ILC7070

SOT-23 CMOS LDO Regulator with Shutdown

POWER ON THE GO — POWERED BY IMPALA

General Description

150mA CMOS LDO regulator in a 5-lead SOT-23 package, featuring 120mV dropout at 100mA levels and nearly negligible dropout below 5mA.

The part offers ±2% precision as standard, yet draws only 5µA of current in operation and drops to 0.5µA in shutdown.

The outputs offer short-circuit protection, and the shutdown pin has an internal pull-down which will disable the output if the pin is left floating.

Features

- All-CMOS design in 5-lead SOT-23 package
- ±2% precision outputs
- Up to 150mA output current
- 120mV dropout at 100mA load
- Only 5µA quiescent current at full load
- 0.5µA quiescent current in shutdown
- Voltage options allow:
  50mA 5V Regulator
  50mA 5V to 3.3, 3.0, or 2.5V Convertor
  150mA 3.3V or 3.0V to 2.5V Convertor

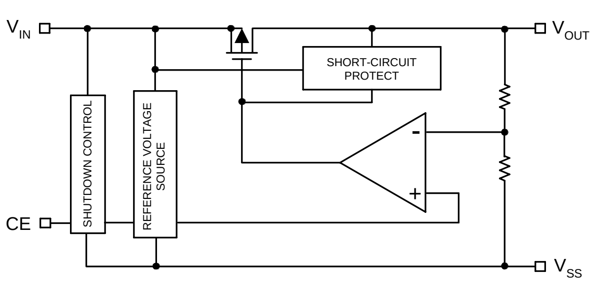
Applications

- Battery-powered Equipment
- Reference voltage sources
- Portable Cameras and Video Recorders
- PDAs

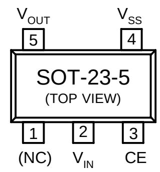
Ordering Information

ILC7070HCM-25	50mA 5V to 2.5V regulator, or 150mA 3.x to 2.5V regulator, High-level true Chip Enable
ILC7070HCM-30	50mA 5V to 3.0V regulator, High-level true Chip Enable
ILC7070HCM-33	50mA 5V to 3.3V regulator, High-level true Chip Enable
ICL7070HCM-50	30mA 5V regulator, High-level true Chip Enable

Block Diagram



Pin-Package Configurations



Absolute Maximum Ratings (T_A = 25°C)

Parameter	Symbol	Ratings	Units
Input Voltage	V_{IN}	12	V
CE Input Voltage	V_{CE}	V_{SS}-.0.3~V_{IN} + 0.3	V
Output Current	I_{OUT}	500	mA
Output Voltage	V_{OUT}	V_{SS}-0.3~V_{IN} + 0.3	V
Continuous Total Power Dissipation	$P_{d(max)}$	150	mW
Operating Ambient Temperature	T_{opr}	-30~+80	°C
Storage Temperature	T_{stg}	-40~+125	°C

Note: I_{OUT} must be less than $P_{d(max)}$ / (V_{IN}-V_{OUT})

Electrical Characteristics ILC7070HCM-50

V_{OUT} = 5.0V, T_A =25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	I_{OUT} = 40mA, V_{IN} = 6.0V	4.90	5.0	5.10	V
Maximum Output Current	$I_{OUT}max$	V_{IN} = 6.0V, $V_{OUT} \geq$ 4.5V	125			mA
Load Stability	ΔV_{OUT}	V_{IN} = 6.0V, 1mA $\leq I_{OUT} \leq$ 100mA			80	mV
Input/Output Voltage Differential	V_{dif}	I_{OUT} = 100mA, V_{OUT} = V_{SET} x 0.98		200	300	mV
Supply Current 1	$I_{SS}1$	V_{IN} = V_{CE} = 6.0V		6	12	µA
Supply Current 2	$I_{SS}2$	V_{IN} = 6.0V, V_{CE} = open (Note 5)		0.5	2.0	µA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \bullet V_{OUT}}$	I_{OUT} = 40mA 6.0V $\leq V_{IN} \leq$ 10.0V			0.3	%/V
Input Voltage	V_{IN}				10	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \bullet V_{OUT}}$	I_{OUT} = 40mA -30°C $\leq T_{opr} \leq$ 80°C		±100		ppm/ °C
CE Input Current	I_{IH} I_{IL}	V_{IN} = 6.0V, V_{CE} = 2.5V V_{IN} = 6.0V, V_{CE} = 0		2	4 0.1	µA
CE ON Voltage	$CE_{(ON)}$	V_{IN} = 6.0V	2.5		V_{IN}	V
CE OFF Voltage	$CI_{(OFF)}$	V_{IN} = 6.0V	0		0.7	V

Electrical Characteristics ILC7070HCM-25

V_{OUT} = 2.5V, T_A = 25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	I_{OUT} = 40mA, V_{IN} = 3.5V	2.450	2.5	2.55	V
Maximum Output Current	$I_{OUT}max$	V_{IN} = 3.5V, $V_{OUT} \geq$ 2.25V	125			mA
Load Stability	ΔV_{OUT}	V_{IN} = 3.5V, 1mA $\leq I_{OUT} \leq$ 60mA		45	90	mV
Input/Output Voltage Differential	V_{dif}	I_{OUT} = 60mA, $V_{OUT} = V_{SET}$ x .98		180	360	mV
Supply Current 1	$I_{SS}1$	$V_{IN} = V_{CE}$ = 3.5V		5	10	µA
Supply Current 2	$I_{SS}2$	V_{IN} = 3.5V, V_{CE} = open (Note 5)		0.5	2	µA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \bullet V_{OUT}}$	I_{OUT} = 40mA 3.5V$\leq V_{IN} \leq$ 10V		0.2	0.3	%/V
Input Voltage	V_{IN}				10.0	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \bullet V_{OUT}}$	I_{OUT} = 40mA -30°C $\leq T_{opr} \leq$ 80°C		±100		ppm/°C
CE Input Current	I_{IH} I_{IL}	V_{IN} = 3.5V, V_{CE} = 3.5V V_{IN} = 3.5V, V_{CE} = 0V		2	4 0.1	µA
CE ON Voltage	$CE_{(ON)}$	V_{IN} = 3.5V	2.5		V_{IN}	V
CE OFF Voltage	$CE_{(OFF)}$	V_{IN} = 3.5V	0		0.7	V

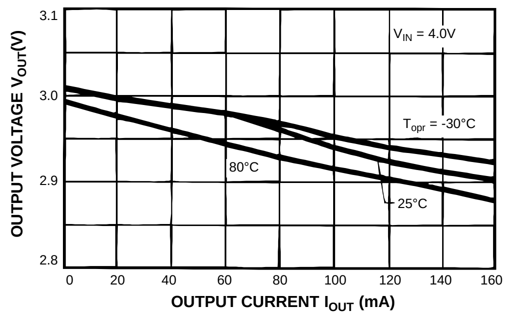
Note:
1. V_{OUT} means the output voltage when "V_{OUT} + 1.0V" is provided at the V_{IN} pin while maintaining a certain I_{OUT} value.
2. $V_{IN}1$ is defined as the input value that is gradually decreased until the output value reaches V_{OUT} x 98%.
3. V_{dif} is defined as "$V_{IN}1$-V_{OUT}."
4. I_{OUT}: this is limited by continuous total power dissipation in the package.
5. When V_{CE} is LOW or OPEN, the output is disabled.

Note: CE pin is a CMOS input. Because of this, when the input voltage reaches $V_{IN}/2$, a rush current will start to flow.

Typical Performance Characteristics *General conditions for all curves*

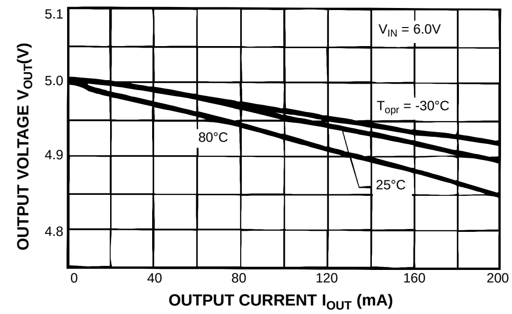
OUTPUT VOLTAGE vs OUTPUT CURRENT

ILC7070HCM-30



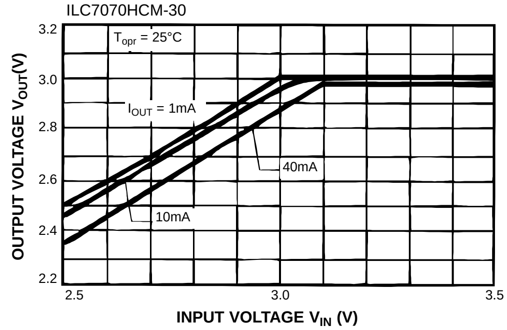
OUTPUT VOLTAGE vs OUTPUT CURRENT

ILC7070HCM-50



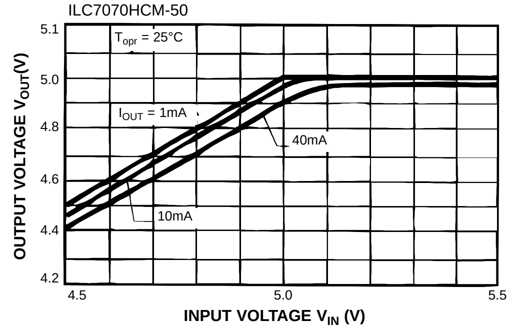
OUTPUT VOLTAGE vs INPUT VOLTAGE

ILC7070HCM-30



OUTPUT VOLTAGE vs INPUT VOLTAGE

ILC7070HCM-50



OUTPUT VOLTAGE vs INPUT VOLTAGE

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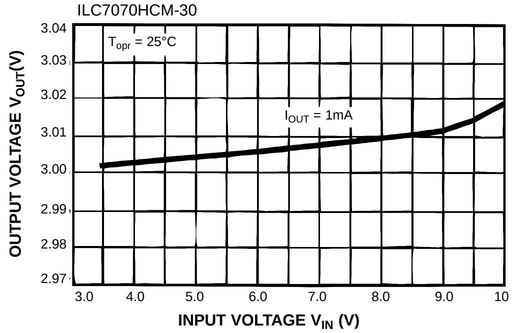
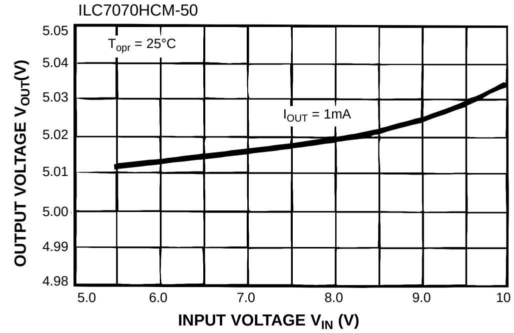


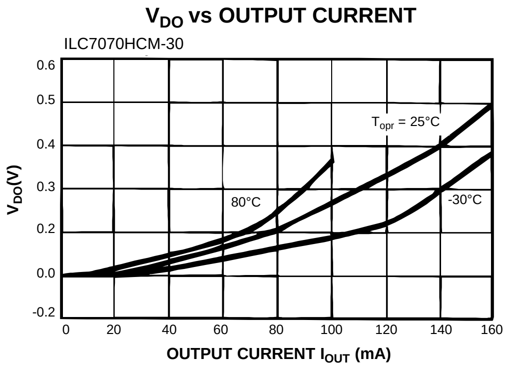
OUTPUT VOLTAGE vs INPUT VOLTAGE

ILC7070HCM-50



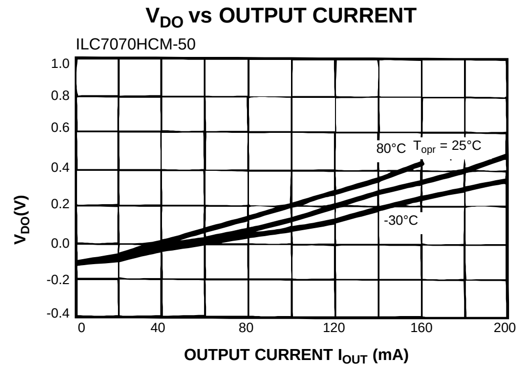
V_{DO} vs OUTPUT CURRENT

ILC7070HCM-30

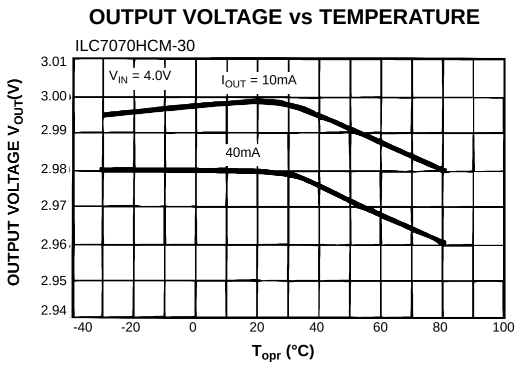


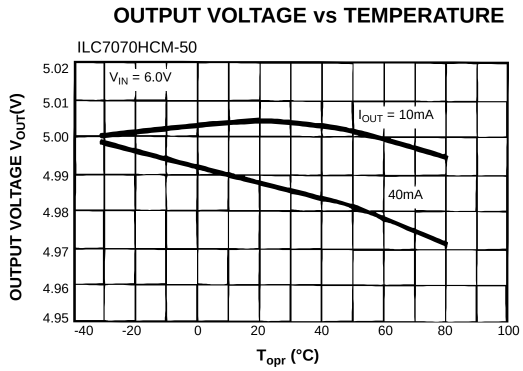
V_{DO} vs OUTPUT CURRENT

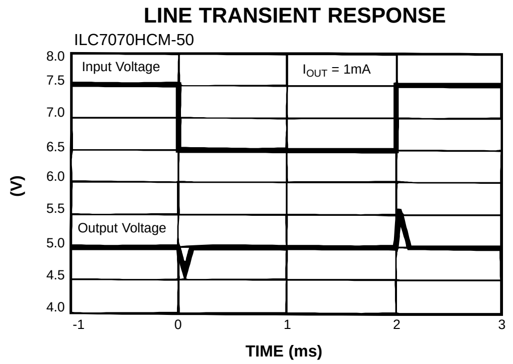
ILC7070HCM-50

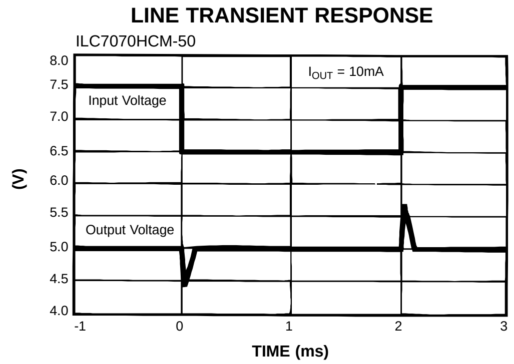


Electrical Characteristics *General conditions for all curves*









Package Outline Dimensions