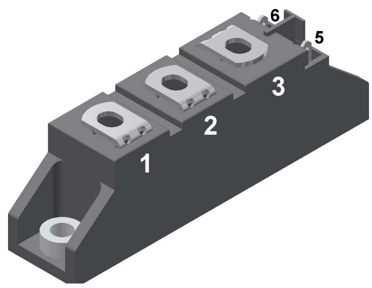
Thyristor Module

V_{RRM} = 2x 1400 V
I_{TAV} = 21 A
V_T = 1.52 V

Phase leg

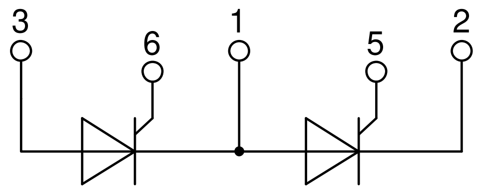
Part number

MCC21-14io8B



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

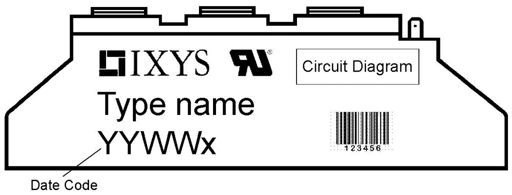
Package: TO-240AA

- 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

Thyristor				Ratings		
Symbol	**Definition**	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*	T_{VJ} = 25°C			1500	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*	T_{VJ} = 25°C			1400	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 1400 V; T_{VJ} = 25°C			100	µA
		$V_{R/D}$ = 1400 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	A²s
		t = 8,3 ms; (60 Hz), sine; V_R = 0 V			495	A²s
		t = 10 ms; (50 Hz), sine; T_{VJ} = 125°C			365	A²s
		t = 8,3 ms; (60 Hz), sine; V_R = 0 V			360	A²s
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				

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; $I_{ISOL} \le 1$ mA		4800			V
		t = 1 minute		4000			V

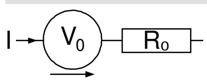


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCC21-14io8B	MCC21-14io8B	Box	36	469785

Similar Part	Package	Voltage class
MCMA25P1600TA	TO-240AA-1B	1600
MCMA35P1600TA	TO-240AA-1B	1600

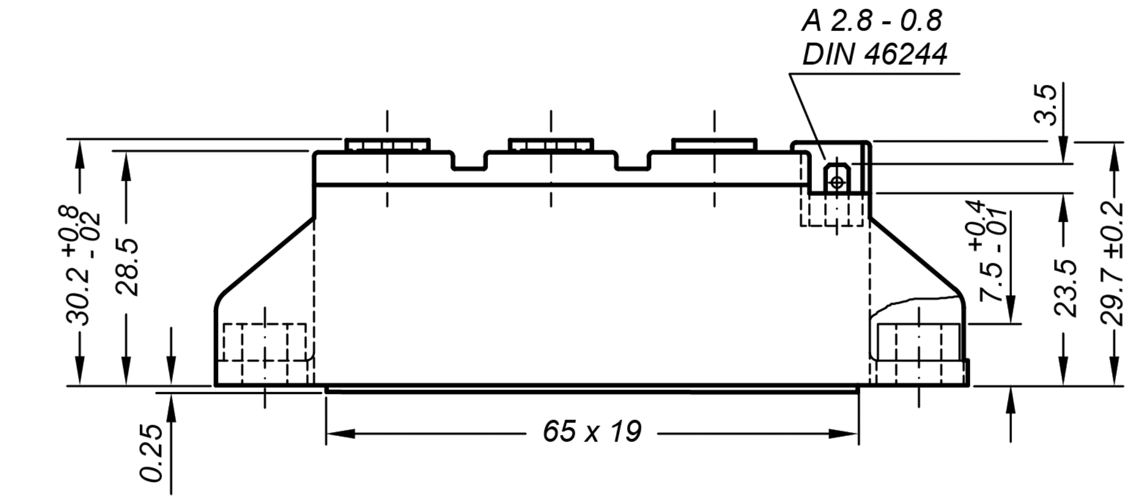
Equivalent Circuits for Simulation

** on die level* $T_{VJ} = 125°C$

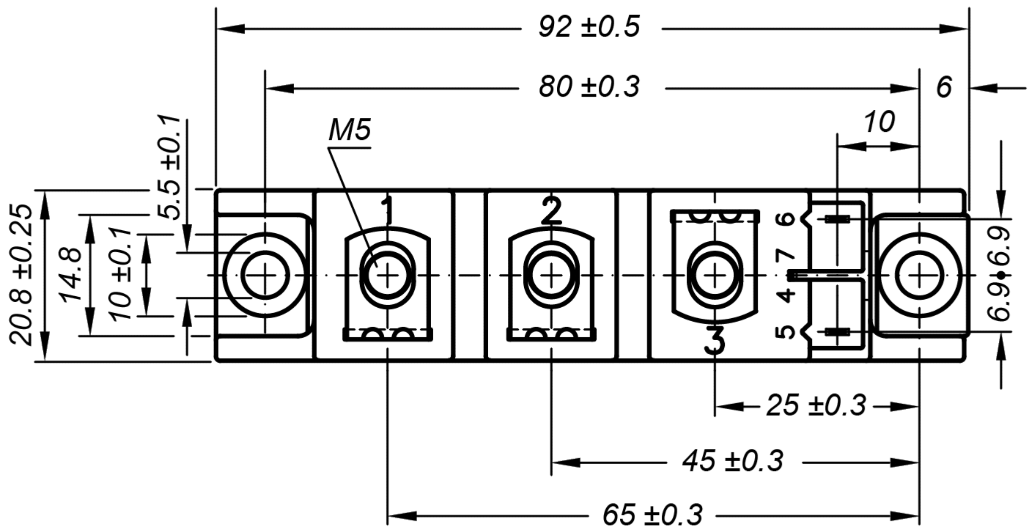


		Thyristor	
$V_{0\,max}$	*threshold voltage*	0.85	V
$R_{0\,max}$	*slope resistance **	13.8	mΩ

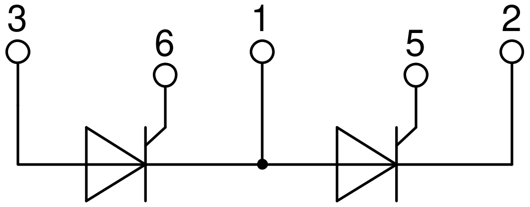
Outlines TO-240AA



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) } UL 758, style 3751
Type ZY 200R (R = Right for pin pair 6/7) }



Thyristor

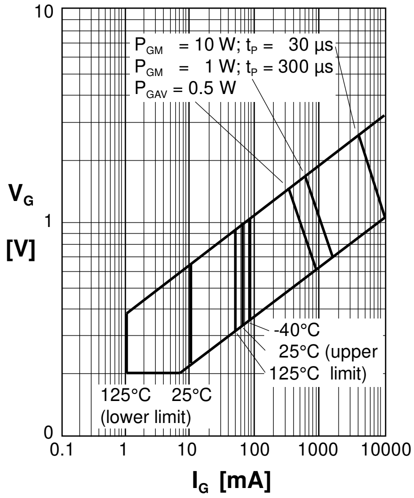


Fig. 1 Gate trigger characteristics

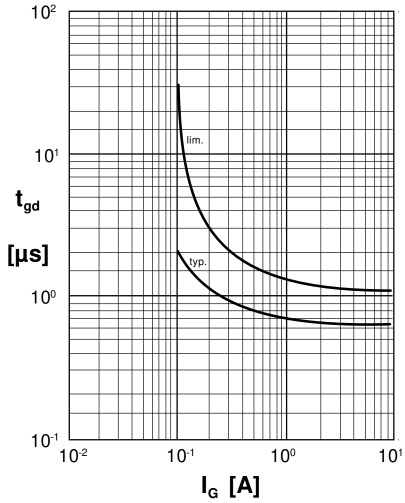


Fig. 2 Gate trigger delay time