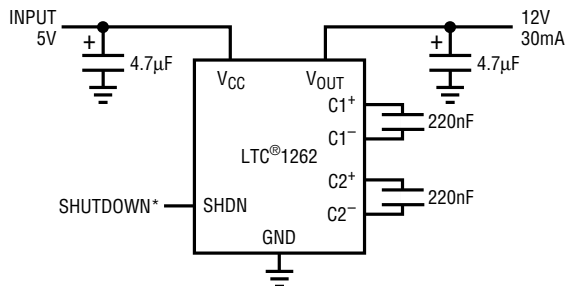![LT Linear Technology logo] **DESIGN NOTES**

Flash Memory VPP Generator Reference Designs

Design Note 97

Mitchell Lee

The VPP generator circuits shown here cover a range of 30mA to 240mA with 3.3V or 5V inputs as noted. Table 1 summarizes these circuits for quick reference.
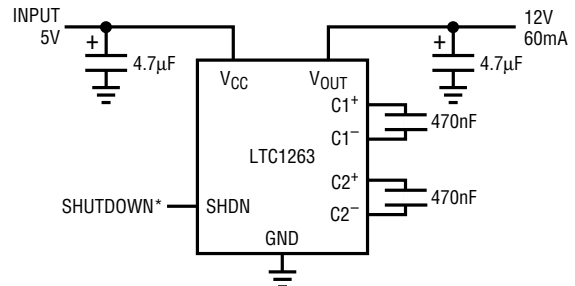
30mA from 5V Input

*0 = PROGRAM, 1 = SHUTDOWN

DN97 • F01

Charge pump design uses no inductors. This is a minimum component count, minimum size solution.

60mA from 5V Input
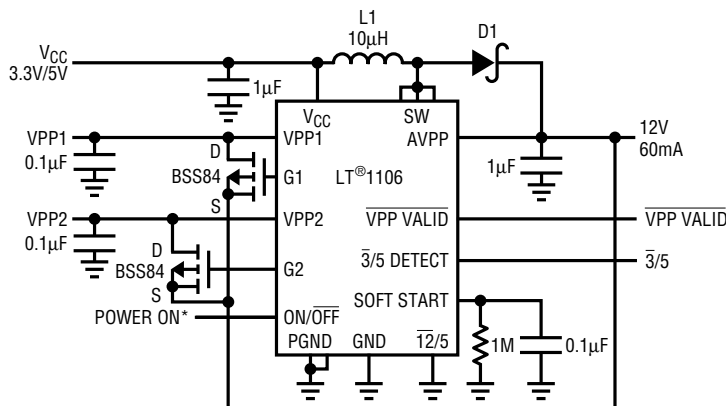

*0 = PROGRAM, 1 = SHUTDOWN

DN97 • F02

Charge pump design uses no inductors. This is a minimum component count, minimum size solution.
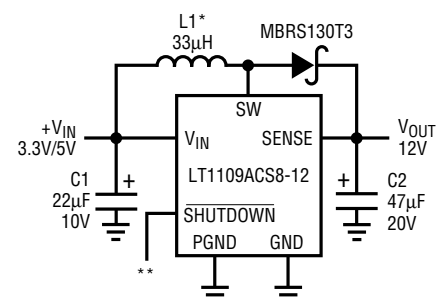
60mA from 3.3V/5V Input

DN97 • F03

FOR TYPE I CARDS:
  L1: DALE ILS-3825-01
  D1: 4 BAT54Cs IN PARALLEL (PHILIPS), 1.1mm MAXIMUM HEIGHT

FOR TYPE II CARDS:
  L1: MURATA ERIE LQH3C100K04M00
  D1: MOTOROLA MBRS0520, 2.1mm MAXIMUM HEIGHT

*1 = PROGRAM, 0 = SHUTDOWN

Designed for PCMCIA Type I or Type II in-card use. The LT1106 includes VPP bank switching for up to four memory chips.

60mA/120mA from 3.3V/5V Input

*   COILTRONICS CTX33-2
    SUMIDA CD54-330LC

** 1 = PROGRAM
    0 = SHUTDOWN

DN97 • F04

All surface mount, minimum component count solution.

60mA/120mA from 3.3V/5V Input

*REQUIRED FOR 5V OUTPUT
**0 = PROGRAM, 1 = SHUTDOWN
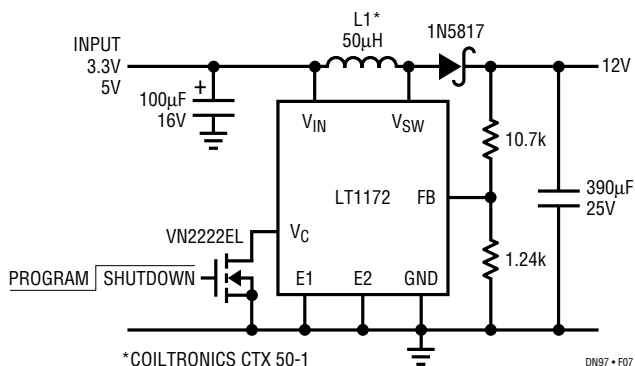
L1: COILCRAFT DO3316-333 OR SUMIDA CD73-330KC
D1: 1N5817 OR MOTOROLA MBRS130LT3
C1: AVX TPSD476M016R0100 OR SANYO OS-CON 165A47M
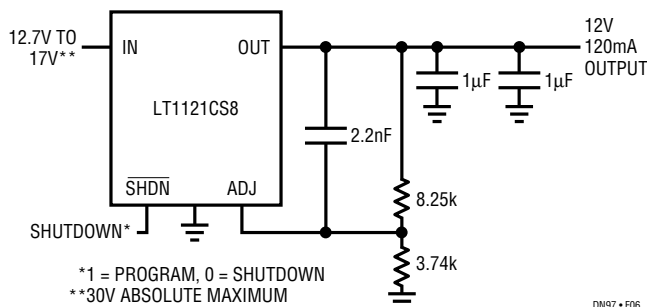C2: AVX TPSD336M020R0100 OR SANYO OS-CON 205A33M

Efficiency is 84% to 88% at full load.
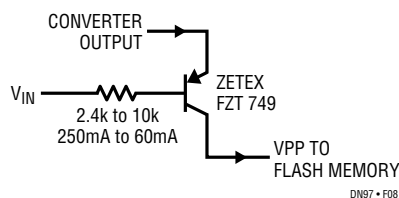
120mA/240mA from 3.3V/5V Input

*COILTRONICS CTX 50-1

High output current converter programs up to eight memory chips simultaneously.

120mA from 12.7V to 17V Input

*1 = PROGRAM, 0 = SHUTDOWN
**30V ABSOLUTE MAXIMUM

This circuit serves as a post regulator for flyback converters or overwindings. Output automatically falls to zero in shutdown.

Output Disconnect

This shutdown circuit allows output to drop to zero when switching converter is disabled.

Table 1. Summary of Flash Memory VPP Generator Solutions

Number of Flash Chips			Regulator	Advantages
V_{IN} = 3.3V	V_{IN} = 5V	V_{IN} = 12.6V To 17V		
—	1	—	LTC1262	No Inductors
—	2	—	LTC1263	No Inductors
2	2	—	LT1106	PCMCIA Type I In-Card Use. Includes VPP Bank Switching for 4 Memory Chips
2	4	—	LT1109A	Low Cost
2	4	—	LT1301	High Efficiency
—	—	4	LT1121	Linear Post Regulator
4	8	—	LT1172	High Current

For literature on our Switching Regulators, call **1-800-4-LINEAR**. For applications help, call (408) 432-1900, Ext. 361