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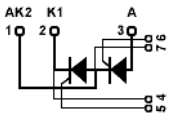
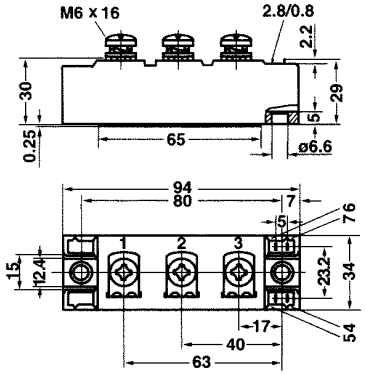
Thyristor-Thyristor Modules



Type	V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V
CTT130GK08	900	800
CTT130GK12	1300	1200
CTT130GK14	1500	1400
CTT130GK16	1700	1600
CTT130GK18	1900	1800

Dimensions in mm (1mm=0.0394")



Symbol	Test Conditions		Maximum Ratings	Unit
I_{TRMS}, I_{FRMS} I_{TAVM}, I_{FAVM}	$T_{VJ}=T_{VJM}$ $T_C=85^oC$; 180° sine		300 130	A
I_{TSM}, I_{FSM}	$T_{VJ}=45^oC$ $V_R=0$	t=10ms (50Hz), sine t=8.3ms (60Hz), sine	5500 5850	A
	$T_{VJ}=T_{VJM}$ $V_R=0$	t=10ms(50Hz), sine t=8.3ms(60Hz), sine	4800 5100	
$\int i^2dt$	$T_{VJ}=45^oC$ $V_R=0$	t=10ms (50Hz), sine t=8.3ms (60Hz), sine	151000 142000	A^2s
	$T_{VJ}=T_{VJM}$ $V_R=0$	t=10ms(50Hz), sine t=8.3ms(60Hz), sine	115000 108000	
$(di/dt)_{cr}$	$T_{VJ}=T_{VJM}$ f=50Hz, t_P=200us $V_D=2/3V_{DRM}$ I_G=0.5A di_G/dt=0.5A/us	repetitive, I_T=500A non repetitive, I_T=500A	150 500	A/us
$(dv/dt)_{cr}$	$T_{VJ}=T_{VJM}$; $V_{DR}=2/3V_{DRM}$ $R_{GK}=\infty$; method 1 (linear voltage rise)		1000	V/us
P_{GM}	$T_{VJ}=T_{VJM}$ $I_T=I_{TAVM}$	t_P=30us t_P=500us	120 60	W
P_{GAV}			8	W
V_{RGM}			10	V
T_{VJ} T_{VJM} T_{stg}			-40...+125 125 -40...+125	°C
V_{ISOL}	50/60Hz, RMS $I_{ISOL}\leq$1mA	t=1min t=1s	3000 3600	V~
M_d	Mounting torque (M6) Terminal connection torque (M6)		2.25-2.75/20-25 4.5-5.5/40-48	Nm/lb.in.
Weight	Typical including screws		125	g

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Symbol	Test Conditions	Characteristic Values	Unit
I_{RRM}, I_{DRM}	$T_{VJ}=T_{VJM}$; $V_R=V_{RRM}$; $V_D=V_{DRM}$	10	mA
V_T, V_F	I_T, I_F=300A; $T_{VJ}=25^oC$	1.36	V
V_{TO}	For power-loss calculations only ($T_{VJ}=125^oC$)	0.8	V
r_T		1.5	mΩ
V_{GT}	V_D=6V; $T_{VJ}=25^oC$ $T_{VJ}=-40^oC$	2.5 2.6	V
I_{GT}	V_D=6V; $T_{VJ}=25^oC$ $T_{VJ}=-40^oC$	150 200	mA
V_{GD}	$T_{VJ}=T_{VJM}$; $V_D=2/3V_{DRM}$	0.2	V
I_{GD}		10	mA
I_L	$T_{VJ}=25^oC$; t_p=30us; V_D=6V I_G=0.5A; di_G/dt=0.5A/us	300	mA
I_H	$T_{VJ}=25^oC$; V_D=6V; $R_{GK}=\infty$	200	mA
t_{gd}	$T_{VJ}=25^oC$; $V_D=1/2V_{DRM}$ I_G=0.5A; di_G/dt=0.5A/us	2	us
t_q	$T_{VJ}=T_{VJM}$; I_T=160A; t_p=200us; -di/dt=10A/us typ. V_R=100V; dv/dt=20V/us; $V_D=2/3V_{DRM}$	150	us
Q_S	$T_{VJ}=T_{VJM}$; I_T, I_F=300A; -di/dt=50A/us	550	uC
I_{RM}		235	A
R_{thJC}	per thyristor/diode; DC current per module	0.23 0.115	K/W
R_{thJK}	per thyristor/diode; DC current per module	0.33 0.165	K/W
d_S	Creeping distance on surface	12.7	mm
d_A	Strike distance through air	9.6	mm
a	Maximum allowable acceleration	50	m/s^2

FEATURES

* International standard package
* Direct copper bonded Al_2O_3-ceramic base plate
* Planar passivated chips
* Isolation voltage 3600 V~
* UL registered, E 72873
* Keyed gate/cathode twin pins

APPLICATIONS

* Motor control
* Power converter
* Heat and temperature control for industrial furnaces and chemical processes
* Lighting control
* Contactless switches

ADVANTAGES

* Space and weight savings
* Simple mounting
* Improved temperature and power cycling
* Reduced protection circuits

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Thyristor-Thyristor Modules

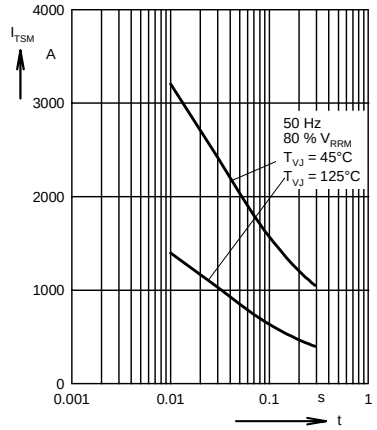

Fig. 1 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

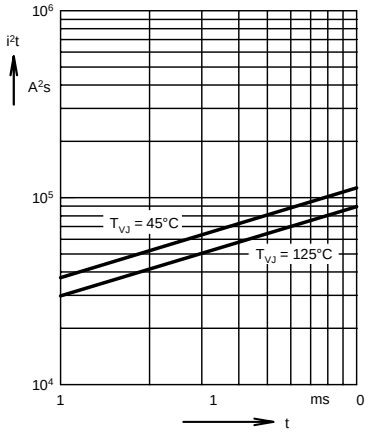

Fig. 2 $\int i^2t$ versus time (1-10 ms)

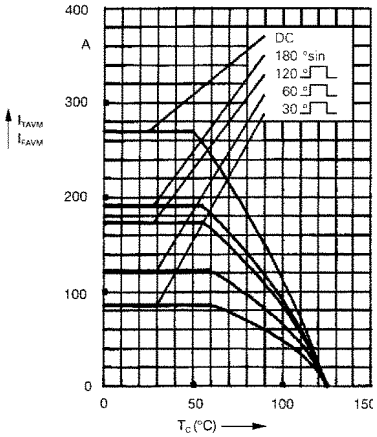

Fig. 2a Maximum forward current at case temperature

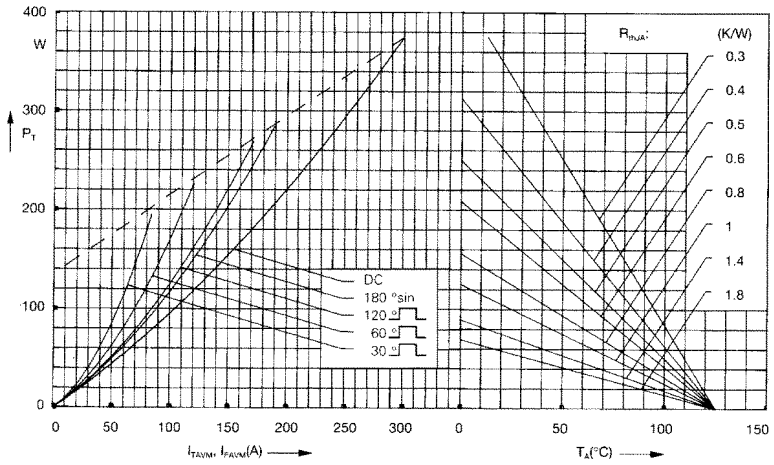

Fig. 3 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

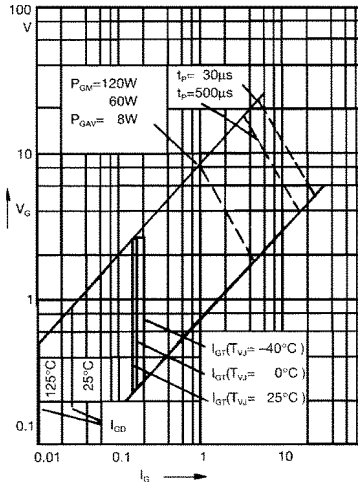

Fig. 4 Gate trigger characteristics

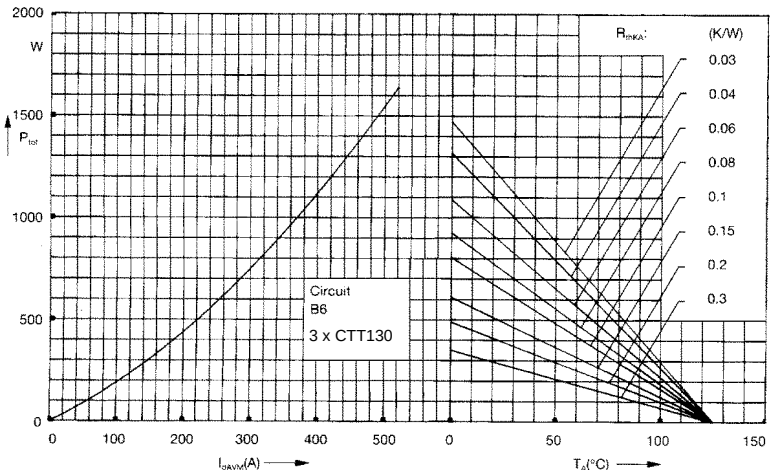

Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

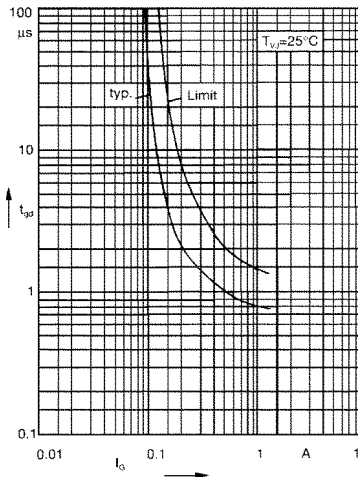

Fig. 6 Gate trigger delay time

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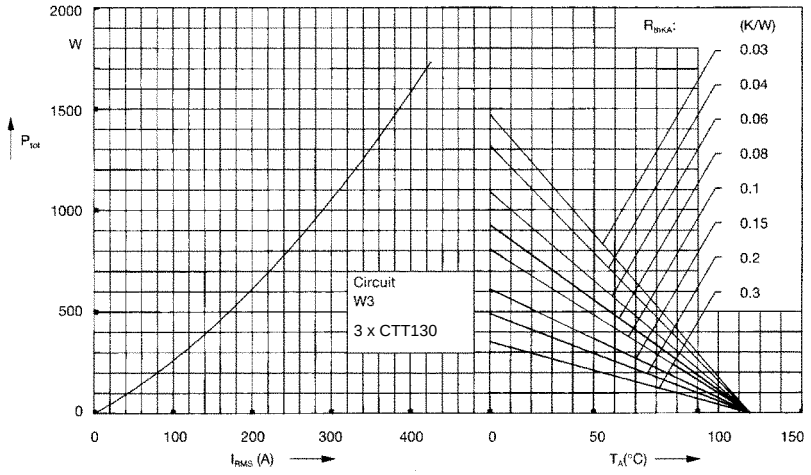

Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

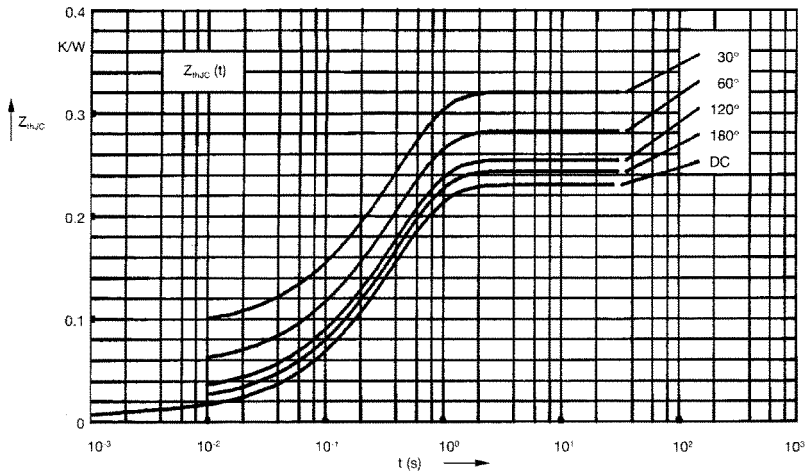

Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.230
180°C	0.244
120°C	0.255
60°C	0.283
30°C	0.321

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0095	0.001
2	0.0175	0.065
3	0.203	0.4

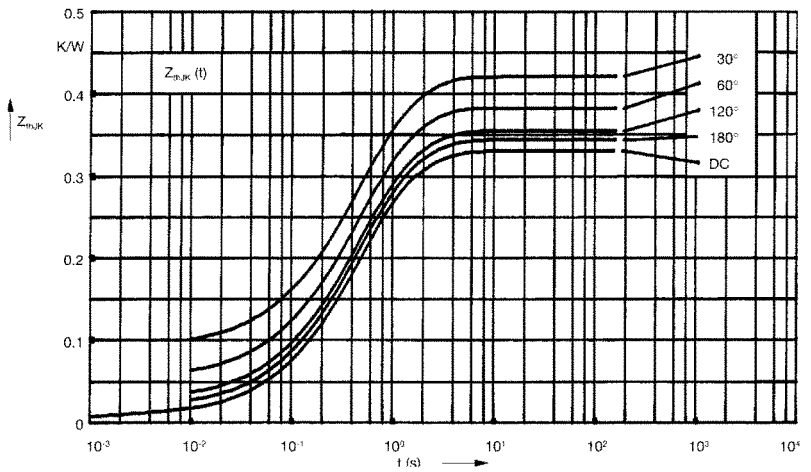

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.330
180°C	0.344
120°C	0.355
60°C	0.383
30°C	0.421

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0095	0.001
2	0.0175	0.065
3	0.203	0.4
4	0.1	1.29