
IRU3038 EVALUATION BOARD USER GUIDE

INTRODUCTION

The IRU3038 controller IC is designed to provide a low cost synchronous Buck regulator for voltage tracking applications such as DDR memory and general purpose on-board DC to DC converter. Modern micro processors combined with DDR memory, need high-speed bandwidth data bus which requires a particular bus termination voltage. This voltage will be tightly regulated to track the half of chipset voltage for best performance.

SPECIFICATION DATA

Switcher:

$V_{IN} = 5V$

$V_{OUT} = 2.5V$

$I_{OUT} = 8A$

$\Delta V_{OUT} = 75mV$

$FS = 200KHz$

INPUT/OUTPUT CONNECTIONS

The following is the input/output connections:

Inputs:

J1: Input (+5V)

J2: Gnd

Outputs:J5: V_{OUT} (+2.5V)

J6: Gnd

Other Connections:J7: V_{DDQ} (for tracking system)J3: V_{REF} (output for reference voltage)

The connection points are shown in Figure 1. Connect the power supply cables according to this figure, minimize wire lengths to reduce losses in the wire. Test point J8 and J9 provide easy connections for oscilloscope voltage probe to monitor the output inductor point and the output voltages.

CONNECTION DIAGRAM

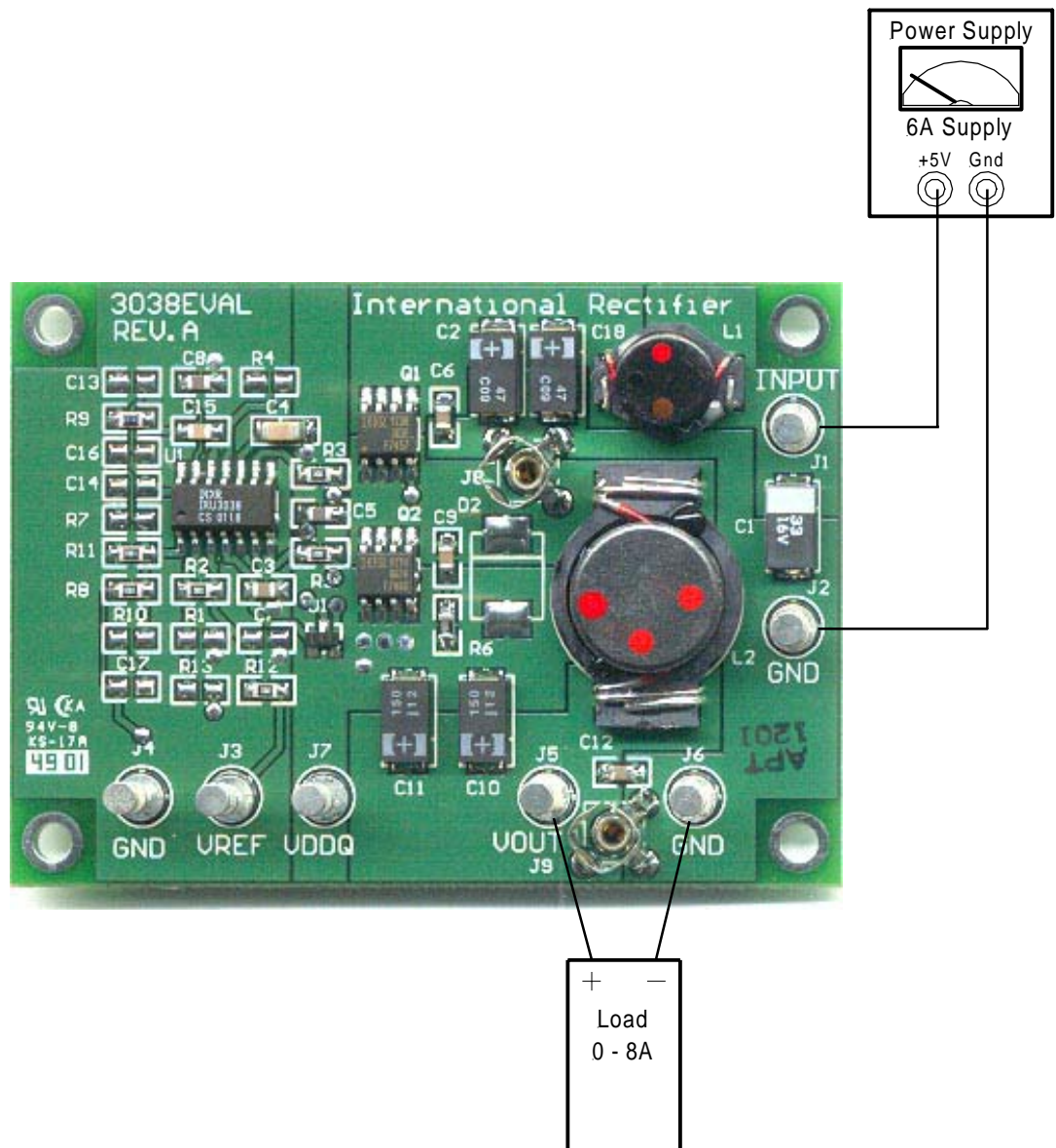


Figure 1 - Connection diagram of evaluation-board for IRU3038.

LAYOUT

The top side (component) layer for IRU3038 Eval board is shown in Figure 2. The input capacitors are all located close to the MOSFETs. All the decoupling capacitors, charge pump capacitor and feedback components are located close to IC. The feedback resistors are tied to

the output voltage at the point of regulation.

The PCB is 4-layers board, one layer is dedicated to Power GND and the analog GND is kept separated from the PGND and it is connected at a single point.

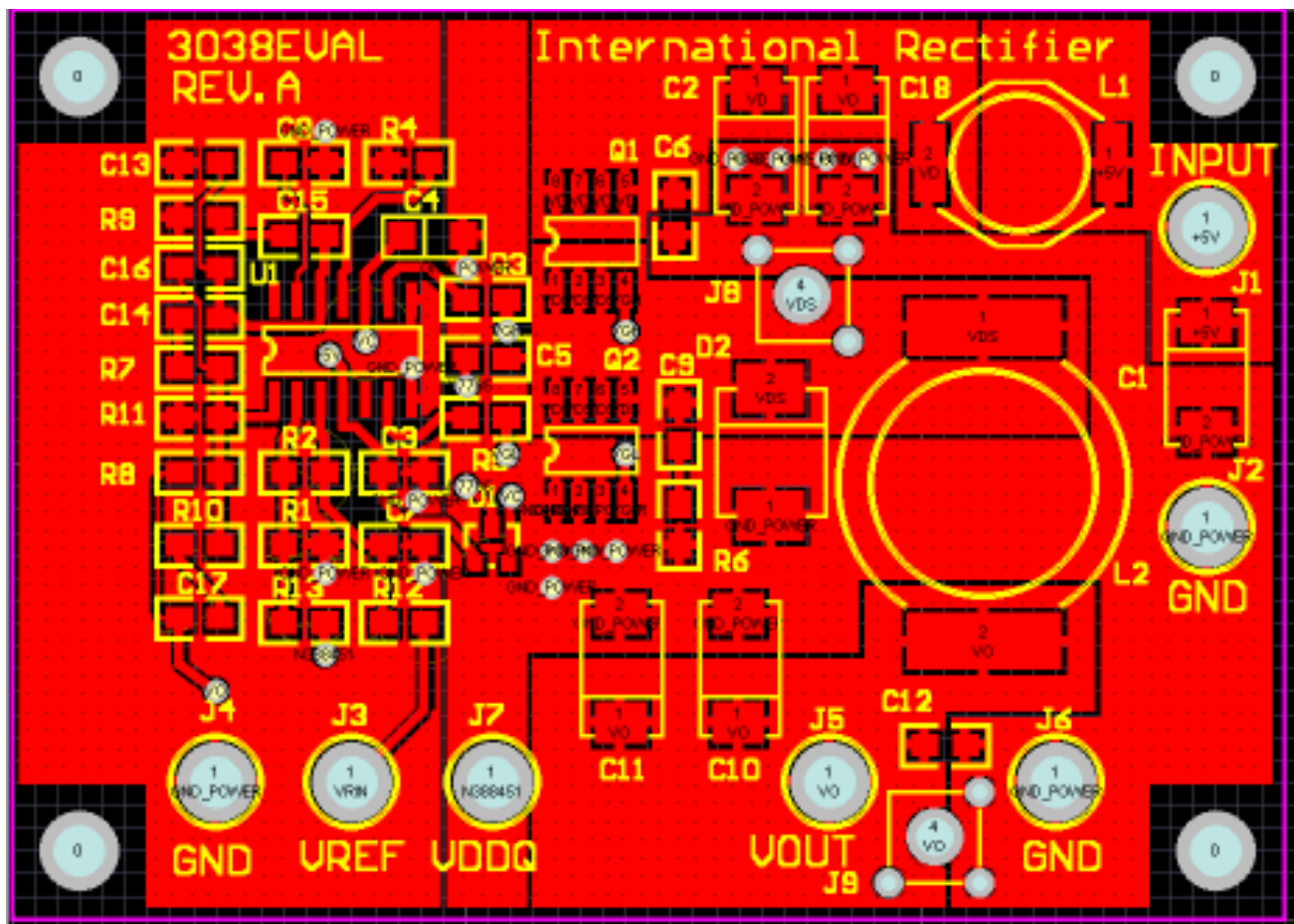


Figure 2 - Top layer of evaluation-board for IRU3038.

SCHEMATIC

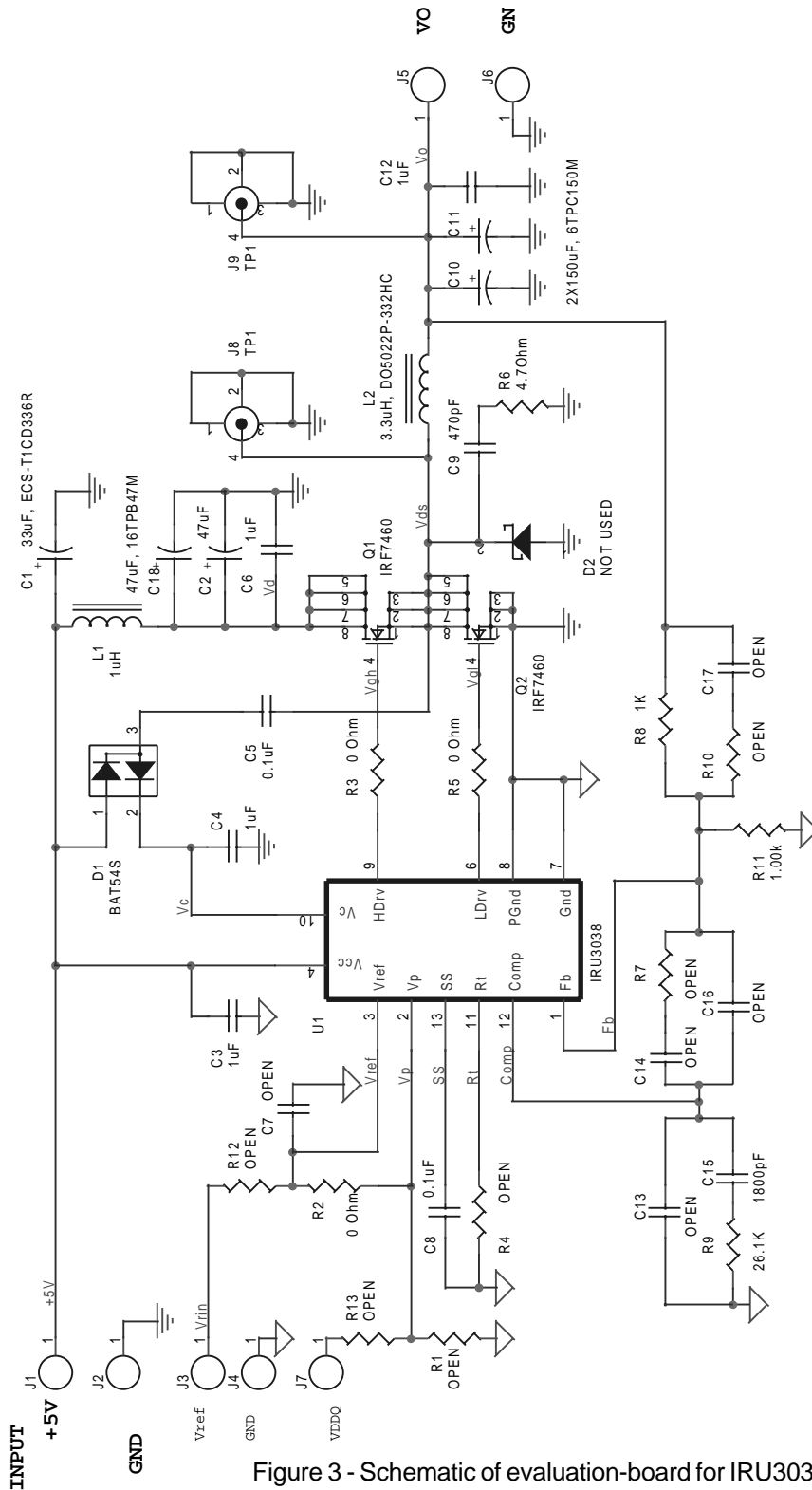


Figure 3 - Schematic of evaluation-board for IRU3038.

| | |
|-------|--------------------------|
| Title | IRU3038EVAL |
| Size | Document Number (Doc) |
| Date: | Friday, May 24, 2002 |
| Sheet | 1 of 1 |

BILL OF MATERIAL

| Ref Desig | Description | Value | Qty | Part# | Manuf | Web site (www.) |
|---------------------|---------------|-----------------------------|-----|---------------|-----------|----------------------|
| Q1, Q2 | MOSFET | 20V, 10mΩ, 12A | 2 | IRF7460 | IR | irf.com |
| U1 | Controller | Synchronous PWM | 1 | IRU3038 | IR | |
| D1 | Diode | Fast Switching, Schottky | 1 | BAT54S | IR | |
| L1 | Inductor | 1μH, 10A | 1 | D03316P-102HC | Coilcraft | coilcraft.com |
| L2 | Inductor | 3.3μH, 12A | 1 | D05022P-332HC | Coilcraft | |
| C1 | Cap, Tantalum | 33μF, 16V | 1 | ECS-T1CD336R | Panasonic | maco.panasonic.co.jp |
| C2,C18 | Cap, Poscap | 47μF, 16V, 70mΩ | 2 | 16TPB47M | Sanyo | sanyo.com/industrial |
| C10,C11 | Cap, Poscap | 150μF, 6.3V, 40mΩ | 2 | 6TPC150M | Sanyo | |
| C5,C8 | Cap, Ceramic | 0.1μF, Y5V, 25V | 2 | ECJ-2VF1E104Z | Panasonic | maco.panasonic.co.jp |
| C4 | Cap, Ceramic | 1μF, X7R, 25V | 1 | ECJ-3YB1E105K | Panasonic | |
| C15 | Cap, Ceramic | 1800pF, X7R, 50V | 1 | ECJ-2VB1H182K | Panasonic | |
| C9 | Cap, Ceramic | 470pF, X7R | 1 | ECJ-2VB2D471K | Panasonic | |
| C3,C6,C12 | Cap, Ceramic | 1μF, Y5V, 16V | 3 | ECJ-2VF1C105Z | Panasonic | |
| R9 | Resistor | 26.1K, 5% | 1 | | | |
| R6 | Resistor | 4.7Ω, 5% | 1 | | | |
| R8,R11 | Resistor | 1K, 1% | 2 | | | |
| R2,R3,R5 | Resistor | 0Ω | 3 | | | |
| R1,4,7, 10,12,13 | Resistor | Not Used | 6 | | | |
| C7,12,13, 14,16 | Capacitor | Not Used | 5 | | | |
| D2 | Diode | Not Used | 1 | | | |

TEST DATA

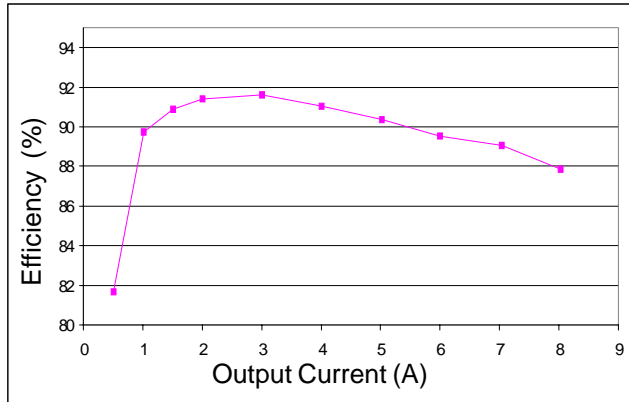


Figure 15 - Efficiency for IRU3038 Evaluation Board.
 $V_{IN}=5V$, $V_{OUT}=2.5V$

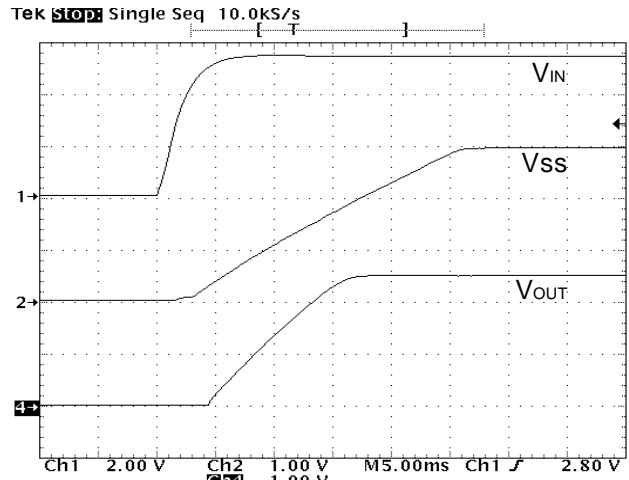


Figure 16 - Start-up time @ $I_{OUT}=5A$.

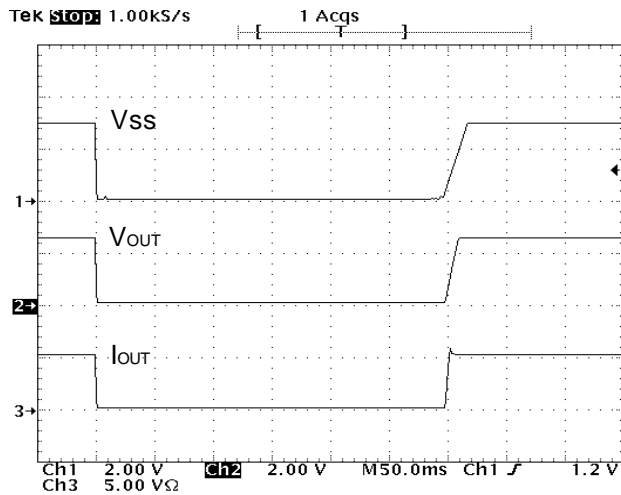


Figure 17 - Shutdown the output by pulling down the soft-start.

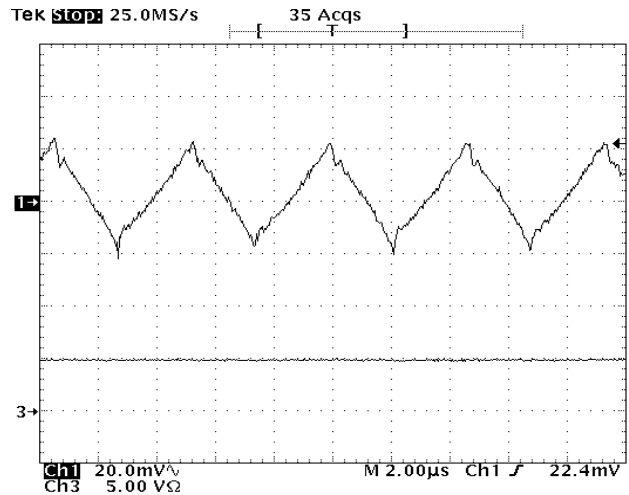


Figure 18 - 3.3V output voltage ripple @ $I_{OUT}=5A$.

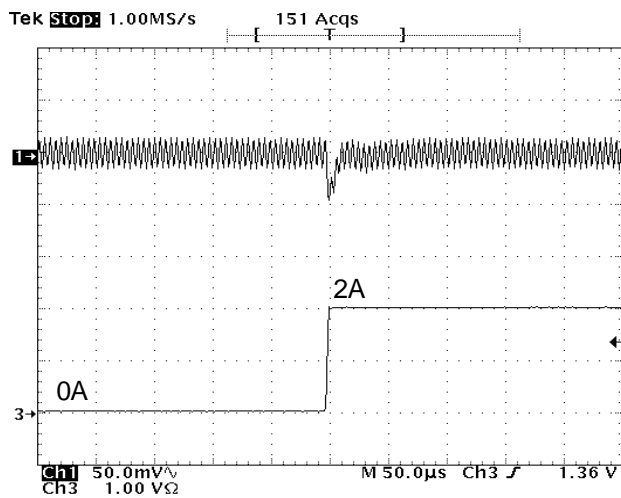


Figure 19 - Transient response @ $I_{OUT}=0$ to 2A.

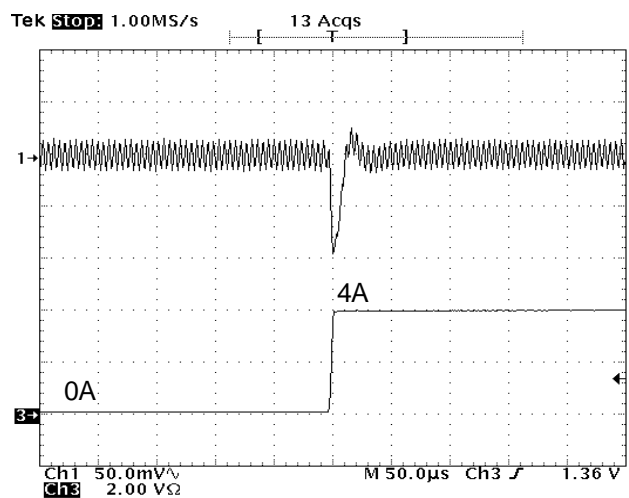


Figure 20 - Transient response @ $I_{OUT}=0$ to 4A.

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Data and specifications subject to change without notice. 7/25/2002