ILC7070

SOT-23 CMOS LDO Regulator with Shutdown

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 Converter
  150mA 3.3V or 3.0V to 2.5V Converter

Applications

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

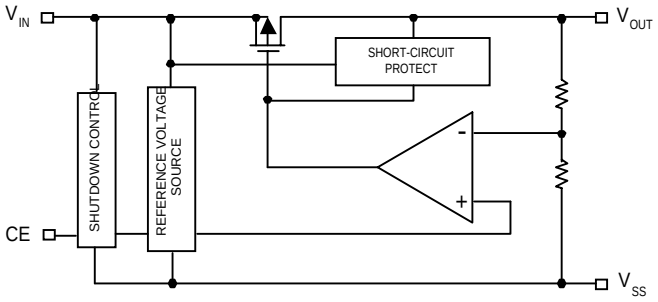
Description

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

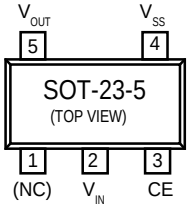
The part offers ±2% precision as standard, yet draws only 5µA of current in operation and drops to 0.5µA in shutdown.

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.

Block Diagram



Pin Assignments



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

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	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \bullet \Delta V_{OUT}}$	I_{OUT} = 40mA 6.0V $\leq V_{IN} \leq$ 10V			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} = 0V		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 0.98		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	2.0	µA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \bullet \Delta V_{OUT}}$	I_{OUT} = 40mA 3.5V $\leq V_{IN} \leq$ 10V		0.2	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} = 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	$CI_{(OFF)}$	V_{IN} = 3.5V	0		0.7	V

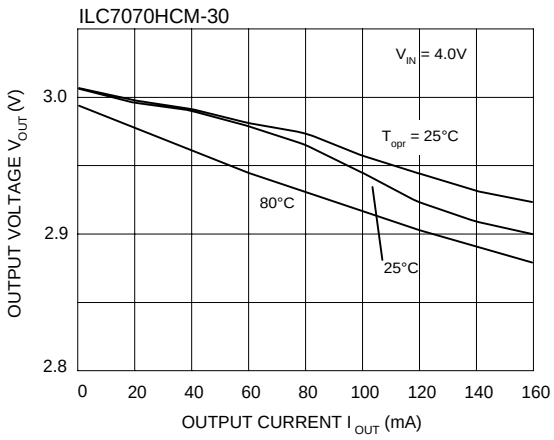
Notes:

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.

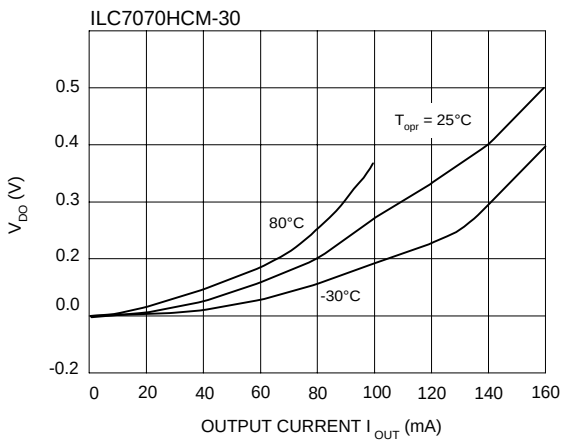
Note: CE pin is a CMOS input. Because of this, when the input voltage reaches $V_{IN}/2$, a rush current will start to flow.

Typical Performance Characteristics General conditions for all curves

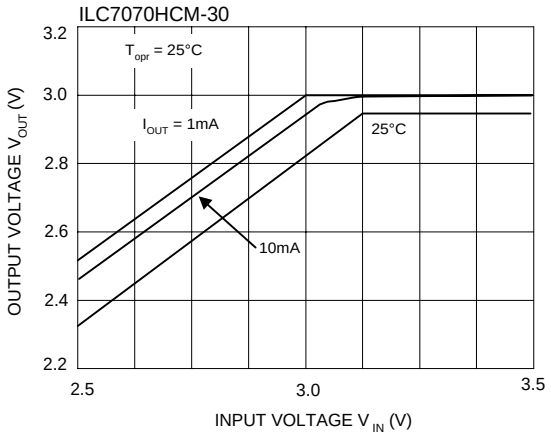
Output Voltage vs Output Current



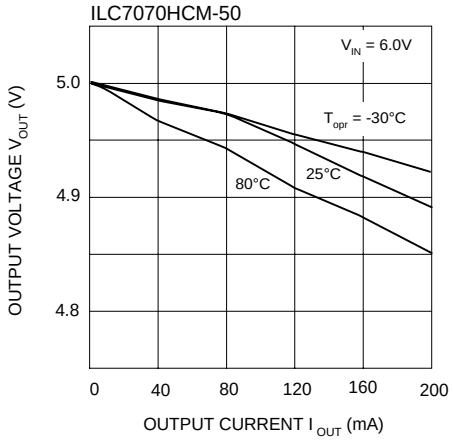
V_{DO} vs Output Current



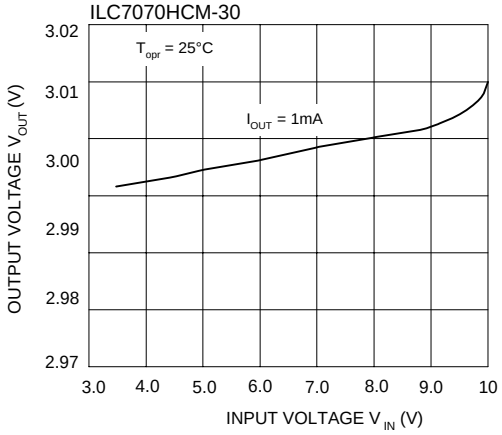
Output Voltage vs Input Voltage



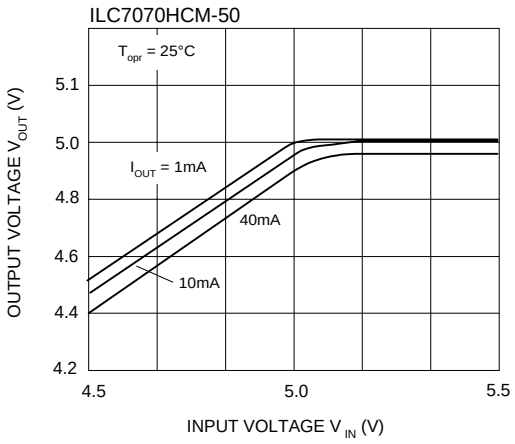
Output Voltage vs Output Current



Output Voltage vs Input Voltage

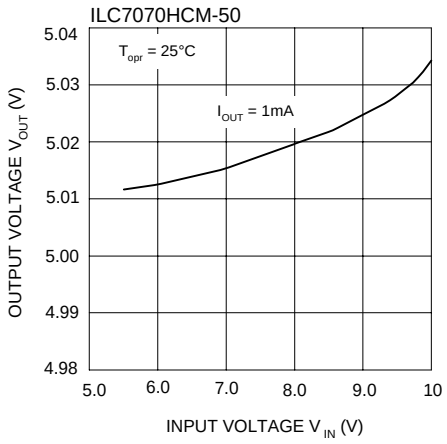


Output Voltage vs Input Voltage

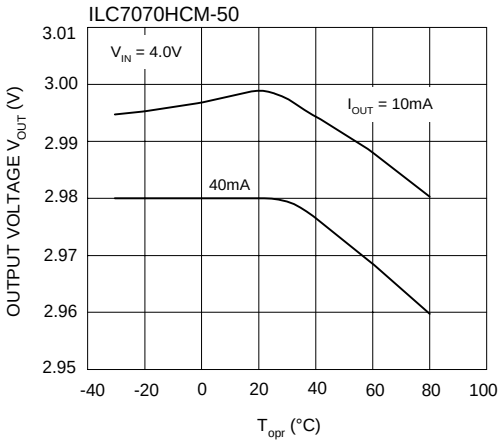


Typical Performance Characteristics General conditions for all curves

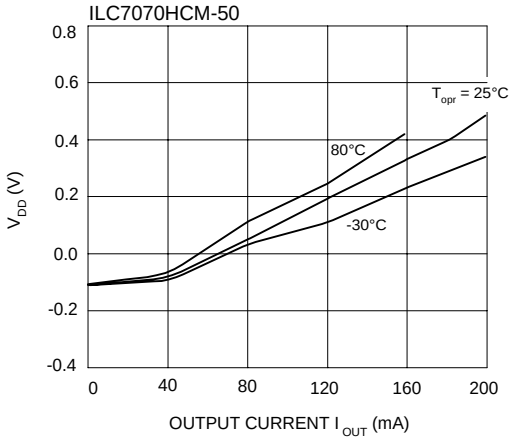
Output Voltage vs Input Voltage



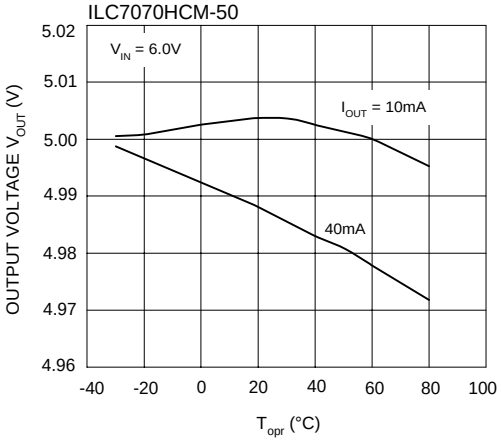
Output Voltage vs Temperature



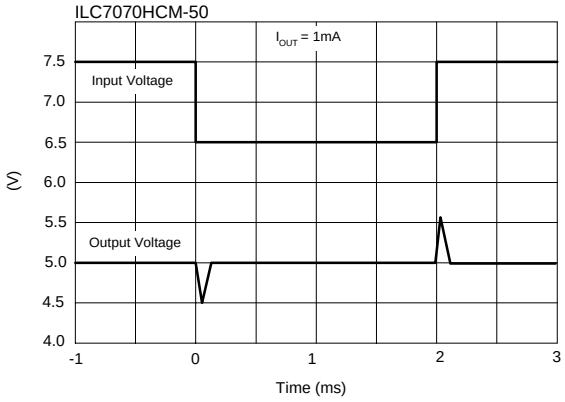
V_{DD} vs Output Current



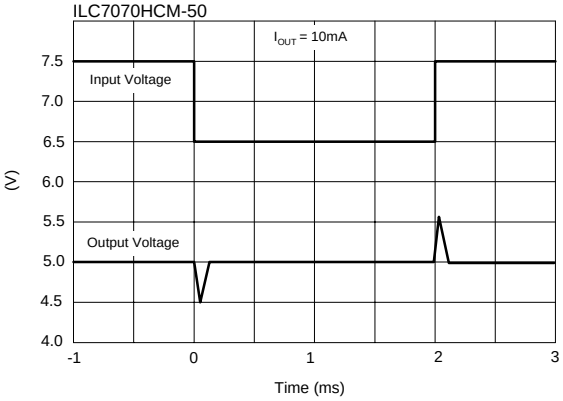
Output Voltage vs Temperature



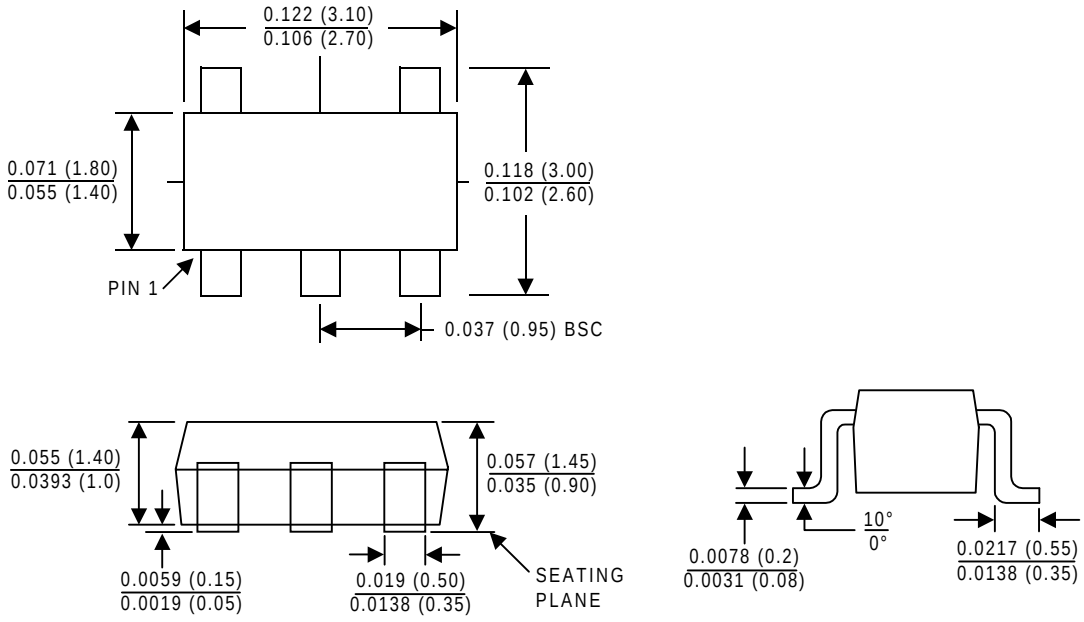
Line Transient Response



Line Transient Response



Package Dimensions



Ordering Information

Product Number	Package
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
ILC7070HCM-50	30mA 5V regulator, High-level true Chip Enable

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Stock#DSxxxxxxxx