

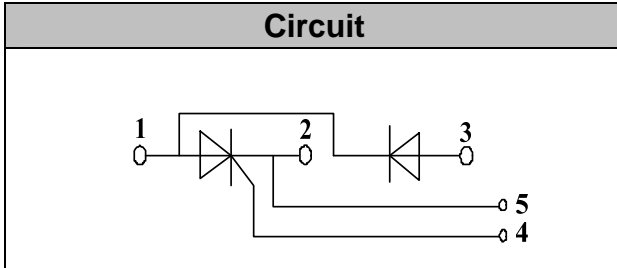


## Thyristor/Diode Modules

**VRRM / VDRM** 800 to 1800V  
**IFAV / ITAV** 90A

### Applications

- Power Converters
- Lighting Control
- DC Motor Control and Drives
- Heat and temperature control



### Features

- International standard package
- High Surge Capability
- Glass passivated chip
- Simple Mounting
- Heat transfer through aluminum oxide DBC ceramic isolated metal baseplate
- UL recognized applied for file no. E360040

### Module Type

TYPE	VRRM/VDRM	VRSM
MT90CB08T1	800V	900V
MT90CB12T1	1200V	1300V
MT90CB16T1	1600V	1700V
MT90CB18T1	1800V	1900V

### ◆ Diode

#### Maximum Ratings

Symbol	Item	Conditions	Values	Units
$I_D$	Output Current(D.C.)	$T_c=85^\circ\text{C}$	90	A
$I_{FSM}$	Surge forward current	$t=10\text{mS } T_{vj}=45^\circ\text{C}$	2000	A
$i^2t$	Circuit Fusing Consideration		20000	$\text{A}^2\text{s}$
$V_{isol}$	Isolation Breakdown Voltage(R.M.S)	a.c.50HZ;r.m.s.;1min	3000	V
$T_{vj}$	Operating Junction Temperature		-40 to +125	$^\circ\text{C}$
$T_{stg}$	Storage Temperature		-40 to +125	$^\circ\text{C}$
$M_t$	Mounting Torque	To terminals(M5)	$3\pm 15\%$	Nm
$M_s$		To heatsink(M6)	$5\pm 15\%$	Nm
Weight	Module (Approximately)		100	g

#### Thermal Characteristics

Symbol	Item	Conditions	Values	Units
$R_{th(j-c)}$	Thermal Impedance, max.	Junction to Case	0.14	$^\circ\text{C/W}$
$R_{th(c-s)}$	Thermal Impedance, max.	Case to Heatsink	0.10	$^\circ\text{C/W}$

#### Electrical Characteristics

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
$V_{FM}$	Forward Voltage Drop, max.	$T=25^\circ\text{C } I_F=300\text{A}$			1.65	V
$I_{RRM}$	Repetitive Peak Reverse Current, max.	$T_{vj}=25^\circ\text{C } V_{RD}=V_{RRM}$ $T_{vj}=125^\circ\text{C } V_{RD}=V_{RRM}$		$\leq 0.5$ $\leq 6$		mA mA



## ◆Thyristor Maximum Ratings

Symbol	Item	Conditions	Values	Units
$I_{TAV}$	Average On-State Current	Sine 180°; $T_c=85^\circ\text{C}$	90	A
$I_{TSM}$	Surge On-State Current	$T_{VJ}=45^\circ\text{C}$ $t=10\text{ms}$ , sine $T_{VJ}=125^\circ\text{C}$ $t=10\text{ms}$ , sine	2000 1750	A
$i^2t$	Circuit Fusing Consideration	$T_{VJ}=45^\circ\text{C}$ $t=10\text{ms}$ , sine $T_{VJ}=125^\circ\text{C}$ $t=10\text{ms}$ , sine	20000 15000	A <sup>2</sup> s
Visol	Isolation Breakdown Voltage(R.M.S)	a.c.50HZ;r.m.s.;1min	3000	V
$T_{vj}$	Operating Junction Temperature		-40 to +130	°C
$T_{stg}$	Storage Temperature		-40 to +125	°C
$M_t$	Mounting Torque	To terminals(M5)	$3 \pm 15\%$	Nm
$M_s$		To heatsink(M6)	$5 \pm 15\%$	Nm
$di/dt$	Critical Rate of Rise of On-State Current	$T_{VJ}=T_{VJM}$ , $2/3V_{DRM}$ , $I_G=500\text{mA}$ $T_r < 0.5\mu\text{s}$ , $t_p > 6\mu\text{s}$	150	A/ $\mu\text{s}$
$dv/dt$	Critical Rate of Rise of Off-State Voltage, min.	$T_J=T_{VJM}$ , $2/3V_{DRM}$ linear voltage rise	1000	V/ $\mu\text{s}$
a	Maximum allowable acceleration		50	$\text{m/s}^2$

## Thermal Characteristics

Symbol	Item	Conditions	Values	Units
$R_{th(j-c)}$	Thermal Impedance, max.	Junction to Case	0.28	°C/W
$R_{th(c-s)}$	Thermal Impedance, max.	Case to Heatsink	0.20	°C/W

## Electrical Characteristics

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
$V_{TM}$	Peak On-State Voltage, max.	$T=25^\circ\text{C}$ $I_T=300\text{A}$			1.65	V
$I_{RRM}/I_{DRM}$	Repetitive Peak Reverse Current, max. / Repetitive Peak Off-State Current, max.	$T_{VJ}=T_{VJM}$ , $V_R=V_{RRM}$ , $V_D=V_{DRM}$			20	mA
$V_{TO}$	On state threshold voltage	For power-loss calculations only ( $T_{VJ}=125^\circ\text{C}$ )			0.9	V
$r_T$	Value of on-state slope resistance. max	$T_{VJ}=T_{VJM}$			2	$\text{m}\Omega$
$V_{GT}$	Gate Trigger Voltage, max.	$T_{VJ}=25^\circ\text{C}$ , $V_D=6\text{V}$			3	V
$I_{GT}$	Gate Trigger Current, max.	$T_{VJ}=25^\circ\text{C}$ , $V_D=6\text{V}$			150	mA
$V_{GD}$	Non-triggering gate voltage, max.	$T_{VJ}=125^\circ\text{C}$ , $V_D=2/3V_{DRM}$			0.25	V
$I_{GD}$	Non-triggering gate current, max.	$T_{VJ}=125^\circ\text{C}$ , $V_D=2/3V_{DRM}$			6	mA
$I_L$	Latching current, max.	$T_{VJ}=25^\circ\text{C}$ , $R_G=33\Omega$	300	600		mA
$I_H$	Holding current, max.	$T_{VJ}=25^\circ\text{C}$ , $V_D=6\text{V}$	150	250		mA
tgd	Gate controlled delay time	$T_{VJ}=25^\circ\text{C}$ , $I_G=1\text{A}$ , $di_G/dt=1\text{A}/\mu\text{s}$	1			$\mu\text{s}$
tq	Circuit commutated turn-off time	$T_{VJ}=T_{VJM}$	100			$\mu\text{s}$



## Performance Curves

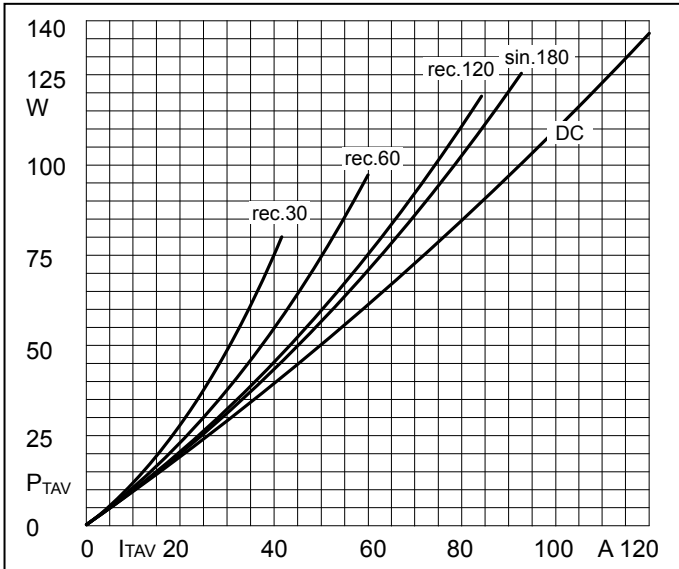


Fig1. Power dissipation

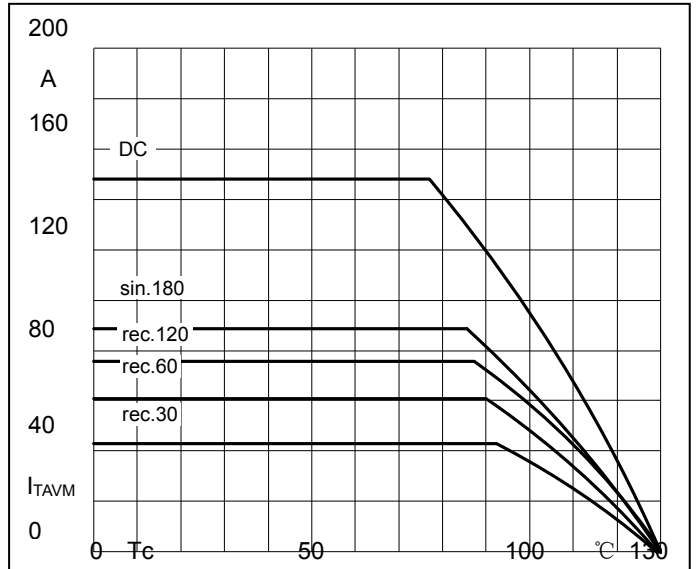


Fig2. Forward Current Derating Curve

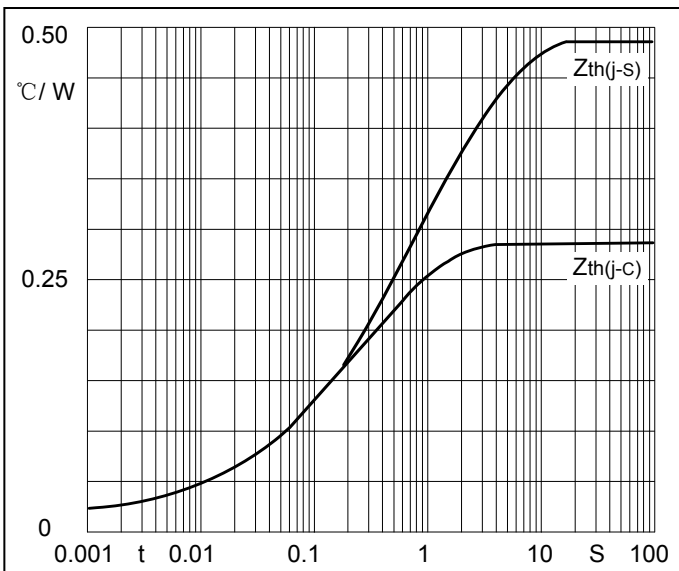


Fig3. Transient thermal impedance

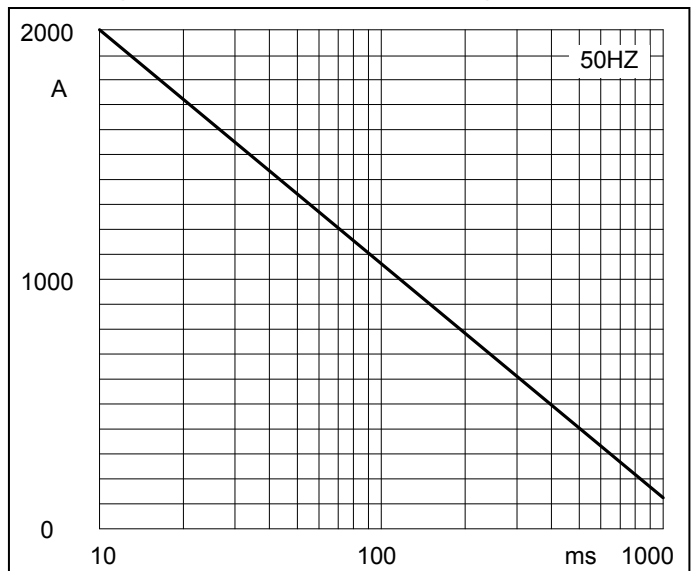


Fig4. Max Non-Repetitive Forward Surge Current

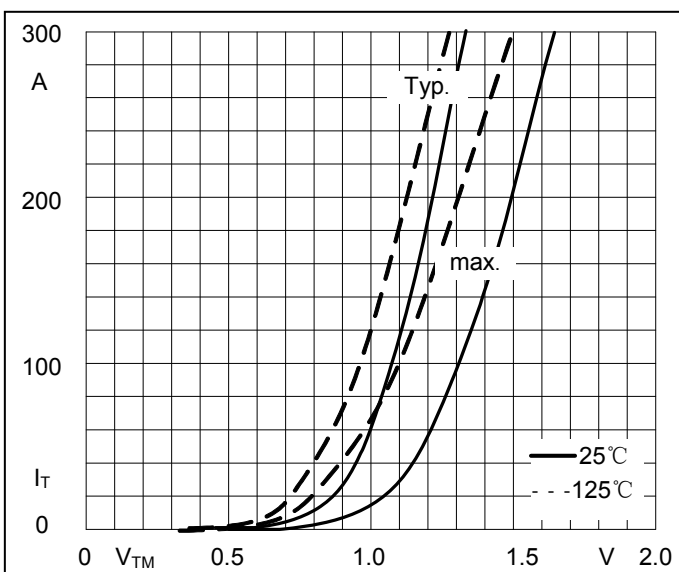


Fig5. Forward Characteristics

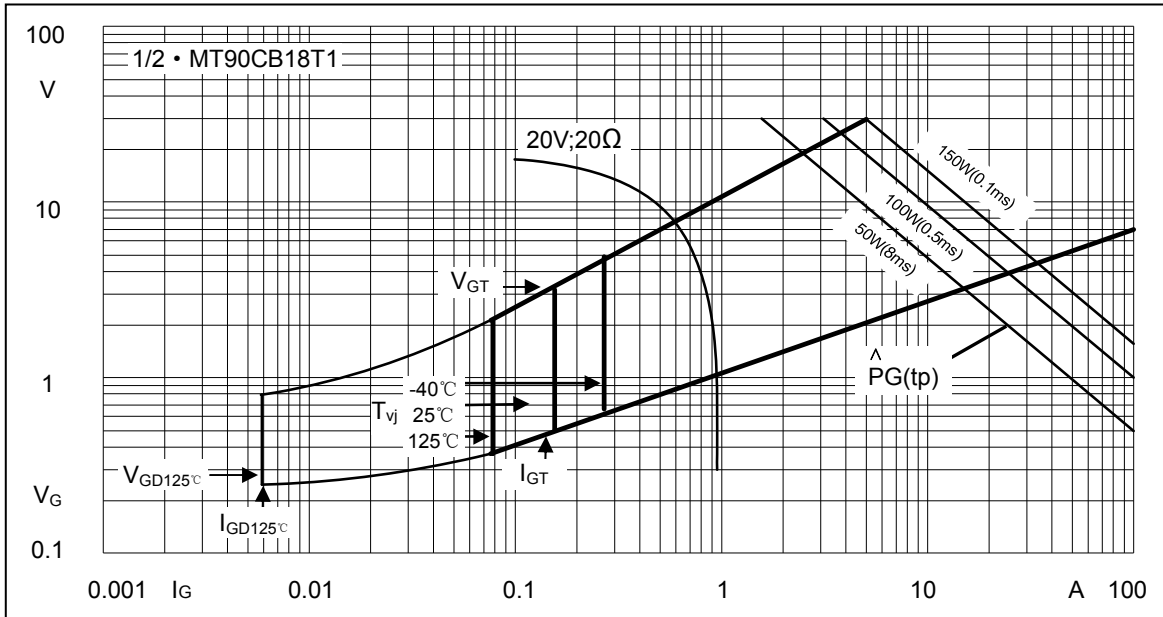
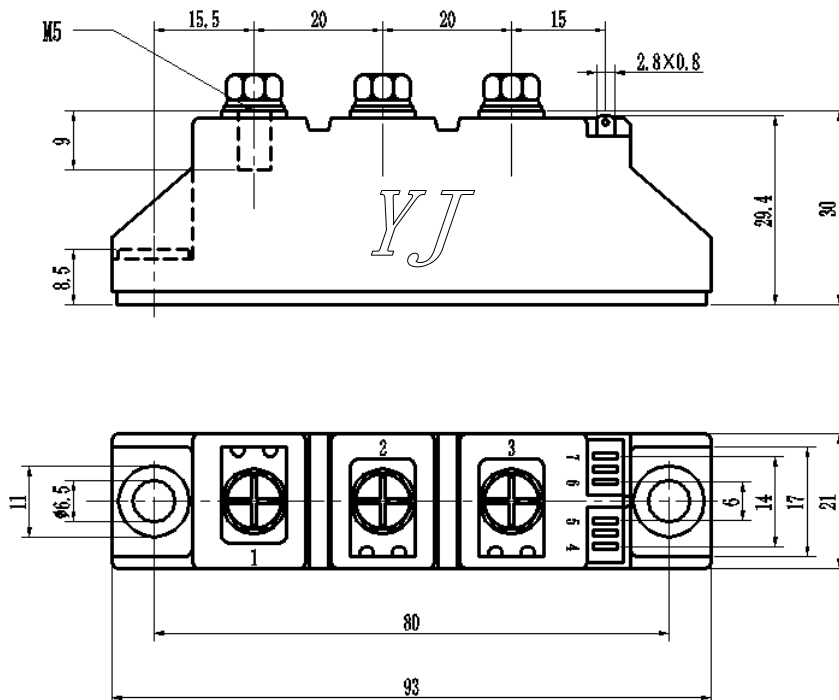


Fig6. Gate trigger Characteristics

## Package Outline Information

CASE: T1



Dimensions in mm

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