

CHANGE NOTIFICATION



Linear Technology Corporation
1630 McCarthy Blvd., Milpitas, CA 95035-7417
(408) 432-1900

April 6, 2015

Dear Sir/Madam:

PCN# 040615

Subject: Notification of Change to LTC4231 Datasheet

Please be advised that Linear Technology Corporation has made a minor change to the LTC4231 product datasheet to facilitate the addition of a high temperature H grade version of the product. The changes are shown on the attached pages of the marked up datasheet. There was no change in form, fit, function, quality or reliability of the product. The product shipped after June 8, 2015 will be tested to the new limits.

Should you have any further questions or concerns please contact your local Linear Technology Sales person or you may contact me at 408-432-1900 ext. 2077, or by e-mail at jason.hu@linear.com. If I do not hear from you by June 8, 2015, we will consider this change to be approved by your company.

Sincerely,

Jason Hu
Quality Assurance Engineer

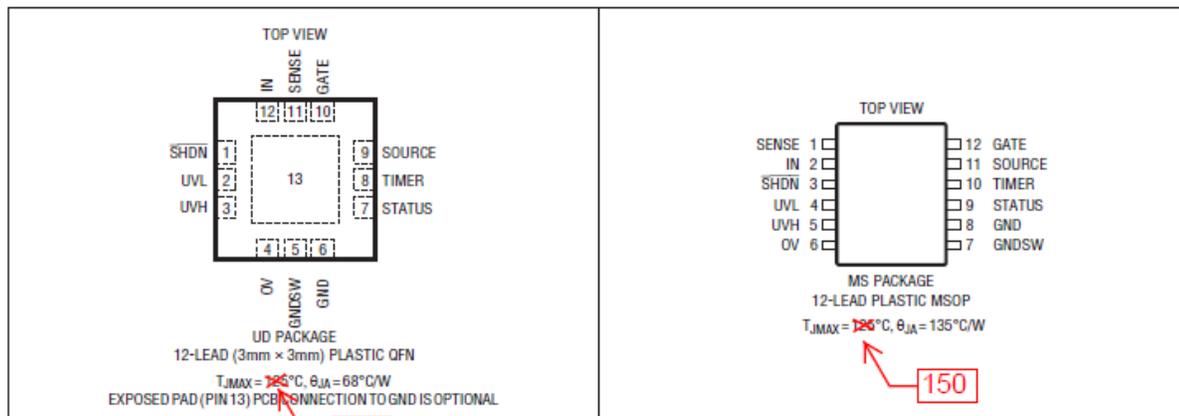
LTC4231

ABSOLUTE MAXIMUM RATINGS

(Notes 1, 2)

Supply Voltage	GATE-SENSE.....	-40V to 20V
IN.....	STATUS	-0.3V to 40V
Input Voltages	TIMER.....	-0.3V to 4V
SENSE, SOURCE.....	Operating Ambient Temperature Range	
IN-SENSE.....	LTC4231C	0°C to 70°C
SHDN, UVL, UVH, OV, GNDSW.....	LTC4231I.....	-40°C to 85°C
Input Currents	LTC4231H.....	-40°C to 125°C
SHDN, UVL, UVH, OV, GNDSW (Note 3).....	Storage Temperature Range	-65°C to 150°C
Output Voltages	Lead Temperature (Soldering, 10 sec)	
GATE-SOURCE (Note 4).....	MSOP Package	300°C

PIN CONFIGURATION



ORDER INFORMATION

LEAD FREE FINISH	TAPE AND REEL	PART MARKING	PACKAGE DESCRIPTION	TEMPERATURE RANGE
LTC4231CUD-1#PBF	LTC4231CUD-1#TRPBF	LGMX	12-Lead (3mm x 3mm) Plastic QFN	0°C to 70°C
LTC4231CUD-2#PBF	LTC4231CUD-2#TRPBF	LGSP	12-Lead (3mm x 3mm) Plastic QFN	0°C to 70°C
LTC4231IUD-1#PBF	LTC4231IUD-1#TRPBF	LGMX	12-Lead (3mm x 3mm) Plastic QFN	-40°C to 85°C
LTC4231IUD-2#PBF	LTC4231IUD-2#TRPBF	LGSP	12-Lead (3mm x 3mm) Plastic QFN	-40°C to 85°C
LTC4231HUD-1#PBF	LTC4231HUD-1#TRPBF	LGMX	12-Lead (3mm x 3mm) Plastic QFN	-40°C to 125°C
LTC4231HUD-2#PBF	LTC4231HUD-2#TRPBF	LGSP	12-Lead (3mm x 3mm) Plastic QFN	-40°C to 125°C
LTC4231CMS-1#PBF	LTC4231CMS-1#TRPBF	42311	12-Lead Plastic MSOP	0°C to 70°C
LTC4231CMS-2#PBF	LTC4231CMS-2#TRPBF	42312	12-Lead Plastic MSOP	0°C to 70°C
LTC4231IMS-1#PBF	LTC4231IMS-1#TRPBF	42311	12-Lead Plastic MSOP	-40°C to 85°C
LTC4231IMS-2#PBF	LTC4231IMS-2#TRPBF	42312	12-Lead Plastic MSOP	-40°C to 85°C
LTC4231HMS-1#PBF	LTC4231HMS-1#TRPBF	42311	12-Lead Plastic MSOP	-40°C to 125°C
LTC4231HMS-2#PBF	LTC4231HMS-2#TRPBF	42312	12-Lead Plastic MSOP	-40°C to 125°C

Consult LTC Marketing for parts specified with wider operating temperature ranges.

Consult LTC Marketing for information on nonstandard lead based finish parts.

For more information on lead free part marking, go to: <http://www.linear.com/leadfree/>

For more information on tape and reel specifications, go to: <http://www.linear.com/tapeandreeel/>

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the full operating temperature range, otherwise specifications are at $T_A = 25^\circ\text{C}$. $I_{IN} = 12\text{V}$, unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
IN						
V_{IN}	Input Supply Voltage Range		● 2.7		36	V
$V_{IN(UVL)}$	Input Supply Undervoltage Lockout	IN Rising	● 2	2.3	2.6	V
$\Delta V_{IN(HYST)}$	Input Supply Undervoltage Lockout Hysteresis			200		mV
I_{CC}	Supply Current (Average)	(Note 5)				
	Normal On, Voltage or Current Fault	$I_{GATE} \leq -0.1\mu\text{A}$, $C_{GATE-SOURCE} = 1\text{nF}$, (C-, I-Grade)	●	4	10	μA
		(H-Grade)	●	4	20	μA
	Start-Up or Overcurrent Shutdown	SHDN Low, GATE Pulled to GND	●	300	600	μA
		IN, SENSE = -40V, (C-, I-Grade)	●	0.3	1	μA
		(H-Grade)	●	0.3	2	μA
	Reverse Input		●	-2.5	-5	mA
SENSE						
$\Delta V_{SENSE(CB)}$	Circuit Breaker Threshold ($V_{IN} - V_{SENSE}$)		● 47	50	53	mV
$\Delta V_{SENSE(ACL)}$	Analog Current Limit	During Output Short-Circuit	● 65	80	90	mV
I_{SENSE}	SENSE Input Current	SHDN = High, SENSE = 12V	●	0.3	1	μA
GATE, SOURCE						
ΔV_{GATE}	External N-Channel Gate Drive ($V_{GATE} - V_{SOURCE}$)	$V_{IN} < 7\text{V}$, $I_{GATE} = 0$, $-0.1\mu\text{A}$ $V_{IN} \geq 7\text{V}$, $I_{GATE} = 0$, $-0.1\mu\text{A}$	● 4.5 ● 10	6.2 11.4	10 18	V
$\Delta V_{GATE(H)}$	ΔV_{GATE} ($V_{GATE} - V_{SOURCE}$) Threshold That Deactivates the Charge Pump	$V_{IN} < 7\text{V}$ $V_{IN} \geq 7\text{V}$	● 5.5 ● 11	6.5 11.7	10 18	V
$V_{GATE(L)}$	GATE Low Threshold	To Enter Shutdown or Voltage Fault	● 0.5	1.2	1.8	V
$I_{GATE(UP)}$	GATE Pull-Up Current	GATE On, GATE = 1V	● -7	-10	-12	μA
$I_{GATE(FAST)}$	GATE Fast Pull-Down Current	$\Delta V_{SENSE} = 0.5\text{V}$, $\Delta V_{GATE} = 5\text{V}$	●	70	130	mA
$I_{GATE(SLOW)}$	GATE Slow Pull-Down Current	SHDN = 0V, $\Delta V_{GATE} = 5\text{V}$	●	0.6	1	mA
$t_{D(ON)}$	Turn-On Debounce Delay	UVL = UVH = 2V, OV = 0V, SHDN = Step 0V to 5V	● 26	40	54	ms
t_{RETRY}	Auto-Retry Delay	LTC4231-2	● 0.27	0.325	0.5	s
$t_{PHL(ILIM)}$	Overcurrent to GATE Low Propagation Delay	$\Delta V_{SENSE} = \text{Step } 0\text{mV to } 300\text{mV}$, $C_{GATE} = 1\text{nF}$, ΔV_{GATE} Crosses 1V	●	0.5	1	μs
UVL, UVH, OV, GNDSW, STATUS and SHDN						
V_{UV}	UVL, UVH Threshold		● 0.776	0.795	0.814	V
V_{OV}	OV Threshold	OV Rising	● 0.776	0.795	0.814	V
$V_{OV(HYST)}$	OV Hysteresis		● 3	15	30	mV
$I_{LEAK(0.9V)}$	UVL, UVH and OV Leakage Current	$V = 0.9\text{V}$, (C-, I-Grade)	●	0	± 10	nA
		(H-Grade)	●	0	± 100	nA
$I_{LEAK(12V)}$	UVL, UVH, OV, GNDSW, STATUS and SHDN Leakage Current	$V = 12\text{V}$, (C-, I-Grade)	●	0	± 100	nA
		(H-Grade)	●	0	± 500	nA
$R_{ON(GNDSW)}$	Switch Resistance		●	80	200	Ω
V_{OL}	STATUS Output Low Voltage	$I = 2\text{mA}$	●	0.2	0.4	V
V_{SHDN}	SHDN Input Threshold		● 0.4	0.8	1.5	V

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For more information www.linear.com/LTC4231

Confidential Statement
 This change notice is for Linear Technology's Customers only.
 Distribution or notification to third parties is prohibited.

LTC4231

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the full operating temperature range, otherwise specifications are at $T_A = 25^\circ\text{C}$. $I_{IN} = 12\text{V}$, unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
t_{PERIOD}	Sampling Period		5 ●	6.5 10	13.5	ms
t_{SAMPLE}	Sampling Width		100 ●	130 200	270	μs
TIMER						
t_{CB}	Circuit Breaker Delay	$C_T = 100\text{nF}$	●	1.7 2.4	3.1	ms
$V_{TIMER(H)}$	TIMER High Threshold	TIMER Rising	●	1.170 1.193	1.216	V
$V_{TIMER(L)}$	TIMER Low Threshold	TIMER Falling	●	0.07 0.1	0.13	V
$I_{TIMER(UP)}$	TIMER Pull-Up Current	TIMER = 0.5V, Circuit Breaker Tripped	●	-35 -50	-65	μA
$I_{TIMER(DN)}$	TIMER Pull-Down Current	TIMER = 0.5V, Circuit Breaker Recovery	●	3 5	7	μA

15
300

3.5

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

Note 2: All currents into device pins are positive; all currents out of device pins are negative. All voltages are referenced to GND unless otherwise specified.

Note 3: These pins can be tied to voltages below -0.3V through a resistance that limits the current below 1 mA.

Note 4: An internal clamp limits GATE to a minimum of 13V above SOURCE. Driving this pin to voltages beyond this clamp may damage the device.

Note 5: For modes where GATE is pulled to GND, $I_{CC} = I_{IN} + I_{SENSE}$.
Else $I_{CC} = I_{IN} + I_{SENSE} + I_{SOURCE}$.

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