



RE46C107

DC to DC Converter, Voltage Regulator and Piezoelectric Horn Driver

Product Specification

General Description

The RE46C107 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. A selectable 3.0V or 3.3V regulator is also provided for microprocessor voltage regulation. An LED driver and low battery detection and signaling are also available.

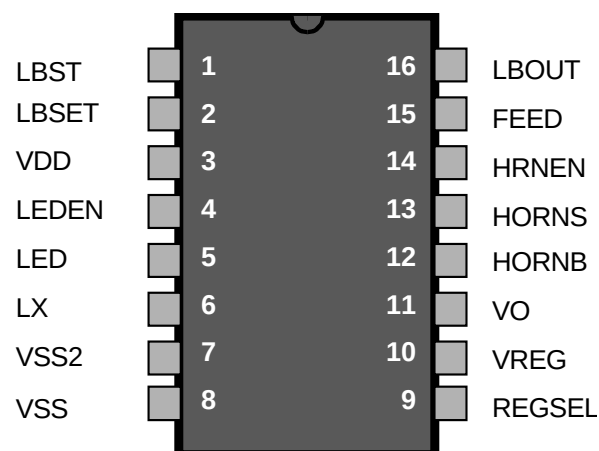
Applications

Smoke detectors
CO Detectors
Personal Security Products
Electronic Toys

Features

- Low Quiescent Current
- 10V Up Converter
- Low Horn Driver Ron
- Voltage Regulation to 3.0V or 3.3V
- Low Battery Detection
- Available in Standard Packaging or RoHS Compliant Pb Free Packaging

Pin Configuration



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNITS
Supply Voltage	V_{DD}	5	V
	V_{OUT}	12	V
Input Voltage Range Except REGSEL & FEED	V_{in}	-.3 to $V_{reg} + .3$	V
REGSEL Input Voltage Range	V_{inrs}	-.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, Vreg, 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

RE46C107

**DC to DC Converter, Voltage Regulator and
Piezoelectric Horn Driver**
Product Specification



R&E International
A Subsidiary of Microchip Technology Inc.

PIN DESCRIPTIONS

<u>PIN#</u>	<u>PIN NAME</u>	<u>DESCRIPTION</u>
1	LBST	Logic input used to activate low battery detection circuitry. This includes activating high boost mode. Input is designed to interface with circuitry supplied by Vreg, so input voltage levels will scale with the Vreg voltage. Input is disabled during brown-out.
2	LBSET	Internally connected to the low battery comparator input used to sense the Vdd voltage divider. The internal reference to which this node is compared is nominally 0.9V. Nominal internal resistance to Vdd is 400kohm. Nominal resistance to Vss is 240kohm. The resistance to Vss is changed to a nominal of 220kohm once a low battery condition is detected. External resistances can be added in parallel to adjust the low battery threshold voltage.
3	VDD	Connect to the positive supply voltage
4	LEDEN	Logic input used to enable the LED driver. Input is designed to interface with circuitry supplied by Vreg, so input voltage levels will scale with the Vreg voltage. LED driver is disabled during brown-out.
5	LED	Open drain NMOS output used to drive a visible LED.
6	LX	Open drain NMOS output used to drive the boost converter inductor. The inductor should be connected from this pin to the positive supply through a low resistance path.
7	VSS2	Internally connected to the source of the NMOS device used to drive the boost converter inductor. Connect to the negative supply voltage through a low resistance path.
8	VSS	Connect to the negative supply voltage.
9	REGSEL	Logic input used to set the Vreg output voltage level. This input should always be tied to either Vdd or Vss.
10	VREG	Regulated output voltage. Nominal output is 3.3V for REGSEL=Vdd and 3.0V for REGSEL=Vss.
11	VO	Boosted voltage produced by DC-DC converter, typically 4V or 10V.
12	HORNB	This pin is connected to the metal electrode (B) of a piezoelectric transducer.
13	HORNS	HS is a complementary output to HB and connects to the ceramic electrode (S) of the piezoelectric transducer.
14	HRNEN	Logic input for horn enable designed to interface with circuitry supplied by Vreg. Input voltage levels will scale with the Vreg voltage. Horn is disabled during brown-out.
15	FEED	Usually connected to the feedback electrode of the piezoelectric horn through a current limiting resistor. If not used, this pin must be connected to Vss.
16	LBOUT	Logic output used to signal a low battery condition. Output pulls to Vreg when LBST is high and a low battery condition is detected.

RE46C107

DC to DC Converter, Voltage Regulator and
Piezoelectric Horn Driver
Product Specification



R&E International
A Subsidiary of Microchip Technology Inc.

Electrical Characteristics

Limits apply at Vdd=3V, Vss=Vss2=0V, Creg=10uF, Cvo=10uF, TA=0°C to 50°C, unless otherwise noted.

Typical values are at TA=27°C.

Parameter	Symbol	Test Pin	Test Conditions	Min	Limits Typ	Max	Units
Supply Voltage	Vdd	3	Operating	2.0		5.0	V
Standby Supply Current	Iddstby		Inputs low; LBSET open; No loads; DC-DC Running		14		uA
Quiescent Supply Current	Iddq	3	Inputs low; LBSET open; No loads; VO=5V; Vlx=0.5V		7	10.5	uA
Quiescent Ivo	Ivoq	10	Same conditions as above for Iddq		4	7.5	uA
Input Leakage Low	Iil	1, 4, 14	LBST, LEDEN, HRNEN Inputs Vin= VSS			-100	nA
	Iilrs	9	REGSEL Input Vin= Vss			-100	nA
	Iilf	15	FEED=-10V; VO=10V		-15	-50	uA
Input Leakage High	Iih	1, 4, 14	LBST, LEDEN, HRNEN Inputs Vin=Vreg			100	nA
	Iihrs	9	REGSEL Input Vin=Vdd			100	nA
	Iihf	15	FEED=+22V; VO=10V		20	50	uA
Input Voltage Low	Vil	1, 4, 14	LBST, LEDEN, HRNEN Inputs			1	V
	Vilrs	9	REGSEL Input			1	V
	Vilf	15	FEED Input; VO=10V			3	V
Input Voltage High	Vih	1, 4, 14	LBST, LEDEN, HRNEN Inputs	Vreg-.7			V
	Vihrs	9	REGSEL Input	2.3			V
	Vihf	15	FEED Input; VO=10V	7			V
Output Low Voltage	Vol1	12,13	HORNB or HORNS; Iout=16mA; Vdd=3V; VO=10V		.3	.5	V
	Vol2	5	LED; Iout=10mA; VO=4V		.3	.5	V
	Vol3	16	LBOUT; Iout=100uA; Vdd=3V		.3	.5	V
Output High Voltage	Voh1	12,13	HORNB or HORNS; VO=10V; Iout=-16mA; HRNEN=Vreg	9.5	9.7		V
	Voh3	16	LBOUT; Iout=100uA; Vdd=2.1V	Vreg-.5	Vreg-.3		V
VO Output Voltage	Vvo1	11	Vdd=3V; HRNEN=Vreg; Iout=10mA	8.5	10	11	V
	Vvo2	11	Vdd=3V; HRNEN=0V; Iout=10mA	3.5	4	4.4	V

RE46C107

**DC to DC Converter, Voltage Regulator and
Piezoelectric Horn Driver**
Product Specification



R&E International
A Subsidiary of Microchip Technology Inc.

Electrical Characteristics (continued)

Limits apply at Vdd=3V, Vss=Vss2=0V, Creg=10uF, Cvo=10uF, TA=0°C to 50°C, unless otherwise noted.

Typical values are at TA=27°C.

Parameter	Symbol	Test Pin	Test Conditions	Limits			Units
				Min	Typ	Max	
VO Efficiency	Voeff1		Iload= 10mA, Vdd=3V; HRNEN=0V		85		%
	Voeff2		Iload=100uA; Vdd=3V; HRNEN=0V		75		%
Low Battery Threshold	VLbat	3	LBST=Vreg	2.3	2.4	2.55	V
LBST to LBOU Propagation Delay	Tplhlb	16	Vdd=2.1; LBSET Cload=5pF		10	20	us
VREG Voltage	Vreg1	10	Iout<20mA; REGSEL=Vdd	3.2	3.3	3.4	V
	Vreg2	10	Iout<20mA; REGSEL=Vss	2.9	3.0	3.1	V
VREG Load Regulation	Vregld1	10	Iout=0 to 20mA; HRNEN=Vreg		30	50	mV
	Vregld2	10	Iout=0 to 20mA; HRNEN=0V		30	50	mV
Brownout Threshold	Vobvt	11	Falling edge of VO	3.2	3.6	4.0	V
VO-to-Brownout Margin	Vobvtm	11	Vv02 -Vobvt	100	400		mV
Brownout Pull down	Ibt	10	VO=3.0V; Vreg=2.0V	20	40		mA
VREG over voltage clamp	Vcl1	10	REGSEL=Vdd	3.75	4	4.25	V
	Vcl2	10	REGSEL=0V	3.35	3.6	3.85	V

Notes on Electrical Characteristics:

1/ DC-DC converter in high boost mode (nominal 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 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 draw 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 regulator and horn will be disabled. At VO voltages below the brown-out threshold Vreg will be pulled to Vss.

4/ In normal operation, the regulator will provide high-side current of up to 20mA, but current sinking capability is typically under 1uA. The overvoltage clamp is intended to limit the voltage at Vreg when it is pulled up by an external source.

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

RE46C107

**DC to DC Converter, Voltage Regulator and
Piezoelectric Horn Driver**
Product Specification



R&E International
A Subsidiary of Microchip Technology Inc.

Truth Table - Horn/Boost Logic

Status	LBST	HRNEN	FEED	HORNB	HORNS	VO (Typ.)
Low Battery Disabled; Horn Disabled	0	0	X	0	0	Vvo2 (4V)
Low Battery Enabled; Horn Disabled	1	0	X	0	0	Vvo1 (10V)
Horn Enabled	X	1	0	1	0	Vvo1 (10V)
Horn Enabled	X	1	1	0	1	Vvo1 (10V)

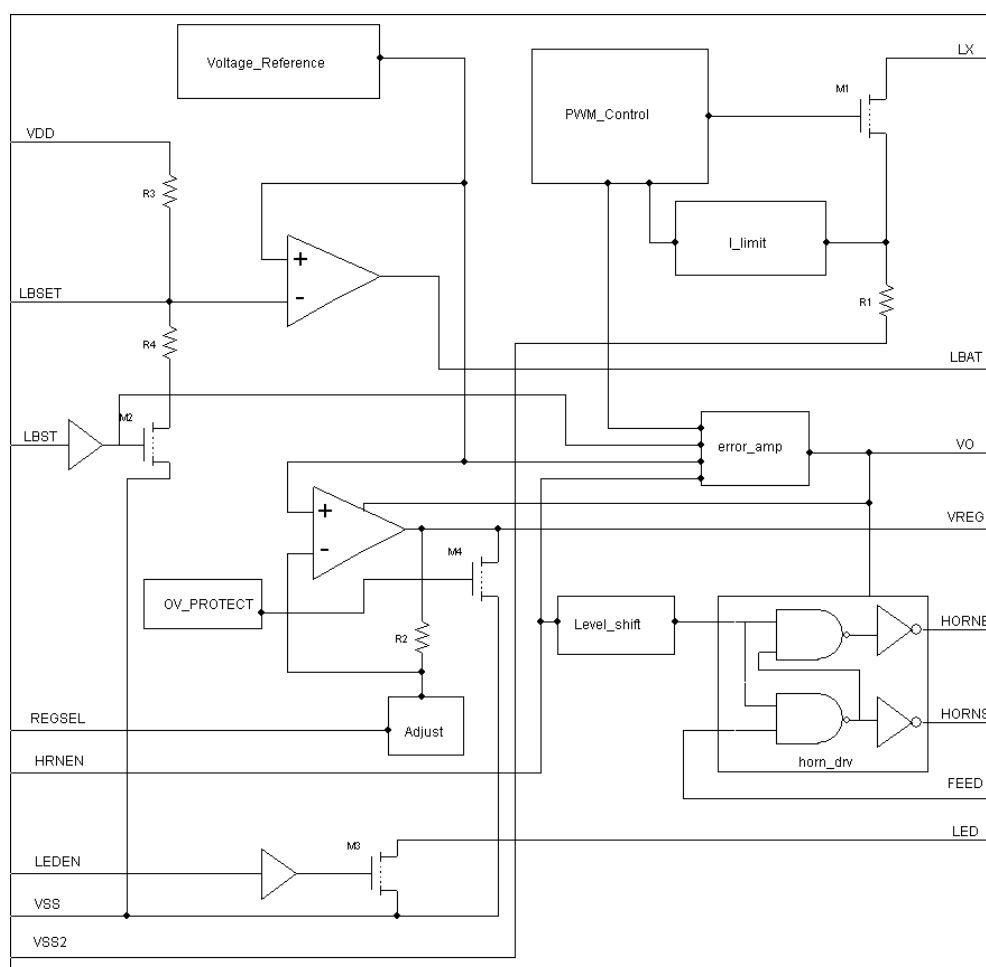
RE46C107

DC to DC Converter, Voltage Regulator and
Piezoelectric Horn Driver
Product Specification



R&E International
A Subsidiary of Microchip Technology Inc.

Functional Block Diagram



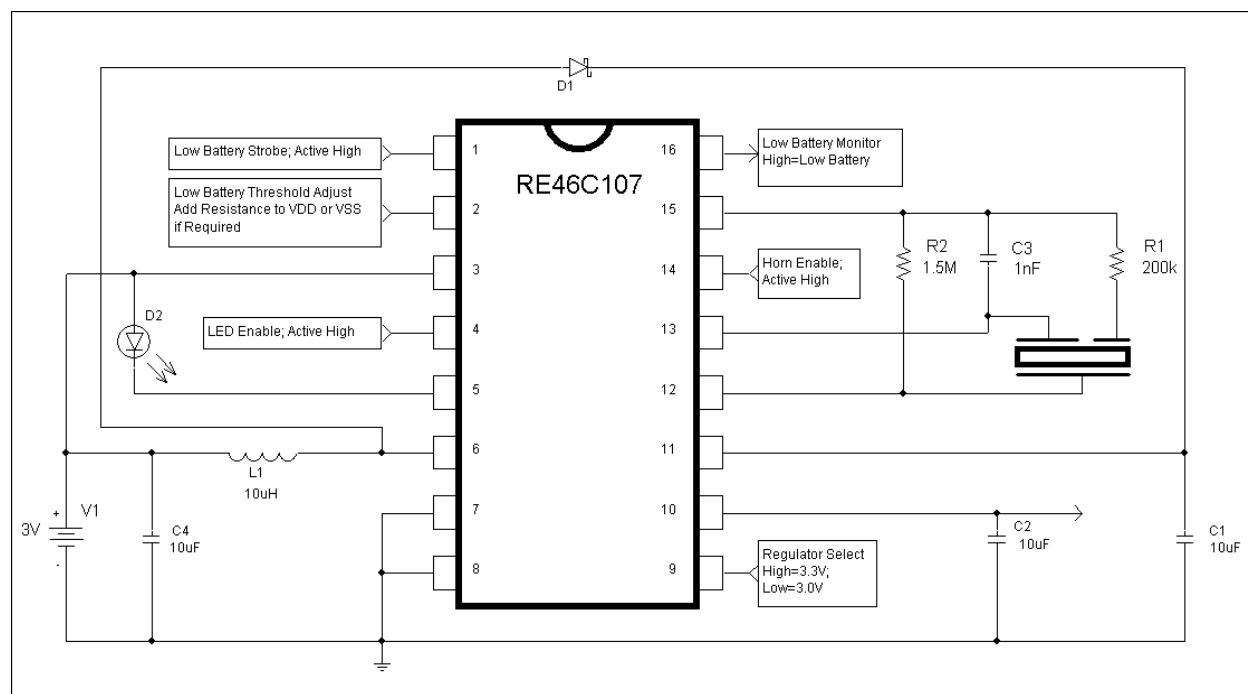
DC to DC Converter, Voltage Regulator and Piezoelectric Horn Driver

Product Specification



R&E International
A Subsidiary of Microchip Technology Inc.

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 L1 must have maximum peak current rating of at least 1.5A and for best results should have DC resistance of less than 0.3 ohm.

RE46C107

**DC to DC Converter, Voltage Regulator and
Piezoelectric Horn Driver
Product Specification**



R&E International
A Subsidiary of Microchip Technology Inc.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

Trademarks

The Microchip name and logo, the Microchip logo, Accuron, dsPIC, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, rfPIC, SmartShunt and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Hampshire, Linear Active Thermistor, MXDEV, MXLAB, SEEVAL, SmartSensor and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Analog-for-the-Digital Age, Application Maestro, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, In-Circuit Serial Programming, ICSP, ICEPIC, Mindi, MiWi, MPASM, MPLAB Certified logo, MPLIB, MPLINK, mTouch, nanoWatt XLP, PICKit, PICDEM, PICDEM.net, PICTail, PIC³² logo, PowerCal, PowerInfo, PowerMate, PowerTool, REAL ICE, rfLAB, Select Mode, Total Endurance, TSHARC, WiperLock and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

All other trademarks mentioned herein are property of their respective companies.

© 2009, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

**QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
== ISO/TS 16949:2002 ==**

Microchip received ISO/TS-16949:2002 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

RE46C107

**DC to DC Converter, Voltage Regulator and
Piezoelectric Horn Driver**
Product Specification



R&E International
A Subsidiary of Microchip Technology Inc.

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9