ORDER INFORMATION

http://www.linear.com/product/LTC3897#orderinfo

LEAD FREE FINISH	TAPE AND REEL	PART MARKING	PACKAGE DESCRIPTION	TEMPERATURE RANGE
LTC3897EUHF#PBF	LTC3897EUHF#TRPBF	3897	38-Lead (5mm x 7mm) Plastic QFN	–40°C to 125°C
LTC3897IUHF#PBF	LTC3897IUHF#TRPBF	3897	38-Lead (5mm x 7mm) Plastic QFN	–40°C to 125°C
LTC3897HUHF#PBF	LTC3897HUHF#TRPBF	3897	38-Lead (5mm x 7mm) Plastic QFN	–40°C to 150°C
LTC3897EFE#PBF	LTC3897EFE#TRPBF	LTC3897FE	38-Lead Plastic TSSOP	–40°C to 125°C
LTC3897IFE#PBF	LTC3897IFE#TRPBF	LTC3897FE	38-Lead Plastic TSSOP	–40°C to 125°C
LTC3897HFE#PBF	LTC3897HFE#TRPBF	LTC3897FE	38-Lead Plastic TSSOP	–40°C to 150°C

Consult LTC Marketing for parts specified with wider operating temperature ranges.
*The temperature grade is identified by a label on the shipping container.

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/tapeandreel/ . Some packages are available in 500 unit reels through designated sales channels with #TRMPBF suffix.

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the specified operating junction temperature range, otherwise specifications are at T_A = 25°C (Note 2). V_{IN} = 12V, V_{BIAS} = 12V, unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Supply Voltage and Operating Current							
V_{BIAS}	Bias Voltage Operating Range			4.5		75	V
	SENSE Pins Common Mode Range (BOOST Converter Input Supply Voltage)			2.3		65	V
V_{IN}	Input Supply Voltage Operating Range			4.2		75	V
	Reverse Input Current	V_{IN} = –30V			0	–10	µA
I_Q	Input DC Supply Current	(Note 5)					
	Pulse-Skipping or Forced Continuous Mode	RUN = 12V, V_{FB} = 1.25V (No Load)			1.32		mA
	Burst Mode (Sleep)	RUN = 12V, DGEN = SGEN = 0V, V_{FB} = 1.25V (No Load), CS = IS^+ = IS^- = V_{SPFB} = 0V			55	90	µA
		RUN = DGEN = 12V, SGEN = 0V, V_{FB} = 1.25V (No Load), CS = 12V, IS^+ = IS^- = CS – 0.1V			125	~~175~~ 190	µA
		RUN = 12V, DGEN = 0V, SGEN = 12V, V_{FB} = 1.25V (No Load), CS = IS^+ = IS^- = 12V			260	~~350~~ 380	µA
		RUN = DGEN = SGEN = 12V, V_{FB} = 1.25V (No Load), CS = 12V, IS^+ = IS^- = CS – 0.1V			325	450	µA
	Shutdown	RUN = DGEN = SGEN = 0V			15	22	µA
BOOST Controller Main Control Loop							
V_{OUT}	Regulated Boost Output Voltage in Synchronous Configuration					60	V
V_{FB}	Regulated Feedback Voltage	I_{TH} = 1.2 V (Note 4)	●	1.188	1.200	1.212	V
I_{FB}	Feedback Current	(Note 4)			±10	±50	nA
	Reference Line Voltage Regulation	(Note 4) V_{IN} = 6V to 75V			0.002	0.02	%/V
	Output Voltage Load Regulation	(Note 4)					
		(Note 4) Measured in Servo Loop, I_{TH} Voltage = 1V to 0.6V	●		0.01	0.1	%
		(Note 4) Measured in Servo Loop, I_{TH} Voltage = 1V to 1.4V	●		–0.01	–0.1	%

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SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
g_m	Error Amplifier Transconductance	I_{TH} = 1.2 V			2		mmho
UVLO	Undervoltage Lockout	DRV_{CC} Ramping Up					
		DRVUV = 0V	●		4.0	4.2	V
		DRVUV = $INTV_{CC}$	●		7.5	7.8	V
		DRV_{CC} Ramping Down					
		DRVUV = 0V	●	3.6	3.8	4.0	V
		DRVUV = $INTV_{CC}$	●	6.4	6.7	7.0	V
V_{RUN}	RUN Pin ON Threshold	V_{RUN} Rising	●	1.18	1.28	1.38	V
	RUN Pin Hysteresis				100		mV
I_{SS}	Soft-Start Charge Current	V_{SS} = GND		7	10	13	µA
$V_{SENSE1,2(MAX)}$	Maximum Current Sense Threshold	V_{FB} = 1.15V, I_{LIM} = $INTV_{CC}$, V_{SENSE+} = 12V	●	125	140	155	mV
		V_{FB} = 1.15V, I_{LIM} = Float, V_{SENSE+} = 12V	●	85	95	105	mV
		V_{FB} = 1.15V, I_{LIM} = GND, V_{SENSE+} = 12V	●	41	48	55	mV
	Matching Between $V_{SENSE1(MAX)}$ and $V_{SENSE2(MAX)}$	V_{FB} = 1.15V, I_{LIM} = $INTV_{CC}$, V_{SENSE+} = 12V	●	–12	0	12	mV
		V_{FB} = 1.15V, I_{LIM} = Float, V_{SENSE+} = 12V	●	–10	0	10	mV
		V_{FB} = 1.15V, I_{LIM} = GND, V_{SENSE+} = 12V	●	–9	0	9	mV
	$SENSE^+$ Pin Current	V_{FB} = 1.1V, I_{LIM} = Float			250	350	µA
	$SENSE^-$ Pin Current	V_{FB} = 1.1V, I_{LIM} = Float				±2	µA
	Top Gate Pull-Up Resistance	DRV_{CC} = 10V			2.5		Ω
	Top Gate Pull-Down Resistance	DRV_{CC} = 10V			1.5		Ω
	Bottom Gate Pull-Up Resistance	DRV_{CC} = 10V			2.5		Ω
	Bottom Gate Pull-Down Resistance	DRV_{CC} = 10V			1		Ω
BDSW	BOOST to DRV_{CC} Switch On-Resistance	V_{SW} = 0V, V_{DRVSET} = $INTV_{CC}$		2.6	3.7		Ω
	Top Gate Off to Bottom Gate On Switch-On Delay Time	DTC = 0V			55	~~70~~ 75	ns
		DTC = Float			90	~~120~~ 130	ns
		DTC = $INTV_{CC}$			170	~~235~~ 275	ns
	Bottom Gate Off to Top Gate On Switch-On Delay Time	DTC = 0V			55	~~70~~ 75	ns
		DTC = Float			90	~~120~~ 130	ns
		DTC = $INTV_{CC}$			170	~~235~~ 275	ns
	Maximum BG Duty Factor				96		%
$t_{ON(MIN)}$	Minimum BG On-Time	(Note 7) V_{DRVSET} = $INTV_{CC}$			90		ns
DRV_{CC} LDO Regulator							
	DRV_{CC} Voltage from Internal V_{BIAS} LDO	V_{EXTVCC} = 0V					
		7V < V_{BIAS} < 75V, DRVSET = 0V		5.8	6.0	6.2	V
		11V < V_{BIAS} < 75V, DRVSET = $INTV_{CC}$		9.6	10.0	10.4	V
	DRV_{CC} Load Regulation from V_{BIAS} LDO	I_{CC} = 0mA to 50mA, V_{EXTVCC} = 0V, V_{DRVSET} = $INTV_{CC}$			0.7	2	%
	DRV_{CC} Voltage from Internal $EXTV_{CC}$ LDO	7V < V_{EXTVCC} < 13V, DRVSET = 0V		5.8	6.0	6.2	V
		11V < V_{EXTVCC} < 13V, DRVSET = $INTV_{CC}$		9.6	10.0	10.4	V
	DRV_{CC} Load Regulation from Internal $EXTV_{CC}$ LDO	I_{CC} = 0mA to 50mA, V_{EXTVCC} = 8.5V, V_{DRVSET} = 0V			0.7	2	%

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SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
	$EXTV_{CC}$ LDO Switchover Voltage	$EXTV_{CC}$ Ramping Positive DRVUV = 0V DRVUV = $INTV_{CC}$		 4.5 7.4	 4.7 7.7	 4.9 8.0	 V V
	$EXTV_{CC}$ Hysteresis				250		mV
	Programmable DRV_{CC}	R_{DRVSET} = 50kΩ, V_{EXTVCC} = 0V			5.0		V
	Programmable DRV_{CC}	R_{DRVSET} = 70kΩ, V_{EXTVCC} = 0V		6.4	7.0	7.6	V
	Programmable DRV_{CC}	R_{DRVSET} = 90kΩ, V_{EXTVCC} = 0V			9.0		V
Oscillator and Phase-Locked Loop							
	Programmable Frequency	R_{FREQ} = 25k			105		kHz
		R_{FREQ} = 60k		335	400	465	kHz
		R_{FREQ} = 100k			760		kHz
	Lowest Fixed Frequency	V_{FREQ} = 0V		320	350	380	kHz
	Highest Fixed Frequency	V_{FREQ} = $INTV_{CC}$		488	535	585	kHz
f_{SYNC}	Synchronizable Frequency	PLLIN/MODE = External Clock	●	75		850	
	PLLIN/MODE Input High Level	PLLIN/MODE = External Clock	●	2.5			V
	PLLIN/MODE Input Low Level	PLLIN/MODE = External Clock	●			0.5	V
BOOST1 and BOOST2 Charge Pump							
	BOOST Charge Pump Available Output Current	FREQ = 0V, Forced Continuous or Pulse-Skipping Mode $V_{SW1,2}$ = 12V; $V_{BOOST1,2}$ = 16.5V $V_{SW1,2}$ = 12V; $V_{BOOST1,2}$ = 19.5V		 70 30			 µA µA
Surge Stopper							
	SGEN Pin ON Threshold	V_{SGEN} Rising	●	1.16	1.26	1.36	V
	SGEN Pin Hysteresis				100		mV
	SG Pin Output High Voltage (V_{SG} – V_{CS})	V_{IN} = 4.2V, I_{SG} = 0, –1µA, DG – CS = 1V	●	4.5		8	V
		V_{IN} = 8V to ~~75~~70V, I_{SG} = 0, –1µA	●	10	12	16	V
	SG Pin Pull-Up Current	V_{IN} = SG = DG = CS = 12V	●	–5	–10	–15	µA
	SG Pin Pull-Down Current	Overvoltage: SPFB = 1.5V, SG – CS = 5V	●	50	130		mA
		Overcurrent: ΔV_{IS} = 100mV, SG – CS = 5V	●	50	130		mA
		Shutdown: DGEN = SGEN = 0V, SG – CS = 5V	●	0.4	1		mA
	CS Pin Input Current	V_{IN} = CS = 12V, IS^+ = IS^- = 11.9V, SGEN = Float	●		2	6	µA
		V_{IN} = CS = 12V, SGEN = 0V	●		25	100	µA
		V_{CS} = –30V	●		–2.5	–3.5	mA
V_{SPFB}	Regulated Surge Protection Feedback Voltage		●	1.205	1.235	1.265	V
ΔV_{IS}	Overcurrent Fault Threshold, (V_{IS^+} – V_{IS^-})	IS^- > 2.5V	●	45	50	55	mV
		IS^- ~~< 1.5V~~ = 1.5V	●	21	27	33	mV
	IS^+ Pin Input Current	IS^+ = IS^- = V_{IN} = CS = 12V, SGEN = DGEN = Float	●		35	100	µA
		IS^+ = IS^- = V_{IN} = CS = 12V, SGEN = DGEN = 0V	●		1	15	µA
	SPFB Pin Input Current	SPFB = 1.235V	●		±20	±500	nA
	IS^- Pin Input Current	IS^+ = IS^- = V_{IN} = CS = 12V, SGEN = DGEN = Float	●		20	100	µA
		IS^+ = IS^- = V_{IN} = CS = 12V, SGEN = DGEN = 0V	●		5	15	µA

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SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
$I_{TMR,UP}$	TMR Pin Pull-Up Current, Overvoltage	TMR = 1V, SPFB = 1.5V, $V_{IN} - V_{IS^-}$ = 0.5V TMR = 1V, SPFB = 1.5V, $V_{IN} - V_{IS^-}$ = 70V	● ●	–1.5 –43	~~–2.5~~ ~~2.3~~ –53	~~–3.2~~ –63	~~-3.7~~ µA µA
	TMR Pin Pull-Up Current, Overcurrent	TMR = 1V, ΔV_{IS} = 60mV, $V_{IN} - V_{IS^-}$ = 0.5V TMR = 1V, ΔV_{IS} = 60mV, $V_{IN} - V_{IS^-}$ = ~~75V~~ 70V	● ●	–6 ~~–230~~ -210	–10 ~~–270~~ -250	~~–15~~ -16 ~~–310~~ -290	µA µA
	TMR Pin Pull-Up Current, Warning	TMR = 1.3V, SPFB = 1.5V, $V_{IN} - V_{IS^-}$ = 0.5V	●	–3	–5	–8	µA
	TMR Pin Pull-Up Current, Retry	TMR = 1V, SPFB = 1.5V	●	–1.5	~~–2.5~~ ~~2.3~~	~~–3.2~~	~~-3.7~~ µA
$I_{TMR,DN}$	TMR Pin Pull-Down Current	TMR = 1V, SPFB = 1.5V, Retry SGEN = 0V	● ●	1.2 0.4	2 0.75	2.8 1.5	µA mA
	Retry Duty Cycle, Overcurrent	ΔV_{IS} = 60mV, $V_{IN} - V_{IS^-}$ = 12V	●	0.06	0.08	~~0.11~~	0.12%
	TMR Pin Thresholds	SG Falling, V_{IN} = 4.2V to ~~75V~~ 70V SG Rising (after 32 cycles), V_{IN} = 4.2V to ~~75V~~ 70V	● ●	1.31 0.13	1.35 0.15	1.38 0.18	V V
Ideal Diode							
	DGEN Pin ON Threshold	V_{DGEN} Rising	●	1.16	1.26	1.36	V
	DGEN Pin Hysteresis				100		mV
	DG Pin Output High Voltage, ($V_{DG} - V_{CS}$)	V_{IN} = 4.2V, I_{DG} = 0, –1µA, No Fault, SG Open	●	4.5			V
		8V < V_{IN} < ~~75V~~ 70V, I_{DG} = 0, –1µA, No Fault, SG Open	●	10	12	16	V
	DG Pin Pull-Up Current	DG = CS = V_{IN} = 12V, CS – IS^+ = 0.1V	●	–5	–10	–15	µA
	DG Pin Pull-Down Current	DG = CS + 5V, CS – IS^+ = –0.2V	●	60	130		mA
		DG = CS + 5V, SGEN = DGEN = 0V	●	0.4	1		mA
ΔV_{SD}	Source-Drain Regulation Voltage, (V_{CS} – V_{IS^+})	DG – CS = 2.5V, V_{IN} = CS = 4.2V to ~~75V~~ 70V	●	20	30	40	mV
	DG Turn Off Propagation Delay in Fault Condition	CS – IS^+ = –1V, DG High to Low	●		0.6	2	µS

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: The LTC3897 is tested under pulsed load conditions such that $T_J \approx T_A$. The LTC3897E is guaranteed to meet specifications from 0°C to 85°C junction temperature. Specifications over the –40°C to 125°C operating junction temperature range are assured by design, characterization and correlation with statistical process controls. The LTC3897I is guaranteed over the –40°C to 125°C operating junction temperature range. The LTC3897H is guaranteed over the –40°C to 150°C operating temperature range. High junction temperatures degrade operation lifetime. Operation lifetime is derated for junction temperatures greater than 125°C. Note that the maximum ambient temperature consistent with these specifications is determined by specific operating conditions in conjunction with board layout, the rated package thermal impedance and other environmental factors. The junction temperature (T_J, in °C) is calculated from the ambient temperature (T_A, in °C) and power dissipation (P_D, in watts) according to the formula:

$T_J = T_A + (P_D \bullet \theta_{JA})$, where θ_{JA} = 34°C/W for the QFN package and where θ_{JA} = 28°C/W for the FE package.

Note 3: This IC includes overtemperature protection that is intended to protect the device during momentary overload conditions. The maximum rated junction temperature will be exceeded when this protection is active. Continuous operation above the specified absolute maximum operating junction temperature may impair device reliability or permanently damage the device.

Note 4: The LTC3897 is tested in a feedback loop that servos V_{FB} to the output of the error amplifier while maintaining I_{TH} at the midpoint of the current limit range.

Note 5: Dynamic supply current is higher due to the gate charge being delivered at the switching frequency.

Note 6: Rise and fall times are measured using 10% and 90% levels. Delay times are measured using 50% levels.

Note 7: See Minimum On-Time Considerations in the Applications Information section.

Note 8: Internal clamps limit the SG and DG pins to minimum of 10V above the CS pin. Driving these pins to voltages beyond the clamp may damage the device.

Note 9: Do not apply a voltage or current source to these pins. They must be connected to capacitive loads only, otherwise permanent damage may occur.