MITSUBISHI THYRISTOR MODULES

TM90DZ/CZ-M,-H

HIGH POWER GENERAL USE
INSULATED TYPE

TM90DZ/CZ-M,-H



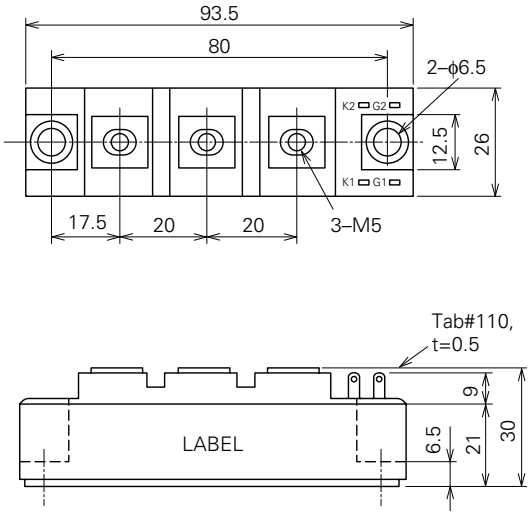
- **$I_{T\ (AV)}$** Average on-state current **90A**
- **V_{RRM}** Repetitive peak reverse voltage **400/800V**
- **V_{DRM}** Repetitive peak off-state voltage **400/800V**
- **DOUBLE ARMS**
- **Insulated Type**
- **UL Recognized**
  Yellow Card No. E80276 (N)
  File No. E80271

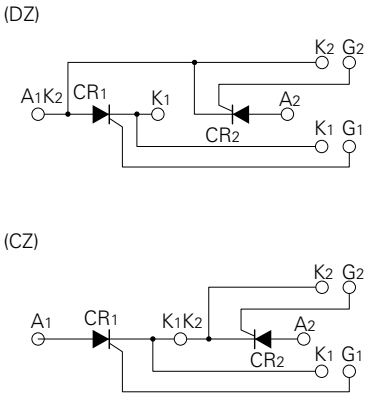
APPLICATION

DC motor control, NC equipment, AC motor control, Contactless switches,
Electric furnace temperature control, Light dimmers

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm





MITSUBISHI ELECTRIC

TM90DZ/CZ-M,-H

HIGH POWER GENERAL USE
INSULATED TYPE

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Voltage class		Unit
		M	H	
V_{RRM}	Repetitive peak reverse voltage	400	800	V
V_{RSM}	Non-repetitive peak reverse voltage	480	960	V
$V_{R\ (DC)}$	DC reverse voltage	320	640	V
V_{DRM}	Repetitive peak off-state voltage	400	800	V
V_{DSM}	Non-repetitive peak off-state voltage	480	960	V
$V_{D\ (DC)}$	DC off-state voltage	320	640	V

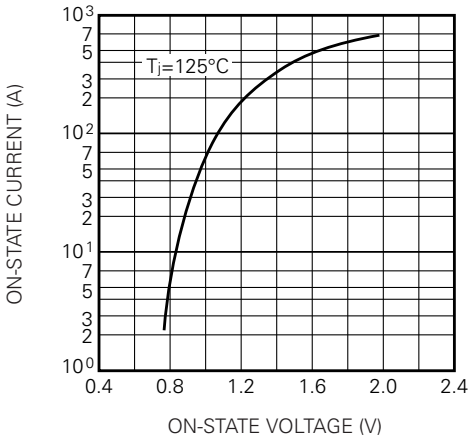
Symbol	Parameter	Conditions	Ratings	Unit
$I_{T\ (RMS)}$	RMS on-state current		140	A
$I_{T\ (AV)}$	Average on-state current	Single-phase, half-wave 180° conduction, T_C=86°C	90	A
I_{TSM}	Surge (non-repetitive) on-state current	One half cycle at 60Hz, peak value	1800	A
I^2t	I^2t for fusing	Value for one cycle of surge current	1.4×10^4	A^2s
di/dt	Critical rate of rise of on-state current	V_D=1/2V_{DRM}, I_G=1.0A, T_j=125°C	100	A/μs
P_{GM}	Peak gate power dissipation		5.0	W
$P_{G\ (AV)}$	Average gate power dissipation		0.5	W
V_{FGM}	Peak gate forward voltage		10	V
V_{RGM}	Peak gate reverse voltage		5.0	V
I_{FGM}	Peak gate forward current		2.0	A
T_j	Junction temperature		–40~+125	°C
T_{stg}	Storage temperature		–40~+125	°C
V_{iso}	Isolation voltage	Charged part to case	2500	V
—	Mounting torque	Main terminal screw M5	1.47~1.96	N·m
			15~20	kg·cm
		Mounting screw M6	1.96~2.94	N·m
			20~30	kg·cm
—	Weight	Typical value	160	g

ELECTRICAL CHARACTERISTICS

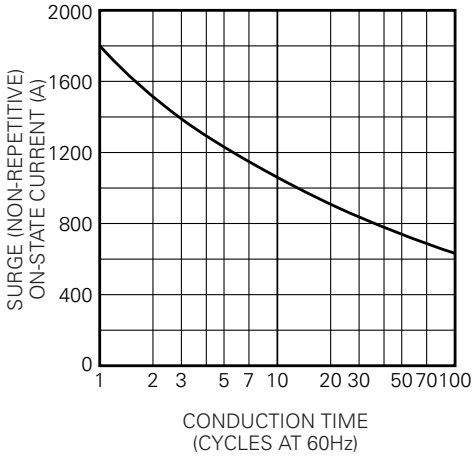
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{RRM}	Repetitive peak reverse current	T_j=125°C, V_{RRM} applied	—	—	15	mA
I_{DRM}	Repetitive peak off-state current	T_j=125°C, V_{DRM} applied	—	—	15	mA
V_{TM}	On-state voltage	T_j=125°C, I_{TM}=270A, instantaneous meas.	—	—	1.3	V
dv/dt	Critical rate of rise of off-state voltage	T_j=125°C, V_D=2/3V_{DRM}	500	—	—	V/μs
V_{GT}	Gate trigger voltage	T_j=25°C, V_D=6V, R_L=2Ω	—	—	3.0	V
V_{GD}	Gate non-trigger voltage	T_j=125°C, V_D=1/2V_{DRM}	0.25	—	—	V
I_{GT}	Gate trigger current	T_j=25°C, V_D=6V, R_L=2Ω	15	—	100	mA
$R_{th\ (j-c)}$	Thermal resistance	Junction to case (per 1/2 module)	—	—	0.3	°C/W
$R_{th\ (c-f)}$	Contact thermal resistance	Case to fin, conductive grease applied (per 1/2 module)	—	—	0.2	°C/W
—	Insulation resistance	Measured with a 500V megohmmeter between main terminal and case	10	—	—	MΩ

PERFORMANCE CURVES

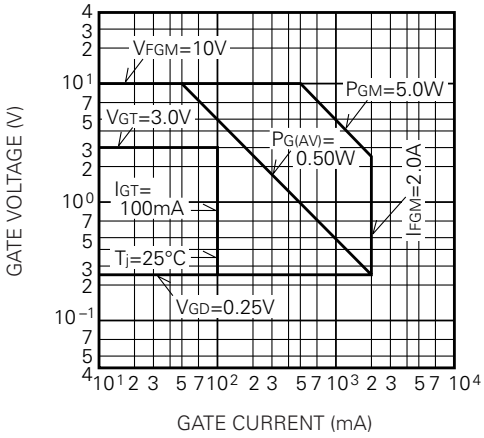
MAXIMUM ON-STATE CHARACTERISTIC



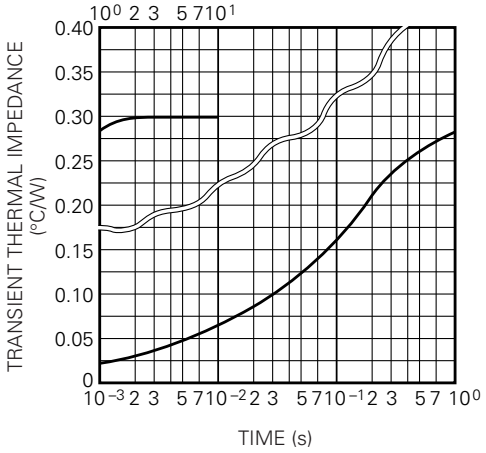
RATED SURGE (NON-REPETITIVE) ON-STATE CURRENT



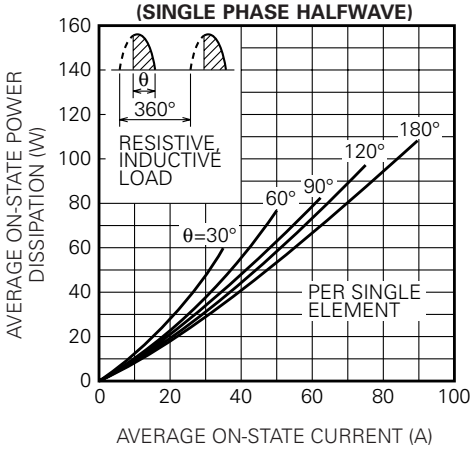
GATE CHARACTERISTICS



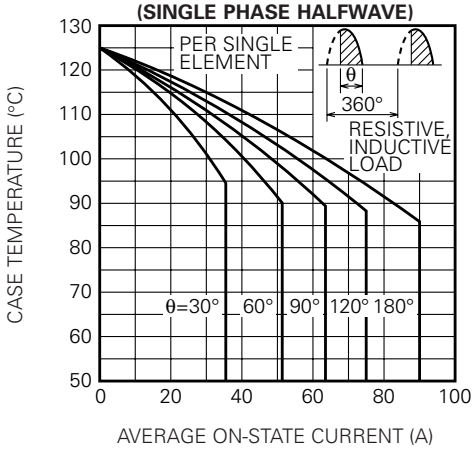
MAXIMUM TRANSIENT THERMAL IMPEDANCE (JUNCTION TO CASE)



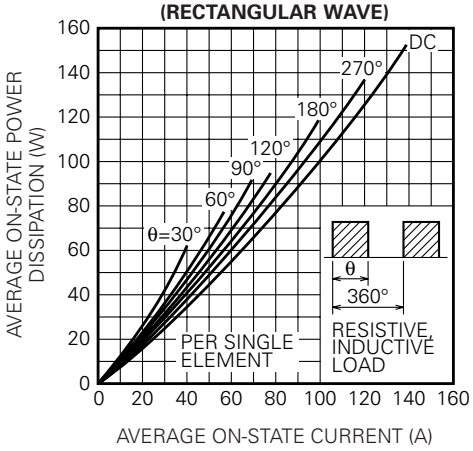
MAXIMUM AVERAGE ON-STATE POWER DISSIPATION (SINGLE PHASE HALFWAVE)



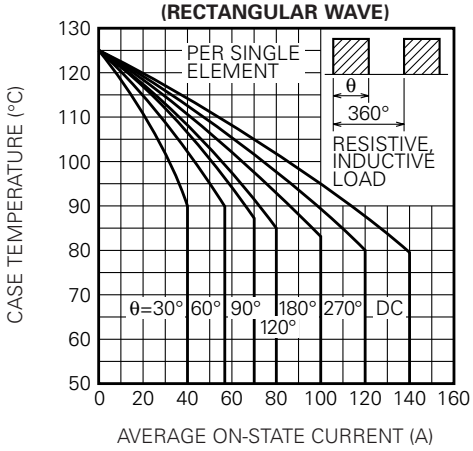
LIMITING VALUE OF THE AVERAGE ON-STATE CURRENT (SINGLE PHASE HALFWAVE)



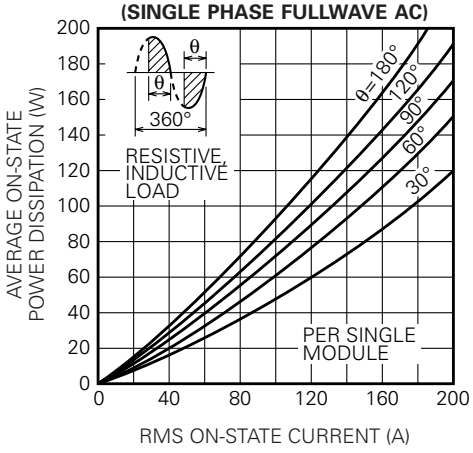
MAXIMUM AVERAGE ON-STATE POWER DISSIPATION (RECTANGULAR WAVE)



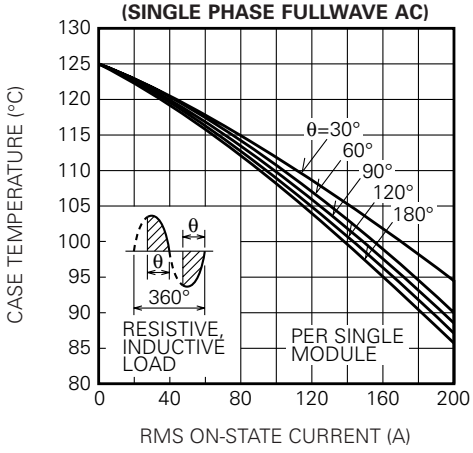
LIMITING VALUE OF THE AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)



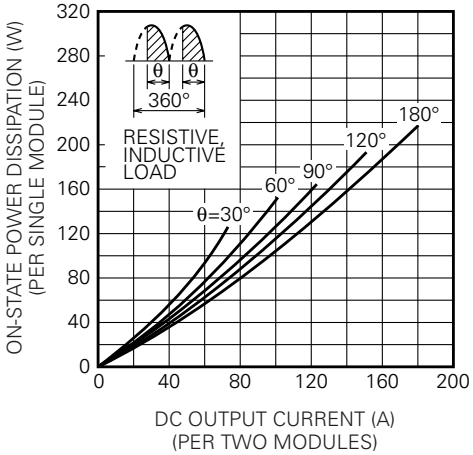
MAXIMUM AVERAGE ON-STATE POWER DISSIPATION (SINGLE PHASE FULLWAVE AC)



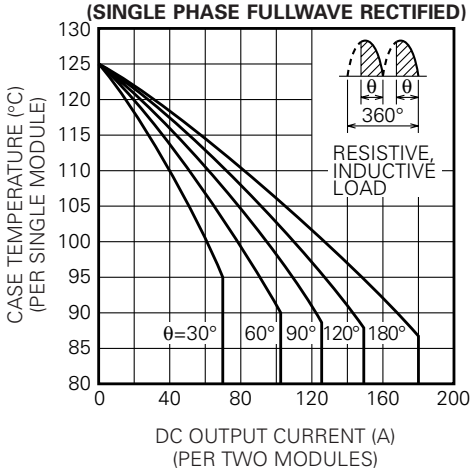
LIMITING VALUE OF THE RMS ON-STATE CURRENT (SINGLE PHASE FULLWAVE AC)



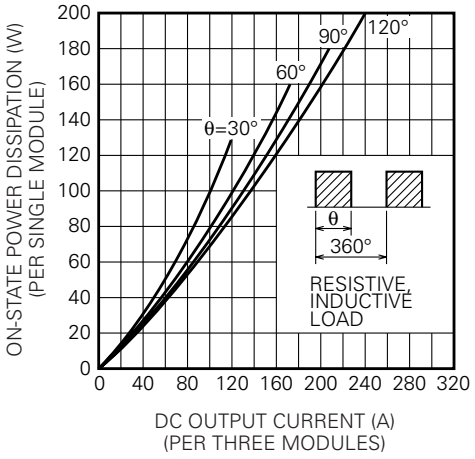
MAXIMUM ON-STATE POWER DISSIPATION (SINGLE PHASE FULLWAVE RECTIFIED)



LIMITING VALUE OF THE DC OUTPUT CURRENT (SINGLE PHASE FULLWAVE RECTIFIED)



MAXIMUM ON-STATE POWER DISSIPATION (THREE PHASE FULLWAVE RECTIFIED)



LIMITING VALUE OF THE DC OUTPUT CURRENT (THREE PHASE FULLWAVE RECTIFIED)

