ILC6301 *Advance*

100mA DC/DC Converter With KeepAlive™ Output

POWER POWERED BY IMPALA ON THE GO

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 standby 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.

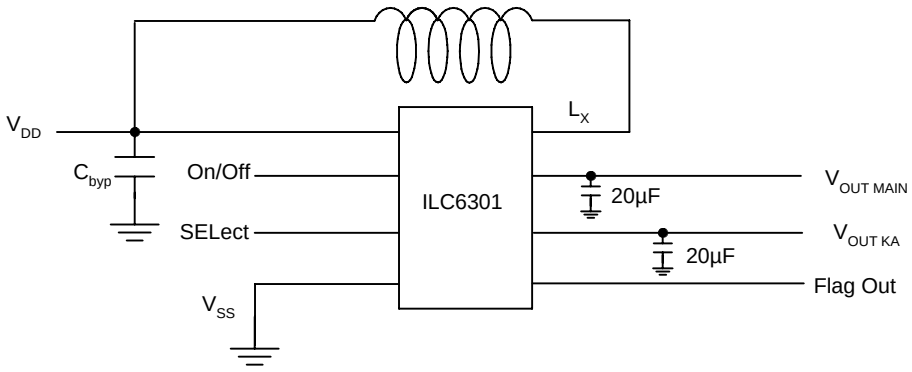
Features

- 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, < 1µA @ V_{DD} = 1.8V
- Internal oscillator frequency ~ 210kHz ±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

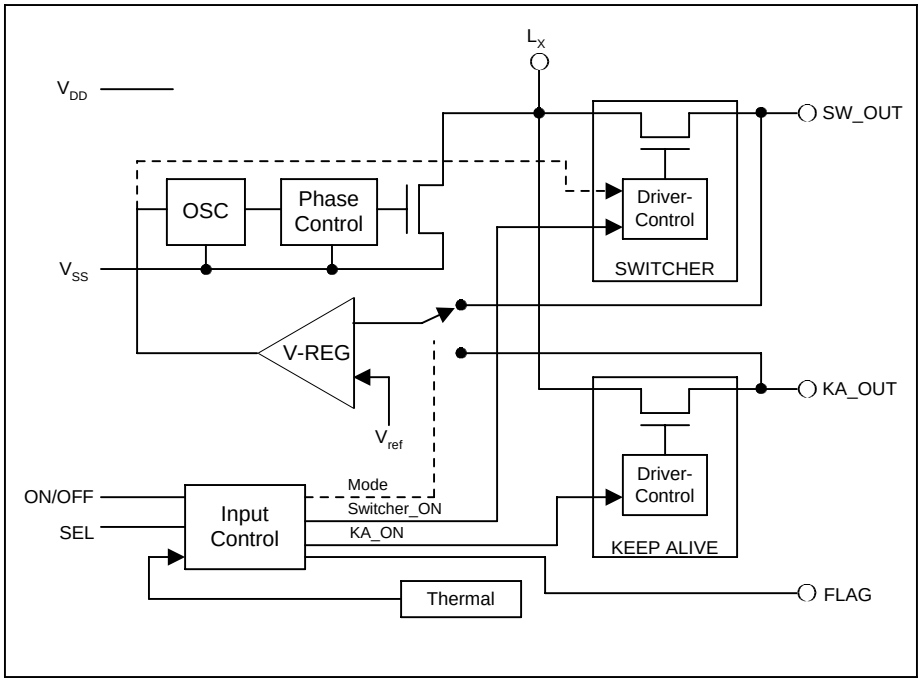
Typical Circuit



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_{OUT} pin	$V_{OUT, MAIN}$	-0.3 to 7	V
Voltage on KA V_{OUT} pin	$V_{OUT, KA}$	-0.3 to 7	V
All other pins Ref to V_{SS}	-	-0.3 to 7	V
Continuous Power Dissipation under ANY condition	P_D	400	mA
Maximum Junction Temperature	$T_{J(MAX)}$	150	°C
Storage Temperature	T_{STG}	-40 to 125	°C
Lead Temperature. Soldering 10 sec		300	°C
Package Thermal Resistance - SOIC	$\theta_{JA, SOIC}$	154	°C/W
Package Thermal Resistance - MSOP	$\theta_{JA, SOIC}$	206	°C/W

Electrical Characteristics ILC6301

General and Common Parameters

Parameter	Symbol	Min	Typ	Max	Units	Comment
Input Voltage	V_{DD}	1.8		6.0	V	V_{IN}
Switch Frequency	F_O	180	200	240	kHz	Trimmed to center
Reference Voltage	V_{ref}		1.217		V	Trimmed Tol. TBD
OFF Mode Current	I_{OFF}			1µA	µA	V_{IN} = 1.8. OFF mode active
Switcher to Chop mode threshold	V_{mode}	3.6		3.8	V	V_{IN} 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_{IH}	1.4			V	Switcher is selected
SEL Logic 0	V_{IL}			0.5	V	KeepAlive is selected
ON/OFF Logic 1	V_{IH}	1.4			V	Normal operation
ON/OFF Logic 0	V_{IL}			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

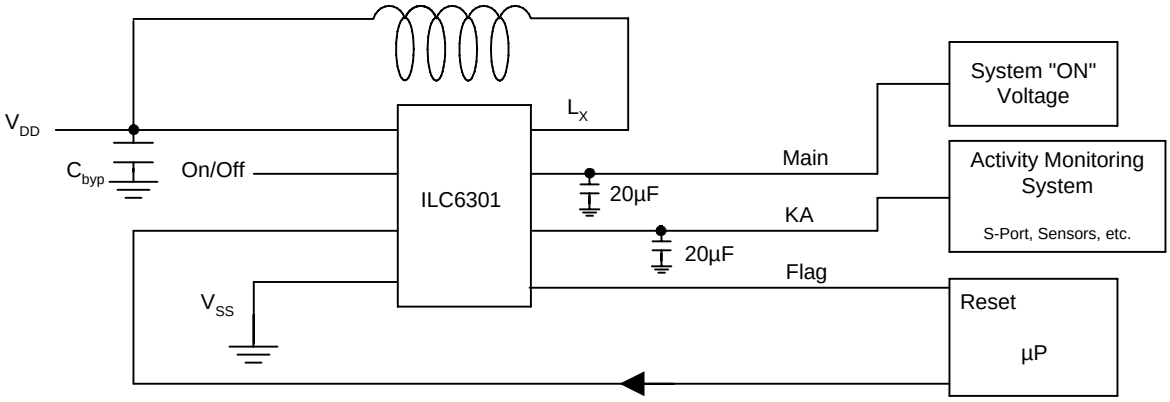
Parameter	Symbol	Min	Typ	Max	Units	Comment
Out Voltage	V_{OUT}		3 or 3.3		V	Fixed
Output Current, max	$I_{O(MAX)}$			10	mA	Short circuit limiting not enabled
Input Current, min	$I_{O(MIN)}$	1			mA	Regulation and ripple percentage Degrades slightly at lower I_{OUT}
Ripple at max load	V_R			60	mV	Coil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

Recommended Components

Switcher Section	Value	Units
Coil	10	µH
Switch out capacitor	20	µF
KeepAlive		
Output capacitor	20	µF
General		
Input bypass capacitor	20 (or user TBD)	µF

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

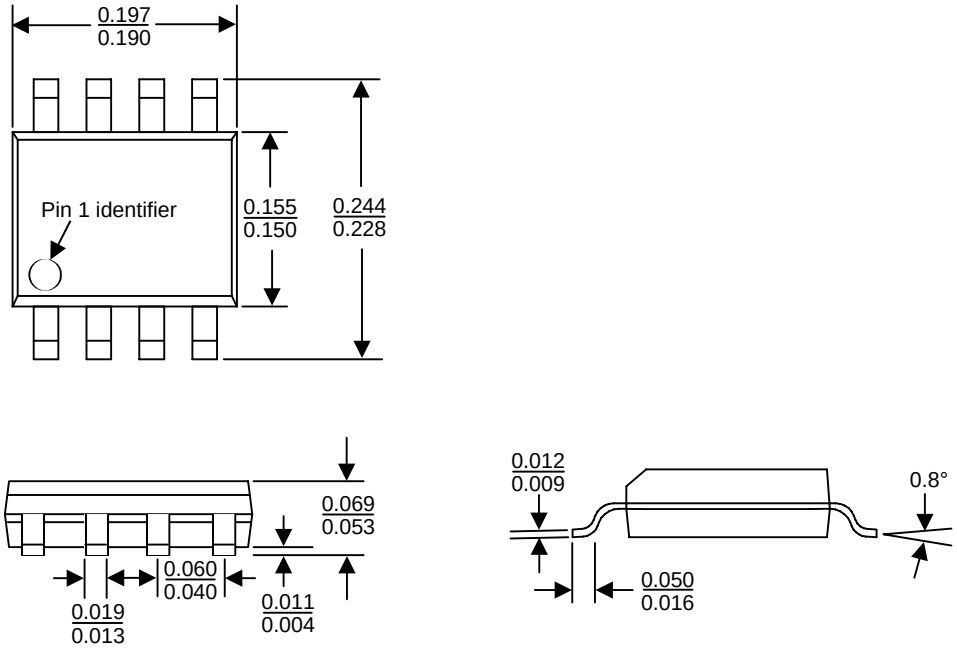
Example Operation



Package Dimensions

All dimensions in inches

8-Pin MSOP



8-Pin SOIC