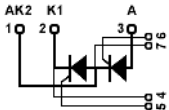


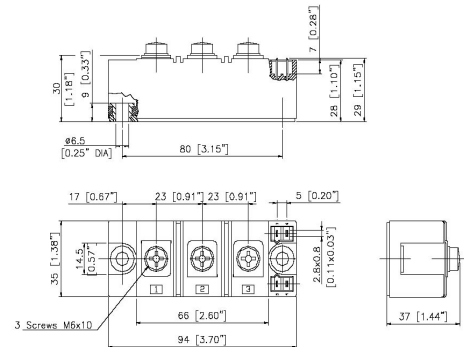
# STT165

## Thyristor-Thyristor Modules



Type	V <sub>RSM</sub> V <sub>DSM</sub> V	V <sub>RRM</sub> V <sub>DRM</sub> 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 <sub>TRMS</sub> , I <sub>FRMS</sub> I <sub>TAVM</sub> , I <sub>FAVM</sub>	T <sub>VJ</sub> =T <sub>VJM</sub> (50Hz/60Hz) T <sub>C</sub> =85°C; 180° sine	300/330 165	A
I <sub>TSM</sub> , I <sub>FSM</sub>	T <sub>VJ</sub> =45°C V <sub>R</sub> =0 t=10ms (50Hz), sine t=8.3ms (60Hz), sine	6000 6400	A
	T <sub>VJ</sub> =T <sub>VJM</sub> V <sub>R</sub> =0 t=10ms(50Hz), sine t=8.3ms(60Hz), sine	5250 5600	
∫i <sup>2</sup> dt	T <sub>VJ</sub> =45°C V <sub>R</sub> =0 t=10ms (50Hz), sine t=8.3ms (60Hz), sine	180000 170000	A <sup>2</sup> s
	T <sub>VJ</sub> =T <sub>VJM</sub> V <sub>R</sub> =0 t=10ms(50Hz), sine t=8.3ms(60Hz), sine	137000 128000	
(di/dt) <sub>cr</sub>	T <sub>VJ</sub> =T <sub>VJM</sub> f=50Hz, t <sub>p</sub> =200us V <sub>D</sub> =2/3V <sub>DRM</sub> I <sub>G</sub> =0.5A di <sub>G</sub> /dt=0.5A/us	repetitive, I <sub>T</sub> =500A  150	A/us
		non repetitive, I <sub>T</sub> =I <sub>TAVM</sub>  500	
(dv/dt) <sub>cr</sub>	T <sub>VJ</sub> =T <sub>VJM</sub> ; R <sub>GK</sub> =∞; method 1 (linear voltage rise)	V <sub>DR</sub> =2/3V <sub>DRM</sub>  1000	V/us
P <sub>GM</sub>	T <sub>VJ</sub> =T <sub>VJM</sub> I <sub>T</sub> =I <sub>TAVM</sub>	t <sub>p</sub> =30us t <sub>p</sub> =500us	120 60 W
P <sub>GAV</sub>			8 W
V <sub>RGM</sub>			10 V
T <sub>VJ</sub> T <sub>VJM</sub> T <sub>stg</sub>			-40...+125 125 -40...+125 °C
V <sub>ISOL</sub>	50/60Hz, RMS I <sub>ISOL</sub> ≤1mA	t=1min t=1s	3000 3600 V~
M <sub>d</sub>	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

# 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	$\mu s$
$t_q$	$T_{VJ}=T_{VJM}; I_T=160A; t_p=200\mu s; -di/dt=10A/\mu s$ $V_R=100V; dv/dt=20V/\mu s; V_D=2/3V_{DRM}$	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

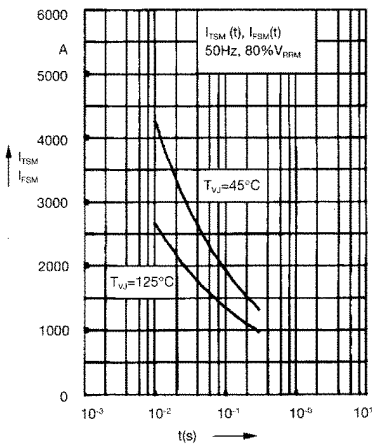


Fig. 1 Surge overload current  
 $I_{TSM}, I_{FSM}$ : Crest value,  $t$ : duration

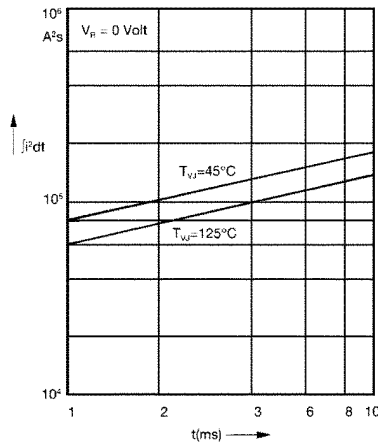


Fig. 2  $\int i^2 dt$  versus time (1-10 ms)

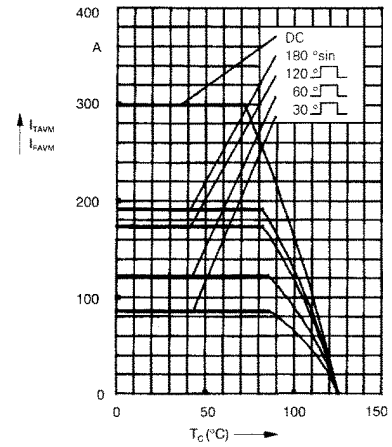


Fig. 2a Maximum forward current at case temperature

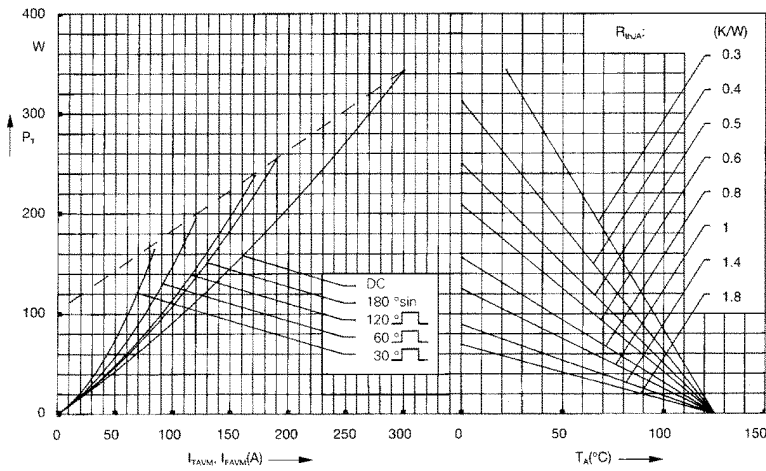


Fig. 3 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

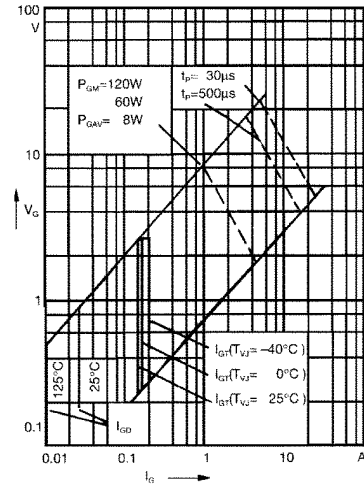


Fig. 4 Gate trigger characteristics

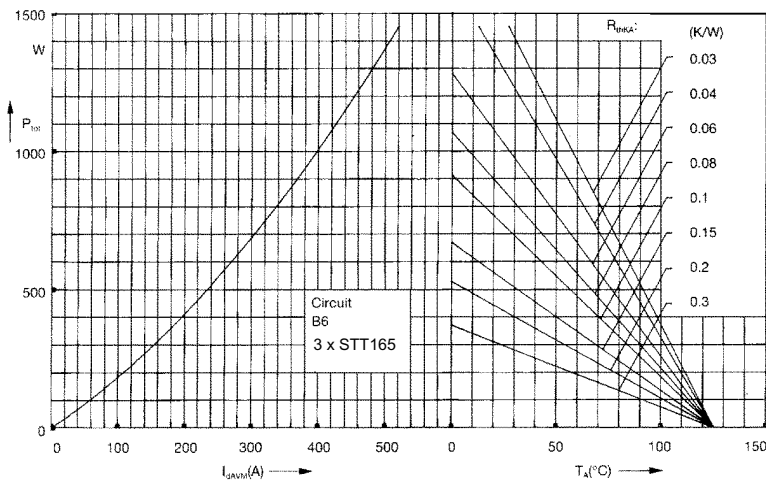


Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

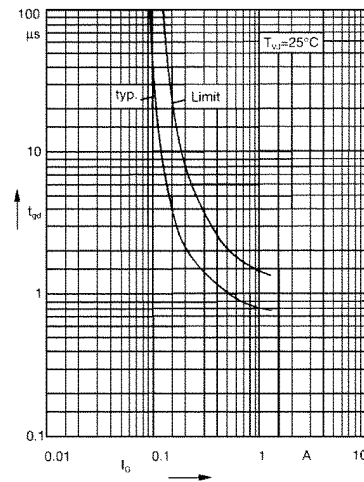


Fig. 6 Gate trigger delay time

# STT165

## Thyristor-Thyristor Modules

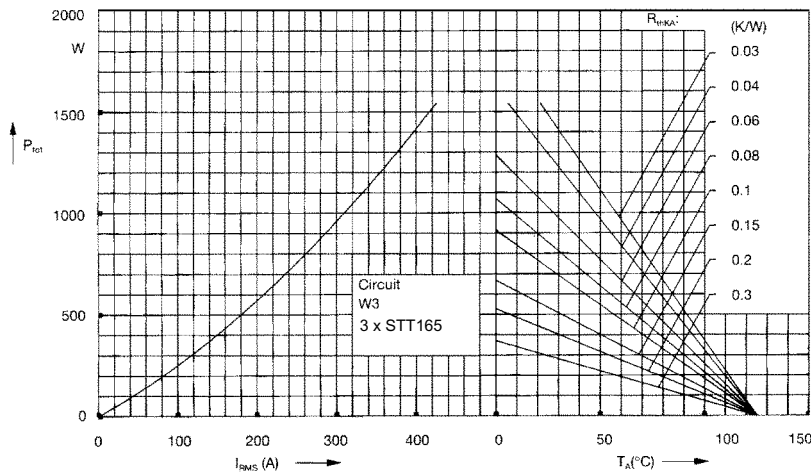


Fig. 7 Three phase AC-controller: Power dissipation versus ambient temperature

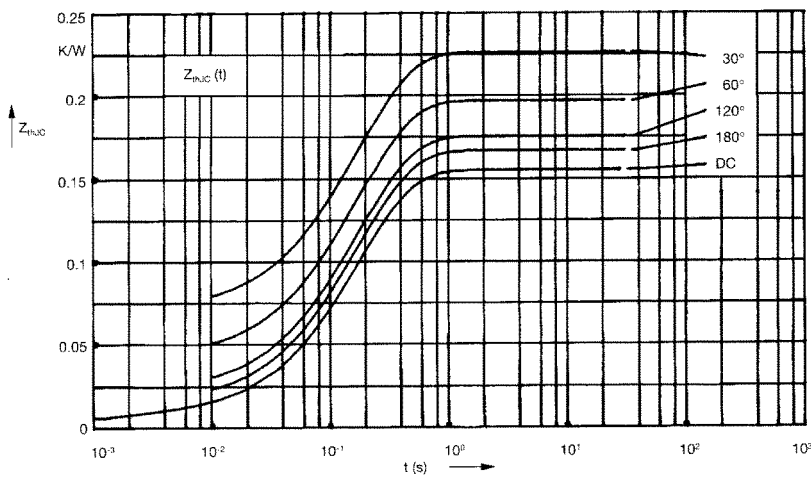


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

$R_{thJC}$  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

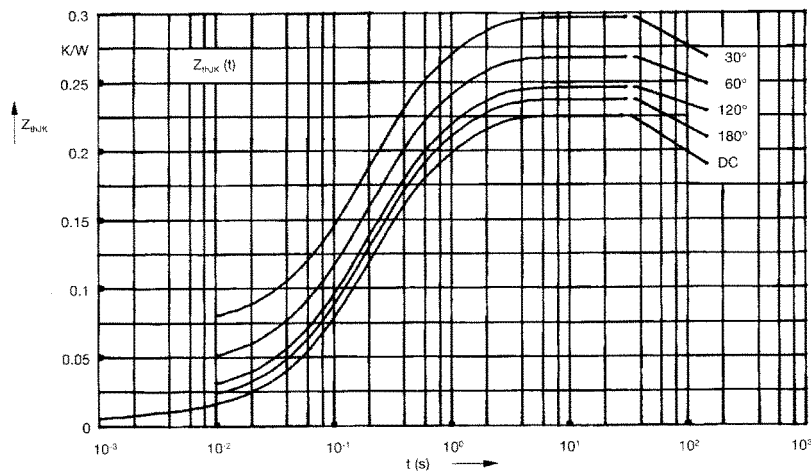


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

$R_{thJK}$  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