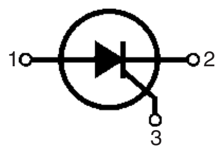
Phase Control Thyristors

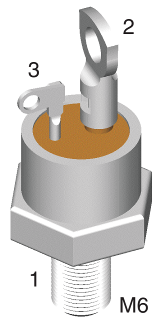
V_{RRM} = 800-1600 V
$I_{T(RMS)}$ = 50 A
$I_{T(AV)M}$ = 32 A

Type	Replacements
CS23-08io2	MCO25-12io1; MCO50-12io1; CLA50E1200HB
CS23-12io2	MCO25-12io1; MCO50-12io1; CLA50E1200HB
CS23-16io2	MCO25-16io1; MCO50-16io1; CMA50E1600HB

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
900	800	CS 23-08io2
1300	1200	CS 23-12io2
1700	1600	CS 23-16io2



TO-208AA
(TO-48)



1 = Anode, 2 = Cathode, 3 = Gate

Symbol	Test Conditions		Maximum Ratings	
$I_{T(RMS)}$	$T_{VJ} = T_{VJM}$		50	A
$I_{T(AV)M}$	T_{case} = 85°C; 180° sine		25	A
	T_{case} = 69°C; 180° sine		32	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	450	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	480	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	400	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	430	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1010	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	970	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	800	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	770	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f = 50 Hz, t_P = 200 µs $V_D = 2/3\ V_{DRM}$	repetitive, I_T = 75 A	150	A/µs
	I_G = 0.3 A di_G/dt = 0.3 A/µs	non repetitive, $I_T = I_{T(AV)M}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $R_{GK} = \infty$; method 1 (linear voltage rise)	$V_{DR} = 2/3\ V_{DRM}$	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
$P_{G(AV)}$			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		2.7-3.3	Nm
			24-29	lb.in.
Weight			12	g

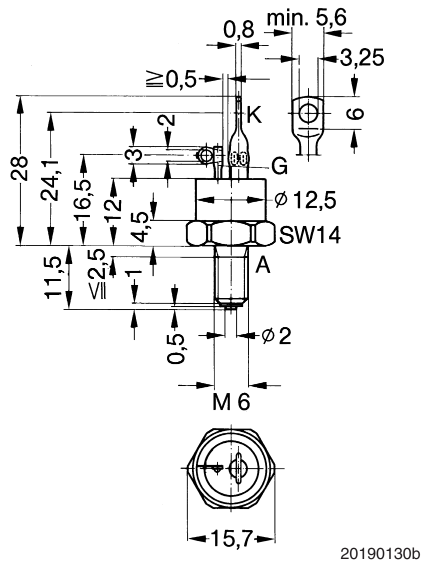
Data according to IEC 60747

Features
- Thyristor for line frequencies
- International standard package JEDEC TO-208AA
- Planar glassivated chip
- Long-term stability of blocking currents and voltages

Applications
- Motor control
- Power converter
- AC power controller

Advantages
- Space and weight savings
- Simple mounting
- Improved temperature and power cycling

Dimensions in mm (1 mm = 0.0394")



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Symbol	Test Conditions		Characteristic Values		
I_R, I_D	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		≤	3	mA
V_T	I_T = 80 A; T_{VJ} = 25°C		≤	1.8	V
V_{T0}	For power-loss calculations only (T_{VJ} = 125°C)			1.0	V
r_T				10	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	2.5	V
		T_{VJ} = -40°C	≤	3.5	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	≤	50	mA
		T_{VJ} = -40°C	≤	80	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	≤	0.2	V
I_{GD}			≤	1	mA
I_L	T_{VJ} = 25°C; t_P = 10 µs I_G = 0.15 A; di_G/dt = 0.15 A/µs		≤	200	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; $R_{GK} = \infty$		≤	100	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.15 A; di_G/dt = 0.15 A/µs		≤	2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 25 A, t_P = 300 µs; di/dt = -20 A/µs V_R = 100 V; dv/dt = 20 V/µs; V_D = 2/3 V_{DRM}		typ.	60	µs
R_{thJC}	DC current			1.0	K/W
R_{thJH}	DC current			1.61	K/W
d_S	Creepage distance on surface			1.5	mm
d_A	Strike distance through air			1.5	mm
a	Max. acceleration, 50 Hz			50	m/s^2

Accessories:
Nut M6 DIN 439/SW14
Lock washer A6 DIN 128

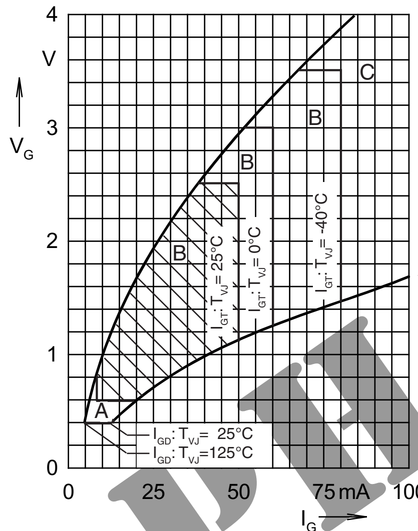

Fig. 1 Gate voltage and gate current
Triggering:
A = no; B = possible; C = safe

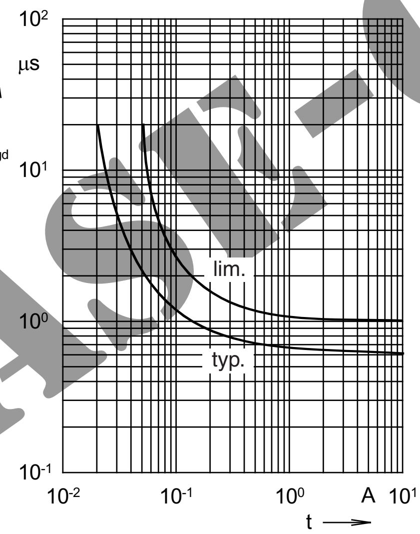

Fig. 2 Gate controlled delay time t_{gd}

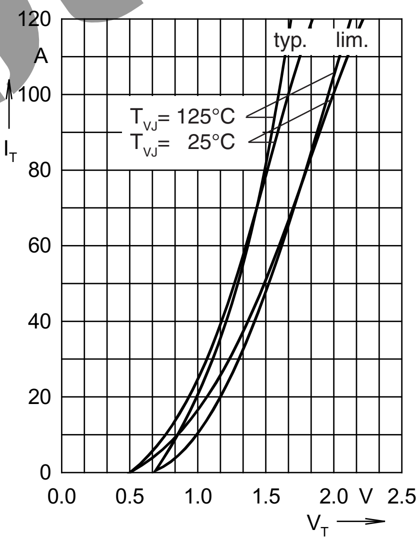

Fig. 3 On-state characteristics

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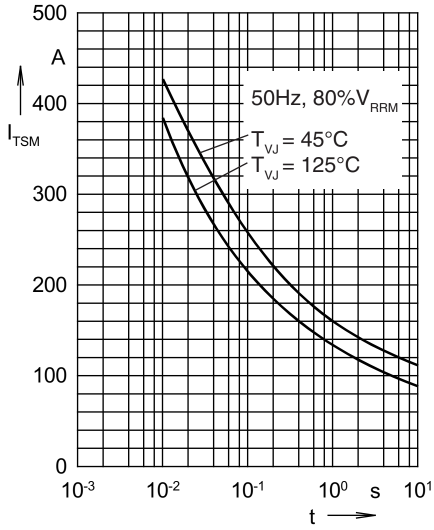

Fig. 4 Surge overload current
I_{TSM}: crest value, t: duration

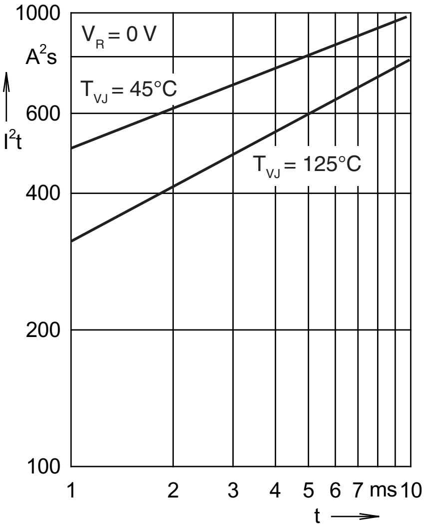

Fig. 5 I^2t versus time (1-10 ms)

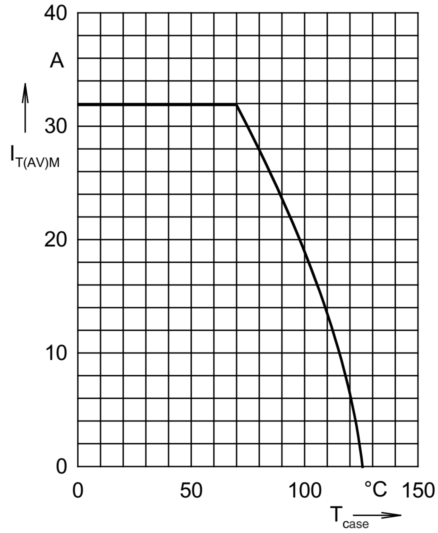

Fig. 6 Maximum forward current at case temperature 180° sine

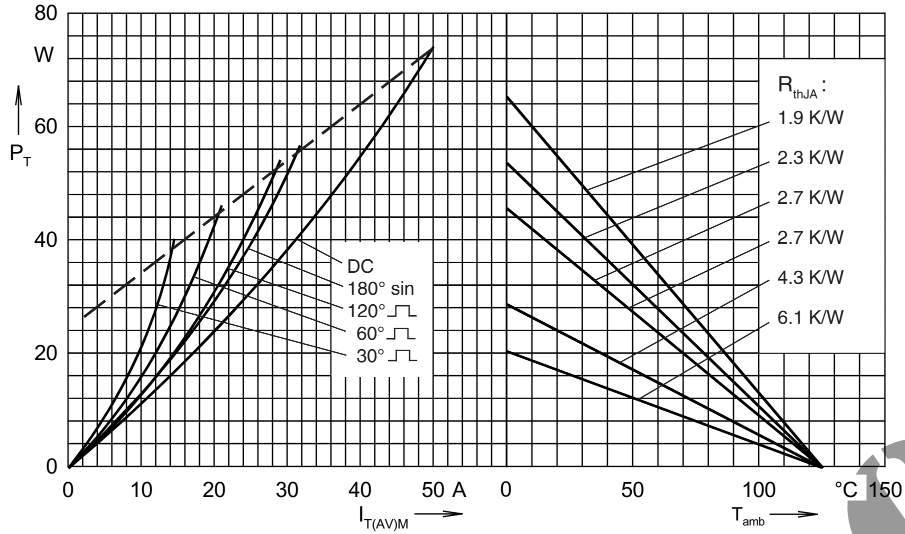

Fig. 7 Power dissipation versus on-state current and ambient temperature

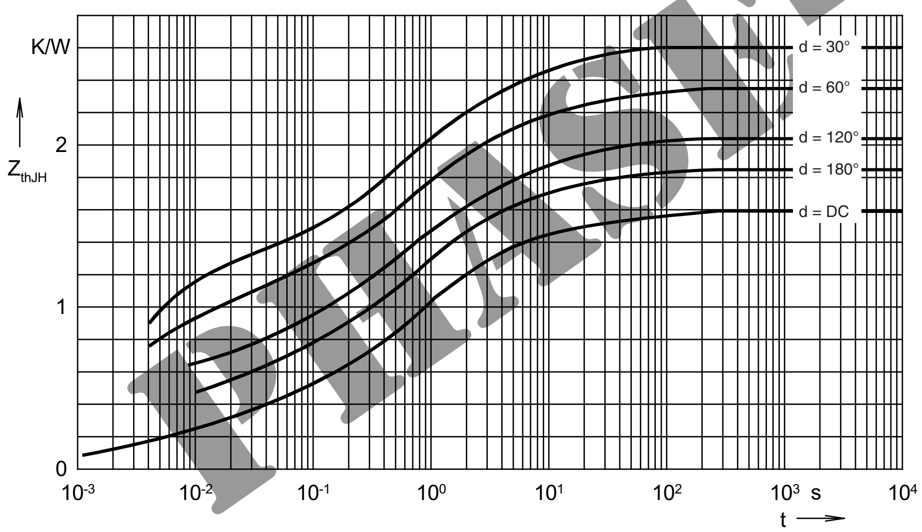

Fig. 8 Transient thermal impedance junction to heatsink

R_{thJH} for various conduction angles d:

d	R_{thJH} (K/W)
DC	1.61
180°	1.85
120°	2.03
60°	2.35
30°	2.60

Constants for Z_{thJH} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.224	0.003
2	0.132	0.028
3	0.321	0.216
4	0.522	1.1
5	0.249	4.2
6	0.162	43.2

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