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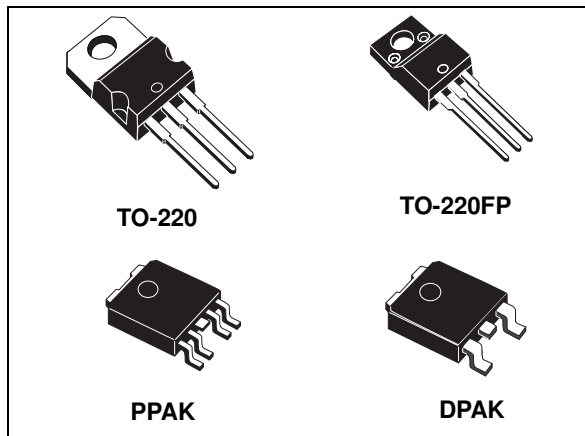
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Very low drop voltage regulator with inhibit function

Datasheet - production data



Description

The LFXX is a very low drop regulator available in TO-220, TO-220FP, DPAK and PPAK packages and in a wide range of output voltages. The low drop voltage (0.45 V) and low quiescent current make it particularly suitable for low-noise, low-power applications and especially in battery-powered systems. In the 5 pin configuration (PPAK) a shutdown logic control function is available (pin 2, TTL compatible). This means that when the device is used as a local regulator, a part of the board can be put in standby, decreasing the total power consumption. In the three terminal configuration, the device has the same electrical performance, but it is fixed in ON state. It requires a capacitor of only 2.2 μF for stability, saving board space and costs. The LFXX is available as automotive grade in DPAK and PPAK packages, for the options of output voltages whose commercial part numbers are shown in the order codes. These devices are qualified according to the specification AEC-Q100 of the automotive market, in the temperature range - 40 °C to 125 °C, and the statistical tests PAT, SYL, SBL are performed.

Features

- Very low-dropout voltage (0.45 V)
- Very low quiescent current (typ. 50 μA in OFF mode, 500 μA in ON mode)
- Output current up to 500 mA
- Logic-controlled electronic shutdown
- Output voltages of 1.5; 1.8; 2.5; 3.3; 4.7; 5; 6; 8; 8.5; 9; 12 V
- Automotive grade product: 1.8 V, 2.5 V, 3.3 V, 5.0 V, 8.0 V, 8.5 V V_{OUT} in DPAK and PPAK packages
- Internal current and thermal limit
- Only 2.2 μF for stability
- Available in $\pm 1\%$ (AB), $\pm 1.5\%$ (AC) or $\pm 2\%$ (C) selection at 25 °C
- Supply voltage rejection: 80 db (typ.)
- Temperature range: from -40 to 125 °C

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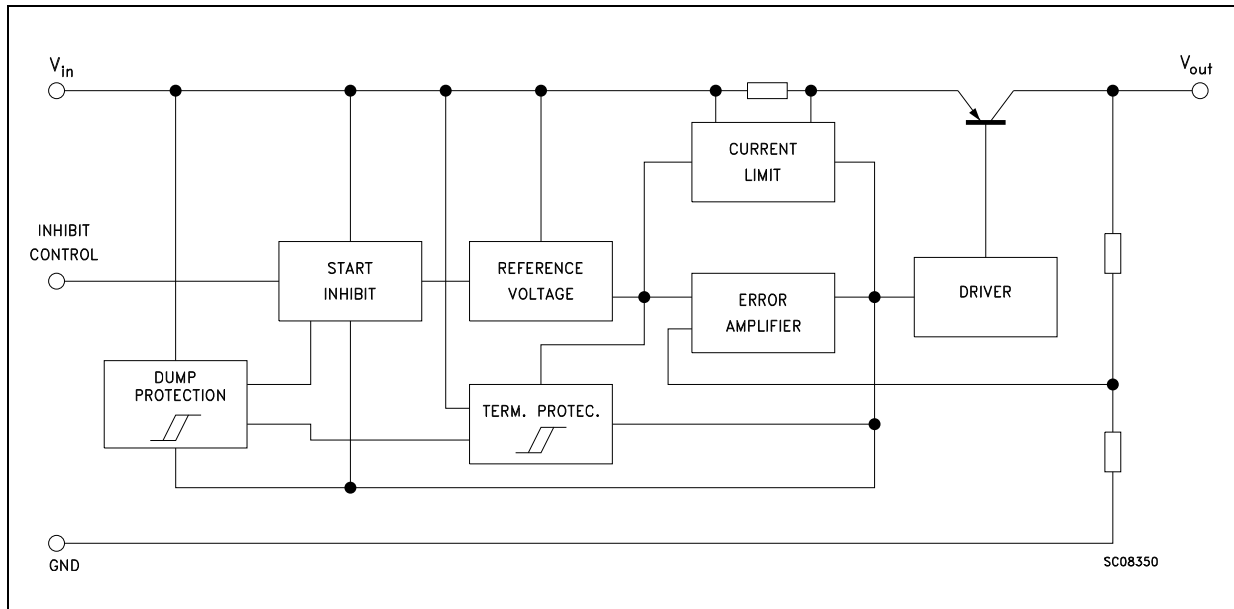
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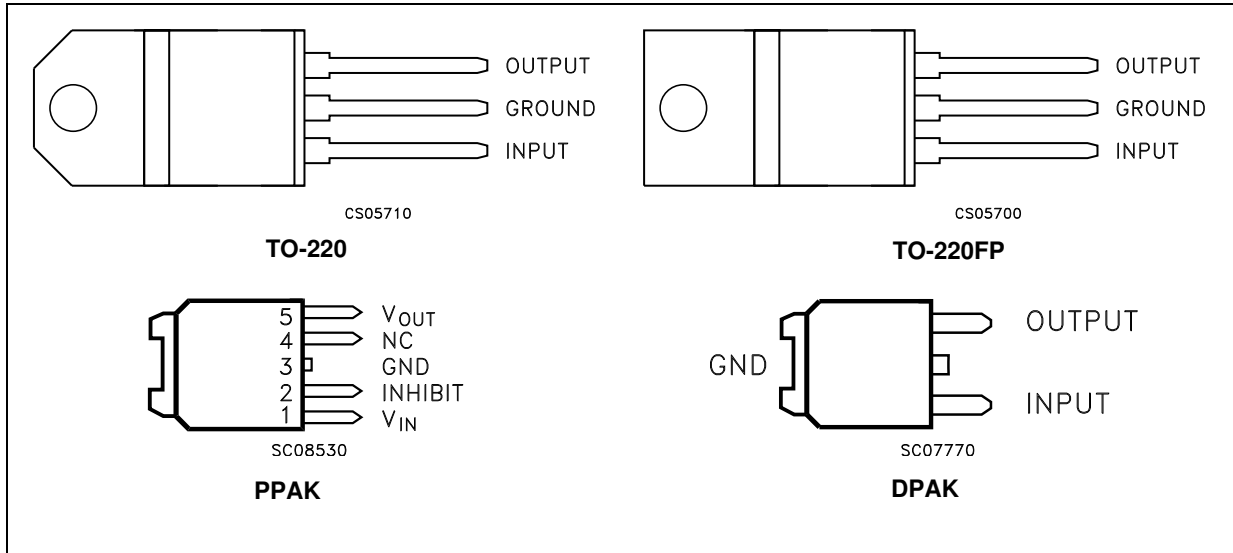
1 Diagram

Figure 1. Block diagram



2 Pin configuration

Figure 2. Pin connections (top view)



Note: TAB is electrically connected to GND on TO-220, PPAK and DPAK packages

3 Maximum ratings

Table 1. Absolute maximum ratings

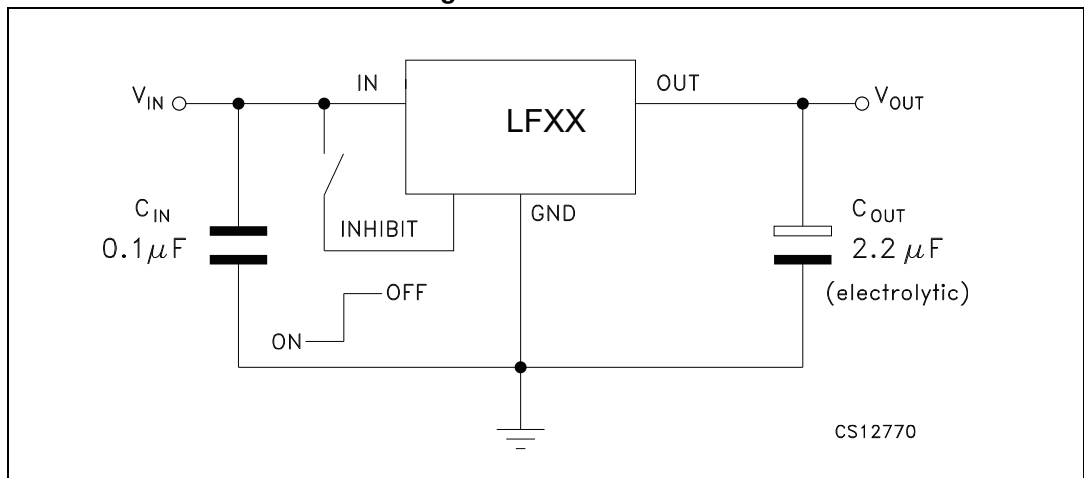
Symbol	Parameter	Value	Unit
V_I	DC input voltage	-0.5 to 40 ⁽¹⁾	V
I_O	Output current	Internally limited	A
P_{TOT}	Power dissipation	Internally limited	W
T_{STG}	Storage temperature range	-40 to 150	°C
T_{OP}	Operating junction temperature range	-40 to 125	°C

1. For $18 < V_I < 40$ the regulator is in shutdown.

Table 2. Thermal data

Symbol	Parameter	TO-220	TO-220FP	DPAK/PPAK	Unit
R_{thJC}	Thermal resistance junction-case	5	5	8	°C/W
R_{thJA}	Thermal resistance junction-ambient	50	60	100	°C/W

Figure 3. Test circuit



4 Electrical characteristics

Refer to test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 3. LF15AB electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$	1.485	1.5	1.515	V
		$I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$	1.470		1.530	
V_I	Operating input voltage	$I_O = 500\text{ mA}$	2.5		16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 2.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		2	10	mV
ΔV_O	Load regulation	$V_I = 2.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		2	10	mV
I_d	Quiescent current	$V_I = 2.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$		0.5	1	mA
		$V_I = 2.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$				
		$V_I = 6\text{ V}$	OFF mode	50	100	
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 3.5 \pm 1\text{ V}$	$f = 120\text{ Hz}$	82		dB
			$f = 1\text{ kHz}$	77		
			$f = 10\text{ kHz}$	65		
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		1		V
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ °C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ °C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 4. LF18AB electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 3.3\text{ V}$	1.782	1.8	1.818	V
		$I_O = 50\text{ mA}$, $V_I = 3.3\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$	1.764		1.836	
V_I	Operating input voltage	$I_O = 500\text{ mA}$	3		16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 2.8\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		2	12	mV
ΔV_O	Load regulation	$V_I = 3.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		2	10	mV
I_d	Quiescent current	$V_I = 2.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 3.1\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$				
		$V_I = 6\text{ V}$	OFF mode	50	100	
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 3.5 \pm 1\text{ V}$	$f = 120\text{ Hz}$		82	dB
			$f = 1\text{ kHz}$		77	
			$f = 10\text{ kHz}$		60	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.7		V
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ °C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ °C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 5. LF18C electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$	1.764	1.8	1.836	V
		$I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$	1.728		1.872	
V_I	Operating input voltage	$I_O = 500\text{ mA}$	3		16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 2.8\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		2	12	mV
ΔV_O	Load regulation	$V_I = 3.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		2	10	mV
I_d	Quiescent current	$V_I = 2.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 3.1\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$				
		$V_I = 6\text{ V}$	OFF mode	50	100	
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 3.5 \pm 1\text{ V}$	$f = 120\text{ Hz}$		82	dB
			$f = 1\text{ kHz}$		77	
			$f = 10\text{ kHz}$		60	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.7		V
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_a = -40$ to 125 °C, $C_I = 0.1$ μ F, $C_O = 2.2$ μ F unless otherwise specified.

Table 6. LF18C (automotive grade) electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50$ mA, $V_I = 3.5$ V, $T_a = 25$ °C	1.764	1.8	1.836	V
		$I_O = 50$ mA, $V_I = 3.5$ V	1.713		1.887	
V_I	Operating input voltage	$I_O = 500$ mA	3		16	V
I_O	Output current limit	$T_a = 25$ °C		1		A
ΔV_O	Line regulation	$V_I = 2.8$ to 16 V, $I_O = 5$ mA		2	15	mV
ΔV_O	Load regulation	$V_I = 3.3$ V, $I_O = 5$ to 500 mA		2	15	mV
I_d	Quiescent current	$V_I = 2.5$ to 16 V, $I_O = 0$ mA	ON mode	0.5	2	mA
		$V_I = 3.1$ to 16 V, $I_O = 500$ mA				
		$V_I = 6$ V	OFF mode	50	120	
SVR	Supply voltage rejection	$I_O = 5$ mA, $V_I = 3.5 \pm 1$ V $T_a = 25$ °C	f = 120 Hz		82	dB
			f = 1 kHz		77	
			f = 10 kHz		60	
eN	Output noise voltage	B = 10 Hz to 100 kHz, $T_a = 25$ °C		50		μ V
V_d	Dropout voltage	$I_O = 200$ mA		0.2	1.3	V
		$I_O = 500$ mA		0.4	1.3	
V_{IL}	Control input logic low				0.8	V
V_{IH}	Control input logic high		2			V
I_I	Control input current	$V_I = 6$ V, $V_C = 6$ V, $T_a = 25$ °C		10		μ A
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω , $I_O = 0$ to 500 mA	2	10		μ F

Refer to test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 7. LF25AB electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 4.5\text{ V}$	2.475	2.5	2.525	V
		$I_O = 50\text{ mA}$, $V_I = 4.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$	2.450		2.550	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 3.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		2	12	mV
ΔV_O	Load regulation	$V_I = 3.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		2	12	mV
I_d	Quiescent current	$V_I = 3.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 3.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$			12	
		$V_I = 6\text{ V}$	OFF mode	50	100	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 4.5 \pm 1\text{ V}$	$f = 120\text{ Hz}$		82	dB
			$f = 1\text{ kHz}$		77	
			$f = 10\text{ kHz}$		65	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_a = -40$ to 125 °C, $C_1 = 0.1$ μ F, $C_O = 2.2$ μ F unless otherwise specified.

Table 8. LF25AB (automotive grade) electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50$ mA, $V_I = 4.5$ V, $T_a = 25$ °C	2.475	2.5	2.525	V
		$I_O = 50$ mA, $V_I = 4.5$ V	2.435		2.565	
V_I	Operating input voltage	$I_O = 500$ mA			16	V
I_O	Output current limit	$T_a = 25$ °C		1		A
ΔV_O	Line regulation	$V_I = 3.5$ to 16 V, $I_O = 5$ mA		2	15	mV
ΔV_O	Load regulation	$V_I = 3.8$ V, $I_O = 5$ to 500 mA		2	15	mV
I_d	Quiescent current	$V_I = 3.5$ to 16 V, $I_O = 0$ mA	ON mode	0.5	2	mA
		$V_I = 3.8$ to 16 V, $I_O = 500$ mA				
		$V_I = 6$ V	OFF mode	50	120	
SVR	Supply voltage rejection	$I_O = 5$ mA, $V_I = 4.5 \pm 1$ V $T_a = 25$ °C	$f = 120$ Hz		82	dB
			$f = 1$ kHz		77	
			$f = 10$ kHz		65	
eN	Output noise voltage	$B = 10$ Hz to 100 kHz, $T_a = 25$ °C		50		μ V
V_d	Dropout voltage	$I_O = 200$ mA		0.2	1.3	V
		$I_O = 500$ mA		0.4	1.3	
V_{IL}	Control input logic low				0.8	V
V_{IH}	Control input logic high		2			V
I_I	Control input current	$V_I = 6$ V, $V_C = 6$ V, $T_a = 25$ °C		10		μ A
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω , $I_O = 0$ to 500 mA	2	10		μ F

Refer to test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 9. LF25C electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 4.5\text{ V}$	2.45	2.5	2.55	V
		$I_O = 50\text{ mA}$, $V_I = 4.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$	2.4		2.6	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 3.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		2	12	mV
ΔV_O	Load regulation	$V_I = 3.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		2	12	mV
I_d	Quiescent current	$V_I = 3.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 3.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$				
		$V_I = 6\text{ V}$	OFF mode	50	100	
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 4.5 \pm 1\text{ V}$	$f = 120\text{ Hz}$		82	dB
			$f = 1\text{ kHz}$		77	
			$f = 10\text{ kHz}$		65	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_a = -40$ to 125 °C, $C_1 = 0.1$ μ F, $C_O = 2.2$ μ F unless otherwise specified.

Table 10. LF25C (automotive grade) electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50$ mA, $V_I = 4.5$ V, $T_a = 25$ °C	2.45	2.5	2.55	V
		$I_O = 50$ mA, $V_I = 4.5$ V	2.385		2.615	
V_I	Operating input voltage	$I_O = 500$ mA			16	V
I_O	Output current limit	$T_a = 25$ °C		1		A
ΔV_O	Line regulation	$V_I = 3.5$ to 16 V, $I_O = 5$ mA		2	15	mV
ΔV_O	Load regulation	$V_I = 3.8$ V, $I_O = 5$ to 500 mA		2	15	mV
I_d	Quiescent current	$V_I = 3.5$ to 16 V, $I_O = 0$ mA	ON mode	0.5	2	mA
		$V_I = 3.8$ to 16 V, $I_O = 500$ mA			12	
		$V_I = 6$ V	OFF mode	50	120	μ A
SVR	Supply voltage rejection	$I_O = 5$ mA, $V_I = 4.5 \pm 1$ V $T_a = 25$ °C	$f = 120$ Hz		82	dB
			$f = 1$ kHz		77	
			$f = 10$ kHz		65	
eN	Output noise voltage	$B = 10$ Hz to 100 kHz, $T_a = 25$ °C		50		μ V
V_d	Dropout voltage	$I_O = 200$ mA		0.2	1.3	V
		$I_O = 500$ mA		0.4	1.3	
V_{IL}	Control input logic low				0.8	V
V_{IH}	Control input logic high		2			V
I_I	Control input current	$V_I = 6$ V, $V_C = 6$ V, $T_a = 25$ °C		10		μ A
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω , $I_O = 0$ to 500 mA	2	10		μ F

Refer to test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 11. LF33AB electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 5.3\text{ V}$	3.267	3.3	3.333	V
		$I_O = 50\text{ mA}$, $V_I = 5.3\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$	3.234		3.366	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 4.3\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		3	16	mV
ΔV_O	Load regulation	$V_I = 4.6\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		3	16	mV
I_d	Quiescent current	$V_I = 4.3\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 4.6\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$			12	
		$V_I = 6\text{ V}$	OFF mode	50	100	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 5.3 \pm 1\text{ V}$	$f = 120\text{ Hz}$		80	dB
			$f = 1\text{ kHz}$		75	
			$f = 10\text{ kHz}$		65	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 12. LF33C electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 5.3\text{ V}$	3.234	3.3	3.366	V
		$I_O = 50\text{ mA}$, $V_I = 5.3\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$	3.168		3.432	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 4.3\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		3	16	mV
ΔV_O	Load regulation	$V_I = 4.6\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		3	16	mV
I_d	Quiescent current	$V_I = 4.3\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 4.6\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$			12	
		$V_I = 6\text{ V}$	OFF mode	50	100	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 5.3 \pm 1\text{ V}$	f = 120 Hz		80	dB
			f = 1 kHz		75	
			f = 10 kHz		65	
eN	Output noise voltage	B = 10 Hz to 100 kHz		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ °C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ °C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω , $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_a = -40$ to 125 °C, $C_1 = 0.1$ μ F, $C_O = 2.2$ μ F unless otherwise specified.

Table 13. LF33C (automotive grade) electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50$ mA, $V_I = 5.3$ V, $T_a = 25$ °C	3.234	3.3	3.366	V
		$I_O = 50$ mA, $V_I = 5.3$ V,	3.153		3.447	
V_I	Operating input voltage	$I_O = 500$ mA			16	V
I_O	Output current limit	$T_a = 25$ °C		1		A
ΔV_O	Line regulation	$V_I = 4.3$ to 16 V, $I_O = 5$ mA		3	19	mV
ΔV_O	Load regulation	$V_I = 4.6$ V, $I_O = 5$ to 500 mA		3	19	mV
I_d	Quiescent current	$V_I = 4.3$ to 16 V, $I_O = 0$ mA	ON mode	0.5	2	mA
		$V_I = 4.6$ to 16 V, $I_O = 500$ mA			12	
		$V_I = 6$ V	OFF mode	50	120	μ A
SVR	Supply voltage rejection	$I_O = 5$ mA, $V_I = 5.3 \pm 1$ V $T_a = 25$ °C	f = 120 Hz	80		dB
			f = 1 kHz	75		
			f = 10 kHz	65		
eN	Output noise voltage	B = 10 Hz to 100 kHz, $T_a = 25$ °C		50		μ V
V_d	Dropout voltage	$I_O = 200$ mA		0.2	1.3	V
		$I_O = 500$ mA		0.4	1.3	
V_{IL}	Control input logic low				0.8	V
V_{IH}	Control input logic high		2			V
I_I	Control input current	$V_I = 6$ V, $V_C = 6$ V, $T_a = 25$ °C		10		μ A
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω , $I_O = 0$ to 500 mA	2	10		μ F

Refer to test circuits, $T_a = -40$ to 125 °C, $C_1 = 0.1$ μ F, $C_O = 2.2$ μ F unless otherwise specified.

Table 14. LF50AB electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50$ mA, $V_I = 7$ V	4.95	5	5.05	V
		$I_O = 50$ mA, $V_I = 7$ V, $T_a = -25$ to 85 °C	4.9		5.1	
V_I	Operating input voltage	$I_O = 500$ mA			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 6$ to 16 V, $I_O = 5$ mA		5	25	mV
ΔV_O	Load regulation	$V_I = 6.3$ V, $I_O = 5$ to 500 mA		5	25	mV
I_d	Quiescent current	$V_I = 6$ to 16 V, $I_O = 0$ mA	ON mode	0.5	1	mA
		$V_I = 6.3$ to 16 V, $I_O = 500$ mA			12	
		$V_I = 6$ V	OFF mode	50	100	
SVR	Supply voltage rejection	$I_O = 5$ mA, $V_I = 7 \pm 1$ V	$f = 120$ Hz		76	dB
			$f = 1$ kHz		71	
			$f = 10$ kHz		60	
eN	Output noise voltage	$B = 10$ Hz to 100 kHz		50		μ V
V_d	Dropout voltage	$I_O = 200$ mA		0.2	0.35	V
		$I_O = 500$ mA		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40$ to 125 °C			0.8	V
V_{IH}	Control input logic high	$T_a = -40$ to 125 °C	2			V
I_I	Control input current	$V_I = 6$ V, $V_C = 6$ V		10		μ A
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω , $I_O = 0$ to 500 mA	2	10		μ F

Refer to test circuits, $T_a = -40$ to 125 °C , $C_1 = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 15. LF50AB (automotive grade) electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 7\text{ V}$, $T_a = 25\text{ °C}$	4.95	5	5.05	V
		$I_O = 50\text{ mA}$, $V_I = 7\text{ V}$	4.885		5.115	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit	$T_a = 25\text{ °C}$		1		A
ΔV_O	Line regulation	$V_I = 6$ to 16 V , $I_O = 5\text{ mA}$		5	28	mV
ΔV_O	Load regulation	$V_I = 6.3\text{ V}$, $I_O = 5$ to 500 mA		5	28	mV
I_d	Quiescent current	$V_I = 6$ to 16 V , $I_O = 0\text{ mA}$	ON mode	0.5	2	mA
		$V_I = 6.3$ to 16 V , $I_O = 500\text{ mA}$			12	
		$V_I = 6\text{ V}$	OFF mode	50	120	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 7 \pm 1\text{ V}$ $T_a = 25\text{ °C}$	$f = 120\text{ Hz}$		76	dB
			$f = 1\text{ kHz}$		71	
			$f = 10\text{ kHz}$		60	
eN	Output noise voltage	$B = 10\text{ Hz}$ to 100 kHz , $T_a = 25\text{ °C}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	1.3	V
		$I_O = 500\text{ mA}$		0.4	1.3	
V_{IL}	Control input logic low				0.8	V
V_{IH}	Control input logic high		2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$, $T_a = 25\text{ °C}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1$ to $10\text{ }\Omega$, $I_O = 0$ to 500 mA	2	10		μF

Refer to test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 16. LF50AC electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 7\text{ V}$	4.925	5	5.075	V
		$I_O = 50\text{ mA}$, $V_I = 7\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$	4.875		5.125	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 6\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		5	25	mV
ΔV_O	Load regulation	$V_I = 6.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		5	25	mV
I_d	Quiescent current	$V_I = 6\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 6.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$			12	
		$V_I = 6\text{ V}$	OFF mode	50	100	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 7 \pm 1\text{ V}$	$f = 120\text{ Hz}$		76	dB
			$f = 1\text{ kHz}$		71	
			$f = 10\text{ kHz}$		60	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ °C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ °C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 17. LF50C electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 7\text{ V}$	4.9	5	5.1	V
		$I_O = 50\text{ mA}$, $V_I = 7\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$	4.8		5.2	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 6\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		5	25	mV
ΔV_O	Load regulation	$V_I = 6.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		5	25	mV
I_d	Quiescent current	$V_I = 6\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.5	1	mA
		$V_I = 6.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$			12	
		$V_I = 6\text{ V}$	OFF mode	50	100	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 7 \pm 1\text{ V}$	$f = 120\text{ Hz}$		76	dB
			$f = 1\text{ kHz}$		71	
			$f = 10\text{ kHz}$		60	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ °C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ °C}$	2			V
I_I	Control input current	$V_I = 6\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_a = -40$ to 125 °C, $C_1 = 0.1$ μ F, $C_O = 2.2$ μ F unless otherwise specified.

Table 18. LF50C (automotive grade) electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50$ mA, $V_I = 7$ V, $T_a = 25$ °C	4.9	5	5.1	V
		$I_O = 50$ mA, $V_I = 7$ V	4.785		5.215	
V_I	Operating input voltage	$I_O = 500$ mA			16	V
I_O	Output current limit	$T_a = 25$ °C		1		A
ΔV_O	Line regulation	$V_I = 6$ to 16 V, $I_O = 5$ mA		5	28	mV
ΔV_O	Load regulation	$V_I = 6.3$ V, $I_O = 5$ to 500 mA		5	28	mV
I_d	Quiescent current	$V_I = 6$ to 16 V, $I_O = 0$ mA	ON mode	0.5	2	mA
		$V_I = 6.3$ to 16 V, $I_O = 500$ mA				
		$V_I = 6$ V	OFF mode	50	120	
SVR	Supply voltage rejection	$I_O = 5$ mA, $V_I = 7 \pm 1$ V $T_a = 25$ °C	$f = 120$ Hz		76	dB
			$f = 1$ kHz		71	
			$f = 10$ kHz		60	
eN	Output noise voltage	$B = 10$ Hz to 100 kHz, $T_a = 25$ °C		50		μ V
V_d	Dropout voltage	$I_O = 200$ mA		0.2	1.3	V
		$I_O = 500$ mA		0.4	1.3	
V_{IL}	Control input logic low				0.8	V
V_{IH}	Control input logic high		2			V
I_I	Control input current	$V_I = 6$ V, $V_C = 6$ V, $T_a = 25$ °C		10		μ A
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω , $I_O = 0$ to 500 mA	2	10		μ F

Refer to test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 19. LF60AB electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 8\text{ V}$	5.94	6	6.06	V
		$I_O = 50\text{ mA}$, $V_I = 8\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$	5.88		6.12	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 7\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		6	30	mV
ΔV_O	Load regulation	$V_I = 7.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		6	30	mV
I_d	Quiescent current	$V_I = 7\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.7	1.5	mA
		$V_I = 7.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$			12	
		$V_I = 9\text{ V}$	OFF mode	70	140	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 8 \pm 1\text{ V}$	$f = 120\text{ Hz}$		75	dB
			$f = 1\text{ kHz}$		70	
			$f = 10\text{ kHz}$		60	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ }^\circ\text{C}$	2			V
I_I	Control input current	$V_I = 9\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF

Refer to test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.

Table 20. LF60C electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$I_O = 50\text{ mA}$, $V_I = 8\text{ V}$	5.88	6	6.12	V
		$I_O = 50\text{ mA}$, $V_I = 8\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$	5.76		6.24	
V_I	Operating input voltage	$I_O = 500\text{ mA}$			16	V
I_O	Output current limit			1		A
ΔV_O	Line regulation	$V_I = 7\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$		6	30	mV
ΔV_O	Load regulation	$V_I = 7.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$		6	30	mV
I_d	Quiescent current	$V_I = 7\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$	ON mode	0.7	1.5	mA
		$V_I = 7.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$			12	
		$V_I = 9\text{ V}$	OFF mode	70	140	μA
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$, $V_I = 8 \pm 1\text{ V}$	$f = 120\text{ Hz}$		75	dB
			$f = 1\text{ kHz}$		70	
			$f = 10\text{ kHz}$		60	
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		μV
V_d	Dropout voltage	$I_O = 200\text{ mA}$		0.2	0.35	V
		$I_O = 500\text{ mA}$		0.4	0.7	
V_{IL}	Control input logic low	$T_a = -40\text{ to }125\text{ °C}$			0.8	V
V_{IH}	Control input logic high	$T_a = -40\text{ to }125\text{ °C}$	2			V
I_I	Control input current	$V_I = 9\text{ V}$, $V_C = 6\text{ V}$		10		μA
C_O	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$	2	10		μF