

# Thyristor Module

$$V_{RRM} = 1600 \text{ V}$$

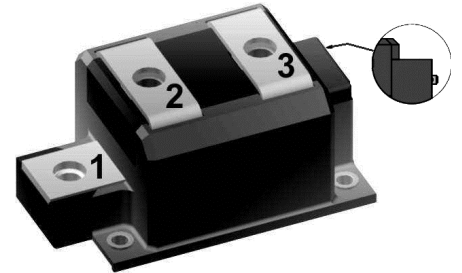
$$I_{TAV} = 1100 \text{ A}$$

$$V_T = 1.09 \text{ V}$$

## Single Thyristor

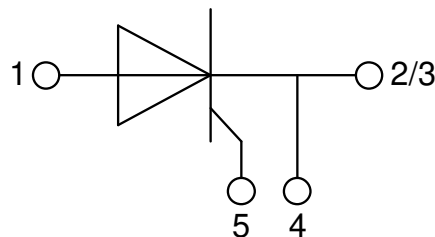
Part number

**MCMA1400E1600CD**



Backside: isolated

 E72873



### Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al<sub>2</sub>O<sub>3</sub>-ceramic

### 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
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

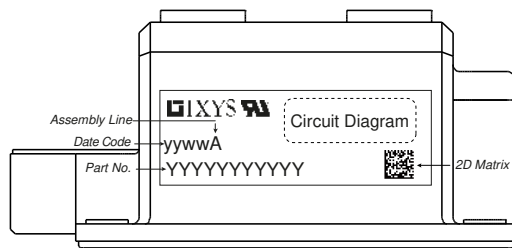
### Disclaimer Notice

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](http://www.littelfuse.com/disclaimer-electronics).



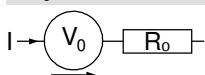
Rectifier			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V
$I_{RD}$	reverse current, drain current	$V_{R/D} = 1600 V$	$T_{VJ} = 25^{\circ}C$		4	mA
		$V_{R/D} = 1600 V$	$T_{VJ} = 125^{\circ}C$		80	mA
$V_T$	forward voltage drop	$I_T = 1000 A$	$T_{VJ} = 25^{\circ}C$		1.16	V
		$I_T = 2000 A$			1.43	V
		$I_T = 1000 A$	$T_{VJ} = 125^{\circ}C$		1.09	V
		$I_T = 2000 A$			1.42	V
$I_{TAV}$	average forward current	$T_C = 85^{\circ}C$	$T_{VJ} = 140^{\circ}C$		1100	A
$I_{T(RMS)}$	RMS forward current	180° sine			1700	A
$V_{T0}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 140^{\circ}C$		0.80	V
$r_T$	slope resistance				0.29	mΩ
$R_{thJC}$	thermal resistance junction to case				0.03	K/W
$R_{thCH}$	thermal resistance case to heatsink			0.015		K/W
$P_{tot}$	total power dissipation		$T_C = 25^{\circ}C$		3800	W
$I_{TSM}$	max. forward surge current	$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 45^{\circ}C$		36.0	kA
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		38.9	kA
		$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 140^{\circ}C$		30.6	kA
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		33.1	kA
$I^2t$	value for fusing	$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 45^{\circ}C$		6.48	MA <sup>2</sup> s
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		6.29	MA <sup>2</sup> s
		$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 140^{\circ}C$		4.68	MA <sup>2</sup> s
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		4.54	MA <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400 V f = 1 MHz$	$T_{VJ} = 25^{\circ}C$	1.75		nF
$P_{GM}$	max. gate power dissipation	$t_p = 30 \mu s$	$T_C = 140^{\circ}C$		480	W
		$t_p = 300 \mu s$			240	W
$P_{GAV}$	average gate power dissipation				80	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 140^{\circ}C; f = 50 Hz$ repetitive, $I_T = 3000 A$			100	A/μs
		$t_p = 200 \mu s; di_G/dt = 1 A/\mu s;$ $I_G = 1 A; V = 2/3 V_{DRM}$ non-repet., $I_T = 1000 A$			500	A/μs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = 2/3 V_{DRM}$	$T_{VJ} = 140^{\circ}C$		1000	V/μs
		$R_{GK} = \infty$ ; method 1 (linear voltage rise)				
$V_{GT}$	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		2	V
			$T_{VJ} = -40^{\circ}C$		3	V
$I_{GT}$	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		600	mA
			$T_{VJ} = -40^{\circ}C$		800	mA
$V_{GD}$	gate non-trigger voltage	$V_D = 2/3 V_{DRM}$	$T_{VJ} = 140^{\circ}C$		0.25	V
$I_{GD}$	gate non-trigger current				10	mA
$I_L$	latching current	$t_p = 30 \mu s$	$T_{VJ} = 25^{\circ}C$		800	mA
		$I_G = 1 A; di_G/dt = 1 A/\mu s$				
$I_H$	holding current	$V_D = 6 V R_{GK} = \infty$	$T_{VJ} = 25^{\circ}C$		600	mA
$t_{gd}$	gate controlled delay time	$V_D = 1/2 V_{DRM}$	$T_{VJ} = 25^{\circ}C$		2	μs
		$I_G = 1 A; di_G/dt = 1 A/\mu s$				
$t_q$	turn-off time	$V_R = 100 V; I_T = -0.3 A; V = 2/3 V_{DRM}$	$T_{VJ} = 125^{\circ}C$	350		μs
		$di/dt = 10 A/\mu s dv/dt = 50 V/\mu s t_p = 200 \mu s$				

Package ComPack		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	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
<b>Weight</b>				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	4800			V
		t = 1 minute	4000			V


**Part description**

- M = Module
- C = Thyristor (SCR)
- M = Thyristor
- A = (up to 1800V)
- 1400 = Current Rating [A]
- E = Single Thyristor
- 1600 = Reverse Voltage [V]
- CD = ComPack

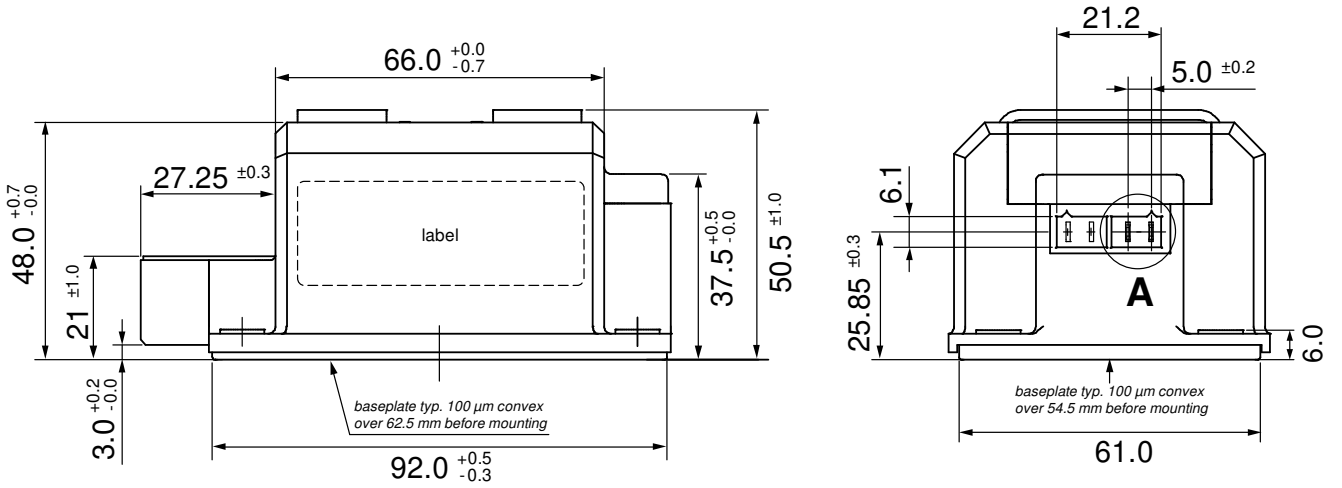
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA1400E1600CD	MCMA1400E1600CD	Box	3	521522

**Equivalent Circuits for Simulation**
*\* on die level*
 $T_{VJ} = 140^{\circ}\text{C}$ 

**Thyristor**

$V_{0\ max}$	threshold voltage	0.8	V
$R_{0\ max}$	slope resistance *	0.21	mΩ



**Outlines ComPack**



Optional accessories for modules  
Keyed gate/cathode twin plug with  
wire length = 350 mm, gate = white, cathode = red  
Type ZY 180R (R = Right for pin pair 6/7) UL 758, style 3751

