Model M3699
Voltage Limiter Module

Customer Reference Manual

Web: www.bonitron.com • Tel: 615-244-2825 • Email: info@bonitron.com

Bonitron, Inc.
Nashville, TN

An industry leader in providing solutions for AC drives.

ABOUT BONITRON

Bonitron designs and manufactures quality industrial electronics that improve the reliability of processes and variable frequency drives worldwide. With products in numerous industries, and an educated and experienced team of engineers, Bonitron has seen thousands of products engineered since 1962 and welcomes custom applications.

With engineering, production, and testing all in the same facility, Bonitron is able to ensure its products are of the utmost quality and ready to be applied to your application.

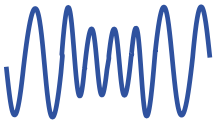
The Bonitron engineering team has the background and expertise necessary to design, develop, and manufacture the quality industrial electronic systems demanded in today's market. A strong academic background supported by continuing education is complemented by many years of hands-on field experience. A clear advantage Bonitron has over many competitors is combined on-site engineering labs and manufacturing facilities, which allows the engineering team to have immediate access to testing and manufacturing. This not only saves time during prototype development, but also is essential to providing only the highest quality products.

The sales and marketing teams work closely with engineering to provide up-to-date information and provide remarkable customer support to make sure you receive the best solution for your application. Thanks to this combination of quality products and superior customer support, Bonitron has products installed in critical applications worldwide.

AC Drive Options

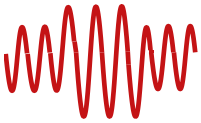
In 1975, Bonitron began working with AC inverter drive specialists at synthetic fiber plants to develop speed control systems that could be interfaced with their plant process computers. Ever since, Bonitron has developed AC drive options that solve application issues associated with modern AC variable frequency drives and aid in reducing drive faults. Below is a sampling of Bonitron's current product offering.

World Class Products



Undervoltage Solutions

Uninterruptible Power for Drives
(DC Bus Ride-Thru)
Voltage Regulators
Chargers and Dischargers
Energy Storage



Overvoltage Solutions

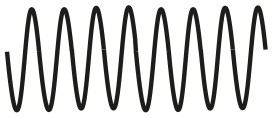
Braking Transistors
Braking Resistors
Transistor/Resistor Combo
Line Regeneration
Dynamic Braking for Servo Drives

Common Bus Solutions

Single Phase Power Supplies
3-Phase Power Supplies
Common Bus Diodes

Portable Maintenance Solutions

Capacitor Formers
Capacitor Testers



Power Quality Solutions

12 and 18 Pulse Kits

Green Solutions

Line Regeneration

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Table of Contents

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1. INTRODUCTION

1.1. WHO SHOULD USE THIS MANUAL

This manual is intended for use by anyone who is responsible for integrating, installing, maintaining, troubleshooting, or using this equipment.

Please keep this manual for future reference.

1.2. PURPOSE AND SCOPE

This manual is a user's guide for the Model M3699. It will provide the user with the necessary information to successfully install, integrate, and use the M3699.

In the event of any conflict between this document and any publication and/or documentation related to the application, the latter shall have precedence.

1.3. MANUAL VERSION AND CHANGE RECORD

Rev 00a is the initial printing of the manual for the M3699.

Added efficiency chart to engineering data in Rev 00b.
The manual template was updated in Rev 00c.
Updates to Tables 2-1 and 6-1, Figures 3-2 and 6-3 were made in Rev 01a.
Updates to Section 2.1 Related Products and to Figure 3-2 in Rev 01b.
Update to Section 4.1, Figure 3-2, and Figure 6-3 was made in Rev 01c.

Figure 1-1: M3699

1.4. SYMBOL CONVENTIONS USED IN THIS MANUAL AND ON EQUIPMENT

	Earth Ground or Protective Earth
	AC Voltage
	DC Voltage
 DANGER!	DANGER: Electrical hazard - Identifies a statement that indicates a shock or electrocution hazard that must be avoided.
 DANGER!	DANGER: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.
 CAUTION!	CAUTION: Identifies information about practices or circumstances that can lead to property damage, or economic loss. Attentions help you identify a potential hazard, avoid a hazard, and recognize the consequences.
 CAUTION!	CAUTION: Heat or burn hazard - Identifies a statement regarding heat production or a burn hazard that should be avoided.

2. PRODUCT DESCRIPTION

The M3699 Voltage Limiter accepts a wide DC input voltage range up to 1000VDC. The voltage limiter reduces the input to a range acceptable by a common 24VDC isolated switching power supply. The M3699 works as a regulator to provide non isolated 175VDC referenced to the negative power rail.

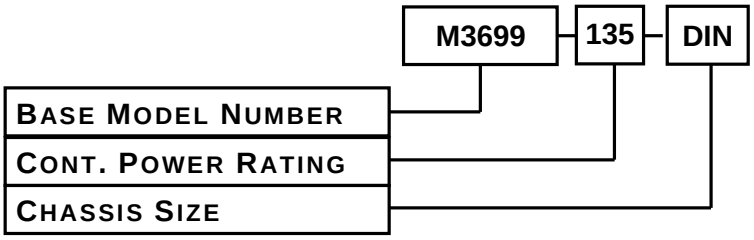
2.1. RELATED PRODUCTS

M7001 MODULE

The M7001 is a 24VDC power supply with a wide range (190-1000VDC) input. For backup systems using capacitors or batteries, such as Bonitron Uninterruptible Power for Drives, the M7001 can provide backup to local control systems, sensors or networks with 24VDC.

2.2. PART NUMBER BREAKDOWN

Figure 2-1: Example of Part Number Breakdown



BASE MODEL NUMBER

The Base Model Number for the voltage limiter modules is **M3699**.

CONTINUOUS POWER RATING

The continuous power rating is a 3 digit number to represent the power able to be supplied by the M3699 in Watts.

For example, **135** represents 135 W.

CHASSIS SIZE

The chassis size used for the M3699 is **DIN**.

2.3. GENERAL SPECIFICATIONS

Table 2-1: General Specifications

PARAMETER	SPECIFICATION
DC Input Operating Range	• 125-1000 VDC
DC Output Voltage	• 175 VDC Nominal
Power (Continuous)	• 135 W
Overload Capability	• 150% for 60 seconds
Indicators	• Status LED
Cooling	• Convection
Operating Temp	• 0°C to 50°C
Storage Temp	• -20°C to 65°C
Humidity	• Below 90%, non-condensing
Atmosphere	• Free of corrosive gas or conductive dust

2.4. GENERAL PRECAUTIONS AND SAFETY WARNINGS

DANGER!

- HIGH VOLTAGES MAY BE PRESENT!
- NEVER ATTEMPT TO OPERATE THIS PRODUCT WITH THE ENCLOSURE COVER REMOVED!
- NEVER ATTEMPT TO SERVICE THIS PRODUCT WITHOUT FIRST DISCONNECTING POWER TO AND FROM THE UNIT!
- ALWAYS ALLOW ADEQUATE TIME FOR RESIDUAL VOLTAGES TO DRAIN BEFORE REMOVING THE ENCLOSURE COVER!
- **FAILURE TO HEED THESE WARNINGS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH!**

CAUTION!

- NO USER-SERVICEABLE PARTS ARE CONTAINED WITHIN THIS PRODUCT. INOPERABLE UNITS SHOULD BE REPLACED OR RETURNED FOR EVALUATION AND/OR REPAIR BY QUALIFIED TECHNICIANS.

ANY QUESTIONS AS TO APPLICATION, INSTALLATION, OR SERVICE SAFETY SHOULD BE DIRECTED TO THE EQUIPMENT SUPPLIER.

3. INSTALLATION INSTRUCTIONS

CAUTION!

Installation and/or removal of this product should only be performed by a qualified electrician in accordance with National Electrical Code or local codes and regulations.

Proper installation of the M3699 should be accomplished following the steps outlined below. Be sure to refer to the system instruction manual as these steps are performed. Please direct all installation inquiries that may arise during the installation and startup of this product to the equipment supplier or system integrator.

3.1. ENVIRONMENT

The module should be installed in an area protected from moisture and falling debris. Buildup of dust or debris may cause poor performance and possibly a failure. Operating in a wet environment can pose a shock hazard. The recommended temperature range for operating or storing this module is 0°C to 50°C.

3.2. UNPACKING

Upon receipt of this product, please verify that the product received matches the product that was ordered and that there is no obvious physical damage to the unit. If the wrong product was received or the product is damaged in any way, please contact the supplier from which the product was purchased.

3.3. MOUNTING

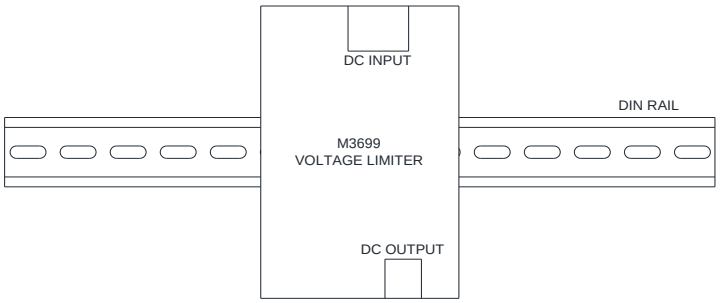
The M3699 module has one method of mounting, which is a DIN rail.

Mounting dimensions can be found in Section 6.3.

The installation site for the module should be chosen with several considerations in mind:

- The unit requires a minimum clearance of two inches in all directions around it when mounted near a non-heat source.
- Unit should not be exposed to falling debris or condensation.
- Once the installation site has been selected as outlined above, the unit should be mounted in place. The unit should be mounted vertically as shown in Figure 3-1.
- DO NOT mount the unit upside-down or on the underside of a mounting surface
- DO NOT mount unit in a horizontal position with its side parallel to the mounting surface or floor.

Figure 3-1: M3699 Mounting Orientation



3.4. WIRING AND USER CONNECTIONS

For the maximum wire size accepted by the individual field connection terminals, refer to Table 3-1. Wire types and sizes should be chosen in accordance with national and local electrical codes to meet the voltage and current levels present for your application.

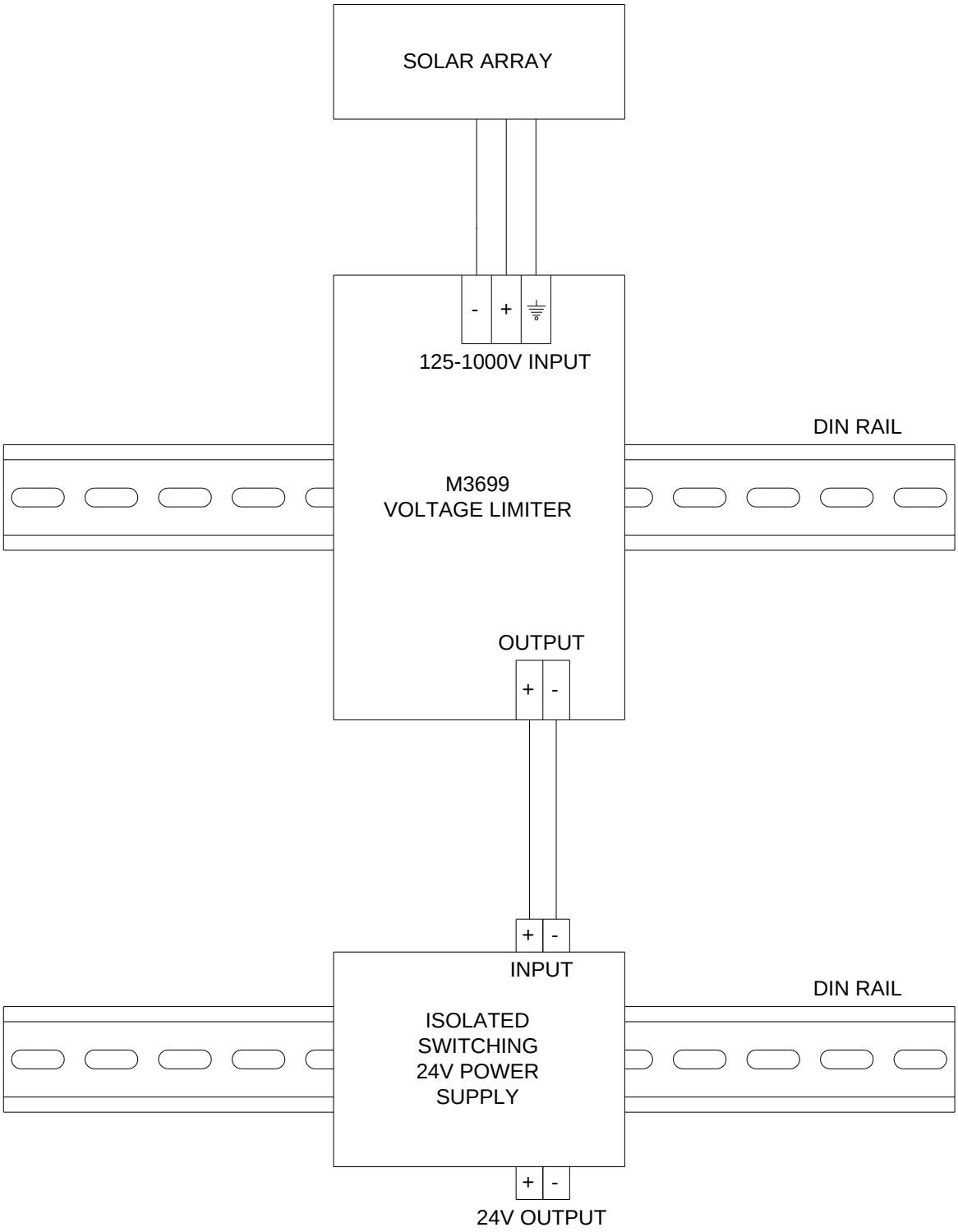
Table 3-1: Wiring Specifications

SIGNAL	TERMINAL	MINIMUM WIRE SIZE	MAXIMUM WIRE SIZE	TORQUE
Input DC -	TB1-1	18 AWG	10 AWG	16 lb-in
Input DC +	TB1-2	18 AWG	10AWG	16 ln-in
Output DC +	TB2-1	18 AWG	12 AWG	16 lb-in
Output DC -	TB2-2	18 AWG	12 AWG	16 lb-in
Ground	TB1-3	18AWG	10AWG	16 lb-in

3.5. FUSING

Fusing for the M3699 Voltage Limiter are internal and not user serviceable.

Figure 3-2: M3699 Wiring Connections



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4. OPERATION

4.1. FUNCTIONAL DESCRIPTION

Bonitron's M3699 Voltage Limiter takes a 200 – 1000 VDC input and converts it to a non-isolated 175 ± 10% VDC referenced to the negative voltage supply.

The minimum DC input level is 125VDC. Between 125 – 200VDC the output follows the input voltage plus 20VDC.

The regulation range is 200 - 1000 VDC. For this range, the output voltage is then limited to 175 ± 10% VDC.

4.2. FEATURES

4.2.1. VOLTAGE PRESENT INDICATOR

Green STATUS LED visible thru top cover.

4.3. STARTUP

This section covers basic checks and procedures that may be used when performing a startup with a M3699.

4.3.1. PRE-POWER CHECKS

- Ensure that all connections are tight and that all wiring is of the proper size and rating for operation with proper fusing.
- Ensure that the polarity of the DC link to the attached system is correct.
- Check for exposed conductors that may lead to inadvertent contact.
- Check for any debris, shavings, trimmings, etc. that may cause shorts or obstruct ventilation on unit.
- Perform the pre-power checks required for the attached system.

4.3.2. STARTUP PROCEDURE AND CHECKS

Monitor voltage output at TB2 and apply nominal input power to TB1. The Green status light will come on and the unit will hold output at 175VDC ± 10%.

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5. MAINTENANCE AND TROUBLESHOOTING

Repairs or modifications to this equipment are to be performed by Bonitron approved personnel only. Any repair or modification to this equipment by personnel not approved by Bonitron will void any warranty remaining on this unit.

5.1. TROUBLESHOOTING

5.1.1. LED INDICATOR NOT LIT

Check incoming voltage

5.1.2. NO OUTPUT

If there is no output, check for the correct polarity on the input.

5.2. TECHNICAL HELP – BEFORE YOU CALL

If possible, please have the following information when calling for technical help:

- Exact model number of affected units
- Serial number of unit
- Name and model number of attached drives
- Name of original equipment supplier
- Brief description of the application

This information will help us support you much more quickly. Please contact us at (615) 244-2825 or through www.Bonitron.com

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6. ENGINEERING DATA

6.1. RATINGS

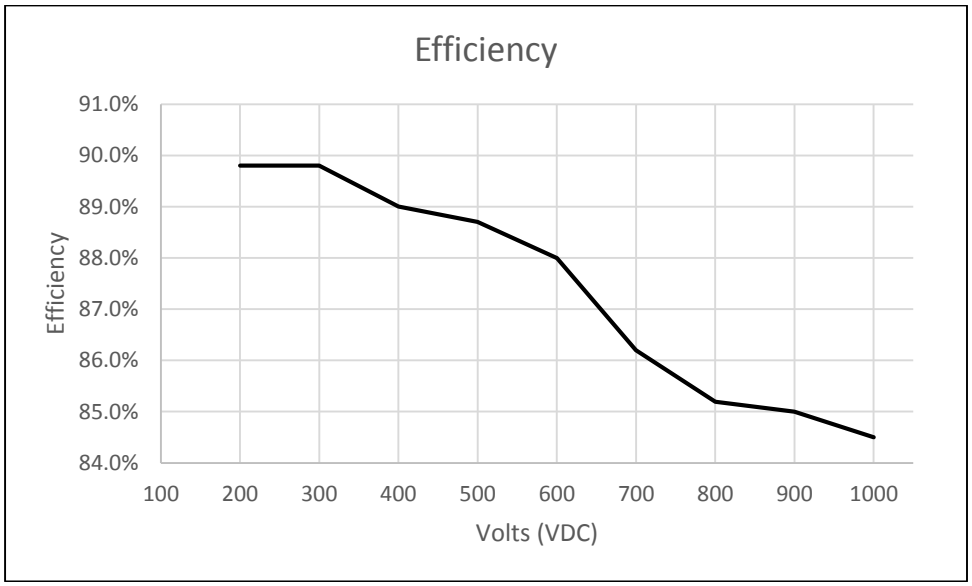
Table 6-1: M3699 Ratings Table

MODEL	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
M3699-135-DIN	125 – 1000 VDC	175 VDC	0 A – 0.77 A

6.2. EFFICIENCY / POWER CONSUMPTION

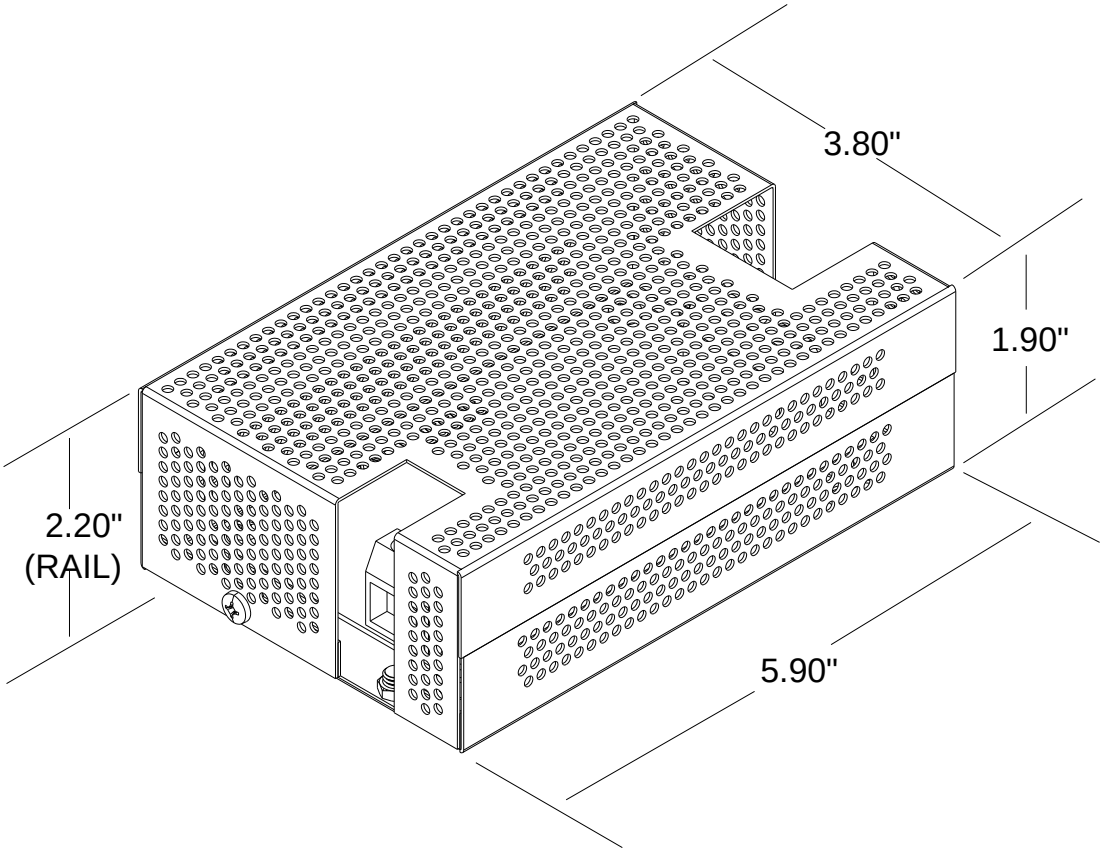
The M3699 efficiency varies with the input DC voltage according to Fig. 6-1.

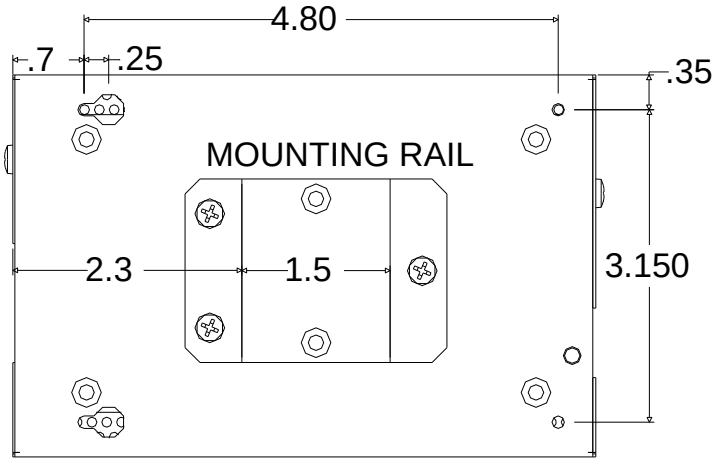
Figure 6-1: M3699 Efficiency Chart



6.3. DIMENSIONS AND MECHANICAL DRAWING

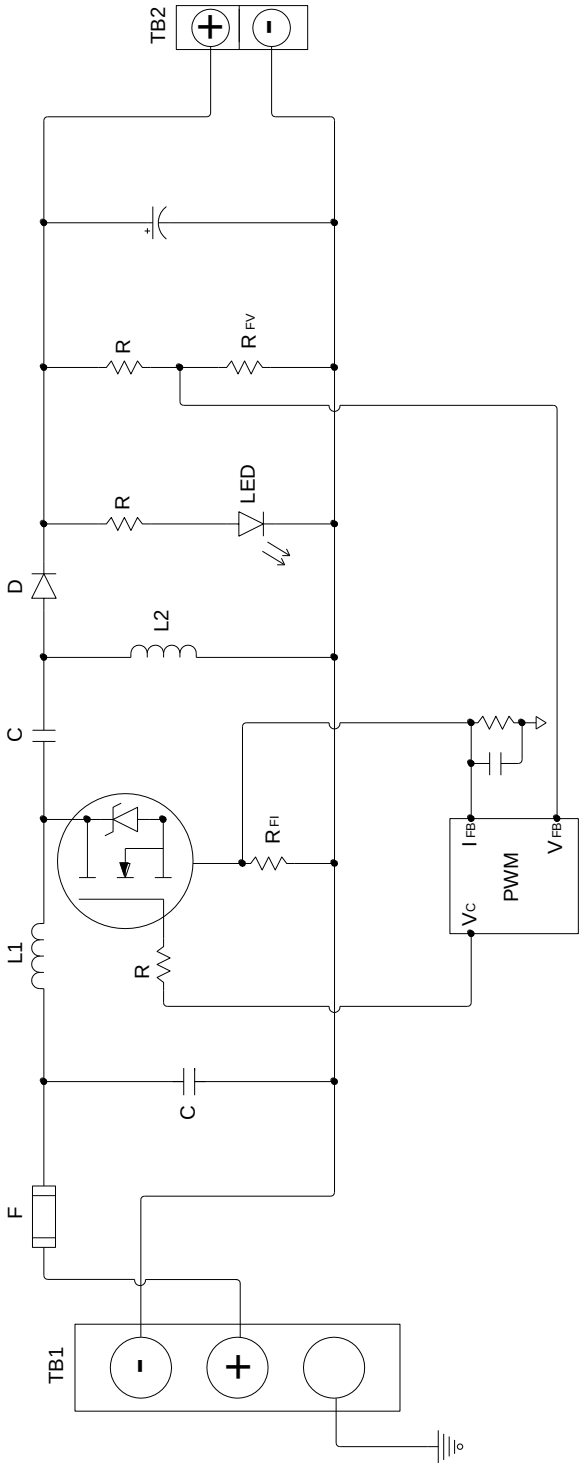
Figure 6-2: M3699 Chassis Dimensional Outline





FOOTPRINT

Figure 6-3: M3699 Voltage Limiter Block Diagram



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