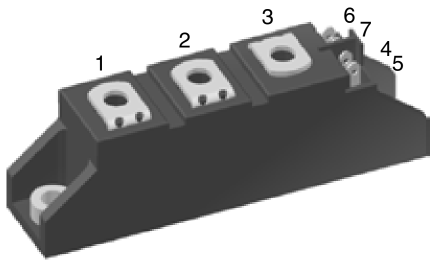
Thyristor Modules
Thyristor/Diode Modules

I_{TRMS} = 2x 180 A
I_{TAVM} = 2x 116 A
V_{RRM} = 800-1800 V

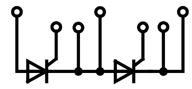
V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type Version	1B / 8B	Version	1B / 8B
900	800	MCC 95-08	io1B / io8B	MCD 95-08	io1B / io8B
1300	1200	MCC 95-12	io1B / io8B	MCD 95-12	io1B / io8B
1500	1400	MCC 95-14	io1B / io8B	MCD 95-14	io1B / io8B
1700	1600	MCC 95-16	io1B / io8B	MCD 95-16	io1B / io8B
1900	1800	MCC 95-18	io1B / io8B	MCD 95-18	io1B / io8B



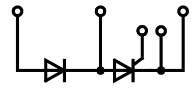
Symbol	Conditions			Maximum Ratings	
I_{TRMS}, I_{FRMS}	$T_{VJ} = T_{VJM}$			180	A
I_{TAVM}, I_{FAVM}	T_C = 85°C; 180° sine			116	A
I_{TSM}, I_{FSM}	T_{VJ} = 45°C	t = 10 ms	(50 Hz)	2250	A
	V_R = 0	t = 8.3 ms	(60 Hz)	2400	A
	$T_{VJ} = T_{VJM}$	t = 10 ms	(50 Hz)	2000	A
	V_R = 0	t = 8.3 ms	(60 Hz)	2150	A
I^2t	T_{VJ} = 45°C	t = 10 ms	(50 Hz)	25 300	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz)	23 900	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms	(50 Hz)	20 000	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz)	19 100	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f = 50 Hz; t_p = 200 µs;	repetitive, I_T = 250 A		150	A/µs
	$V_D = {}^2/_3 V_{DRM}$; I_G = 0.45 A; di_G/dt = 0.45 A/µs	non repetitive, $I_T = I_{TAVM}$		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 µs			10	W
	$I_T = I_{T(AV)M}$; t_p = 500 µs			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
V_{ISOL}	50/60 Hz, RMS	t = 1 min		3000	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s		3600	V~
M_d	Mounting torque (M5)			2.5 - 4	Nm
	Terminal connection torque (M5)			2.5 - 4	Nm
Weight	Typical including screws			85	g

Data according to IEC 60747 and refer to a single diode unless otherwise stated.

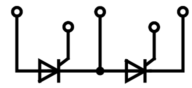
MCC Version 1



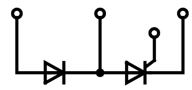
MCD Version 1



MCC Version 8



MCD Version 8



Features
- International standard package, JEDEC TO-240 AA
- Direct copper bonded Al_2O_3 -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Gate-cathode twin pins for version 1

Applications
- DC Motor control
- Softstart AC motor controller
- Light, heat and temperature control

Advantages
- Space and weight savings
- Simple mounting with two screws
- Improved temperature & power cycling
- Reduced protection circuits

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

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Symbol	Conditions		Characteristic Values typ.	max.	
I_{RRM}, I_{DRM}	V_R / V_D = V_{RRM} / V_{DRM}	T_{VJ} = T_{VJM}		5	mA
V_T, V_F	I_T / I_F = 300 A	T_{VJ} = 25°C		1.5	V
V_{T0}	For power-loss calculations only			0.8	V
r_t		T_{VJ} = T_{VJM}		2.4	mΩ
V_{GT}	V_D = 6 V	T_{VJ} = 25°C		2.5	V
		T_{VJ} = -40°C		2.6	V
I_{GT}	V_D = 6 V	T_{VJ} = 25°C		150	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; V_D = 6 V I_G = 0.45 A; di_G/dt = 0.45 A/µs	T_{VJ} = 25°C		450	mA
I_H	V_D = 6 V; R_{GK} = ∞;	T_{VJ} = 25°C		200	mA
t_{gd}	V_D = ½V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs	T_{VJ} = 25°C		2	µs
t_q	V_D = $^2/_3$ V_{DRM} dv/dt = 20 V/µs; -di/dt = 10 A/µs I_T = 150 A; V_R = 100 V; t_p = 200 µs	T_{VJ} = T_{VJM}	185		µs
Q_S	I_T / I_F = 50 A; -di/dt = 6 A/µs	T_{VJ} = T_{VJM}		170	µC
I_{RM}				45	A
R_{thJC}	per thyristor; DC current	other values see Fig. 8/9		0.22	K/W
	per module			0.11	K/W
R_{thJK}	per thyristor; DC current			0.42	K/W
	per module			0.21	K/W
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.6	mm
a	Maximum allowable acceleration			50	m/s²

Optional accessories for modules

Coded gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **ZY 200L** (L = Left for pin pair 4/5) UL 758, style 1385,
Type **ZY 200R** (R = Right for pin pair 6/7) CSA class 5851, guide 460-1-1

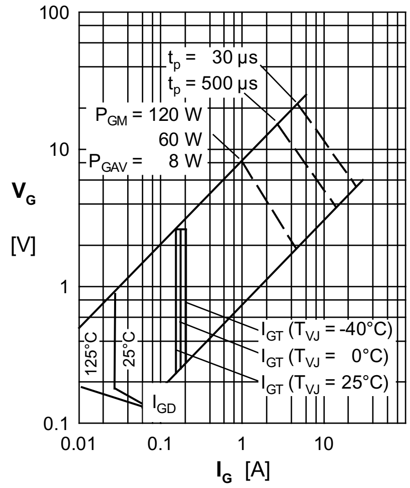


Fig. 1 Gate trigger characteristics

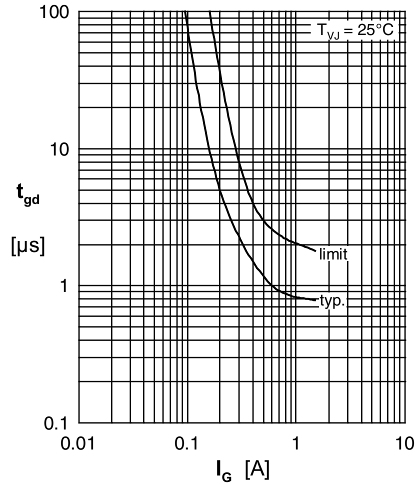
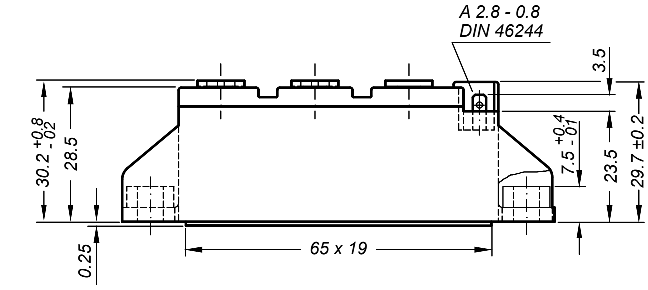


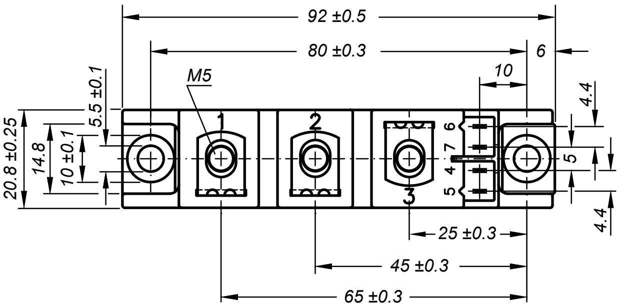
Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394“)

MCC... Version 1B

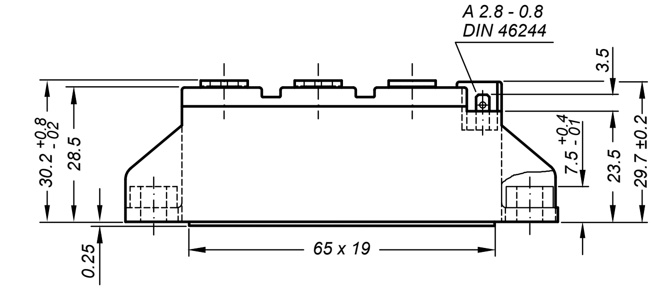


General tolerance: DIN ISO 2768 class „c“

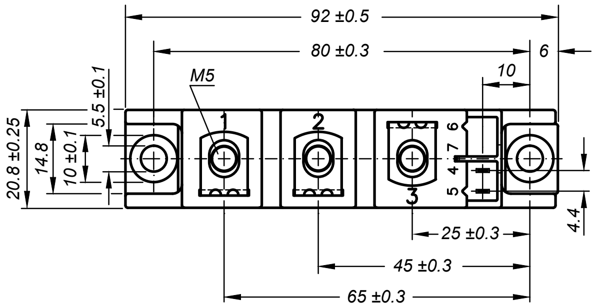


Optional accessories: Keyed gate/cathode twin plugs
Wire length: 350 mm, gate = yellow, cathode = red
UL 758, style 1385, CSA class 5851, guide 460-1-1
*Type **ZY 200L** (L = Left for pin pair 4/5)*
*Type **ZY 200R** (R = Right for pin pair 6/7)*

MCD... Version 1B

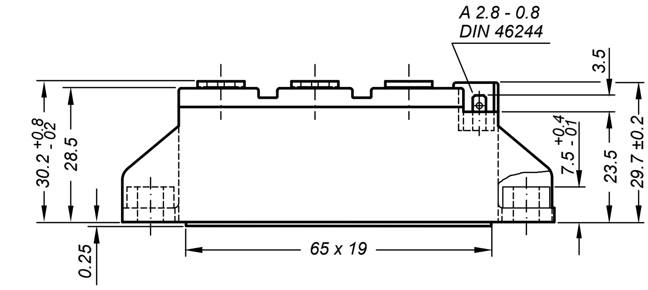


General tolerance: DIN ISO 2768 class „c“

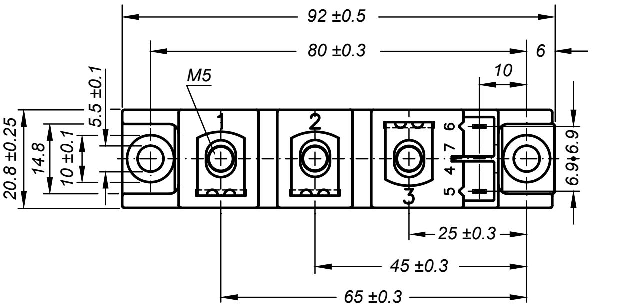


Optional accessories: Keyed gate/cathode twin plugs
Wire length: 350 mm, gate = yellow, cathode = red
UL 758, style 1385, CSA class 5851, guide 460-1-1
*Type **ZY 200L** (L = Left for pin pair 4/5)*

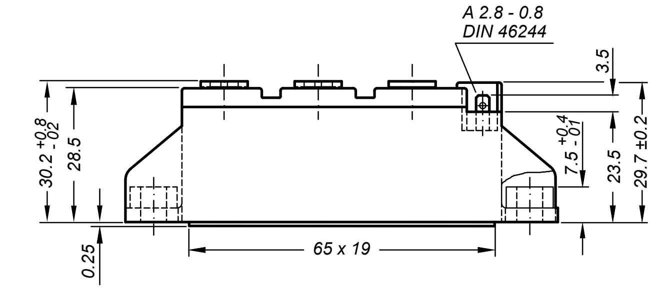
MCC... Version 8B



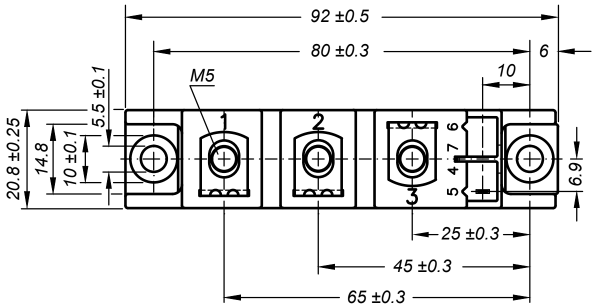
General tolerance: DIN ISO 2768 class „c“



MCD... Version 8B



General tolerance: DIN ISO 2768 class „c“



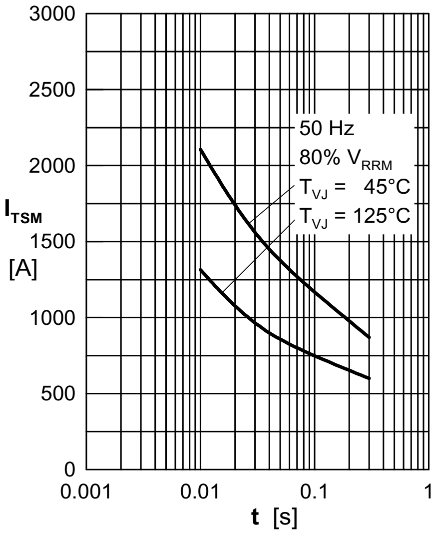


Fig. 3 Surge overload current I_{TSM}, I_{FSM}: Crest value, t: duration

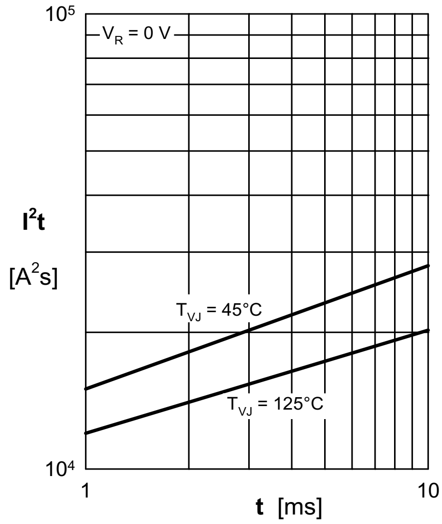


Fig. 4 I^2t versus time (1-10 ms)

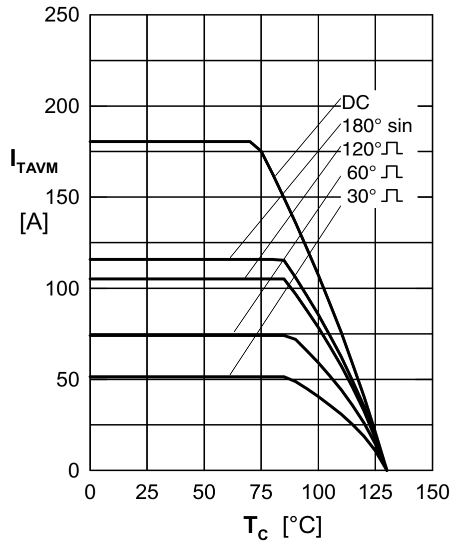


Fig. 4a Maximum forward current at case temperature

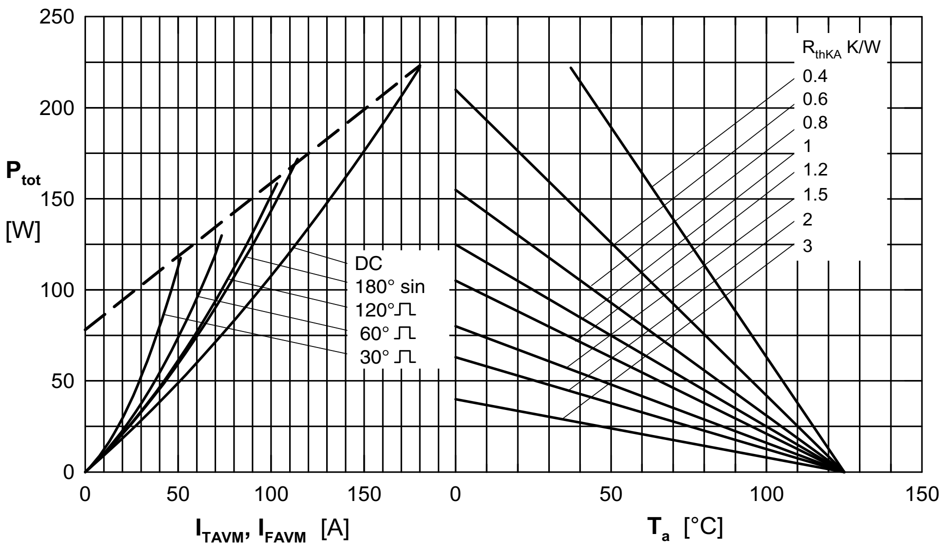


Fig. 5 Power dissipation versus on-state current & ambient temperature (per thyristor or diode)

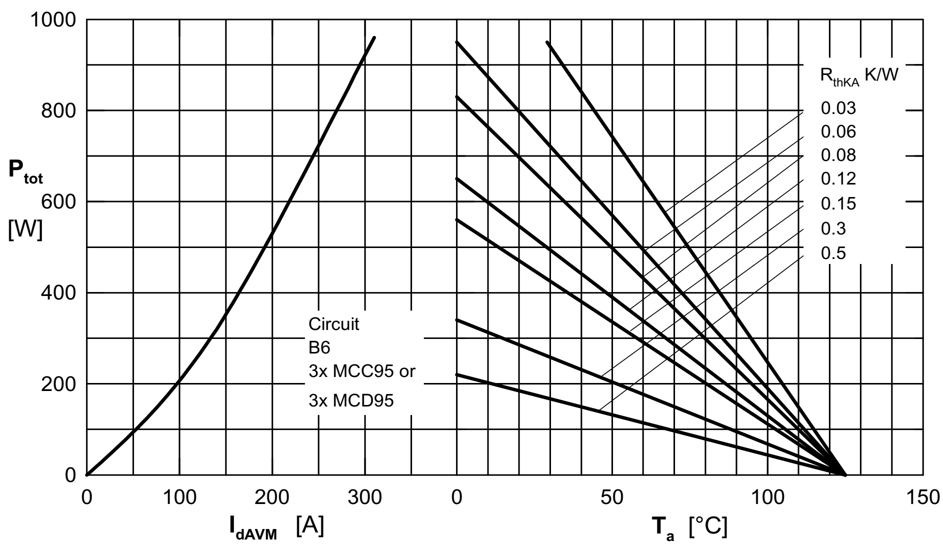


Fig. 6 Three phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature

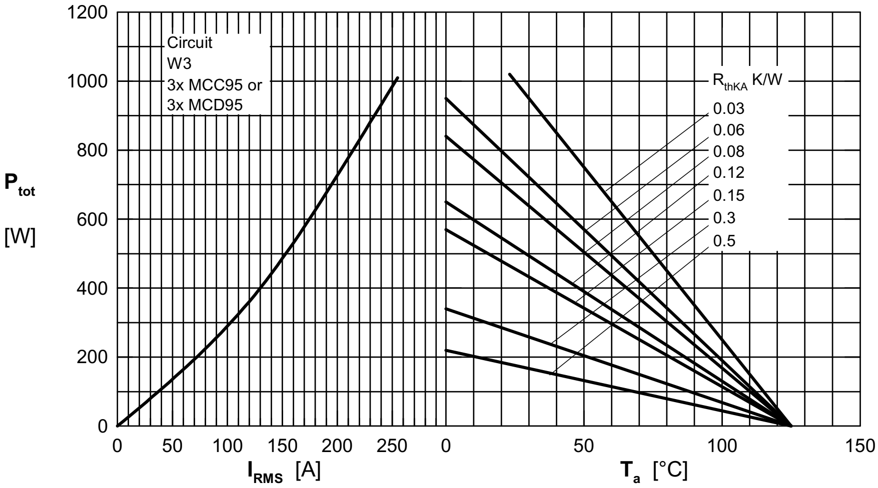


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

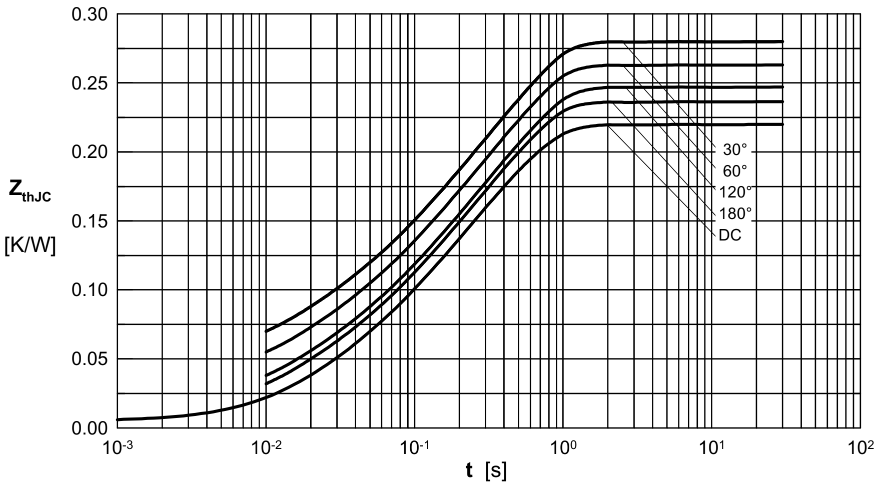


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.22
180°	0.23
120°	0.25
60°	0.27
30°	0.28

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344

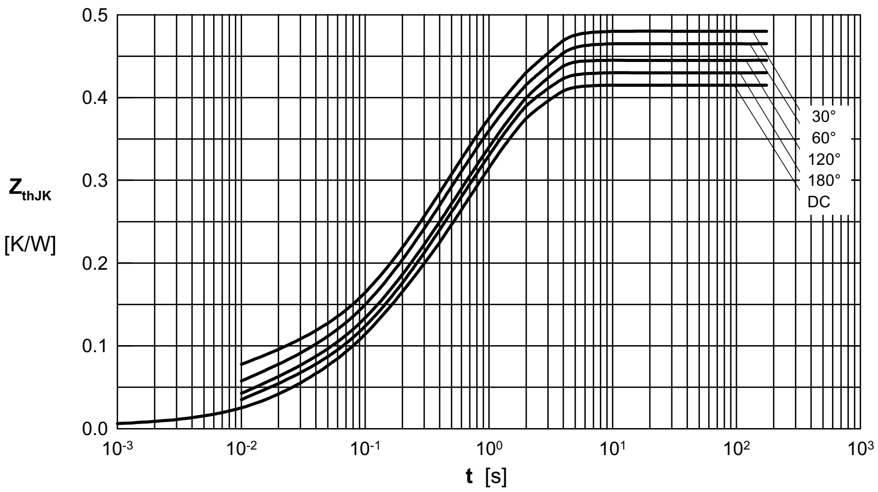


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.42
180°	0.43
120°	0.45
60°	0.47
30°	0.48

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344
4	0.2	1.32