Excellent Integrated System Limited

Stocking Distributor

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IXYS Corporation
MCC255-14IO1

For any questions, you can email us directly:
sales@integrated-circuit.com

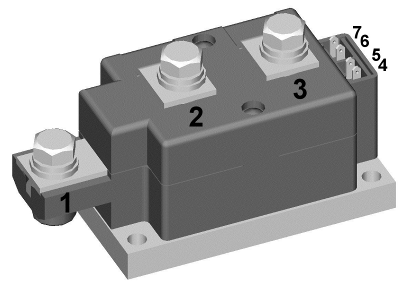
Thyristor Module

V_{RRM} = 2x 1400 V
I_{TAV} = 250 A
V_T = 1.08 V

Phase leg

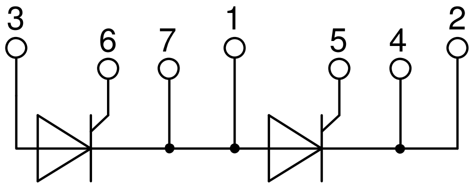
Part number

MCC255-14io1



Backside: isolated

E72873



Features / Advantages:

- International standard package
- Direct copper bonded Al2O3-ceramic with copper base plate
- Planar passivated chip
- Isolation voltage 3600 V~
- Keyed gate/cathode twin pins

Applications:

- Motor control, softstarter
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Solid state switches

Package: Y1

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

Terms 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 the sales office, which is responsible for you.
Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.
Should you intend to use the product in aviation, in health or live 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.

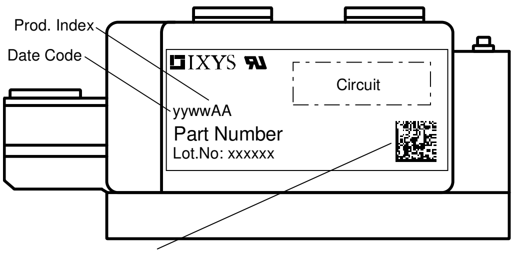
IXYS MCC255-14io1

Thyristor

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1500	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1400	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 1400 V	T_{VJ} = 25°C			1	mA
		$V_{R/D}$ = 1400 V	T_{VJ} = 140°C			40	mA
V_T	*forward voltage drop*	I_T = 300 A	T_{VJ} = 25°C			1.14	V
		I_T = 600 A				1.36	V
		I_T = 300 A	T_{VJ} = 125°C			1.08	V
		I_T = 600 A				1.33	V
I_{TAV}	*average forward current*	T_C = 85°C	T_{VJ} = 140°C			250	A
$I_{T(RMS)}$	*RMS forward current*	180° sine				450	A
V_{T0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 140°C			0.80	V
r_T	*slope resistance*					0.68	mΩ
R_{thJC}	*thermal resistance junction to case*					0.14	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.04		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			820	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			9.20	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			9.94	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			7.82	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			8.45	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			423.2	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			410.6	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			305.8	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			296.7	kA²s
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		438		pF
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 140°C			120	W
		t_P = 500 µs				60	W
P_{GAV}	*average gate power dissipation*					20	W
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 140 °C; f = 50 Hz	repetitive, I_T = 860 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 = 250 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			150	mA
			T_{VJ} = -40°C			220	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			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			150	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 = 300 A; V = ⅔ V_{DRM}	T_{VJ} = 125 °C		200		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 20160301d

Package Y1			Ratings			
Symbol	**Definition**	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal			600	A
T_{VJ}	*virtual junction temperature*		-40		140	°C
T_{op}	*operation temperature*		-40		125	°C
T_{stg}	*storage temperature*		-40		125	°C
Weight				680		g
M_D	*mounting torque*		4.5		7	Nm
M_T	*terminal torque*		11		13	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*	*terminal to terminal*	16.0			mm
$d_{Spb/Apb}$		*terminal to backside*	16.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second; 50/60 Hz, RMS; $I_{ISOL} \le 1$ mA	3600			V
		t = 1 minute	3000			V

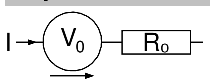


Data Matrix: *Typ* (1-19), DC+*Prod.Index* (20-25), *FKT#* (26-31) *leer* (33), *lfd.#* (33-36)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCC255-14io1	MCC255-14io1	Box	3	463558

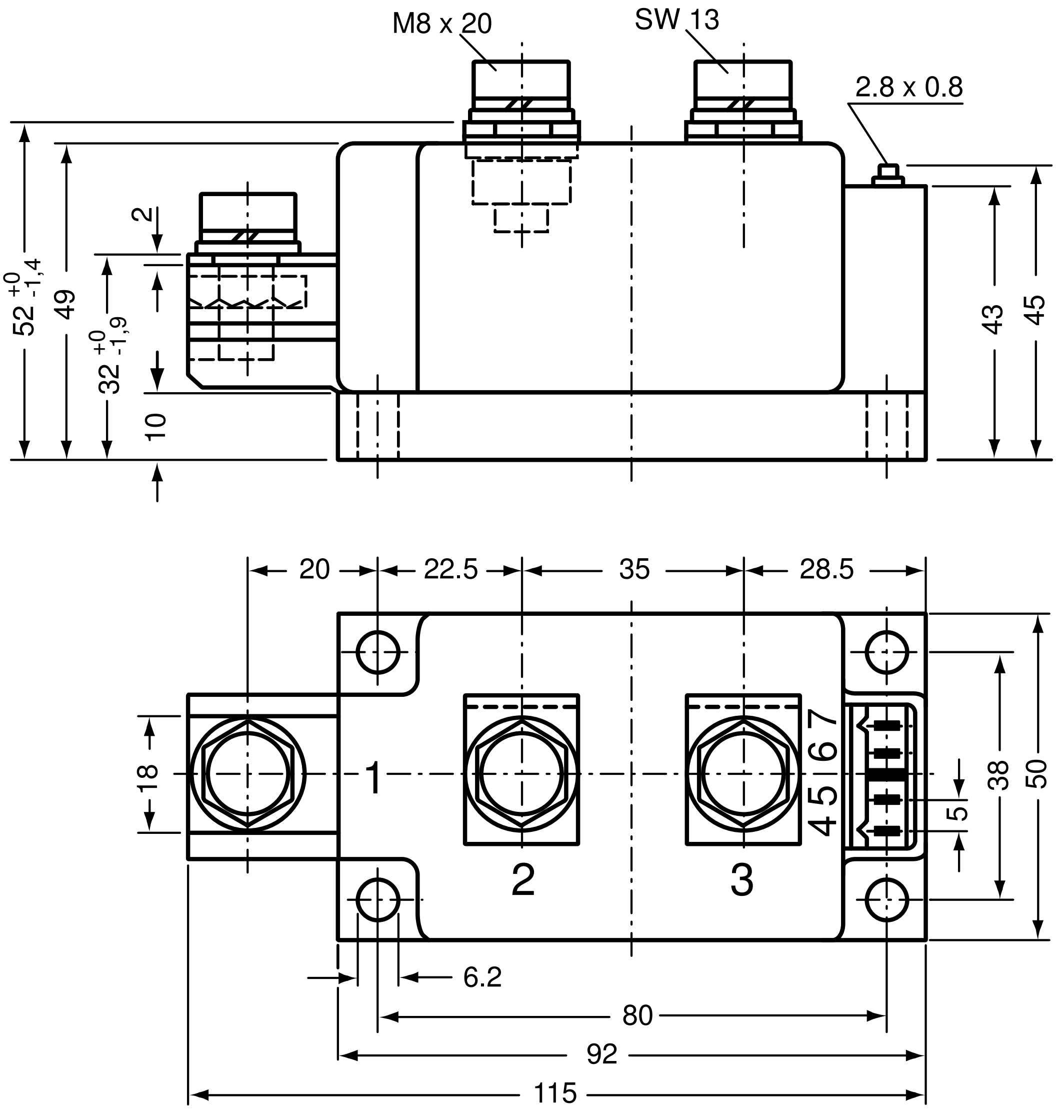
Equivalent Circuits for Simulation

** on die level* $T_{VJ} = 140\,°C$

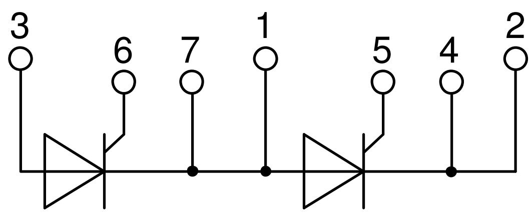


		Thyristor	
$V_{0\,max}$	*threshold voltage*	0.8	V
$R_{0\,max}$	*slope resistance **	0.5	mΩ

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
Type ZY 180R (R = Right for pin pair 6/7)



Thyristor

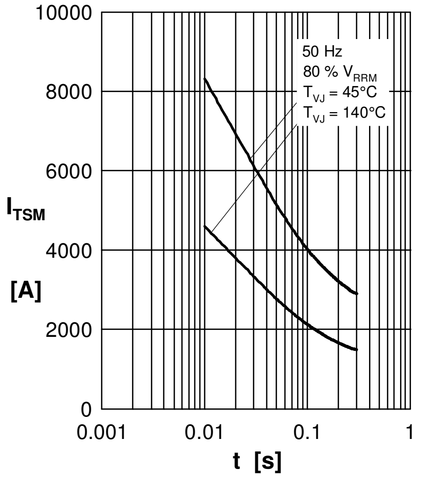


Fig. 1 Surge overload current
$I_{T(F)SM}$: Crest value, t: duration

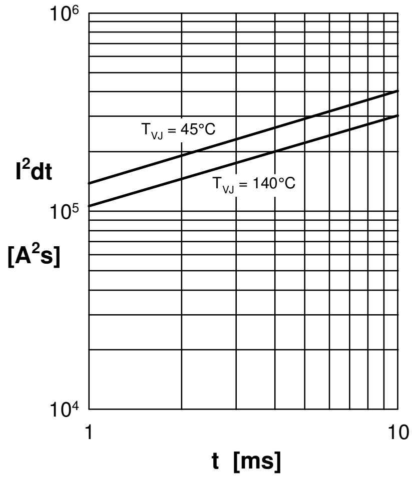


Fig. 2 I^2dt versus time

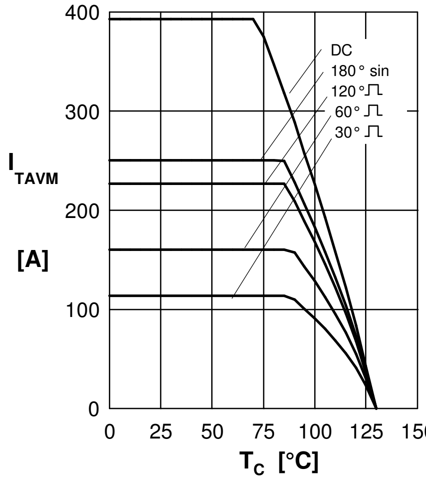


Fig. 3 Max. forward current
at case temperature

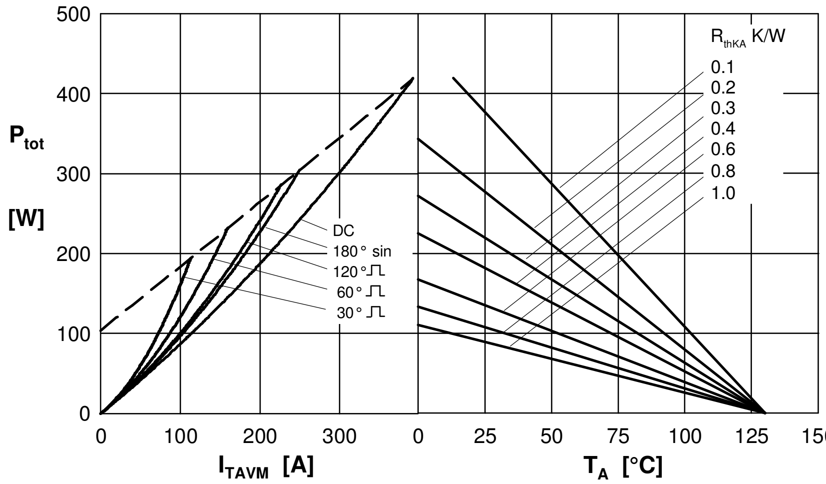


Fig. 4 Power dissipation versus on-state current and
ambient temperature (per thyristor or diode)

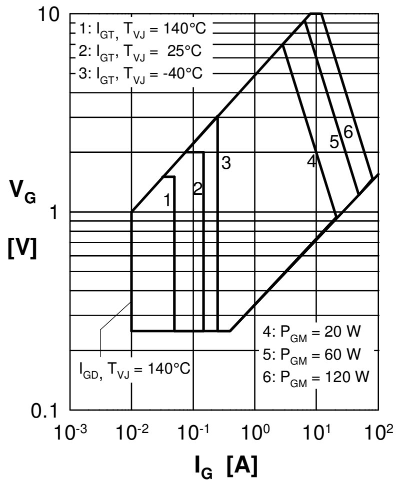


Fig. 5 Surge overload current
$I_{T(F)SM}$: Crest value, t: duration

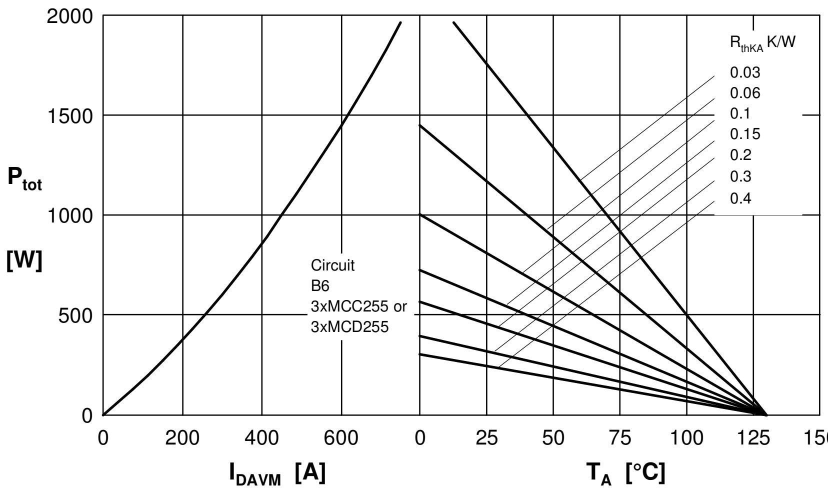


Fig. 6 Three phase rectifier bridge: Power dissipation
vs. direct output current and ambient temperature

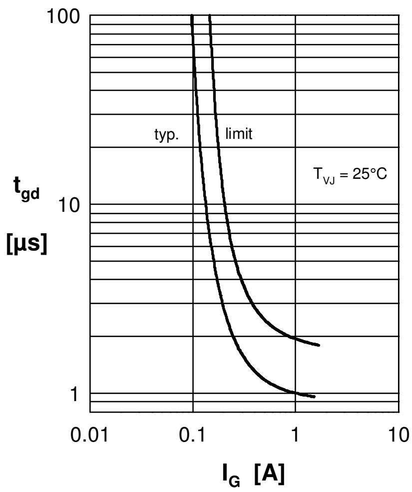


Fig. 7 Gate trigger delay time

Thyristor

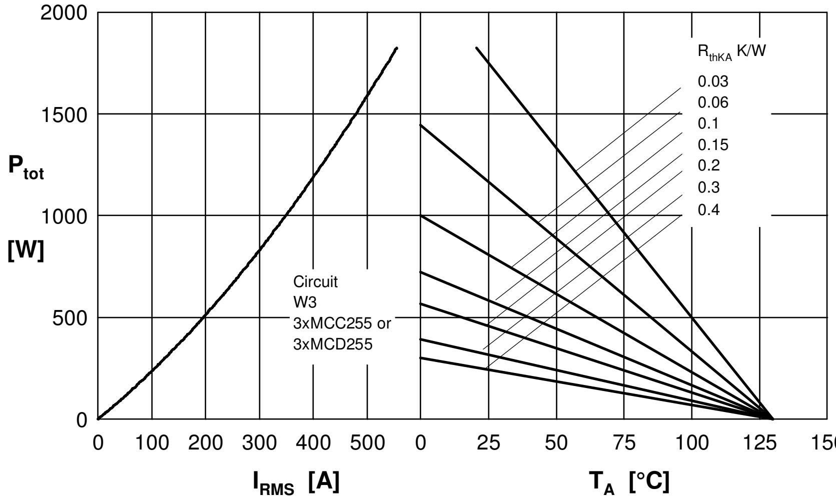


Fig. 8 Three phase AC-controller: Power dissipation versus R_{MS} output current and ambient temperature

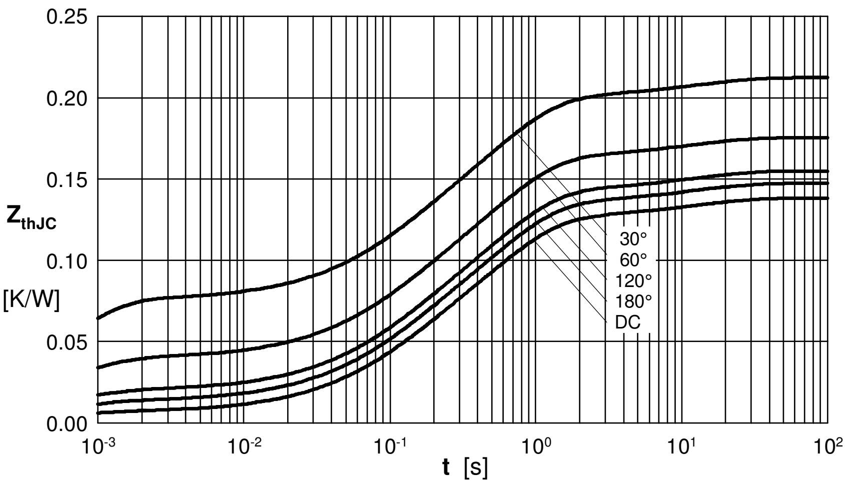


Fig. 9 Transient thermal impedance junction to case (per thyristor/diode)

R_{thJC} for various conduct. angles d:

d	R_{thJC} [K/W]
DC	0.139
180°	0.148
120°	0.156
60°	0.176
30°	0.214

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.0066	0.00054
2	0.0358	0.098
3	0.0831	0.54
4	0.0129	12

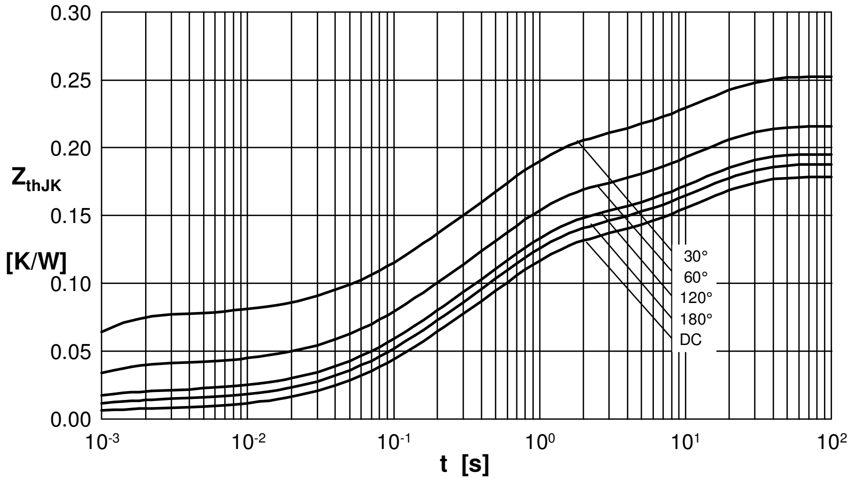


Fig. 10 Transient thermal impedance junction to heatsink (per thyristor/diode)

R_{thJC} for various conduct. angles d:

d	R_{thJK} [K/W]
DC	0.179
180°	0.188
120°	0.196
60°	0.216
30°	0.254

Constants for Z_{thJK} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.0066	0.00054
2	0.0358	0.098
3	0.0831	0.54
4	0.0129	12
5	0.04	12