Reference Design for 1200V Isolated I2C High Side Current Sensing for Solar Combiner Boxes

**PV Array** (>50kW) \( \rightarrow \) **Combiner Box** \( \rightarrow \) **Solar Inverter** \( \rightarrow \) **Grid**

**Smart Combiner Box**

- **Transformer Driver** TPS65063
- **Current Sensor** INA260 LaunchPad Socket
- **Voltage** VCC (3.3V)
- **Ground** GND
- **Alert** SDA
- **ISO 7842 DWW** Reinforced Digital Isolator

**Terminal**

- **PV Array**
- **Combiner Box**
- **Solar Inverter**
- **Grid**

**Digital Isolation**

**Communication**

**Display**

**Smart Combiner Box**

1500 VDC Bus From Solar String

Load (Solar Inverter)

PV Inverter

DC Power Supply

Fuse

Digital Isolation

TI Design

**Notes**

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Version control disabled

SVN Rev: TIDA-01590

Orderable: EVM_orderable

**Revision History**

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TID #: TIDA-01590

Contact: http://www.ti.com/support

http://www.ti.com
You should delete the nylon screws/standoffs and/or the bumpons as needed for your design (or substitute other parts from Hardware.IntLib). Bumpons are cheaper, but provide less clearance.

Deleting anything else from this page may result in your EVM submission being rejected (until you add them back).

Update the Label Text in the Label Table as needed for each Assembly Variant.

You should delete this note too.
Two 10µF electrolytic capacitors are recommended for R111 and R112. Prevents signal from feeding back to source.

Low-level applied to SDA (transmit direction) turns transistor on. Q1 conducts. Then the data signal becomes high. SDA_HI can be pulled high by the pull-up resistor. After SDA is released, VE blocks Q1, releases SDA_HI and Q2.

Low-level sent from SDA_HI keeps transistor at high impedance. SDA_HI pulls line (receive direction) high. Low-level applied to SDA keeps transistor at low impedance. After SDA_HI is released, SDA follows after one propagation delay.

Current sensing with I2C output. Air flow and large 2 oz. copper planes to accommodate up to 125°C.

The design is suitable for solar combiner boxes. It provides overcurrent protection and fault indication. The Q1 comparator driver and LOO setup based on recommended configuration from data sheet.
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