

#### General Description

The ILC6301 series of DC-DC converters represents an advanced generation of energy resource management IC's for battery operated and portable systems. This device series showcases the unique ability to power down a primary load while maintaining power regulation to a secondary load that must remain continuously active. Termed "KeepAlive™" (KA), this feature can supply auxiliary power to serial port receivers, command receivers or control sensors (i.e. IR, RF) while holding other system blocks in stand-by or power-down mode. Main and KA™ outputs are user selected via the SEL pin. Overall device control is accomplished with the use of the On/Off pin. Only one output is active at any time.

Both outputs are fixed at either 3.0V or 3.3V. For economy and efficiency, the architecture utilizes a single coil to generate each output. The Main output can supply up to 100mA and the KeepAlive™ section can supply up to 10mA. Each regulator performs buck or boost functions depending on the value of  $V_{DD}$ . At  $V_{DD} > 3.7V$  automatic control invokes chopper mode operation and for  $V_{DD} < 3.7V$  automatic control invokes boost mode operation. The operating range for  $V_{DD}$  is 1.8V to 6V.

The ILC6301 is available in either the conventional SOIC-8 or the space saving MSOP-8 plastic packaging.

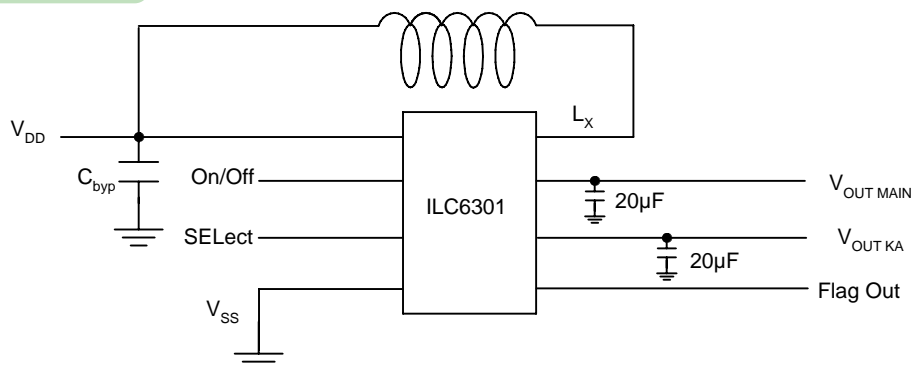
#### Features

- Selectable Main (to 100mA) or KeepAlive™ (to 10mA) voltage outputs
- Input voltage operating range 1.8V to 6.0V
- 3.0V or 3.3V fixed output voltages (custom requirements contact Impala)
- Internal controlled synchronous operation requires no external diode
- Optimized design requires a minimum of external components  
One inductor and three capacitors
- Low power OFF mode,  $< 1\mu A$  @  $V_{DD} = 1.8V$
- Internal oscillator frequency  $\sim 210kHz \pm 15\%$
- Condition Flag output

#### Applications

- Portable and battery operated systems
- Remote data collection terminals
- Designs requiring continuous communications receive port monitoring
- Systems requiring continuous sensor activation for event specific detection
- Security devices
- Low duty cycle, NLS medical instrumentation

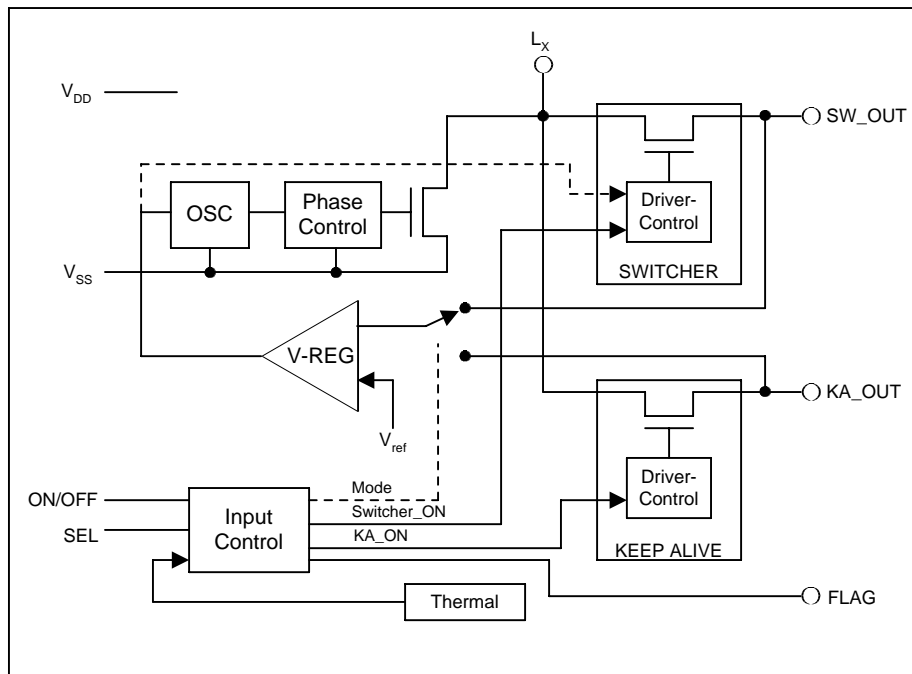
#### Typical Circuit



Pin Description ILC6301

Pin Number	Pin Name	Pin Description
TBD	$V_{DD}$	Input voltage. i.e. Battery. Positive Relative to $V_{SS}$
TBD	$V_{SS}$	Common, Ground
TBD	$V_{OUT MAIN}$	Main output voltage. Output bypass capacitor connection
TBD	$V_{OUT KeepAlive}$	KA output voltage. Output bypass capacitor connection
TBD	On/Off	Digital input activates device. 1 = ON, 0 = OFF Can be tied to $V_{DD}$
TBD	Select	Digital input, mode select. 1= Normal, 0 = KeepAlive
TBD	Flag	Digital Output. Indicates low battery status
TBD	$L_X$	Connection for inductor. (inductor returns to $V_{DD}$ ) Can be tied to $V_{DD}$

Functional Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
Voltage on Main V <sub>OUT</sub> pin	V <sub>OUT, MAIN</sub>	-0.3 to 7	V
Voltage on KA V <sub>OUT</sub> pin	V <sub>OUT, KA</sub>	-0.3 to 7	V
All other pins Ref to V <sub>SS</sub>	-	-0.3 to 7	V
Continuous Power Dissipation under ANY condition	P <sub>D</sub>	400	mA
Maximum Junction Temperature	T <sub>J(MAX)</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-40 to 125	°C
Lead Temperature. Soldering 10 sec		300	°C
Package Thermal Resistance - SOIC	θ <sub>JA, SOIC</sub>	154	°C/W
Package Thermal Resistance - MSOP	θ <sub>JA, SOIC</sub>	206	°C/W

## Electrical Characteristics ILC6301

### General and Common Parameters

Parameter	Symbol	Min	Typ	Max	Units	Comment
Input Voltage	V <sub>DD</sub>	1.8		6.0	V	V <sub>IN</sub>
Switch Frequency	F <sub>O</sub>	180	200	240	kHz	Trimmed to center
Reference Voltage	V <sub>ref</sub>		1.217		V	Trimmed Tol. TBD
OFF Mode Current	I <sub>OFF</sub>			1μA	μA	V <sub>IN</sub> = 1.8. OFF mode active
Switcher to Chop mode threshold	V <sub>mode</sub>	3.6		3.8	V	V <sub>IN</sub> where SW to Chop or Chop to SW mode change occurs
Thermal Shutdown		142	150	163	°C	Hysteresis ~ 20°C

### Input Parameters

Parameter	Symbol	Min	Typ	Max	Units	Comment
SEL Logic 1	V <sub>IH</sub>	1.4			V	Switcher is selected
SEL Logic 0	V <sub>IL</sub>			0.5	V	KeepAlive is selected
ON/OFF Logic 1	V <sub>IH</sub>	1.4			V	Normal operation
ON/OFF Logic 0	V <sub>IL</sub>			0.5	V	Stand-by operation

## Electrical Characteristics ILC6301

### Switcher Section Parameters

Parameter	Symbol	Min	Typ	Max	Units	Comment
Out Voltage	$V_{OUT}$		3 or 3.3		V	Mask programmable
Output Current, max	$I_{O(MAX)}$			100	mA	Short circuit limiting not enabled
Input Current, min	$I_{O(MIN)}$	10			mA	Regulation and ripple percentage Degrades slightly at lower $I_{OUT}$
Ripple at max load	$V_R$			60	mV	$L_X$ and $C_{OUT}$ as recommended
Conversion Efficiency	EFF	48		86	%	

### KeepAlive Section Parameters

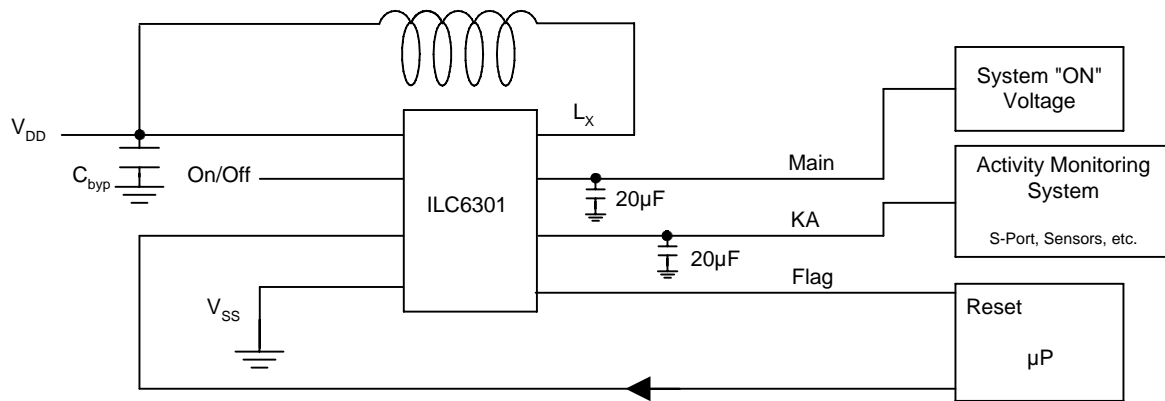
Parameter	Symbol	Min	Typ	Max	Units	Comment
Out Voltage	$V_{OUT}$		3 or 3.3		V	Fixed
Output Current, max	$I_{O(MAX)}$			10	mA	Short circuit limiting not enabled
Input Current, min	$I_{O(MIN)}$	1			mA	Regulation and ripple percentage Degrades slightly at lower $I_{OUT}$
Ripple at max load	$V_R$			60	mV	Coil and $C_{OUT}$ as recommended
Conversion Efficiency	EFF		85		%	

### Recommended Components

Switcher Section	Value	Units
Coil	10	$\mu H$
Switch out capacitor	20	$\mu F$
<b>KeepAlive</b>		
Output capacitor	20	$\mu F$
<b>General</b>		
Input bypass capacitor	20 (or user TBD)	$\mu F$

Note: Customer may choose to optimize recommended values to suit a given application

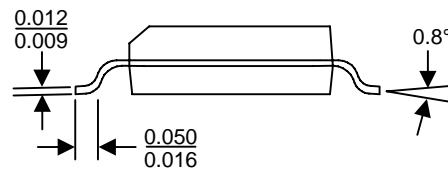
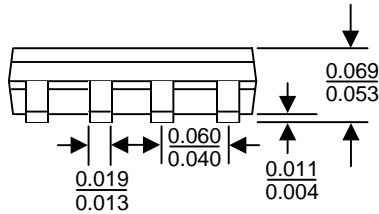
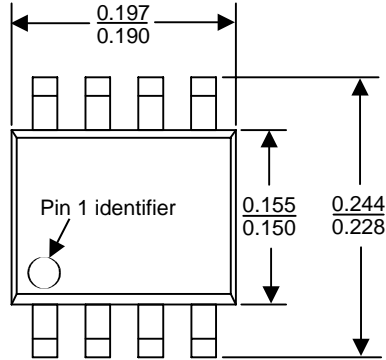
Example Operation



Package Dimensions

All dimensions in inches

8-Pin MSOP



8-Pin SOIC

