

MS0690J-DL1TE

90 A AC Controller Module

RoHS  E71639

Description

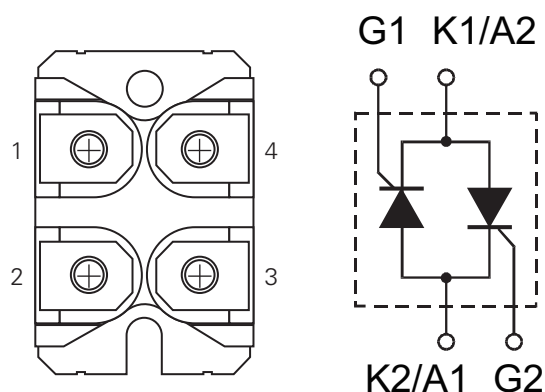
The MS0690J-DL1TE is a thyristor AC controller module for mains frequency (50 Hz/60 Hz), utilizing two SCR dies in anti-parallel configuration, providing efficient and reliable power control for heating applications.

This module is available in a robust SOT-227B package with an isolation voltage of 2500 V minimum.

Features

- High current handling capability, $I_{T(RMS)} = 90\text{ A}$
- Surge current capability up to 950 A
- Glass-passivated junctions
- Compact and robust SOT-227B package

Pinout Diagram SOT-227B



Pin 1: K1/A2 (Cathode 1/Anode 2); **Pin 2:** G2 (Gate 2);
Pin 3: K2/A1 (Cathode 2/Anode 1); **Pin 4:** G1 (Gate 1)

Applications

This device is suitable for applications such as high power electrical tankless water heater.

Product Summary

Characteristic	Value	Unit
$I_{T(RMS)}$	90	A
V_{DRM}/V_{RRM}	600	V
I_{GT}	50	mA

Maximum Ratings

Symbol	Characteristics	Conditions	Value	Units
$V_{\text{DRM}}/V_{\text{RRM}}$	Repetitive Peak Off-state Voltage	–	600	V
$I_{\text{T(RMS)}}$	RMS On-state Current – 360° as module	$T_c = 92\text{ }^{\circ}\text{C}$	90	A
	RMS On-state Current – 180° as single SCR		65	
$I_{\text{T(AV)}}$	Average On-state Current – 360° as module	$T_c = 92\text{ }^{\circ}\text{C}$	64	A
	Average On-state Current – 180° as single SCR		41	
I_{TSM}	Non-repetitive Surge Peak On-state Current	Single cycle, $f = 60\text{ Hz}$	950	A
I^2t	I^2t Value for Fusing	$t_p = 8.3\text{ ms}$	3745	A^2s
di/dt	Critical Rate of Rise of On-state Current	$I_G = 150\text{ mA}$, $f = 60\text{ Hz}$, $T_{vj} = 125\text{ }^{\circ}\text{C}$	200	$\text{A}/\mu\text{s}$
P_{GM}	Peak Gate Power Dissipation	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $t_p = 30\text{ }\mu\text{s}$	10	W
		$T_{vj} = 125\text{ }^{\circ}\text{C}$, $t_p = 300\text{ }\mu\text{s}$	5	
$P_{\text{G(AV)}}$	Average Gate Power Dissipation	$T_{vj} = 125\text{ }^{\circ}\text{C}$	1.0	W
T_{stg}	Storage Temperature Range	–	–40 to 150	$^{\circ}\text{C}$
T_{vj}	Virtual Junction Temperature Range	–	–40 to 125	$^{\circ}\text{C}$

Thermal Characteristics

Symbol	Characteristics	Value	Units
$R_{\text{th(j-c)}}$	Thermal Resistance, Junction to Case	0.3	K/W

Electrical Characteristics ($T_{vj} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Symbol	Characteristics	Conditions	Value		Units
			Min.	Max.	
I_{GT}	DC Gate Trigger Current	$V_D = 12\text{ V}$, $R_L = 30\text{ }\Omega$	5	50	mA
V_{GT}	DC Gate Trigger Voltage	$V_D = 12\text{ V}$, $R_L = 30\text{ }\Omega$	–	1.6	V
I_{H}	Holding Current	$I_T = 400\text{ mA}$ (initial)	–	80	mA
$dv/dt_{(\text{cr})}$	Critical Rate-of-rise of Off-stage Voltage	$V_D = 2/3 V_{\text{DRM}}$, Gate Open, $T_{vj} = 125\text{ }^{\circ}\text{C}$	500	–	$\text{V}/\mu\text{s}$
t_q	Turn-off Time	$I_T = 2\text{ A}$; $t_p = 50\text{ }\mu\text{s}$; $dv/dt = 5\text{ V}/\mu\text{s}$; $di/dt = 30\text{ A}/\mu\text{s}$	–	35	μs
t_{gt}	Turn-on Time	$I_G = 150\text{ mA}$, $t_p = 15\text{ }\mu\text{s}$, $I_T = 130\text{ A(pk)}$	–	3	μs

Static Characteristics

Symbol	Characteristics	Conditions	Maximum Value	Units
V_{TM}	Peak On-state Voltage	$I_T = 60\text{ A}$; $t_p = 380\text{ }\mu\text{s}$	1.8	V
$I_{\text{DRM}}/I_{\text{RRM}}$	Off-state Current, Peak Repetitive	$T_{vj} = 25\text{ }^{\circ}\text{C}$, $V_D = V_{\text{DRM}}/V_{\text{RRM}}$	20	μA
		$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_D = V_{\text{DRM}}/V_{\text{RRM}}$	3000	μA

Characteristic Curves

Fig. 1. Normalized DC Gate Trigger Current vs. Junction Temperature

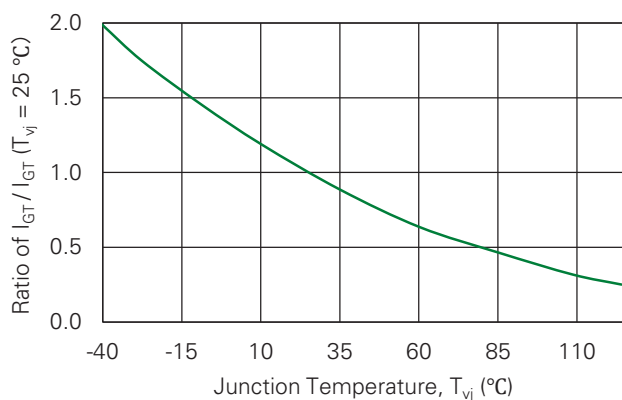


Fig. 2. Normalized DC Gate Trigger Voltage vs. Junction Temperature

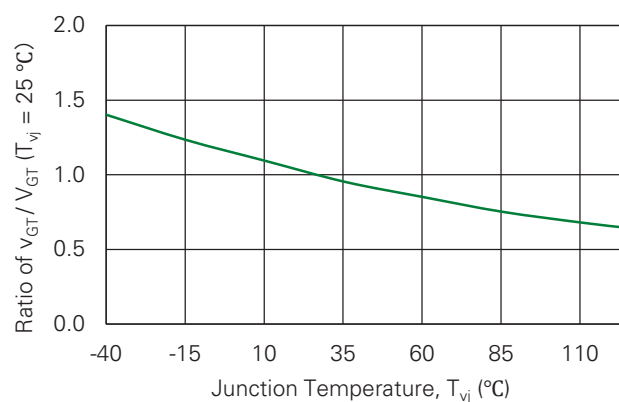


Fig. 3. Normalized DC Holding Current vs. Junction Temperature

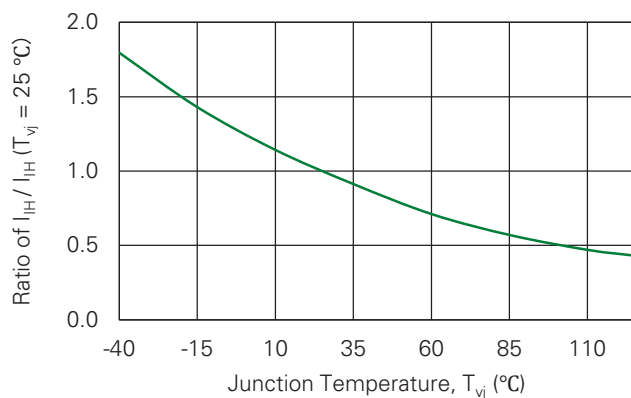


Fig. 4. Typical On-state Current vs. On-state Voltage (per SCR)

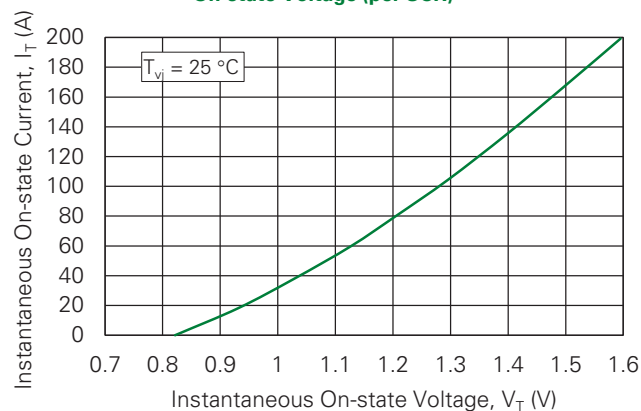


Fig. 5. Typical Power Dissipation vs. RMS On-state Current (per SCR)

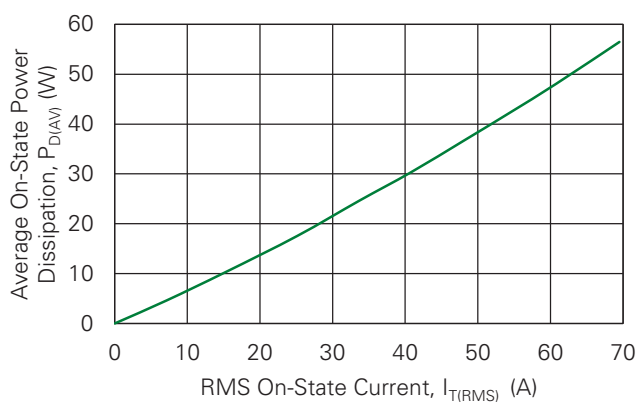


Fig. 6. Maximum Allowable Case Temperature vs. RMS On-state Current (per module)

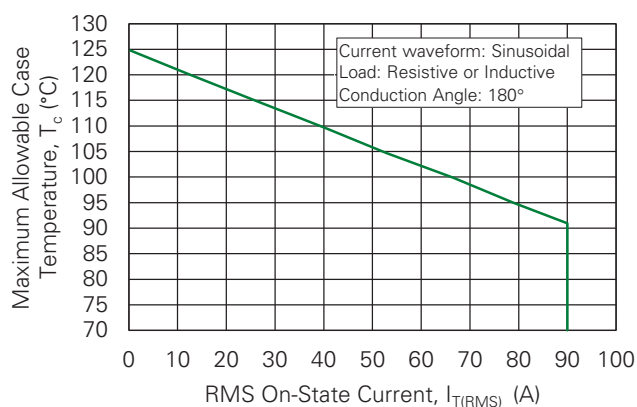


Fig. 7. Maximum Allowable Case Temperature vs. Average On-state Current (per module)

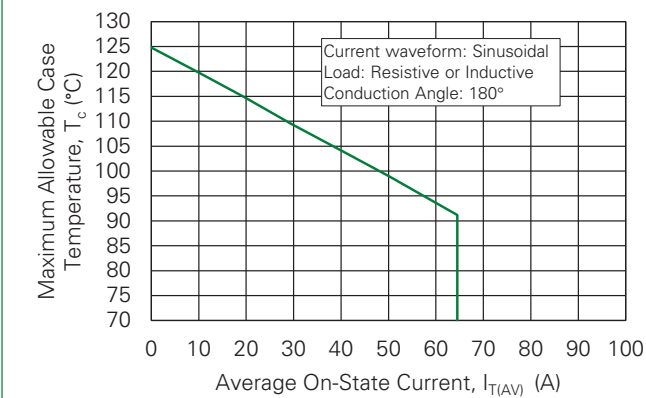
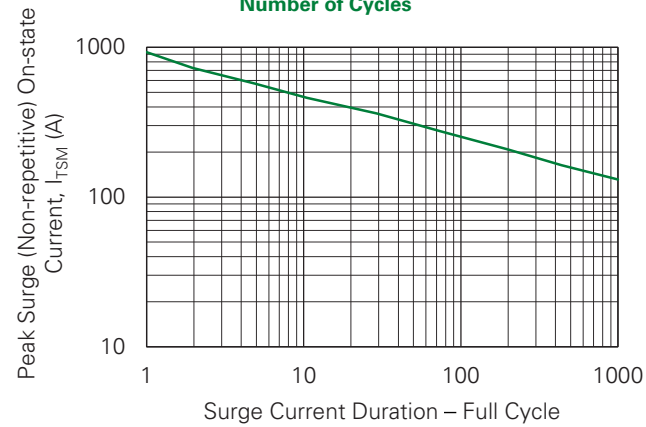


Fig. 8. Surge Peak On-state Current vs. Number of Cycles



Supply Frequency: 60 Hz Sinusoidal
Load: Resistive
RMS On-state, $I_{T(RMS)}$: Maximum rated value at Specific Case Temperature

- Notes:
1. Gate control may be lost during and immediately following surge current interval.
 2. Overload may not be repeated until junction temperature has returned to steady-state rated value.

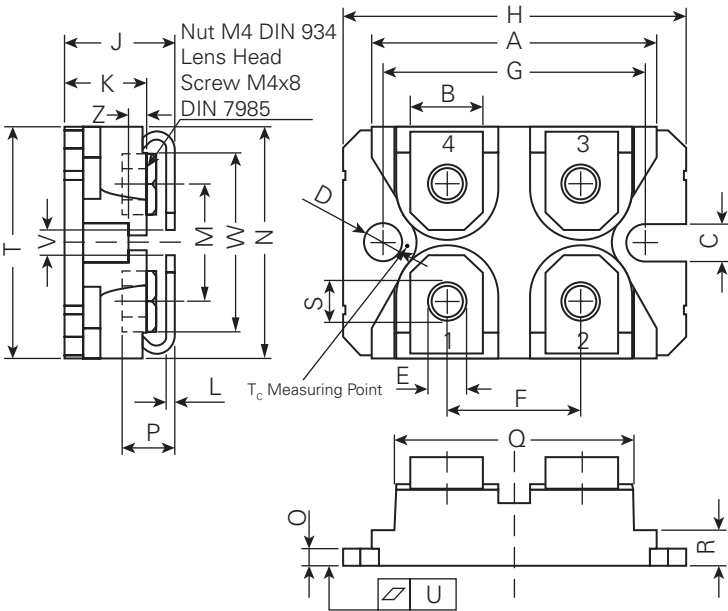
Physical Specifications

Characteristic	Value
Terminal Finish	100% Nickel-plated
Body Material	UL recognized epoxy meeting flammability classification 94V-0
Lead Material	Copper Alloy

Environmental Specifications

Test	Specifications and Conditions
HTRB	1008 hours, 125 °C
Temperature Cycle	100 cycles, -40 °C/150 °C
uHAST	96 hours, 130 °C, 85% RH
Power Cycle	10000 cycles, Delta T 80 °C, 125 °C

Package Dimensions SOT-227B

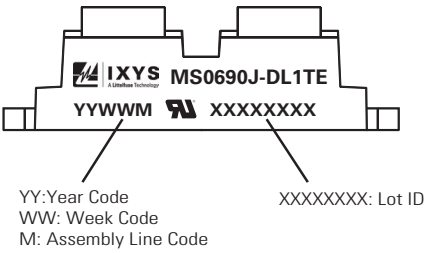
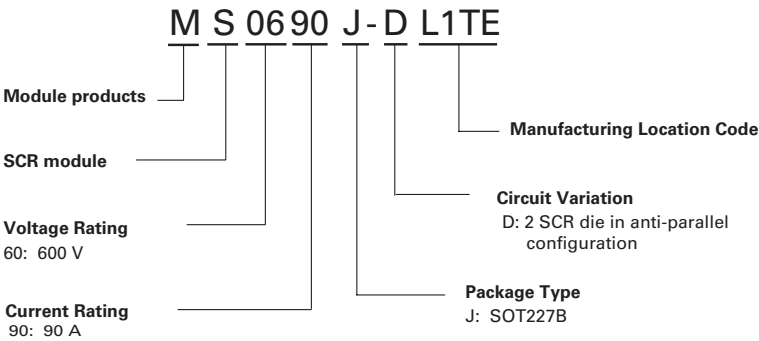


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	31.50	31.90	1.240	1.256
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.62	12.88	0.497	0.507
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.90	5.89	0.193	0.232
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.50	25.07	0.968	0.987
U	0	0.127	0	0.005
V	3.30	4.57	0.130	0.180

Packing Options

Part Number	Marking	Weight	Packing Mode	Quantity
MS0690J-DL1TE	MS0690J-DL1TE	30 g	Tube	160

Part Numbering and Marking



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