
IRU3138 EVALUATION BOARD USER GUIDE**DESCRIPTION**

The IRU3138 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. The IRU3138 together with two N-channel MOSFETs, provide a low cost solution for such applications. This device features a programmable frequency set from 200KHz to 400KHz, under-voltage lockout for both Vcc and Vc supplies, an external programmable soft-start function as well as output under-voltage detection that latches off the device when an output short is detected.

SPECIFICATION DATA**Switcher:**

$$V_c = 12V$$

$$V_{cc} = V_{IN} = 5V$$

$$V_{OUT} = 1.6V$$

$$I_{OUT} = 12A$$

$$\Delta V_{OUT} = 50mV$$

$$FS = 400KHz$$

INPUT/OUTPUT CONNECTIONS

The following is the input/output connections:

Inputs:

JP1: Input (+5V) and GND

JU1: Vcc/Vc

Outputs:

JP2: V_{OUT} (+1.6V)

JP3: Gnd

Other Connections:

J1: Scope connection for Vout

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 J1 provides easy connections for oscilloscope voltage probe to monitor the output voltage.

CONNECTION DIAGRAM

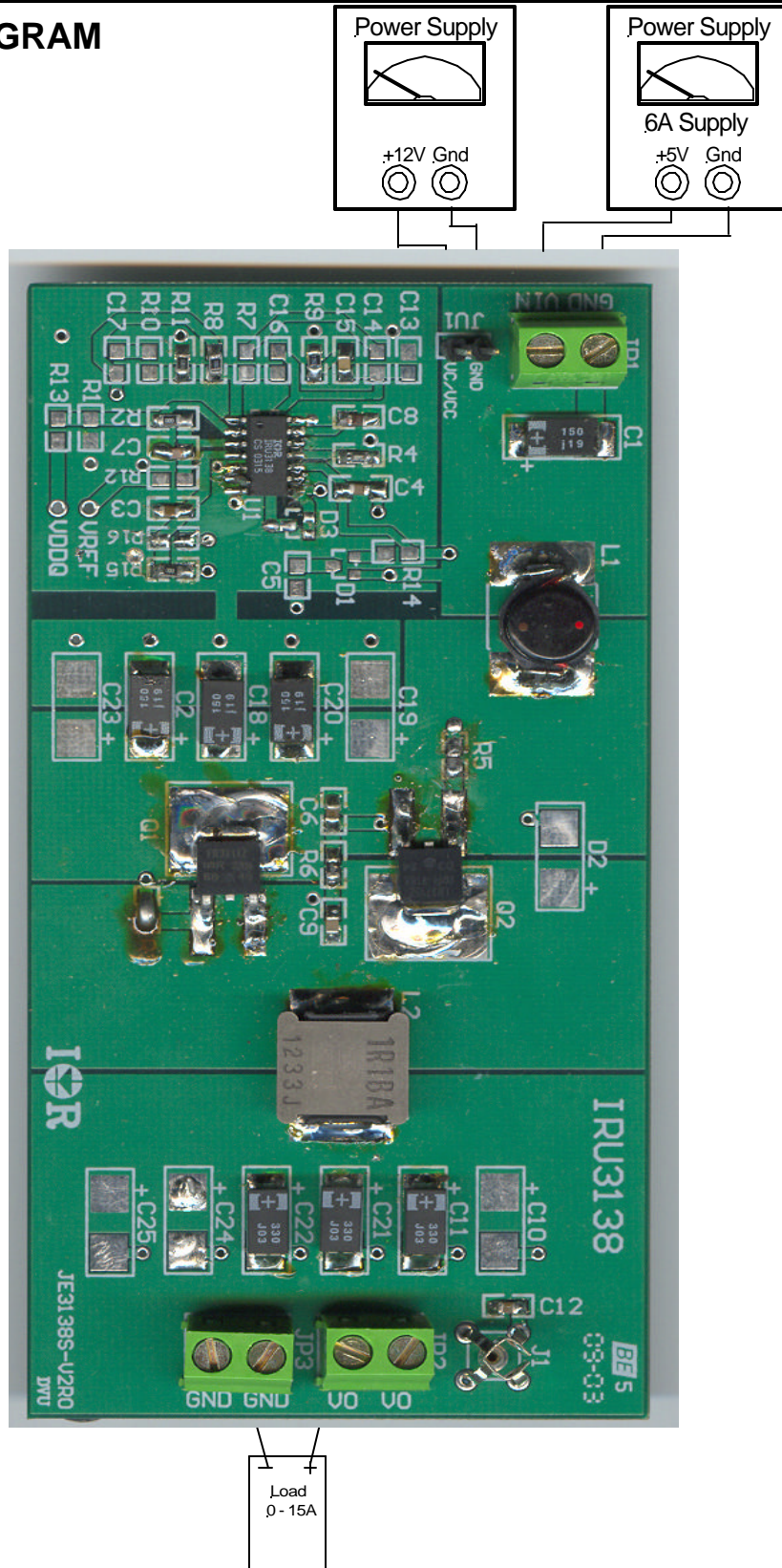


Figure 1 - Connection diagram of evaluation-board for IRU3138.

LAYOUT

The top side (component) layer for IRU3138 Eval board is shown in Figure 2. The input capacitors are all located close to the MOSFETs. All the decoupling capacitors, 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.

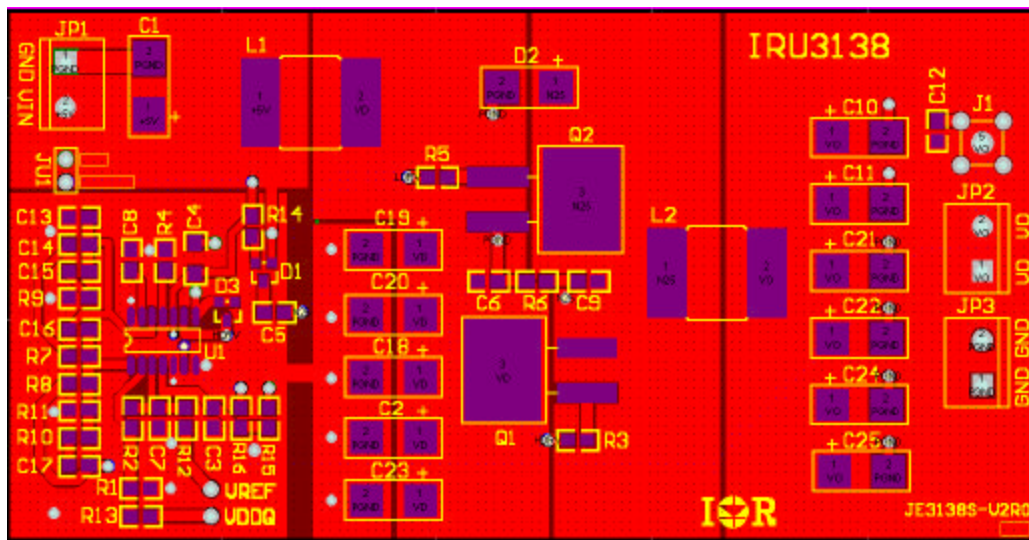


Figure 2 - Top layer of evaluation-board for IRU3138.

SCHEMATIC

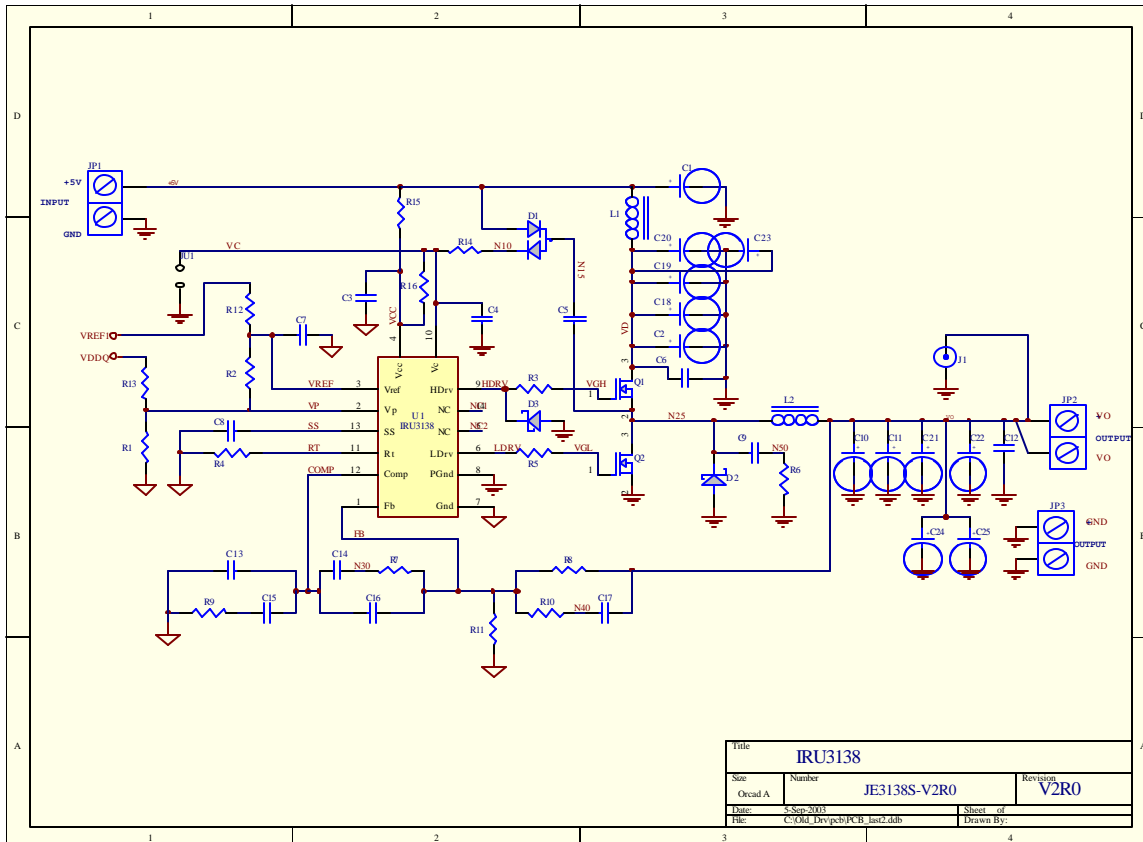
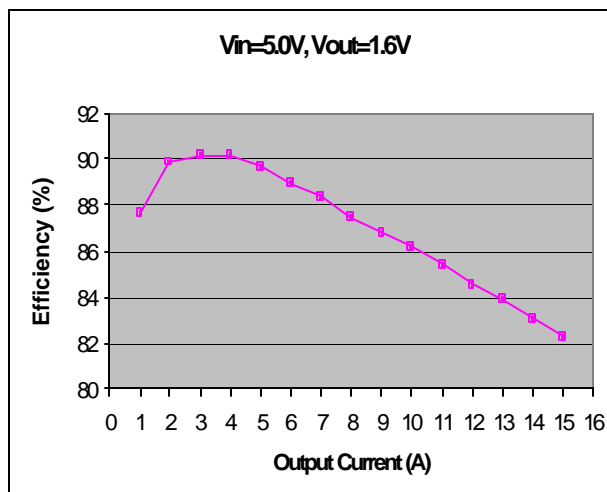


Figure 3 - Schematic of evaluation-board for IRU3138.

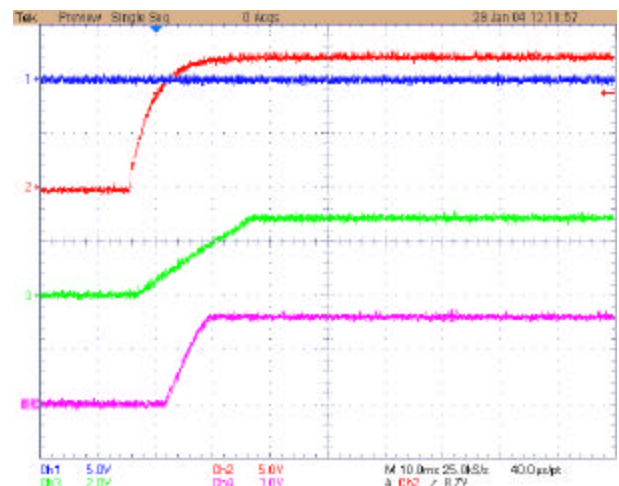
BILL OF MATERIAL

Ref Desig	Description	Value	Qty	Part#	Manuf	Web site (www.)
Q1	MOSFET	20V, 11mΩ	1	IRLR3715Z	IR	irf.com
Q2	MOSFET	20V, 6mΩ	1	IRFR3711Z	IR	
U1	Controller	Synchronous PWM	1	IRU3138	IR	
D3	Diode	Fast Switching	1	BAT54S	IR	
L1	Inductor	1μH, 10A	1	D03316P-102HC	Coilcraft	coilcraft.com
L2	Inductor	1.1μH, 16A	1	ETQP6F1R1BFA	Panasonic	maco.panasonic.co.jp
C1,2,18,20	Cap, Poscap	150μF, 6.3V	4	6TPC150M	Sanyo	sanyo.com/industrial
C11,21,22	Cap, Poscap	330μF, 6.3V, 40mΩ	3	6TPC330M	Sanyo	
C8	Cap, Ceramic	0.1μF, Y5V, 25V	1	ECJ-2VF1E104Z	Panasonic	maco.panasonic.co.jp
C3,4,6,12	Cap, Ceramic	1μF, X7R, 25V	3	ECJ-3YB1E105K	Panasonic	
C7	Cap, Ceramic	100pF, 50V	1	ECJ-2VB1H101J	Panasonic	
C9	Cap, Ceramic	470pF, X7R	1	ECJ-2VB2D471K	Panasonic	
C3,C6,C12	Cap, Ceramic	1μF, Y5V, 16V	3	ECJ-2VF1C105Z	Panasonic	
R9	Resistor	17.8K, 5%	1			
R6	Resistor	4.7Ω, 5%	1			
R8,R11	Resistor	1K, 1%	2			
R2,3,4,5,15	Resistor	0Ω	4			
R1,7,10,12, 13,14,16	Resistor	Not Used	7			
			5			
C7,10,13,14 16,17,19,23 24,25	Capacitor	Not Used	10			
D2	Diode	Not Used	1			

TYPICAL OPERATING CHARACTERISTICS

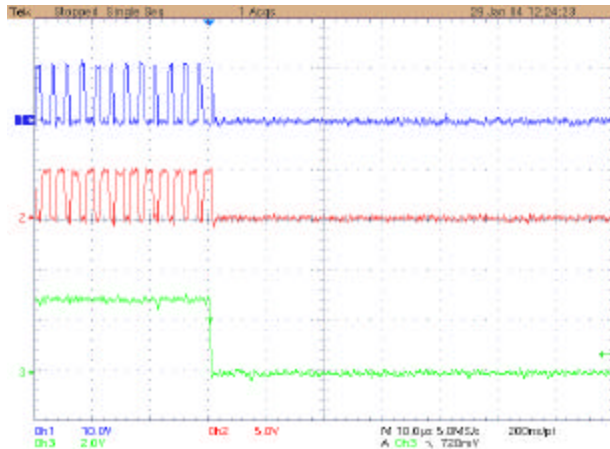


Efficiency

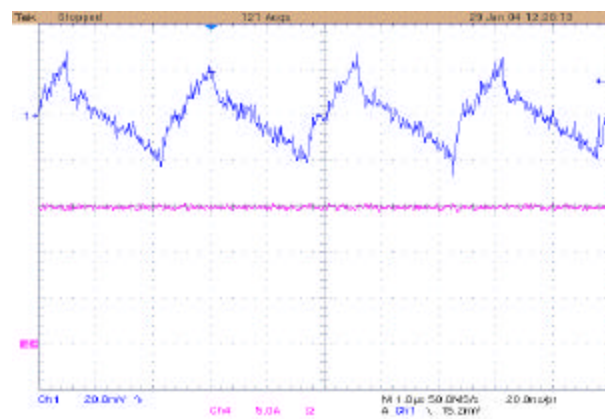


Start-up time
 Ch2:VC, Ch3:SS pin, Ch4:Vout

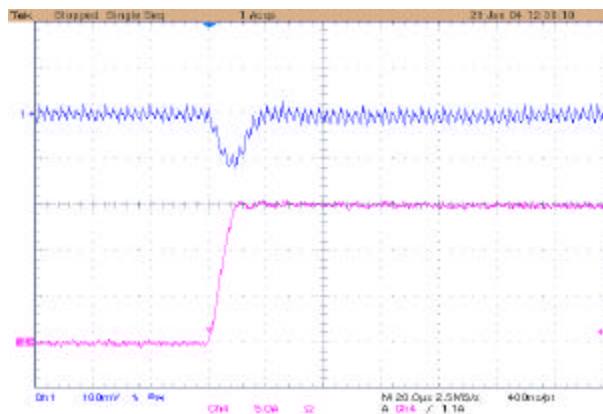
TYPICAL OPERATING CHARACTERISTICS



Shut Down the output by pulling down the soft-start pin
Ch1: HDrv, Ch2:LDrv, Ch3: SS pin



Output Voltage Ripple @ 15A
Ch1:Output, Ch4:Iout (5A/Div)



Transient response @ Iout=15A
Ch1: Output, Ch4:Iout (5A/Div)