



LT1120M/883

Micropower Regulator with Comparator and Shutdown

**DESCRIPTION**

The LT1120M/883 is a combination micropower positive regulator and free collector comparator on a single monolithic chip. With only 40µA supply current, the LT1120M/883 can supply over 125mA of output current. Input voltage range is from 4.5V to 36V and dropout voltage is 0.6V at 125mA. Dropout voltage decreases with lower load currents. Also included on the chip is a Class B output 2.5V reference that can either source or sink current. Shutdown pin allows logic shutdown of the output.

The comparator can be used for system or battery monitoring. For example, the comparator can be used to warn of low system voltage.

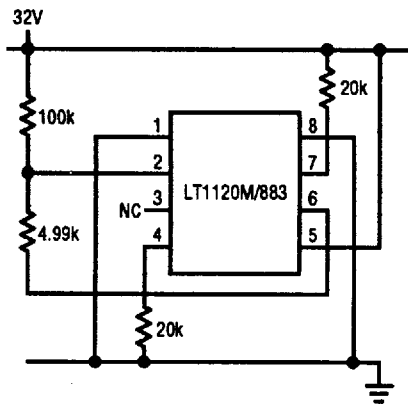
The 2.5V reference will source or sink current. This allows it to be used as a supply splitter or auxiliary output.

The device is processed to the requirements of MIL-STD-883 Class B to yield circuits usable in precision military applications.

**ABSOLUTE MAXIMUM RATINGS**

Input Voltage Transient .....	36V
NPN Collector Voltage .....	36V
Output Short-Circuit Duration .....	Indefinite
Power Dissipation .....	Internally Limited
Operating Temperature Range .....	-55°C to 125°C
Storage Temperature Range .....	-65°C to 150°C

**BURN-IN CIRCUIT**



**PACKAGE/ORDER INFORMATION**

<p>J8 PACKAGE 8-LEAD CERAMIC DIP</p>	ORDER PART NUMBER
	LT1120MJ8/883
<p>H PACKAGE 8-LEAD TO-5 METAL CAN</p>	ORDER PART NUMBER
	LT1120MH/883
PART MARKINGS†	
LT1120MJ8/883C	
PART MARKINGS†	
LT1120MH/883C	

† The suffix letter "C" of the part mark indicates compliance per MIL-STD-883, para 1.2.1.1.

**TABLE 1: ELECTRICAL CHARACTERISTICS**

PARAMETER	CONDITIONS	T <sub>A</sub> = 25°C			SUB-GROUP	-55°C ≤ T <sub>A</sub> ≤ 125°C			SUB-GROUP	UNITS
		MIN	TYP	MAX		MIN	TYP	MAX		
<b>Reference</b>										
Reference Voltage	4.5V ≤ V <sub>IN</sub> ≤ 36V	2.46	2.5	2.54	1	2.4	2.5	2.55	2,3	V
Line Regulation	4.5V ≤ V <sub>IN</sub> ≤ 36V		0.01	0.015	1		0.01	0.02	2,3	%/V



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## TABLE 1: ELECTRICAL CHARACTERISTICS

PARAMETER	CONDITIONS	$T_A = 25^\circ\text{C}$			SUB-GROUP	$-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$			SUB-GROUP	UNITS
		MIN	TYP	MAX		MIN	TYP	MAX		
Load Regulation	$-2\text{mA} \leq I_{\text{REF}} \leq 2\text{mA}, V_{\text{IN}} = 12\text{V}$		0.2	0.6	1		0.3	0.8	2,3	%
Output Source Current	$V_{\text{IN}} = 5\text{V}$	2	4		1	2			2,3	mA
Output Sink Current	$V_{\text{IN}} = 5\text{V}$	2	4		1	2			2,3	mA
Temperature Stability			1							%
<b>Regulator</b>										
Supply Current	$V_{\text{IN}} = 6\text{V}, I_{\text{OUT}} \leq 100\mu\text{A}$ $V_{\text{IN}} = 36\text{V}, I_{\text{OUT}} \leq 100\mu\text{A}$ $V_{\text{IN}} = 12\text{V}, I_{\text{OUT}} \leq 125\text{mA}$	45	80		1	65	95		2,3	$\mu\text{A}$
		75	100		1	85	100		2,3	$\mu\text{A}$
		11	20		1	11	20		2,3	mA
Output Current	$(V_{\text{IN}} - V_{\text{OUT}}) \geq 1\text{V}, V_{\text{IN}} \geq 6\text{V}$	125			1	125			2,3	mA
Load Regulation	$(V_{\text{IN}} - V_{\text{OUT}}) \geq 1\text{V}, V_{\text{IN}} \geq 6\text{V}$		0.2	0.5	1		1		2,3	%
Line Regulation	$6\text{V} \leq V_{\text{IN}} \leq 36\text{V}$		0.01	0.015	1		0.02		2,3	%/V
Dropout Voltage	$I_{\text{OUT}} = 100\mu\text{A}$ $I_{\text{OUT}} = 125\text{mA}$		0.02	0.05	1		0.06		2,3	V
			0.40	0.65	1		0.85		2,3	V
Feedback Sense Voltage	$V_{\text{IN}} = 12\text{V}$	2.44	2.5	2.56	1	2.38	2.5	2.57	2,3	V
Shutdown Pin Voltage	$V_{\text{OUT}} \leq 0.5\text{V}$			0.4	1					V
	Normal Shutdown	2.2	1.4							V
Feedback Bias Current			15	40	1		50		2,3	nA
Minimum Load Current	$V_{\text{IN}} = 36\text{V}$		1	5	1		50		2,3	$\mu\text{A}$
Short-Circuit Current	$V_{\text{IN}} = 36\text{V}$		300	400	1		300	400	2,3	mA
<b>Comparator</b>										
Offset Voltage	$0\text{V} \leq V_{\text{CM}} \leq 35\text{V}, V_{\text{IN}} = 36\text{V}$		3	7	1		10		2,3	mV
Bias Current	$0\text{V} \leq V_{\text{CM}} \leq 35\text{V}, V_{\text{IN}} = 36\text{V}$ (Note 1)		15	40	1		15	60	2,3	nA
Gain-NPN Pull-down	$\Delta V_{\text{OUT}} = 29\text{V}, R_L = 20\text{k}$	2000	10000		1	1000			2,3	V/V
Common-Mode Rejection	$0\text{V} \leq V_{\text{CM}} \leq 35\text{V}, V_{\text{IN}} = 36\text{V}$	80	94		1					dB
Power Supply Rejection	$4.5\text{V} \leq V_S \leq 36\text{V}$	80	96		1				2,3	dB
Output Sink Current	$V_{\text{IN}} = 4.5\text{V}$ (Note 2)	10	18		1	5	10		2,3	mA
Saturation Voltage	$I_{\text{OUT}} = 1\text{mA}$		0.4	0.6	1					V
Input Voltage Range		0		$V_{\text{IN}} - 1$	1					V
Response Time			5							$\mu\text{s}$
Leakage Current			2		1		8		2,3	$\mu\text{A}$

**Note 1:** For  $0\text{V} \leq V_{\text{CM}} \leq 0.1\text{V}$  and  $T > 85^\circ\text{C}$   $I_{\text{BIAS MAX}}$  is 100nA.

**Note 2:** For  $T_A \leq -40^\circ\text{C}$  output sink current min is 2.5mA

**Note 3:** Devices are tested to 36V on a pulse power basis. This device is rated steady state to 30V.

## TABLE 2: ELECTRICAL TEST REQUIREMENTS

MIL-STD-883 TEST REQUIREMENTS	SUBGROUP
Final Electrical Test Requirements (Method 5004)	1*, 2,3
Group A Test Requirements (Method 5005)	1,2,3
Group C and D End Point Electrical Parameters (Method 5005)	1

\* PDA applies to subgroup 1. See PDA Test Notes.

### PDA Test Notes

The PDA is specified as 5% based on failures from group A, subgroup 1, tests after cooldown as the final electrical test in accordance with method 5004 of MIL-STD-883 Class B. The verified failures of group A, subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent for the lot.

Linear Technology Corporation reserves the right to test to tighter limits than those given.

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