DESCRIPTION

Demonstration circuit DC1043A-A features the LTM®4601EV and LTM4601-1EV, the high efficiency, high density switch mode step-down power modules. The input voltage range is from 5.0V to 20V. The output voltage is programmable from 0.6V to 3.3V; refer to step down ratio curve in the LTM4601 datasheet. The rated load current is 20A, while de-rating is necessary for certain V_{IN}, V_{OUT}, and thermal conditions. 24A load current can be achieved by applying forced airflow convection or attaching heatsinks. Master module U1 provides differential remote sensing to accurately regulate output voltage independent of load current. Integrated input and output filters enable a simple PCB layout. Only bulk input and output capacitors are needed externally. The DC1043A-A has onboard 180 degree interleaving clock generator. The default clock frequency is 750 KHz. The LTM4601 allows the user to program output ramp-up and ramp-down through the TRACK/SS pin. The output can be set to coincidentally or ratiometrically track with another supply's output. Margining function is provided for the user who wants to stress their system by varying supply voltages during testing; refer to datasheet for functional diagram.

If desired, slave unit U2 could be substituted by LTM4601-1EV.

Design files for this circuit board are available. Call the LTC Factory.

, LTC and LT are registered trademarks of Linear Technology Corporation.

Table 1. Performance Summary (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		5V
Maximum Input Voltage		20V
Output Voltage V_{OUT}	Jumper selectable (open for 0.6V)	1.2V, 1.5V, 1.8V, 2.5V, 3.3V
Maximum Continuous Output Current	De-rating is necessary for certain V_{IN}, V_{OUT}, and thermal conditions	$20A_{DC}$
Default Operating Frequency		750kHz
Efficiency	V_{IN}=12V, V_{OUT} =1.5V, I_{OUT}=20A	83.2%, See Figure 3
Load Transient	V_{IN}=12V, V_{OUT} =1.5V	See Figure 4

QUICK START PROCEDURE

Demonstration circuit DC1043A-A is easy to set up to evaluate the performance of the LTM4601EV. Please refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place jumpers in the following positions for a typical 1.5V_{OUT} application:

Vout Select	RUN	MARG0	MARG1
1.5V	ON	LO	LO

2. With power off, connect the input power supply, load and meters as shown in Figure 1. Preset the load to 0A and Vin supply to be less than 20V.
3. Turn on the power at the input. The output voltage should be 1.5V ± 2%.
4. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other pa-

Downloaded from Arrow.com.

rameters. Output ripple should be measured across the output capacitors.

5. For optional load transient test, apply adjustable pulse signal between IOSTEP CLK and GND pins. Pulse amplitude sets the current step. The pulse signal should have very small duty cycle (<15%) to limit the thermal stress on the transient load circuit. The output transient current can be monitored at BNC connector J5 (25mV/10A).

6. For Margining function test, place jumper MARG0 and MARG1 in the configurations shown in the following table, measure the output voltage at Vo+ and Vo-.

MARG1	MARG0	Vout
LO	LO	0
LO	HI	+5%
HI	LO	-5%
HI	HI	0

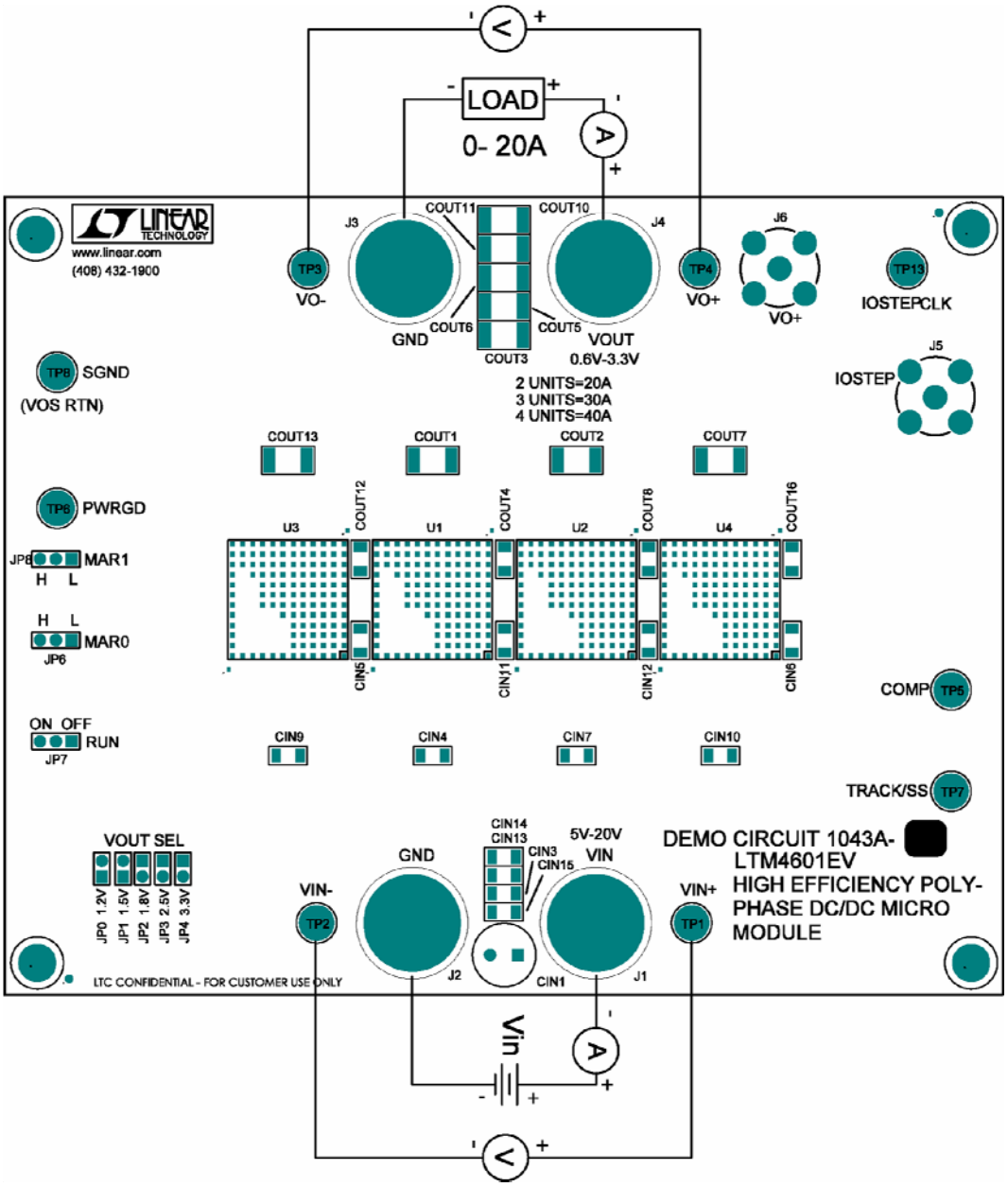


Figure 1. Test Setup of DC1043A-A

Downloaded from Arrow.com.

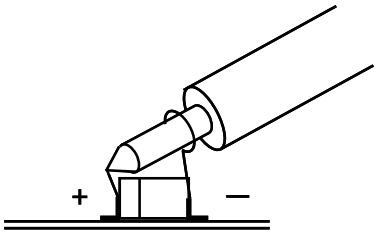


Figure 2. Scope Probe Placements for Measuring Input or Output Ripple.

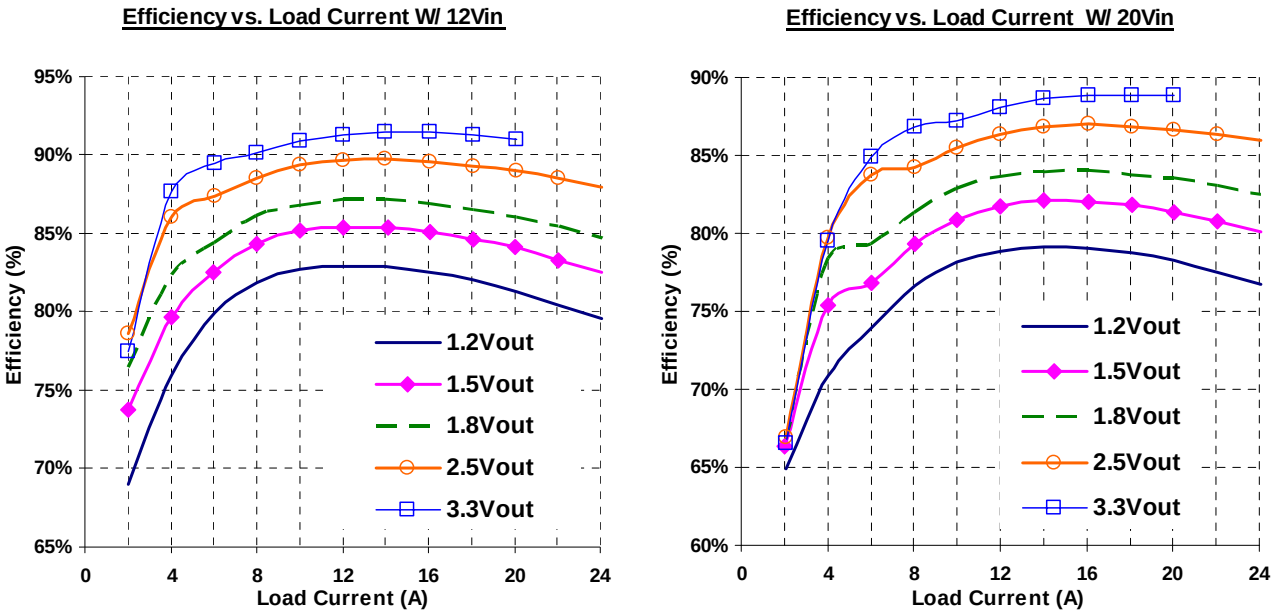
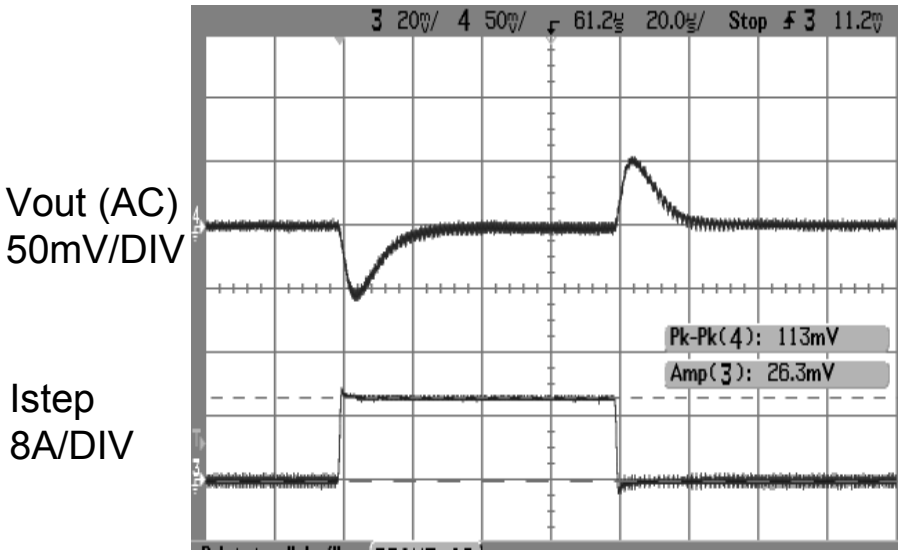


Figure 3. Measured Supply Efficiency with Different V_{IN} and V_{OUT}

Downloaded from Arrow.com.



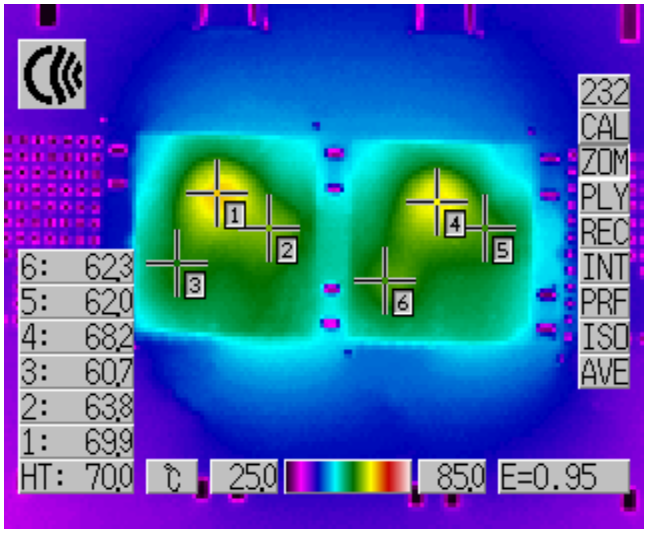
Vin = 12V

Vout =1.5V

5A to 15A LOAD STEP (50%)

Cout = 2 X 22uF ceramic, 4X100uF ceramic; C12 = 47pF

Figure 4. Measured Load Transient Response (5-15A Step)

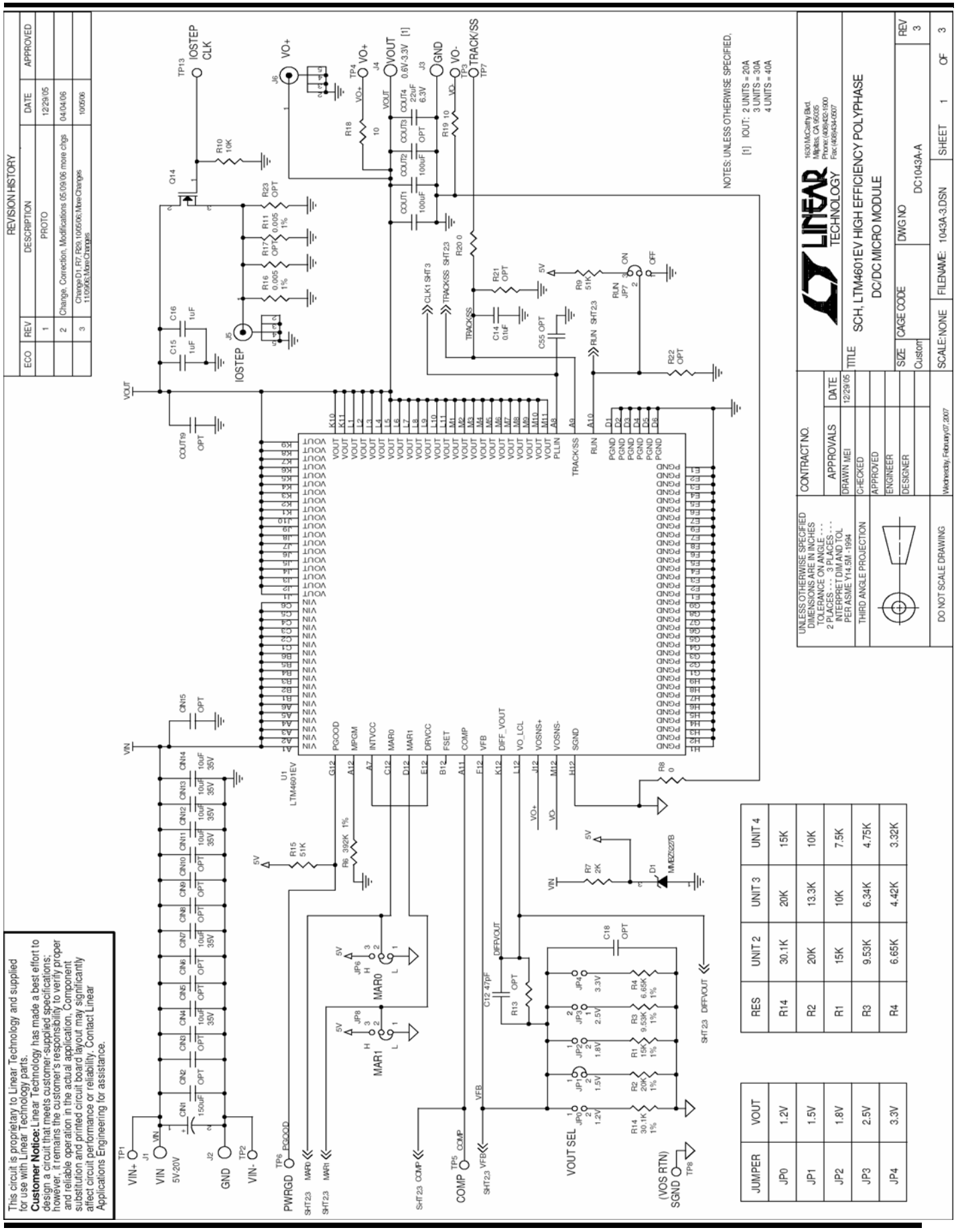


Vo = 1.5V@20A

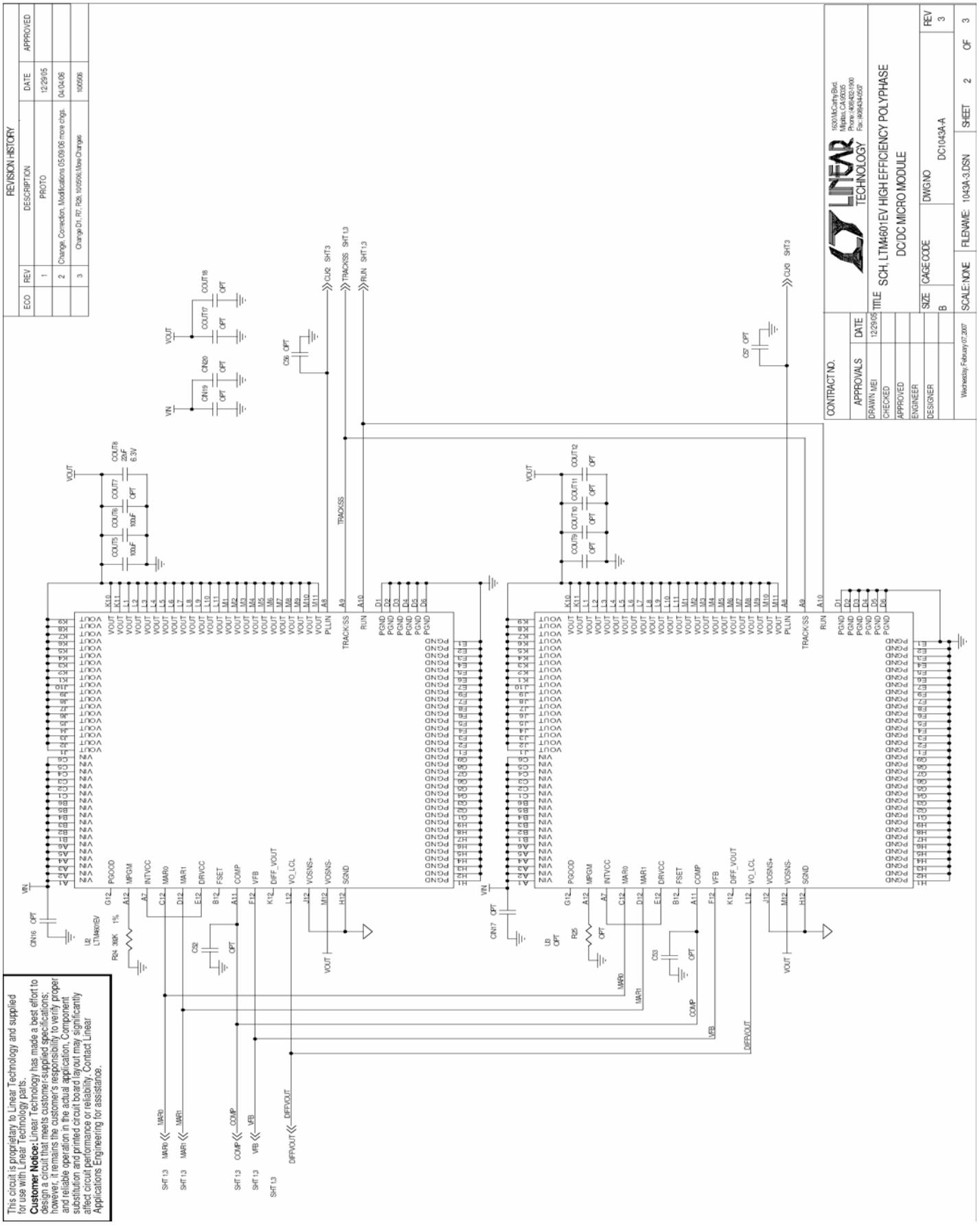
Vin = 20V

Figure 5. Measured Thermal Performance

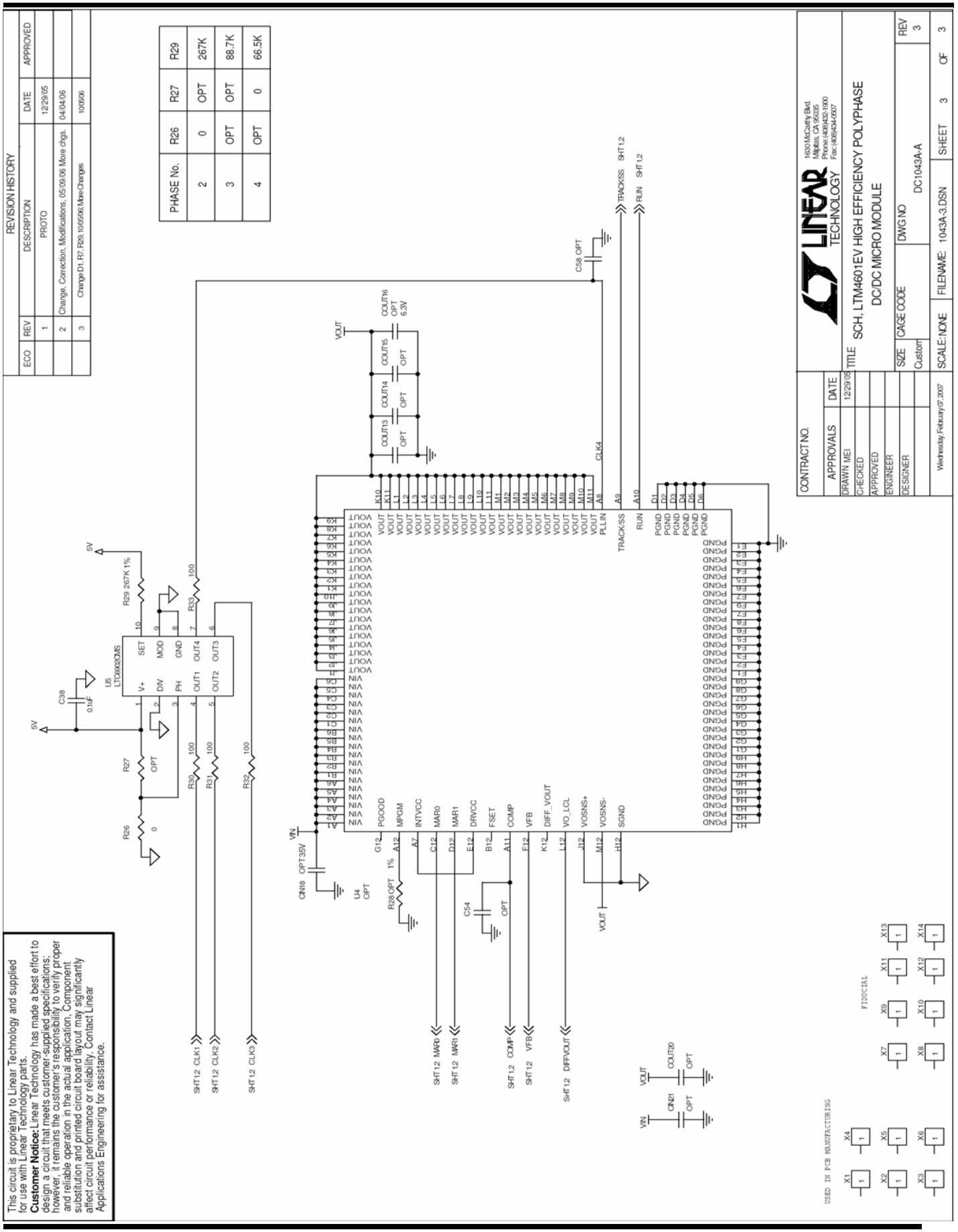
Downloaded from Arrow.com.



Downloaded from Arrow.com.



Downloaded from Arrow.com.



Downloaded from Arrow.com.