R&E International

A Subsidiary of Microchip Technology Inc.

RE46C117

DC to DC Converter and Piezoelectric Horn Driver
Product Specification

General Description

The RE46C117 is intended for use in 3V or 4.5V battery or battery-backed applications. The circuit features a DC-to-DC up-converter and driver circuit suitable for driving a piezoelectric horn
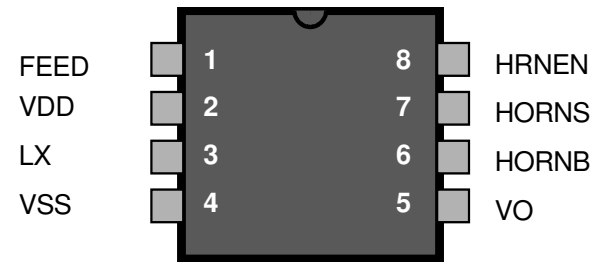
Applications

Smoke detectors
CO Detectors
Personal Security Products
Electronic Toys

Features

- Low Quiescent Current
- 10V Up Converter
- Low Horn Driver Ron
- Available in Standard Packaging or RoHS Compliant Pb Free Packaging

Pin Configuration

FEED	1
VDD	2
LX	3
VSS	4
HRNEN	8
HORNS	7
HORNB	6
VO	5

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNITS
Supply Voltage	V_{DD}	5	V
	V_{OUT}	12	V
Input Voltage Range Except FEED	V_{in}	-.3 to V_{dd} +.3	V
FEED Input Voltage Range	V_{infd}	-10 to +22	V
Input Current except FEED	I_{in}	10	mA
Operating Temperature	T_A	0 to 50	°C
Storage Temperature	T_{STG}	-55 to 125	°C
Continuous Operating Current (HornS, HornB, VO)	I_O	40	mA

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only and operation at these conditions for extended periods may affect device reliability.

This product utilizes CMOS technology with static protection; however proper ESD prevention procedures should be used when handling this product. Damage can occur when exposed to extremely high static electrical charge

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Electrical Characteristics

Limits apply at Vdd=3V, Vss=0V, Cvo=10uF, T_A=0°C to 50°C, unless otherwise noted.
Typical values are at T_A=27°C.

Parameter	Symbol	Test Conditions	Min	Limits Typ	Max	Units
Supply Voltage	Vdd	Operating	2.0	—	5.0	V
Standby Supply Current	Iddstby	HRNEN low; No loads; DC-DC Running	—	14	—	uA
Quiescent Supply Current	Iddq	HRNEN low; No loads; VO=5V; Vlx=0.5V	—	7	10.5	uA
Quiescent Ivo	Ivoq	Same conditions as above for Iddq	—	4	7.5	uA
Input Leakage	Iin	HRNEN Input, Vin=VDD or VSS	-100	—	100	nA
	Iihf	FEED=+22V; VO=10V	—	20	50	uA
	Iilf	FEED=-10V; VO=10V	-50	-15	—	uA
Input Voltage Low	Vil	HRNEN Input	—	—	1	V
Input Voltage High	Vih	HRNEN Input	2.3	—	—	V
Output Low Voltage	Vol1	HORNB or HORNS; Iout=16mA; Vdd=3V	—	.3	.5	V
Output High Voltage	Voh1	HORNB or HORNS; VO=10V; Iout=-16mA; Vdd=HRNEN=3V	9.5	9.7	—	V
VO Output Voltage	Vvo1	Vdd=3V; HRNEN=3V: Iout=10mA	8.5	10	11	V
	Vvo2	Vdd=3V; HRNEN=0V; Iout=10mA	3.5	4	4.4	V
VO Efficiency	Voeff1	Iload= 10mA, Vdd=3V; HRNEN=0V	—	85	—	%
	Voeff2	Iload=100uA; Vdd=3V; HRNEN=0V	—	75	—	%
Brownout Threshold	Vobvt	Falling edge of VO	3.2	3.6	4.0	V

Notes on Electrical Characteristics:

1. DC-DC converter in high boost mode (normal VO=10V) can draw current pulses of greater than 1 Amp and is therefore very sensitive to series resistance. Critical components of this resistance are the inductor DC resistance, the internal resistance of the battery and the resistance in the connections from the inductor to the battery, from the inductor to the LX pin and from the Vss2 pin to the battery. In order to function properly under full load at Vdd=2V, the total of the inductor and the interconnect resistances should not exceed 0.3 ohm. The internal battery resistance should be no more than 0.5 ohm and a low ESR capacitor of 10uF or more should be connected in parallel with the battery to average current over the boost converter cycle.

2. In the Electrical Characteristics Table, wherever a specific VO value is listed under test conditions, the VO is forced externally with the inductor disconnected and the DC-DC converter is not running.

3. The brown-out threshold voltage is the VO voltage at which the horn will be disabled.

4. The limits shown are 100% tested at 25C only. Test limits are guard-banded based on temperature characterization to guarantee compliance at temperature extremes.
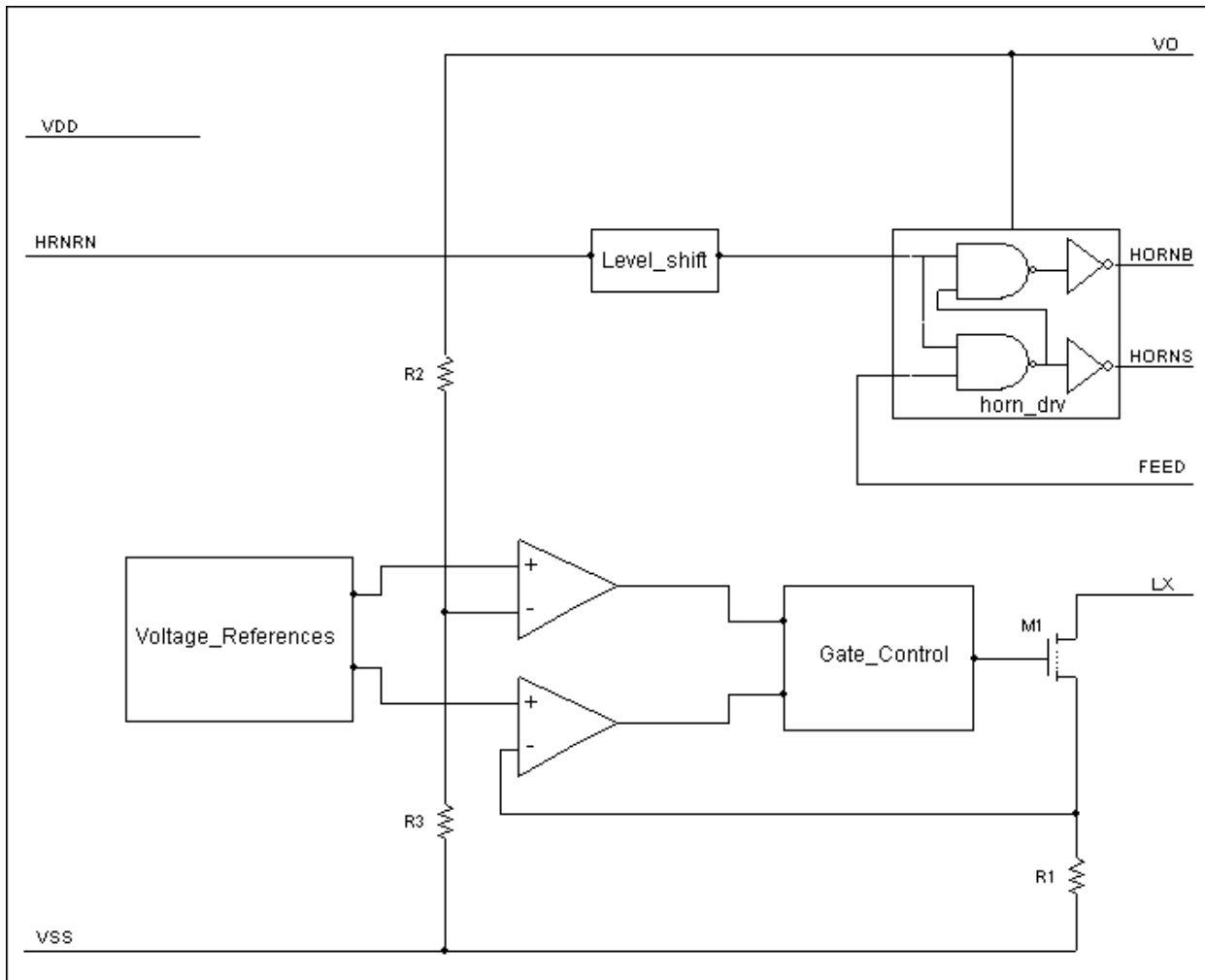
Functional Block Diagram

Typical Application Circuit
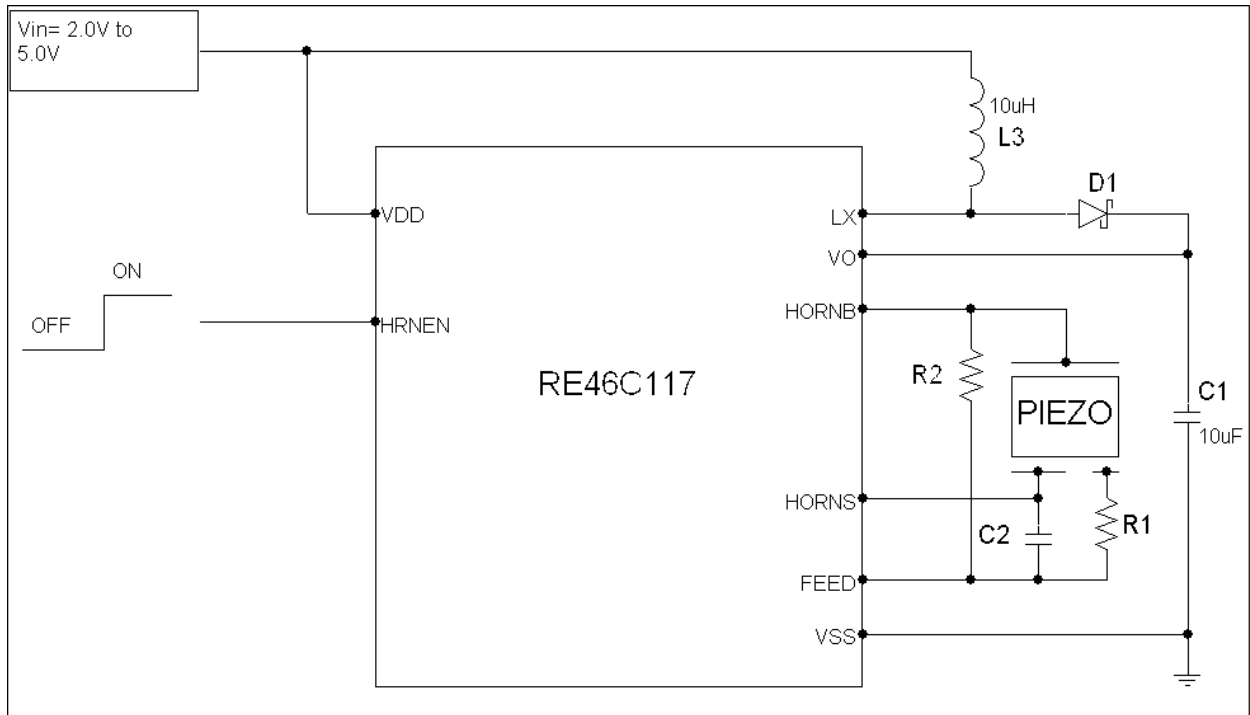
Notes:

1/ Schottky diode D1 must have maximum peak current rating of at least 1.5A and for best results should have forward voltage spec of less than 0.5V at 1 Amp.

2/ Inductor L3 must have maximum peak current rating of at least 1.5A and for best results should have DC resistance of less than 0.5 ohm.

Notes

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