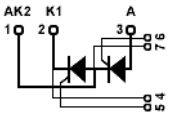
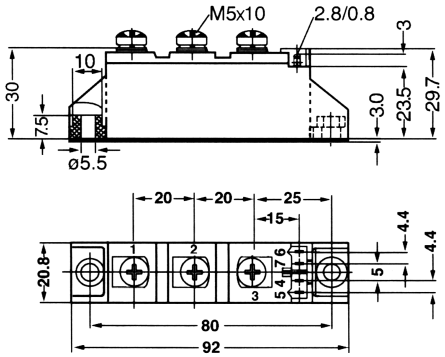
STT90

Thyristor-Thyristor Modules



Type	V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V
STT90GK08	900	800
STT90GK12	1300	1200
STT90GK14	1500	1400
STT90GK16	1700	1600
STT90GK18	1900	1800
STT90GK20	2100	2000

Dimensions in mm (1mm=0.0394")



Symbol	Test Conditions		Maximum Ratings	Unit
I_{TRMS}, I_{FRMS} I_{TAVM}, I_{FAVM}	$T_{VJ}=T_{VJM}$ (50Hz/60Hz) $T_C=85^oC$; 180° sine		180/195 90	A
I_{TSM}, I_{FSM}	$T_{VJ}=45^oC$ $V_R=0$	t=10ms (50Hz), sine t=8.3ms (60Hz), sine	1700 1800	A
	$T_{VJ}=T_{VJM}$ $V_R=0$	t=10ms(50Hz), sine t=8.3ms(60Hz), sine	1540 1640	
$\int i^2dt$	$T_{VJ}=45^oC$ $V_R=0$	t=10ms (50Hz), sine t=8.3ms (60Hz), sine	14450 13500	A^2s
	$T_{VJ}=T_{VJM}$ $V_R=0$	t=10ms(50Hz), sine t=8.3ms(60Hz), sine	11850 11300	
$(di/dt)_{cr}$	$T_{VJ}=T_{VJM}$ f=50Hz, t_P=200us $V_D=2/3V_{DRM}$ I_G=0.45A di_G/dt=0.45A/us	repetitive, I_T=250A non repetitive, $I_T=I_{TAVM}$	150 500	A/us
$(dv/dt)_{cr}$	$T_{VJ}=T_{VJM}$; $R_{GK}=\infty$; method 1 (linear	$V_{DR}=2/3V_{DRM}$ voltage rise)	1000	V/us
P_{GM}	$T_{VJ}=T_{VJM}$ $I_T=I_{TAVM}$	t_P=30us t_P=300us	10 5	W
P_{GAV}			0.5	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 (M5) Terminal connection torque (M5)		2.5-4.0/22-35 2.5-4.0/22-35	Nm/lb.in.
Weight	Typical including screws		90	g

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Symbol	Test Conditions	Characteristic Values	Unit
I_{RRM}, I_{DRM}	$T_{VJ}=T_{VJM}$; $V_R=V_{RRM}$; $V_D=V_{DRM}$	5	mA
V_T, V_F	I_T, I_F=300A; $T_{VJ}=25^oC$	1.74	V
V_{TO}	For power-loss calculations only ($T_{VJ}=125^oC$)	0.85	V
r_T		3.2	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=10us; V_D=6V I_G=0.45A; di_G/dt=0.45A/us	450	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=0.45A; di_G/dt=0.45A/us	2	us
t_q	$T_{VJ}=T_{VJM}$; I_T=150A; t_p=200us; -di/dt=10A/us typ. V_R=100V; dv/dt=20V/us; $V_D=2/3V_{DRM}$	185	us
Q_S	$T_{VJ}=T_{VJM}$; I_T, I_F=50A; -di/dt=6A/us	170	uC
I_{RM}		45	A
R_{thJC}	per thyristor/diode; DC current per module	0.3 0.15	K/W
R_{thJK}	per thyristor/diode; DC current per module	0.5 0.25	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
* Copper base plate
* Planar passivated chips
* Isolation voltage 3600 V~

APPLICATIONS
* DC motor control
* Softstart AC motor controller
* Light, heat and temperature control

ADVANTAGES
* Space and weight savings
* Simple mounting with two screws
* Improved temperature and power cycling
* Reduced protection circuits

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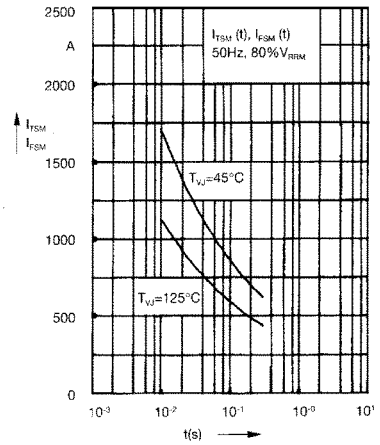

Fig. 1 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

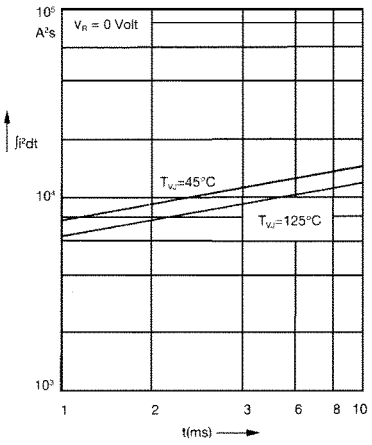

Fig. 2 $\int i^2dt$ versus time (1-10 ms)

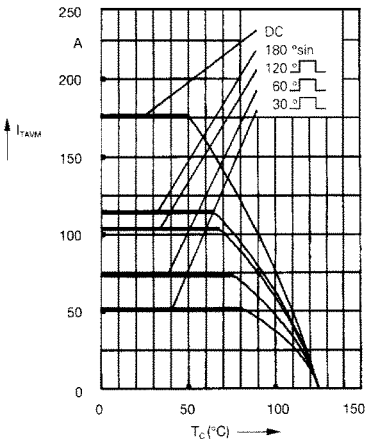

Fig. 2a Maximum forward current at case temperature

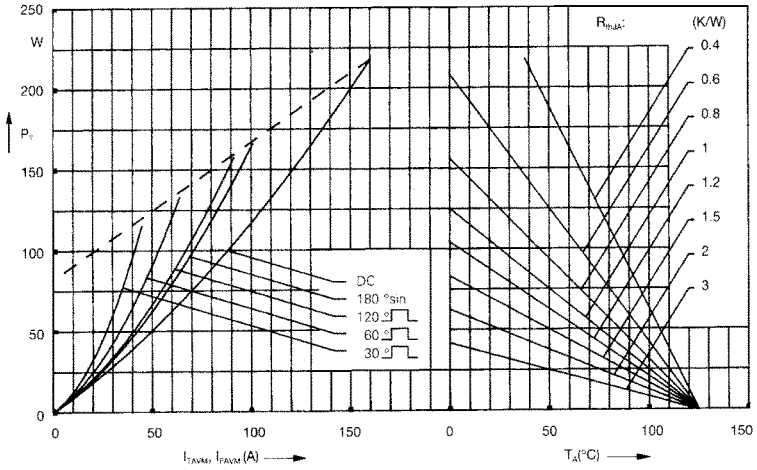

Fig. 3 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

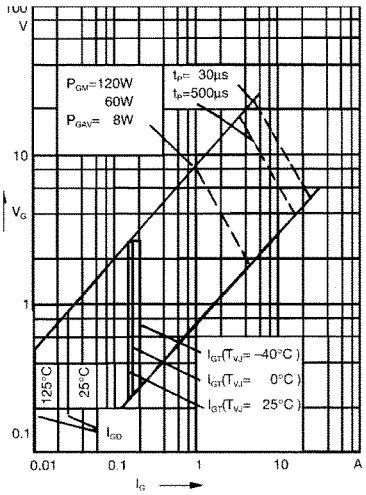

Fig. 4 Gate trigger characteristics

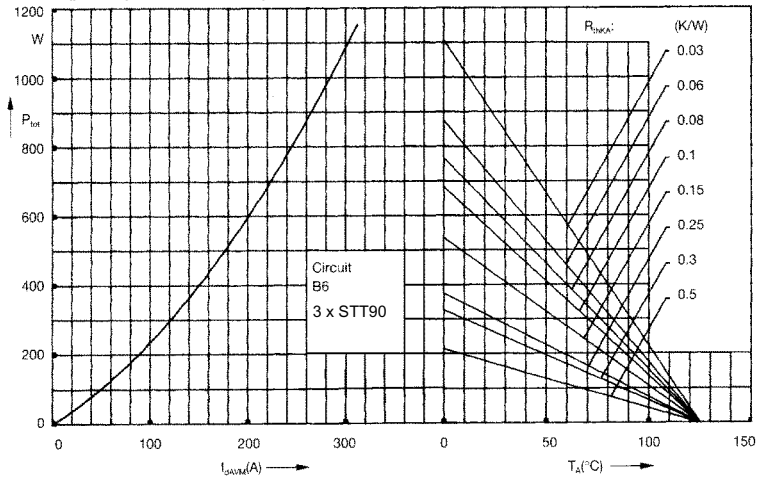

Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

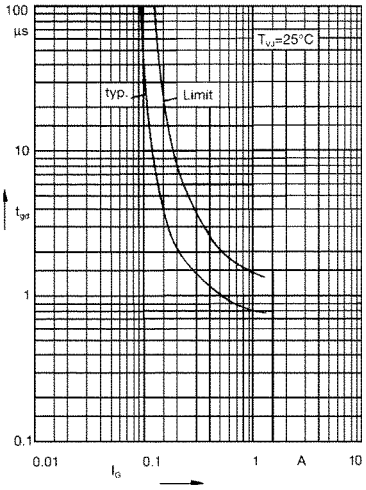

Fig. 6 Gate trigger delay time

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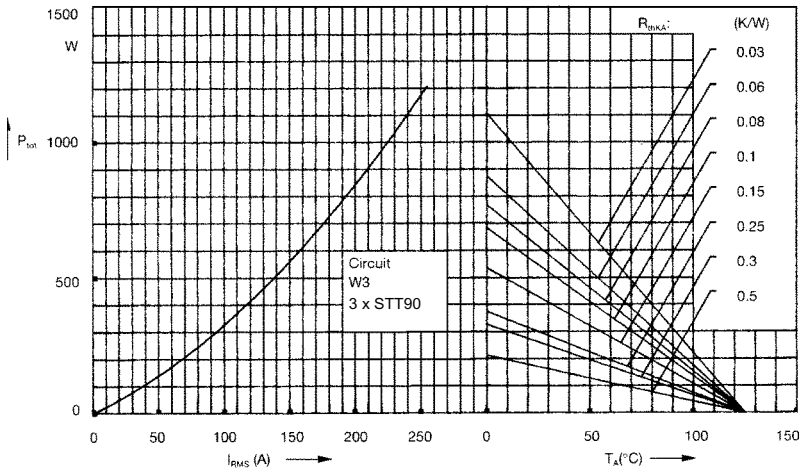

Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

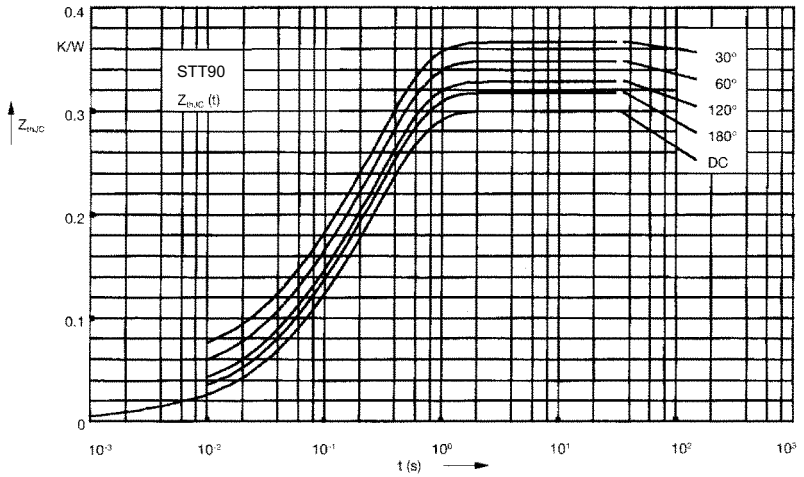

Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.3
180°C	0.31
120°C	0.33
60°C	0.35
30°C	0.37

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.008	0.0019
2	0.054	0.047
3	0.238	0.3

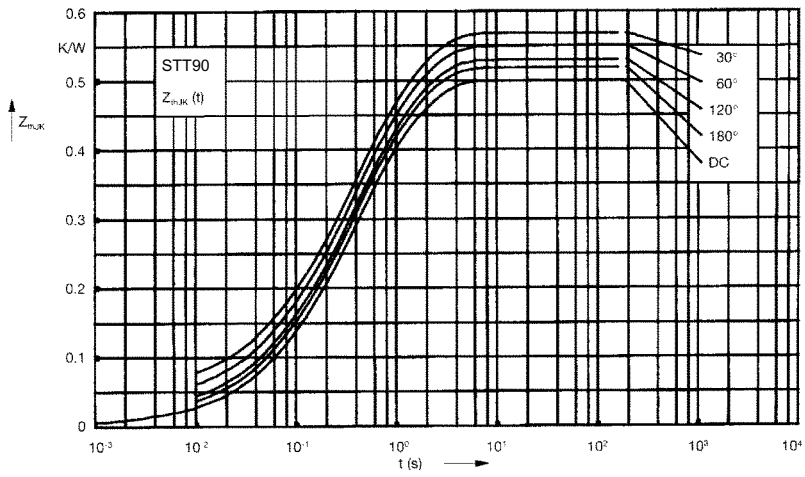

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.5
180°C	0.51
120°C	0.53
60°C	0.55
30°C	0.57

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.008	0.0019
2	0.054	0.047
3	0.238	0.3
4	0.2	1.25