i3A Evaluation Board Manual

TDK Lambda Evaluation Board P/N i3A5A8A-001-EVK-D2PP

TDK-Lambda Corporation
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Before Using the Eval Board

Caution

• Follow the electrical connection instructions for the evaluation board carefully. Reverse Connections on the input or the output can cause permanent damage.

• Do not operate the input voltage higher than the specified values. Overvoltage on the input to the device will cause permanent damage.

• This product contains a printed circuit board utilizing surface mounted devices. PCB stresses such as bending, twisting etc. can cause damage. Please handle with care.
Device Introduction

I3A Series DC/DC Power Modules
9-53V Input, 4.5 & 8A Output
100W 1/32nd Brick Power Module

I3A power modules perform local voltage conversion from a 12V, 24V, or well regulated 48V bus. The i3A series utilizes a low component count that results in both a low cost structure and a high level of performance. The open-frame, compact, design features a low profile and weight that allow for extremely flexible and robust manufacturing processes. The ultrahigh efficiency allows for a high amount of usable power even in demanding thermal environments.
Eval Board Introduction

Eval Board is populated with two i3A Converters

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>Output Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vi: 9 – 53 VDC</td>
<td>V out 1 Adj.</td>
</tr>
<tr>
<td>Vo: 3.3 – 16.5 Volts</td>
<td>V out 2 Adj.</td>
</tr>
</tbody>
</table>

**Converter Section #1:**
- I3A4W008A033V
- Vi: 9 – 53 VDC
- Vo: 3.3 – 16.5 Volts
- 8 A Max
- 100 W Max

**Converter Section #2:**
- I3A4W005A150V
- Vi: 9 – 53 VDC
- Vo: 5 – 30 Volts
- 4.5 A Max
- 100 W Max
Converter #1 Test Points and Controls

- TP1: Enable
- TP2: Trim
- TP3: Vo Sense
- TP15: V out+
- TP3: V out-

Converter On/Off Control
Converter #2 Test Points and Controls

Converter On/Off Control
TP8 Enable
TP9 Trim
TP10 Vo Sense
TP17 V out+
TP18 V out -

On     Off
Input Section test Points

**Vi:** 9 – 53 VDC

**TP20**
Vin -

**TP19**
Vin +

*Do not exceed input voltage range*
Input/Output Electrical Connections & Vo Adjust

- 9 – 53 Volt Input Connections
- Do not exceed max input voltage

Output Connections

Converter #1 Output

Converter #2 Output

V2 Output Adjust

V1 Output Adjust
Operation

• Once input voltage is applied, either of the converters can be turned on or off using ON/OFF toggle switch.

• User can change output voltage by using Vo1 or Vo2 Trim adjust potentiometer:
  - V01 Adjustment Range: 3.3 – 16.5 Volts
  - Vo2 Adjustment Range: 5 – 30 Volts

• Please note the specified operating ranges and keep in mind that the positive output units are step down converters. The input voltage to the converters must always be greater than the output voltage. Please see charts below:

![Charts showing the maximum and minimum attainable output voltages for given input voltages.](image)
Setup Example

48 VDC In
Vo 2: 30 VDC Out
Vo 1: 16.5 VDC Out

Converters can be turned on or off using toggle switches.
Setup Example Using Scope

• An oscilloscope can be connected to the inputs and the outputs to observe converter behavior.
• Top trace shows input voltage rise to 48 VDC.
• Bottom Trace shows converter startup characteristic into full load.
Appendix

Scope Measurement Technique

When making sensitive measurements a vertical mini-probe socket should be used to connect the oscilloscope probe to minimize loop area of the measurement leads. See scope connection below using Agilent P/N N2768A.

Vertical Mini Probe Socket P/N N2768A
Appendix

Scope Measurement Technique (cont.)

Example below shows output ripple measurement on the left with a vertical mount socket connection to the board. The right shows loop pickup.

Full load output ripple with scope socket

Full load output ripple with ground loop.
Note Noise Pickup
Appendix (cont.)

Simplified Evaluation Board Schematic
Appendix (cont.)

Evaluation Board Silkscreen
# Evaluation Board Bill Of Materials

<table>
<thead>
<tr>
<th>Mfr. Name</th>
<th>Mfr. Part Number</th>
<th>Description</th>
<th>Ref Des</th>
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<tbody>
<tr>
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<td>20A SMT Fuse</td>
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<tr>
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<td>0456020.ER</td>
<td>20A SMT Fuse</td>
<td>F2</td>
</tr>
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<td>Power Unit Assembly</td>
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<td>DCDC Power Module</td>
<td>PS5</td>
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<td>Power Unit Assembly</td>
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