

Programmable Dual Output LCD Bias for Smartphone and Tablets

■ General Description

The OCP2138 is designed to support positive / negative driven TFT-LCD panels up to 10" at least (from SFF to MFF like tablets). The two output rails are usually connected to the Source Driver IC. The device uses a single inductor scheme in order to provide the user the smallest solution size possible as well as high efficiency.

It features a highly integrated step-up DC-DC converter with wide input voltage range from 2.7V to 5.5V. It is optimized for products powered by single-cell batteries (Li-Ion, Ni-Li, and Li-Polymer) and symmetrical output currents up to 150mA. An LDO and charge pump generate dual outputs at +5V (default) and -5V (default), whose voltages can be programmed via an I²C compatible interface. Optimized step-up, LDO and charge pump converters maximize conversion efficiency, exceeding 87%.

OCP2138 integrates all compensation and soft-start circuitry, which results in a simpler and smaller solution with much fewer external components. High switching frequency (1.2MHz) allows the use of a smaller inductor and capacitor to further reduce the solution size.

The I²C compatible interface allows to control the positive and negative outputs from +4V to +6.5V and -4V to -6.5V, respectively, as well as programming additional registers on the device.

The device is a RoHS compliant 15-Ball 1.97mm X 1.17mm X 0.56mm WLCSP package.

■ Pin Configuration

WLCSP-15B (Top view)

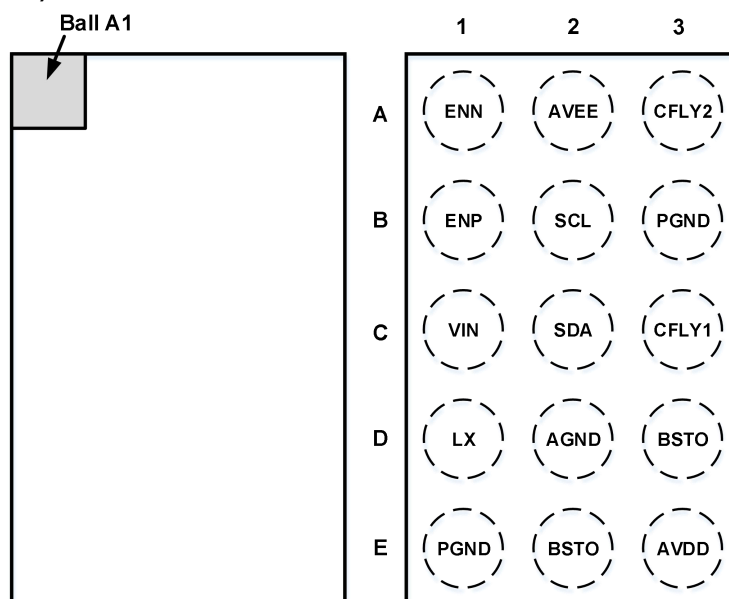


Figure 1, Pin Assignments of OCP2138

■ Features

- Wide 2.7V to 5.5V Operating Input Range
- Dual Output Regulator with Single Inductor
- Programmable Output Voltage Voltages
- Positive Output Voltage Range: +4V to +6.5V (100mV/Step)
- Negative Output Voltage Range: -4V to -6.5V (100mV/Step)
- ±1.5% Output Voltage Accuracy
- Excellent Line Regulation
- Advanced Power-Save Mode for Light Load
- Support I²C Compatible Interface
- Integrated Compensation and Feedback Circuits
- 1uA Shut-Down Supply Current
- Boost Current Mode Operation
- Over Current Protection
- Internal Soft-Start Prevents Inrush Current
- Under Voltage Lock Out
- Thermal Shutdown
- Available in an 15-Ball WLCSP
- -40°C to +85°C Operating Temperature Range

■ Applications

- TFT LCD Smart-phones
- TFT LCD Tablets
- General Dual Power Supply Application

| Pin Name | Pin No. | I/O | Pin Function |
|----------|---------|-----|---|
| ENN | A1 | I | Enable Input for negative output (AVEE). A logic high Enable the negative Output, a logic low forces the output into shutdown mode reducing the supply current. |
| AVEE | A2 | O | Charge pump output pin of the negative power. |
| CFLY2 | A3 | I/O | Negative charge pump flying capacitor pin. |
| ENP | B1 | I | Enable Input for positive output (AVDD). A logic high Enable the negative Output, a logic low forces the output into shutdown mode reducing the supply current. |
| SCL | B2 | I/O | SCL clock input pin of I ² C interface. |
| PGND | B3, E1 | P | Power Ground. |
| VIN | C1 | P | Input voltage supply pin. Connect a larger than 10uF capacitor to ground. |
| SDA | C2 | I/O | SDA bi-direction data pin of the I ² C interface |
| CFLY1 | C3 | I/O | Negative charge pump flying capacitor pin. |
| LX | D1 | I/O | Switch pin of boost converter. |
| AGND | D2 | P | Analog ground. |
| BSTO | D3, E2 | I/O | Boost converter output pin. |
| AVDD | E3 | O | Output pin of the LDO positive voltage. |

■ Typical Application Circuit

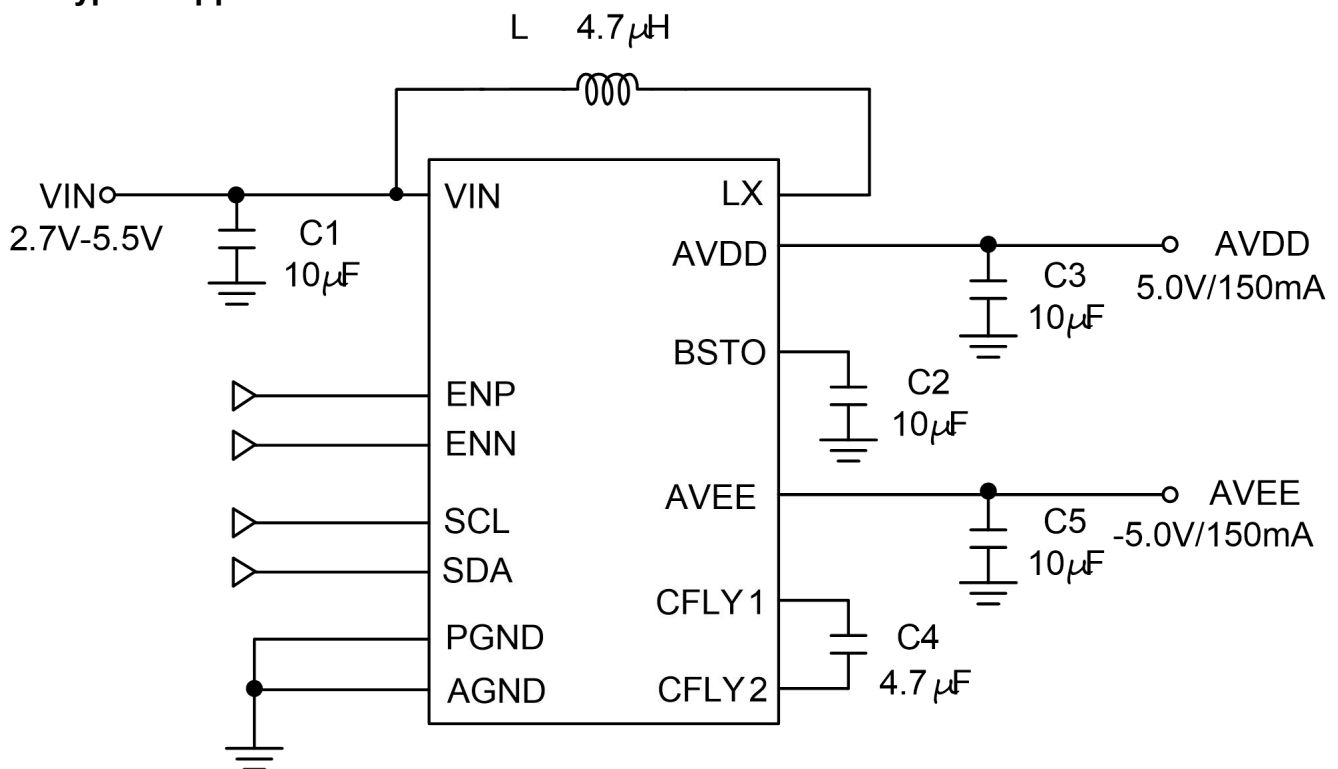


Figure 2, Typical Application Circuit of OCP2138



■ Block Diagram

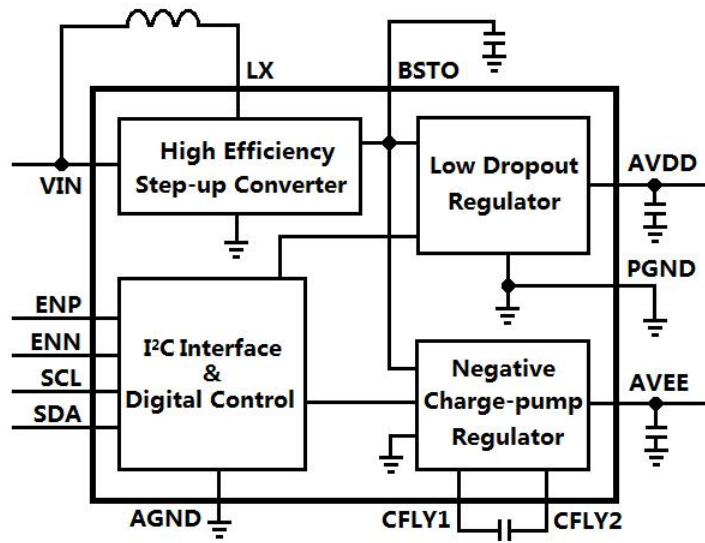


Figure 3, Block Diagram of OCP2138