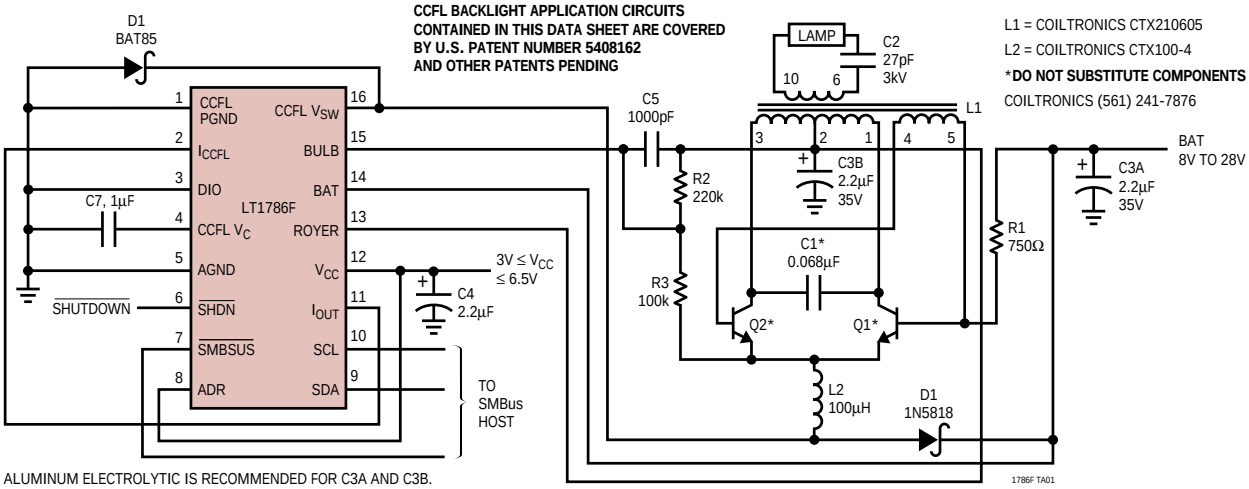
CCFL Switching Regulator Has SMBus–Programmable Brightness

The LT1786F is a fixed frequency, current mode, switching regulator that provides the control function for Cold Cathode Fluorescent Lighting (CCFL). The IC includes an efficient high current switch, an oscillator, output drive logic, control circuitry and a micropower 6-bit 100µA full-scale current output DAC. The DAC provides simple "bits-to-lamp current control" and communicates using the 2-wire SMBus serial interface. The LT1786F acts as an SMBus slave device using one of two selectable SMBus addresses set by the address pin ADR.

On Power-up, the DAC output current assumes midrange or zero scale, depending on the logic state of the ADR pin.The entire IC can be shut down through the $\overline{\text{SMBSUS}}$ pin or by setting the $\overline{\text{SHDN}}$ bit = 1 in the SMBus command byte. Digital data for the DAC output current is retained internally and the supply current drops to 40µA for standby operation. The active low $\overline{\text{SHDN}}$ pin disables the CCFL control circuitry, but keeps the DAC alive. Supply current in this operating mode drops to 150µA.

The LT1786F control circuitry operates from a logic supply voltage of 3.3V or 5V. The IC also has a battery supply pin that operates from 4.5V to 30V. The LT1786F draws 6mA typical quiescent current. A 200kHz switching frequency minimizes magnetic component size. Current mode switching techniques with cycle-by-cycle limiting gives high reliability and simple loop frequency compensation.

90% Efficient Floating CCFL with 2-Wire SMBus Control of Lamp Current



ALUMINUM ELECTROLYTIC IS RECOMMENDED FOR C3A AND C3B.
MAKE 3CB ESR ≥ 0.5Ω TO PREVENT DAMAGE TO THE LT1786F HIGH-SIDE SENSE RESISTOR DUE TO SURGE CURRENTS AT TURN-ON

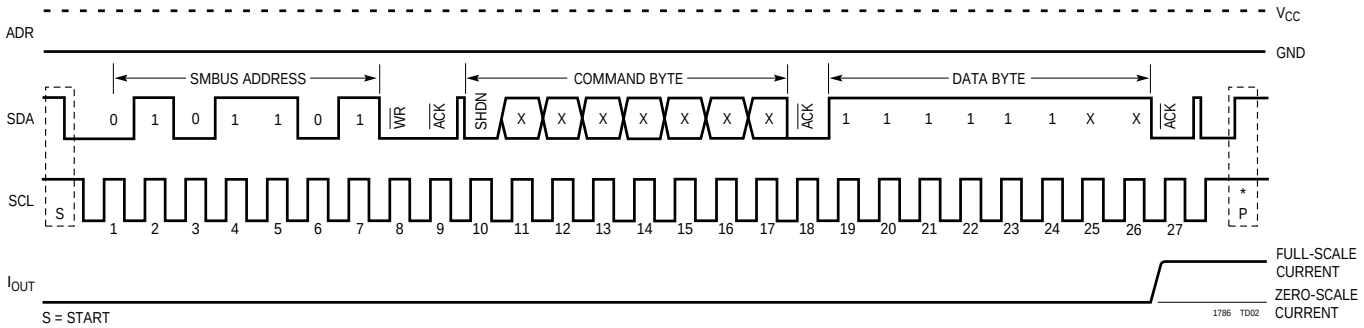
C1 MUST BE A LOW LOSS CAPACITOR, C1 = WIMA MKI OR MKP-20
= PANASONIC ECH-U

Q1, Q2 = ZETEX ZTX849 OR ROHM 2SC5001

0µA TO 50µA I_{CCFL} CURRENT GIVES 0mA TO 6mA LAMP CURRENT FOR A TYPICAL DISPLAY.

FOR ADDITIONAL CCFL/LCD CONTRAST APPLICATION CIRCUITS, REFER TO THE LT1182/83/84/84F DATA SHEET

Operating Sequence
SMBus Write Byte Protocol, with SMBus Address = 0101101B, Command Byte = 0XXXXXXXB and Data Byte = 111111XXB



S = START
P = STOP
* = OPTIONAL

Source: LT1786F Data Sheet
www.linear-tech.com/notebook.html