AMERICAN MICROSEMICONDUCTOR

MTC500A Series

Technical Specifications

Also Orderable Under MTC500A-1600V

Features

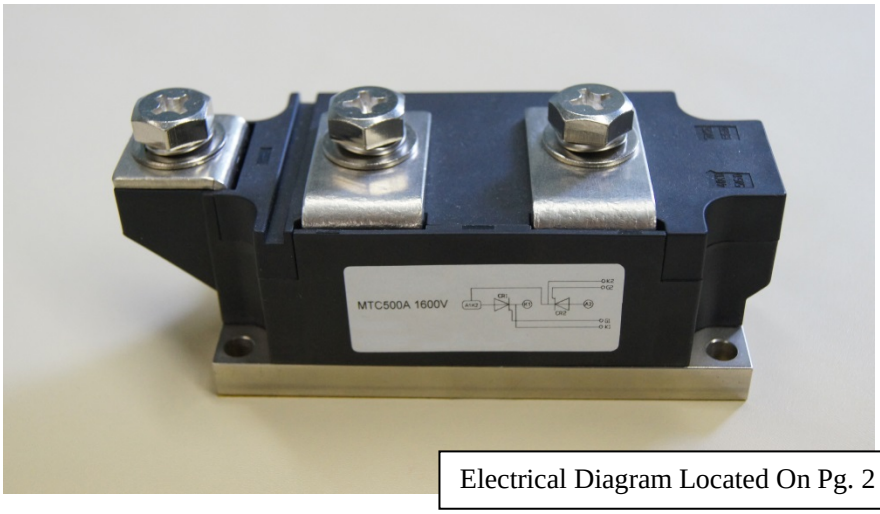
International standard package. Copper base Plate with Inter-DCB.
Planar passivated chips.
Isolation voltage 3600 V~.

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.



Electrical Diagram Located On Pg. 2

Symbol	Test Conditions	Maximum Ratings	Unit
I_{TRMS}, I_{FRMS} I_{TAVM}, I_{FAVM}	$T_{VJ}=T_{VJM}$ $T_C=85^oC$; 180° sine	785 500	A
I_{TSM}, I_{FSM}	$T_{VJ}=45^oC$ t=10ms (50Hz), sine $V_R=0$ t=8.3ms (60Hz), sine	15000 16000	A
	$T_{VJ}=T_{VJM}$ t=10ms(50Hz), sine $V_R=0$ t=8.3ms(60Hz), sine	13000 14400	
i^2dt	$T_{VJ}=45^oC$ t=10ms (50Hz), sine $V_R=0$ t=8.3ms (60Hz), sine	1125000 1062600	A^2s
	$T_{VJ}=T_{VJM}$ t=10ms(50Hz), sine $V_R=0$ t=8.3ms(60Hz), sine	845000 813000	
$(di/dt)_{cr}$	$T_{VJ}=T_{VJM}$ repetitive, I_T=45A f=50Hz, t_p=200µs $V_D=2/3V_{DRM}$ I_G=0.45A non repetitive, $I_T=I_{TAVM}$ di_G/dt=0.45A/µs	100 500	A/µs
$(dv/dt)_{cr}$	$T_{VJ}=T_{VJM}$; $V_{DR}=2/3V_{DRM}$ R_{GK}= ; method 1 (linear voltage rise)	1000	V/µs
P_{GM}	$T_{VJ}=T_{VJM}$ t_p=30µs $I_T=I_{TAVM}$ t_p=300µs	120 60	W
P_{GAV}		20	W
V_{RGM}		10	V
T_{VJ} T_{VJM} T_{stg}		-40...+125 125 -40...+125	°C
V_{ISOL}	50/60Hz, RMS t=1min I_{ISOL}<1mA 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	1.6	kg

Symbol	Test Conditions	Maximum Ratings	Unit
IRRM, IDRM	TVJ=TVJM; VR=VRRM; VD=VDRM	40	mA
VT, VF	IT, IF=80A; TVJ=25°C	1.3	V
VTO	For power-loss calculations only (TVJ=125°C)	0.8	V
rT		0.3	m
VGT	VD=6V; TVJ=25°C TVJ=-40°C	2 3	V

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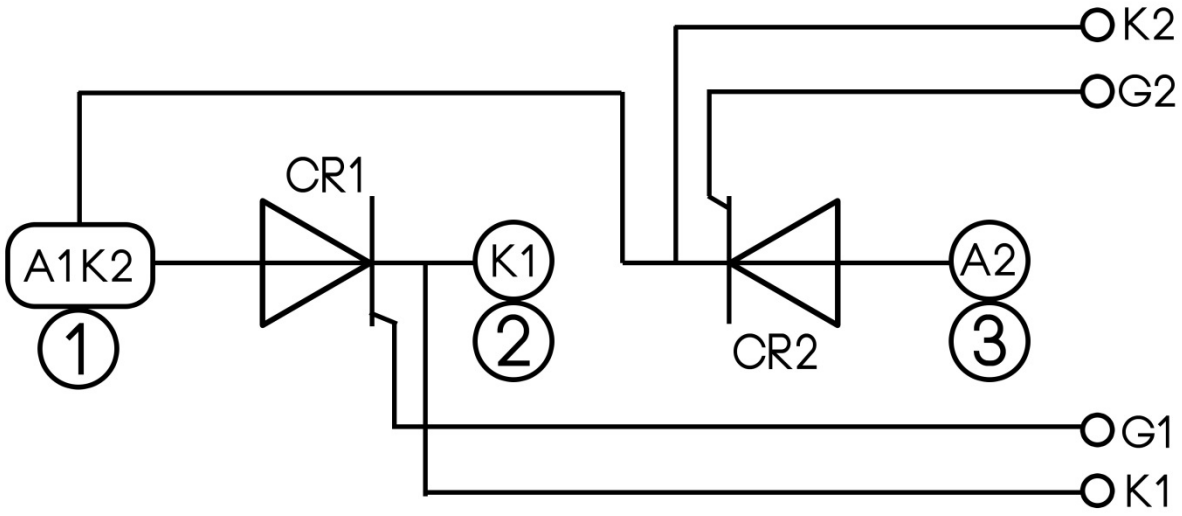
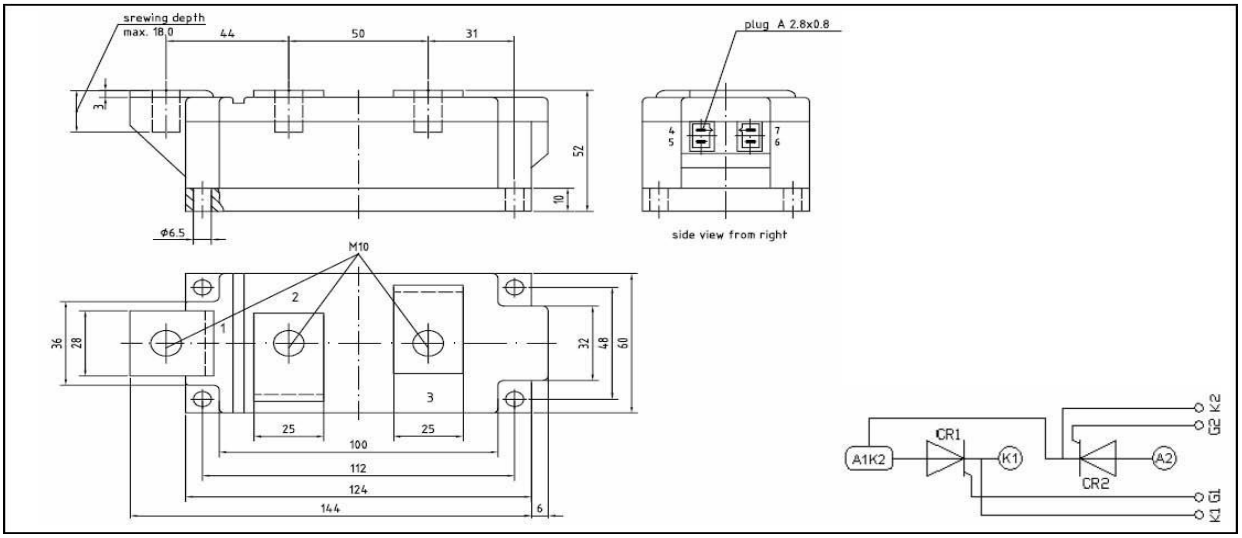
IGT	VD=6V; TVJ=25°C TVJ=-40°C	300	m
VGD	TVJ=TVJM; VD=2/3VDRM	0.2	V
IGD		10	m
IL	TVJ=25°C; tp=10µs; VD=6V IL IG=0.45A;		
IH	TVJ=25°C; VD=6V; RGK=	300	m
tgd	TVJ=25°C; VD=1/2VDRM IG=0.45A; diG/dt=0.45A/µs	2	µs
tq	TVJ=TVJM; IT=20A; tp=200µs; -di/dt=10A/µs typ.		
QS	TVJ=TVJM; IT, IF=25A; -di/dt=0.64A/µs	760	u
IRM		275	A
RthJC	per thyristor/diode; DC current per module	0.1	K/
RthJK	per thyristor/diode; DC current per module	0.1	K/
dS	Creeping distance on surface	12.	m
dA	Strike distance through air	9.6	m
a	Maximum allowable acceleration	50	m/





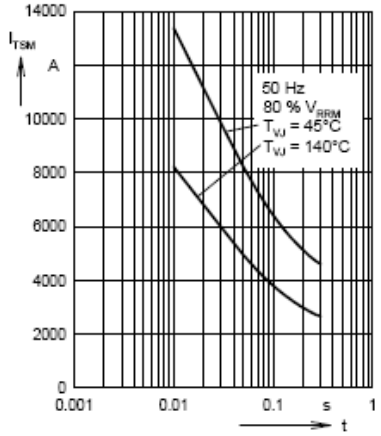


Fig. 1 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

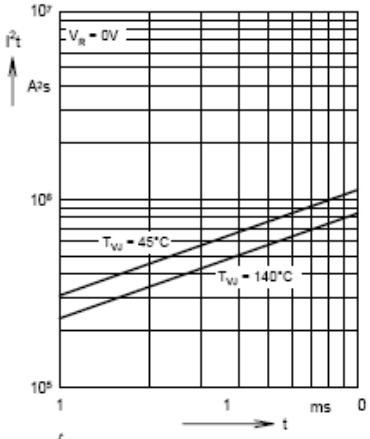


Fig. 2 $\int i^2dt$ versus time (1-10 ms)

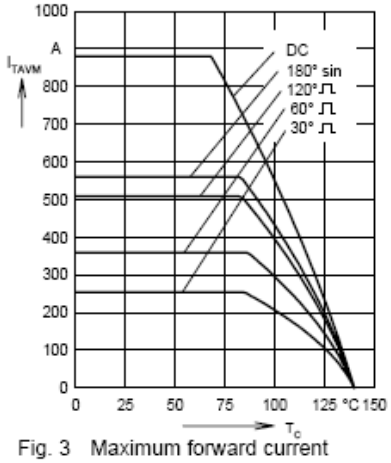


Fig. 3 Maximum forward current at case temperature

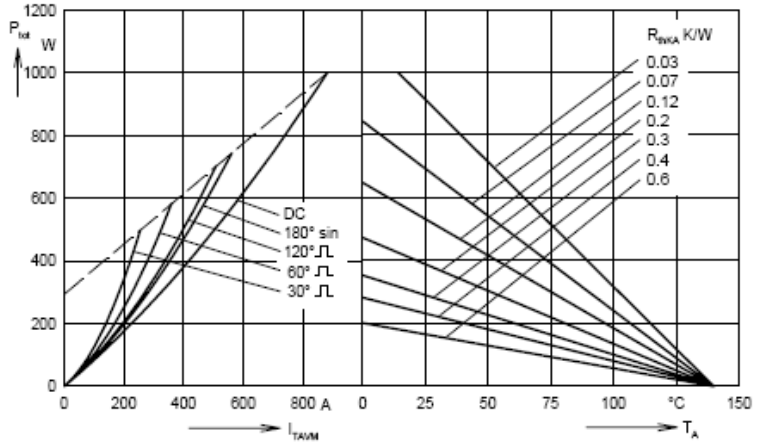


Fig. 4 Power dissipation versus on-state current and ambient temperature

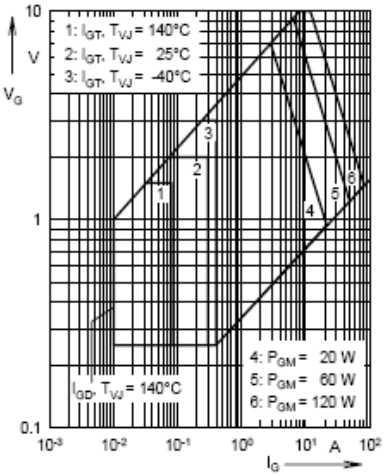


Fig. 5 Gate trigger characteristics

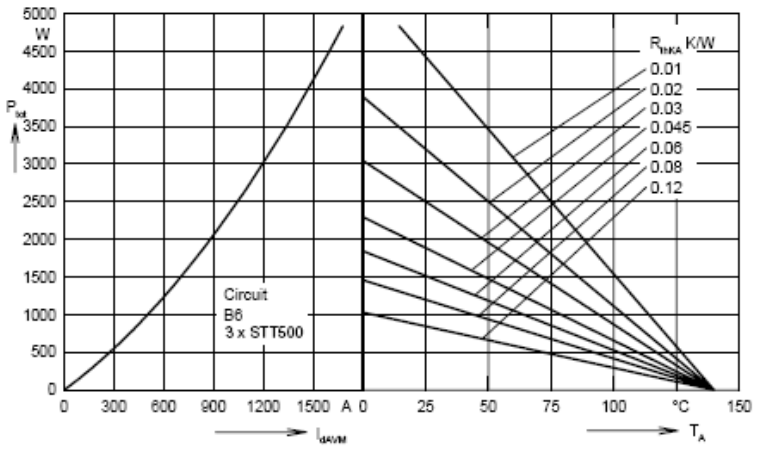


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

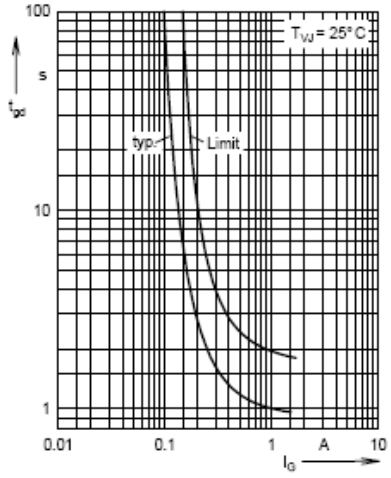


Fig. 7 Gate trigger delay time

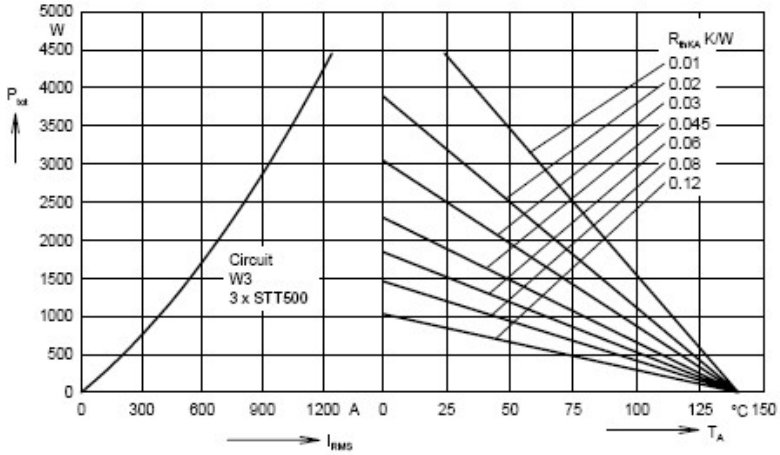


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

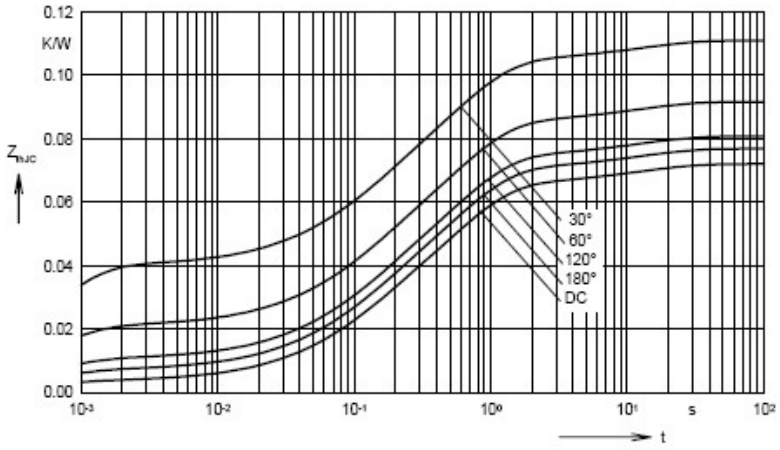


Fig. 9 Transient thermal impedance junction to case (per thyristor)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.072
180°C	0.0768
120°C	0.081
60°C	0.092
30°C	0.111

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.0054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12

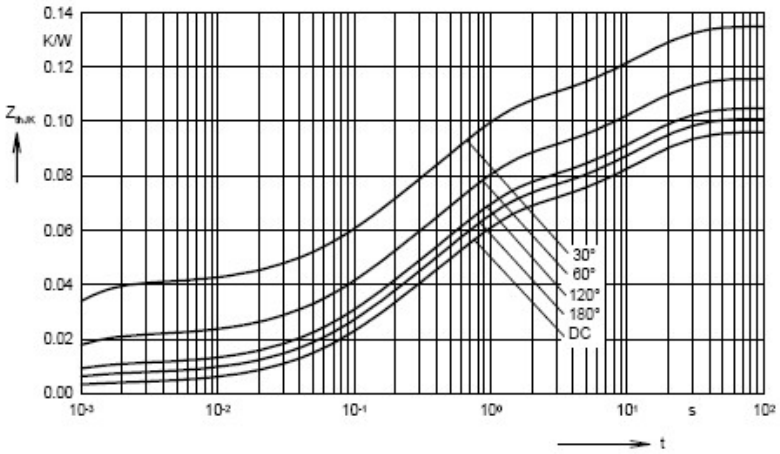


Fig.10 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.096
180°C	0.1
120°C	0.105
60°C	0.116
30°C	0.135

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.0054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12
5	0.024	12