$	t = 10 ms (50 Hz), sine	200 A <sup>2</sup> s
		t = 8.3 ms (60 Hz), sine	195 A <sup>2</sup> s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f = 50 Hz, $t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$ $I_G = 0.3 \text{ A}$ $di_G/dt = 0.3 \text{ A}/\mu\text{s}$	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)	$V_{DR} = 2/3 V_{DRM}$	1000 V/ $\mu\text{s}$
$P_{GM}$	$T_{VJ} = T_{VJM}$	$t_p = 30 \mu\text{s}$	10 W
$P_{GAV}$	$I_T = I_{T(AV)M}$	$t_p = 300 \mu\text{s}$	5 W
			0.5 W
$V_{RGM}$			10 V
$T_{VJ}$		-40...+125	$^{\circ}\text{C}$
$T_{VJM}$		125	$^{\circ}\text{C}$
$T_{stg}$		-40...+125	$^{\circ}\text{C}$
$M_d$	Mounting torque M3	0.8...1.2	Nm
Weight		6	g

**Features**

- Thyristor for line frequency
- International standard package JEDEC TO-247
- Planar passivated chip
- Long-term stability of blocking currents and voltages
- 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

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

Symbol	Test Conditions	Characteristic Values	
$I_R, I_D$	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	$\leq$	2 mA
$V_T$	$I_T = 25 \text{ A}; T_{VJ} = 25^\circ\text{C}$	$\leq$	2.1 V
$V_{T0}$	For power-loss calculations only ( $T_{VJ} = 125^\circ\text{C}$ )		1.1 V
$r_T$			40 m $\Omega$
$V_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	$\leq$	1.0 V
	$T_{VJ} = -40^\circ\text{C}$	$\leq$	1.2 V
$I_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	$\leq$	65 mA
	$T_{VJ} = -40^\circ\text{C}$	$\leq$	80 mA
	$T_{VJ} = 125^\circ\text{C}$	$\leq$	50 mA
$V_{GD}$	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	$\leq$	0.2 V
$I_{GD}$		$\leq$	5 mA
$I_L$	$T_{VJ} = 25^\circ\text{C}; t_p = 10 \mu\text{s}$ $I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$	$\leq$	150 mA
$I_H$	$T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; R_{GK} = \infty$	$\leq$	100 mA
$t_{gd}$	$T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$ $I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$	$\leq$	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>

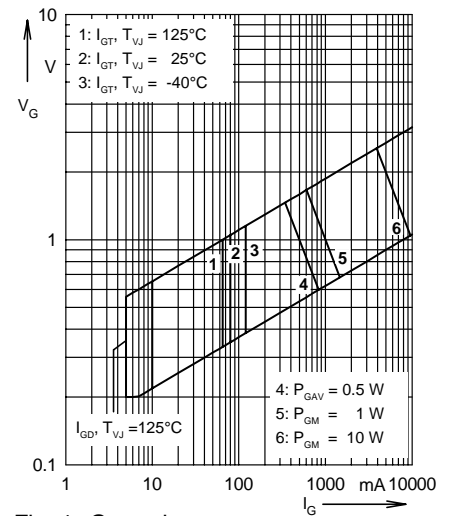


Fig. 1 Gate trigger range

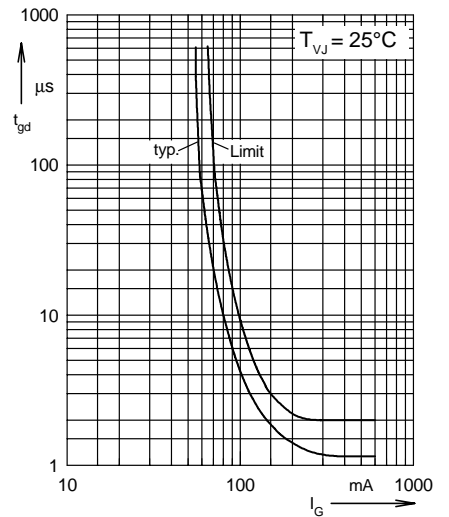


Fig. 2 Gate controlled delay time  $t_{gd}$

**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

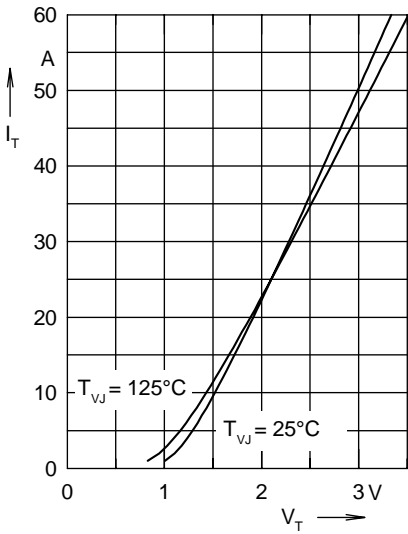


Fig. 3 Forward characteristics

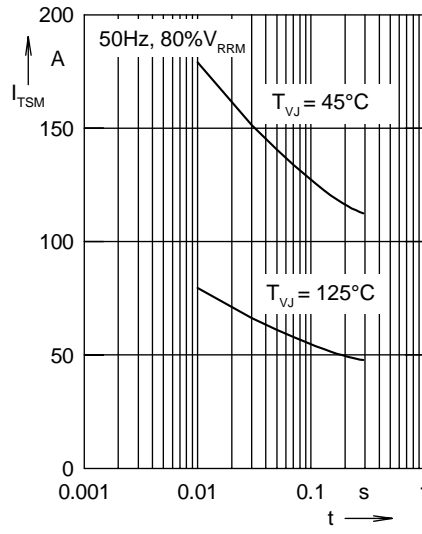


Fig. 4 Surge overload current  
 $I_{TSM}$ : crest value,  $t$ : duration

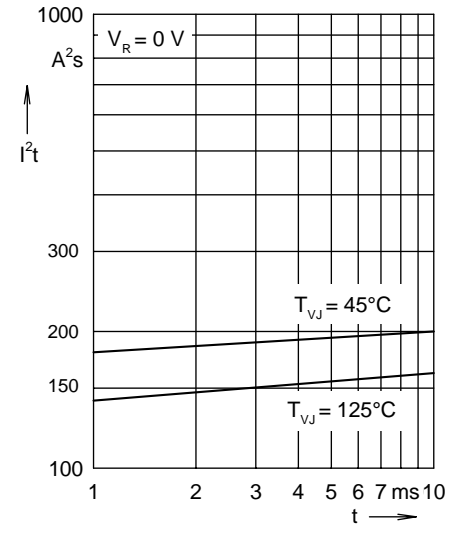


Fig. 5  $I^2t$  versus time (1-10 ms)

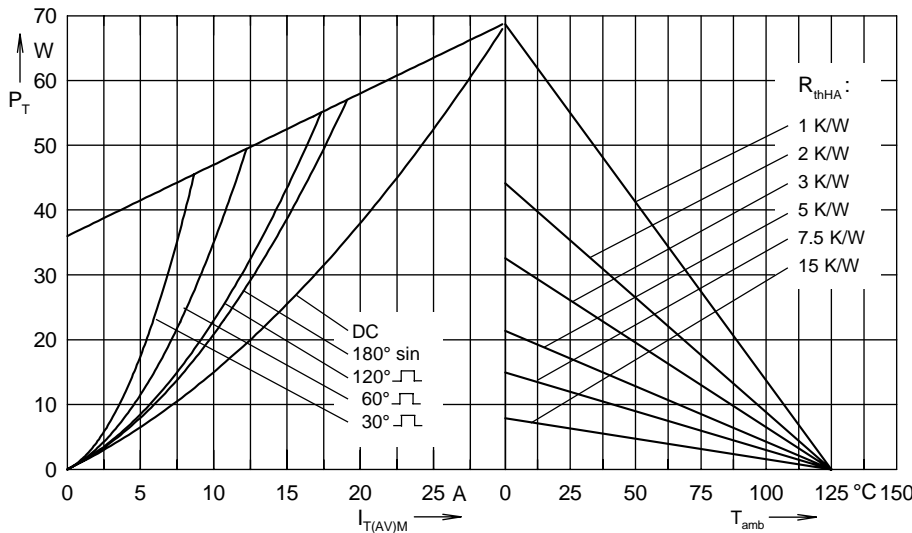


Fig. 6 Power dissipation versus forward current and ambient temperature

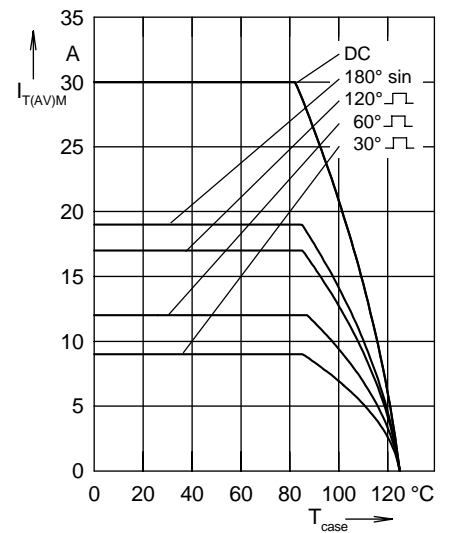


Fig. 7 Max. forward current at case temperature

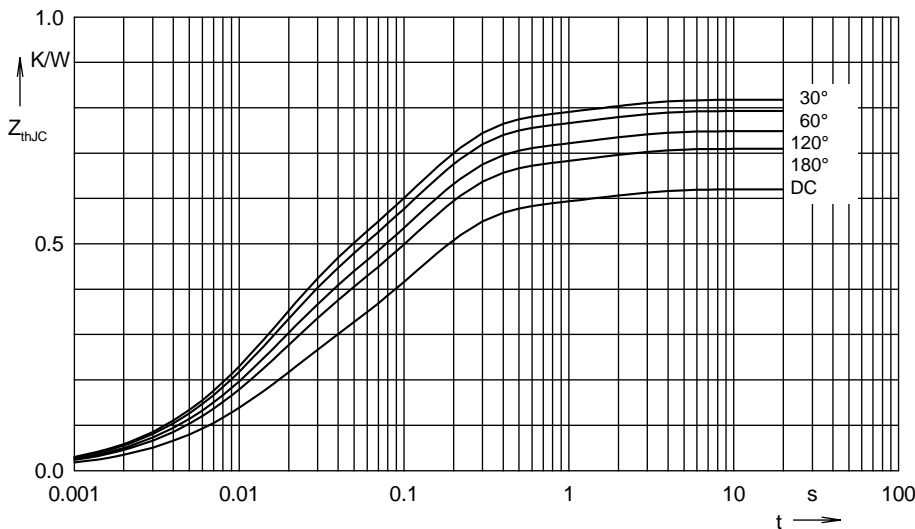


Fig. 8 Transient thermal impedance junction to case

$R_{thJC}$  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