

LX8610-xx

1A BiCMOS VERY LOW DROPOUT REGULATORS

PRELIMINARY DATA SHEET

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ABSOLUTE MAXIMUM RATINGS (Note 1)

Input Voltage (V_{IN})	6.5V
Enable Pin	-0.3V to $V_{IN}+0.3V$
Operating Junction Temperature	
Plastic (ST & DM Packages)	125°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 seconds)	300°C

Note 1. Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

THERMAL DATA

ST PACKAGE:

THERMAL RESISTANCE-JUNCTION TO TAB, θ_{JT}	15°C/W
THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	*150°C/W

DM PACKAGE:

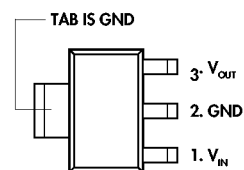
THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	165°C/W
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Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.

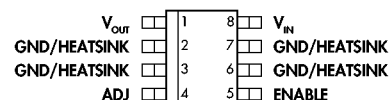
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system. All of the above assume no ambient airflow.

* θ_{JA} can be improved with package soldered to 0.5IN² copper area over backside ground plane or internal power plane. θ_{JA} can vary from 20°C/W to > 40°C/W depending on mounting technique.

PACKAGE PIN OUTS



ST PACKAGE
(Top View)



DM PACKAGE
(Top View)

FUNCTIONAL PIN DESCRIPTION

Pin Designator	Description
V_{IN}	Positive supply input for the regulator. Bypass to GND with at least 2.2 μ F of low ESR, ESL capacitance if supply source is further than 1 inch from the device.
V_{OUT}	Output for the regulator. It is recommended to bypass to GND with at least 10 μ F although this is not required for regulation, rather its needed for transient response. Size your output capacitor to meet the transient loading requirement. If you have a very dynamic load, a larger capacitor will improve the response to these load steps.
GND	Reference ground. The input and output decoupling capacitors should be connected to this pin. In addition the tab on the SOT-223 package and pins 2, 3, 6 and 7 on the SOIC package are also used for heatsinking the device.
ADJ	Feedback pin for the regulator. For the LX8610-00, the output voltage can be set by two external resistors with the following relationship: $V_{OUT} = 1.25V \times (1+R2/R1)$ where R1 is the resistor connected between V_{OUT} and ADJ, and R2 is the resistor connected between ADJ and GND pin.
ENABLE	Enable input. This pin has a threshold of about 1.5V, it should be actively pulled high to enable the regulator. This can be accomplished with a resistive pull-up or controlled by a logic gate. When low, it turns off the regulator and puts the device in a low current shutdown state.

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RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Recommended Operating Conditions			Units
		Min.	Typ.	Max.	
Input Voltage	V_{IN}	2.5		5.5	V
Load Current (with adequate heatsinking)		10		1000	mA
Input Capacitor (V_{IN} to GND)		2.2			μF
Output Capacitor (V_{OUT} to GND)		10			μF

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for the LX8610-xxC with $0^{\circ}C \leq T_A \leq 70^{\circ}C$; $V_{IN} = V_{OUT} + 1.5V$; $I_{OUT} = 10mA$; $C_{IN} = 10\mu F$; $C_{OUT} = 22\mu F$; $T_J = T_A$. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

LX8610-33 Fixed 3.3V, 1A

Parameter	Symbol	Test Conditions	LX8610-33			Units
			Min.	Typ.	Max.	
Output Voltage	V_{OUT}	$T_J = 25^{\circ}C$	3.25	3.3	3.35	V
		Over Temperature	3.22		3.38	V
Line Regulation	V_{REG}	$V_{IN} = 3.45V$ to $5.5V$		4	8	mV
Load Regulation	I_{REG}	$I_{OUT} = 10mA$ to $1A$		5	10	mV
Dropout Voltage ($V_{DO} = V_{IN} - V_{OUT}$)	V_{DO}	$I_{OUT} = 1A$, $V_{OUT} = \Delta V_{OUT} - 1\%$		0.25	0.4	V
		$I_{OUT} = 0.5A$, $V_{OUT} = \Delta V_{OUT} - 1\%$		0.15	0.25	V
		$I_{OUT} = 10mA$, $V_{OUT} = \Delta V_{OUT} - 1\%$		0.05	0.15	V
Current Limit	I_{CL}	$V_{OUT} = V_{OUT} - 1\%$	1.1	1.3	1.8	A
Short Circuit Current	I_{SC}	$V_{OUT} = 0V$	1	1.25	1.7	A
Quiescent Current	I_Q	$I_{OUT} = 10mA$ to $1A$		400	600	μA
Reverse Leakage Current		$0V < V_{IN} < V_{OUT}$, $V_{OUT} < 3.4V$ (at V_{OUT})		400	650	μA
		$0V < V_{IN} < V_{OUT}$, $V_{OUT} < 3.4V$ (at V_{IN})	-50	0		mA
Enable Threshold *			0.8	1.5		V
Shutdown Current *				10	25	μA

LX8610-25 Fixed 2.5V, 1A

Parameter	Symbol	Test Conditions	LX8610-25			Units
			Min.	Typ.	Max.	
Output Voltage	V_{OUT}	$T_J = 25^{\circ}C$	2.46	2.5	2.54	V
		Over Temperature	2.44	2.5	2.56	V
Line Regulation	V_{REG}	$V_{IN} = 3.1V$ to $5.5V$, $I_{OUT} = -10mA$		3	6	mV
Load Regulation	I_{REG}	$I_{OUT} = 10mA$ to $1A$		5	10	mV
Dropout Voltage ($V_{DO} = V_{IN} - V_{OUT}$)	V_{DO}	$I_{OUT} = 1A$, $V_{OUT} = \Delta V_{OUT} - 1\%$		0.25	0.4	V
		$I_{OUT} = 0.5A$, $V_{OUT} = \Delta V_{OUT} - 1\%$		0.15	0.25	V
		$I_{OUT} = 10mA$, $V_{OUT} = \Delta V_{OUT} - 1\%$		0.05	0.1	V
Current Limit	I_{CL}	$V_{OUT} = V_{OUT} - 1\%$	1.1	1.3	1.8	A
Short Circuit Current	I_{SC}	$V_{OUT} = 0V$	1	1.25	1.7	A
Quiescent Current	I_Q	$I_{OUT} = 10mA$ to $1A$		300	600	μA
Reverse Leakage Current		$0V < V_{IN} < V_{OUT}$, $V_{OUT} < 2.6V$ (at V_{OUT})		400	650	μA
		$0V < V_{IN} < V_{OUT}$, $V_{OUT} < 2.6V$ (at V_{IN})	-50	0		mA
Enable Threshold *			0.8	1.5		V
Shutdown Current *				10	25	μA

* Enable Threshold and Shutdown Current apply only to 8-pin SOIC package outline versions.

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ELECTRICAL CHARACTERISTICS (Continued)

LX8610-00 Adjustable Output, 1A

Parameter	Symbol	Test Conditions	LX8610-00			Units
			Min.	Typ.	Max.	
Reference Voltage	V_{REF}	$T_J = 25^\circ\text{C}$	1.238	1.25	1.262	V
		Over Temperature	1.225	1.25	1.270	V
Line Regulation	V_{REG}	$V_{IN} = V_{OUT} + 150\text{mV}$ to 5.5V , $I_{OUT} = 10\text{mA}$		2	4	mV
Load Regulation	I_{REG}	$I_{OUT} = 10\text{mA}$ to 1A		7	15	mV
Dropout Voltage ($V_{DO} = V_{OUT} - V_{IN}$)	V_{DO}	$I_{OUT} = 1\text{A}$, $V_{IN} > 4\text{V}$		0.25	0.4	V
		$I_{OUT} = 0.5\text{A}$, $V_{IN} > 3\text{V}$		0.15	0.25	V
		$I_{OUT} = 10\text{mA}$, $V_{IN} > 3\text{V}$		0.05	0.15	V
Current Limit	I_{CL}	$V_{OUT} = V_{OUT} - 1\%$	1.1	1.3	1.8	A
Short Circuit Current	I_{SC}	$V_{OUT} = 0\text{V}$	1	1.25	1.7	A
Quiescent Current	I_Q	$I_{OUT} = 10\text{mA}$ to 1A , $V_{IN} = 5.5\text{V}$		400	600	μA
Reverse Leakage Current		$0\text{V} < V_{IN} < V_{OUT}$, $V_{OUT} < 5.5\text{V}$ (at V_{OUT})		400	650	μA
		$0\text{V} < V_{IN} < V_{OUT}$, $V_{OUT} < 5.5\text{V}$ (at V_{IN})	-50	0		mA
Bias Current at ADJ Pin				100	250	nA
Enable Threshold			0.8	1.5		V
Shutdown Current		Enable $< 0.8\text{V}$		10	25	μA

TYPICAL APPLICATION

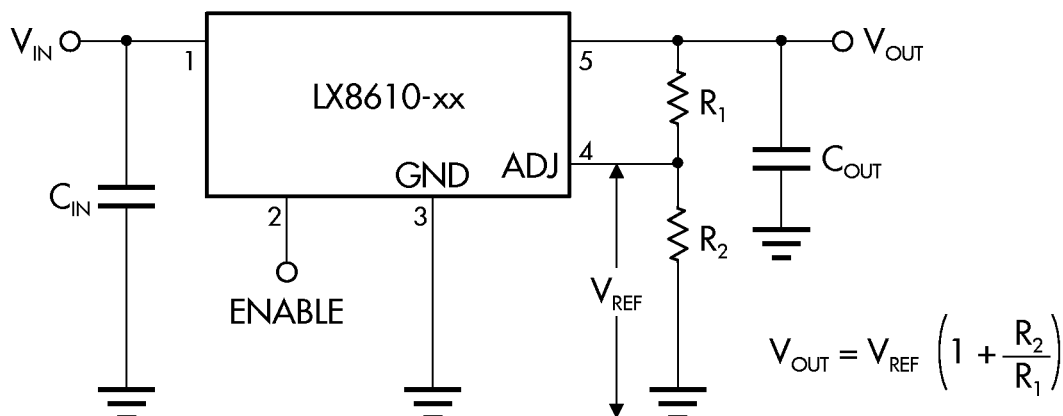
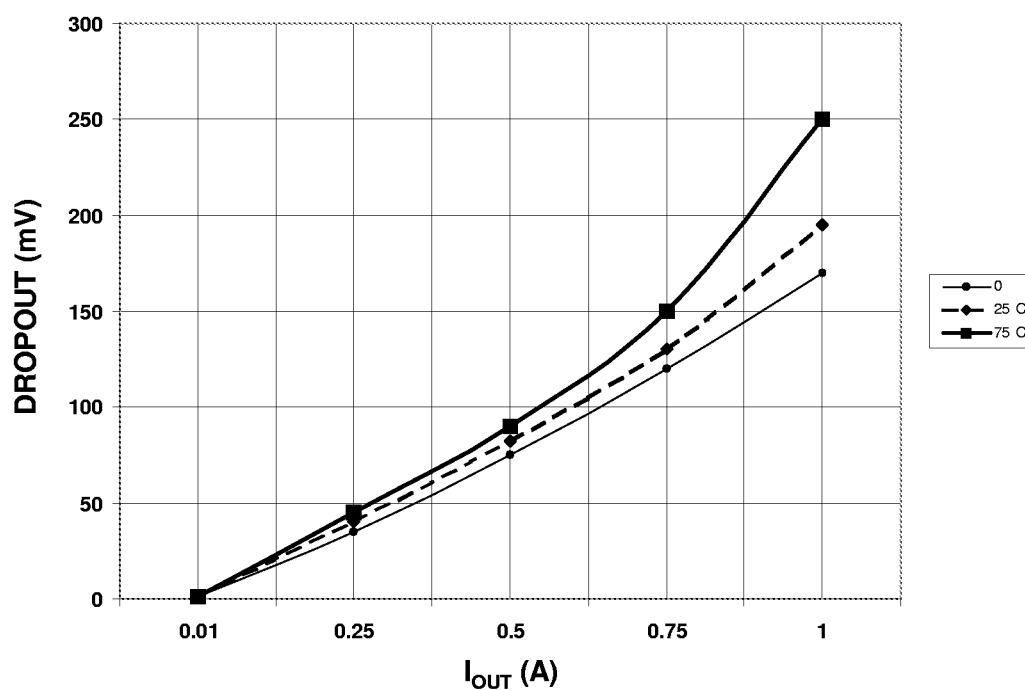


FIGURE 1 — Typical Application

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CHARACTERISTIC CURVES

FIGURE 2 — Dropout Voltage vs. Output Current (Typical - LX8610-25CST)

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