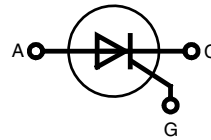


Phase Control Thyristor

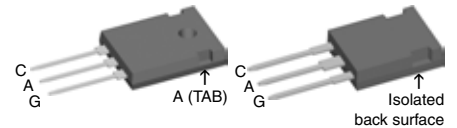
$V_{RRM} = 800-1600 \text{ V}$
 $I_{T(RMS)} = 75 \text{ A}$
 $I_{T(AV)M} = 48 \text{ A}$

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



TO-247 AD
Version io1

ISOPLUS247™
Version io1R



A = Anode, C = Cathode, G = Gate

Symbol	Conditions	Maximum Ratings	
I_{TRMS}	$T_{VJ} = T_{VJM}$	75	A
$I_{T(AV)M}$	$T_C = 75^\circ\text{C}$, 180° sine	48	A
I_{TSM}	$T_{VJ} = 45^\circ\text{C}$ $V_R = 0 \text{ V}$	t = 10 ms (50 Hz), sine	520 A
		t = 8.3 ms (60 Hz), sine	560 A
	$T_{VJ} = T_{VJM}$ $V_R = 0$	t = 10 ms (50 Hz), sine	460 A
		t = 8.3 ms (60 Hz), sine	500 A
I^2t	$T_{VJ} = 45^\circ\text{C}$ $V_R = 0 \text{ V}$	t = 10 ms (50 Hz), sine	1350 A ² s
		t = 8.3 ms (60 Hz), sine	1300 A ² 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/ μs
		non repetitive, $I_T = I_{T(AV)M}$	500 A/ μs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $V_D = 2/3 V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)	1000	V/ μs
P_{GM}	$T_{VJ} = T_{VJM}$; $t_p = 30 \mu\text{s}$ $I_T = I_{T(AV)M}$; $t_p = 300 \mu\text{s}$	10	W
		5	W
P_{GAV}		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 minute, leads-to-tab	2500	V~
Weight	typ.	6	g

* Version io1R only

Data according to IEC 60747

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	
		min.	max.
I_R, I_D	$V_R = V_{RRM}; V_D = V_{DRM}; T_{VJ} = T_{VJM}$		5 mA
V_T	$I_T = 80 \text{ A}; T_{VJ} = 25^\circ\text{C}$		1.64 V
V_{TO}	For power-loss calculations only		0.85 V
r_T	$T_{VJ} = 125^\circ\text{C}$		11 mΩ
V_{GT}	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$		1.5 V
	$T_{VJ} = -40^\circ\text{C}$		1.6 V
I_{GT}	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$		100 mA
	$T_{VJ} = -40^\circ\text{C}$		200 mA
V_{GD}	$V_D = \frac{2}{3} V_{DRM}; T_{VJ} = T_{VJM}$		0.2 V
I_{GD}			10 mA
I_L	$t_p = 10 \mu\text{s}; T_{VJ} = 25^\circ\text{C}$ $I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$		150 mA
I_H	$V_D = 6 \text{ V}; R_{GK} = \infty; T_{VJ} = 25^\circ\text{C}$		100 mA
t_{gd}	$V_D = \frac{1}{2} V_{DRM}; T_{VJ} = 25^\circ\text{C}$ $I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$		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

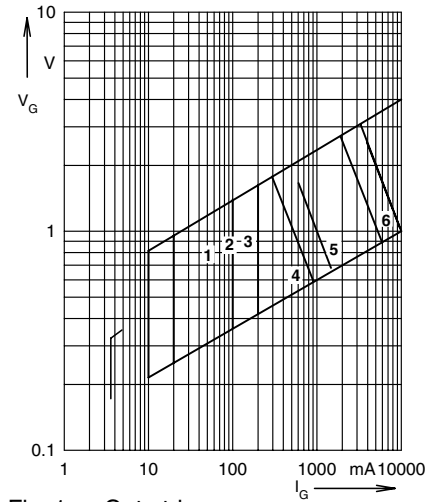


Fig. 1 Gate trigger range

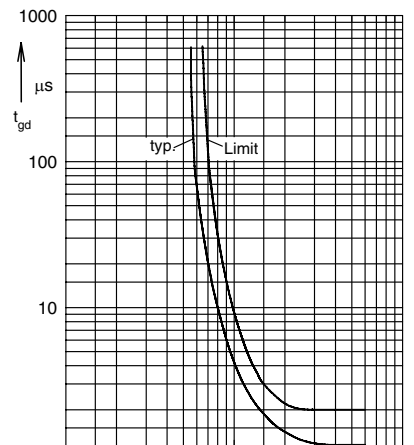
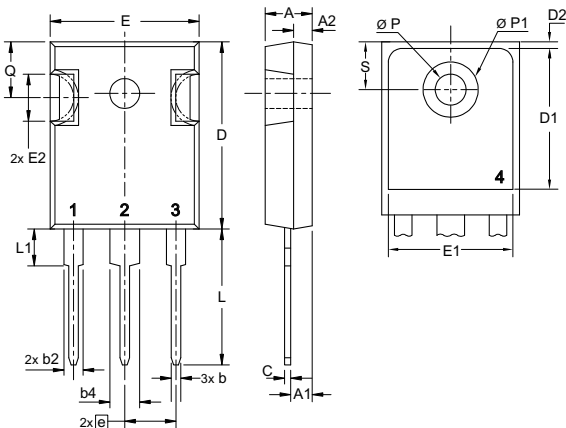


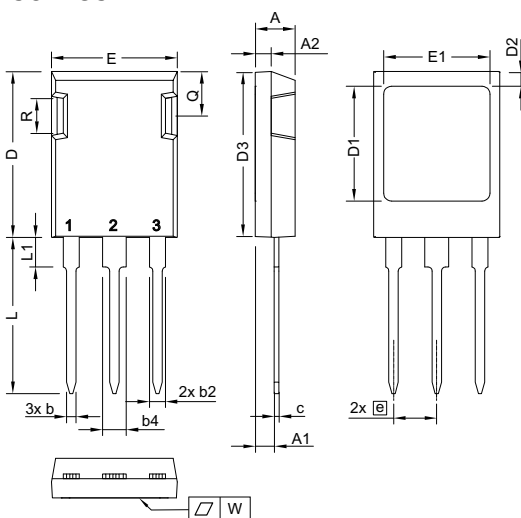
Fig. 2 Gate controlled delay time t_{gd}

TO-247 AD



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.845
D1	13.07	-	0.515	-
D2	0.51	1.35	0.020	0.053
E	15.48	16.24	0.610	0.640
E1	13.45	-	0.53	-
E2	4.31	5.48	1.170	0.216
e	5.46 BSC		0.2150 BSC	
L	19.80	20.30	0.078	0.800
L1	-	4.49	-	0.177
Ø P	3.55	3.65	0.140	0.144
Ø P1	-	7.39	-	0.290
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	

ISOPLUS 247™



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.14	1.40	0.045	0.055
b2	1.91	2.20	0.075	0.087
b4	2.92	3.24	0.115	0.128
c	0.61	0.83	0.024	0.033
D	20.80	21.34	0.819	0.840
D1	15.75	16.26	0.620	0.640
D2	1.65	2.15	0.065	0.085
D3	20.30	20.70	0.799	0.815
E	15.75	16.13	0.620	0.635
E1	13.21	13.72	0.520	0.540
e	5.45 BSC		0.215 BSC	
L	19.81	20.60	0.780	0.811
L1	3.81	4.38	0.150	0.172
Q	5.59	6.20	0.220	0.244
R	4.25	5.50	0.167	0.217
W	-	0.10	-	0.004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L_{max}
This drawing will meet all dimensions requirement of JEDEC

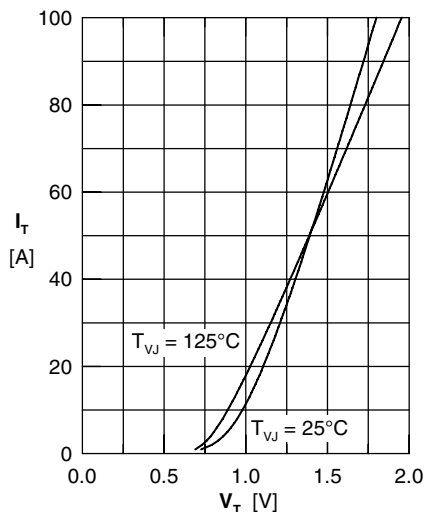


Fig. 3 Forward characteristics

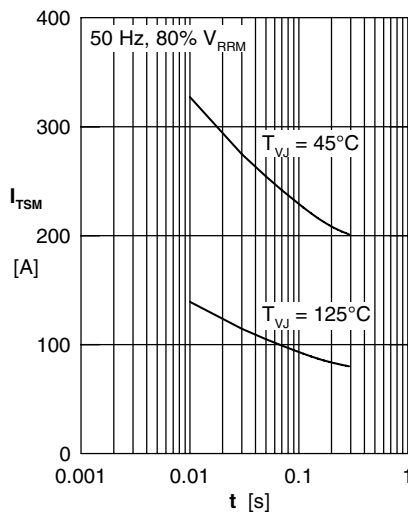


Fig. 4 Surge overload current
 I_{TSM} : crest value, t: duration

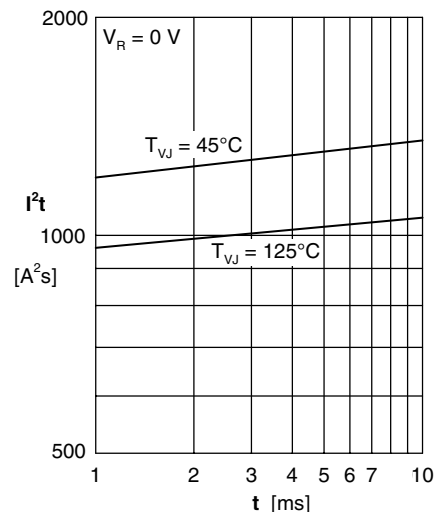


Fig. 5 I^2t versus time (1-10 s)

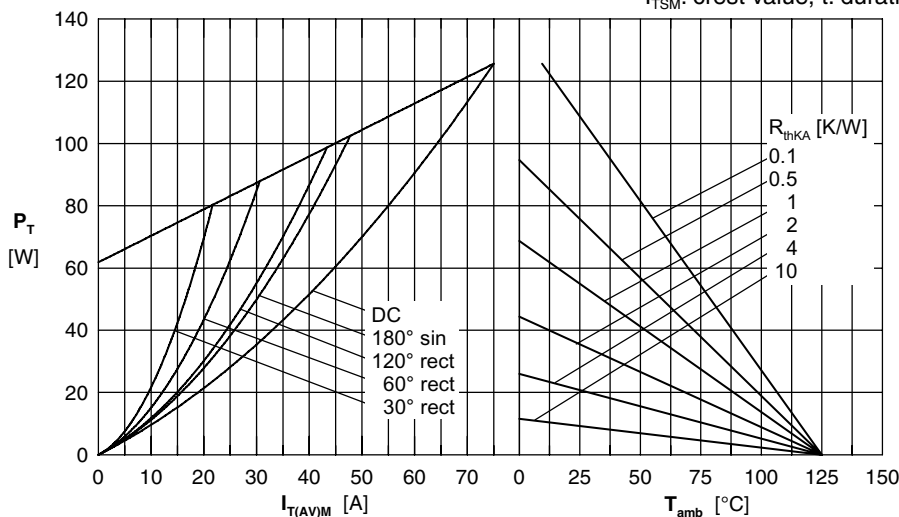


Fig. 6 Power dissipation versus forward current and ambient temperature

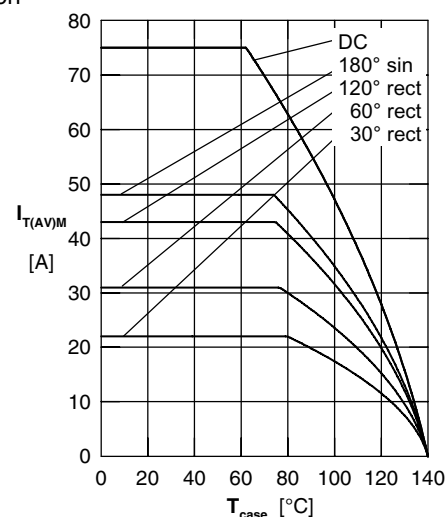


Fig. 7 Max. forward current at case temperature

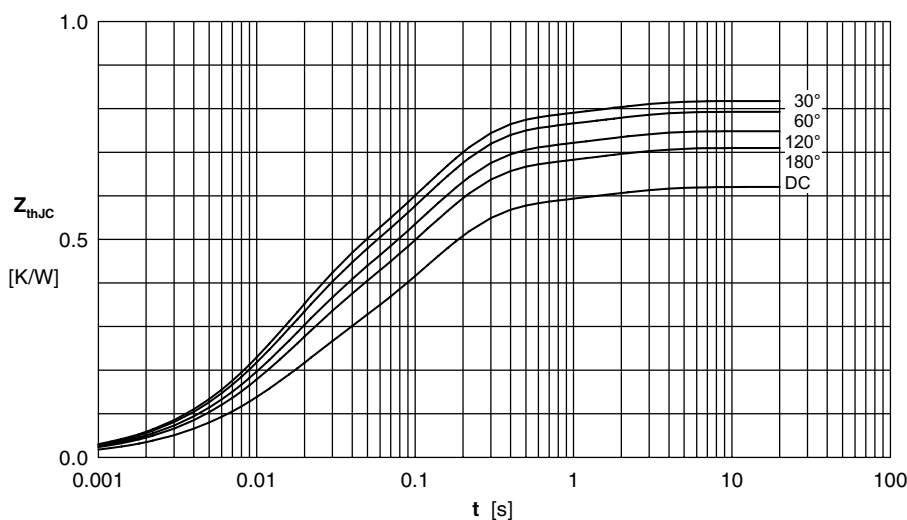


Fig. 8 Transient thermal impedance junction to case

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