

1A SYNCHRONOUS BUCK SWITCHER WITH FET ON BOARD

ADVANCE DATA SHEET

Pb Free Product

DESCRIPTION

The LX13097 is a current mode PWM buck switcher with internal compensation, can provide up to 1A output current with FET on board. It operates from 2.8V to 5.5V and output as low as 0.6V which is ideal for the application with single cell Li-Ion battery as well as other 3.3V input bus supply applications. Switching frequency is fixed 1MHz, small surface mount inductors and capacitors are allowed to use, make it good for portable applications.

LX13097 is available in 5-pin SOT23 package.

- SOT23-5L package
- Internal Digital Soft Start
- Internally-compensated Current Mode Controller
- <1uA Shut-down Current
- Peak Current Limit with HICCUP Feature and Over Temperature Protection
- Prebias Start-up Operation
- Enable Available
- Pb-free and RoHS Compliant

FEATURES

APPLICATIONS

- Li-Ion battery operated portable system
- Cellular Phones
- Portable applications
- USB Devices

TYPICAL APPLICATION

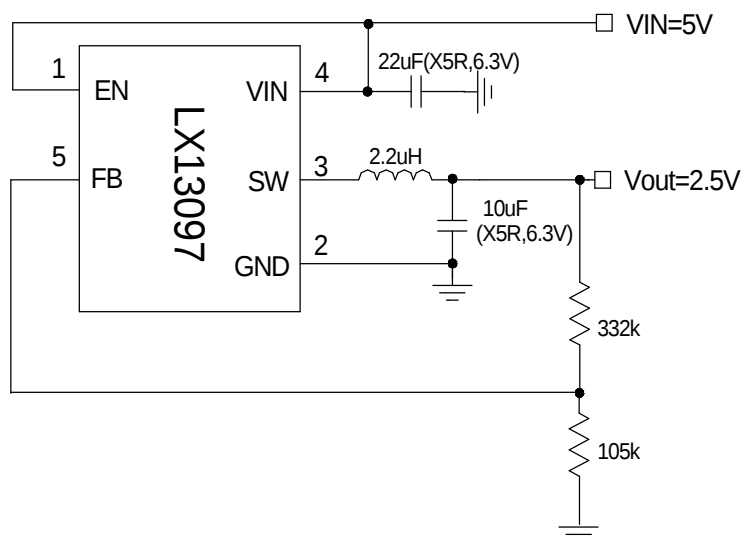


Figure1 - Typical application of LX13097

ORDERING INFORMATION

Device	Temperature	Package	Pb-Free
LX13097CSE	-40°C to 85°C	SOT23-5L	Yes

Note: Available in Tape & Reel. Append the letters "TR" to the part number. (i.e. LX13097CSE-TR)

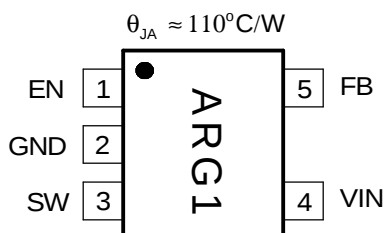
ABSOLUTE MAXIMUM RATINGS

VIN to GND	-0.3V to 6V
SW, FB, EN to GND	-0.3V to VIN + 0.3V
ESD Susceptibility	1kV
Lead Temperature(Soldering,10sec.)	260°C
Storage Temperature Range	-55°C to 150°C
Operating Junction Temperature Range	-40°C to 150°C

CAUTION: Stresses above those listed in "ABSOLUTE MAXIMUM RATINGS", may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

PACKAGE INFORMATION

5-LEAD PLASTIC SOT23



SE Package (Top View)

Top marking: ARG1

Bottom marking: "xxxx" Denote Date Code and Lot Identification

ELECTRICAL SPECIFICATIONS

V_{IN}=3.5V. Typical data refers to T_A = 25°C. Unless otherwise specified.

PARAMETER	SYM	Test Condition	Min	TYP	MAX	Units
Reference Voltage						
Ref Voltage	V _{REF}		0.59	0.6	0.607	V
Line Regulation						
Line Regulation		VIN=3V to 5V,VOUT=1.8V, IOUT=10mA		2		mV
VIN UVLO						
VIN Rising Threshold			2.3	2.5	2.8	V
VIN Falling Threshold				2.3		V
Supply Voltage(VIN)						
VIN Input Voltage Range	V _{IN}		2.8		5.5	V
Shutdown Current	I _{shutdown}	EN=GND		1	2.5	uA
Quiescent Current	I _q	No Load, switching		4		mA
Oscillator (Rt)						
Frequency	F _S		800	1000	1200	kHz
Max Duty Cycle			78	86		%
Min ON time				100		nS

PARAMETER	SYM	Test Condition	Min	TYP	MAX	Units
Error Amplifiers						
Feedback Input Bias Current					0.05	uA
SS						
Soft Start time	Tss			500		uS
Current Limit						
Current Limit Threshold				1.8		A
Thermal Shutdown						
Thermal shutdown trip point				155		°C
Hysteresis				15		°C
Internal Switch						
Rdson of Control FET		Vin=5V		400		mohm
		Vin=3.3V		480		
Rdson of Synchronous FET		Vin=5V		300		mohm
		Vin=3.3V		360		
Enable						
En low Threshold voltage					0.4	V
En high Threshold voltage			1.4			V

PIN DESCRIPTIONS

PIN SYMBOL	PIN DESCRIPTION
SW	SW output. Junction of the internal high-side and low-side power MOSFETs, and output inductor.
GND	Ground Connection for Chip. Connect GND with large copper areas to the input and output supply returns, and negative terminals of the input and output capacitors.
FB	Error amplifier inverting input. This pin is connected via resistor dividers to the output of the switching regulators to set the output DC voltage. A 332kohm resistor is recommended to be connected from VOUT and FB .
VIN	Supply voltage input for switcher.
EN	Enable input. Set this pin to GND or less than 0.4V will shut down the regulator. Enable signal can not be high when VIN is low.

BLOCK DIAGRAM

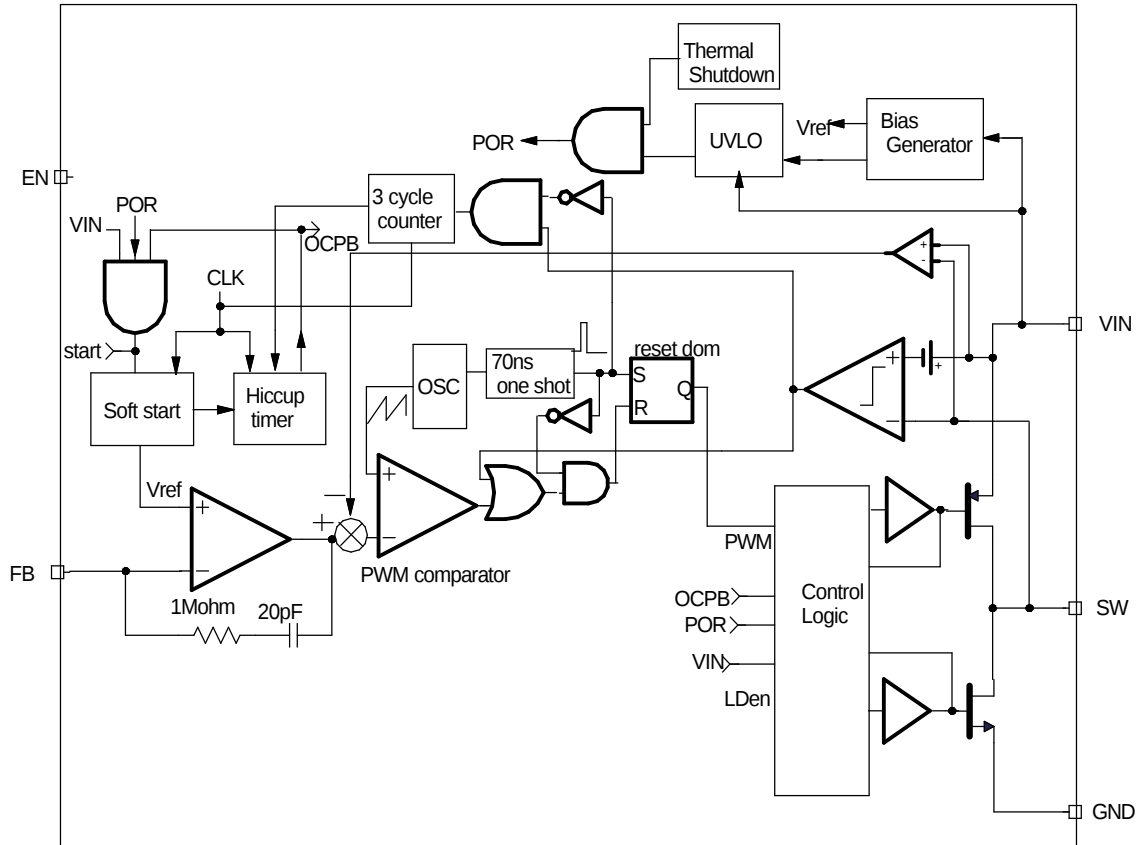


Figure 2 - Simplified block diagram of the LX13097

Typical Operating Characteristics

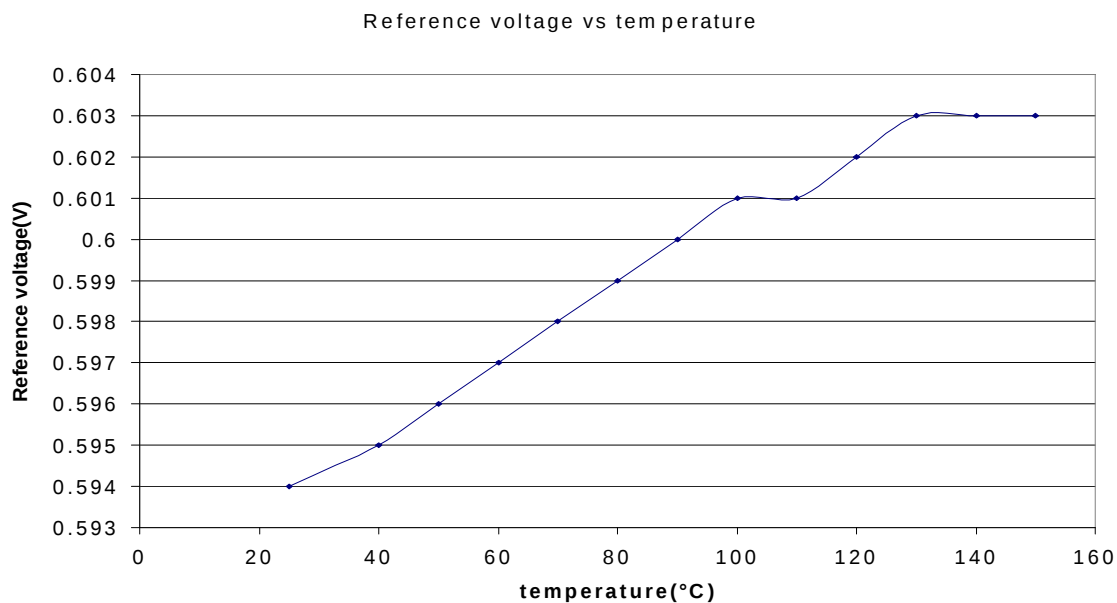


Fig.3 - Reference volateg vs temperature

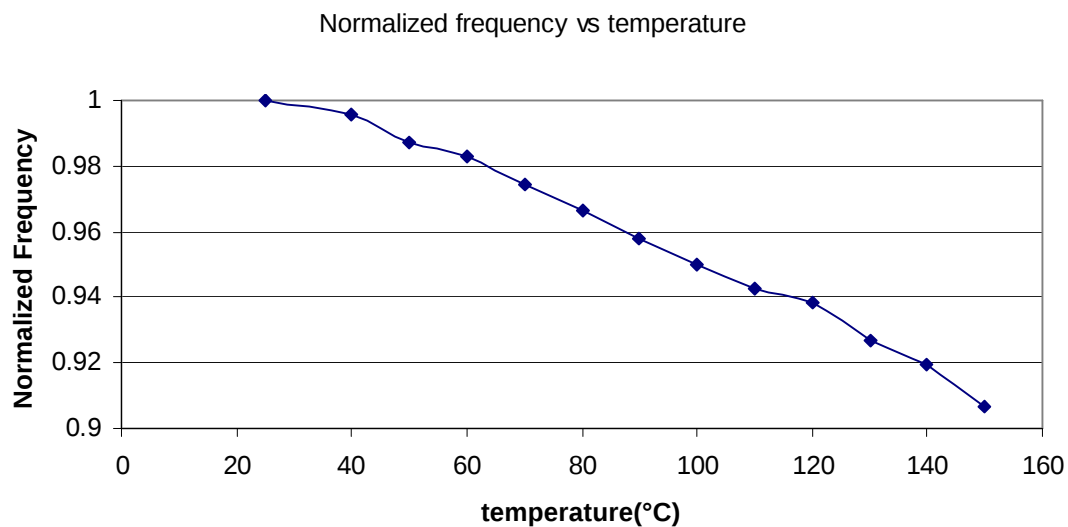


Fig.4 - Normalized frequency vs temperature

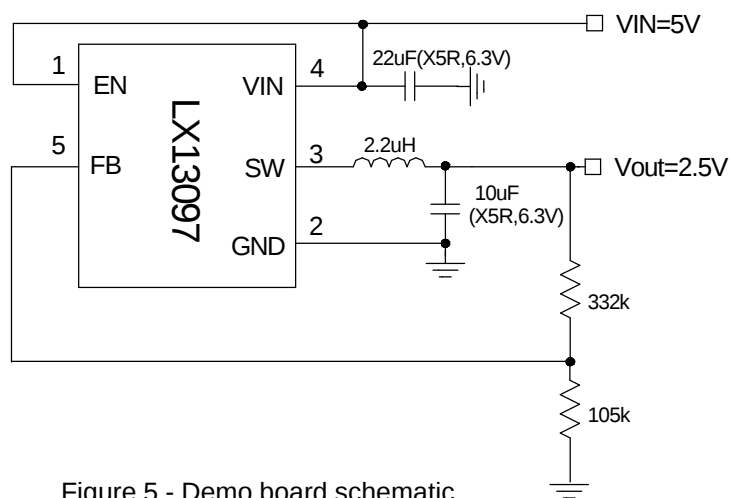
Typical Application(VOUT=2.5V)


Figure 5 - Demo board schematic

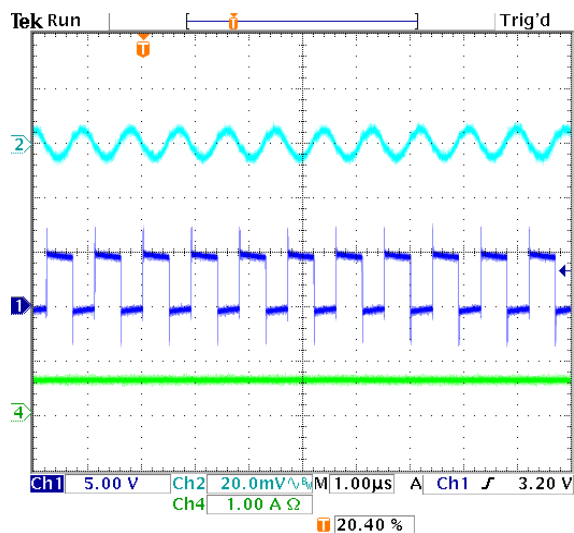


Figure 6 - Output ripple

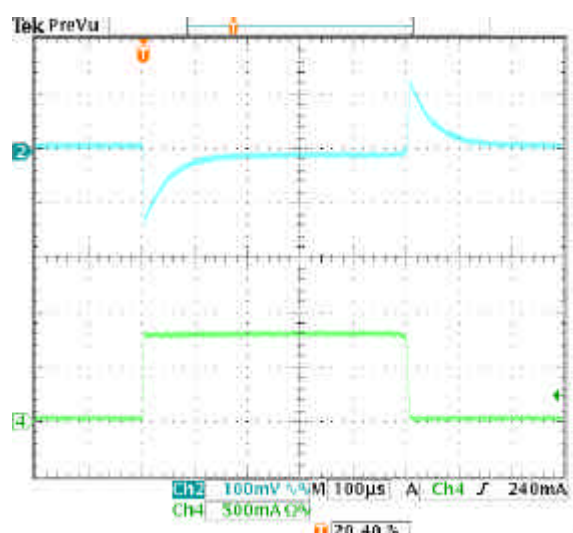


Figure 7 - Transient response

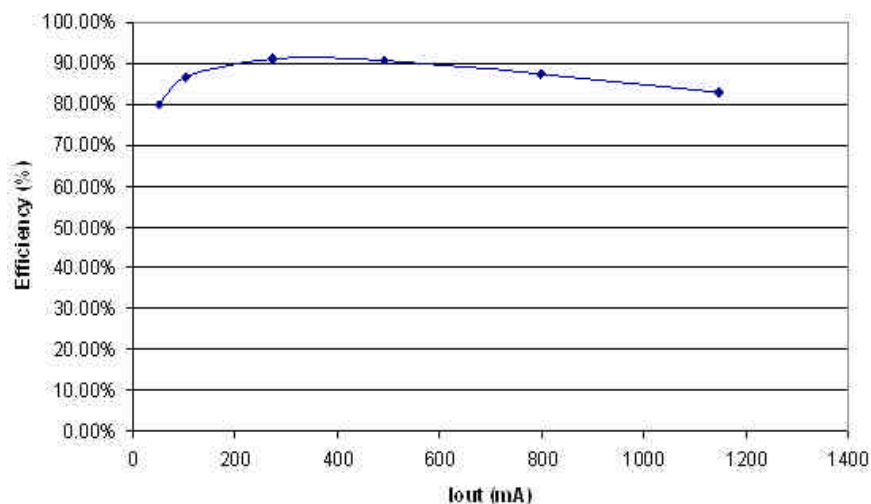
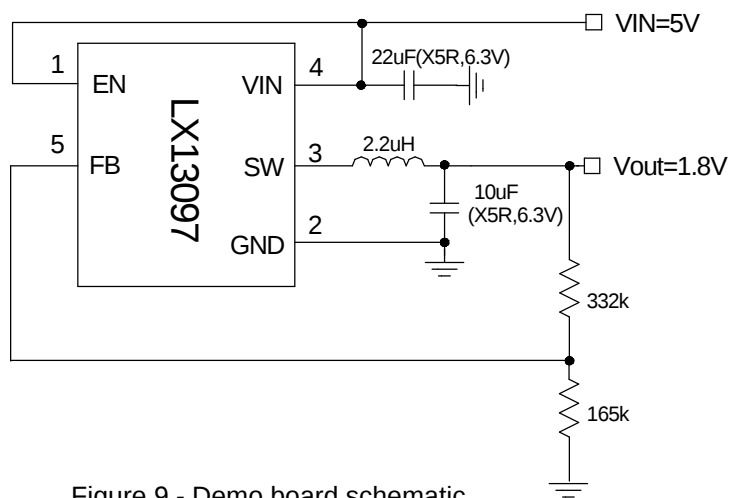
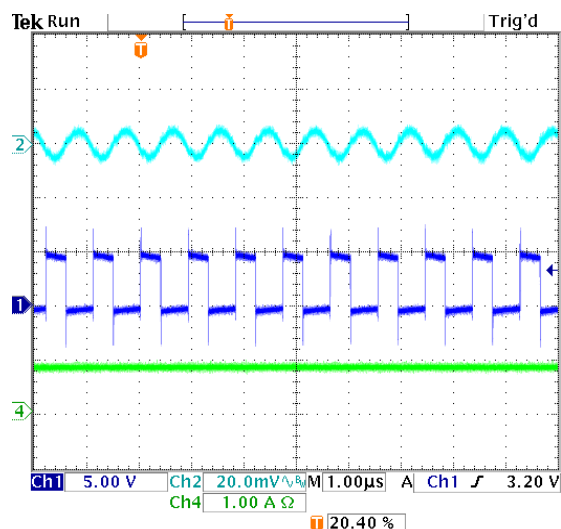
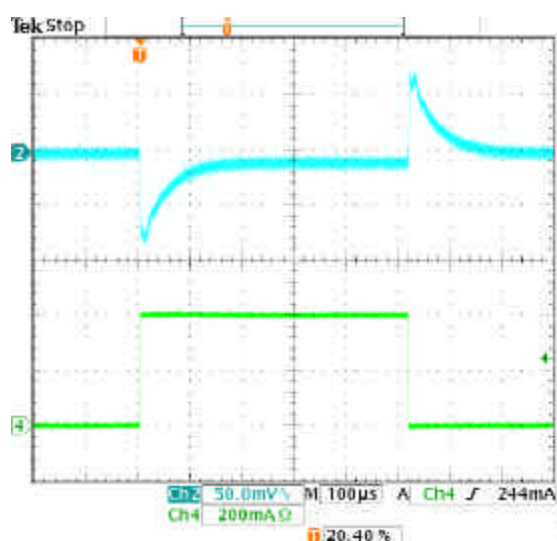
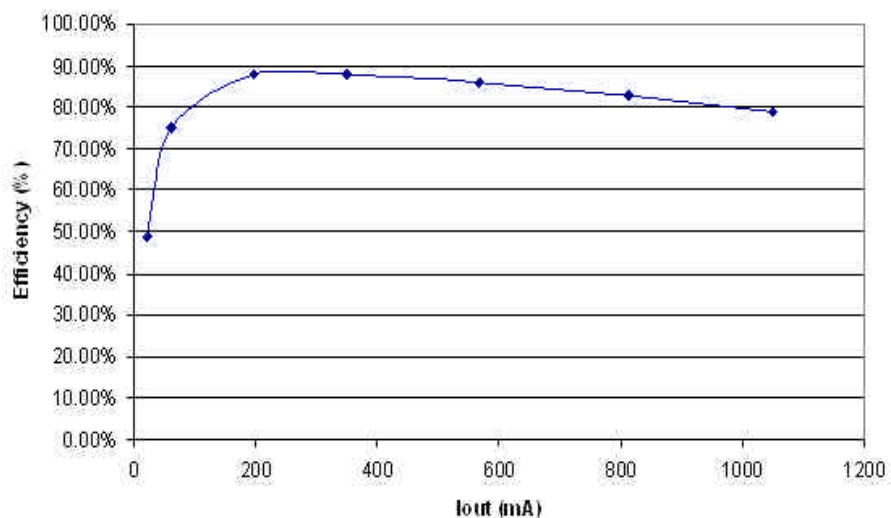


Figure 8 - Efficiency

Typical Application(VOUT=1.8V)

Figure 9 - Demo board schematic

Figure 10 - Output ripple

Figure 11 - Transient response

Figure12 - Efficiency

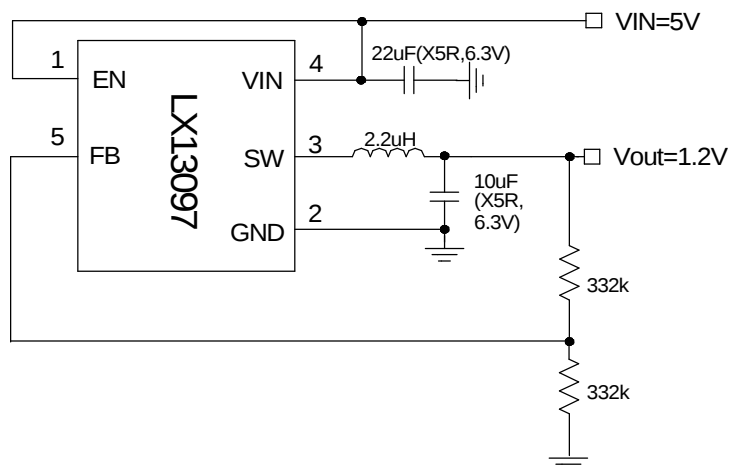
Typical Application(VOUT=1.2V)


Figure 13 - Demo board schematic

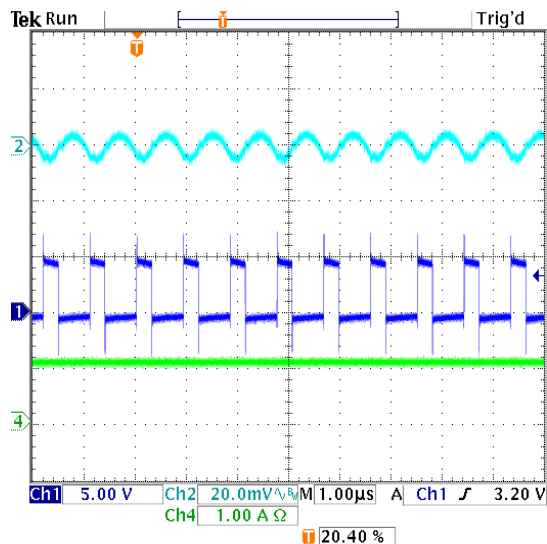


Figure 14 - Output ripple

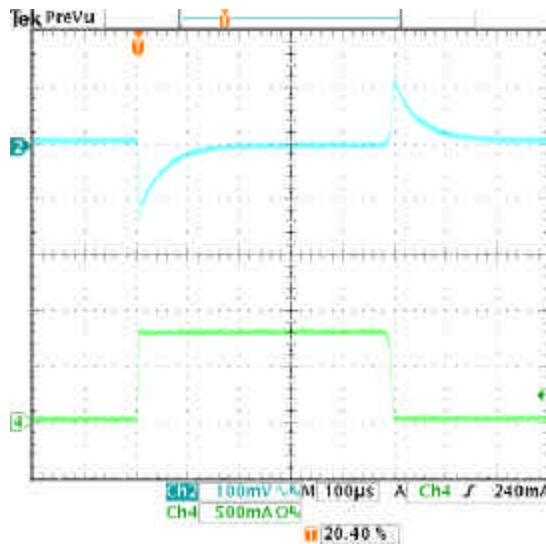


Figure 15 - Transient response

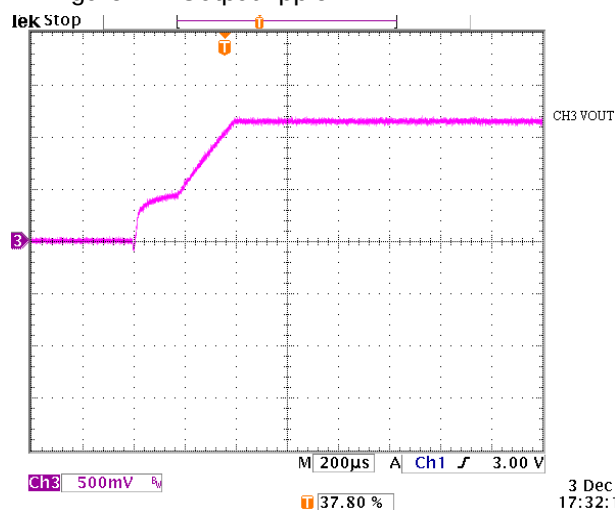


Figure 16 - Startup

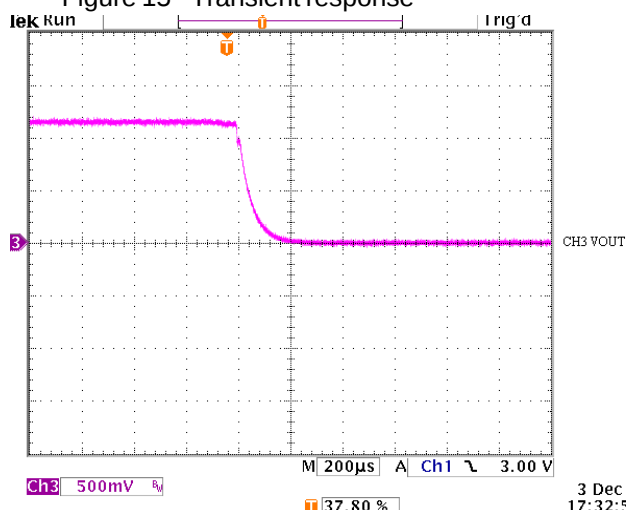


Figure 17 - Shutdown

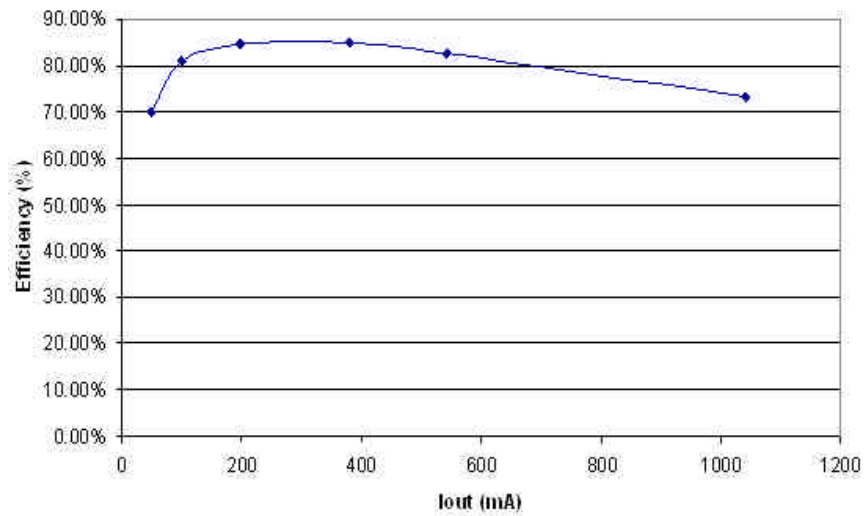
Typical Application(VOUT=1.2V)

Figure 18 - Efficiency

Demoboard Layout

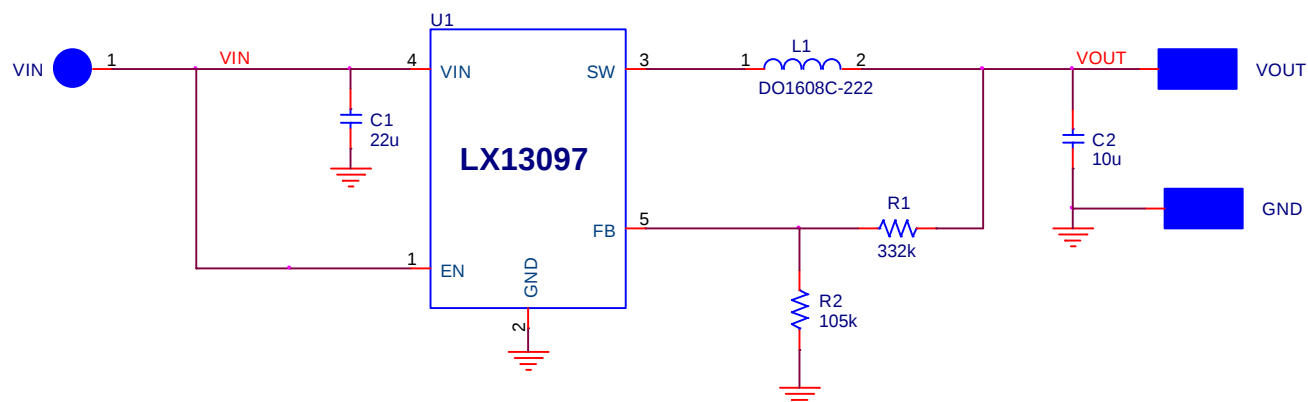


Figure 19 - Demoboard schematic

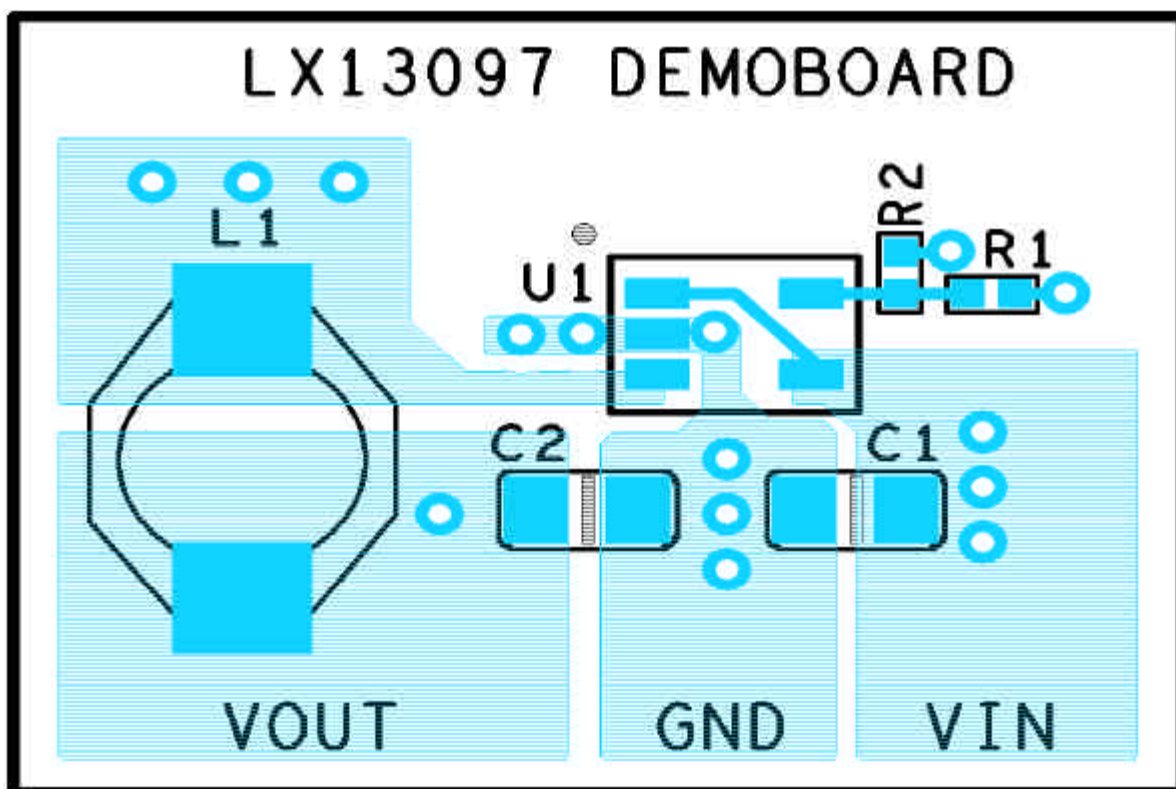


Figure 20- Top layer

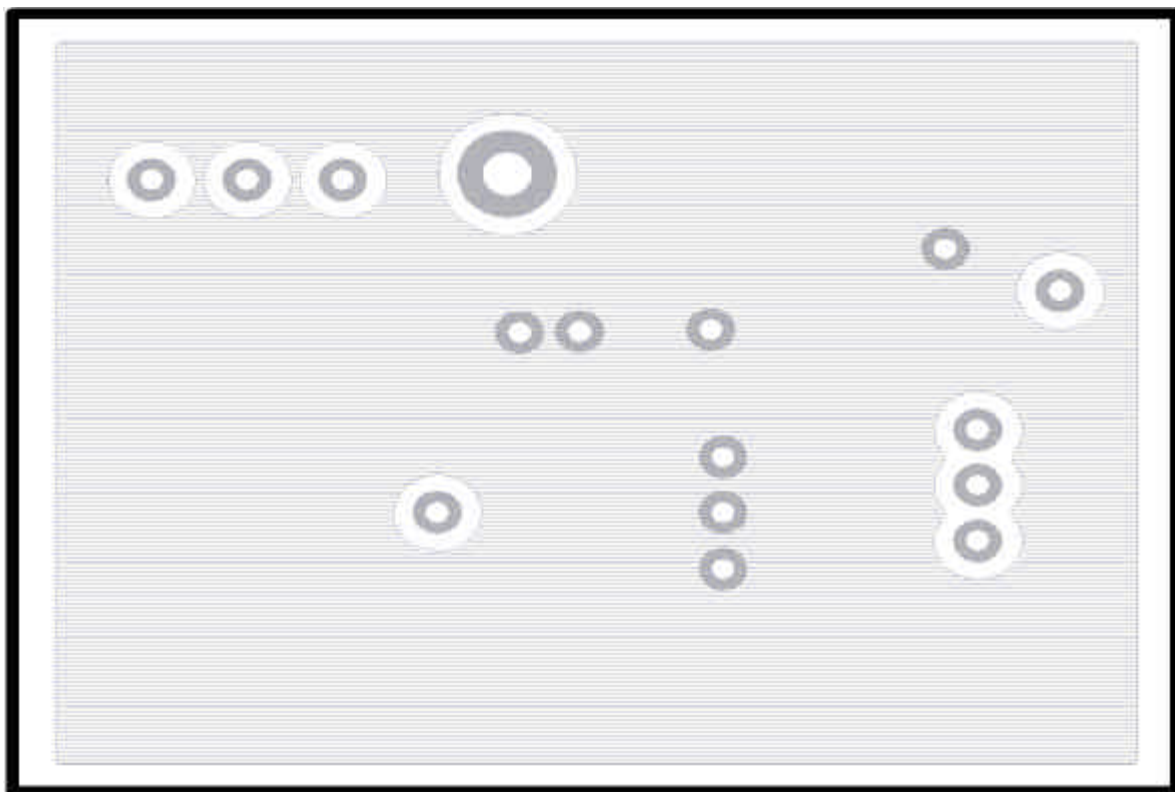


Figure 21- Gound layer

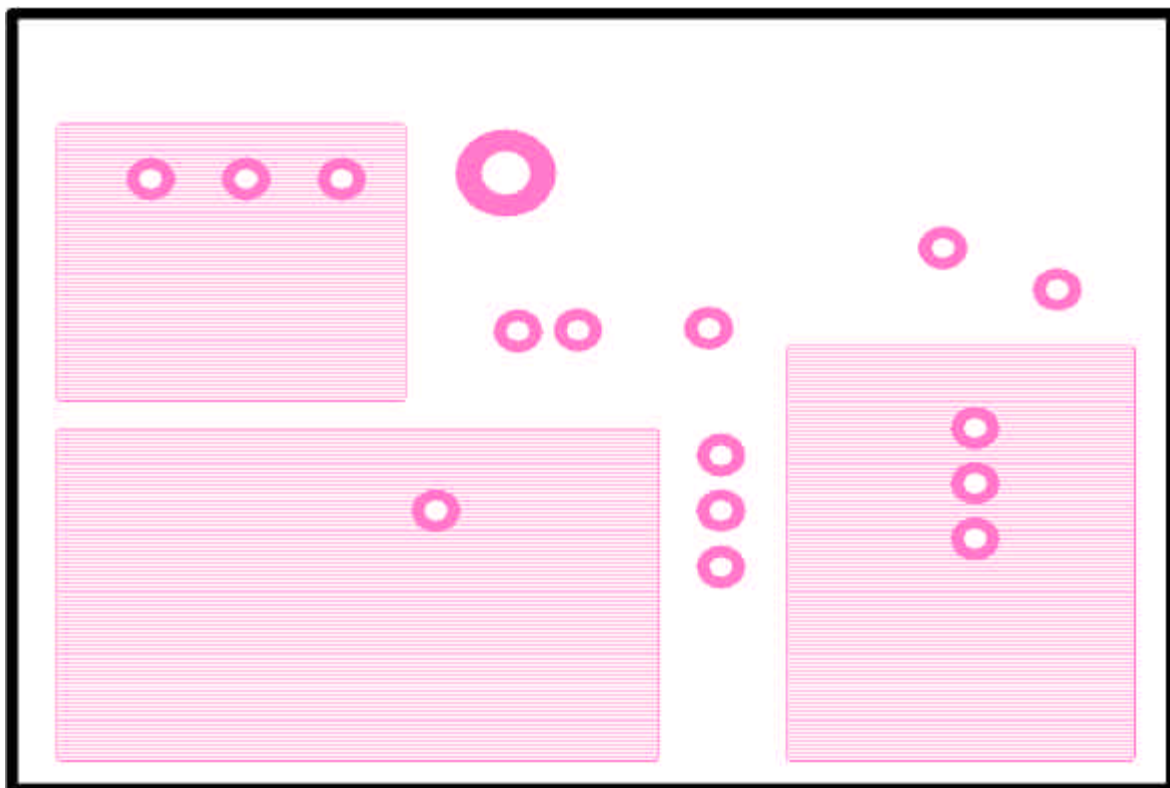


Figure 22- Power layer

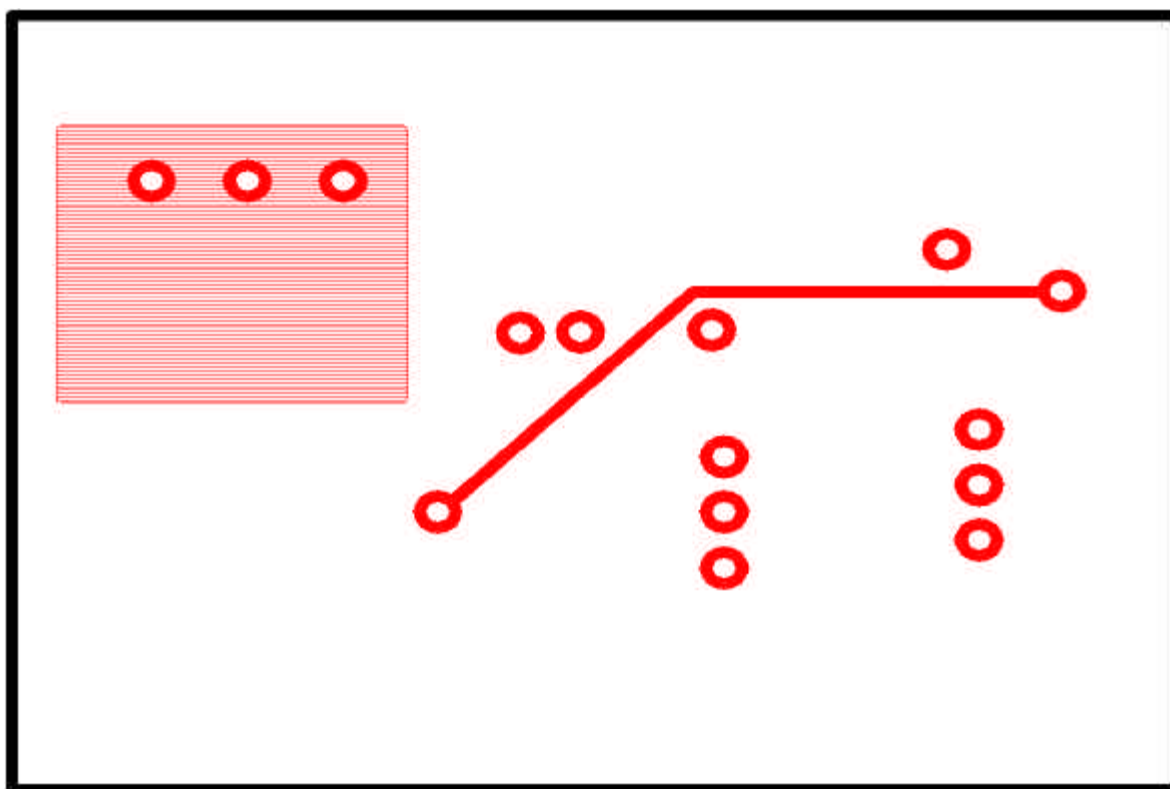


Figure 22- Bottom layer