Thyristor Module

|		
V_{RRM}	=	2x 2000 V
I_{TAV}	=	104 A
V_T	=	1.46 V

Phase leg

Part number

MCC94-20io1B
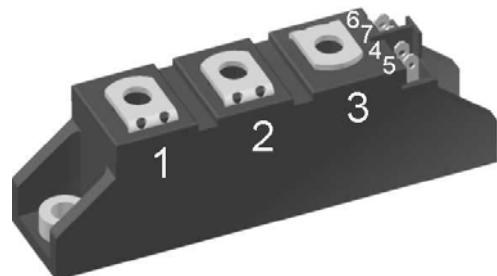
Backside: isolated

E72873
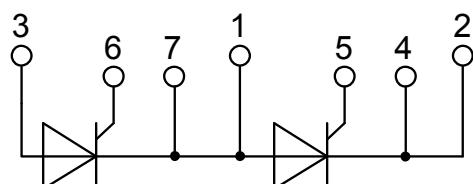
Features / Advantages:
- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

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

Package: TO-240AA
- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

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

Data according to IEC 60747and per semiconductor unless otherwise specified   20130605a

Thyristor | Ratings

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage		$T_{VJ} = 25°C$			2100	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage		$T_{VJ} = 25°C$			2000	V
$I_{R/D}$	reverse current, drain current	$V_{R/D} = 2000$ V	$T_{VJ} = 25°C$			200	μA
		$V_{R/D} = 2000$ V	$T_{VJ} = 125°C$			15	mA
V_T	forward voltage drop	$I_T = 150$ A	$T_{VJ} = 25°C$			1.44	V
		$I_T = 300$ A				1.74	V
		$I_T = 150$ A	$T_{VJ} = 125°C$			1.46	V
		$I_T = 300$ A				1.99	V
I_{TAV}	average forward current	$T_C = 85°C$	$T_{VJ} = 125°C$			104	A
$I_{T(RMS)}$	RMS forward current	180° sine				180	A
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 125°C$			0.85	V
r_T	slope resistance					3.2	mΩ
R_{thJC}	thermal resistance junction to case					0.22	K/W
R_{thCH}	thermal resistance case to heatsink				0.20		K/W
P_{tot}	total power dissipation		$T_C = 25°C$			455	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			1.70	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1.84	kA
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 125°C$			1.45	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1.56	kA
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			14.5	kA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			14.0	kA²s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 125°C$			10.4	kA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			10.1	kA²s
C_J	junction capacitance	$V_R = 700$ V f = 1 MHz	$T_{VJ} = 25°C$		63		pF
P_{GM}	max. gate power dissipation	$t_P = 30$ μs	$T_C = 125°C$			10	W
		$t_P = 300$ μs				5	W
P_{GAV}	average gate power dissipation					0.5	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 125°C$; f = 50 Hz repetitive, $I_T = 250$ A				150	A/μs
		$t_P = 200$ μs; $di_G/dt = 0.45$ A/μs;					
		$I_G = 0.45$A; $V_D = ⅔ V_{DRM}$ non-repet., $I_T = 104$ A				500	A/μs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V_D = ⅔ V_{DRM}$	$T_{VJ} = 125°C$			1000	V/μs
		$R_{GK} = ∞$; method 1 (linear voltage rise)					
V_{GT}	gate trigger voltage	$V_D = 6$ V	$T_{VJ} = 25°C$			1.5	V
			$T_{VJ} = -40°C$			1.6	V
I_{GT}	gate trigger current	$V_D = 6$ V	$T_{VJ} = 25°C$			150	mA
			$T_{VJ} = -40°C$			200	mA
V_{GD}	gate non-trigger voltage	$V_D = ⅔ V_{DRM}$	$T_{VJ} = 125°C$			0.25	V
I_{GD}	gate non-trigger current					10	mA
I_L	latching current	$t_p = 10$ 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
		$I_G = 0.45$A; $di_G/dt = 0.45$ A/μs					
t_q	turn-off time	$V_R = 100$ V; $I_T = 150$ A; $V_D = ⅔ V_{DRM}$ $T_{VJ} = 125°C$			185		μs
		di/dt = 10 A/μs; dv/dt = 20 V/μs; $t_p = 200$ μs					

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Package	TO-240AA			Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal				200	A
T_{stg}	storage temperature			-40		125	°C
T_{VJ}	virtual junction temperature			-40		125	°C
Weight					90		g
M_D	mounting torque			2.5		4	Nm
M_T	terminal torque			2.5		4	Nm
$d_{Spp/App}$	creepage distance on surface | striking distance through air	terminal to terminal	13.0	9.7			mm
$d_{Spb/Apb}$		terminal to backside	16.0	16.0			mm
V_{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3600			V
		t = 1 minute		3000			V
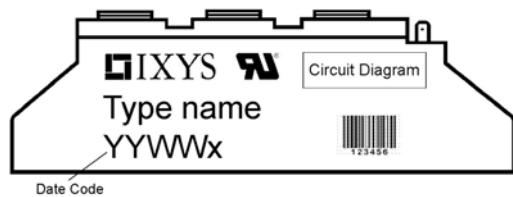
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCC94-20io1B	MCC94-20io1B	Box	6	463485

Similar Part	Package	Voltage class
MCNA120P2200TA	TO-240AA-1B	2200

Equivalent Circuits for Simulation   *on die level* T_{VJ} = 125 °C

Thyristor

$V_{0\,max}$	threshold voltage	0.85	V
$R_{0\,max}$	slope resistance *	2	mΩ

Outlines   TO-240AA

A 2.8 - 0.8
DIN 46244
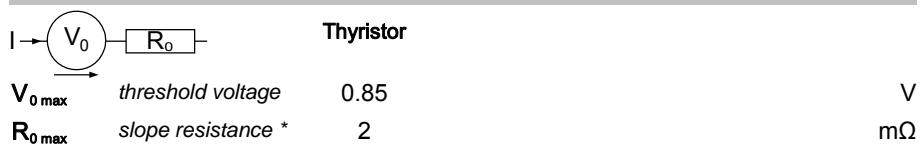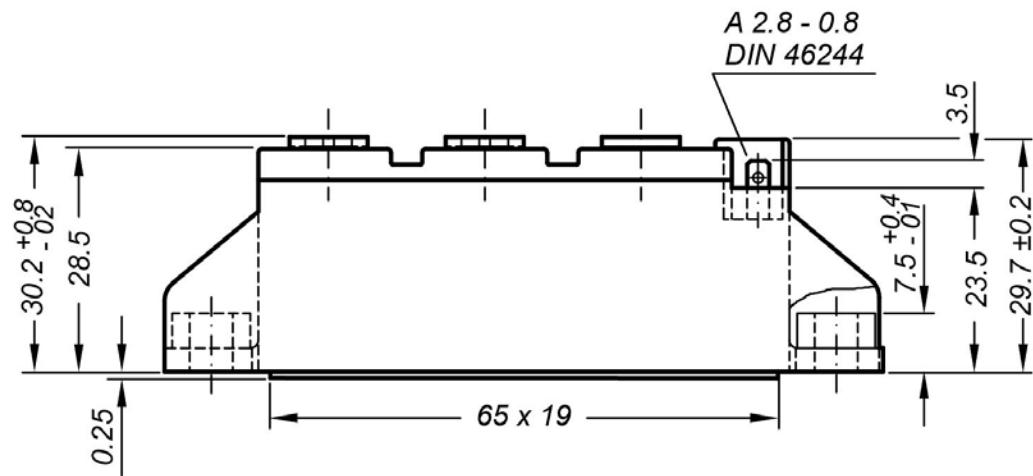
General tolerance: DIN ISO 2768 class „c"

M5
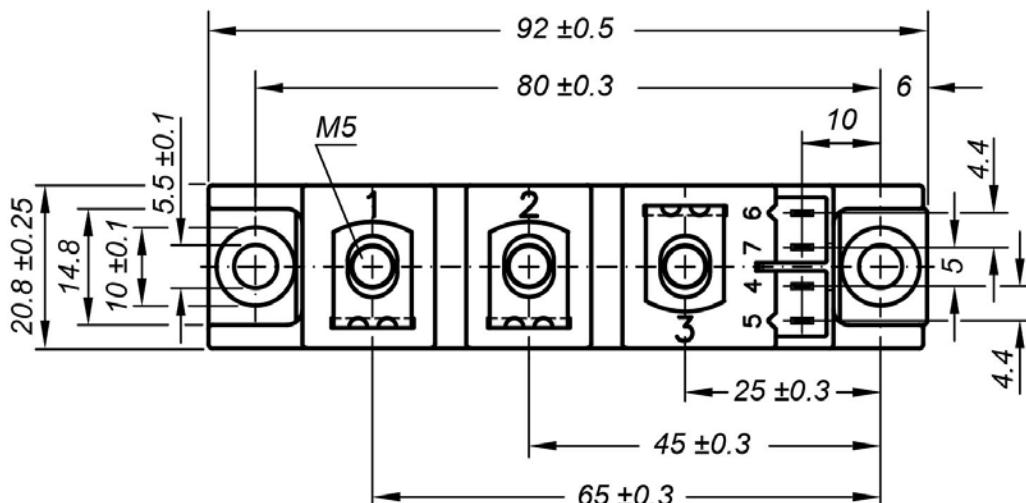
Optional accessories: Keyed gate/cathode twin plugs
Wire length: 350 mm, gate = white, cathode = red
UL 758, style 3751
Type **ZY 200L** (L = Left   for pin pair 4/5)
Type **ZY 200R** (R = Right for pin pair 6/7)

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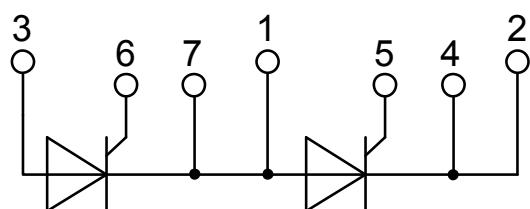
Thyristor
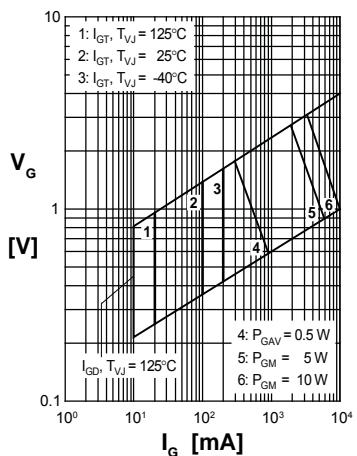
Fig. 1 Gate trigger characteristics
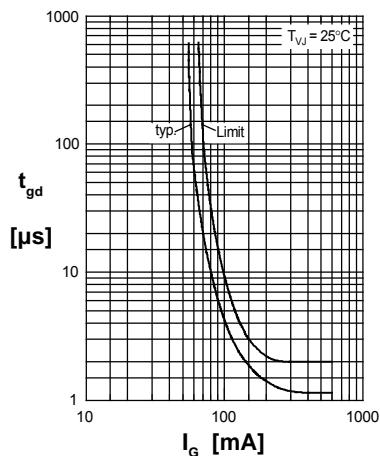
Fig. 2 Gate trigger delay time

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