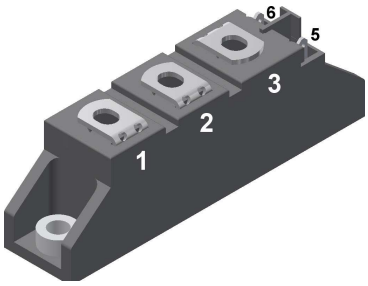
Thyristor Module

V_{RRM} = 2x 800 V
I_{TAV} = 21 A
V_T = 1.52 V

Phase leg

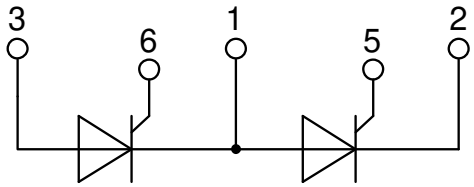
Part number

MCC21-08io8B



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: 4800 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

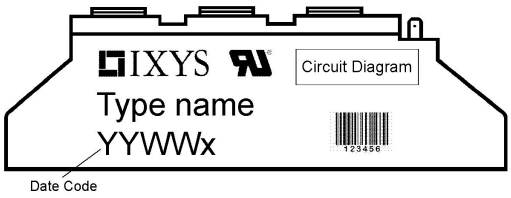
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Thyristor

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			900	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			800	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 800 V	T_{VJ} = 25°C			100	µA
		$V_{R/D}$ = 800 V	T_{VJ} = 125°C			5	mA
V_T	*forward voltage drop*	I_T = 45 A	T_{VJ} = 25°C			1.45	V
		I_T = 90 A				1.89	V
		I_T = 45 A	T_{VJ} = 125°C			1.52	V
		I_T = 90 A				2.20	V
I_{TAV}	*average forward current*	T_C = 85°C	T_{VJ} = 125°C			21	A
$I_{T(RMS)}$	*RMS forward current*	180° sine				33	A
V_{T0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 125°C			0.85	V
r_T	*slope resistance* }					15	mΩ
R_{thJC}	*thermal resistance junction to case*					1.1	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.2		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			90	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			320	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			345	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			270	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			295	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			510	A^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			495	A^2s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			365	A^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			360	A^2s
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		22		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 = 45 A			150	A/µs
		t_P = 200 µs; di_G/dt = 0.45 A/µs;					
		I_G = 0.45 A; V = ⅔ V_{DRM} non-repet.,	I_T = 21 A			500	A/µs
$(dv/dt)_{cr}$	*critical rate of rise of voltage*	V = 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	V
			T_{VJ} = -40°C			1.2	V
I_{GT}	*gate trigger current*	V_D = 6 V	T_{VJ} = 25°C			65	mA
			T_{VJ} = -40°C			80	mA
V_{GD}	*gate non-trigger voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 125°C			0.2	V
I_{GD}	*gate non-trigger current*					5	mA
I_L	*latching current*	t_p = 10 µs	T_{VJ} = 25°C			150	mA
		I_G = 0.3 A; di_G/dt = 0.3 A/µs					
I_H	*holding current*	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			100	mA
t_{gd}	*gate controlled delay time*	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 0.3 A; di_G/dt = 0.3 A/µs					
t_q	*turn-off time*	V_R = 100 V; I_T = 15A; V = ⅔ V_{DRM}	T_{VJ} = 100 °C		150		µs
		di/dt = 10 A/µs dv/dt = 20 V/µs t_p = 300 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_{VJ}	*virtual junction temperature*				-40		125	°C
T_{op}	*operation temperature*				-40		100	°C
T_{stg}	*storage temperature*				-40		125	°C
Weight						81		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} ≤ 1 mA		4800			V
		t = 1 minute			4000			V

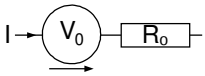


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCC21-08io8B	MCC21-08io8B	Box	36	

Similar Part	Package	Voltage class
MCMA25P1200TA	TO-240AA-1B	1200
MCMA35P1200TA	TO-240AA-1B	1200

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 125°C

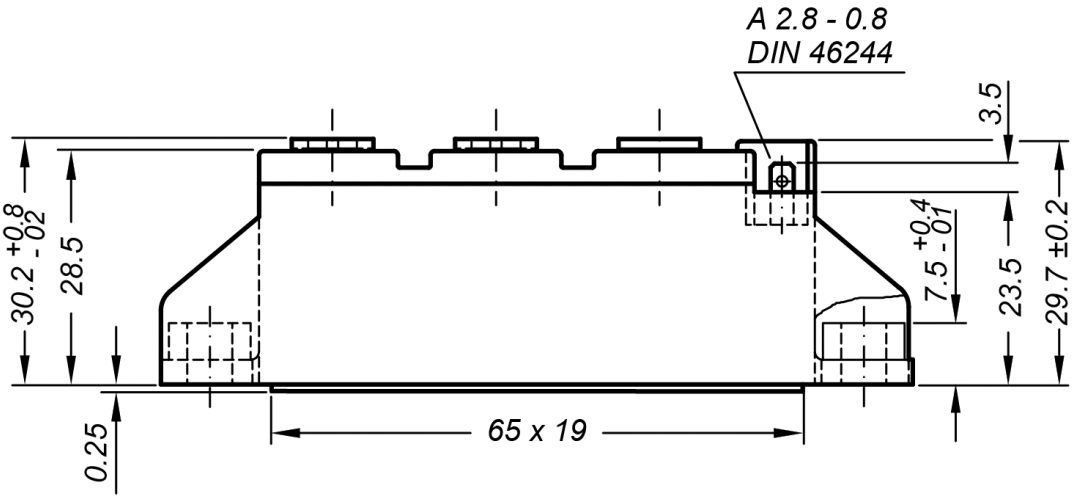


Thyristor

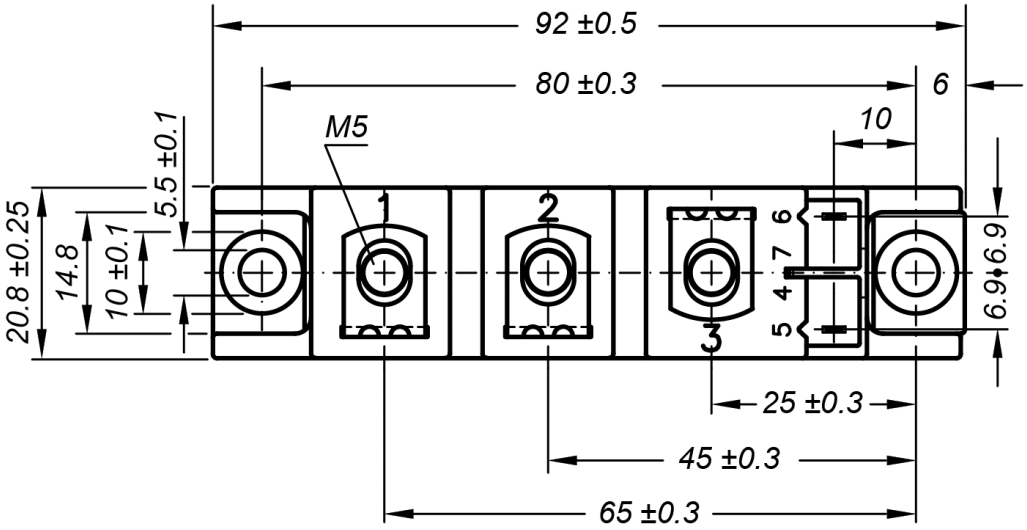
$V_{0\,max}$	*threshold voltage*	0.85	V
$R_{0\,max}$	*slope resistance **	13.8	mΩ

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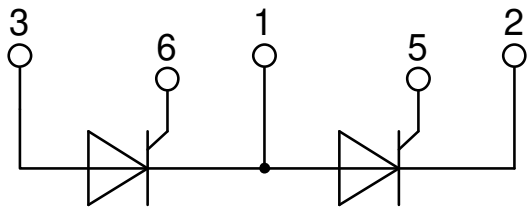
Outlines TO-240AA



General tolerance: DIN ISO 2768 class „c“



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



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Thyristor

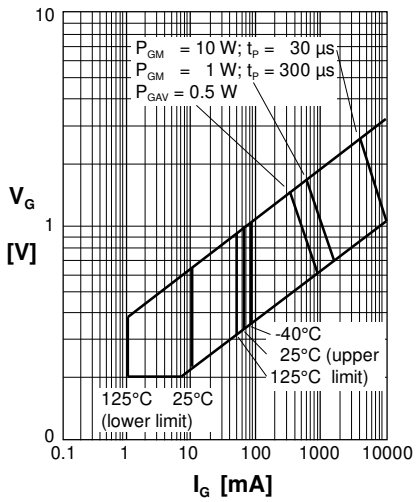


Fig. 1 Gate trigger characteristics

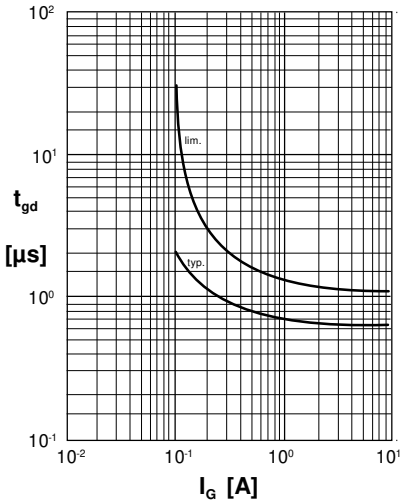


Fig. 2 Gate trigger delay time

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