Thyristor Module

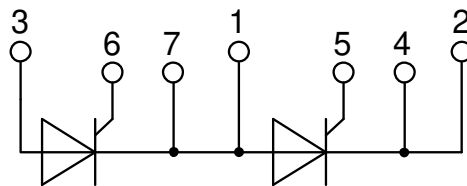|		
V_{RRM}	$=$	$2 \times 1600\,V$
I_{TAV}	$=$	$50\,A$
V_T	$=$	$1.17\,V$

Phase leg

Part number

MCMA50P1600TA

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

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Thyristor

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage		$T_{VJ} = 25°C$			1700	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage		$T_{VJ} = 25°C$			1600	V
$I_{R/D}$	reverse current, drain current	$V_{R/D} = 1600$ V	$T_{VJ} = 25°C$			100	µA
		$V_{R/D} = 1600$ V	$T_{VJ} = 140°C$			6	mA
V_T	forward voltage drop	$I_T = 50$ A	$T_{VJ} = 25°C$			1.25	V
		$I_T = 100$ A				1.48	V
		$I_T = 50$ A	$T_{VJ} = 125°C$			1.17	V
		$I_T = 100$ A				1.44	V
I_{TAV}	average forward current	$T_C = 85°C$	$T_{VJ} = 140°C$			50	A
$I_{T(RMS)}$	RMS forward current	180° sine				79	A
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 140°C$			0.89	V
r_T	slope resistance					5.3	mΩ
R_{thJC}	thermal resistance junction to case					0.7	K/W
R_{thCH}	thermal resistance case to heatsink				0.2		K/W
P_{tot}	total power dissipation		$T_C = 25°C$			160	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			800	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			865	A
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140°C$			680	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			735	A
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			3.20	kA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			3.12	kA²s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140°C$			2.31	kA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			2.25	kA²s
C_J	junction capacitance	$V_R = 400$ V f = 1 MHz	$T_{VJ} = 25°C$		32		pF
P_{GM}	max. gate power dissipation	$t_P = 30$ µs	$T_C = 140°C$			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	$T_{VJ} = 140°C$; f = 50 Hz repetitive, $I_T = 150$ 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., $I_T = 50$ 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	$T_{VJ} = 25°C$			1.5	V
			$T_{VJ} = -40°C$			1.6	V
I_{GT}	gate trigger current	$V_D = 6$ V	$T_{VJ} = 25°C$			78	mA
			$T_{VJ} = -40°C$			200	mA
V_{GD}	gate non-trigger voltage	$V_D = ⅔ V_{DRM}$	$T_{VJ} = 140°C$			0.2	V
I_{GD}	gate non-trigger current					5	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 $R_{GK} = ∞$	$T_{VJ} = 25°C$			100	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; $I_T = 50$A; V = ⅔ V_{DRM} $T_{VJ} = 125$ °C			150		µs
		di/dt = 10 A/µs dv/dt = 20 V/µs $t_p = 200$ µs					

IXYS reserves the right to change limits, conditions and dimensions.   Data according to IEC 60747and per semiconductor unless otherwise specified   20191209d

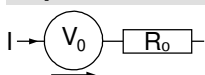| Package	TO-240AA			Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	RMS current	per terminal				100	A
T_{VJ}	virtual junction temperature			-40		140	°C
T_{op}	operation temperature			-40		125	°C
T_{stg}	storage temperature			-40		125	°C
Weight					81		g
M_D	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		4800			V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	4000			V
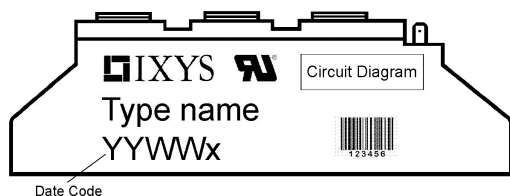
Part description

- M = Module
- C = Thyristor (SCR)
- M = Thyristor
- A = (up to 1800V)
- 50 = Current Rating [A]
- P = Phase leg
- 1600 = Reverse Voltage [V]
- TA = TO-240AA-1B

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA50P1600TA	MCMA50P1600TA	Box	36	513950

Equivalent Circuits for Simulation   *on die level* $T_{VJ} = 140°C$

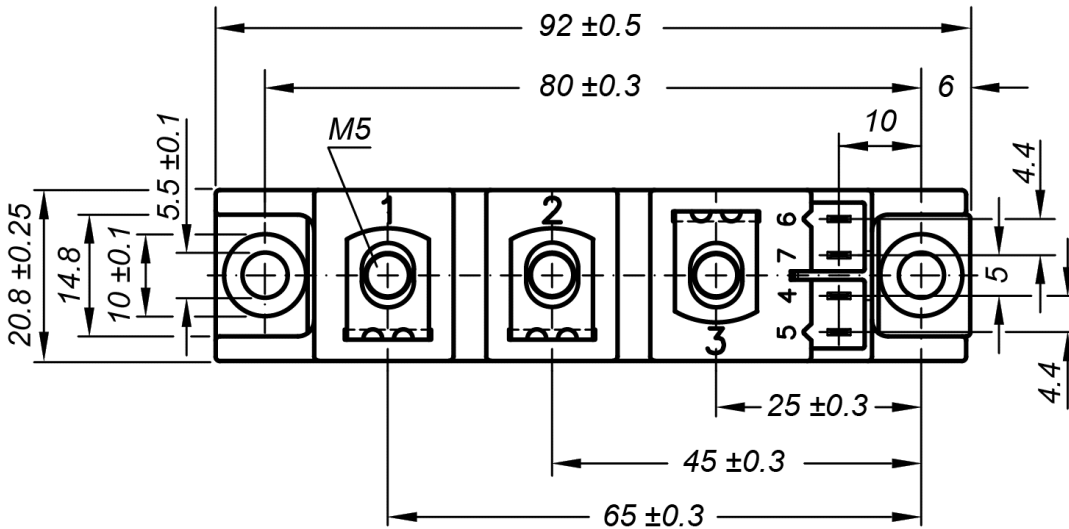**Thyristor**

$V_{0\ max}$	threshold voltage	0.89	V
$R_{0\ max}$	slope resistance *	4.1	mΩ

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Outlines   TO-240AA

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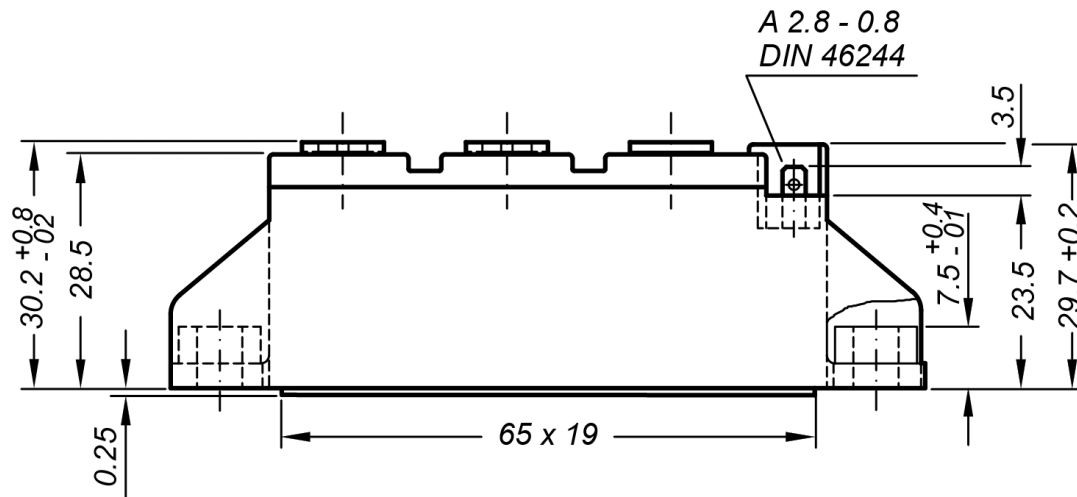
General tolerance: DIN ISO 2768 class „c"

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