Thyristor Module

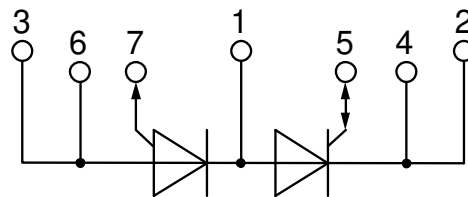|		
V_{RRM}	=	2 x 1600 V
I_{TAV}	=	700 A
V_T	=	1.11 V

Phase leg
optional usage as Dual Thyristor Triac

Part number

MCMA700P1600NCA
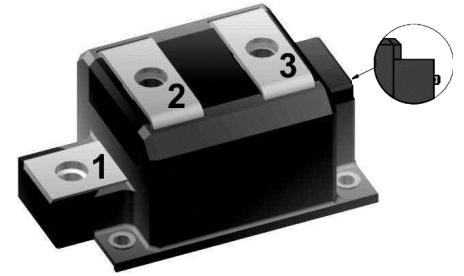
Backside: isolated

🛡 E72873

Features / Advantages:

● Thyristor for line frequency
● Planar passivated chip
● Long-term stability
● Direct Copper Bonded Al2O3-ceramic
● Gate current polarities
  - upper SCR (2 -> 1) = positive/negative
  - lower SCR (1 -> 3) = negative

Applications:

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

Package: ComPack

● Isolation Voltage: 4800 V~
● Industry standard outline
● RoHS compliant
● Soldering pins for PCB mounting
● Base plate: Copper
  internally DCB isolated
● Advanced power cycling
● Phase Change Material available

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Rectifier

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	$T_{VJ} = 25°C$			2	mA
		$V_{R/D} = 1600$ V	$T_{VJ} = 125°C$			40	mA
V_T	forward voltage drop	$I_T = 700$ A	$T_{VJ} = 25°C$			1.16	V
		$I_T = 1400$ A				1.41	V
		$I_T = 700$ A	$T_{VJ} = 125°C$			1.11	V
		$I_T = 1400$ A				1.41	V
I_{TAV}	average forward current	$T_C = 85°C$	$T_{VJ} = 140°C$			700	A
$I_{T(RMS)}$	RMS forward current	180° sine				1100	A
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 140°C$			0.82	V
r_T	slope resistance					0.4	mΩ
R_{thJC}	thermal resistance junction to case					0.05	K/W
R_{thCH}	thermal resistance case to heatsink				0.02		K/W
P_{tot}	total power dissipation		$T_C = 25°C$			2300	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			19.0	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			20.5	kA
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140°C$			16.2	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			17.4	kA
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			1.81	MA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1.75	MA²s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140°C$			1.30	MA²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1.27	MA²s
C_J	junction capacitance	$V_R = 400$ V f = 1 MHz	$T_{VJ} = 25°C$		876		pF
P_{GM}	max. gate power dissipation	$t_P = 30$ µs	$T_C = 140°C$			240	W
		$t_P = 300$ µs				120	W
P_{GAV}	average gate power dissipation					40	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 140°C$; f = 50 Hz repetitive, $I_T = 2100$ A				100	A/µs
		$t_P = 200$ µs; $di_G/dt = 1$ A/µs;					
		$I_G = 1$ A; V = ⅔ V_{DRM} non-repet., $I_T = 700$ 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	$T_{VJ} = 25°C$			2	V
			$T_{VJ} = -40°C$			3	V
I_{GT}	gate trigger current	$V_D = 6$ V	$T_{VJ} = 25°C$			± 300	mA
			$T_{VJ} = -40°C$			± 400	mA
V_{GD}	gate non-trigger voltage	$V_D = ⅔ V_{DRM}$	$T_{VJ} = 140°C$			0.25	V
I_{GD}	gate non-trigger current					± 10	mA
I_L	latching current	$t_p = 30$ µs	$T_{VJ} = 25°C$			400	mA
		$I_G = 1$ A; $di_G/dt = 1$ A/µs					
I_H	holding current	$V_D = 6$ V $R_{GK} = ∞$	$T_{VJ} = 25°C$			300	mA
t_{gd}	gate controlled delay time	$V_D = ½ V_{DRM}$	$T_{VJ} = 25°C$			2	µs
		$I_G = 1$ A; $di_G/dt = 1$ A/µs					
t_q	turn-off time	$V_R = 100$ V; $I_T = 700A$; V = ⅔ V_{DRM} $T_{VJ} = 125$ °C			350		µs
		di/dt = 10 A/µs dv/dt = 50 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   20191217d

Package   ComPack

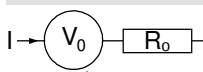| Symbol	Definition	Conditions		min.	typ.	max.	Unit
Ratings							
I_{RMS}	RMS current	per terminal				1200	A
T_{VJ}	virtual junction temperature			-40		140	°C
T_{op}	operation temperature			-40		125	°C
T_{stg}	storage temperature			-40		125	°C
Weight					500		g
M_D	mounting torque			3		5	Nm
M_T	terminal torque			12		14	Nm
$d_{Spp/App}$	creepage distance on surface | striking distance through air	terminal to terminal		21.0			mm
$d_{Spb/Apb}$		terminal to backside		18.0			mm
V_{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	4800			V
		t = 1 minute		4000			V
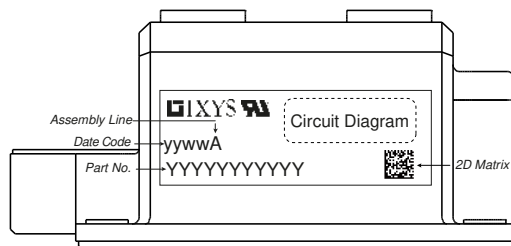
Part description

M = Module
C = Thyristor (SCR)
M = Thyristor
A = (up to 1800V)
700 = Current Rating [A]
P = Phase leg
1600 = Reverse Voltage [V]
N = Three Quadrants operation: QI - QIII
CA = ComPack

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA700P1600NCA	MCMA700P1600NCA	Box	3	515494

Similar Part	Package	Voltage class
MCMA700P1600CA	ComPack	1600

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

Thyristor

$V_{0\,max}$	threshold voltage	0.82	V
$R_{0\,max}$	slope resistance *	0.21	mΩ

Outlines   ComPack

66.0 +0.0 / -0.7

27.25 ±0.3

label

48.0 +0.7 / -0.0

21 ±1.0

3.0 +0.2 / -0.0

37.5 +0.5 / -0.0

50.5 ±1.0

92.0 +0.5 / -0.3

baseplate typ. 100 μm convex over 62.5 mm before mounting

21.2

7.2

5.0 ±0.2

6.1

25.85 ±0.3

A

6.0

61.0

baseplate typ. 100 μm convex over 54.5 mm before mounting

107 ±0.5

48.0

39.5 ±0.5

2   3

30.0 +0.5 / -0.0

23.0

1

4 5   6 7

30.0 ±0.5

45.0

65.0 ±0.5

M10x16 (3x)

Ø 5.5

18.0

80,0

93,5
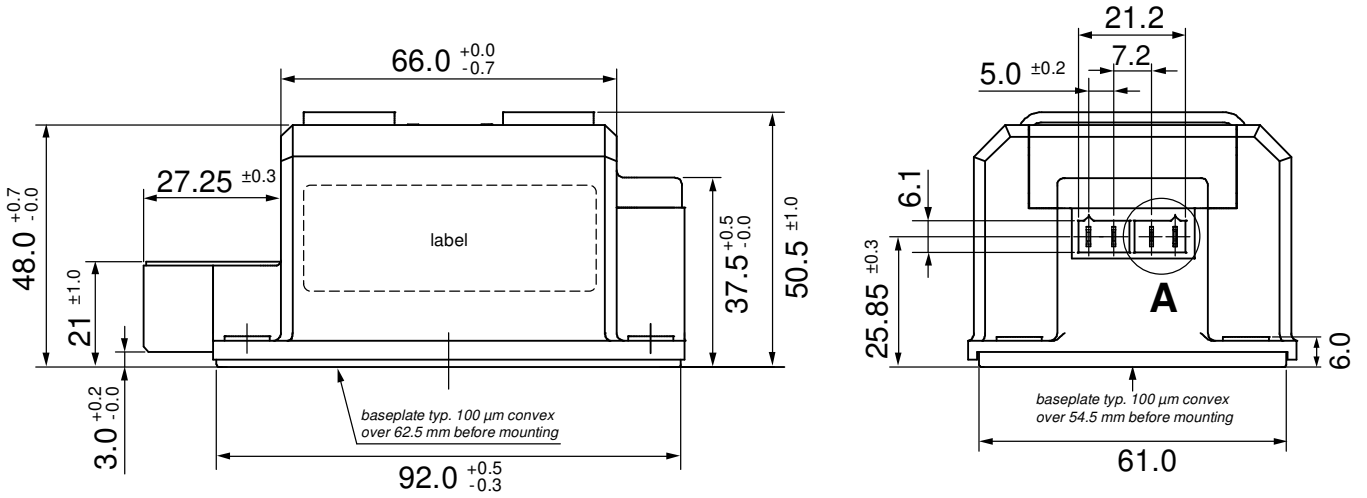
Optional accessories for modules
Keyed gate/cathode twin plugs with
wire length = 350 mm, gate = white, cathode = red

Type ZY 180L (L = Left for pin pair 4/5) ⎫ UL 758,
Type ZY 180R (R = Right for pin pair 6/7) ⎭ style 3751

A (2:1)

2.8

0.8

3   6   7   1   5   4   2