Thyristor Module

1800 V

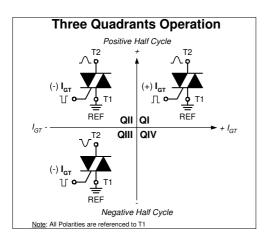
300 A

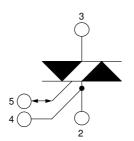
1.02 V

1~ Triac

Part number

MCMA650MT1800NKD







Backside: isolated



Features / Advantages:

- Triac for line frequency
- Three Quadrants Operation
- QI QIII
- Planar passivated chip
- Long-term stability of blocking currents and voltages

Applications:

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

Package: Y1

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: Copper internally DCB isolated
- Advanced power cycling

Terms and Conditions of Usage

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;
 the conclusion of quality agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

IXYS reserves the right to change limits, conditions and dimensions.

Data according to IEC 60747 and per semiconductor unless otherwise specified

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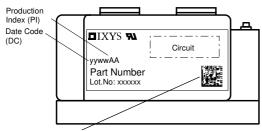
MCMA650MT1800NKD

Rectifier				"	Ratings	5	1
Symbol	Definition	Conditions		min.	typ.	max.	Uni
V _{RSM/DSM}	max. non-repetitive reverse/forward	blocking voltage	$T_{VJ} = 25^{\circ}C$			1900	'
V _{RRM/DRM}	max. repetitive reverse/forward block		$T_{VJ} = 25^{\circ}C$			1800	'
I _{R/D}	reverse current, drain current	$V_{R/D} = 1800 \text{ V}$	$T_{VJ} = 25^{\circ}C$			1	m
		$V_{R/D} = 1800 \text{ V}$	$T_{VJ} = 125^{\circ}C$			40	m
V _T	forward voltage drop	$I_T = 300 A$	$T_{VJ} = 25^{\circ}C$			1.09	,
		$I_{T} = 600 \text{ A}$				1.26	,
		$I_{T} = 300 \text{ A}$	T _{vJ} = 125°C			1.02	
		$I_T = 600 \text{ A}$				1.23	
I _{TAV}	average forward current	$T_C = 85^{\circ}C$	$T_{VJ} = 140$ °C			300	
I _{RMS}	RMS forward current per phase	180° sine				650	
V _{T0}	threshold voltage	and a state of a state	T _{vJ} = 140°C			0.81	
r⊤	slope resistance	calculation only				0.68	m
R _{thJC}	thermal resistance junction to case					0.12	K/V
R _{thCH}	thermal resistance case to heatsink				0.04		K/V
P _{tot}	total power dissipation		$T_C = 25^{\circ}C$			960	٧
I _{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			9.60	k
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			10.4	k
		t = 10 ms; (50 Hz), sine	T _{v,i} = 140°C			8.16	k
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			8.82	k
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			460.8	kA²
		t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			447.4	kA²
		t = 10 ms; (50 Hz), sine	T _{v.l} = 140°C			332.9	kA²
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			323.3	ĺ
C,	junction capacitance	$V_B = 400 \text{ V}$ f = 1 MHz	$T_{VJ} = 25^{\circ}C$		438		р
P _{GM}	max. gate power dissipation	t _P = 30 μs	T _C = 140°C			120	<u> </u>
GIWI	учен дана реттег спостранот	t _P = 300 μs	Ŭ			60	٧
P_{GAV}	average gate power dissipation	-F				20	٧
(di/dt) _{cr}	critical rate of rise of current	T _{v,I} = 140°C; f = 50 Hz	repetitive, $I_T = 900 \text{ A}$			100	!
(and any cr		$t_{P} = 200 \mu s; di_{G}/dt = 1 A/\mu$	•				
		$I_{G} = 1A; V = \frac{2}{3} V_{DRM}$	non-repet., $I_T = 300 \text{ A}$			500	Α/μ
(dv/dt) _{cr}	critical rate of rise of voltage	$V = \frac{2}{3} V_{DBM}$	$T_{VJ} = 140^{\circ}C$			1000	<u>i </u>
(av/at/ _{cr}	omical rate of rise of voltage	$R_{GK} = \infty$; method 1 (linear v	· ·			1000	•/μ
V _{GT}	gate trigger voltage	$V_D = 6 \text{ V}$	$T_{VJ} = 25^{\circ}C$			2	١
♥ GT	gate ingger vertage	v _D = 0 v	$T_{VJ} = -40$ °C			3	,
	gate trigger current	$V_D = 6 V$	$T_{VJ} = -40^{\circ} \text{C}$ $T_{VJ} = 25^{\circ} \text{C}$!
I _{GT}	gate ingger current	$\mathbf{v}_{D} = \mathbf{o} \ \mathbf{v}$	$T_{VJ} = 23 \text{ C}$ $T_{VJ} = -40 \text{ °C}$			220 400	m,
V	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = -40^{\circ} \text{C}$ $T_{VJ} = 140^{\circ} \text{C}$			0.25	m,
V _{GD}		$\mathbf{v}_{\mathrm{D}} = /3 \mathbf{v}_{\mathrm{DRM}}$	1 _{VJ} = 140 C				į
I _{GD}	gate non-trigger current		T 0500			10	m
I _L	latching current	$t_p = 30 \mu s$ $I_G = 1 A; di_G/dt = 1$	$T_{VJ} = 25 ^{\circ}\text{C}$ A/ μ s			200	m
I _H	holding current	V _D = 6 V R _{GK} = ∞	T _{vJ} = 25°C			150	m
t _{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$			2	<u> </u>
2-	-		A/μs				"
t _q	turn-off time $V_R = 100 \text{ V}; I_T = 300 \text{ A}; V = \frac{2}{3} V_{DRM} T_{VJ} = 125 \text{ °C}$				350		μ
-4		$di/dt = 10 \text{ A/}\mu\text{s} \text{ dv/dt} = 10 \text{ A/}\mu\text$					٣



MCMA650MT1800NKD

Package	Package Y1			Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I _{RMS}	RMS current	per terminal				600	Α
T _{VJ}	virtual junction temperature			-40		140	°C
Top	operation temperature			-40		125	°C
T _{stg}	storage temperature			-40		125	°C
Weight					650		g
M _D	mounting torque			4.5		7	Nm
$\mathbf{M}_{_{\mathrm{T}}}$	terminal torque			11		13	Nm
d _{Spp/App}	oroonaga diatanaa an aurfac	oo Latriking diatanaa through air	terminal to terminal	16.0			mm
$d_{\text{Spb/Apb}}$	creepage distance on surfac	ee striking distance through air	terminal to backside	25.0			mm
V _{ISOL}	isolation voltage	t = 1 second	50/00 II	3600			٧
IOUL	t = 1 minute		50/60 Hz, RMS; IISOL ≤ 1 mA	3000			٧



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

Part description

M = Module

M = NOULLIE
C = Thyristor (SCR)
M = Thyristor
A = (up to 1800V)
650 = Current Rating [A]

MT = 1~ Triac

1800 = Reverse Voltage [V]

N = Three Quadrants operation: QI - QIII KD = Y1-2-CU

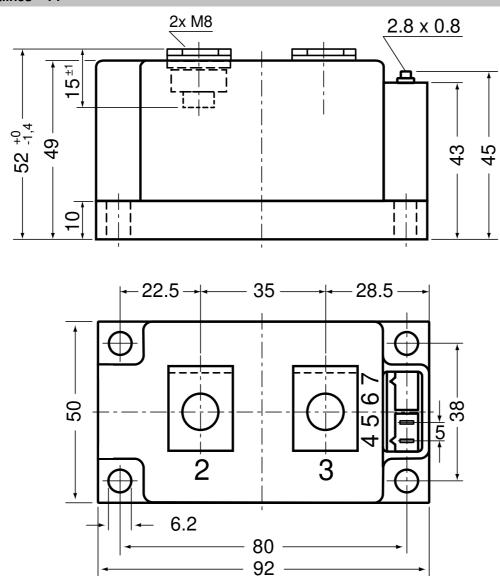
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA650MT1800NKD	MCMA650MT1800NKD	Box	2	518710

Similar Part	Package	Voltage class
MCMA650MT1400NKD	Y1-2-CU	1400

Equivalent Circuits for Simulation			* on die level	$T_{VJ} = 140 ^{\circ}\text{C}$
$I \rightarrow V_0$	R_0	Thyristor		
V _{0 max}	threshold voltage	0.81		V
$R_{0 \; max}$	slope resistance *	0.5		$m\Omega$

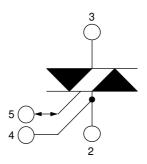


Outlines Y1



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

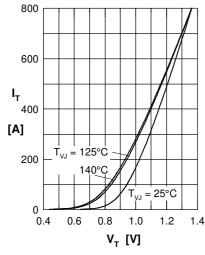


Fig. 1 Forward characteristics

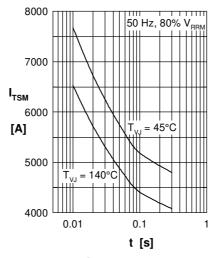


Fig. 2 Surge overload current I_{TSM} : crest value, t: duration

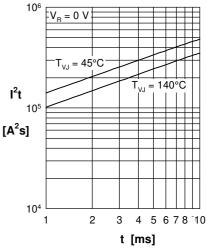


Fig. 3 I²t versus time (1-10 s)

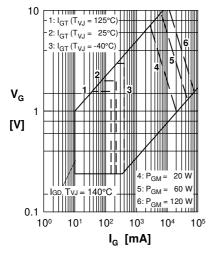


Fig. 4 Gate voltage & gate current

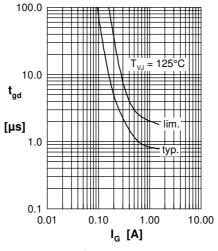


Fig. 5 Gate controlled delay time t_{ad}

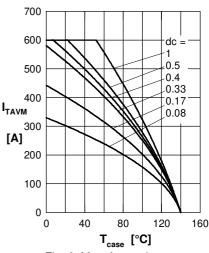


Fig. 6 Max. forward current at case temperature

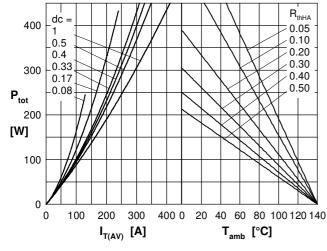


Fig. 7a Power dissipation versus direct output current Fig. 7b and ambient temperature

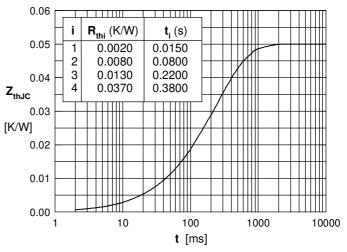


Fig. 8 Transient thermal impedance junction to case

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