

Phase out

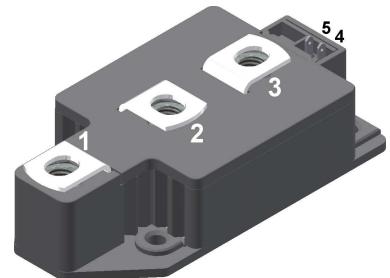
Thyristor \ Diode Module**PHASE OUT**

Phase leg

$V_{RRM} = 2 \times 1400 \text{ V}$
 $I_{TAV} = 250 \text{ A}$
 $V_T = 1.14 \text{ V}$

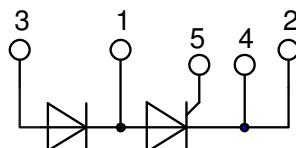
Part number

MCD220-14io1



Backside: isolated

E72873

**Features / Advantages:**

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

Applications:

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

Package: Y2

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Recommended replacement: MCD310-14io1**Terms & Conditions of usage:**

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

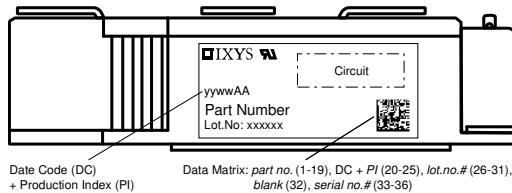
Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;
- the conclusion of quality agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Rectifier

Symbol	Definition	Conditions	Ratings			
			min.	typ.	max.	
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^\circ C$			1500	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^\circ C$			1400	V
$I_{R/D}$	reverse current, drain current	$V_{R/D} = 1400 V$ $V_{R/D} = 1400 V$	$T_{VJ} = 25^\circ C$ $T_{VJ} = 140^\circ C$		1 40	mA
V_T	forward voltage drop	$I_T = 200 A$	$T_{VJ} = 25^\circ C$		1.24	V
		$I_T = 400 A$			1.39	V
		$I_T = 200 A$ $I_T = 400 A$	$T_{VJ} = 125^\circ C$		1.14 1.33	V
I_{TAV}	average forward current	$T_C = 85^\circ C$	$T_{VJ} = 140^\circ C$		250	A
$I_{T(RMS)}$	RMS forward current	180° sine			400	A
V_{T0}	threshold voltage	$\left. \begin{array}{l} r_T \\ \text{slope resistance} \end{array} \right\} \text{for power loss calculation only}$	$T_{VJ} = 140^\circ C$		0.90	V
r_T	slope resistance				1	mΩ
R_{thJC}	thermal resistance junction to case				0.14	K/W
R_{thCH}	thermal resistance case to heatsink			0.040		K/W
P_{tot}	total power dissipation		$T_C = 25^\circ C$		820	W
I_{TSM}	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$	$T_{VJ} = 45^\circ C$		8.50	kA
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$V_R = 0 V$		9.18	kA
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$	$T_{VJ} = 140^\circ C$		7.23	kA
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$V_R = 0 V$		7.81	kA
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$ $t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$T_{VJ} = 45^\circ C$ $V_R = 0 V$		361.3 350.6	kA²s
I^2t	value for fusing	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$	$T_{VJ} = 140^\circ C$		261.0	kA²s
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$V_R = 0 V$		253.4	kA²s
C_J	junction capacitance	$V_R = 400 V$ $f = 1 \text{ MHz}$	$T_{VJ} = 25^\circ C$	438		pF
P_{GM}	max. gate power dissipation	$t_p = 30 \mu s$	$T_C = 140^\circ C$		120	W
		$t_p = 500 \mu s$			60 20	W
P_{GAV}	average gate power dissipation					
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 140^\circ C; f = 50 \text{ Hz}$	repetitive, $I_T = 750 A$		100	A/μs
		$t_p = 200 \mu s; di_G/dt = 1 A/\mu s;$				
		$I_G = 1 A; V = \frac{2}{3} V_{DRM}$	non-repet., $I_T = 250 A$		500	A/μs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140^\circ C$		1000	V/μs
		$R_{GK} = \infty$; method 1 (linear voltage rise)				
V_{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^\circ C$		2	V
			$T_{VJ} = -40^\circ C$		3	V
I_{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^\circ C$		150	mA
			$T_{VJ} = -40^\circ C$		200	mA
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140^\circ C$		0.25	V
I_{GD}	gate non-trigger current				10	mA
I_L	latching current	$t_p = 30 \mu s$ $I_G = 0.45 A; di_G/dt = 0.45 A/\mu s$	$T_{VJ} = 25^\circ C$		200	mA
I_H	holding current	$V_D = 6 V$ $R_{GK} = \infty$	$T_{VJ} = 25^\circ C$		150	mA
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^\circ C$		2	μs
$I_G = 1 A; di_G/dt = 1 A/\mu s$						
t_q	turn-off time	$V_R = 100 V; I_T = 250 A; V = \frac{2}{3} V_{DRM}$ $T_{VJ} = 125^\circ C$ $di/dt = 10 A/\mu s$ $dv/dt = 50 V/\mu s$ $t_p = 200 \mu s$		200		μs

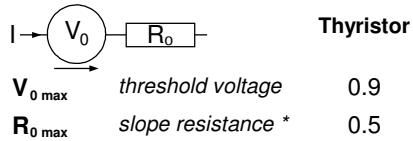
Package Y2			Ratings		
Symbol	Definition	Conditions	min.	typ.	max.
					Unit
I_{RMS}	RMS current	per terminal			600 A
T_{VJ}	virtual junction temperature		-40		140 °C
T_{op}	operation temperature		-40		125 °C
T_{stg}	storage temperature		-40		125 °C
Weight				255	g
M_D	mounting torque		2.5		5 Nm
M_T	terminal torque		12		15 Nm
$d_{Spp/App}$	creepage distance on surface / striking distance through air		terminal to terminal	13.0	mm
$d_{Spb/Apb}$			terminal to backside	13.0	mm
V_{ISOL}	isolation voltage	t = 1 second t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3600 3000	V V



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCD220-14io1	MCD220-14io1	Box	2	419281

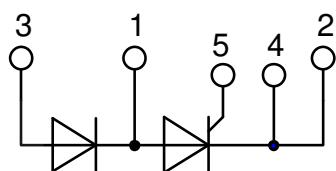
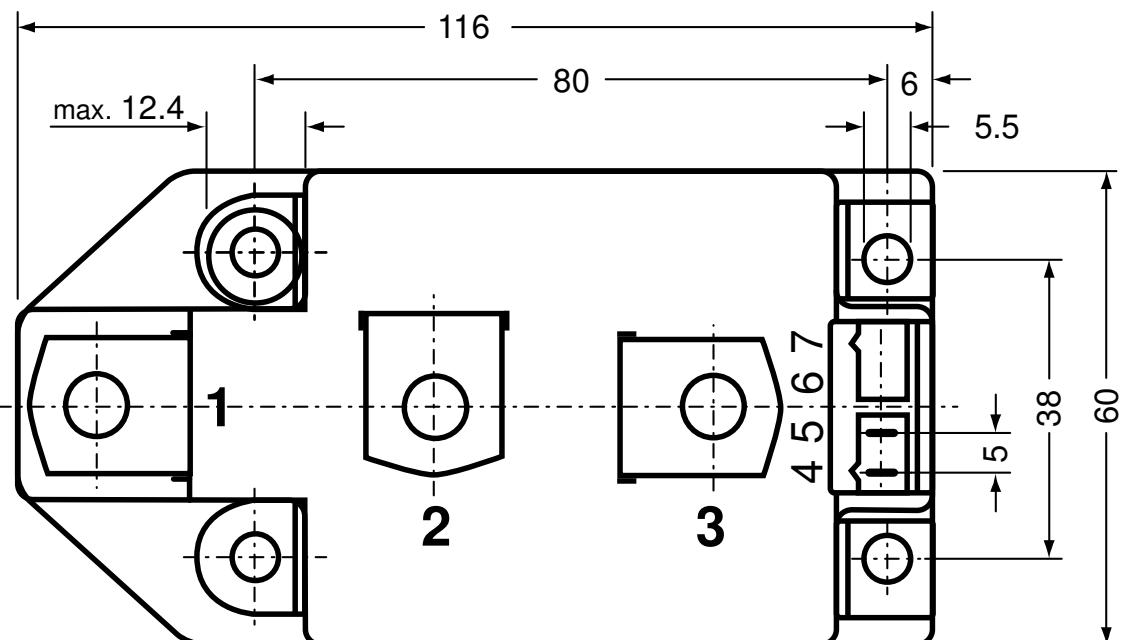
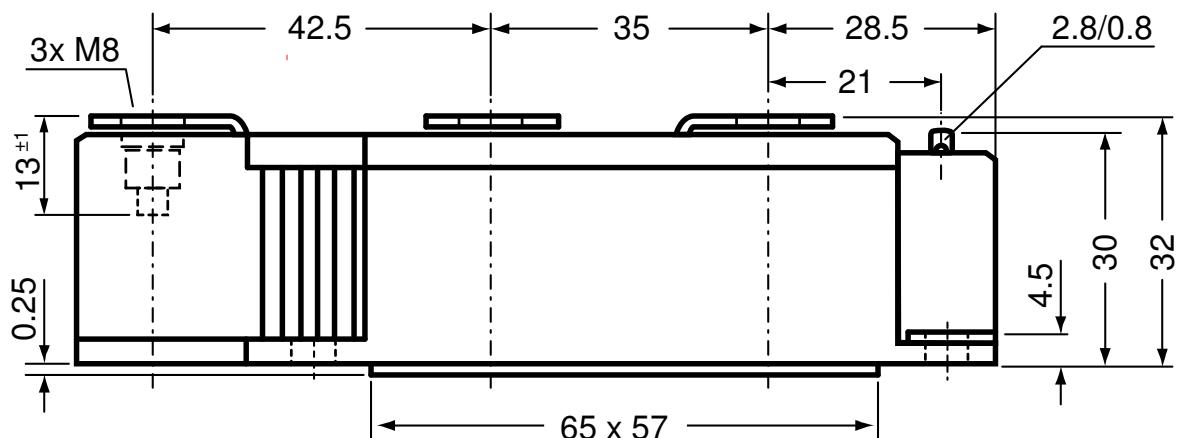
Equivalent Circuits for Simulation

* on die level

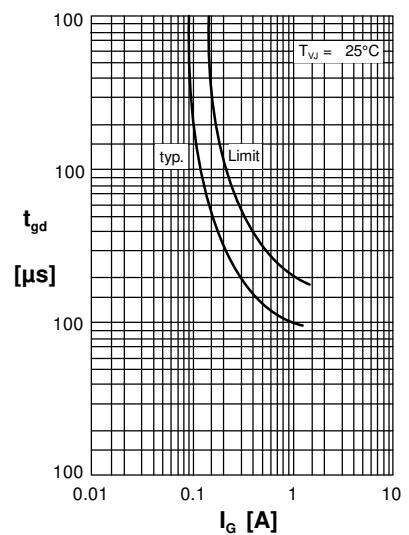
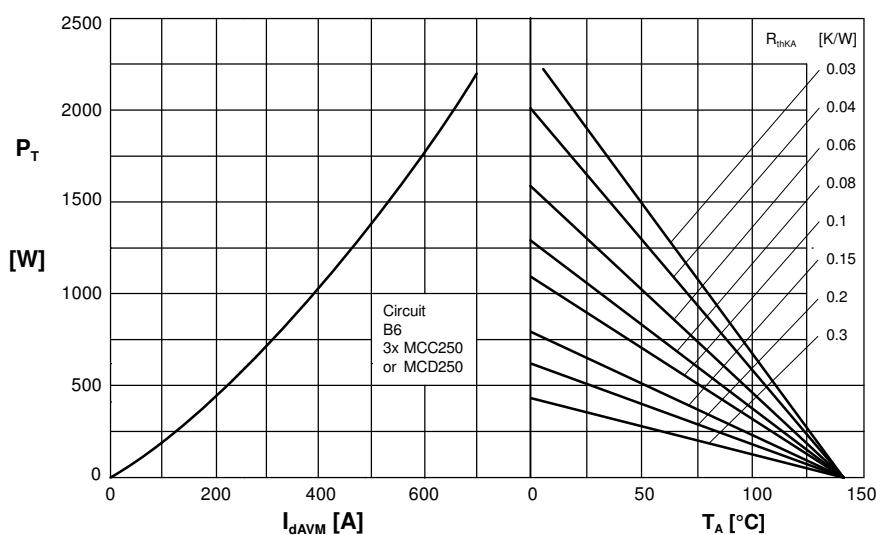
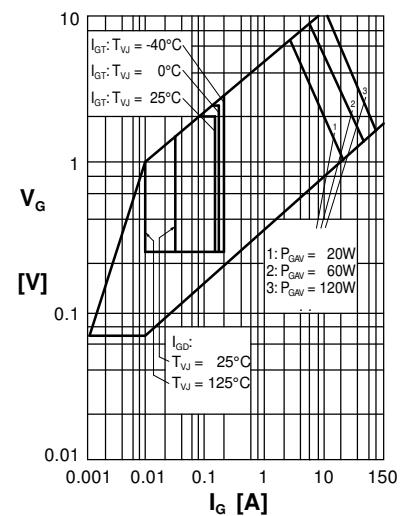
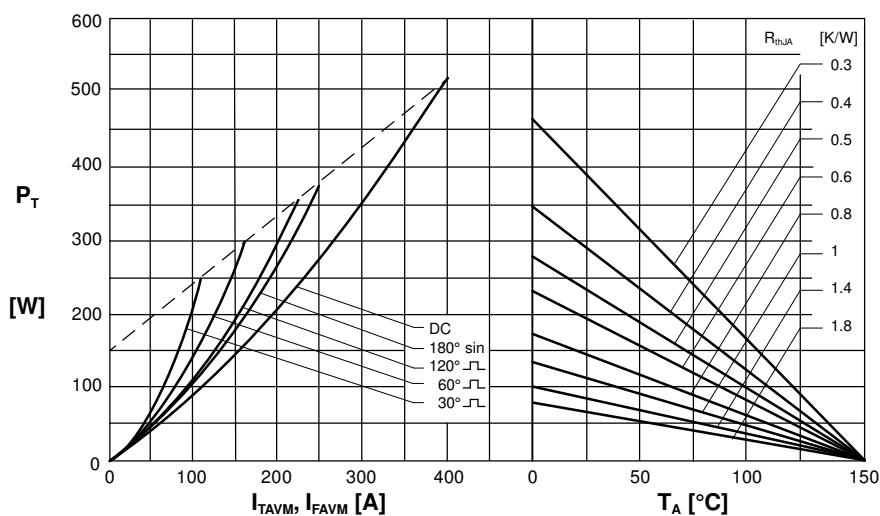
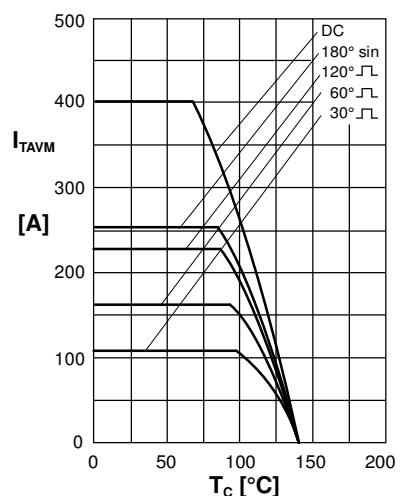
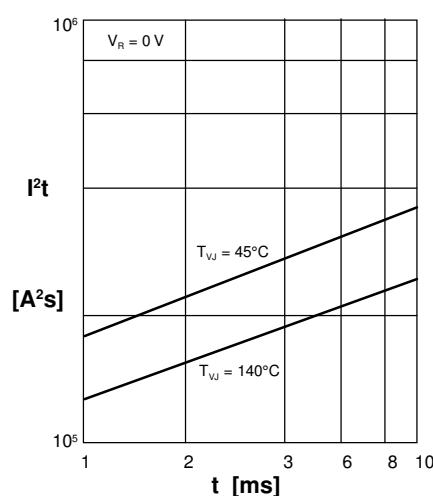
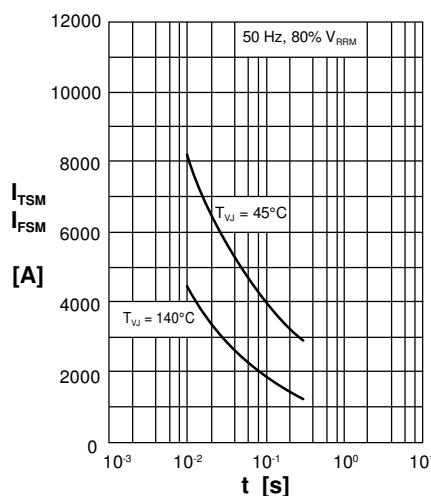
 $T_{VJ} = 140$ °C

Phase out

Outlines Y2



Thyristor



Rectifier

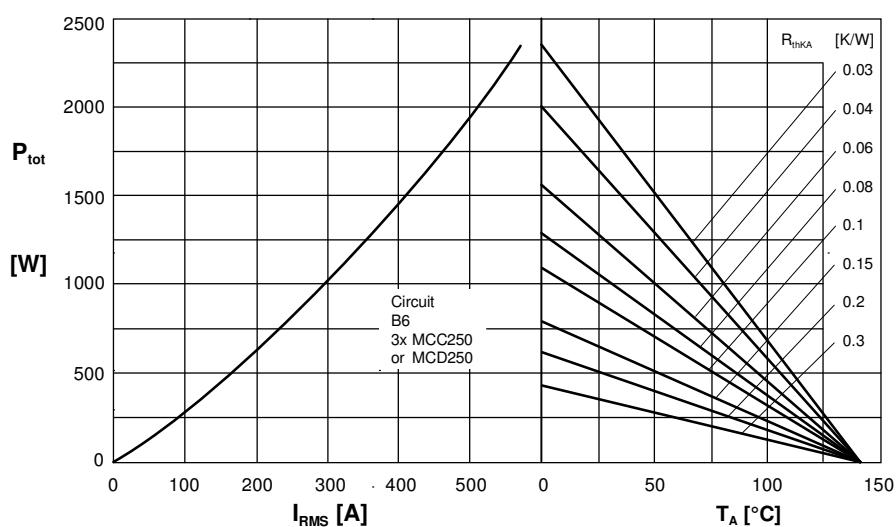


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

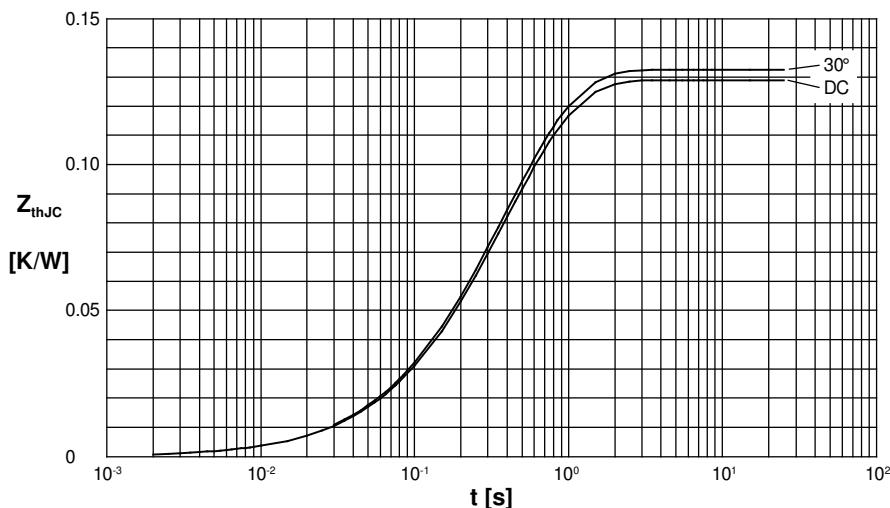


Fig. 8 Transient thermal impedance junction to case (per thyristor/diode)

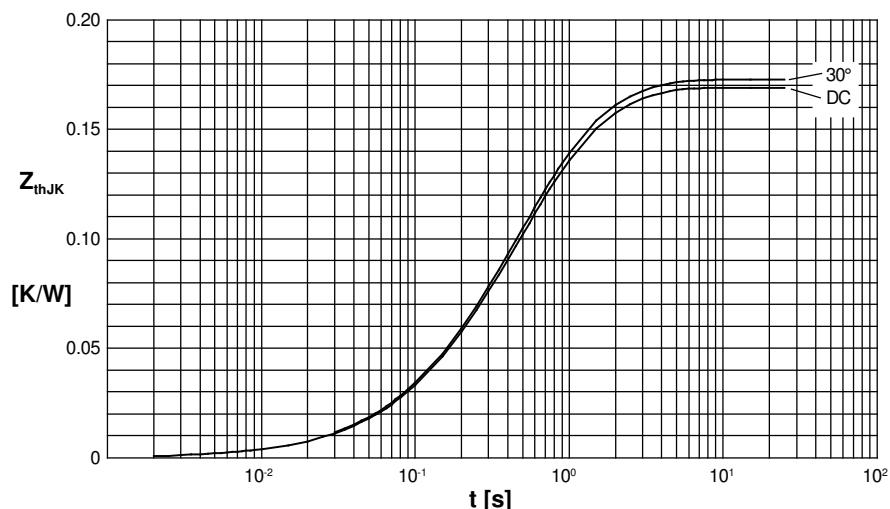


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor/diode)

R_{thJC} for various conduction angles d:

d	$R_{\text{thJC}} [\text{K/W}]$
DC	0.139
180°C	0.141
120°C	0.142
60°C	0.142
30°C	0.143

Constants for Z_{thJC} calculation:

i	$R_{\text{thi}} [\text{K/W}]$	$t_i [\text{s}]$
1	0.0037	0.0099
2	0.0177	0.168
3	0.1175	0.456

R_{thJK} for various conduction angles d:

d	$R_{\text{thJK}} [\text{K/W}]$
DC	0.179
180°C	0.181
120°C	0.182
60°C	0.183
30°C	0.183

Constants for Z_{thJK} calculation:

i	$R_{\text{thi}} [\text{K/W}]$	$t_i [\text{s}]$
1	0.0033	0.0099
2	0.0159	0.168
3	0.1053	0.456
4	0.04	1.36

Данный компонент на территории Российской Федерации**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибуторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ Р В 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru
moschip.ru_4

moschip.ru_6
moschip.ru_9