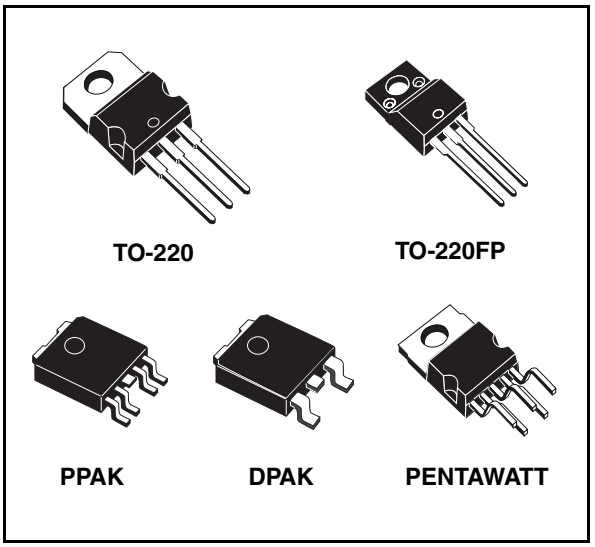
LFxxAB
LFxxC

Very low drop voltage regulators with inhibit

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 ± 1% (AB) or ± 2% (C) selection at 25 °C
- Supply voltage rejection: 80 db (typ.)
- Temperature range: -40 to 125 °C



Description

The LFxxAB/LFxxC are very low drop regulators available in PENTAWATT, TO-220, TO-220FP, DPAK and PPAK package and in a wide range of output voltages.
The very low drop voltage (0.45 V) and the very low quiescent current make them particularly suitable for low noise, low power applications and specially in battery powered systems. In the 5 pins configuration (PENTAWATT and PPAK) a shutdown logic control function is available (pin 2, TTL compatible). This means that when the device is used as a local regulator, it is possible to put a part of the board in standby, decreasing the total power consumption. In the three terminal configuration the device has the same electrical performance, but is fixed in the ON state. It requires only a 2.2 µF capacitor for stability allowing space and cost saving. 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 *Table 32* (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.

Table 1. Device summary

Part numbers						
LF15C	LF18AB	LF33C	LF50C	LF60AB	LF85C	LF90AB
LF15AB	LF25C	LF33AB	LF50AB	LF80C	LF85AB	LF120C
LF18C	LF25AB	LF47C	LF60C	LF80AB	LF90C	LF120AB

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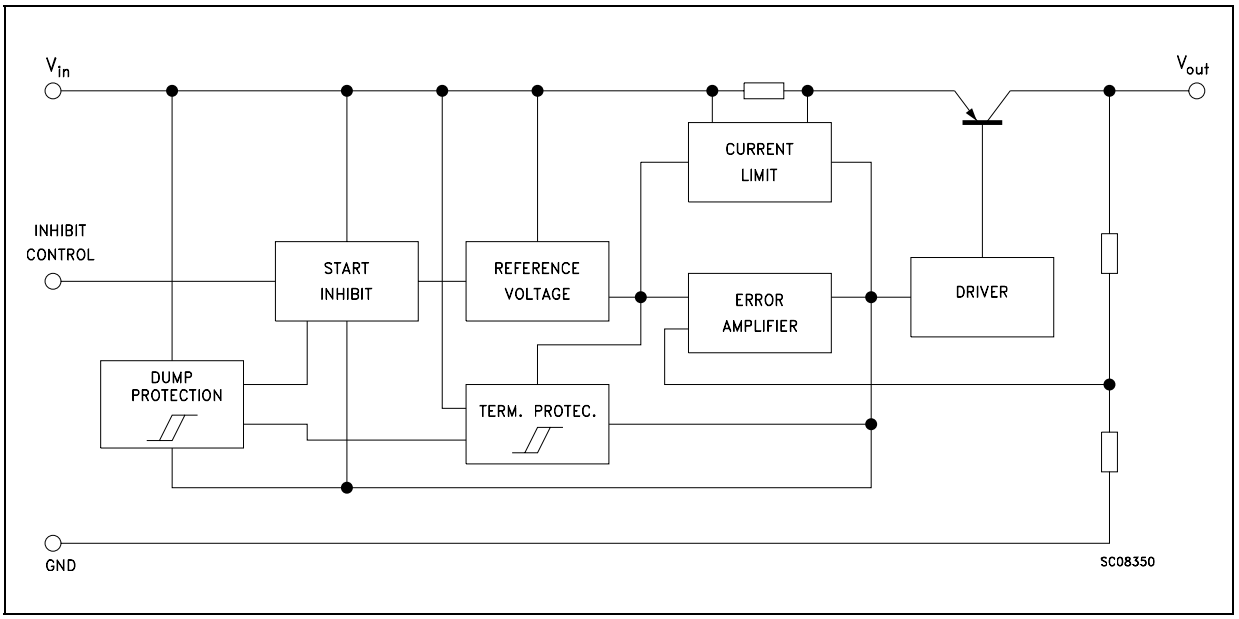
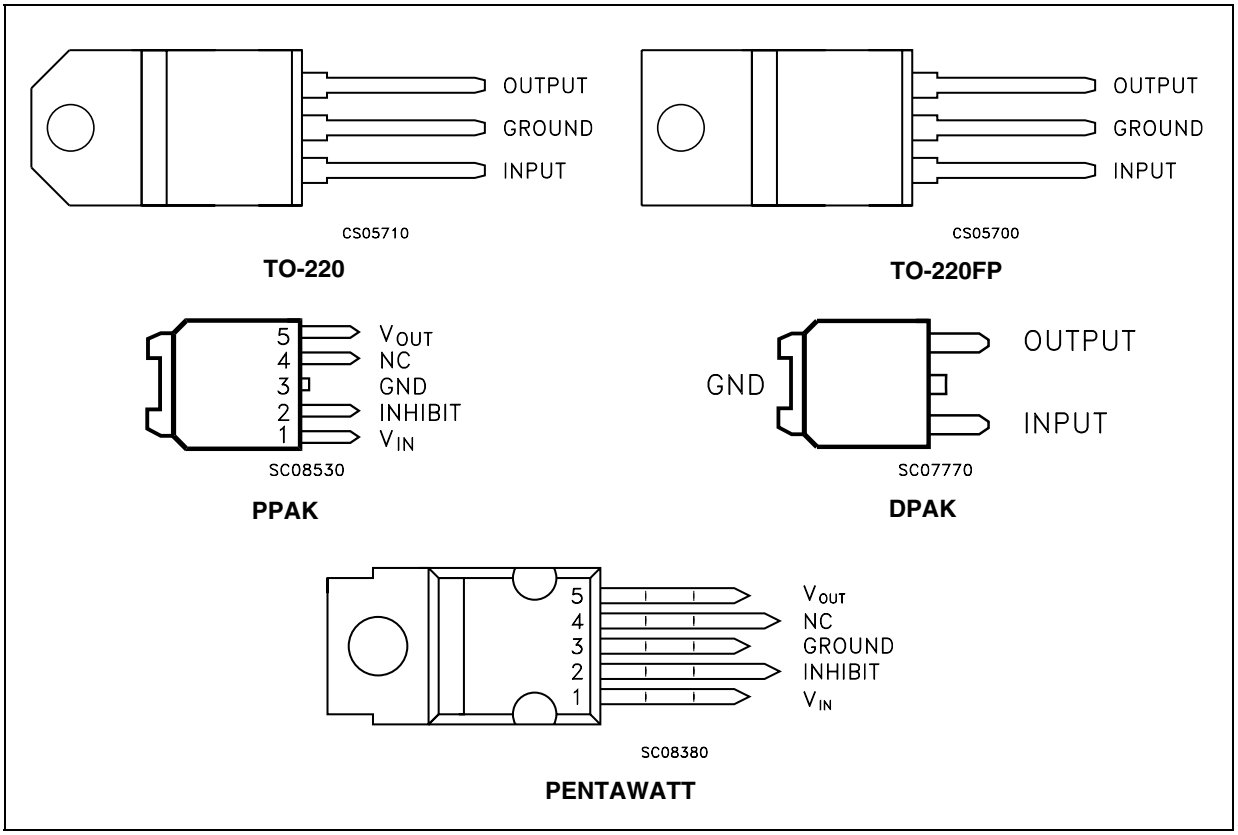
1 Diagram

Figure 1. Block diagram



2 Pin configuration

Figure 2. Pin connections (top view)



3 Maximum ratings

Table 2. Absolute maximum ratings

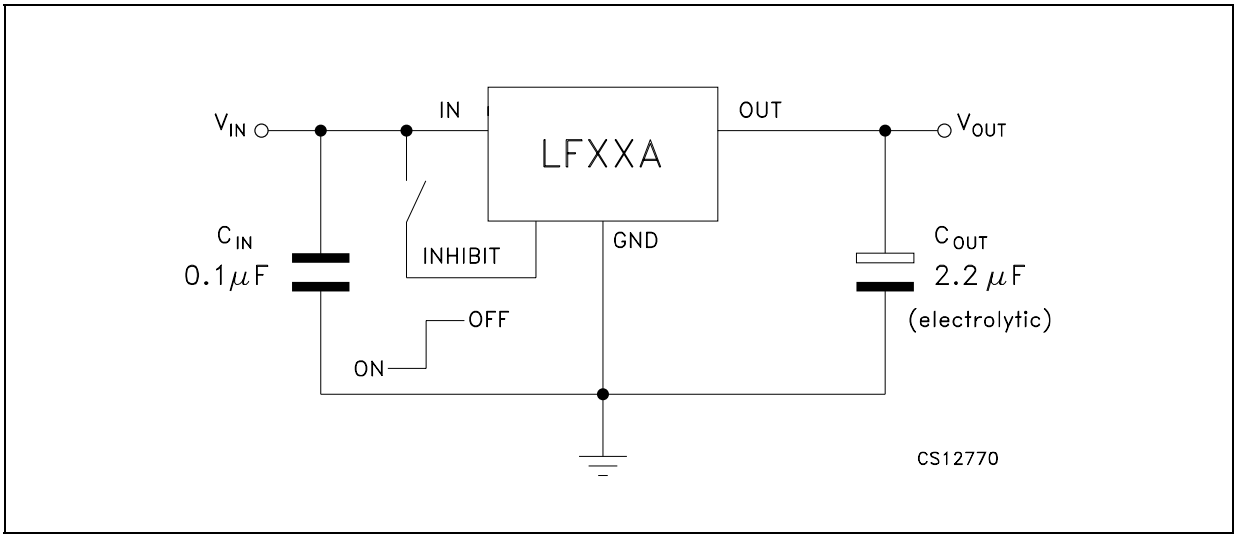
Symbol	Parameter	Value	Unit
V_I	DC input voltage	-0.5 to 40(1)	V
I_O	Output current	Internally Limited	
P_{TOT}	Power dissipation	Internally Limited	
T_{STG}	Storage temperature range	-40 to 150	°C
T_{OP}	Operating junction temperature range	-40 to 125	°C

1. For $18 < V_I < 40$ the regulator is in shut-down

Table 3. Thermal data

Symbol	Parameter	PENTAWATT	TO-220	TO-220FP	DPAK/PPAK	Unit
R_{thJC}	Thermal resistance junction-case	3	3	5	8	°C/W
R_{thJA}	Thermal resistance junction-ambient	50	50	60	100	°C/W

Figure 3. Test circuit



4 Electrical characteristics

Table 4. Electrical characteristics for LF15AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 3.5 V		1.485	1.5	1.515	V
		I_O = 50 mA, V_I = 3.5 V, T_a = -25 to 85°C		1.470		1.530	
V_I	Operating input voltage	I_O = 500 mA		2.5		16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 2.5 to 16 V, I_O = 5 mA			2	10	mV
ΔV_O	Load regulation	V_I = 2.8 V, I_O = 5 to 500 mA			2	10	mV
I_d	Quiescent current	V_I = 2.5 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 2.8 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 3.5 ± 1 V	f = 120 Hz		82		dB
			f = 1 kHz		77		
			f = 10 kHz		65		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 200 mA			1		V
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 5. Electrical characteristics for LF15C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 3.5 V		1.47	1.5	1.53	V
		I_O = 50 mA, V_I = 3.5 V, T_a = -25 to 85°C		1.44		1.56	
V_I	Operating input voltage	I_O = 500 mA		2.5		16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 2.5 to 16 V, I_O = 5 mA			2	10	mV
ΔV_O	Load regulation	V_I = 2.8 V, I_O = 5 to 500 mA			2	10	mV
I_d	Quiescent current	V_I = 2.5 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 2.8 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 3.5 ± 1 V	f = 120 Hz		82		dB
			f = 1 kHz		77		
			f = 10 kHz		65		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 200 mA			1		V
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 6. Electrical characteristics for LF18AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 3.3 V		1.782	1.8	1.818	V
		I_O = 50 mA, V_I = 3.3 V, T_a = -25 to 85°C		1.764		1.836	
V_I	Operating input voltage	I_O = 500 mA		3		16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 2.8 to 16 V, I_O = 5 mA			2	12	mV
ΔV_O	Load regulation	V_I = 3.3 V, I_O = 5 to 500 mA			2	10	mV
I_d	Quiescent current	V_I = 2.5 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.1 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 3.5 ± 1 V	f = 120 Hz		82		dB
			f = 1 kHz		77		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 200 mA			0.7		V
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 7. Electrical characteristics for LF18C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 3.5 V		1.764	1.8	1.836	V
		I_O = 50 mA, V_I = 3.5 V, T_a = -25 to 85°C		1.728		1.872	
V_I	Operating input voltage	I_O = 500 mA		3		16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 2.8 to 16 V, I_O = 5 mA			2	12	mV
ΔV_O	Load regulation	V_I = 3.3 V, I_O = 5 to 500 mA			2	10	mV
I_d	Quiescent current	V_I = 2.5 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.1 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 3.5 ± 1 V	f = 120 Hz		82		dB
			f = 1 kHz		77		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 200 mA			0.7		V
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 8. Electrical characteristics for LF18CDT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 125°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

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 16V, I_O = 0mA	ON MODE		0.5	2	mA
		V_I = 3.1 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	120	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 3.5 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 9. Electrical characteristics for LF25AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 4.5 V		2.475	2.5	2.525	V
		I_O = 50 mA, V_I = 4.5 V, T_a = -25 to 85°C		2.450		2.550	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 3.5 to 16 V, I_O = 5 mA			2	12	mV
ΔV_O	Load regulation	V_I = 3.8 V, I_O = 5 to 500 mA			2	12	mV
I_d	Quiescent current	V_I = 3.5 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.8 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 4.5 ± 1 V	f = 120 Hz		82		dB
			f = 1 kHz		77		
			f = 10 kHz		65		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 10. Electrical characteristics for LF25ABDT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 125°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

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 16V, I_O = 0mA	ON MODE		0.5	2	mA
		V_I = 3.8 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	120	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 4.5 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 11. Electrical characteristics for LF25C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 4.5 V		2.45	2.5	2.55	V
		I_O = 50 mA, V_I = 4.5 V, T_a = -25 to 85°C		2.4		2.6	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 3.5 to 16 V, I_O = 5 mA			2	12	mV
ΔV_O	Load regulation	V_I = 3.8 V, I_O = 5 to 500 mA			2	12	mV
I_d	Quiescent current	V_I = 3.5 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.8 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 4.5 ± 1 V	f = 120 Hz		82		dB
			f = 1 kHz		77		
			f = 10 kHz		65		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 12. Electrical characteristics for LF25CDT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 125°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

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 16V, I_O = 0mA	ON MODE		0.5	2	mA
		V_I = 3.8 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	120	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 4.5 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 13. Electrical characteristics for LF33AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 5.3 V		3.267	3.3	3.333	V
		I_O = 50 mA, V_I = 5.3 V, T_a = -25 to 85°C		3.234		3.366	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 4.3 to 16 V, I_O = 5 mA			3	16	mV
ΔV_O	Load regulation	V_I = 4.6 V, I_O = 5 to 500 mA			3	16	mV
I_d	Quiescent current	V_I = 4.3 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4.6 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5.3 ± 1 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 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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 14. Electrical characteristics for LF33C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 5.3 V		3.234	3.3	3.366	V
		I_O = 50 mA, V_I = 5.3 V, T_a = -25 to 85°C		3.168		3.432	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 4.3 to 16 V, I_O = 5 mA			3	16	mV
ΔV_O	Load regulation	V_I = 4.6 V, I_O = 5 to 500 mA			3	16	mV
I_d	Quiescent current	V_I = 4.3 to 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4.6 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5.3 ± 1 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 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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 15. Electrical characteristics for LF33CDT-TRY and LF33CPT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 125°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

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 16V, I_O = 0mA	ON MODE		0.5	2	mA
		V_I = 4.6 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	120	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5.3 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 16. Electrical characteristics for LF50AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

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 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 6.3 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 7 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 17. Electrical characteristics for LF50ABDT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 125°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 7 V, T_a = 25°C		4.95	5	5.05	V
		I_O = 50 mA, V_I = 7 V		4.885		5.115	
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 16V, I_O = 0mA	ON MODE		0.5	2	mA
		V_I = 6.3 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	120	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 7 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 18. Electrical characteristics for LF50C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 7 V		4.9	5	5.1	V
		I_O = 50 mA, V_I = 7 V, T_a = -25 to 85°C		4.8		5.2	
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 16V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 6.3 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 7 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 19. Electrical characteristics for LF50CDT-TRY and LF50CPT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 125°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

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 16V, I_O = 0mA	ON MODE		0.5	2	mA
		V_I = 6.3 to 16V, I_O=500mA				12	
		V_I = 6 V	OFF MODE		50	120	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 7 ± 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		µV
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		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 20. Electrical characteristics for LF60AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 8 V		5.94	6	6.06	V
		I_O = 50 mA, V_I = 8 V, T_a = -25 to 85°C		5.88		6.12	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 7 to 16 V, I_O = 5 mA			6	30	mV
ΔV_O	Load regulation	V_I = 7.3 V, I_O = 5 to 500 mA			6	30	mV
I_d	Quiescent current	V_I = 7 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 7.3 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 8 ± 1 V	f = 120 Hz		75		dB
			f = 1 kHz		70		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 9 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 21. Electrical characteristics for LF60C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 8 V		5.88	6	6.12	V
		I_O = 50 mA, V_I = 8 V, T_a = -25 to 85°C		5.76		6.24	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 7 to 16 V, I_O = 5 mA			6	30	mV
ΔV_O	Load regulation	V_I = 7.3 V, I_O = 5 to 500 mA			6	30	mV
I_d	Quiescent current	V_I = 7 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 7.3 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 8 ± 1 V	f = 120 Hz		75		dB
			f = 1 kHz		70		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 9 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 22. Electrical characteristics for LF80AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 10 V		7.92	8	8.08	V
		I_O = 50 mA, V_I = 10 V, T_a = -25 to 85°C		7.84		8.16	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 9 to 16 V, I_O = 5 mA			8	40	mV
ΔV_O	Load regulation	V_I = 9.3 V, I_O = 5 to 500 mA			8	40	mV
I_d	Quiescent current	V_I = 9 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 9.3 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 10 ± 1 V	f = 120 Hz		72		dB
			f = 1 kHz		67		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 9 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 23. Electrical characteristics for LF80C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 10 V		7.84	8	8.16	V
		I_O = 50 mA, V_I = 10 V, T_a = -25 to 85°C		7.68		8.32	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 9 to 16 V, I_O = 5 mA			8	40	mV
ΔV_O	Load regulation	V_I = 9.3 V, I_O = 5 to 500 mA			8	40	mV
I_d	Quiescent current	V_I = 9 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 9.3 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 10 ± 1 V	f = 120 Hz		72		dB
			f = 1 kHz		67		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 9 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 24. Electrical characteristics for LF80CDT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 125°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 10 V, T_a = 25°C		7.84	8	8.16	V
		I_O = 50 mA, V_I = 10 V		7.665		8.335	
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 = 9 to 16 V, I_O = 5 mA			8	44	mV
ΔV_O	Load regulation	V_I = 9.3 V, I_O = 5 to 500 mA			8	44	mV
I_d	Quiescent current	V_I = 9 to 16V, I_O = 0mA	ON MODE		0.7	2.5	mA
		V_I = 9.3 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	160	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 10 ± 1 V T_a = 25°C	f = 120 Hz		72		dB
			f = 1 kHz		67		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz, T_a = 25°C			50		µV
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 = 9 V, V_C = 6 V, T_a = 25°C			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 25. Electrical characteristics for LF85AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 10.5 V		8.415	8.5	8.585	V
		I_O = 50 mA, V_I = 10.5 V, T_a = -25 to 85°C		8.33		8.67	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 9.5 to 16 V, I_O = 5 mA			8	42	mV
ΔV_O	Load regulation	V_I = 9.8 V, I_O = 5 to 500 mA			8	42	mV
I_d	Quiescent current	V_I = 9.5 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 9.8 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 10.5 ± 1 V	f = 120 Hz		72		dB
			f = 1 kHz		67		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 9 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 26. Electrical characteristics for LF85C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 10.5 V		8.33	8.5	8.67	V
		I_O = 50 mA, V_I = 10.5 V, T_a = -25 to 85°C		8.16		8.84	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 9.5 to 16 V, I_O = 5 mA			8	42	mV
ΔV_O	Load regulation	V_I = 9.8 V, I_O = 5 to 500 mA			8	42	mV
I_d	Quiescent current	V_I = 9.5 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 9.8 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 10.5 ± 1 V	f = 120 Hz		72		dB
			f = 1 kHz		67		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 9 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 27. Electrical characteristics for LF85CDT-TRY and LF85CPT-TRY (Automotive Grade) (refer to the test circuits, T_A = -40 to 25°C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 10.5 V, T_a = 25°C		8.33	8.5	8.67	V
		I_O = 50 mA, V_I = 10.5 V		8.145		8.855	
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 = 9.5 to 16 V, I_O = 5 mA			8	44	mV
ΔV_O	Load regulation	V_I = 9.8 V, I_O = 5 to 500 mA			8	44	mV
I_d	Quiescent current	V_I = 9.5 to 16V, I_O = 0mA	ON MODE		0.7	2.5	mA
		V_I = 9.8 to 16V, I_O=500mA				12	
		V_I = 9 V	OFF MODE		70	160	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 10.5 ± 1 V T_a = 25°C	f = 120 Hz		72		dB
			f = 1 kHz		67		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz, T_a = 25°C			50		µV
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 = 9 V, V_C = 6 V, T_a = 25°C			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 28. Electrical characteristics for LF90AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 11 V		8.91	9	9.09	V
		I_O = 50 mA, V_I = 11 V, T_a = -25 to 85°C		8.82		9.18	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 10 to 16 V, I_O = 5 mA			9	45	mV
ΔV_O	Load regulation	V_I = 10.3 V, I_O = 5 to 500 mA			9	45	mV
I_d	Quiescent current	V_I = 10 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 10.3 to 16V, I_O = 500mA				12	
		V_I = 10 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 11 ± 1 V	f = 120 Hz		71		dB
			f = 1 kHz		66		
			f = 10 kHz		56		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 10 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 29. Electrical characteristics for LF90C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 11 V		8.82	9	9.18	V
		I_O = 50 mA, V_I = 11 V, T_a = -25 to 85°C		8.64		9.36	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 10 to 16 V, I_O = 5 mA			9	45	mV
ΔV_O	Load regulation	V_I = 10.3 V, I_O = 5 to 500 mA			9	45	mV
I_d	Quiescent current	V_I = 10 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 10.3 to 16V, I_O = 500mA				12	
		V_I = 10 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 11 ± 1 V	f = 120 Hz		71		dB
			f = 1 kHz		66		
			f = 10 kHz		56		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 10 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 30. Electrical characteristics for LF120AB (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified.)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 15 V		11.88	12	12.12	V
		I_O = 50 mA, V_I = 15 V, T_a = -25 to 85°C		11.76		12.24	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 13 to 16 V, I_O = 5 mA			12	60	mV
ΔV_O	Load regulation	V_I = 13.3 V, I_O = 5 to 500 mA			12	60	mV
I_d	Quiescent current	V_I = 13 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 13.3 to 16V, I_O = 500mA				12	
		V_I = 13 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 14 ± 1 V	f = 120 Hz		69		dB
			f = 1 kHz		64		
			f = 10 kHz		54		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 13 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

Table 31. Electrical characteristics for LF120C (refer to the test circuits, T_J = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 50 mA, V_I = 14 V		11.76	12	12.24	V
		I_O = 50 mA, V_I = 14 V, T_a = -25 to 85°C		11.52		12.48	
V_I	Operating input voltage	I_O = 500 mA				16	V
I_O	Output current limit				1		A
ΔV_O	Line regulation	V_I = 13 to 16 V, I_O = 5 mA			12	60	mV
ΔV_O	Load regulation	V_I = 13.3 V, I_O = 5 to 500 mA			12	60	mV
I_d	Quiescent current	V_I = 13 to 16V, I_O = 0mA	ON MODE		0.7	1.5	mA
		V_I = 13.3 to 16V, I_O = 500mA				12	
		V_I = 13 V	OFF MODE		70	140	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 14 ± 1 V	f = 120 Hz		69		dB
			f = 1 kHz		64		
			f = 10 kHz		54		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
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 = 13 V, V_C = 6 V			10		µA
C_O	Output bypass capacitance	ESR = 0.1 to 10 Ω, I_O = 0 to 500 mA		2	10		µF

5 Typical performance characteristics

(unless otherwise specified $V_{O(NOM)}$ = 3.3 V)

Figure 4. Dropout voltage vs output current

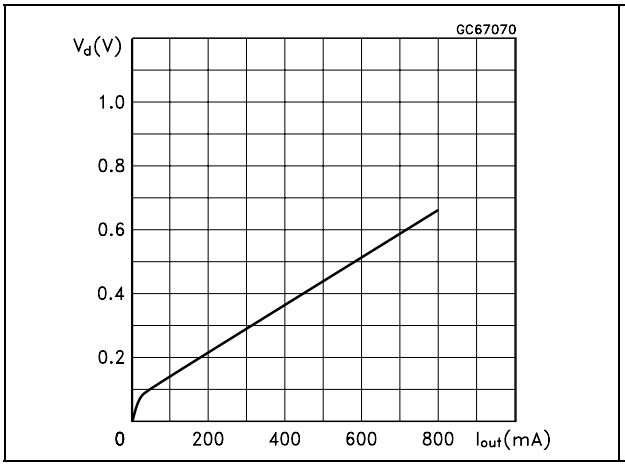


Figure 5. Dropout voltage vs temperature

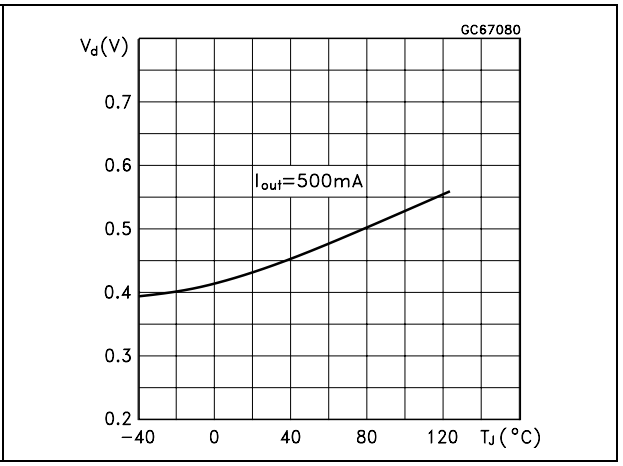


Figure 6. Supply current vs input voltage

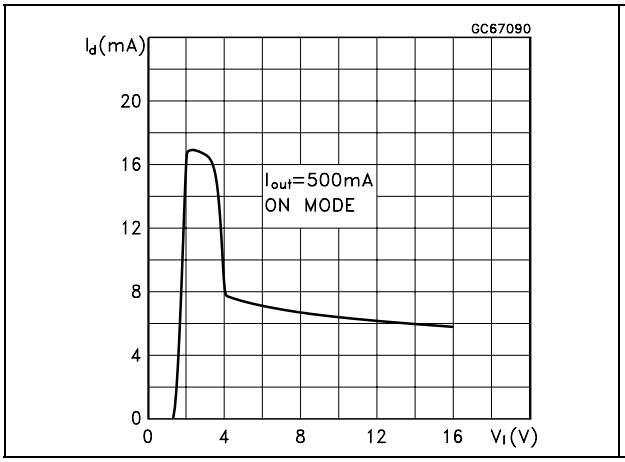


Figure 7. Supply current vs input voltage

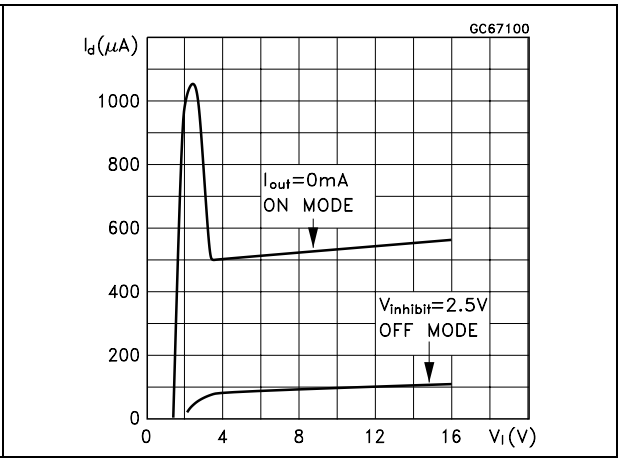


Figure 8. Short circuit current vs input voltage

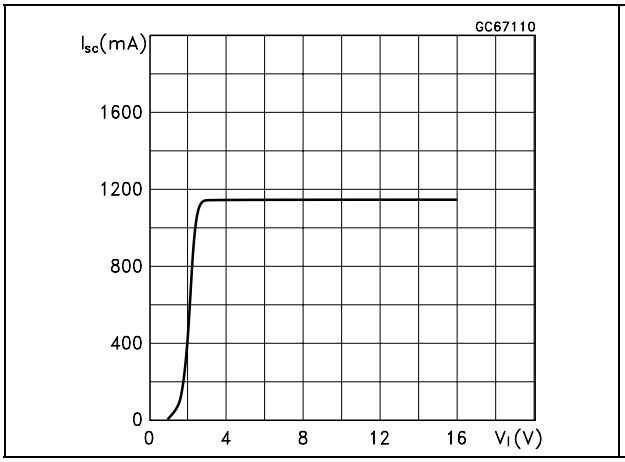


Figure 9. Supply current vs temperature

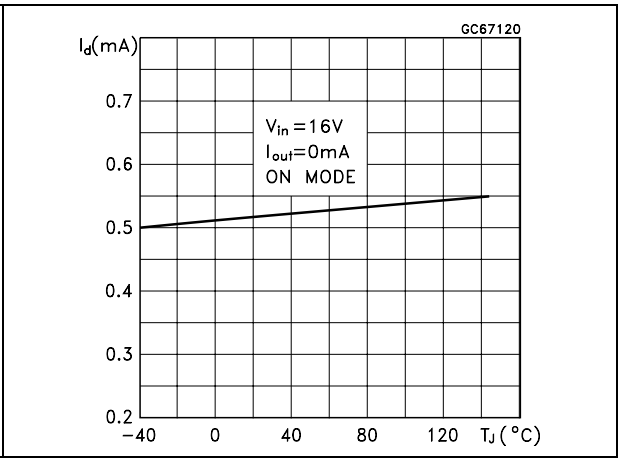


Figure 10. Logic controlled precision 3.3/5.0 V selectable output

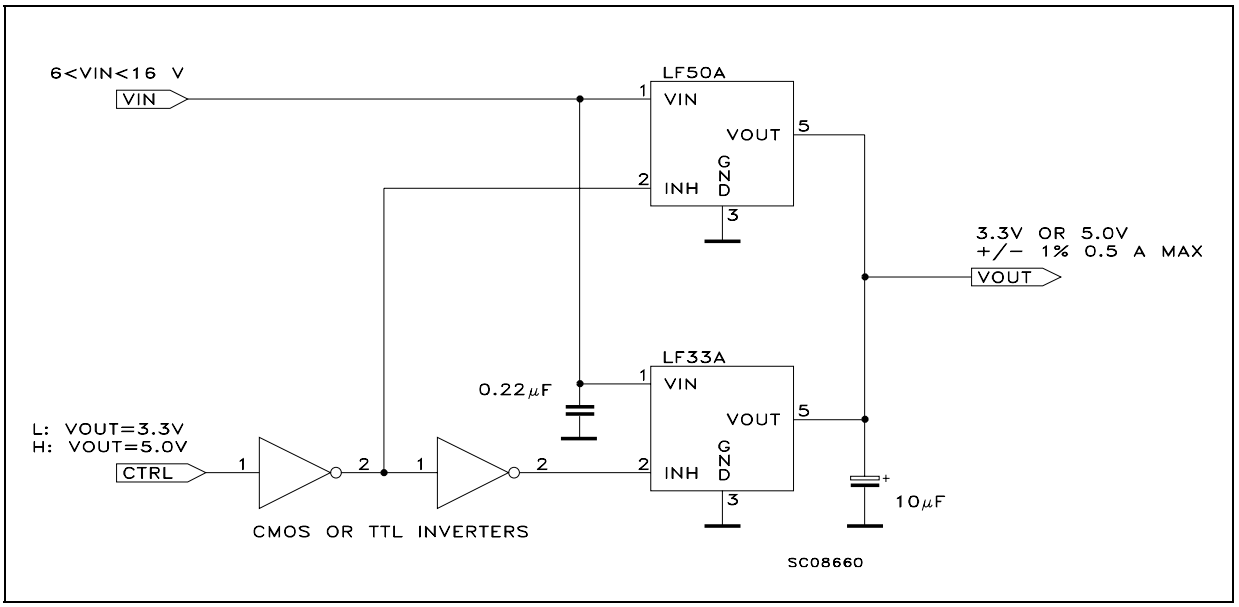


Figure 11. Sequential multi-output supply

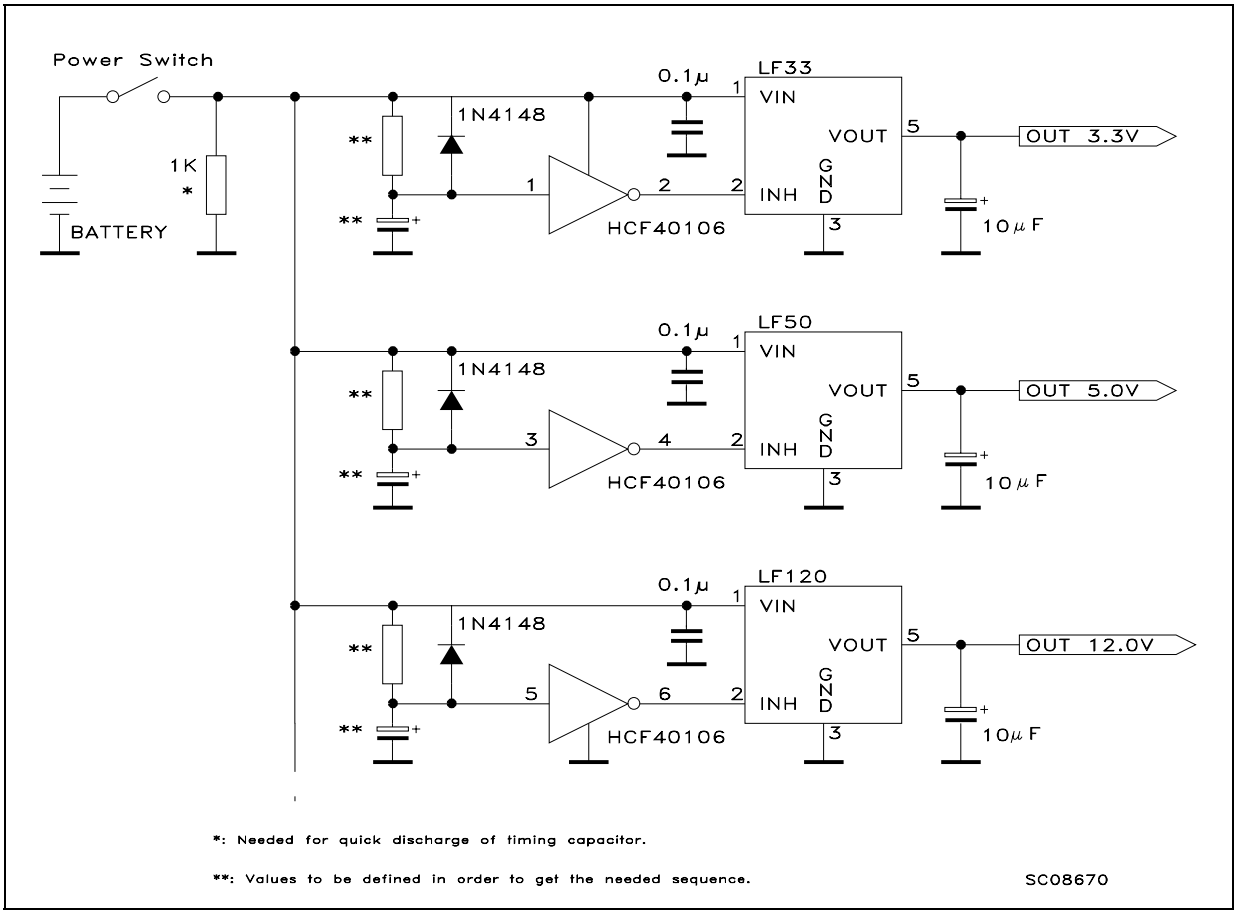


Figure 12. Multiple supply with ON/OFF toggle switch

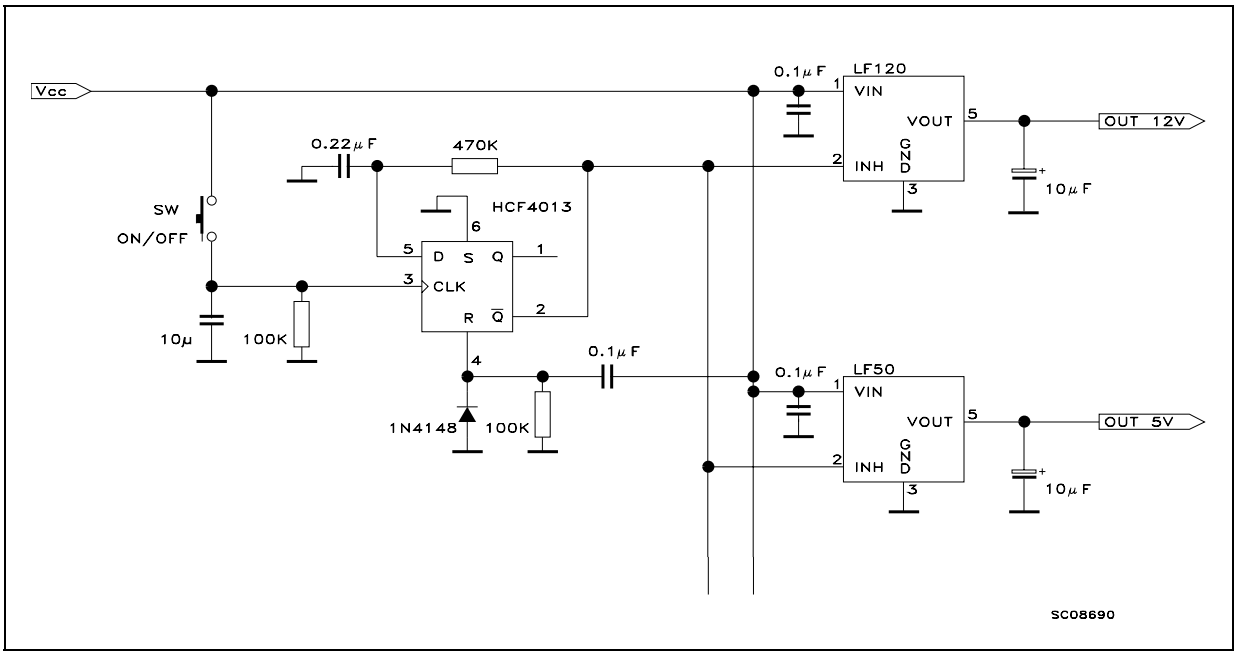


Figure 13. Basic inhibit functions

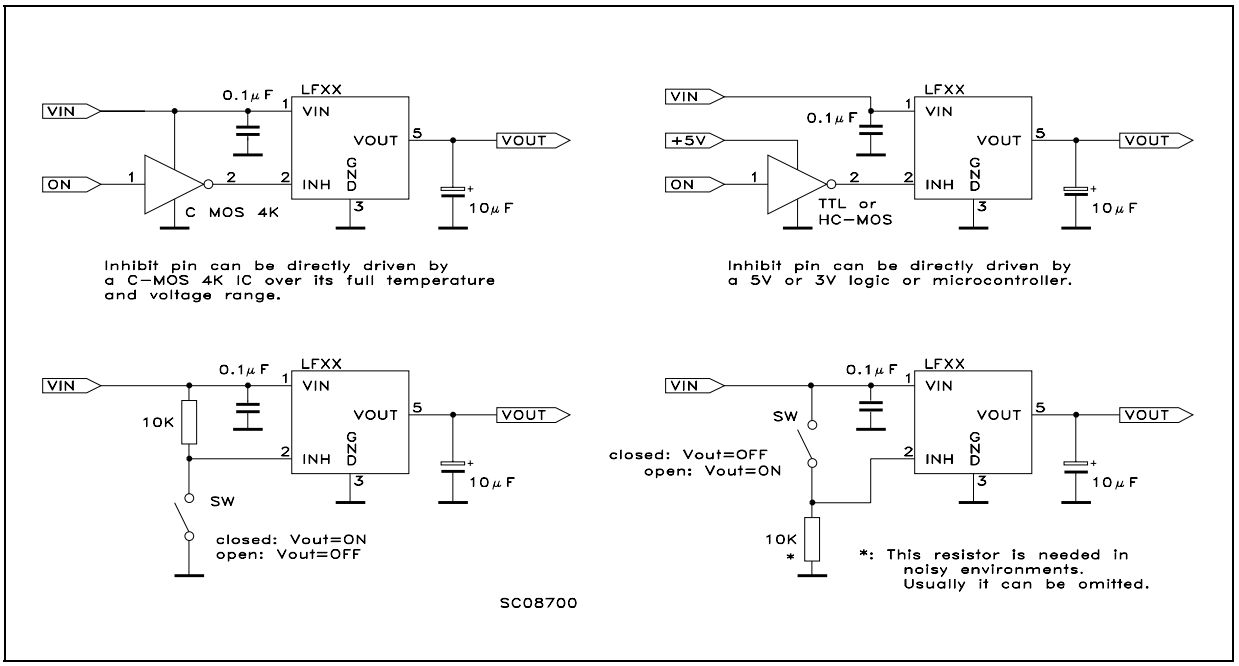
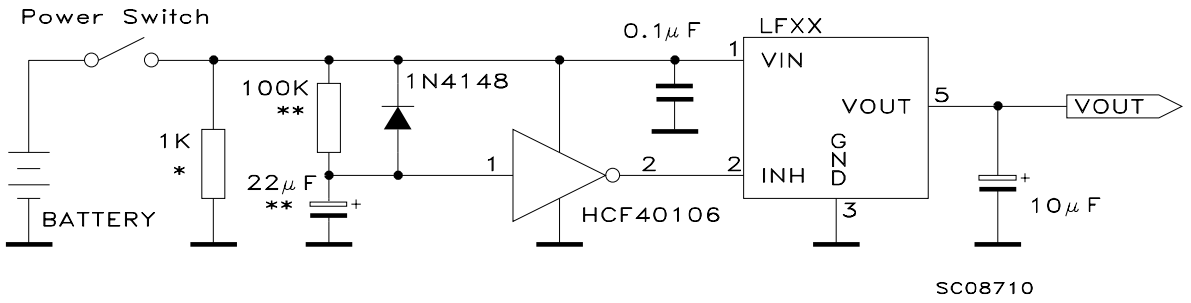


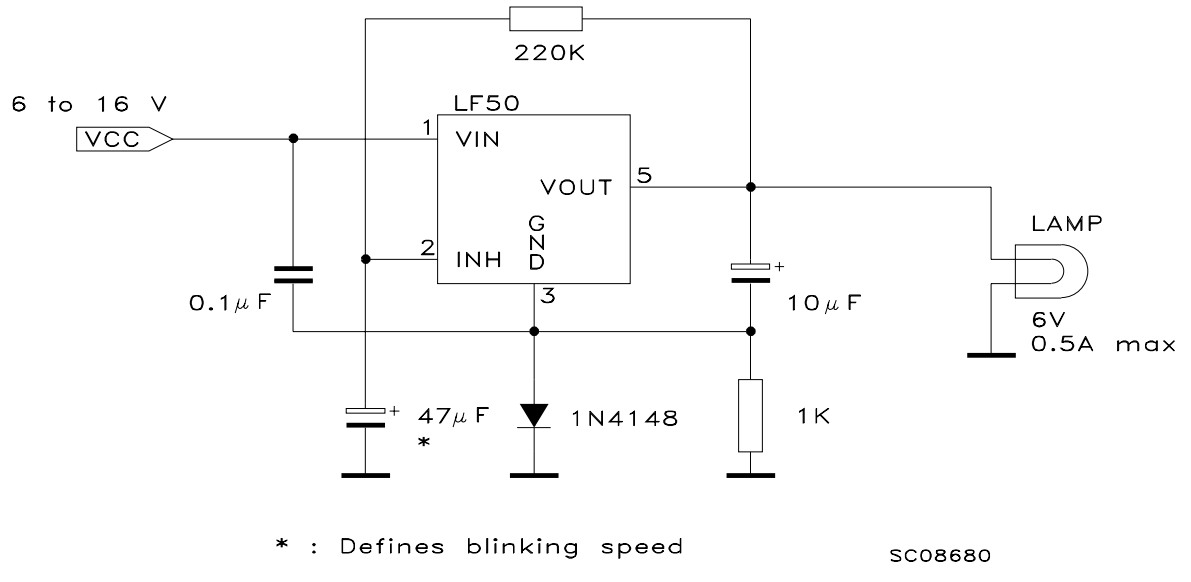
Figure 14. Delayed turn-on



*: Needed for quick discharge of timing capacitor.

**: With these values the typical delay is about 1.5 sec.

Figure 15. Low voltage bulb blinker

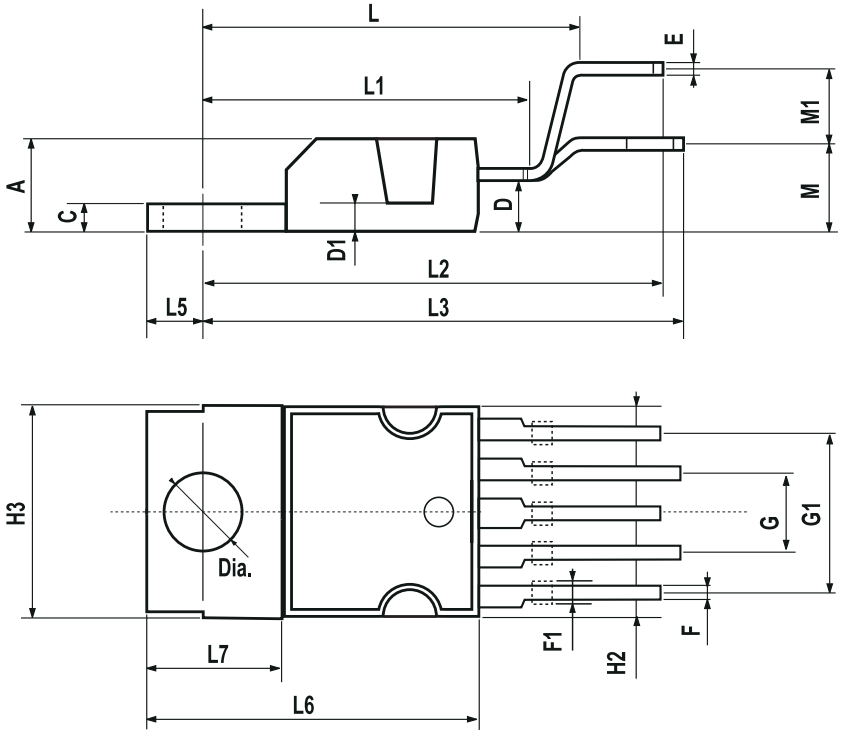


6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

PENTAWATT (Vertical) mechanical data

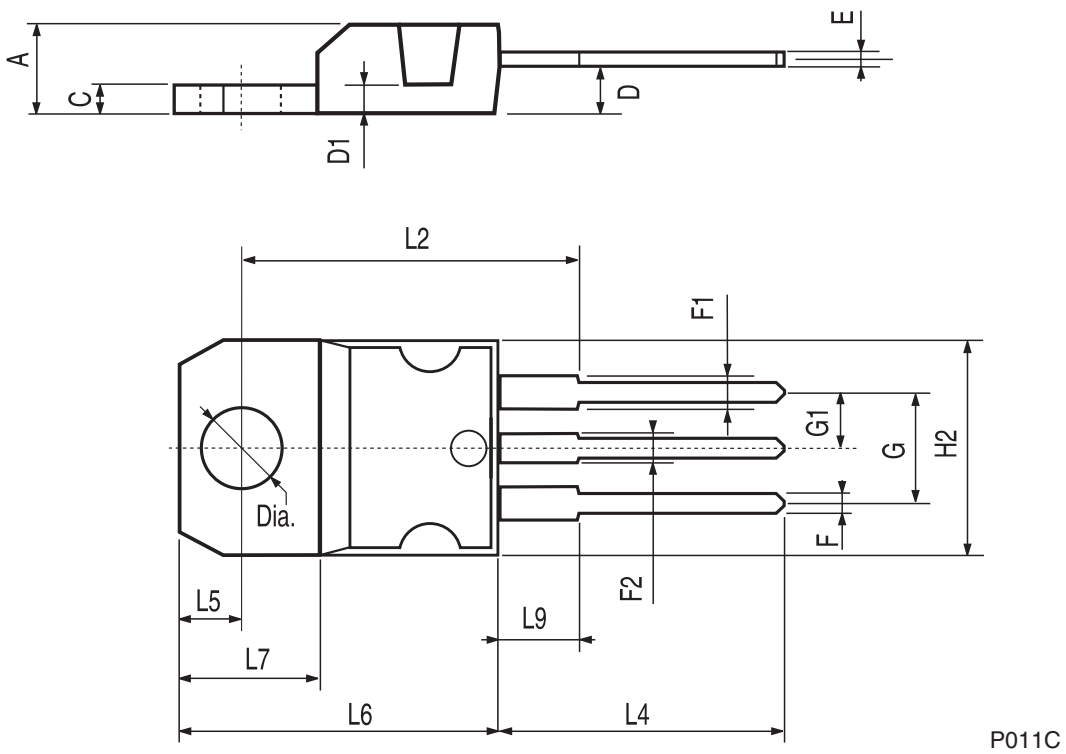
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			4.8			0.189
C			1.37			0.054
D	2.4		2.8	0.094		0.110
D1	1.2		1.35	0.047		0.053
E	0.35		0.55	0.014		0.022
F	0.8		1.05	0.031		0.041
F1	1		1.4	0.039		0.055
G	3.2	3.4	3.6	0.126	0.134	0.142
G1	6.6	6.8	7	0.260	0.268	0.276
H2			10.4			0.409
H3	10.05		10.4	0.396		0.409
L		17.85			0.703	
L1		15.75			0.620	
L2		21.4			0.843	
L3		22.5			0.886	
L5	2.6		3	0.102		0.118
L6	15.1		15.8	0.594		0.622
L7	6		6.6	0.236		0.260
M		4.5			0.177	
M1		4			0.157	
Dia1	3.65		3.85	0.144		0.152



P010E

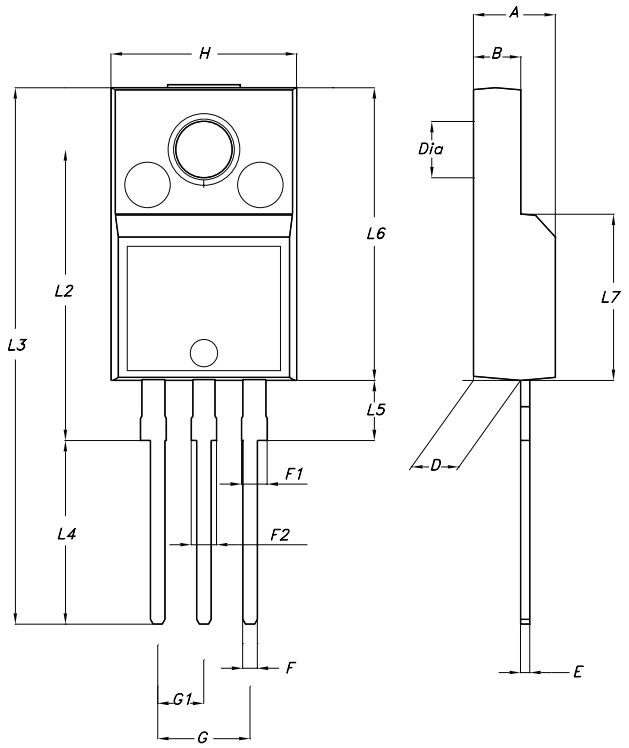
TO-220 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



TO-220FP mechanical data

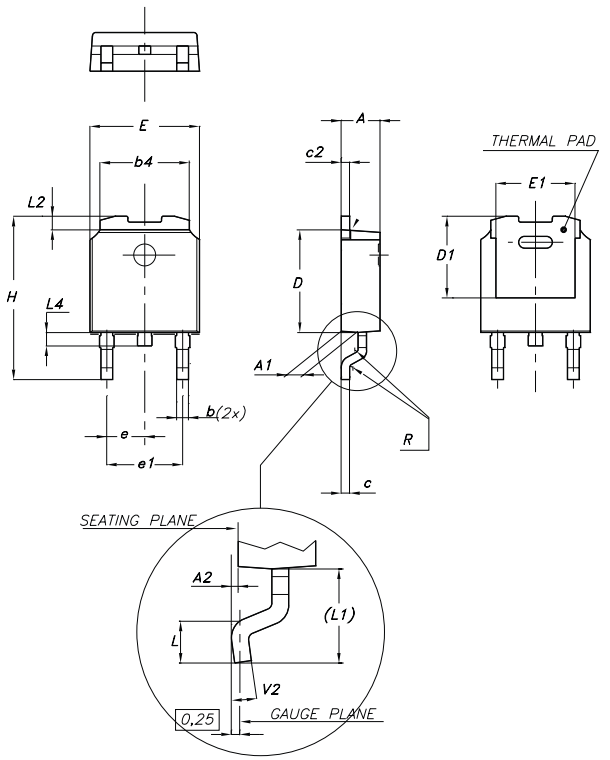
Dim.	mm.			inch.		
	Min.	Typ	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.70	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.50	0.045		0.059
F2	1.15		1.50	0.045		0.059
G	4.95		5.2	0.194		0.204
G1	2.4		2.7	0.094		0.106
H	10.0		10.40	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L5	2.9		3.6	0.114		0.142
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
DIA.	3		3.2	0.118		0.126



7012510A-H

DPAK mechanical data

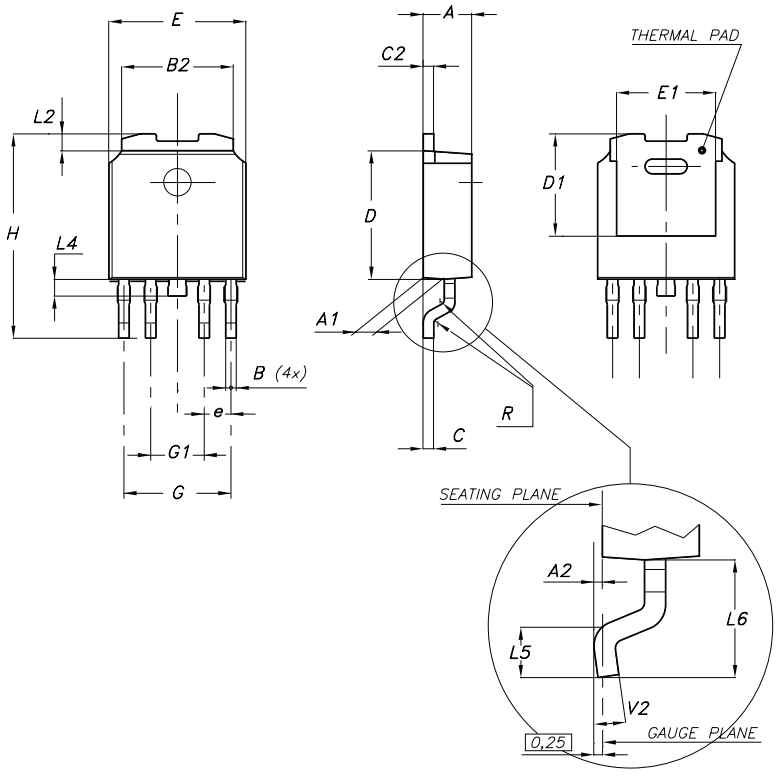
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
b4	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		2.28			0.090	
e1	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L	1			0.039		
(L1)		2.8			0.110	
L2		0.8			0.031	
L4	0.6		1	0.023		0.039
R		0.2			0.008	
V2	0°		8°	0°		8°



0068772-F

PPAK mechanical data

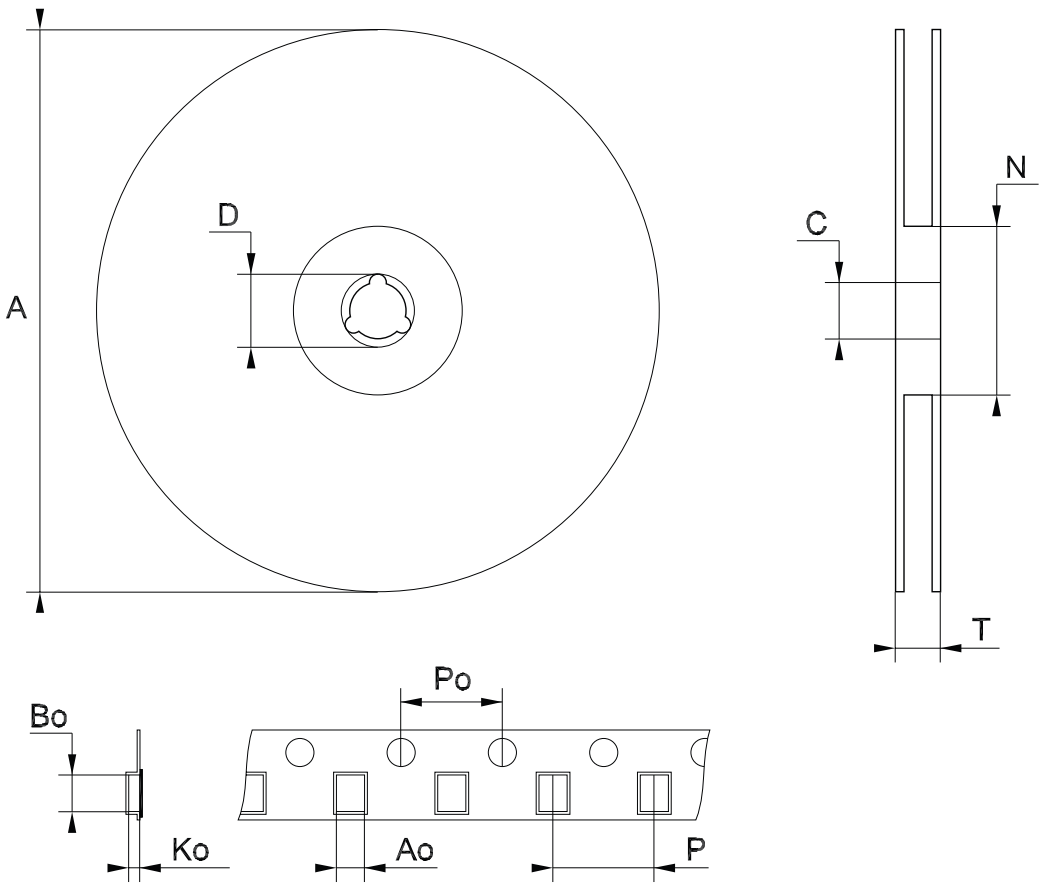
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.4		0.6	0.015		0.023
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.201	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		1.27			0.050	
G	4.9		5.25	0.193		0.206
G1	2.38		2.7	0.093		0.106
H	9.35		10.1	0.368		0.397
L2		0.8	1		0.031	0.039
L4	0.6		1	0.023		0.039
L5	1			0.039		
L6		2.8			0.110	



0078180-E

Tape & reel DPAK-PPAK mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			330			12.992
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.80	6.90	7.00	0.268	0.272	0.2.76
Bo	10.40	10.50	10.60	0.409	0.413	0.417
Ko	2.55	2.65	2.75	0.100	0.104	0.105
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	7.9	8.0	8.1	0.311	0.315	0.319



Note: Drawing not in scale

7 Order codes

Table 32. Order codes

Packages						Output voltage
TO-220	TO-220FP	DPAK	DPAK (T&R)	PPAK	PPAK (T&R)	
LF15CV(1)	LF15CP(1)			LF15CPT(1)	LF15CPT-TR(1)	1.5 V
LF15ABV(1)	LF15ABP(1)		LF15ABDT-TR	LF15ABPT(1)		1.5 V
	LF18CP(1)		LF18CDT-TR		LF18CPT-TR	1.8 V
			LF18CDT-TRY(2)			1.8 V
	LF18ABP(1)		LF18ABDT-TR		LF18ABPT-TR	1.8 V
	LF25CP(1)		LF25CDT-TR		LF25CPT-TR	2.5 V
			LF25CDT-TRY(2)			2.5 V
	LF25ABP(1)		LF25ABDT-TR	LF25ABPT(1)		2.5 V
			LF25ABDT-TRY(2)			2.5 V
LF33CV			LF33CDT-TR		LF33CPT-TR	3.3 V
			LF33CDT-TRY(2)		LF33CPT-TRY(2)	3.3 V
LF33ABV			LF33ABDT-TR			3.3 V
LF47CV						4.7 V
LF50CV	LF50CP		LF50CDT-TR		LF50CPT-TR	5 V
			LF50CDT-TRY(2)		LF50CPT-TRY(2)	5 V
LF50ABV	LF50ABP		LF50ABDT-TR		LF50ABPT-TR	5 V
			LF50ABDT-TRY(2)			5 V
LF60CV	LF60CP(1)		LF60CDT-TR		LF60CPT-TR(1)	6 V
LF60ABV	LF60ABP(1)		LF60ABDT-TR	LF60ABPT(1)	LF60ABPT-TR(1)	6 V
LF80CV	LF80CP(1)		LF80CDT-TR		LF80CPT-TR	8 V
			LF80CDT-TRY(2)			8 V
LF80ABV	LF80ABP(1)		LF80ABDT-TR			8 V
			LF85CDT-TR		LF85CPT-TR	8.5 V
			LF85CDT-TRY(2)		LF85CPT-TRY(2)	8.5 V
				LF85ABPT(1)	LF85ABPT-TR	8.5 V
LF90CV	LF90CP(1)		LF90CDT-TR		LF90CPT-TR	9 V
	LF90ABP(1)	LF90ABDT(1)	LF90ABDT-TR		LF90ABPT-TR	9 V
	LF120CP(1)		LF120CDT-TR			12 V
LF120ABV			LF120ABDT-TR	LF120ABPT(1)		12 V

1. Available on request.
2. Automotive Grade products.

8 Revision history

Table 33. Document revision history

Date	Revision	Changes
21-Jun-2004	14	Document updating.
24-May-2006	15	Order codes updated.
02-Apr-2007	16	Order codes updated.
14-May-2007	17	Order codes updated.
26-Jul-2007	18	Add *Table 1* in cover page.
26-Nov-2007	19	Modified: *Table 32*.
16-Jan-2008	20	Added new order codes for Automotive grade products see *Table 32 on page 47*.
12-Feb-2008	21	Modified: *Table 32 on page 47*.
10-Jul-2008	22	Modified: *Table 32 on page 47*.

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