Bourns MOV-07DxxxK Series

Bourns MOV-07DxxxK Series TVS Varistor Instruction Manual

Model: MOV-07DxxxK Series

1. Introduction

This instruction manual provides essential information for the proper handling, installation, and understanding of the Bourns MOV-07DxxxK Series Metal Oxide Varistor (MOV). This component is designed for overvoltage protection in various electronic circuits. Please read this manual thoroughly before use to ensure safe and effective operation.

2. Product Overview

The Bourns MOV-07DxxxK Series varistor is a voltage-dependent, non-linear resistor that protects electronic circuits from transient voltage spikes. When a voltage surge occurs, the varistor's resistance rapidly decreases, diverting the excess current away from sensitive components and clamping the voltage to a safe level. This series features a compact disc design with radial leads, suitable for through-hole mounting.

Figure 2.1: Bourns MOV-07DxxxK Series Varistor. This image displays the physical appearance of the varistor, which is a small, blue, disc-shaped electronic component with two metallic leads for circuit connection.

3. Specifications

Key technical specifications for the MOV-07DxxxK Series varistor are detailed below. Refer to the specific part number datasheet for precise values.

Table 3.1: General Specifications

Parameter	Value
Voltage Rating VAC	50V
Voltage Rating VDC	65V
Product Range	MOV-07DxxxK Series
Clamping Voltage Vc Max	135V
Varistor Case Style	Disc 7mm
Varistor Type	Metal Oxide Varistor (MOV)
Peak Surge Current @ 8/20µS	1.2kA
Operating Temperature Min	-40°C
Operating Temperature Max	85°C

For detailed electrical characteristics and performance curves, please refer to the official Bourns datasheet for the specific MOV-07DxxxK part number.

4. Installation and Setup

Proper installation is crucial for the effective operation and longevity of the varistor. Always ensure power is disconnected before handling electronic components.

4.1 Safety Precautions

- Always disconnect power from the circuit before installing or removing components.
- Wear appropriate personal protective equipment (PPE), such as safety glasses.
- Avoid touching the component leads directly after soldering, as they may be hot.
- Ensure proper ventilation when soldering.

4.2 Mounting Instructions

1. Identify the correct mounting location on the Printed Circuit Board (PCB) for the varistor.
2. Insert the varistor's leads into the designated through-holes on the PCB. Ensure the component sits flush against the board or at the intended height.
3. Bend the leads slightly on the solder side of the PCB to hold the component in place.
4. Solder the leads to the PCB pads using appropriate soldering techniques. Ensure good solder joints without shorts or cold joints.
5. Trim any excess lead length after soldering.

4.3 Circuit Integration

Varistors are typically connected in parallel with the component or circuit section they are protecting. They should be placed as close as possible to the point of entry of the transient voltage to minimize inductance in the protection path.

5. Operating Principles

The Metal Oxide Varistor (MOV) operates as a voltage-dependent resistor. Under normal operating conditions (below its clamping voltage), the varistor exhibits a very high impedance, effectively acting as an open circuit and drawing minimal current. When a transient voltage spike exceeds the varistor's clamping voltage, its impedance rapidly drops to a very low value, allowing it to conduct the surge current away from the protected circuit. This action clamps the voltage across the protected circuit to a safe level, preventing damage to sensitive components.
The varistor absorbs the energy of the transient and dissipates it as heat. Repeated exposure to surges, or exposure to surges exceeding its rated energy absorption capacity, can degrade the varistor over time, potentially leading to a short-circuit failure mode.

6. Maintenance

Varistors are generally maintenance-free components. However, periodic inspection of the circuit board and components can help identify potential issues.

6.1 Inspection

- Visually inspect the varistor for any signs of physical damage, such as cracks, discoloration, or bulging, which may indicate a past surge event or degradation.
- Check solder joints for integrity.

6.2 Storage

Store varistors in a dry, cool environment, away from direct sunlight and corrosive atmospheres, to preserve their shelf life and performance characteristics.

7. Troubleshooting

If the protected circuit experiences issues or the varistor is suspected of failure, consider the following:

7.1 Varistor Failure Modes

- **Short Circuit:** A common failure mode for varistors after absorbing a significant surge or multiple surges beyond their rating. This can lead to a continuous current flow, potentially blowing a fuse or tripping a circuit breaker.
- **Open Circuit:** Less common, but can occur if the varistor is severely damaged, leading to a complete break in the component. In this case, the circuit will lose its surge protection.
- **Degradation:** Repeated exposure to surges below the catastrophic failure level can gradually increase the varistor's leakage current or decrease its clamping voltage effectiveness.

7.2 Diagnostic Steps

1. **Visual Inspection:** Look for physical signs of damage (cracks, charring, bulging).
2. **Continuity Test (Power Off):** With power disconnected, use a multimeter to check for continuity across the varistor. A healthy varistor should show very high resistance (open circuit) at low test voltages. A short-circuited varistor will show very low resistance.
3. **Circuit Breaker/Fuse Tripping:** If the circuit breaker trips or a fuse blows immediately upon power-up, and the varistor shows signs of damage or low resistance, it likely failed short.

If a varistor is suspected of failure, it should be replaced with a component of equivalent specifications to maintain circuit protection.

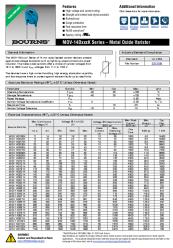
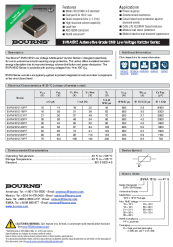
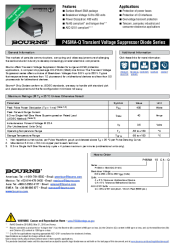
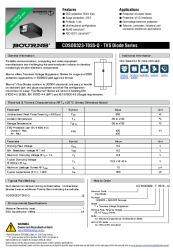
8. Disposal

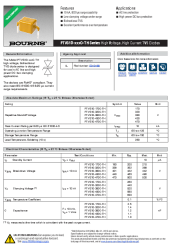
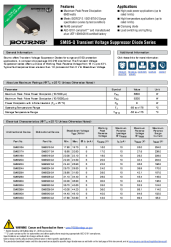
When the varistor reaches the end of its life or is replaced, dispose of it according to local electronic waste regulations. Do not dispose of electronic components in general household waste.

9. Warranty and Support

For specific warranty information or technical support regarding Bourns products, please refer to the official Bourns website or contact their authorized distributors. Product specifications and availability are subject to change without notice.
For further assistance, visit: www.bourns.com

Related Documents - MOV-07DxxxK Series

	Bourns MOV-14DxxxK Series Metal Oxide Varistors (MOVs) - Datasheet Comprehensive datasheet for Bourns MOV-14DxxxK Series Metal Oxide Varistors. Features high voltage/current ratings, surge protection, and RoHS compliance. Includes electrical characteristics, dimensions, packaging, and ordering information.
	Bourns BVRA1812 Automotive Grade SMD Low Voltage Varistor Series Datasheet Technical datasheet for the Bourns BVRA1812 Automotive Grade SMD Low Voltage Varistor Series, detailing features, applications, electrical and environmental characteristics, dimensions, and ordering information.
	Bourns P4SMA-Q Transient Voltage Suppressor Diode Series Datasheet Detailed technical datasheet for the Bourns P4SMA-Q series Transient Voltage Suppressor Diodes. This series features a compact SMA (DO-214AC) package, offering breakdown voltages from 6.8V to 250V and a peak pulse power dissipation of 400 watts. Includes electrical characteristics, rating curves, dimensions, and packaging information. Suitable for automotive, telecom, and industrial applications.
	Bourns CDSOD323-T05S-Q TVS Diode Series Datasheet | ESD & Surge Protection Comprehensive datasheet for the Bourns CDSOD323-T05S-Q TVS Diode Series. Features include 30 kV ESD protection, >24 A surge capability, AEC-Q101 compliance, and SOD323 package. Ideal for automotive, telecom, and industrial applications.

	[Bourns PTVS10-xxxC-TH High Voltage High Current TVS Diodes Datasheet] Datasheet for Bourns PTVS10-xxxC-TH series high voltage, high current bidirectional TVS diodes. Features 10 kA surge capability, low clamping voltage, and applications in AC line and DC bus protection. Includes electrical characteristics, absolute maximum ratings, dimensions, and ordering information.
	[Bourns SM8S-Q Transient Voltage Suppressor Diode Series Datasheet] Comprehensive datasheet for the Bourns SM8S-Q series of Transient Voltage Suppressor (TVS) Diodes. Features high peak power dissipation, automotive grade (AEC-Q101 compliant), and suitability for surge and ESD protection applications.