LITTELFUSE MS0690J-DL1TE

LITTELFUSE MS0690J-DL1TE SCR Module Instruction Manual

Model: MS0690J-DL1TE

1. Introduction

This manual provides essential information for the safe and effective use of the LITTELFUSE MS0690J-DL1TE SCR Module. This Silicon Controlled Rectifier (SCR) module is designed for high-power applications, offering robust performance in industrial electrical systems. Please read this manual thoroughly before installation and operation to ensure proper handling and to prevent potential hazards.

2. Safety Information

WARNING: Electrical components can cause severe injury or death if not handled properly. Only qualified personnel should install, operate, and maintain this device.

- Always disconnect power before working with the module or its connections.
- Ensure proper grounding to prevent electrical shock.
- Verify all connections are secure and correctly polarized.
- Do not exceed the specified voltage and current ratings.
- Wear appropriate personal protective equipment (PPE) when handling electrical components.
- Keep the module away from moisture, dust, and extreme temperatures.

3. Product Description and Features

The MS0690J-DL1TE is a high-performance SCR module housed in a SOT-227B MINIBLOC package, designed for reliable operation in demanding industrial environments. It features a robust design capable of handling significant power loads.

Figure 1: LITTELFUSE MS0690J-DL1TE SCR Module in SOT-227B package. This image shows the compact, robust design of the module, highlighting its terminals and heat sink mounting points.

Key Features:

- **On-State RMS Current (It RMS):** 90 A
- **Non Repetitive On-State Current:** 950 A
- **Rated Repetitive Off-State Voltage (VDRM):** 600 V
- **Off-State Leakage Current @ VDRM (IDRM):** 20 µA
- **On-State Voltage:** 1.8 V
- **Holding Current (Ih Max):** 80 mA
- **Gate Trigger Voltage (Vgt):** 1.6 V
- **Gate Trigger Current (Igt):** 50 mA
- **Minimum Operating Temperature:** -40°C
- **Maximum Operating Temperature:** +125°C
- **Mounting Style:** Screw Mount
- **Package / Case:** SOT-227B (MINIBLOC)

4. Technical Specifications

Parameter	Value
On-State RMS Current (It RMS)	90 A
Non Repetitive On-State Current	950 A
Rated Repetitive Off-State Voltage (VDRM)	600 V
Off-State Leakage Current @ VDRM (IDRM)	20 µA

Parameter	Value
On-State Voltage	1.8 V
Holding Current (Ih Max)	80 mA
Gate Trigger Voltage (Vgt)	1.6 V
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Minimum Operating Temperature	-40°C
Maximum Operating Temperature	+125°C
Mounting Style	Screw Mount
Package / Case	SOT-227B (MINIBLOC)
Item Weight	6.99 pounds
Manufacturer	LITTELFUSE

5. Setup and Installation

Proper installation is crucial for the performance and longevity of the SCR module. Refer to the circuit diagram of your specific application for correct wiring.

1. **Mounting:** Securely mount the SOT-227B module using appropriate screws to a heat sink. Ensure good thermal contact between the module's baseplate and the heat sink. Use thermal paste if recommended by your system design.
2. **Wiring:** Connect the main power terminals (Anode and Cathode) to the load and power supply according to your circuit design. Ensure all connections are tight and use appropriately sized wires for the expected current.
3. **Gate Connection:** Connect the gate terminal to the control circuit. The gate signal is used to trigger the SCR into conduction.
4. **Grounding:** Ensure the system is properly grounded to prevent electrical hazards and ensure stable operation.
5. **Pre-Power Check:** Before applying power, double-check all wiring for correctness, shorts, and loose connections.

6. Operating Instructions

The MS0690J-DL1TE SCR module functions as a controlled rectifier, allowing current to flow in one direction once triggered. It remains in the ON state until the anode current falls below the holding current or the anode-cathode voltage reverses.

- **Triggering:** Apply a positive pulse to the gate terminal (relative to the cathode) with a voltage of at least 1.6 V and a current of at least 50 mA to turn the SCR ON.
- **Conduction:** Once triggered, the SCR will conduct current up to 90 A RMS. Ensure the load current does not exceed this rating.
- **Turn-Off:** The SCR will turn off when the anode current drops below the holding current (80 mA) or when the anode-cathode voltage becomes reverse-biased.
- **Thermal Management:** Monitor the operating temperature. Ensure the heat sink is adequately sized and ventilation is sufficient to keep the module within its specified operating temperature range (-40°C to

+125°C).

7. Maintenance

The MS0690J-DL1TE SCR module is designed for long-term reliability with minimal maintenance. However, periodic checks can help ensure optimal performance.

- **Visual Inspection:** Periodically inspect the module and its connections for any signs of damage, discoloration, or loose wiring.
- **Cleaning:** Ensure the module and heat sink are free from dust and debris, which can impede heat dissipation. Use a soft, dry brush or compressed air for cleaning.
- **Thermal Paste:** If the module is removed or re-mounted, reapply thermal paste if necessary to ensure efficient heat transfer.
- **Environmental Conditions:** Verify that the operating environment remains within the specified temperature and humidity ranges.

8. Troubleshooting

If the SCR module is not functioning as expected, consider the following common issues:

- **Module Not Turning ON:**
  - Check if the gate trigger voltage (Vgt) and current (Igt) meet the minimum requirements (1.6 V, 50 mA).
  - Verify the gate signal polarity and duration.
  - Ensure the anode-cathode voltage is sufficient for conduction.
  - Inspect gate connections for breaks or shorts.
- **Module Not Turning OFF:**
  - Ensure the anode current drops below the holding current (Ih Max: 80 mA).
  - Verify that the anode-cathode voltage is reversing or dropping to zero.
  - Check for continuous gate signal, which can prevent turn-off.
- **Overheating:**
  - Verify the heat sink is properly mounted and adequately sized for the application.
  - Check for proper thermal paste application.
  - Ensure sufficient airflow and ventilation around the module.
  - Confirm that the load current does not exceed the RMS current rating (90 A).
- **No Output:**
  - Check all power connections and fuses in the circuit.
  - Verify the input power supply is stable and within specifications.
  - Test the module's continuity if possible (with power disconnected).

For persistent issues, consult a qualified electronics technician or contact LITTELFUSE technical support.

9. Warranty and Support

Warranty information for the LITTELFUSE MS0690J-DL1TE SCR Module is typically provided by the manufacturer, LITTELFUSE, or the authorized distributor at the time of purchase. Please refer to your purchase

documentation or the official LITTELFUSE website for detailed warranty terms and conditions.
For technical support, product inquiries, or service, please contact your supplier or visit the official LITTELFUSE website:

- **Manufacturer:** LITTELFUSE
- **Website:** www.littelfuse.com (*Note: This is a general link; specific product support pages may vary.*)