⊓IXYS

CS 45
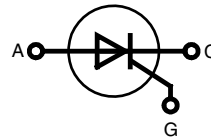
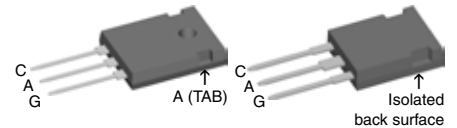# Phase Control Thyristor

V_{RRM} = 800-1600 V
$I_{T(RMS)}$ = 75 A
$I_{T(AV)M}$ = 48 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
$I_{T(AV)M}$	$T_C = 75°C$, 180° sine		48	A
I_{TSM}	$T_{VJ} = 45°C$	t = 10 ms (50 Hz), sine	520	A
	$V_R = 0$ V	t = 8.3 ms (60 Hz), sine	560	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	460	A
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	500	A
I^2t	$T_{VJ} = 45°C$	t = 10 ms (50 Hz), sine	1350	A^{2}s
	$V_R = 0$ V	t = 8.3 ms (60 Hz), sine	1300	A^{2}s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	1050	A^{2}s
	$V_R = 0$ V	t = 8.3 ms (60 Hz), sine	1030	A^{2}s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f = 50 Hz; $t_p = 200$ µs	repetitive, I_T = 40 A	150	A/µs
	$V_D = ^2/_3 V_{DRM}$ $I_G = 0.3$ A $di_G/dt = 0.3$ A/µs	non repetitive, $I_T = I_{T(AV)M}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $V_D = ^2/_3 V_{DRM}$ $R_{GK} = ∞$; method 1 (linear voltage rise)		1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$; $t_p = $ 30 µs		10	W
	$I_T = I_{T(AV)M}$; $t_p = $ 300 µs		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

IXYS reserves the right to change limits, test conditions and dimensions.

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| 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	$I_T = 80$ A;		$T_{VJ} = 25°C$		1.64	V
V_{TO}	For power-loss calculations only				0.85	V
r_T			$T_{VJ} = 125°C$		11	mΩ
V_{GT}	$V_D = 6$ V;		$T_{VJ} = 25°C$		1.5	V
			$T_{VJ} = -40°C$		1.6	V
I_{GT}	$V_D = 6$ V;		$T_{VJ} = 25°C$		100	mA
			$T_{VJ} = -40°C$		200	mA
V_{GD}	$V_D = ^2/_3\,V_{DRM}$;		$T_{VJ} = T_{VJM}$		0.2	V
I_{GD}					10	mA
I_L	$t_p = 10$ µs;		$T_{VJ} = 25°C$		150	mA
	$I_G = 0.3$ A; $di_G/dt = 0.3$ A/µs					
I_H	$V_D = 6$ V; $R_{GK} = \infty$;		$T_{VJ} = 25°C$		100	mA
t_{gd}	$V_D = ½\,V_{DRM}$;		$T_{VJ} = 25°C$		2	µs
	$I_G = 0.3$ A; $di_G/dt = 0.3$ A/µs					
R_{thJC}	DC current				0.62	K/W
R_{thJH}	DC current				0.82	K/W
a	Max. acceleration; 50 Hz				50	m/s²
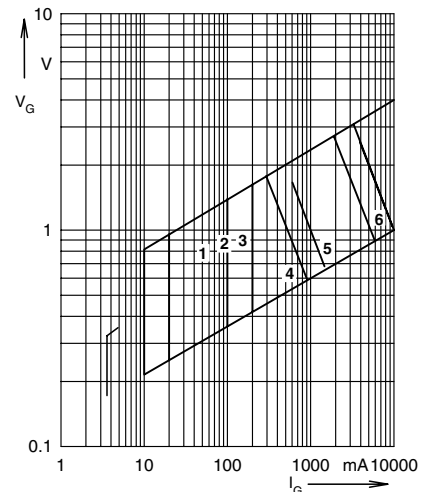
Fig. 1   Gate trigger range
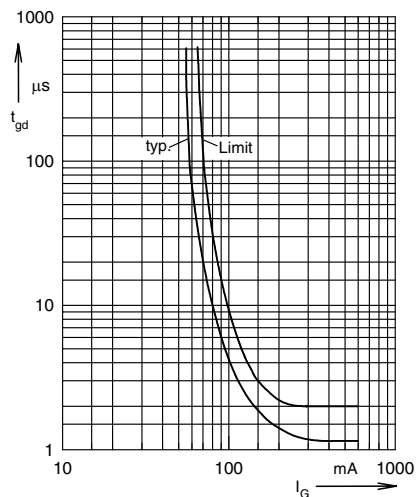
Fig. 2   Gate controlled delay time t_{gd}
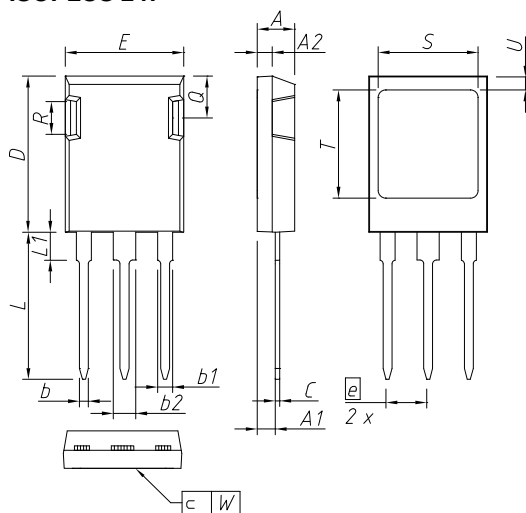
TO-247 AD
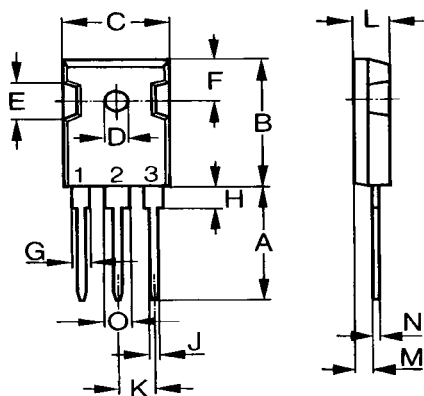
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.40	6.20	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.50	-	0.177
J	1.00	1.40	0.040	0.055
K	10.80	11.00	0.426	0.433
L	4.70	5.30	0.185	0.209
M	0.40	0.80	0.016	0.031
N	1.50	2.49	0.087	0.102

Dimensions (1 mm = 0.0394")

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
b1	1,91	2,15	0,075	0,085
b2	2,92	3,20	0,115	0,126
C	0,61	0,83	0,024	0,033
D	20,80	21,34	0,819	0,840
E	15,75	16,13	0,620	0,635
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	4,32	4,85	0,170	0,191
S	13,21	13,72	0,520	0,540
T	15,75	16,26	0,620	0,640
U	1,65	2,03	0,065	0,080
W	-	0,10	-	0,004

The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side
This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except Lmax.

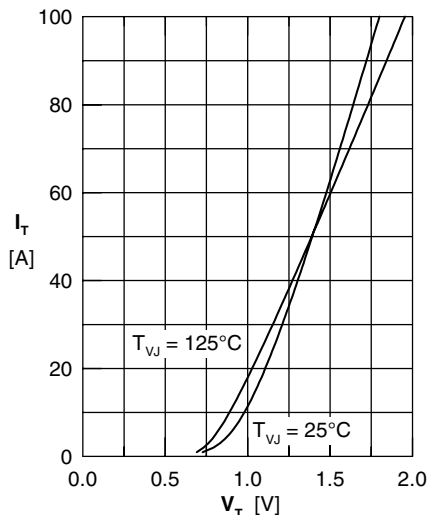IXYS reserves the right to change limits, test conditions and dimensions.
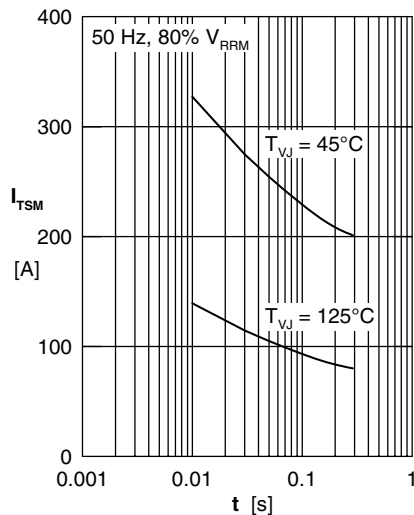
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Fig. 3   Forward characteristics

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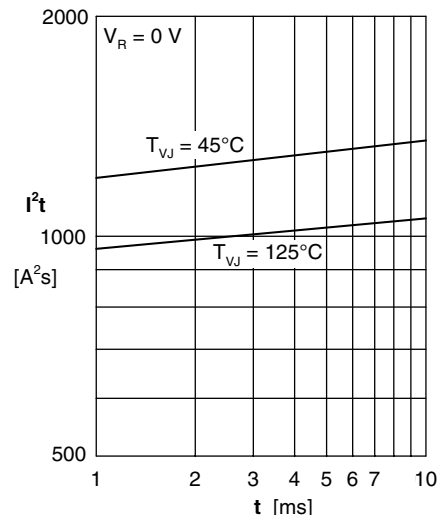I_{TSM}: crest value, t: duration

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

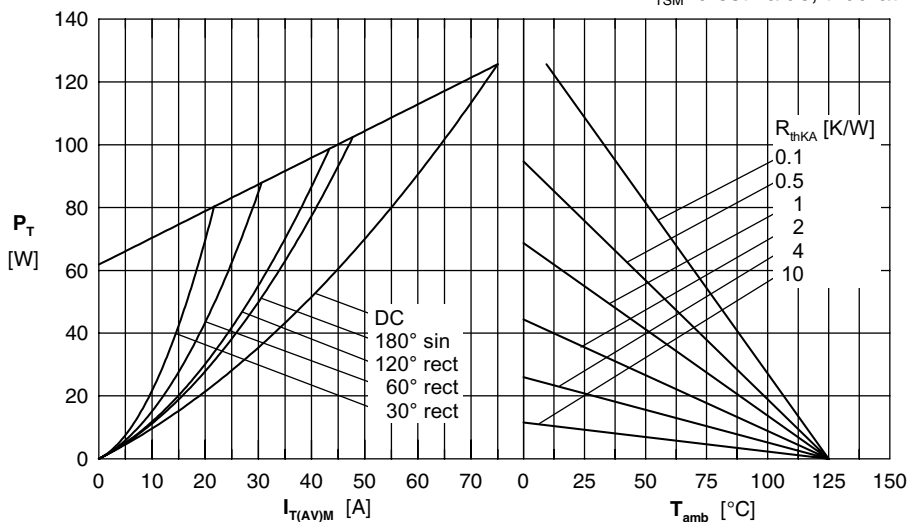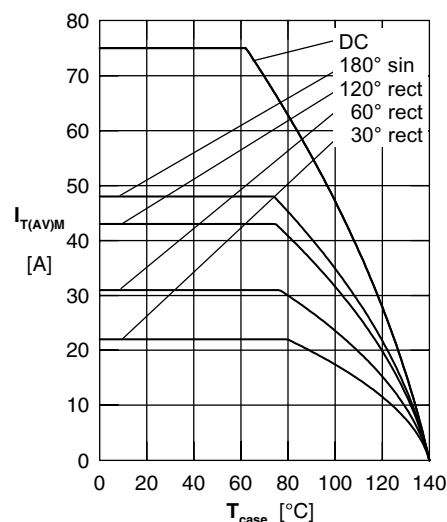Fig. 6   Power dissipation versus forward current and ambient temperature

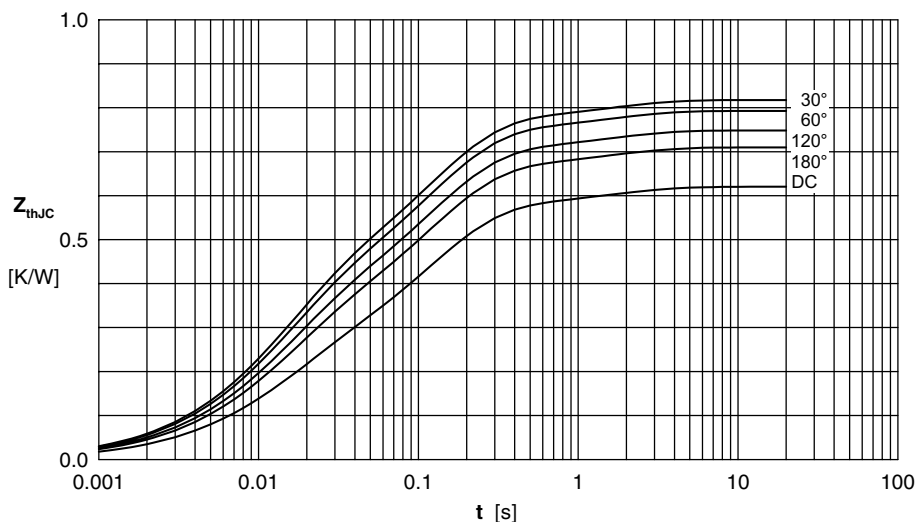Fig. 7   Max. forward current at case temperature

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

Fig. 8   Transient thermal impedance junction to case

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