

## RE46C116

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

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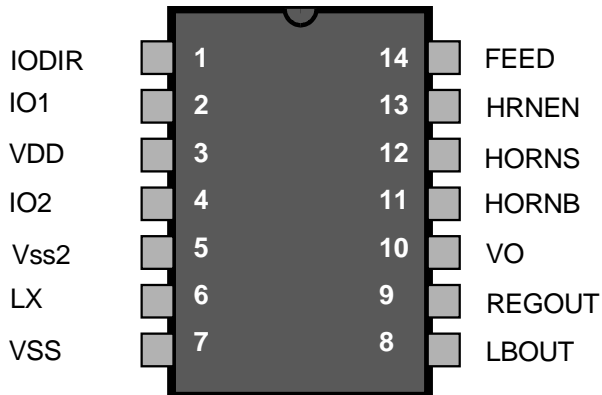
### General Description

The RE46C116 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 sounding a piezoelectric horn, a 3.3V regulator for microprocessor voltage regulation and an I/O for communication with interconnected units.

### Features

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

### Preliminary Pin Configuration



**14 Lead 300 mil PDIP**

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## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNITS
Supply Voltage	$V_{DD}$	5	V
	VO	14	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	$T_A$	-40 to 85	°C
Storage Temperature	$T_{STG}$	-55 to 125	°C
Junction Temperature	$T_J$	150	°C
Continuous Operating Current (HornS, HornB, Vreg)	$I_O$	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  $V_{dd}=3V$ ,  $V_{ss}=V_{ss2}=0V$ ,  $C_{reg}=10\mu F$ ,  $C_{vo}=10\mu F$ ,  $T_A=27^\circ C$ , unless otherwise noted.

Parameter	Symbol	Test Conditions	Limits			Units
			Min	Typ	Max	
Supply Voltage	V <sub>dd</sub>	Operating	2.0		5.0	V
Standby Supply Current	I <sub>ddstby</sub>	HRNEN=V <sub>ss</sub> ; Other inputs low; No loads; DC-DC Running; IO2=Float		22		uA
Quiescent Supply Current	I <sub>ddq</sub>	HRNEN=V <sub>ss</sub> ; Other inputs low; No loads; VO=5V; IO2=Float		8	12	uA
Quiescent I <sub>vo</sub>	I <sub>voq</sub>	HRNEN=V <sub>ss</sub> ; Other inputs low; No loads; VO=5V; IO2=Float		10	15	uA
Input Leakage	I <sub>in</sub>	All Inputs except FEED V <sub>in</sub> =V <sub>DD</sub> or V <sub>SS</sub>	-100		100	nA
	I <sub>ihf</sub>	FEED=+22V; VO=10V		20	50	uA
	I <sub>iif</sub>	FEED=-10V; VO=10V	-50	-15		uA
Input Voltage Low	V <sub>il</sub>	All Inputs except FEED and IO1			1	V
		FEED Input; VO=10V			3	V
Input Voltage High	V <sub>ih</sub>	All Inputs Except FEED and IO1	2.3			V
		FEED Input; VO=10V	7			V
Output Low Voltage	V <sub>ol1</sub>	HORNB or HORNS; I <sub>out</sub> =16mA;		.3	.5	V
	V <sub>ol2</sub>	LBOU; I <sub>out</sub> =100uA		.3	.5	V
	V <sub>ol3</sub>	IO2, I <sub>out</sub> =100uA; IODIR=0V		.3	.5	V
Output High Voltage	V <sub>oh1</sub>	HORNB or HORNS; VO=10V; I <sub>out</sub> =-16mA; V <sub>dd</sub> =HRNEN=3V	9.5	9.7		V
	V <sub>oh2</sub>	LBOU; I <sub>out</sub> =-100uA; V <sub>dd</sub> <V <sub>lbat</sub>	V <sub>reg</sub> -.5	V <sub>reg</sub> -.3		V
	V <sub>oh3</sub>	IO2, I <sub>out</sub> =-100uA; IODIR=0V	V <sub>reg</sub> -.5	V <sub>reg</sub> -.3		V
	V <sub>oh4</sub>	IO1, I <sub>out</sub> =-4mA; IODIR=V <sub>ih</sub>		5		V
VO Output Voltage	V <sub>vo1</sub>	HRNEN=3V; I <sub>out</sub> =10mA		10		V
	V <sub>vo2</sub>	HRNEN=V <sub>ss</sub> ; I <sub>out</sub> =10mA		4		V
VO Efficiency	V <sub>oeff1</sub>	HRNEN=V <sub>ss</sub> ; I <sub>load</sub> =10mA		85		%
	V <sub>oeff2</sub>	HRNEN=V <sub>ss</sub> ; I <sub>load</sub> =100uA		75		%
Low Battery Threshold	V <sub>lbat</sub>	T <sub>A</sub> =0 to 50°C		2.4		V
VREG Voltage	V <sub>reg1</sub>	I <sub>out</sub> <20mA	3.1	3.3	3.5	V
VREG Load Regulation	V <sub>regld1</sub>	I <sub>out</sub> =0 to 20mA; HRNEN=3V		50		mV
	V <sub>regld2</sub>	I <sub>out</sub> =0 to 20mA; HRNEN=V <sub>ss</sub>		50		mV
Brownout Threshold	V <sub>obvt</sub>	Falling edge of VO		3.6		V
Brownout Pull down	I <sub>bt</sub>	VO=3.0V; V <sub>reg</sub> =2.0V	20	40		mA
VREG over voltage clamp	V <sub>cl1</sub>		3.75	4	4.25	V
IO1 Output Current	IO1 <sub>ih1</sub>	IODIR=0V, IO1=1V	25		60	uA
	IO1 <sub>ih2</sub>	IODIR=0V, IO1=17V			150	uA
	IO1 <sub>ioh1</sub>	IODIR, IO2=V <sub>ih</sub> , IO1=3V	-4	-5		mA
	IO1 <sub>ioh2</sub>	IODIR, IO2=V <sub>ih</sub> , IO1=V <sub>ss</sub>		-5	-16	mA
	IO1 <sub>iol1</sub>	IO dump current IODIR= V <sub>ih</sub> , IO2=0V, IO1=1V			10	mA
IO1 Alarm Voltage	IO1 <sub>vih</sub>	IODIR=0V	3			V
	IO1 <sub>vil</sub>	IODIR=0V			1.5	V

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Electrical Table Notes:

1/ 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 Regout will be pulled to Vss.

2/ 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 Regout when it is pulled up by an external source.

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

### Interconnect Logic Truth Table

IODIR	IO2		IO1	
	Input	Output	Input	Output
1	0			0
1	1			1
0		0	0	
0		1	1	

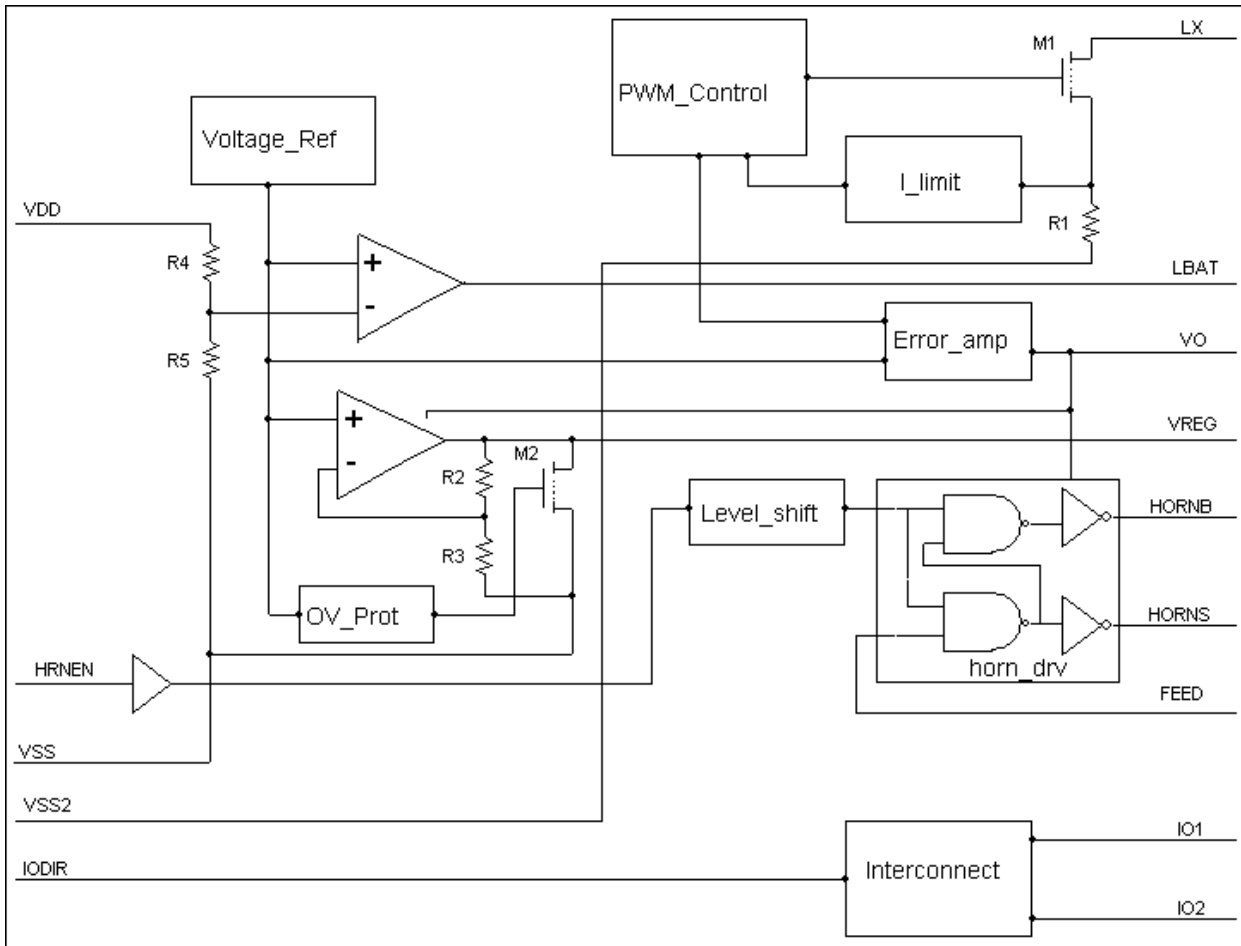
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## Functional Block Diagram



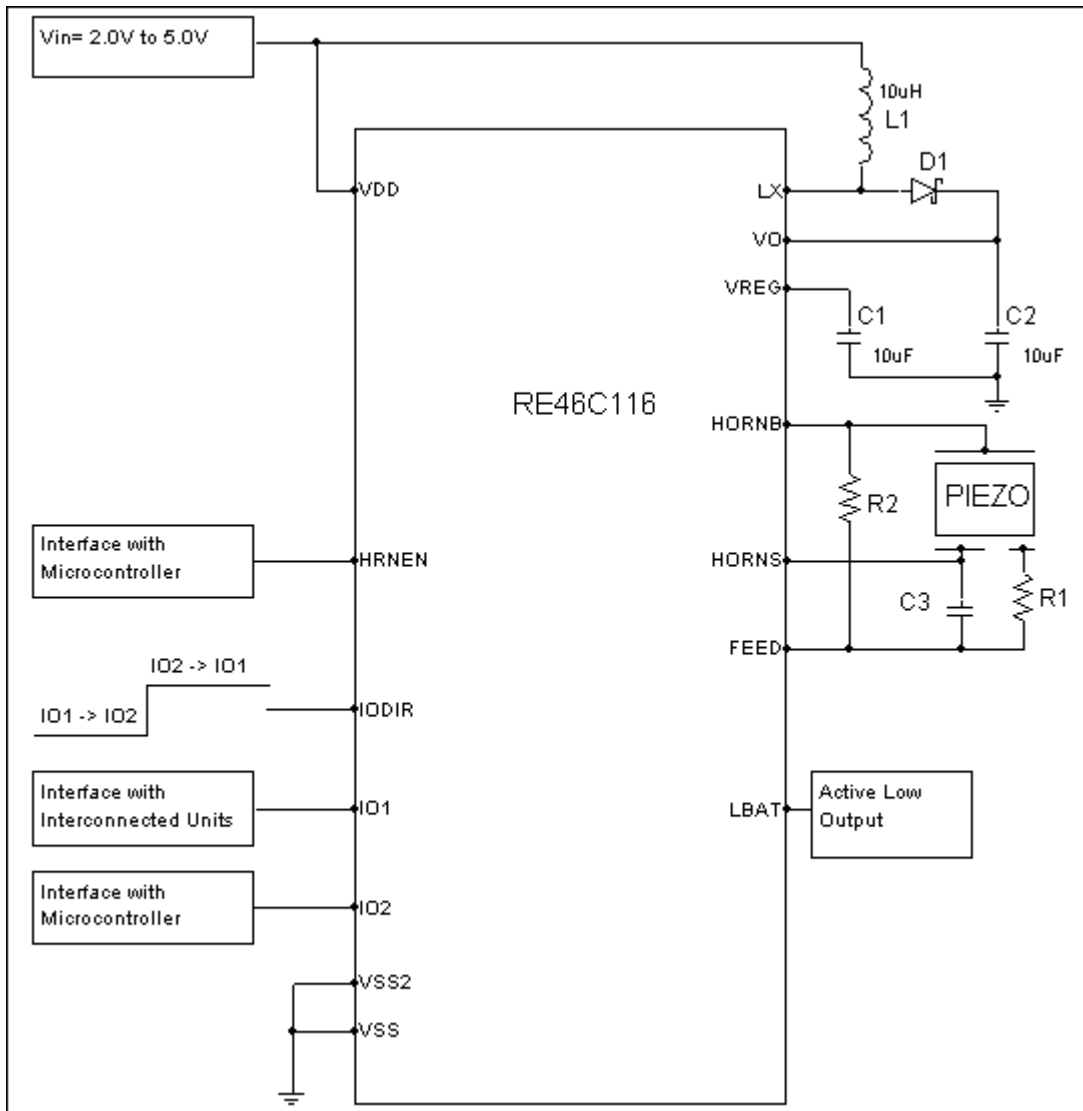
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## Typical Application Circuit



### 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.

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