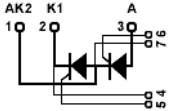


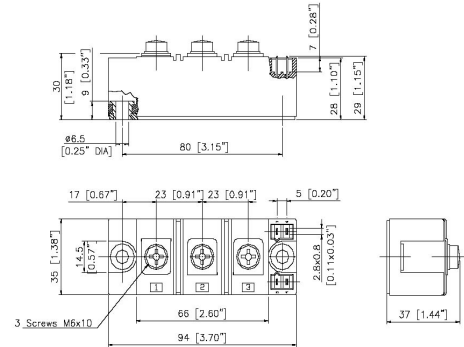
# STT165

## Thyristor-Thyristor Modules



Type	$V_{RSM}$ $V_{DSM}$ V	$V_{RRM}$ $V_{DRM}$ V
STT165GK08	900	800
STT165GK12	1300	1200
STT165GK14	1500	1400
STT165GK16	1700	1600
STT165GK18	1900	1800
STT165GK20	2100	2000
STT165GK22	2300	2200

Dimensions in mm (1mm=0.0394")



Symbol	Test Conditions	Maximum Ratings	Unit
$I_{TRMS}$ , $I_{FRMS}$ $I_{TAVM}$ , $I_{FAVM}$	$T_{VJ}=T_{VJM}$ $T_C=85^{\circ}C$ ; 180° sine	300 165	A
$I_{TSM}$ , $I_{FSM}$	$T_{VJ}=45^{\circ}C$ $V_R=0$ $t=10ms$ (50Hz), sine $t=8.3ms$ (60Hz), sine	6000 6400	A
	$T_{VJ}=T_{VJM}$ $V_R=0$ $t=10ms$ (50Hz), sine $t=8.3ms$ (60Hz), sine	5250 5600	
$\int i^2 dt$	$T_{VJ}=45^{\circ}C$ $V_R=0$ $t=10ms$ (50Hz), sine $t=8.3ms$ (60Hz), sine	180000 170000	A <sup>2</sup> s
	$T_{VJ}=T_{VJM}$ $V_R=0$ $t=10ms$ (50Hz), sine $t=8.3ms$ (60Hz), sine	137000 128000	
$(di/dt)_{cr}$	$T_{VJ}=T_{VJM}$ $f=50Hz$ , $t_p=200\mu s$ $V_D=2/3V_{DRM}$ $I_G=0.5A$ $di_G/dt=0.5A/\mu s$	repetitive, $I_T=500A$  150	A/ $\mu s$
	    non repetitive, $I_T=I_{TAVM}$	  500	
$(dv/dt)_{cr}$	$T_{VJ}=T_{VJM}$ ; $R_{GK}=\infty$ ; method 1 (linear voltage rise)	$V_{DR}=2/3V_{DRM}$  1000	V/ $\mu s$
$P_{GM}$	$T_{VJ}=T_{VJM}$ $I_T=I_{TAVM}$	$t_p=30\mu s$ 120	W
		$t_p=500\mu s$ 60	
$P_{GAV}$		8	W
$V_{RGM}$		10	V
$T_{VJ}$ $T_{VJM}$ $T_{stg}$		-40...+125	°C
		125	
		-40...+125	
$V_{ISOL}$	50/60Hz, RMS $I_{ISOL} \leq 1mA$	$t=1min$ 3000	V~
		$t=1s$ 3600	
$M_d$	Mounting torque (M6)	2.25-2.75/20-25	Nm/lb.in.
	Terminal connection torque (M6)	4.5-5.5/40-48	
Weight	Typical including screws	125	g

# STT165

## Thyristor-Thyristor Modules

Symbol	Test Conditions	Characteristic Values	Unit
$I_{RRM}, I_{DRM}$	$T_{VJ}=T_{VJM}; V_R=V_{RRM}; V_D=V_{DRM}$	40	mA
$V_T, V_F$	$I_T, I_F=300A; T_{VJ}=25^{\circ}C$	1.36	V
$V_{TO}$	For power-loss calculations only ( $T_{VJ}=T_{VJM}$ )	0.8	V
$r_T$		1.6	$m\Omega$
$V_{GT}$	$V_D=6V;$ $T_{VJ}=25^{\circ}C$ $T_{VJ}=-40^{\circ}C$	2 2.6	V
$I_{GT}$	$V_D=6V;$ $T_{VJ}=25^{\circ}C$ $T_{VJ}=-40^{\circ}C$	150 200	mA
$V_{GD}$	$T_{VJ}=T_{VJM};$ $V_D=2/3V_{DRM}$	0.25	V
$I_{GD}$	$T_{VJ}=T_{VJM};$ $V_D=2/3V_{DRM}$	10	mA
$I_L$	$T_{VJ}=25^{\circ}C; t_p=30\mu s; V_D=6V$ $I_G=0.45A; di_G/dt=0.45A/\mu s$	200	mA
$I_H$	$T_{VJ}=25^{\circ}C; V_D=6V; R_{GK}=\infty$	150	mA
$t_{gd}$	$T_{VJ}=25^{\circ}C; V_D=1/2V_{DRM}$ $I_G=0.5A; di_G/dt=0.5A/\mu s$	2	$\mu s$
$t_q$	$T_{VJ}=T_{VJM}; I_T=160A; t_p=200\mu s; -di/dt=10A/\mu s$ $V_R=100V; dv/dt=20V/\mu s; V_D=2/3V_{DRM}$	typ. 150	$\mu s$
$Q_S$	$T_{VJ}=T_{VJM}; I_T, I_F=300A; -di/dt=50A/\mu s$	550	$\mu C$
$I_{RM}$		235	A
$R_{thJC}$	per thyristor/diode; DC current per module	0.155 0.0775	K/W
$R_{thJK}$	per thyristor/diode; DC current per module	0.225 0.1125	K/W
$d_s$	Creeping distance on surface	12.7	mm
$d_A$	Creepage distance in 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

- \* 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

# STT165

## Thyristor-Thyristor Modules

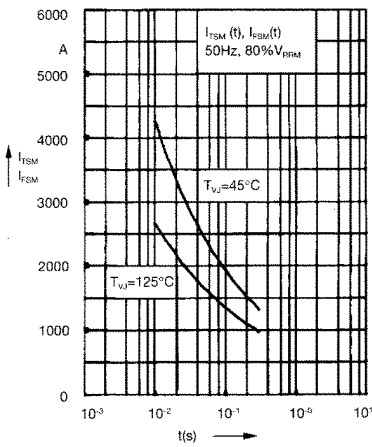


Fig. 1 Surge overload current  
 $I_{TSM}$ ,  $I_{FSM}$ : Crest value,  $t$ : duration

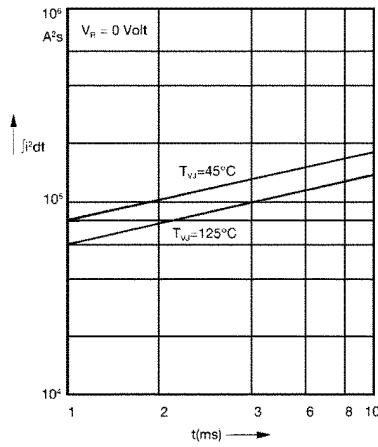


Fig. 2  $\int i^2 dt$  versus time (1-10 ms)

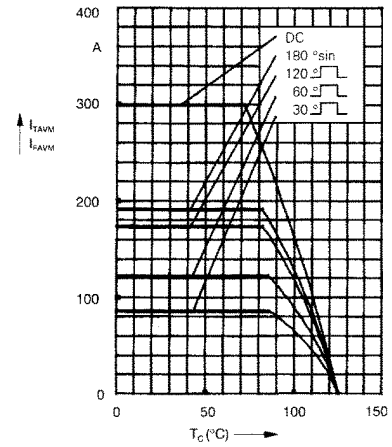


Fig. 2a Maximum forward current at case temperature

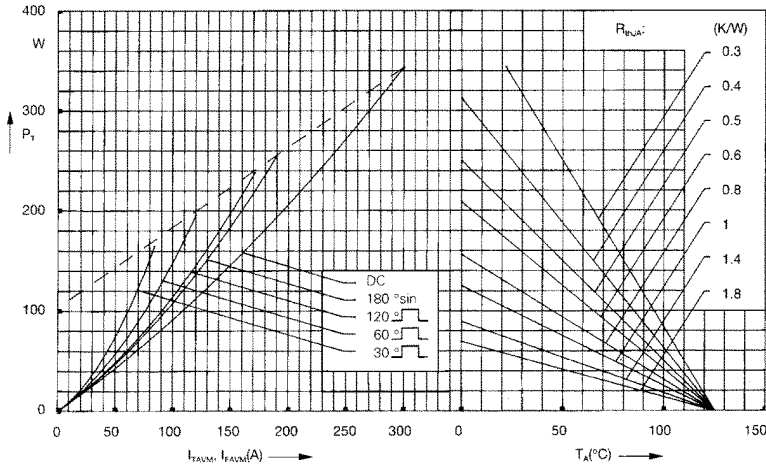


Fig. 3 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

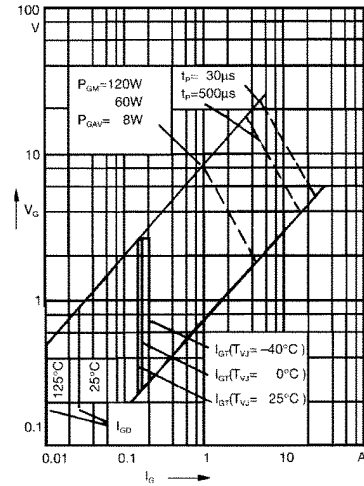


Fig. 4 Gate trigger characteristics

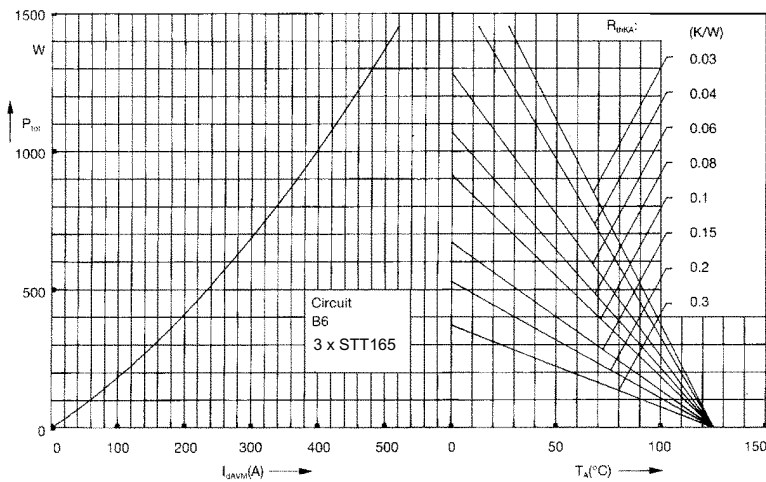


Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

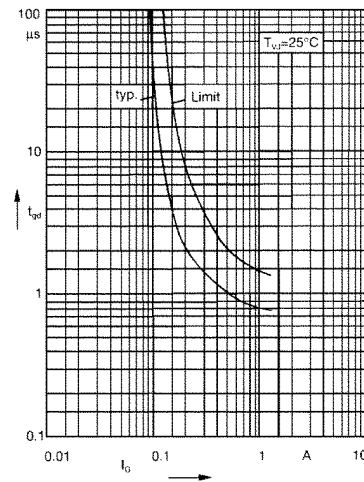


Fig. 6 Gate trigger delay time

# STT165

## Thyristor-Thyristor Modules

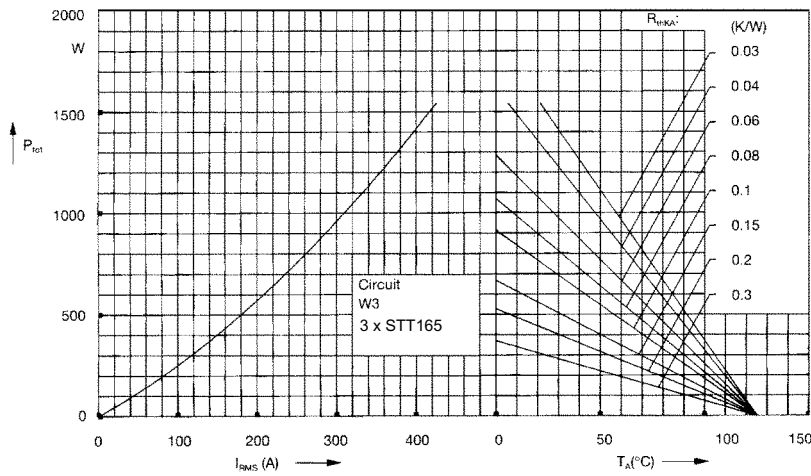


Fig. 7 Three phase AC-controller: Power dissipation versus ambient temperature

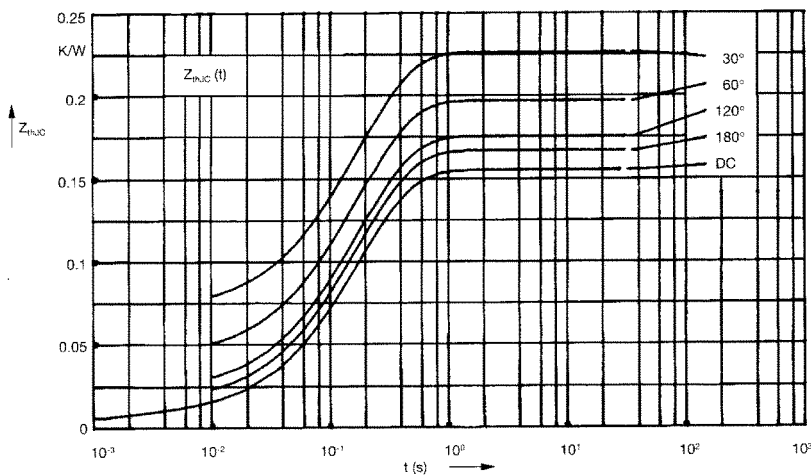


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

$R_{thJC}$  for various conduction angles d:

d	$R_{thJC}$ (K/W)
DC	0.155
180°C	0.167
120°C	0.175
60°C	0.197
30°C	0.226

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0072	0.001
2	0.0188	0.08
3	0.129	0.2

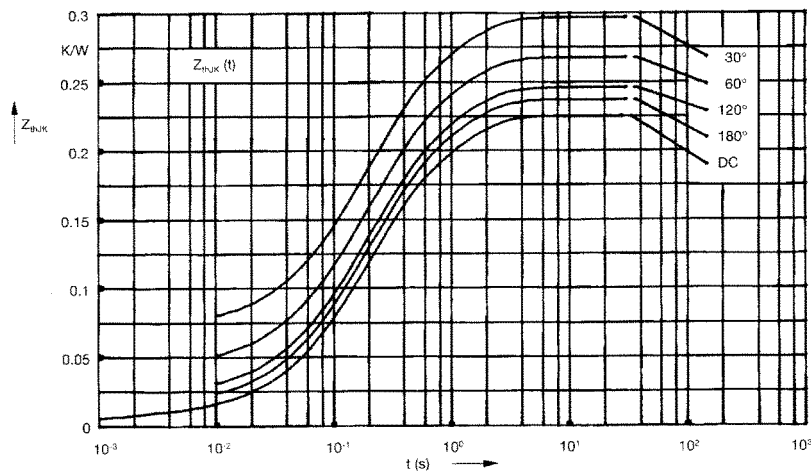


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

$R_{thJK}$  for various conduction angles d:

d	$R_{thJK}$ (K/W)
DC	0.225
180°C	0.237
120°C	0.245
60°C	0.262
30°C	0.296

Constants for  $Z_{thJK}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0072	0.001
2	0.0188	0.08
3	0.129	0.2
4	0.07	1.0