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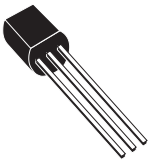
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LExxAB
LExxC

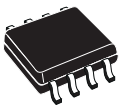
Very low drop voltage regulators with inhibit

Features

- Very low dropout voltage (0.2 V typ)
- Very low quiescent current (typ. 50 µA in OFF MODE, 0.5 mA in ON MODE, no load)
- Output current up to 100 mA
- Output voltages of 2.5; 2.7; 3; 3.3; 3.5; 4; 4.5; 4.7; 5; 8 V
- Internal current and thermal limit
- Only 2.2 µF for stability
- Available in ± 1 % (A) or ± 2 % (C) selection at 25 °C
- Supply voltage rejection: 80 dB (typ.)
- Temperature range: -40 to 125 °C



TO-92



SO-8

Description

The LExxAB and LExxC are very low drop voltage regulators available in SO-8 and TO-92 packages and in a wide range of output voltages.

The very low drop voltage (0.2 V) and the very low quiescent current make them particularly suitable for low noise low power applications and specially in battery powered systems.

They are pin to pin compatible with the older L78Lxx series. Furthermore in the 8 pin configuration (SO-8) they employ a shutdown logic control (pin 5, TTL compatible). This means that when the device is used as a local regulator, it's possible to put in stand by a part of the board even more decreasing the total power consumption. In the three terminal configuration (TO-92) the device is even in ON STATE, maintaining the same electrical performances. It needs only 2.2 µF capacitor for stability allowing room and cost saving effect.

Table 1. Device summary

Part numbers		
LE25AB	LE35C	LE47AB
LE27AB	LE35AB	LE50C
LE30C	LE40C	LE50AB
LE33C	LE45C	LE80C
LE33AB	LE45AB	LE80AB

Contents

1 Diagram 5

2 Pin configuration 6

3 Maximum ratings 7

4 Electrical characteristics 8

5 Typical performance characteristics 29

6 Package mechanical data 32

7 Order codes 37

8 Revision history 38

List of figures

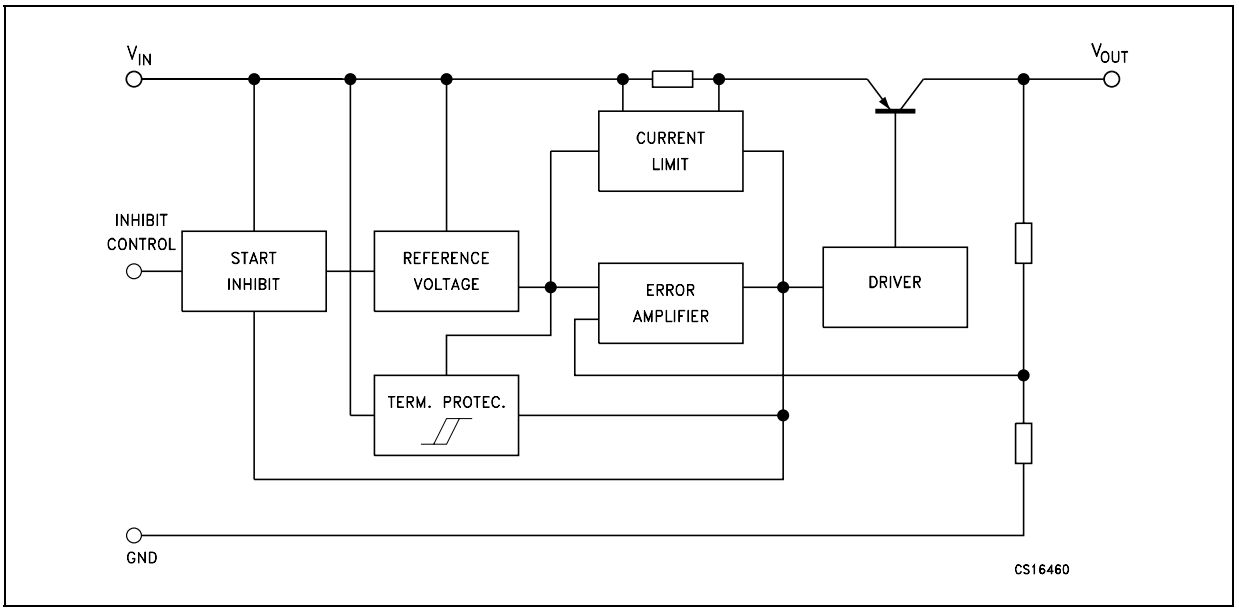
Figure 1. Block diagram . . . 5
Figure 2. Pin connections (top view for SO-8, bottom view for TO-92) . . . 6
Figure 3. Test circuit . . . 7
Figure 4. Dropout voltage vs output current . . . 29
Figure 5. Dropout voltage vs temperature . . . 29
Figure 6. Supply current vs temperature . . . 29
Figure 7. Supply current vs input voltage . . . 29
Figure 8. Short circuit current vs dropout voltage . . . 29
Figure 9. SVR vs frequency . . . 29
Figure 10. Logic controlled precision 3.3/5.0 V selectable output . . . 30
Figure 11. Sequential multi-output supply . . . 30
Figure 12. Multiple supply with ON/OFF toggle switch . . . 31
Figure 13. Basic inhibit functions . . . 31

List of tables

Table 1. Device summary . . . 1
Table 2. Absolute maximum ratings . . . 7
Table 3. Thermal data . . . 7
Table 4. Electrical characteristics for LE12AB . . . 8
Table 5. Electrical characteristics for LE25AB . . . 9
Table 6. Electrical characteristics for LE25C . . . 10
Table 7. Electrical characteristics for LE27AB . . . 11
Table 8. Electrical characteristics for LE27C . . . 12
Table 9. Electrical characteristics for LE30AB . . . 13
Table 10. Electrical characteristics for LE30C . . . 14
Table 11. Electrical characteristics for LE33AB . . . 15
Table 12. Electrical characteristics for LE33C . . . 16
Table 13. Electrical characteristics for LE35AB . . . 17
Table 14. Electrical characteristics for LE35C . . . 18
Table 15. Electrical characteristics for LE40AB . . . 19
Table 16. Electrical characteristics for LE40C . . . 20
Table 17. Electrical characteristics for LE45AB . . . 21
Table 18. Electrical characteristics for LE45C . . . 22
Table 19. Electrical characteristics for LE47AB . . . 23
Table 20. Electrical characteristics for LE47C . . . 24
Table 21. Electrical characteristics for LE50AB . . . 25
Table 22. Electrical characteristics for LE50C . . . 26
Table 23. Electrical characteristics for LE80AB . . . 27
Table 24. Electrical characteristics for LE80C . . . 28
Table 25. Order codes . . . 37
Table 26. Document revision history . . . 38

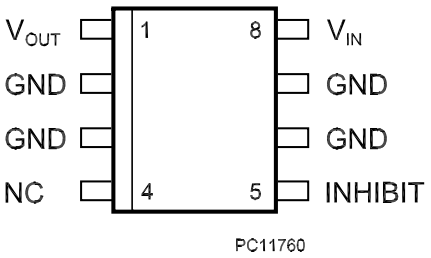
1 Diagram

Figure 1. Block diagram

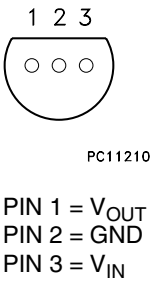


2 Pin configuration

Figure 2. Pin connections (top view for SO-8, bottom view for TO-92)



SO-8



PIN 1 = V_{OUT}
PIN 2 = GND
PIN 3 = V_{IN}

TO-92

3 Maximum ratings

Table 2. Absolute maximum ratings

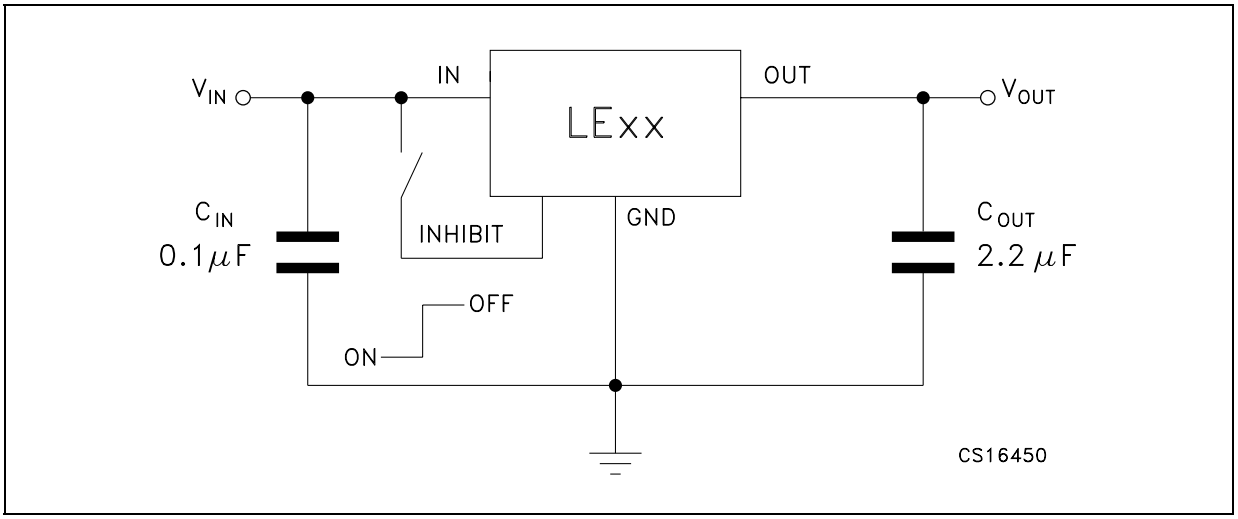
Symbol	Parameter	Value	Unit
V_I	DC input voltage	20	V
I_O	Output current	Internally limited (1)	
P_{TOT}	Power dissipation	Internally limited	
T_{STG}	Storage temperature range	-65 to 150	°C
T_{OP}	Operating junction temperature range	-40 to 125	°C

1. Our SO-8 package used for Voltage Regulators is modified internally to have pins 2, 3, 6 and 7 electrically communed to the die attach flag. This particular frame decreases the total thermal resistance of the package and increases its ability to dissipate power when an appropriate area of copper on the printed circuit board is available for heatsinking. The external dimensions are the same as for the standard SO-8.

Table 3. Thermal data

Symbol	Parameter	SO-8	TO-92	Unit
R_{thJC}	Thermal resistance junction-case	20		°C/W
R_{thJA}	Thermal resistance junction-ambient	55	200	°C/W

Figure 3. Test circuit



Note: If the Inhibit pin is left floating, the regulator is in ON mode. However, to avoid any noise picking-up, it is suggested to ground it when the Inhibit function is not used.

4 Electrical characteristics

Table 4. Electrical characteristics for LE12AB (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 = 10 mA, V_I = 3.3 V		1.225	1.25	1.275	V
		I_O = 10 mA, V_I = 3.3 V, T_A = -25 to 85°C		1.2		1.3	
V_I	Operating input voltage	I_O = 100 mA		2.5		18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 2.5 to 18 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation	V_I = 2.8 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 2.5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 2.5 to 18V, I_O=100mA			1.5	3	
		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 = 100 mA, T_A = -40 to 125°C			1.25		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 100 mA		2	10		µF

Table 5. Electrical characteristics for LE25AB (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 = 10 mA, V_I = 4.5 V		2.475	2.5	2.525	V
		I_O = 10 mA, V_I = 4.5 V, T_A = -25 to 85°C		2.45		2.55	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 3.2 to 18 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation	V_I = 3.5 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 3.5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.5 to 18V, I_O=100mA			1.5	3	
		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		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 6. Electrical characteristics for LE25C (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 = 10 mA, V_I = 4.5 V		2.45	2.5	2.55	V
		I_O = 10 mA, V_I = 4.5 V, T_A = -25 to 85°C		2.4		2.6	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 3.2 to 18 V, I_O = 0.5 mA			3	20	mV
ΔV_O	Load regulation	V_I = 3.5 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 3.5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.5 to 18V, I_O=100mA			1.5	3	
		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		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 7. Electrical characteristics for LE27AB (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 = 10 mA, V_I = 4.7 V		2.673	2.7	2.727	V
		I_O = 10 mA, V_I = 4.7 V, T_A = -25 to 85°C		2.646		2.754	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 3.4 to 18 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation	V_I = 3.7 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 3.7 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.7 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 4.7 ± 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 = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 8. Electrical characteristics for LE27C (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 = 10 mA, V_I = 4.7 V		2.646	2.7	2.754	V
		I_O = 10 mA, V_I = 4.7 V, T_A = -25 to 85°C		2.592		2.808	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 3.4 to 18 V, I_O = 0.5 mA			3	20	mV
ΔV_O	Load regulation	V_I = 3.7 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 3.7 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 3.7 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 4.7 ± 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 = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 9. Electrical characteristics for LE30AB (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 = 10 mA, V_I = 5 V		2.970	3	3.030	V
		I_O = 10 mA, V_I = 5 V, T_A = -25 to 85°C		2.940		3.060	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 3.7 to 18 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation	V_I = 4 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 4 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5 ± 1 V	f = 120 Hz		81		dB
			f = 1 kHz		76		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 10. Electrical characteristics for LE30C (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 = 10 mA, V_I = 5 V		2.940	3	3.060	V
		I_O = 10 mA, V_I = 5 V, T_A = -25 to 85°C		2.880		3.120	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 3.7 to 18 V, I_O = 0.5 mA			3	20	mV
ΔV_O	Load regulation	V_I = 4 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 4 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5 ± 1 V	f = 120 Hz		81		dB
			f = 1kHz		76		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 11. Electrical characteristics for LE33AB (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 = 10 mA, V_I = 5.3 V		3.267	3.3	3.333	V
		I_O = 10 mA, V_I = 5.3 V, T_A = -25 to 85°C		3.234		3.366	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 4 to 18 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation	V_I = 4.3 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 4.3 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4.3 to 18V, I_O=100mA			1.5	3	
		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		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 12. Electrical characteristics for LE33C (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 = 10 mA, V_I = 5.3 V		3.234	3.3	3.366	V
		I_O = 10 mA, V_I = 5.3 V, T_A = -25 to 85°C		3.168		3.432	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 4 to 18 V, I_O = 0.5 mA			3	20	mV
ΔV_O	Load regulation	V_I = 4.3 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 4.3 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4.3 to 18V, I_O=100mA			1.5	3	
		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		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 13. Electrical characteristics for LE35AB (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 = 10 mA, V_I = 5.5 V		3.465	3.5	3.535	V
		I_O = 10 mA, V_I = 5.5 V, T_A = -25 to 85°C		3.43		3.57	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 4.2 to 18 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation	V_I = 4.5 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 4.5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4.5 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5.5 ± 1 V	f = 120 Hz		79		dB
			f = 1 kHz		74		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 14. Electrical characteristics for LE35C (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 = 10 mA, V_I = 5.5 V		3.43	3.5	3.57	V
		I_O = 10 mA, V_I = 5.5 V, T_A = -25 to 85°C		3.36		3.64	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 4.2 to 18 V, I_O = 0.5 mA			3	20	mV
ΔV_O	Load regulation	V_I = 4.5 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 4.5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 4.5 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5.5 ± 1 V	f = 120 Hz		79		dB
			f = 1 kHz		74		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 15. Electrical characteristics for LE40AB (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 = 10 mA, V_I = 6 V		3.96	4	4.04	V
		I_O = 10 mA, V_I = 6 V, T_A = -25 to 85°C		3.92		4.08	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 4.7 to 18 V, I_O = 0.5 mA			4	20	mV
ΔV_O	Load regulation	V_I = 5 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 5 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 6 ± 1 V	f = 120 Hz		78		dB
			f = 1 kHz		73		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 16. Electrical characteristics for LE40C (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 = 10 mA, V_I = 6 V		3.92	4	4.08	V
		I_O = 10 mA, V_I = 6 V, T_A = -25 to 85°C		3.84		4.16	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 4.7 to 18 V, I_O = 0.5 mA			4	30	mV
ΔV_O	Load regulation	V_I = 5 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 5 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 6 ± 1 V	f = 120 Hz		78		dB
			f = 1 kHz		73		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 17. Electrical characteristics for LE45AB (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 = 10 mA, V_I = 6.5 V		4.445	4.5	4.545	V
		I_O = 10 mA, V_I = 6.5 V, T_A = -25 to 85°C		4.41		4.59	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 5.2 to 18 V, I_O = 0.5 mA			4	20	mV
ΔV_O	Load regulation	V_I = 5.5 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 5.5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 5.5 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 6.5 ± 1 V	f = 120 Hz		77		dB
			f = 1 kHz		72		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 18. Electrical characteristics for LE45C (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 = 10 mA, V_I = 6.5 V		4.41	4.5	4.59	V
		I_O = 10 mA, V_I = 6.5 V, T_A = -25 to 85°C		4.32		4.68	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 5.2 to 18 V, I_O = 0.5 mA			4	30	mV
ΔV_O	Load regulation	V_I = 5.5 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 5.5 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 5.5 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 6.5 ± 1 V	f = 120 Hz		77		dB
			f = 1 kHz		72		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 19. Electrical characteristics for LE47AB (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 = 10 mA, V_I = 6.7 V		4.653	4.7	4.747	V
		I_O = 10 mA, V_I = 6.7 V, T_A = -25 to 85°C		4.606		4.794	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 5.4 to 18 V, I_O = 0.5 mA			4	20	mV
ΔV_O	Load regulation	V_I = 5.7 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 5.7 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 5.7 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 6.7 ± 1 V	f = 120 Hz		77		dB
			f = 1 kHz		72		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 20. Electrical characteristics for LE47C (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 = 10 mA, V_I = 6.7 V		4.606	4.7	4.794	V
		I_O = 10 mA, V_I = 6.7 V, T_A = -25 to 85°C		4.512		4.888	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 5.4 to 18 V, I_O = 0.5 mA			4	30	mV
ΔV_O	Load regulation	V_I = 5.7 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 5.7 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 5.7 to 18V, I_O=100mA			1.5	3	
		V_I = 6 V	OFF MODE		50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 6.7 ± 1 V	f = 120 Hz		77		dB
			f = 1 kHz		72		
			f = 10 kHz		60		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 21. Electrical characteristics for LE50AB (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 = 10 mA, V_I = 7 V		4.95	5	5.05	V
		I_O = 10 mA, V_I = 7 V, T_A = -25 to 85°C		4.9		5.1	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150	350	425	mA
ΔV_O	Line regulation	V_I = 5.7 to 18 V, I_O = 0.5 mA			4	20	mV
ΔV_O	Load regulation	V_I = 6 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 6 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 6 to 18V, I_O=100mA			1.5	3	
		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 = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 22. Electrical characteristics for LE50C (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 = 10 mA, V_I = 7 V		4.9	5	5.1	V
		I_O = 10 mA, V_I = 7 V, T_A = -25 to 85°C		4.8		5.2	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150	350	425	mA
ΔV_O	Line regulation	V_I = 5.7 to 18 V, I_O = 0.5 mA			4	30	mV
ΔV_O	Load regulation	V_I = 6 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 6 to 18V, I_O = 0mA	ON MODE		0.5	1	mA
		V_I = 6 to 18V, I_O=100mA			1.5	3	
		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 = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 23. Electrical characteristics for LE80AB (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 = 10 mA, V_I = 10 V		7.92	8	8.08	V
		I_O = 10 mA, V_I = 10 V, T_A = -25 to 85°C		7.84		8.16	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 8.7 to 18 V, I_O = 0.5 mA			5	25	mV
ΔV_O	Load regulation	V_I = 9 V, I_O = 0.5 to 100 mA			3	15	mV
I_d	Quiescent current	V_I = 9 to 18V, I_O = 0mA	ON MODE		0.7	1.6	mA
		V_I = 9 to 18V, I_O=100mA			1.7	3.6	
		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		66		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

Table 24. Electrical characteristics for LE80C (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 = 10 mA, V_I = 10 V		7.84	8	8.16	V
		I_O = 10 mA, V_I = 10 V, T_A = -25 to 85°C		7.68		8.32	
V_I	Operating input voltage	I_O = 100 mA				18	V
I_O	Output current limit			150			mA
ΔV_O	Line regulation	V_I = 8.7 to 18 V, I_O = 0.5 mA			5	35	mV
ΔV_O	Load regulation	V_I = 9 V, I_O = 0.5 to 100 mA			3	25	mV
I_d	Quiescent current	V_I = 9 to 18V, I_O = 0mA	ON MODE		0.7	1.6	mA
		V_I = 9 to 18V, I_O=100mA			1.7	3.6	
		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		66		
			f = 10 kHz		57		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage	I_O = 100 mA			0.2	0.4	V
		I_O = 100 mA, T_A = -40 to 125°C				0.5	
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 100 mA		2	10		µF

5 Typical performance characteristics

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

Figure 4. Dropout voltage vs output current

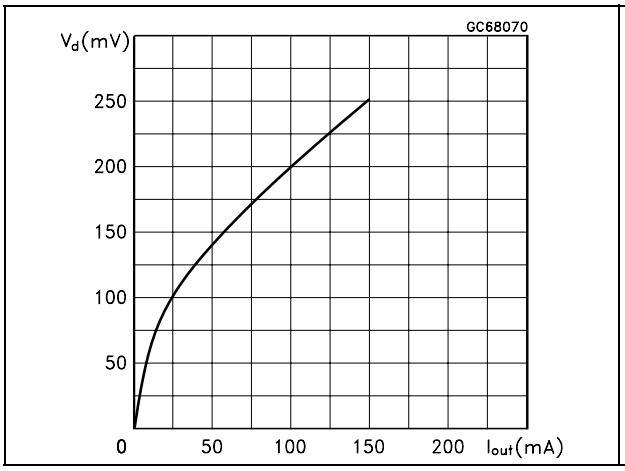


Figure 5. Dropout voltage vs temperature

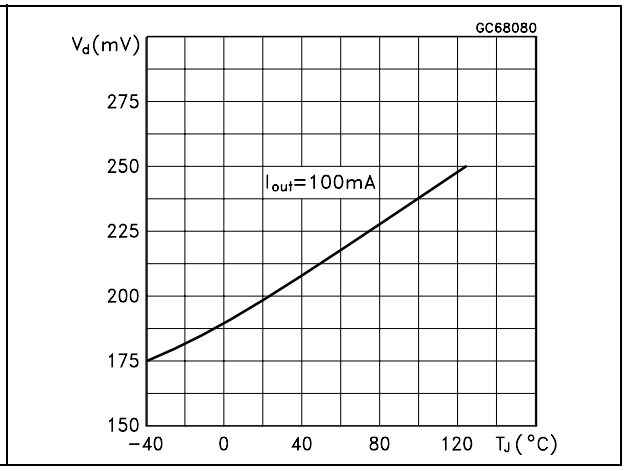


Figure 6. Supply current vs temperature

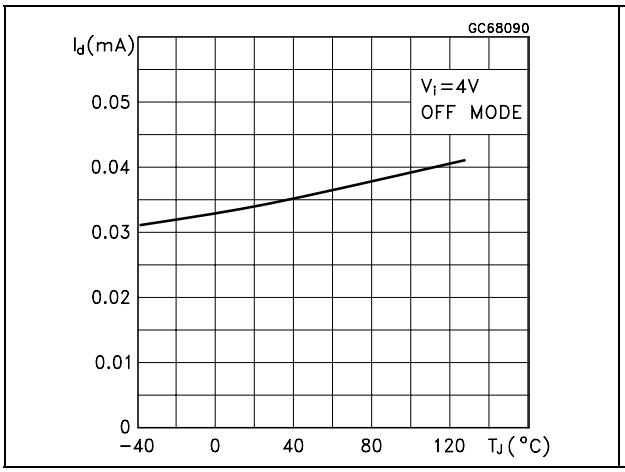


Figure 7. Supply current vs input voltage

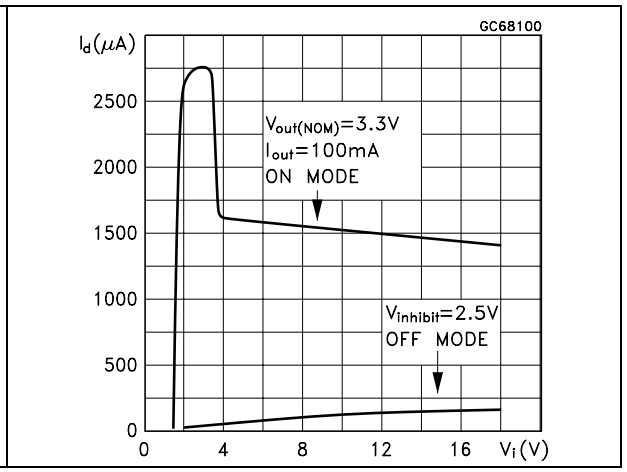


Figure 8. Short circuit current vs dropout voltage

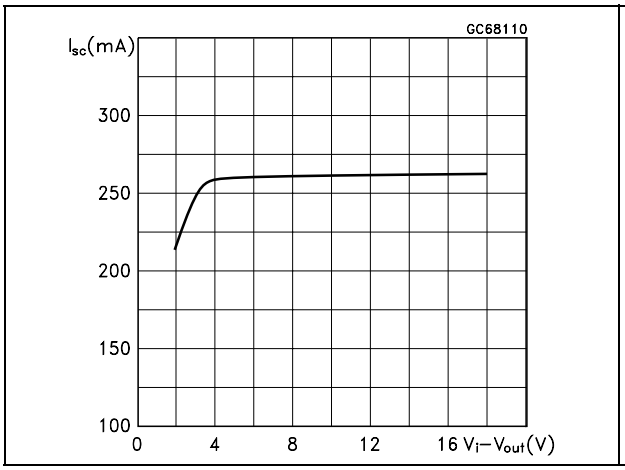


Figure 9. SVR vs frequency

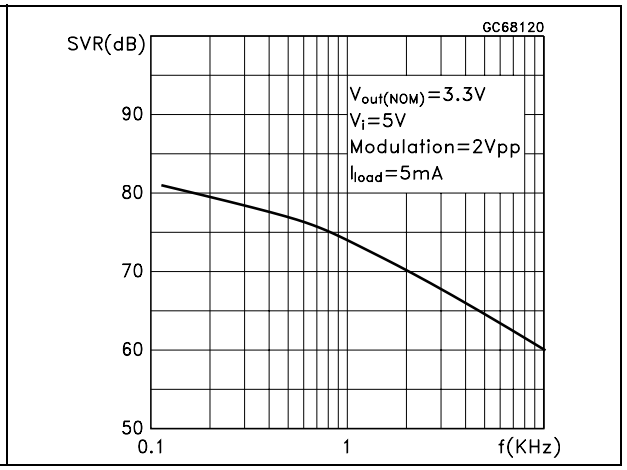


Figure 10. Logic controlled precision 3.3/5.0 V selectable output

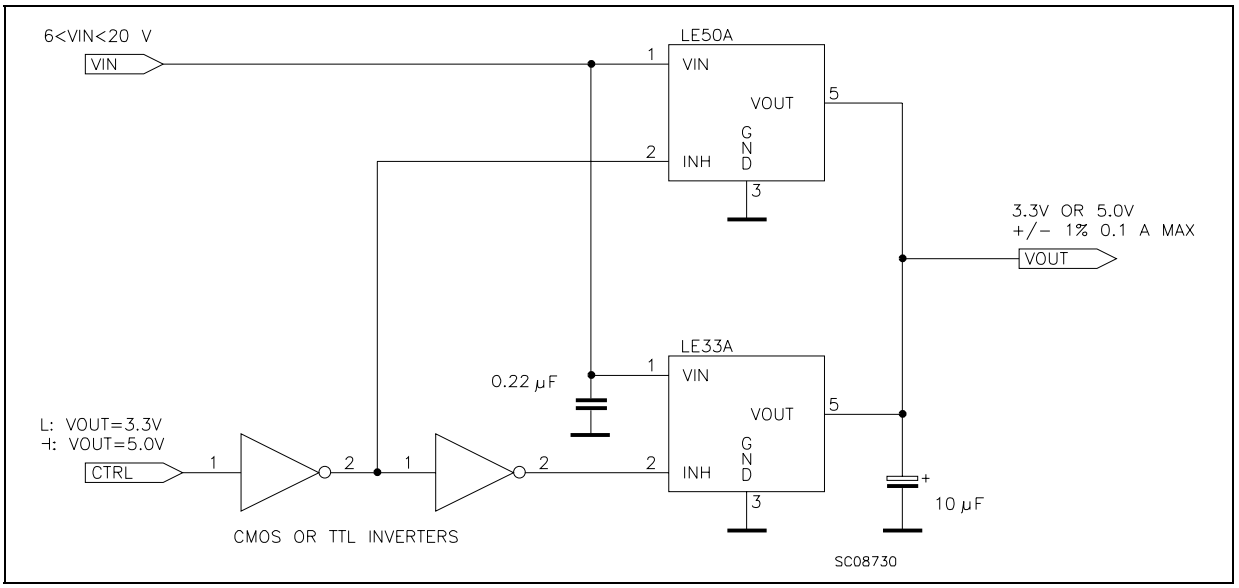


Figure 11. Sequential multi-output supply

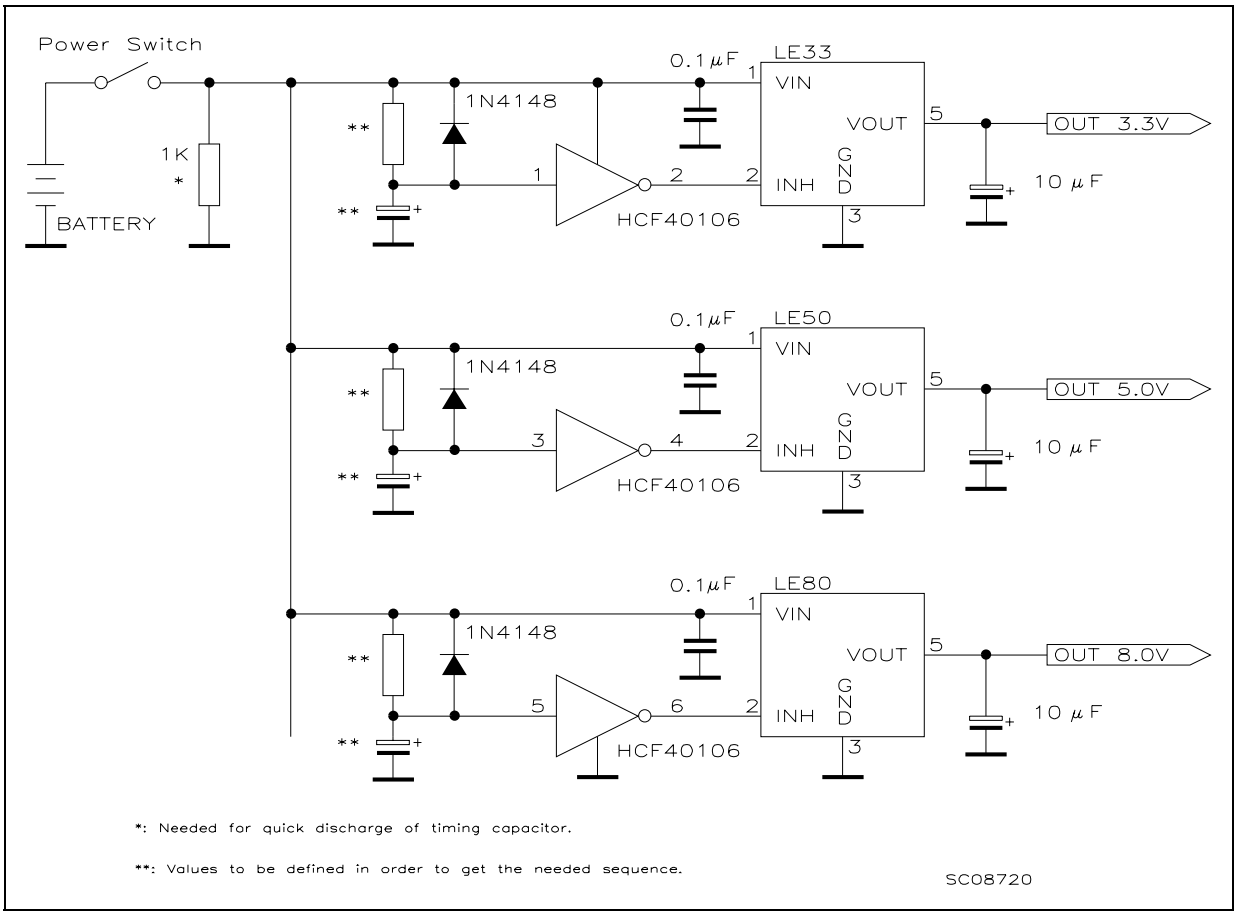


Figure 12. Multiple supply with ON/OFF toggle switch

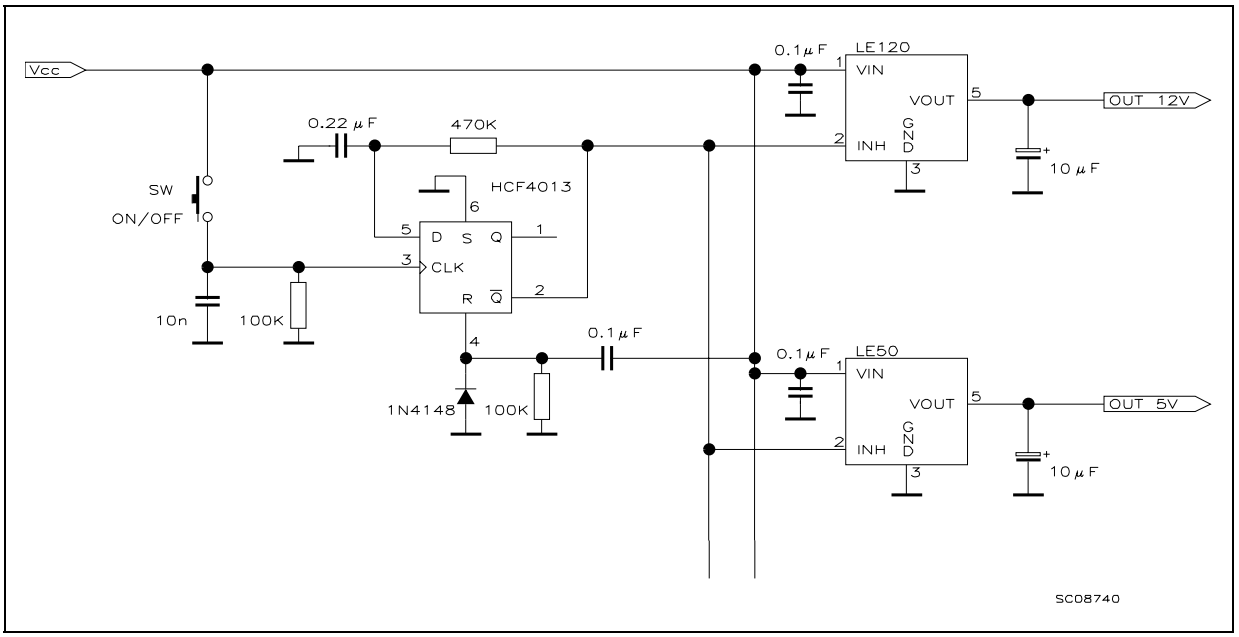
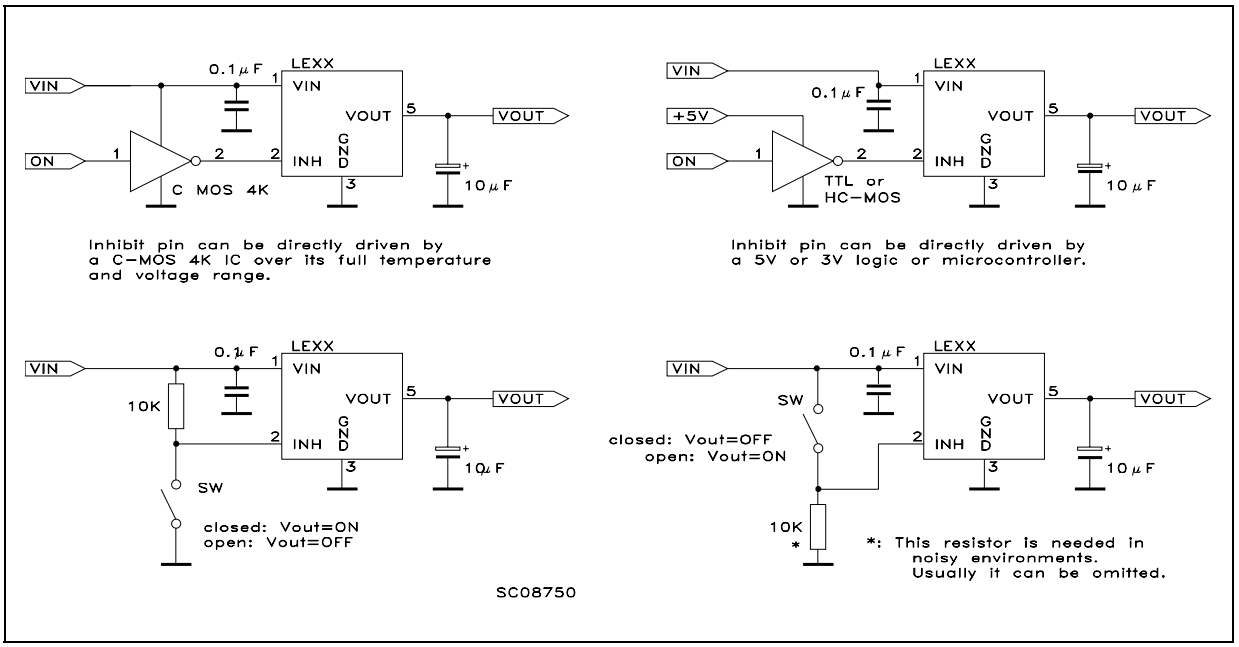


Figure 13. Basic inhibit functions

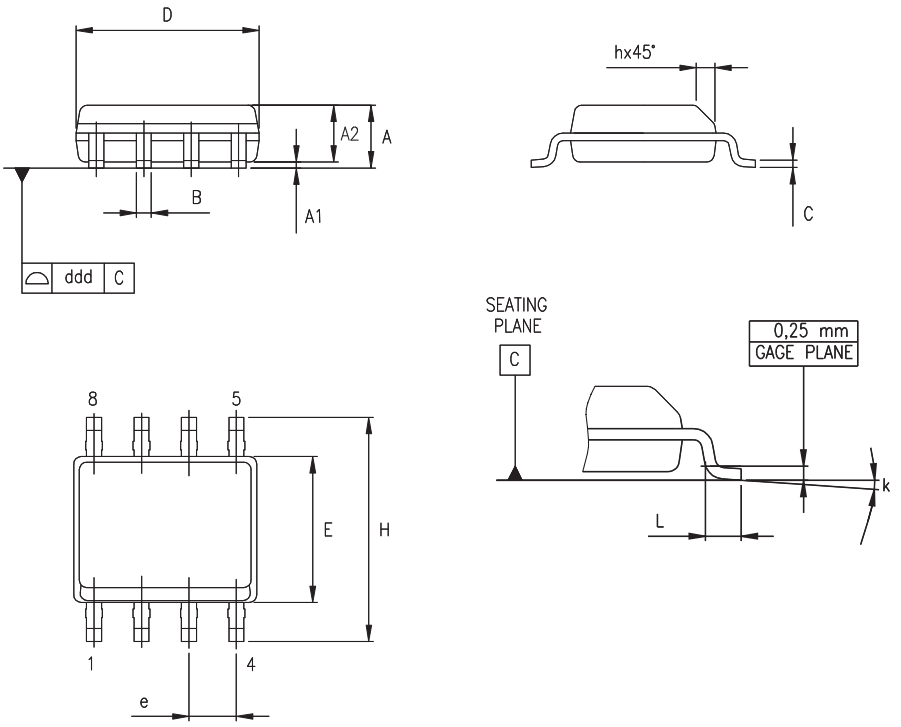


6 Package mechanical data

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.

SO-8 mechanical data

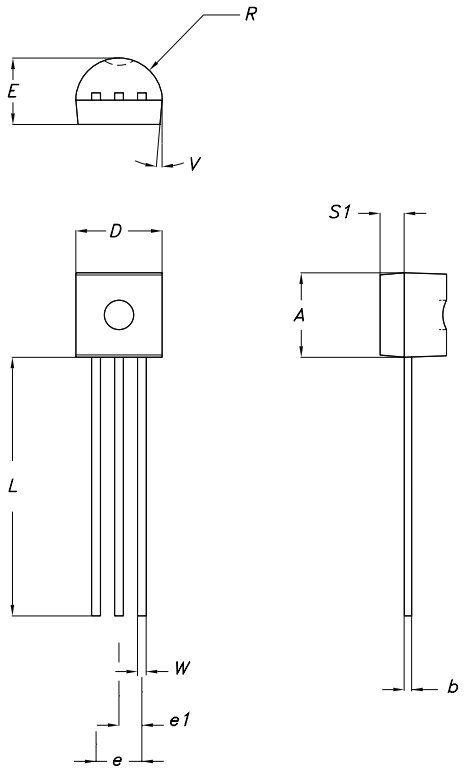
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.04		0.010
A2	1.10		1.65	0.043		0.065
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D	4.80		5.00	0.189		0.197
E	3.80		4.00	0.150		0.157
e		1.27			0.050	
H	5.80		6.20	0.228		0.244
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
k	8° (max.)					
ddd			0.1			0.04



0016023/C

TO-92 mechanical data

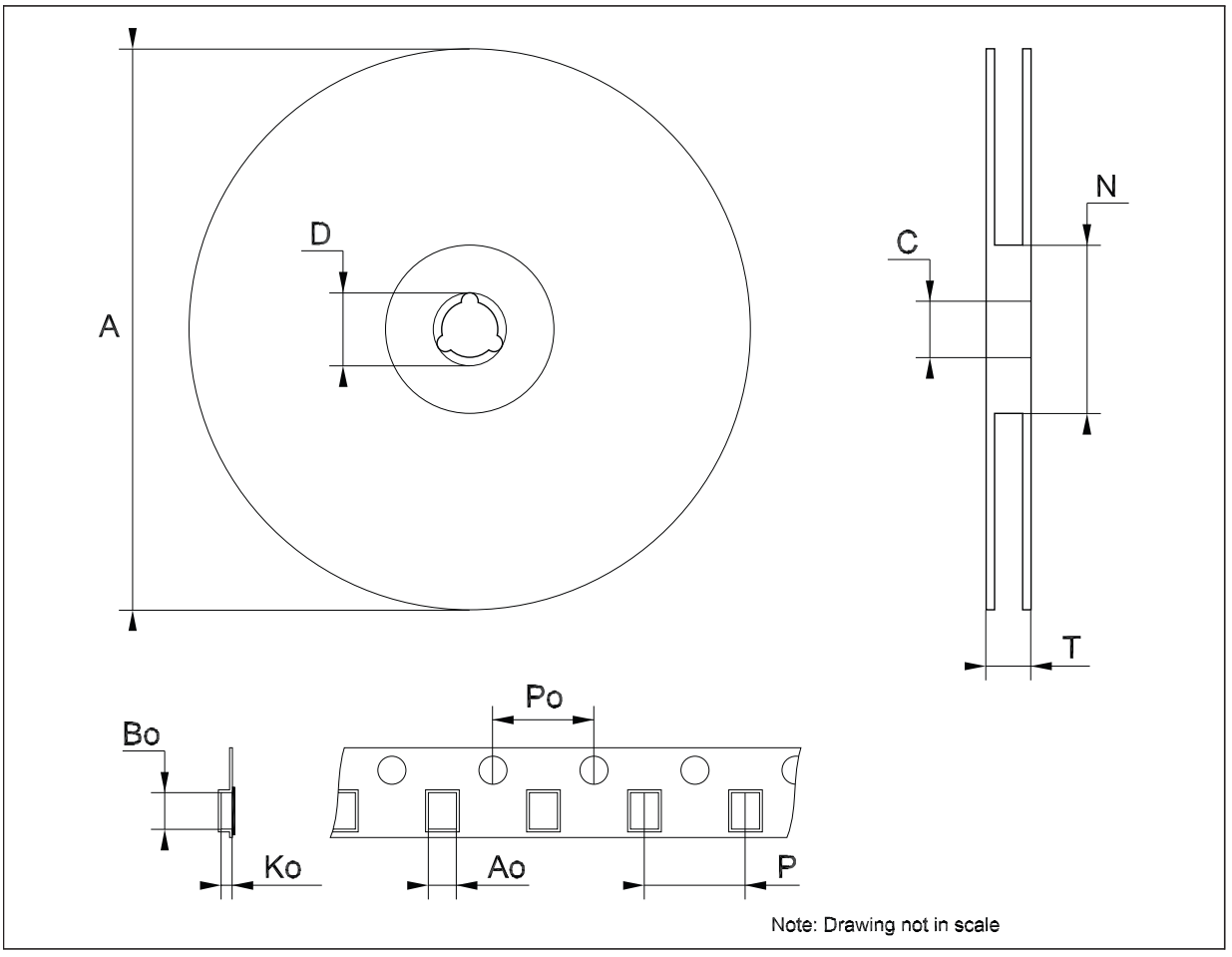
Dim.	mm.			mils.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.32		4.95	170.1		194.9
b	0.36		0.51	14.2		20.1
D	4.45		4.95	175.2		194.9
E	3.30		3.94	129.9		155.1
e	2.41		2.67	94.9		105.1
e1	1.14		1.40	44.9		55.1
L	12.7		15.49	500.0		609.8
R	2.16		2.41	85.0		94.9
S1	0.92		1.52	36.2		59.8
W	0.41		0.56	16.1		22.0
α		5°			5°	



0102782/D

Tape & reel SO-8 mechanical data

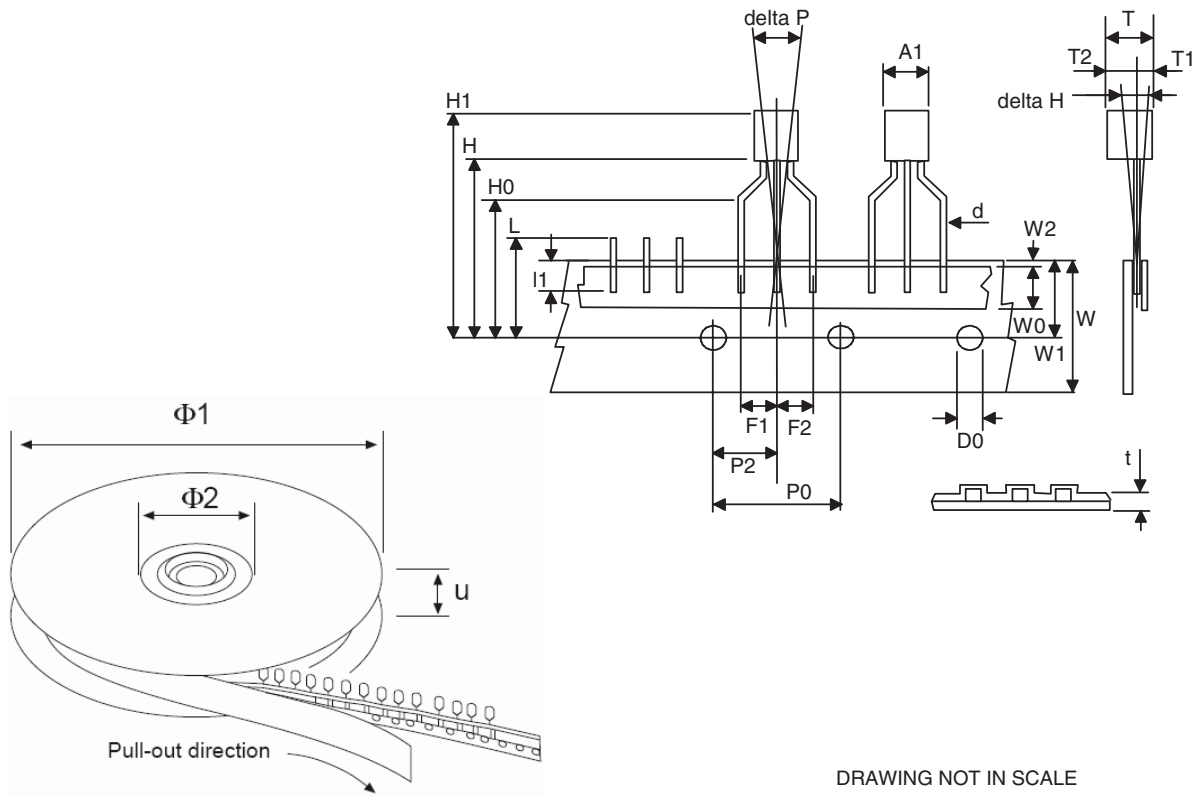
Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	8.1		8.5	0.319		0.335
Bo	5.5		5.9	0.216		0.232
Ko	2.1		2.3	0.082		0.090
Po	3.9		4.1	0.153		0.161
P	7.9		8.1	0.311		0.319



Note: Drawing not in scale

Tape & reel for TO-92 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1		4.80			0.189	
T		3.80			0.150	
T1		1.60			0.063	
T2		2.30			0.091	
d		0.48			0.019	
P0	12.5		12.9	0.492		0.508
P2	5.65		7.05	0.222		0.278
F1, F2	2.44	2.54	2.94	0.096	0.100	0.116
delta H		±2			0.079	
W	17.5	18.00	19.0	0.689	0.709	0.748
W0	5.7		6.3	0.224		0.248
W1	8.5		9.25	0.335		0.364
W2		0.50			0.20	
H		18.50	18.70		0.728	0.726
H0	15.50		16.50	0.610		0.650
H1		25.00			0.984	
D0	3.8		4.2	0.150		0.165
t		0.90			0.035	
L1		3			0.118	
delta P		±1			0.039	
u		50			1.968	
Φ1		360			14.173	
Φ2		30			1.181	



7 Order codes

Table 25. Order codes

Packages					Output voltage
SO-8	SO-8 (T&R)	TO-92	TO-92 (T&R)	TO-92 (Ammopak)	
	LE12ABD-TR(1)				1.25 V
LE25ABD	LE25ABD-TR(1)			LE25ABZ-AP(1)	2.5 V
	LE25CD-TR(1)		LE25CZ-TR(1)	LE25CZ-AP(1)	2.5 V
LE27ABD(1)	LE27ABD-TR(1)				2.7 V
LE27CD(1)					2.7 V
	LE30ABD-TR(1)		LE30ABZ-TR		3 V
	LE30CD-TR		LE30CZ-TR		3 V
		LE33ABZ	LE33ABZ-TR(1)	LE33ABZ-AP(1)	3.3 V
	LE33CD-TR	LE33CZ	LE33CZ-TR	LE33CZ-AP	3.3 V
	LE35ABD-TR(1)	LE35ABZ(1)	LE35ABZ-TR(1)	LE35ABZ-AP(1)	3.5 V
LE35CD(1)	LE35CD-TR(1)		LE35CZ-TR(1)	LE35CZ-AP(1)	3.5 V
	LE40ABD-TR(1)	LE40ABZ(1)	LE40ABZ-TR(1)	LE40ABZ-AP(1)	4 V
	LE40CD-TR(1)	LE40CZ	LE40CZ-TR(1)	LE40CZ-AP(1)	4 V
				LE45ABZ-AP(1)	4.5 V
	LE45CD-TR			LE45CZ-AP(1)	4.5 V
LE47ABD(1)	LE47ABD-TR(1)		LE47ABZ-TR(1)	LE47ABZ-AP(1)	4.7 V
	LE47CD-TR(1)	LE47CZ(1)	LE47CZ-TR(1)	LE47CZ-AP(1)	4.7 V
	LE50ABD-TR	LE50ABZ	LE50ABZ-TR	LE50ABZ-AP	5 V
	LE50CD-TR	LE50CZ	LE50CZ-TR	LE50CZ-AP	5 V
			LE80ABZ-TR(1)		8 V
	LE80CD-TR		LE80CZ-TR(1)		8 V

1. Available on request.

8 Revision history

Table 26. Document revision history

Date	Revision	Changes
09-Jul-2004	6	I_O typ. and max. are changed in tab. 24 and 25 - pag. 14.
16-Mar-2005	7	Add Tape & Reel for TO-92 - Note on Table 3.
12-Feb-2007	8	Change value T_{OP} on *Table 2*.
26-Jul-2007	9	Add *Table 1* in cover page.
29-Nov-2007	10	Modified: *Table 25*.
12-Feb-2008	11	Modified: *Table 25 on page 37*.
10-Jul-2008	12	Modified: *Table 1 on page 1* and *Table 25 on page 37*.

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