

# DESIGN NOTES

## Drive Large TFT-LCD Displays with a Space-Saving Triple-Output Regulator – Design Note 417

Jesus Rosales

### Introduction

The power appetite of large TFT-LCDs appears to be insatiable. Power supplies must feed increasing numbers of transistors and improved display resolutions, and do so without taking much space.

The triple output supply shown in Figure 1 shows a compact design based on the LT3489, which is optimized for driving large TFT panel displays. The main output provides 8V at 600mA while the 23V and -8V outputs provide 10mA and 20mA respectively, all from a 3.3V input. Even though TFT converters generally run from a regulated 3.3V or 5V source, this converter can operate seamlessly from a Lithium-Ion battery, delivering 5W when the battery is drained to 3.3V and 8W when it is at 4.2V.

The LT3489 squeezes a 2.5A, 0.12 $\Omega$ , 40V switch into a tiny 3mm  $\times$  3mm MS8E footprint. It offers external or internal compensation, an internal soft-start, a 2MHz

switching frequency, and it is also pin compatible with the popular LT1946. The design process with the LT3489 is easy and predictable.

The circuit in Figure 2 operates as a SEPIC converter, allowing the output to be higher or lower than the input. Pulling the **SHDN** pin to ground sets the output at 0V even while the voltage source is connected to the input.

Both applications take full advantage of the soft-start feature in which a single capacitor programs the voltage ramp rate of the output at startup. The 2MHz switching frequency makes possible the use of small surface mount inductors and ceramic capacitors, which reduce the total footprint of the design. Figure 3 shows how small the triple-output TFT circuit in Figure 1 can be.

LT, LTC, LTM and Burst Mode are registered trademarks of Linear Technology Corporation. All other trademarks are the property of their respective owners.

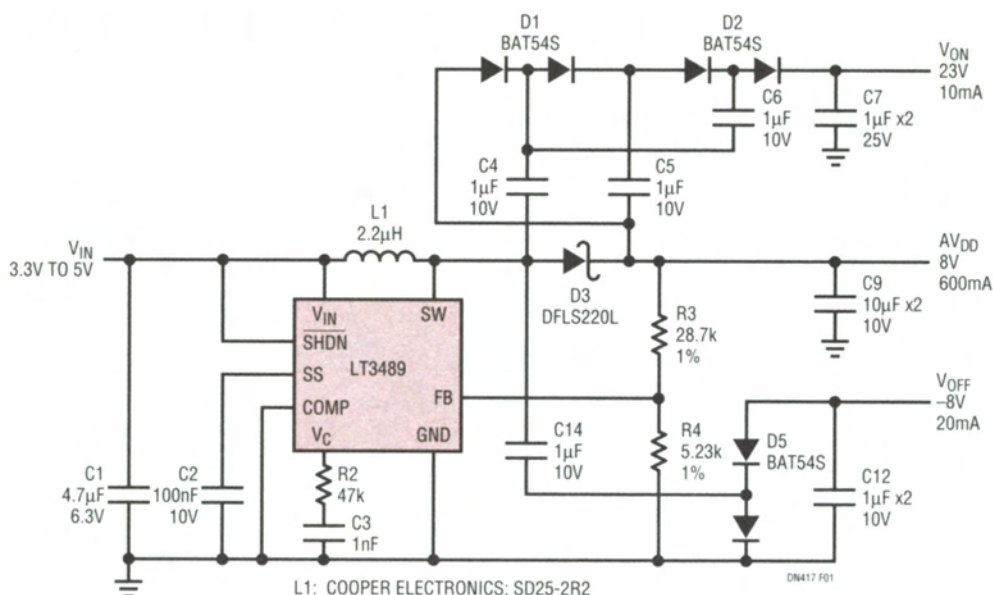


Figure 1. A 3.3V Input, Triple-Output—8V, 23V and -8V—2MHz, TFT Converter

## Conclusion

For large TFT-LCD panel displays, local bias supplies, DSL modems or portable devices, the LT3489 delivers big power from a small 3mm × 3mm MS8E package.

Its rugged 2.5A, 0.12Ω, 40V internal switch, soft-start feature, fixed frequency and flexible compensation simplify the design and improve the performance of many applications.

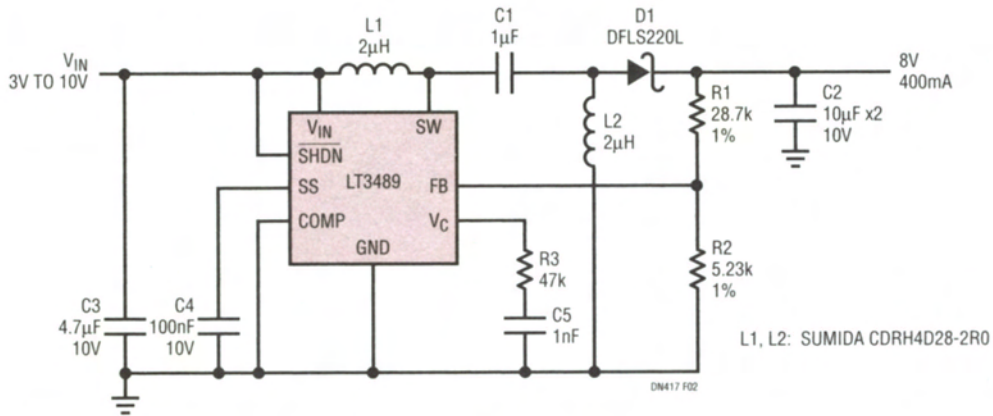


Figure 2. A 2MHz, 3V to 10V Input to 8V at 400mA to 900mA with Output Disconnect Converter

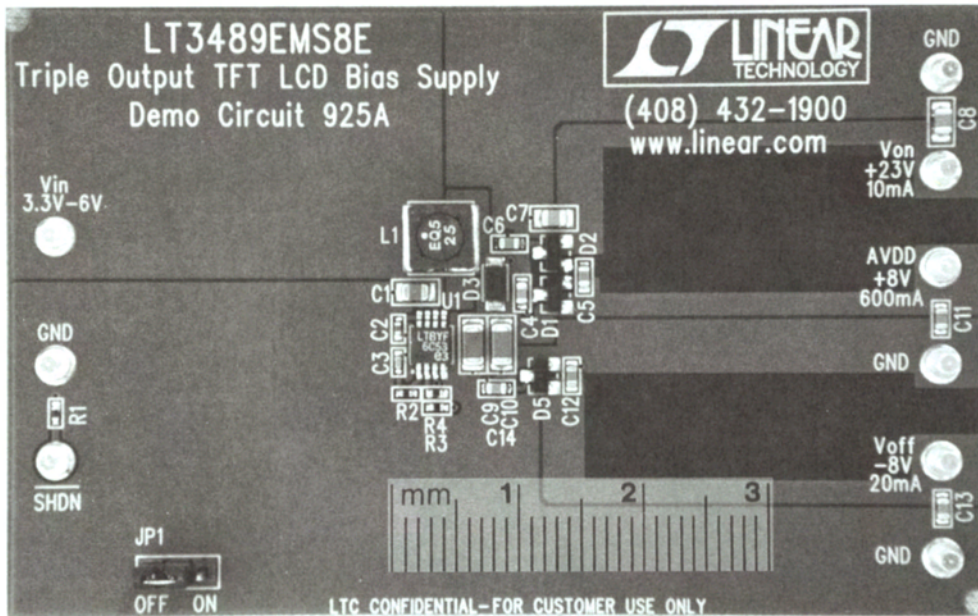


Figure 3. LT3489 Demo Circuit with Layout for the Figure 1 Schematic

Data Sheet Download

[www.linear.com](http://www.linear.com)

For applications help,  
call (408) 432-1900, Ext. 2759