

Phase Control Thyristor

$$V_{RRM} = 1200-1600 \text{ V}$$

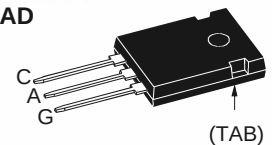
$$I_{T(RMS)} = 49 \text{ A}$$

$$I_{T(AV)M} = 31 \text{ A}$$

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
1200	1200	CS 30-12io1
1400	1400	CS 30-14io1
1600	1600	CS 30-16io1



TO-247 AD



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

Symbol	Test Conditions	Maximum Ratings
$I_{T(RMS)}$ $I_{T(AV)M}$	$T_{VJ} = T_{VJM}$ $T_{case} = 85^{\circ}\text{C}$; 180° sine	49 A 31 A
I_{TSM}	$T_{VJ} = 45^{\circ}\text{C}$; $V_R = 0 \text{ V}$ $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	300 A 320 A
	$T_{VJ} = T_{VJM}$ $V_R = 0 \text{ V}$ $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	270 A 290 A
I^2t	$T_{VJ} = 45^{\circ}\text{C}$ $V_R = 0 \text{ V}$ $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	450 A ² s 440 A ² s
	$T_{VJ} = T_{VJM}$ $V_R = 0 \text{ V}$ $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	365 A ² s 355 A ² s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ $f = 50 \text{ Hz}$, $t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$ $I_G = 0.3 \text{ A}$ $di_G/dt = 0.3 \text{ A}/\mu\text{s}$	repetitive, $I_T = 40 \text{ A}$ 150 A/ μs
	non repetitive, $I_T = I_{T(AV)M}$	500 A/ μs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $R_{GK} = \infty$; method 1 (linear voltage rise)	$V_{DR} = 2/3 V_{DRM}$ 1000 V/ μs
P_{GM}	$T_{VJ} = T_{VJM}$ $I_T = I_{T(AV)M}$ $t_p = 30 \mu\text{s}$ $t_p = 300 \mu\text{s}$	10 W 5 W
P_{GAV}		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 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

Symbol	Test Conditions	Characteristic Values
I_R, I_D	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	≤ 5 mA
V_T	$I_T = 45$ A; $T_{VJ} = 25^\circ\text{C}$	≤ 1.6 V
V_{T0}	For power-loss calculations only ($T_{VJ} = 125^\circ\text{C}$)	0.9 V
r_T		15 mΩ
V_{GT}	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$	≤ 1.0 V
	$T_{VJ} = -40^\circ\text{C}$	≤ 1.2 V
I_{GT}	$V_D = 6$ V; $T_{VJ} = 25^\circ\text{C}$	≤ 65 mA
	$T_{VJ} = -40^\circ\text{C}$	≤ 80 mA
	$T_{VJ} = 125^\circ\text{C}$	≤ 50 mA
V_{GD}	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	≤ 0.2 V
I_{GD}		≤ 5 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}	$T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$ $I_G = 0.3$ 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

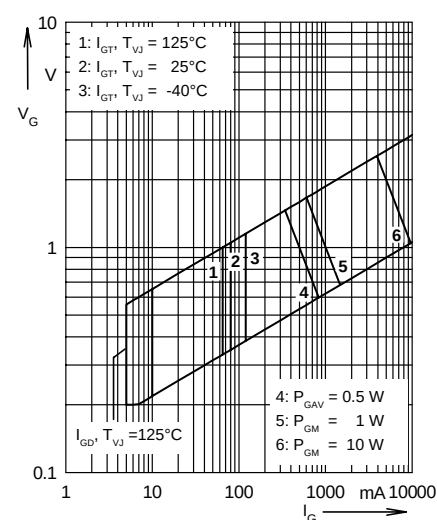


Fig. 1 Gate trigger range

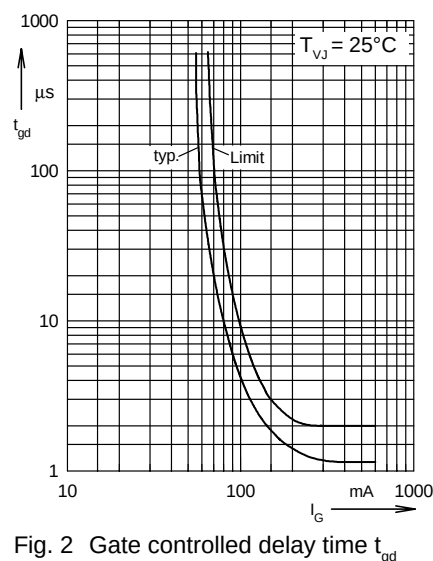
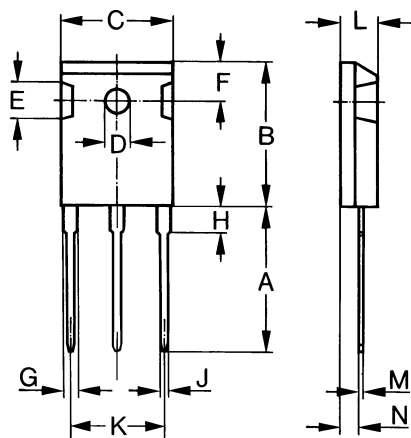


Fig. 2 Gate controlled delay time t_{gd}

TO-247 AD and ISOPLUS 247™



Dim.	Millimeter		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

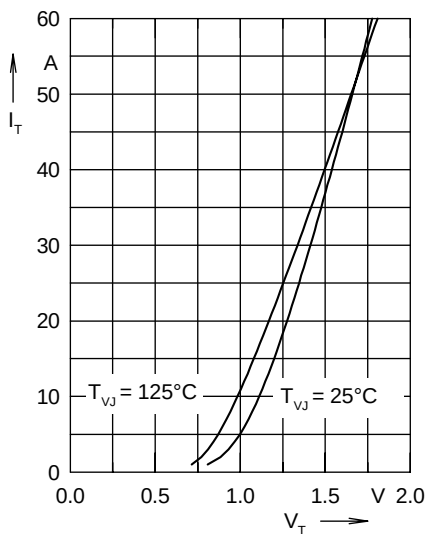


Fig. 3 Forward characteristics

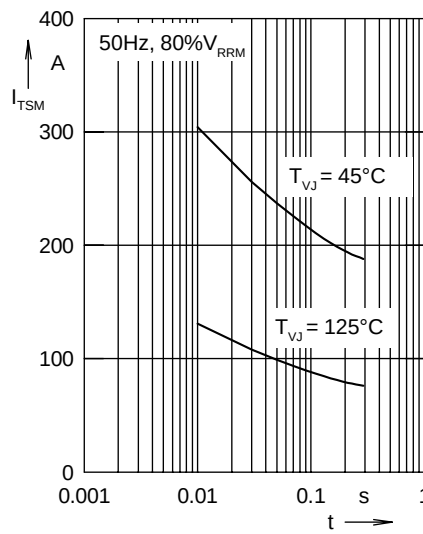


Fig. 4 Surge overload current
 I_{TSM} : crest value, t : duration

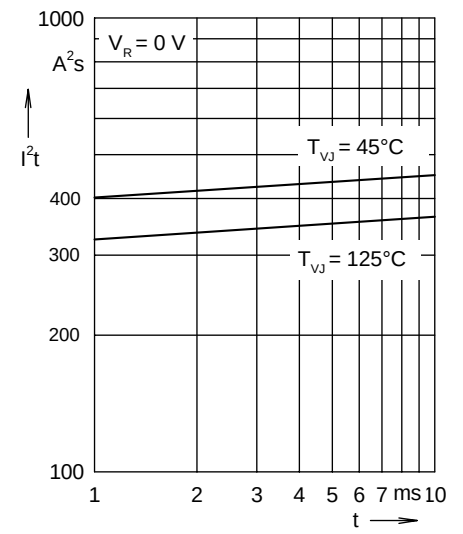


Fig. 5 I^2t versus time (1-10 ms)

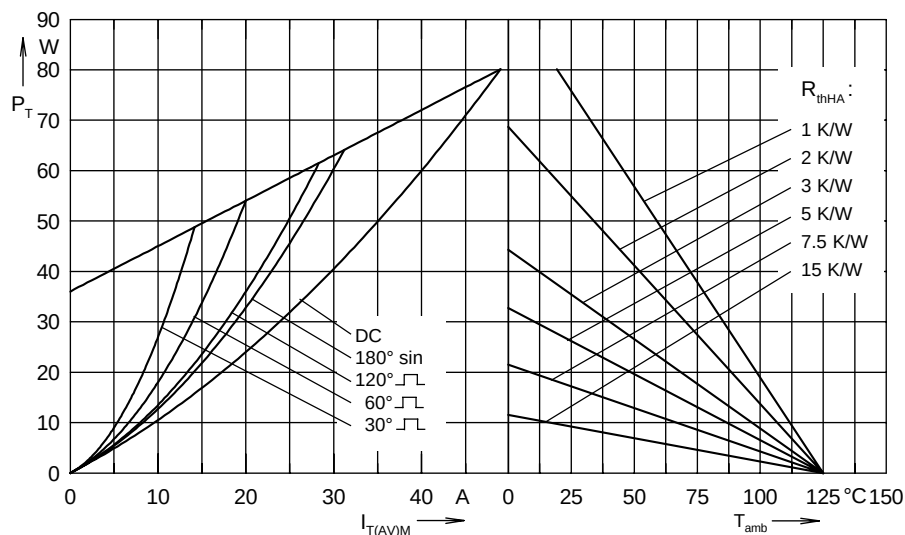


Fig. 6 Power dissipation versus forward current and ambient temperature

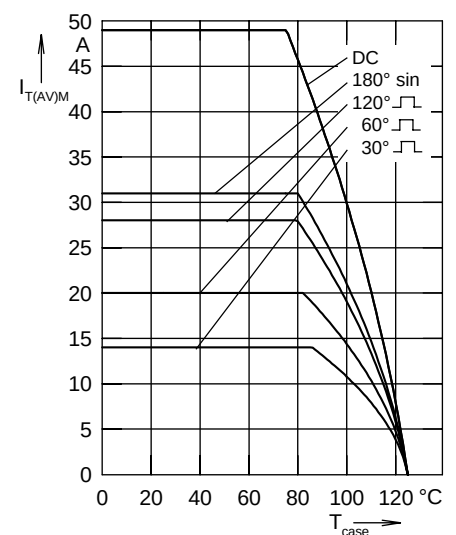


Fig. 7 Max. forward current at case temperature

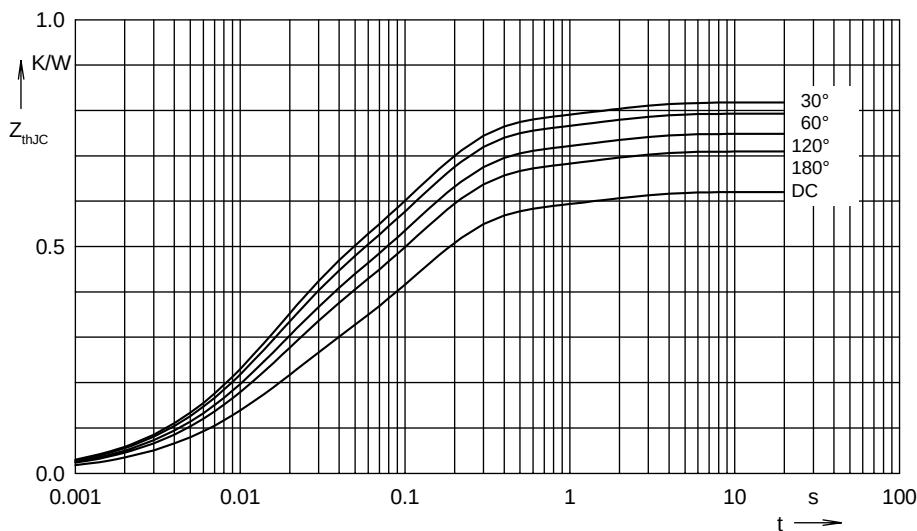


Fig. 8 Transient thermal impedance junction to case

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