ILC7010

80mA SC70 Ultra Low Noise CMOS RF-LDO™ Regulator

Features

- 1% output voltage accuracy
- Only 20mV_{RMS} noise @ 10kHz
- Uses low ESR ceramic or tantalum output capacitor to minimize noise and output ripple
- Only 90mA ground current at 80mA load
- Ripple rejection up to 70dB at 1kHz, 60dB at 1MHz
- Excellent line and transient response
- Guaranteed to 80mA output current
- Industry standard five lead SC70 packages
- Fixed 2.8V, 3.0V, 3.3V,3.6V, 4.7V, 5.0V and adjustable output voltage options
- Metal mask option available for custom voltages between 2.5V and 10V

Applications

- Cellular phones
- Wireless communicators
- PDAs / palmtops / organizers
- Battery powered portable electronics

Description

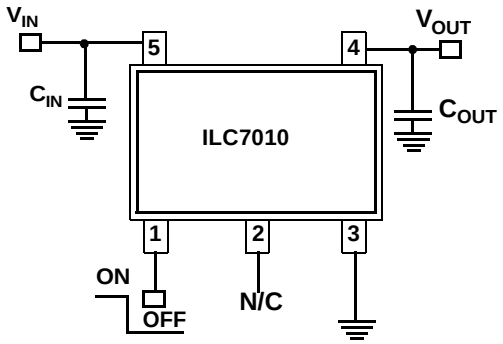
The ILC7010 is an 80mA, Ultra Low Noise, Low Dropout (LDO) linear regulator, designed and processed in Impala's proprietary CMOS process technology. This process combines the best CMOS features of low quiescent current, small size and low dropout voltage with the best bipolar features of high ripple rejection, ultra low noise and power handling capability. The ILC7010 offers a quiescent current of less than 100mA, a logic level enable (regulator on/off) pin, a footprint that is half the size of the industry standard SOT-23, and a low dropout voltage of 50mV at 10mA. With better than 70dB (1kHz) of ripple rejection, ultra low noise of 20µV_{RMS} and 1% output voltage accuracy, the ILC7010 sets a new standard in linear regulators for communications and personal electronics applications.

The ILC7010 is designed to operate with small, low cost ceramic capacitors and is stable over a wide range of ESR values. In addition to the output capacitor, the ILC7010 requires only a 1µF input capacitor. The enable pin can be tied to V_{IN} for easy device layout. The ILC7010 is available in a number of fixed output voltages ranging from 2.5V to 8V. An adjustable version will be available shortly. For competitive replacements, the ILC7080 is available in a variety of pinout options in a SOT-23 package. The ILC7080 offers the same operating characteristics and features as the ILC7010.

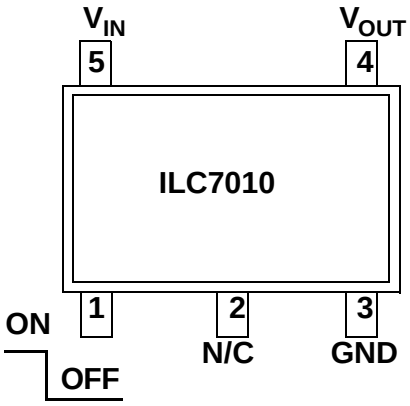
The ILC7010 is ideally suited for use in small size cordless and cellular handsets as well as many other low battery powered electronic devices. Please contact Impala for samples and application information.

Preliminary Information

Typical Application



Pin Assignments



Pin Definitions

Pin Number	Pin Name	Pin Function Description
1	ON/OFF	Shutdown
2	N/C	
3	GND	Ground pin. Local ground for C_{OUT}
4	V_{OUT}	Output voltage. Connect C_{OUT} between this pin and the GND (pin 3)
5	V_{IN}	Connect Directly to Supply

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
Input voltage 7010	V_{IN}	-0.3 to +9V	V
ON/OFF Input Voltage	$V_{ON/OFF}$	-0.3 to V_{IN}	V
Output Current	I_{OUT}	Short Circuit Protected	mA
Output Voltage	V_{OUT}	-0.3 to V_{IN} +0.3	V
Package Power Dissipation	P_D	TBD	mW
Maximum Junction Temp. Range	$T_{J(MAX)}$	-40 to +125	°C
Storage Temperature	T_{STG}	-40 to +125	°C
Operation Ambient Temperature	T_A	-40 to +85	°C

Preliminary Information

Electrical Characteristics

Unless otherwise specified, all limits are at $_A$=25°C, $V_{IN} = V_{OUT(NOM)} + 1v$, $I_{OUT} = 1mA$, $C_{OUT} = 1mF$, $V_{ON/OFF} = 2V$

Parameter	Symbol	Conditions		Typ.	Units
Input Voltage Range	V_{IN}			2.5-8	V
Output Voltage Accuracy	$\Delta V_{OUT}/(V_{OUT}*\Delta V_{IN})$			±1	%
Line Regulation		V_{OUT} (NOM +1V ≤ 8V)		0.007	%/V
Dropout Voltage (Note 3)	V_{IN} V_{OUT}	I_{OUT} = 10µA		0.1	mV
		IOUT $_{= 10mA}$		50	
		I_{OUT} = 20mA		70	
		I_{OUT} = 80mA		235	
Ground Pin Current	I_{GND}	I_{OUT} = 0mA		66	µA
		I_{OUT} = 10mA		67	
		I_{OUT} = 80mA		90	
Shutdown (OFF) Current	$I_{ON/OFF}$	$I_{ON/OFF}$ = 0V		0.1	µA
ON/$\overline{OFF}$ Input Voltage	$V_{ON/OFF}$	High = Regulator On Low = Regulator Off		1.5-2.0 0.6	V
ON/$\overline{OFF}$ Pin Input Current (Note 5)	$I_{IN\ ON/\overline{OFF}}$	$V_{ON/OFF}$ 0.6V Regulator OFF $V_{ON/OFF}$ 2V Regulator ON		0.3 1	µA
Peak Output Current (Note 4)	$I_{IN\ (peak)}$	$V_{OUT} \geq 0.95V_{OUT(NOM)}$, tpw = 2ms		100-120	mA
Output Noise Voltage (RMS)	e_N	BW = 300Hz to 50kHz, C_{IN} = 1µF C_{NOISE} = 0.01µF, C_{OUT} = 2.2µF, I_{OUT} = 10mA		TBD	μ_{VRMS}
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	C_{OUT} = 4.7µF I_{OUT} = 100mA	Freq=1kHz	70	dB
			Freq=10kHz	50	
			Freq=1MHz	65	
Dynamic Line Regulation	$\Delta V_{OUT(line)}$	V_{IN}: $V_{OUT(NOM)}$ + 1V to $V_{OUT(NOM)}$ + 2V, tr/tf = 2µs; I_{OUT} = 80mA		14	mV
Dynamic Load Regulation	$\Delta V_{OUT(load)}$	I_{OUT}: 1mA to 80mA; tr < 5mS		40	mV
Short Circuit Current	I_{SC}	V_{OUT} = 0V		200	mA
Resistance Shutdown Discharge				1.5	kΩ

Notes:

1: Absolute maximum ratings indicate limits which when exceeded may result in damage to the component. Electrical specifications do not apply when operating the device outside of its rated operating conditions.

2: Specified Min/Max limits are production tested or guaranteed through correlation based on statistical control methods. Measurements are taken at constant junction temperature as close to ambient as possible using low duty pulse testing.

3: Dropout voltage is defined as the input to output differential voltage at which the output voltage drops 2% below the nominal value measured with a 1V differential.

4: Guaranteed by design

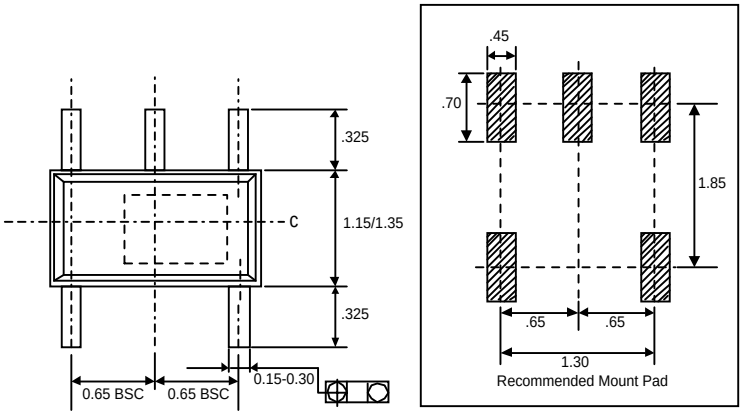
5: The device's shutdown pin includes a 2MΩ internal pull down resistor connected to ground.

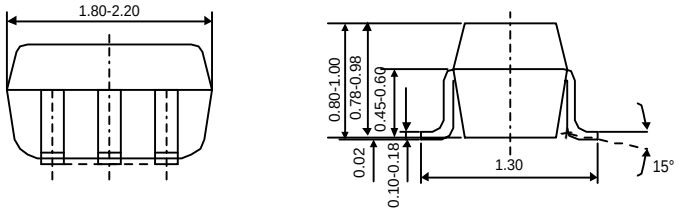
Preliminary Information

Ordering Information TA = 0°C to 70°C	
ILC7010C5-xx	80mA, fixed voltage, SC70 Package

SC-70 Package Markings ILC7010C5-xx

Output Voltage (V)	Grade	Order Information	Supplied As:
2.8	A	ILC7010C5-28	3K Units on Tape and Reel
3.0	A	ILC7010C5-30	3K Units on Tape and Reel
3.3	A	ILC7010C5-33	3K Units on Tape and Reel
3.6	A	ILC7010C5-36	3K Units on Tape and Reel
4.7	A	ILC7010C5-47	3K Units on Tape and Reel
5.0	A	ILC7010C5-50	3K Units on Tape and Reel





1. All dimensions are in millimeters min/max
2. Dimensions are inclusive of plating
3. Dimensions are exclusive of mold flash and metal burr
4. All specifications comply to EIAJ SC70

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