Thyristor Module

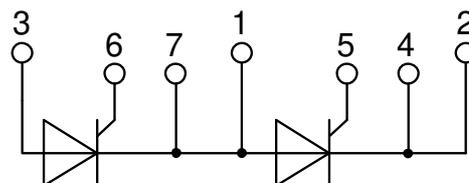|		
V_{RRM}	=	2x 1200 V
I_{TAV}	=	85 A
V_T	=	1,18 V

Phase leg

Part number

MCMA85P1200TA
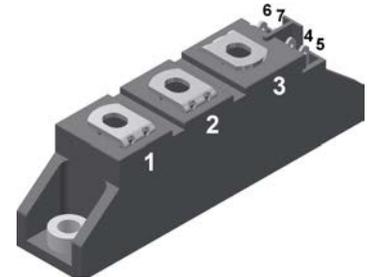
Backside: isolated

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.

Thyristor

Ratings

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25°C$				1300	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25°C$				1200	V
$I_{R/D}$	reverse current, drain current	$V_{R/D} = 1200$ V	$T_{VJ} = 25°C$			100	µA
		$V_{R/D} = 1200$ V	$T_{VJ} = 140°C$			10	mA
V_T	forward voltage drop	$I_T = 85$ A	$T_{VJ} = 25°C$			1,21	V
		$I_T = 170$ A				1,47	V
		$I_T = 85$ A	$T_{VJ} = 125°C$			1,18	V
		$I_T = 170$ A				1,51	V
I_{TAV}	average forward current	$T_C = 85°C$	$T_{VJ} = 140°C$			85	A
$I_{T(RMS)}$	RMS forward current	180° sine				135	A
V_{T0}	threshold voltage		$T_{VJ} = 140°C$			0,85	V
r_T	slope resistance	} for power loss calculation only				3,9	mΩ
R_{thJC}	thermal resistance junction to case					0,38	K/W
R_{thCH}	thermal resistance case to heatsink				0,2		K/W
P_{tot}	total power dissipation	$T_C = 25°C$				300	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			1,50	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1,62	kA
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140°C$			1,28	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1,38	kA
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			11,3	kA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			10,9	kA²s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140°C$			8,13	kA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			7,87	kA²s
C_J	junction capacitance	$V_R = 400$V f = 1 MHz	$T_{VJ} = 25°C$		74		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, $I_T = 255$ 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., $I_T = 85$ A				500	A/µs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V_D = ⅔ V_{DRM}$	$T_{VJ} = 140°C$			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	$T_{VJ} = 25°C$			95	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					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 $R_{GK} = ∞$	$T_{VJ} = 25°C$			200	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; $I_T = 85$A; $V_D = ⅔ V_{DRM}$ $T_{VJ} = 125$ °C			150		µs
		di/dt = 10 A/µs; dv/dt = 20 V/µs; $t_p = 200$ µs					

Package   TO-240AA

Ratings

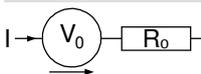| Symbol	Definition	Conditions			min.	typ.	max.	Unit
I$_{RMS}$	RMS current	per terminal					150	A
T$_{VJ}$	virtual junction temperature				-40		140	°C
T$_{op}$	operation temperature				-40		125	°C
T$_{stg}$	storage temperature				-40		125	°C
Weight						81		g
M$_{D}$	mounting torque				2,5		4	Nm
M$_{T}$	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	50/60 Hz, RMS; I$_{ISOL}$ ≤ 1 mA		4800			V
		t = 1 minute			4000			V
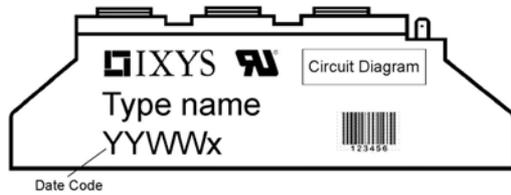
Part description

M = Module
C = Thyristor (SCR)
M = Thyristor
A = (up to 1800V)
85 = Current Rating [A]
P = Phase leg
1200 = Reverse Voltage [V]
TA = TO-240AA-1B

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA85P1200TA	MCMA85P1200TA	Box	36	512923

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

Thyristor

V$_{0 max}$	threshold voltage	0,85	V
R$_{0 max}$	slope resistance *	2,7	mΩ

IXYS reserves the right to change limits, conditions and dimensions.   Data according to IEC 60747and per semiconductor unless otherwise specified   20250702e

Outlines   TO-240AA

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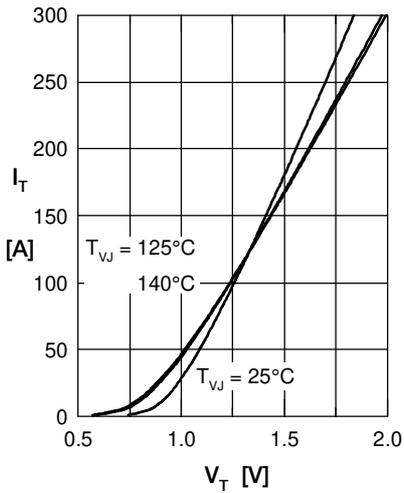Type ZY 200L (L = Left for pin pair 4/5) } UL 758, style 3751
Type ZY 200R (R = Right for pin pair 6/7) }

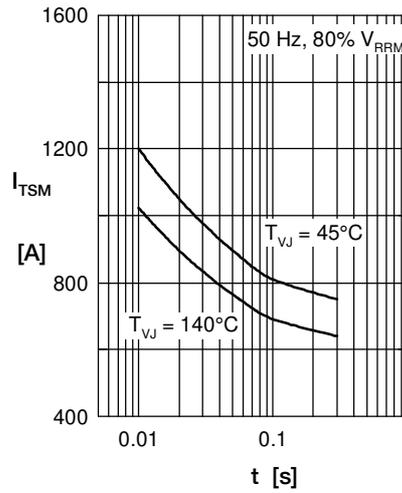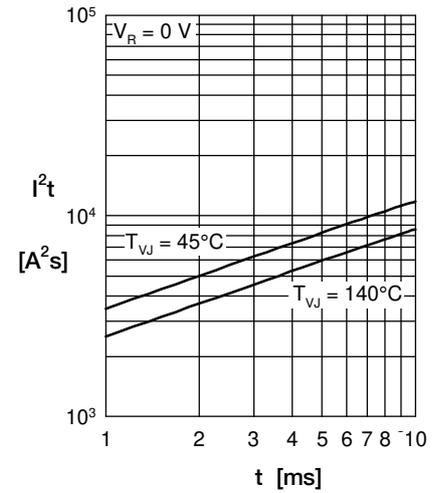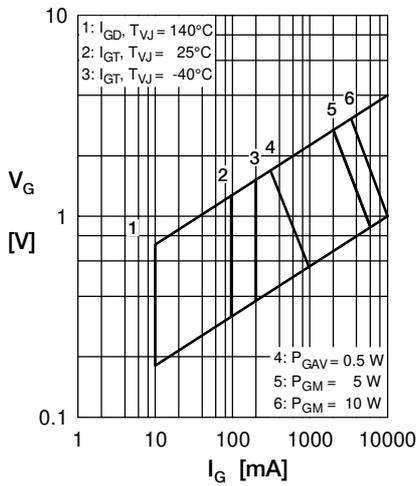## Thyristor

Fig. 1 Forward characteristics

Fig. 2 Surge overload current
I_{TSM}: crest value, t: duration

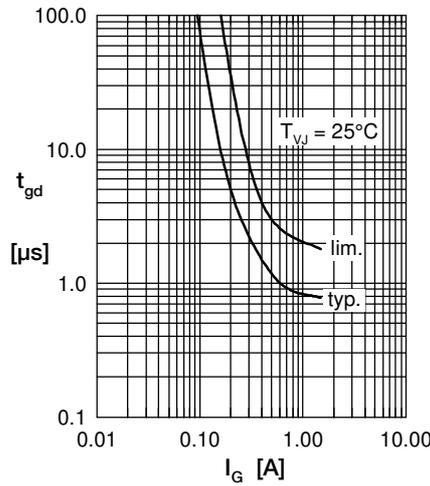Fig. 3 I^2t versus time (1-10 s)
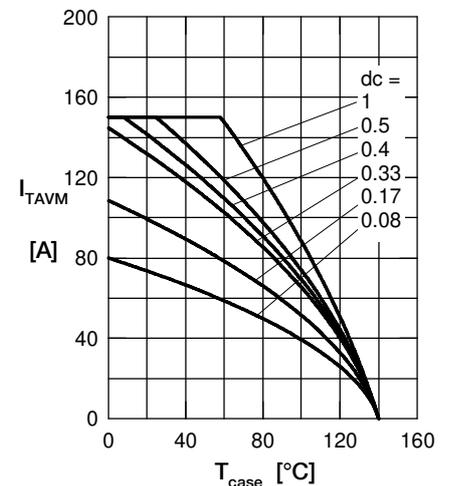

Fig. 4 Gate voltage & gate current

Fig. 5 Gate controlled delay time t_{gd}

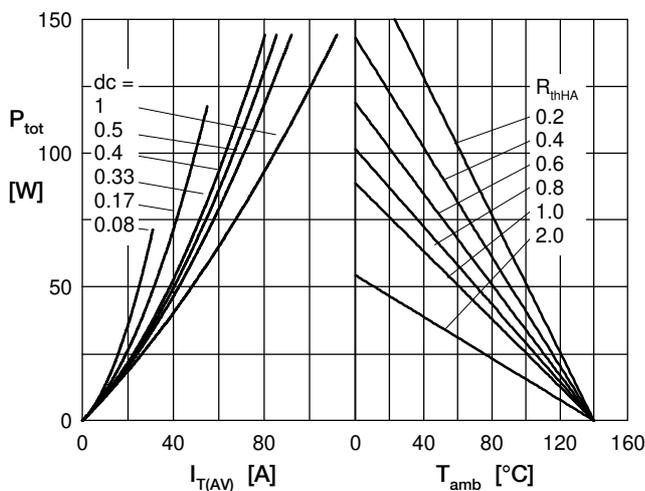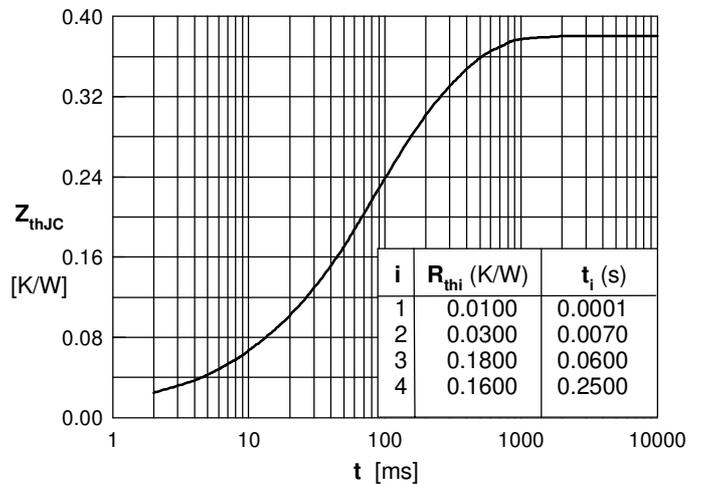Fig. 6 Max. forward current at case temperature

Fig. 7a Power dissipation versus direct output current
Fig. 7b and ambient temperature

Fig. 8 Transient thermal impedance junction to case

i	R_{thi} (K/W)	t_i (s)
1	0.0100	0.0001
2	0.0300	0.0070
3	0.1800	0.0600
4	0.1600	0.2500