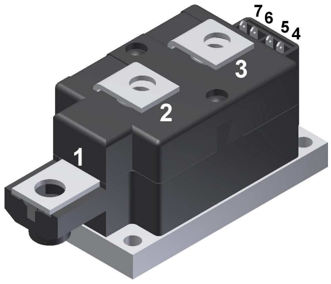
Thyristor Module

V_{RRM} = 2x 1200 V
I_{TAV} = 220 A
V_T = 1.18 V

Phase leg

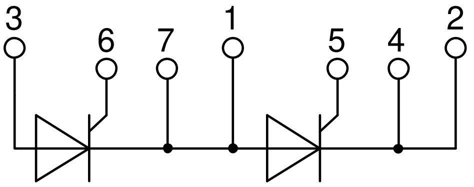
Part number

MCC225-12io1



Backside: isolated

E72873



Features / Advantages:

- International standard package
- Direct copper bonded Al2O3-ceramic with copper base plate
- Planar passivated chip
- Keyed gate/cathode twin pins

Applications:

- Motor control, softstarter
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Solid state switches

Package: Y1

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: Copper internally DCB isolated
- Advanced power cycling

Disclaimer Notice

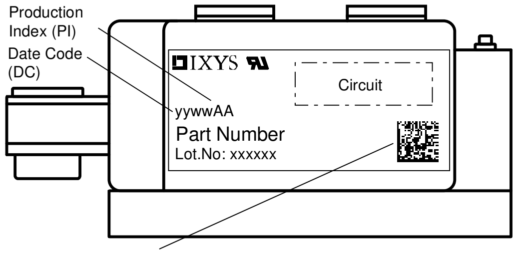
Rectifier

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1300	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1200	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 1200 V	T_{VJ} = 25°C			1	mA
		$V_{R/D}$ = 1200 V	T_{VJ} = 125°C			40	mA
V_T	*forward voltage drop*	I_T = 200 A	T_{VJ} = 25°C			1.04	V
		I_T = 400 A				0.97	V
		I_T = 200 A	T_{VJ} = 125°C			1.18	V
		I_T = 400 A				1.14	V
I_{TAV}	*average forward current*	T_C = 85°C	T_{VJ} = 140°C			220	A
$I_{T(RMS)}$	*RMS forward current*	180° sine				400	A
V_{T0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 140°C			0.79	V
r_T	*slope resistance*					0.83	mΩ
R_{thJC}	*thermal resistance junction to case*					0.157	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.04		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			730	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			8.00	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			8.64	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			6.80	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			7.35	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			320.0	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			310.5	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			231.2	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			224.4	kA²s
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		366		pF
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 140°C			120	W
		t_P = 500 µs				60	W
P_{GAV}	*average gate power dissipation*					20	W
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 140 °C; f = 50 Hz	repetitive, I_T = 660 A			100	A/µs
		t_P = 200 µs; di_G/dt = 1 A/µs;					
		I_G = 1 A; V = ⅔ V_{DRM}	non-repet., I_T = 220 A			500	A/µs
$(dv/dt)_{cr}$	*critical rate of rise of voltage*	V = ⅔ V_{DRM}	T_{VJ} = 140°C			1000	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	*gate trigger voltage*	V_D = 6 V	T_{VJ} = 25°C			2	V
			T_{VJ} = -40°C			3	V
I_{GT}	*gate trigger current*	V_D = 6 V	T_{VJ} = 25°C			150	mA
			T_{VJ} = -40°C			220	mA
V_{GD}	*gate non-trigger voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 140°C			0.25	V
I_{GD}	*gate non-trigger current*					10	mA
I_L	*latching current*	t_p = 30 µs	T_{VJ} = 25°C			200	mA
		I_G = 0.45 A; di_G/dt = 0.45 A/µs					
I_H	*holding current*	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			150	mA
t_{gd}	*gate controlled delay time*	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 1 A; di_G/dt = 1 A/µs					
t_q	*turn-off time*	V_R = 100 V; I_T = 220A; V = ⅔ V_{DRM}	T_{VJ} = 125 °C		200		µs
		di/dt = 10 A/µs dv/dt = 50 V/µs t_p = 200 µs					

Data according to IEC 60747and per semiconductor unless otherwise specified

Package Y1

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				600	A
T_{VJ}	*virtual junction temperature*			-40		140	°C
T_{op}	*operation temperature*			-40		125	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					680		g
M_D	*mounting torque*			4.5		7	Nm
M_T	*terminal torque*			11		13	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	16.0			mm
$d_{Spb/Apb}$			*terminal to backside*	16.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \le 1$ mA	3600			V
		t = 1 minute		3000			V



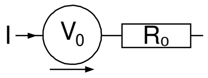
Data Matrix: *part no.* (1-19), DC + *PI* (20-25), *lot.no.#* (26-31), *blank* (32), *serial no.#* (33-36)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCC225-12io1	MCC225-12io1	Box	3	463280

Equivalent Circuits for Simulation

** on die level*

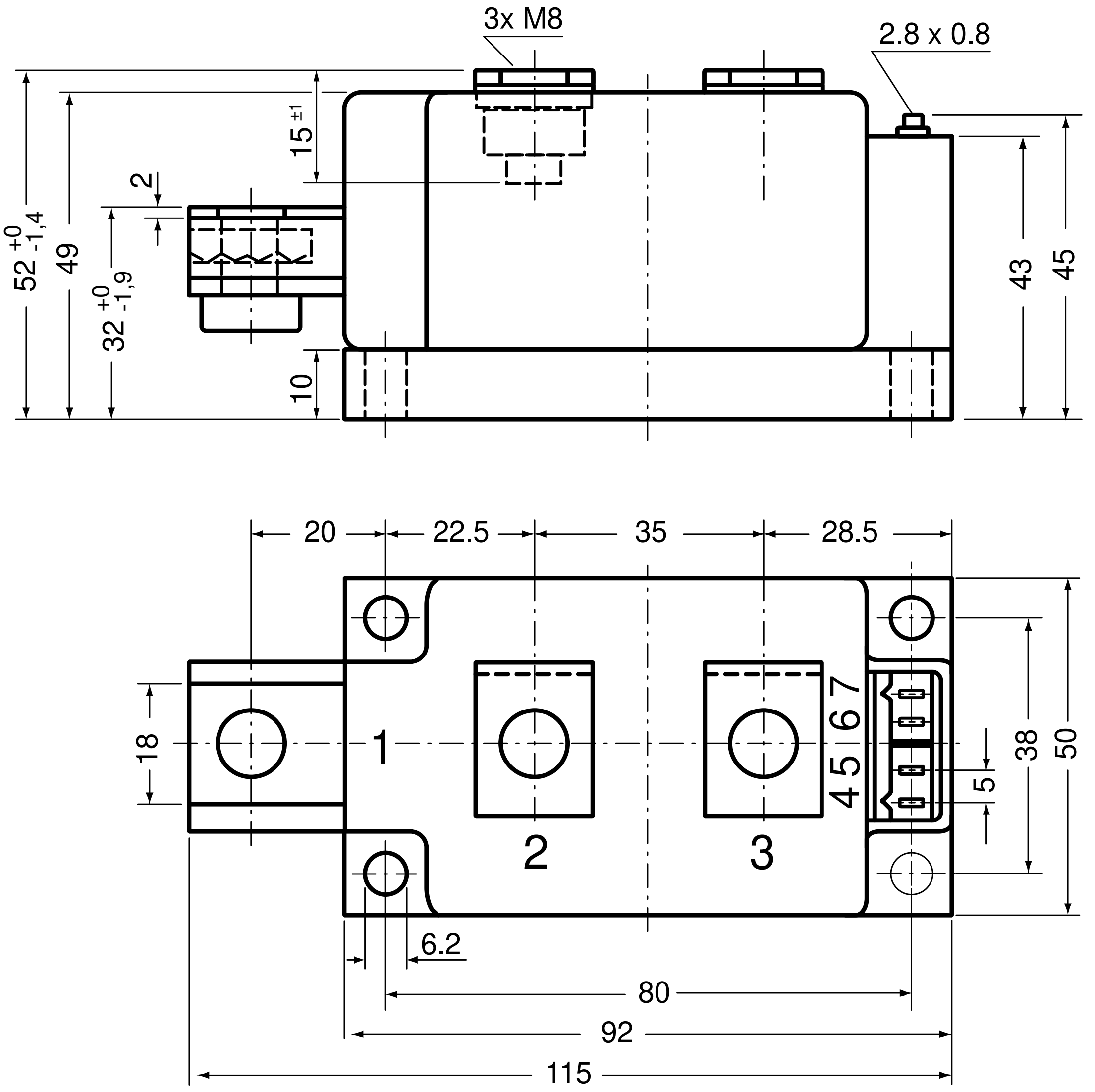
$T_{VJ} = 140°C$



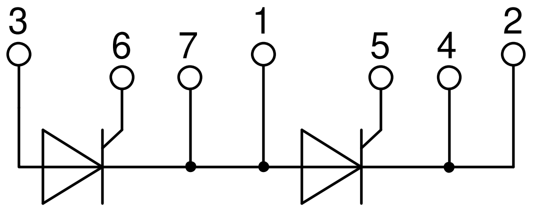
Thyristor

$V_{0\ max}$	*threshold voltage*	0.79	V
$R_{0\ max}$	*slope resistance **	0.64	mΩ

Outlines Y1



Optional accessories for modules
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red
Type ZY 180L (L = Left for pin pair 4/5) } UL 758, style 3751
Type ZY 180R (R = Right for pin pair 6/7)



Thyristor

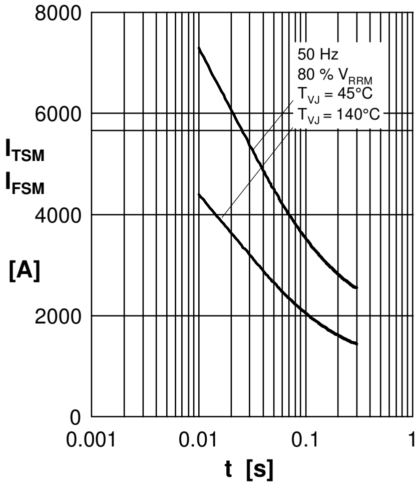


Fig. 1 Surge overload current
$I_{TSM/FSM}$: Crest value, t: duration

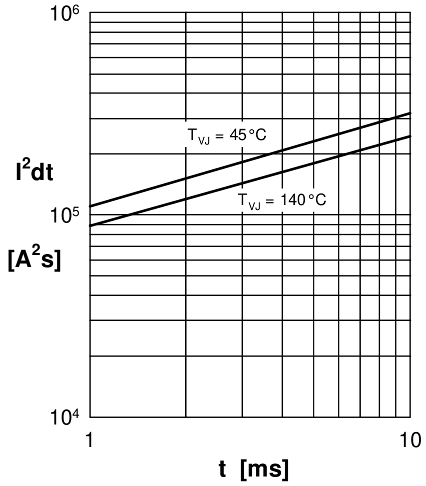


Fig. 2 I^2dt versus time

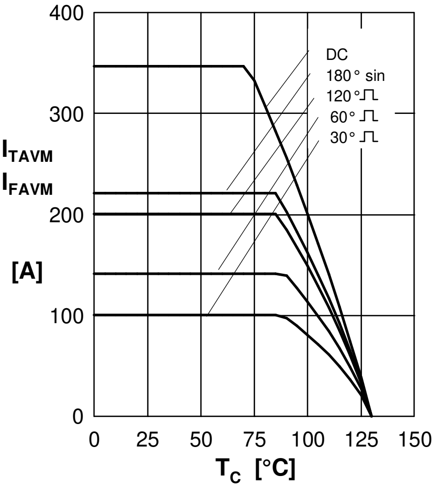


Fig. 3 Max. forward current
at case temperature

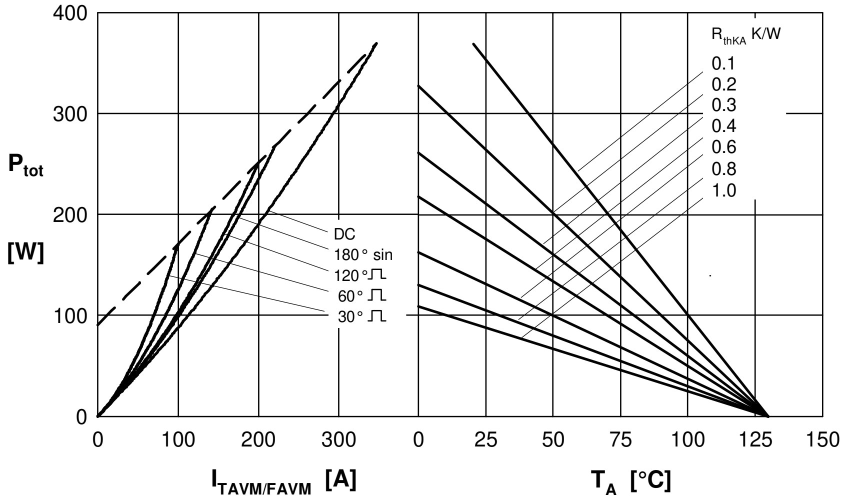


Fig. 4 Power dissipation versus on-state current and
ambient temperature (per thyristor or diode)

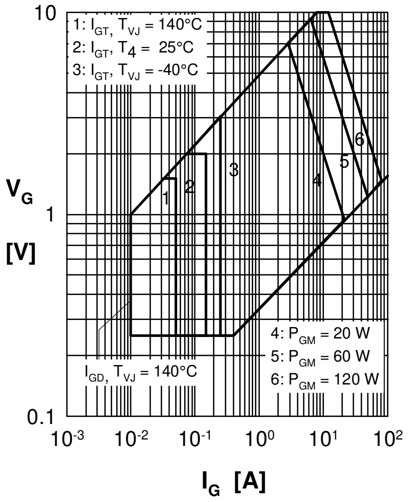


Fig. 5 Gate voltage and current

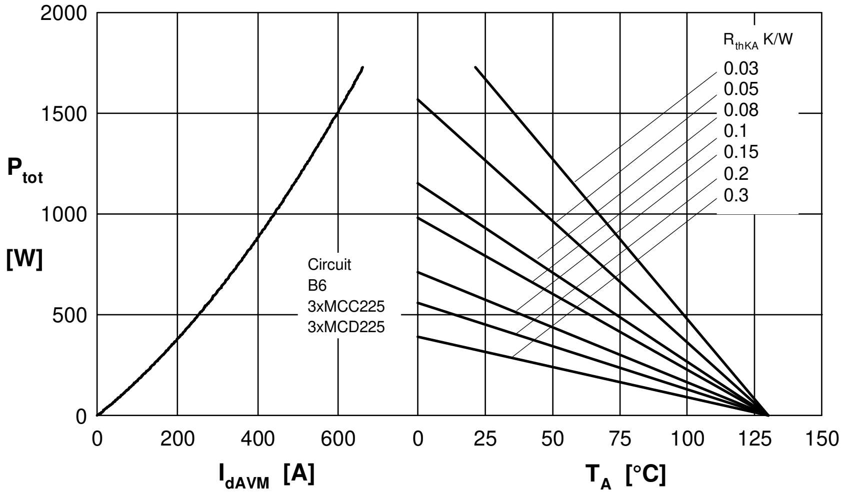


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct
output current and ambient temperature

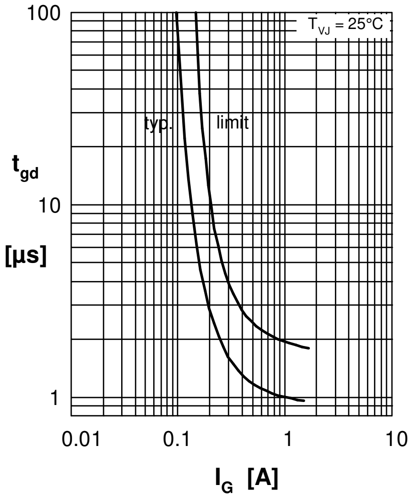


Fig. 7 Gate trigger characteristics

Rectifier

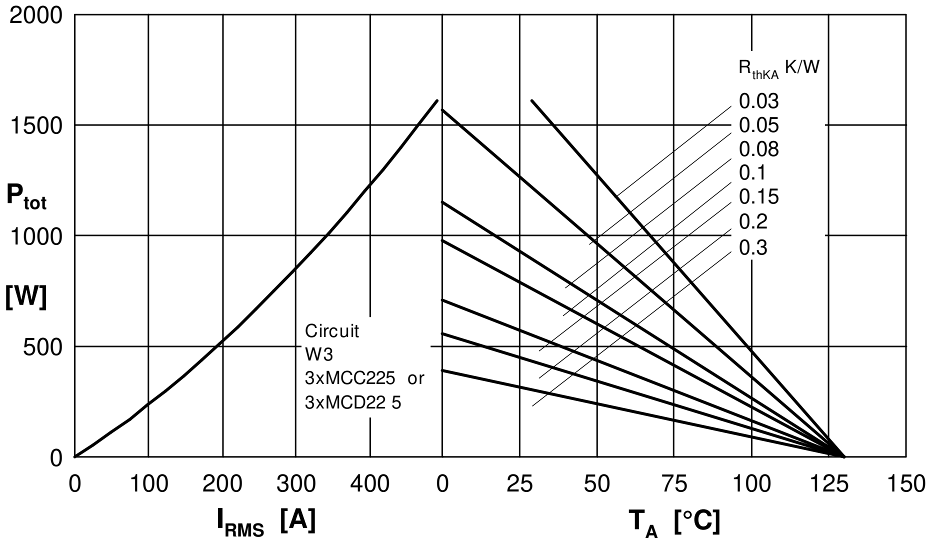


Fig. 8 Three phase AC-controller: Power dissipation versus R_{MS} output current and ambient temperature

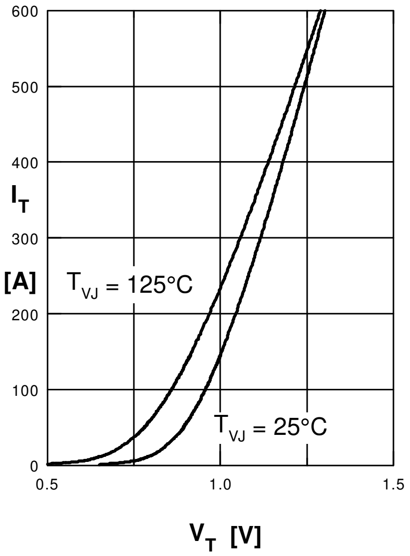


Fig. 9 Forward characteristics

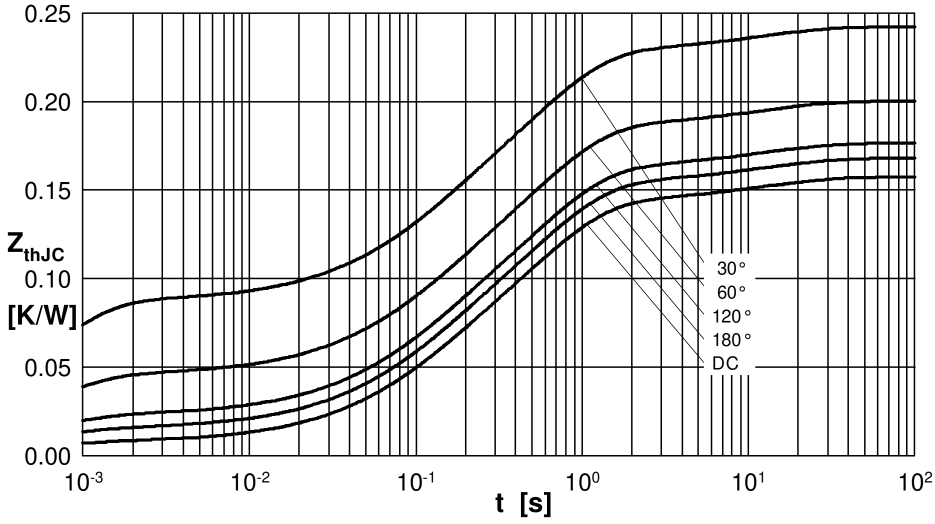


Fig. 10 Transient thermal impedance junction to case (per thyristor/diode)

R_{thJC} for various conduct. angles d:

d	R_{thJC} (K/W)
DC	0.157
180°	0.168
120°	0.177
60°	0.200
30°	0.243

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0076	0.00054
2	0.0406	0.09800
3	0.0944	0.54000
4	0.0147	12.0000

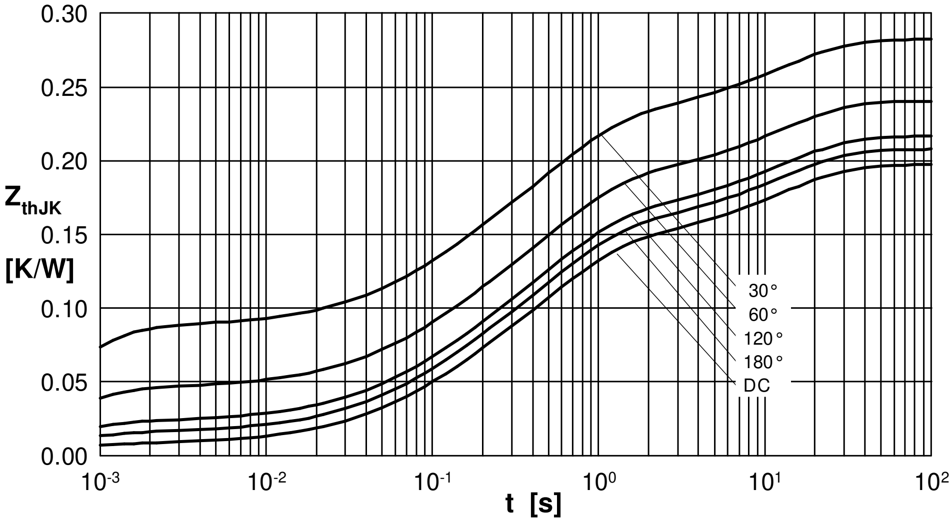


Fig. 11 Transient thermal impedance junction to heatsink (per thyristor/diode)

R_{thJK} for various conduct. angles d:

d	R_{thJK} (K/W)
DC	0.197
180°	0.208
120°	0.217
60°	0.240
30°	0.283

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0076	0.00054
2	0.0406	0.09800
3	0.0944	0.54000
4	0.0147	12.0000
5	0.0400	12.0000

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.