

High Voltage Thyristor \ Diode Module

$$V_{RRM} = 2 \times 2200 \text{ V}$$

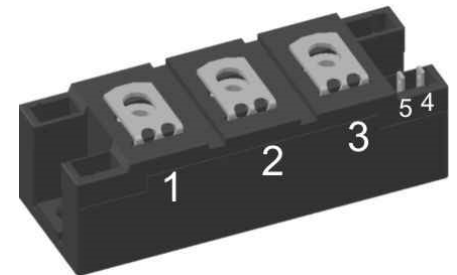
$$I_{TAV} = 220 \text{ A}$$

$$V_T = 1.19 \text{ V}$$

Phase leg

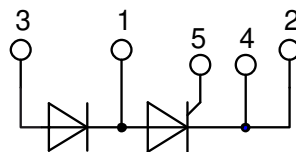
Part number

MCNA220PD2200YB



Backside: isolated

 E72873



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability

Applications:

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

Package: Y4

- 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.



Rectifier			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			2300	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			2200	V
I_{RD}	reverse current, drain current	$V_{R/D} = 2200\text{ V}$	$T_{VJ} = 25^{\circ}C$		400	μA
		$V_{R/D} = 2200\text{ V}$	$T_{VJ} = 125^{\circ}C$		15	mA
V_T	forward voltage drop	$I_T = 220\text{ A}$	$T_{VJ} = 25^{\circ}C$		1.24	V
		$I_T = 440\text{ A}$			1.51	V
		$I_T = 220\text{ A}$	$T_{VJ} = 125^{\circ}C$		1.19	V
		$I_T = 440\text{ A}$			1.53	V
I_{TAV}	average forward current	$T_C = 85^{\circ}C$	$T_{VJ} = 140^{\circ}C$		220	A
$I_{T(RMS)}$	RMS forward current	180° sine			345	A
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 140^{\circ}C$		0.84	V
r_T	slope resistance				1.5	m Ω
R_{thJC}	thermal resistance junction to case				0.13	K/W
R_{thCH}	thermal resistance case to heatsink			0.07		K/W
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		885	W
I_{TSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		7.20	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		7.78	kA
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 140^{\circ}C$		6.12	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		6.61	kA
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		259.2	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		251.5	kA ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 140^{\circ}C$		187.3	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		181.8	kA ² s
C_J	junction capacitance	$V_R = 700\text{ V } f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}C$		195	pF
P_{GM}	max. gate power dissipation	$t_p = 30\text{ }\mu s$	$T_C = 140^{\circ}C$		120	W
		$t_p = 300\text{ }\mu s$			60	W
P_{GAV}	average gate power dissipation				8	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 140^{\circ}C; f = 50\text{ Hz}$ repetitive, $I_T = 660\text{ A}$			150	A/ μs
		$t_p = 200\text{ }\mu s; di_G/dt = 0.5\text{ A}/\mu s;$ $I_G = 0.5\text{ A}; V = \frac{2}{3} V_{DRM}$ non-repet., $I_T = 220\text{ A}$			500	A/ μs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty; \text{ method 1 (linear voltage rise)}$	$T_{VJ} = 140^{\circ}C$		1000	V/ μs
V_{GT}	gate trigger voltage	$V_D = 6\text{ V}$	$T_{VJ} = 25^{\circ}C$		2	V
			$T_{VJ} = -40^{\circ}C$		2.6	V
I_{GT}	gate trigger current	$V_D = 6\text{ V}$	$T_{VJ} = 25^{\circ}C$		150	mA
			$T_{VJ} = -40^{\circ}C$		200	mA
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140^{\circ}C$		0.2	V
I_{GD}	gate non-trigger current				10	mA
I_L	latching current	$t_p = 30\text{ }\mu s$	$T_{VJ} = 25^{\circ}C$		200	mA
		$I_G = 0.45\text{ A}; di_G/dt = 0.45\text{ A}/\mu s$				
I_H	holding current	$V_D = 6\text{ V } R_{GK} = \infty$	$T_{VJ} = 25^{\circ}C$		200	mA
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$		2	μs
		$I_G = 0.5\text{ A}; di_G/dt = 0.5\text{ A}/\mu s$				
t_q	turn-off time	$V_R = 100\text{ V}; I_T = 220\text{ A}; V = \frac{2}{3} V_{DRM}$ $di/dt = 10\text{ A}/\mu s \quad dv/dt = 20\text{ V}/\mu s \quad t_p = 200\text{ }\mu s$	$T_{VJ} = 125^{\circ}C$		200	μs



Package Y4				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
I_{RMS}	RMS current	per terminal			300	A	
T_{VJ}	virtual junction temperature		-40		140	°C	
T_{op}	operation temperature		-40		125	°C	
T_{stg}	storage temperature		-40		125	°C	
Weight					150	g	
M_D	mounting torque		2.25		2.75	Nm	
M_T	terminal torque		4.5		5.5	Nm	
$d_{Spp/APP}$	creepage distance on surface striking distance through air	terminal to terminal	14.0	10.0		mm	
$d_{Spb/APb}$		terminal to backside	16.0	16.0		mm	
V_{ISOL}	isolation voltage	t = 1 second	4800			V	
		t = 1 minute	4000			V	



Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

Part description

- M = Module
- C = Thyristor (SCR)
- N = High Voltage Thyristor
- A = (>= 2000V)
- 220 = Current Rating [A]
- PD = Phase leg
- 2200 = Reverse Voltage [V]
- YB = Y4-M6

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCNA220PD2200YB	MCNA220PD2200YB	Box	6	520509

Similar Part	Package	Voltage class
MCNA150PD2200YB	Y4-M6	2200
MCNA180PD2200YB	Y4-M6	2200

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 140^{\circ}C$



Thyristor

$V_{0\ max}$	threshold voltage	0.84	V
$R_{0\ max}$	slope resistance *	0.9	mΩ

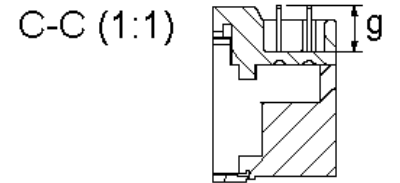


Outlines Y4



Dim.	MIN [mm]	MAX [mm]	MIN [inch]	MAX [inch]
a	30.0	30.6	1.181	1.205
b	typ. 0.25		typ. 0.010	
c	64.0	65.0	2.520	2.559
d	6.5	7.0	0.256	0.275
e	4.9	5.1	0.193	0.201
f	28.6	29.2	1.126	1.150
g	7.3	7.7	0.287	0.303
h	93.5	94.5	3.681	3.720
i	79.5	80.5	3.130	3.169
j	4.8	5.2	0.189	0.205
k	33.4	34.0	1.315	1.339
l	16.7	17.3	0.657	0.681
m	22.7	23.3	0.894	0.917
n	22.7	23.3	0.894	0.917
o	14.0	15.0	0.551	0.591
p	typ. 10.5		typ. 0.413	
r	1.8	2.4	0.071	0.041

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, style 3751



Thyristor

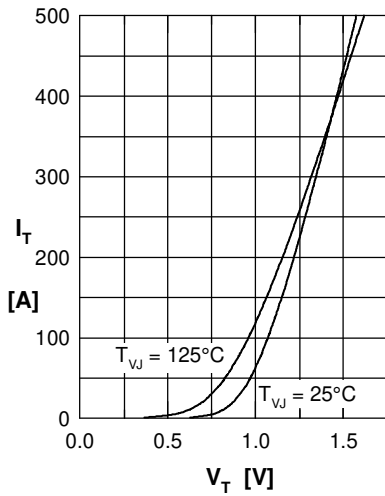


Fig. 1 Forward characteristics

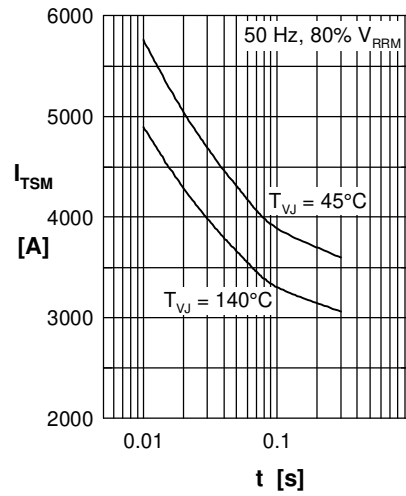


Fig. 2 Surge overload current
 I_{TSM} : crest value, t : duration

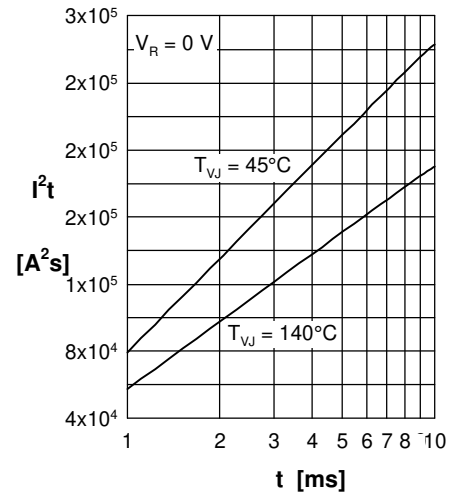


Fig. 3 I^2t versus time (1-10 s)

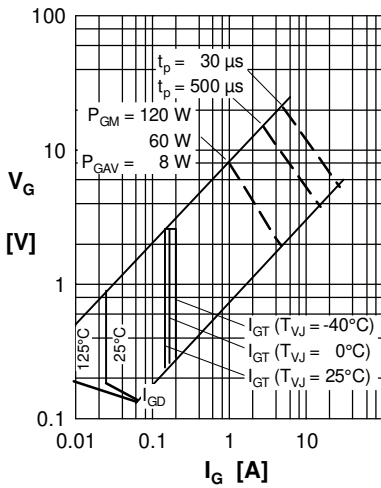


Fig. 4 Gate voltage & gate current

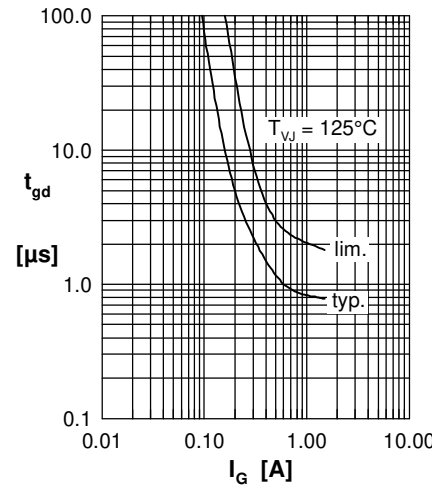


Fig. 5 Gate controlled delay time t_{gd}

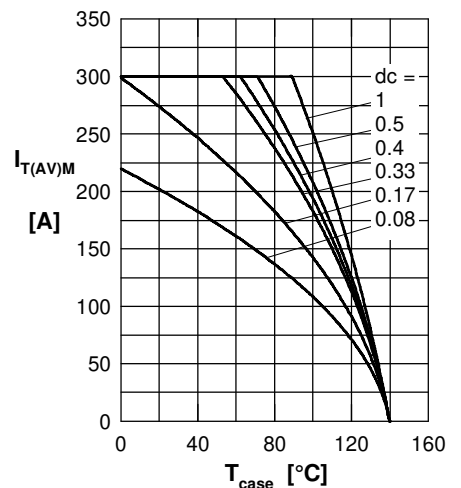


Fig. 6 Max. forward current at case temperature

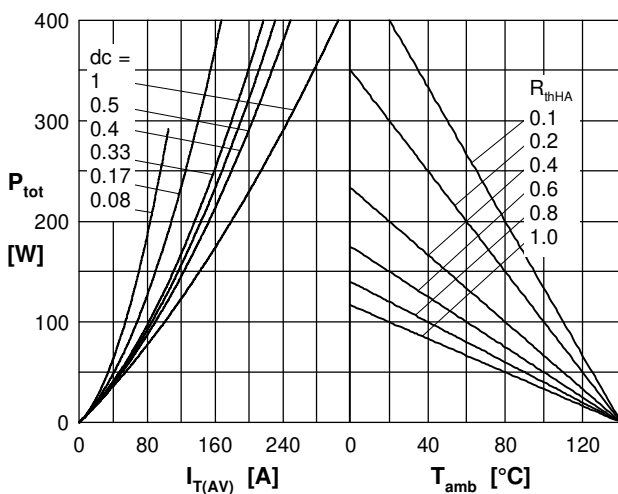


Fig. 7a Power dissipation versus direct output current
 Fig. 7b and ambient temperature

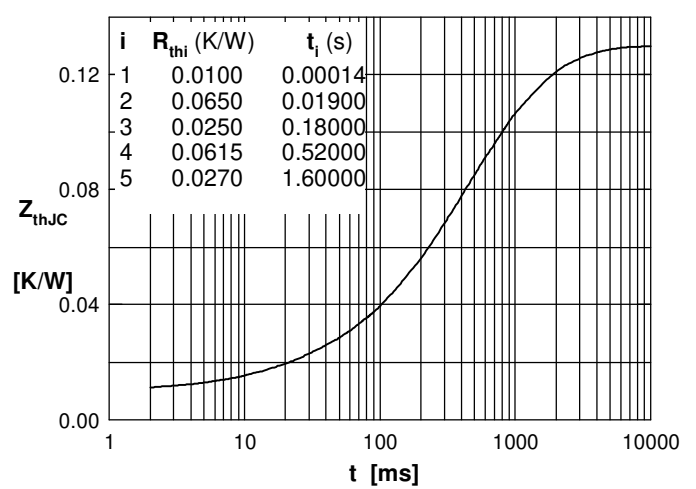


Fig. 8 Transient thermal impedance junction to case

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [SCR Modules](#) category:

Click to view products by [IXYS](#) manufacturer:

Other Similar products are found below :

[DT430N22KOF](#) [T1851N60TOH](#) [T420N12TOF](#) [T470N16TOF](#) [T901N36TOF](#) [TD162N16KOF-A](#) [TD330N16AOF](#) [T300N14TOF](#)
[T390N16TOF](#) [T460N24TOF](#) [TD570N16KOF](#) [TD180N16KOF](#) [VSKE236/16PBF](#) [T1081N60TOH](#) [TT61N08KOF](#) [TT162N08KOF](#)
[T2001N34TOF](#) [T901N35TOF](#) [T1080N02TOF](#) [T360N22TOF](#) [TZ810N22KOF](#) [T420N18TOF](#) [T420N14TOF](#) [TD305N16KOF](#) [T740N26TOF](#)
[T360N24TOF](#) [T430N16TOF](#) [T300N16TOF](#) [TD520N22KOF](#) [TT305N16KOF](#) [TT270N16KOF](#) [TD600N16KOF](#) [T740N22TOF](#) [T640N12TOF](#)
[T470N12TOF](#) [NTE5728](#) [ETZ1100N16P70HPSA1](#) [T430N18TOF](#) [TD700N22KOFHPSA1](#) [T3441N52TOH](#) [T2851N48TOH](#)
[TD820N16KOFHPSA1](#) [MCD501-16IO2](#) [MCD501-18IO2](#) [SK 100 KQ 12](#) [SK 45 UT 16](#) [SKKT 106B12 E](#) [SKKT 27/16E](#) [VS-](#)
[ST180S12P0VPBF](#) [PSET132/16](#)