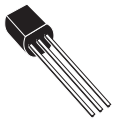
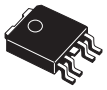
life.augmented

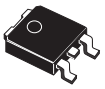
L4931

Datasheet

Very low drop voltage regulators with inhibit


TO-92


PPAK


DPAK


SO-8

Features

- Very low dropout voltage (0.4 V)
- Very low quiescent current
- Typ. 50 µA in OFF mode, 600 µA in ON mode
- Output current up to 250 mA
- Logic controlled electronic shutdown
- Output voltages: 3.3; 3.5; 5; 12 V
- Automotive-grade product: 3.3 V V_{OUT} in SO-8 package only
- 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: 70 dB typ. for 5 V version
- Temperature range: from -40 to 125 °C

Description

The L4931 is a very low drop regulator available in SO-8, DPAK, PPAK and TO-92 packages and in a wide range of output voltages.

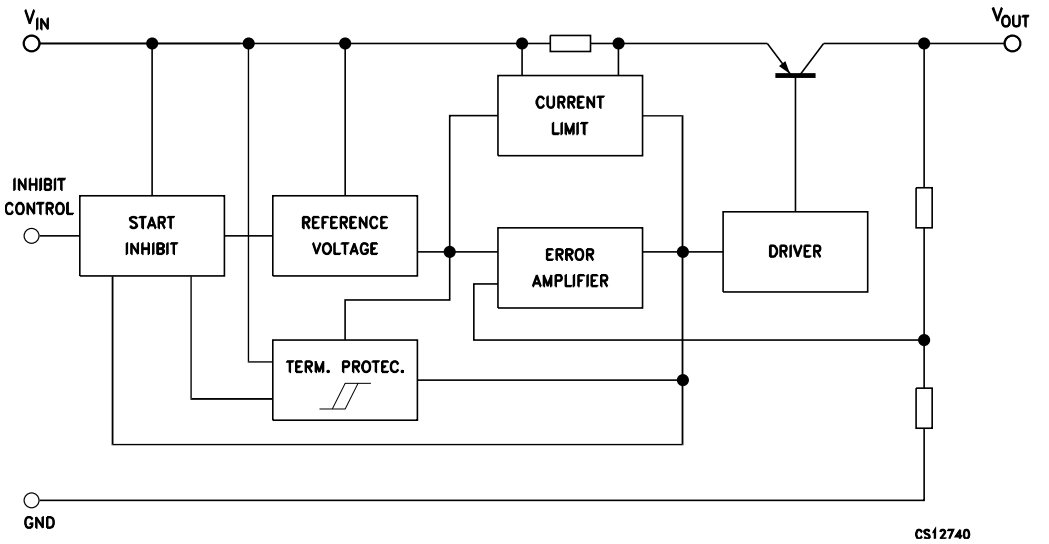
The very low drop voltage (0.4 V) and the very low quiescent current make it particularly suitable for low noise, low power applications and especially in battery-powered systems.

A TTL compatible shutdown logic control function is available in PPAK and SO-8 packages. This means that when the device is used as a local regulator, a part of the board can be put in standby mode, decreasing the total power consumption. It requires only a 2.2 µF capacitor for stability allowing space and cost saving.

The L4931 is available as automotive-grade in SO-8 package only. This device is qualified according to the specification AEC-Q100 of the automotive market, in the temperature range from 40 °C to 125 °C, and the statistical tests: PAT, SYL, SBL are performed.

1 Diagram

Figure 1. **Schematic diagram**



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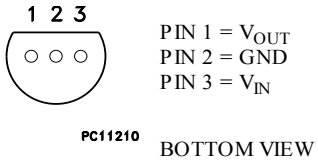
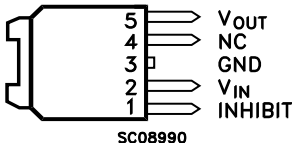
2 Pin configuration

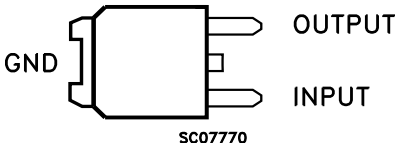
Figure 2. Pin connections (top view)



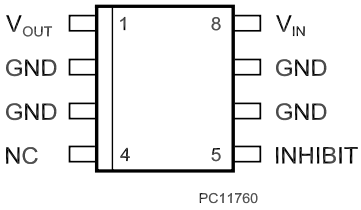
TO-92



PPAK



DPAK



SO-8

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3 Maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_I	DC Input voltage	20	V
I_O	Output current	Internally limited	mA
P_D	Power dissipation	Internally limited	mW
T_{STG}	Storage temperature range	-40 to 150	°C
T_{OP}	Operating junction temperature range	-40 to 125	°C

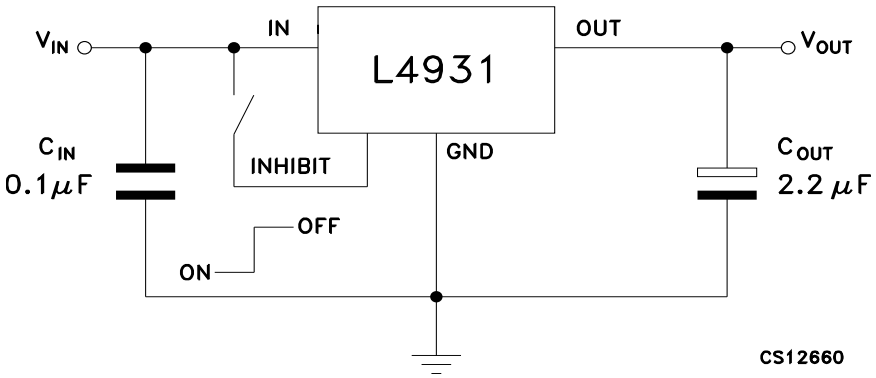
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 2. Thermal data

Symbol	Parameter	TO-92	DPAK	SO-8	Unit
R_{thJC}	Thermal resistance junction-case		8	20	°C/W
R_{thJA}	Thermal resistance junction-ambient	200	100	55	°C/W

4 Application circuit

Figure 3. **Test circuit**



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5 Electrical characteristics

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 3. L4931ABxx33 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 5.3 V		3.267	3.3	3.333	V
		I_O = 5 mA, V_I = 5.3 V, T_A = -25 to 85 °C		3.234		3.366	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 4 to 20 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation (1)	V_I = 4.2 V, I_O = 0.5 to 250 mA			3	15	mV
I_d	Quiescent current ON mode	V_I = 4.2 to 20 V, I_O = 0 mA			0.6	1	mA
		V_I = 4.2 to 20 V, I_O = 250 mA			4	6	
	OFF mode	V_I = 6 V			50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA V_I = 5.2 ± 1 V	f = 120 Hz		73		dB
			f = 1 kHz		70		
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. *For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.*

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 4. L4931Cxx33 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 5.3 V		3.234	3.3	3.366	V
		I_O = 5 mA, V_I = 5.3 V, T_A=-25 to 85 °C		3.168		3.432	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 4.1 to 20 V, I_O = 0.5 mA			3	18	mV
ΔV_O	Load regulation (1)	V_I = 4.3 V, I_O = 0.5 to 250 mA			3	18	mV
I_d	Quiescent current ON mode	V_I = 4.3 to 20 V, I_O = 0 mA			0.6	1	mA
		V_I = 4.3 to 20 V, I_O = 250 mA			4	6	

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
	OFF mode	V_I = 6 V			50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA V_I = 5.3 ± 1 V	f = 120 Hz		73		dB
			f = 1 kHz		70		
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. *For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.*

(Refer to the test circuits, T_A = -40 to 125 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 5. L4931Cxx33-TRY (automotive-grade) electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 5.3 V, T_A = 25 °C		3.234	3.3	3.366	V
		I_O = 5 mA, V_I = 5.3 V		3.168		3.432	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit	T_A = 25 °C			300		mA
ΔV_O	Line regulation	V_I = 4.1 to 20 V, I_O = 0.5 mA				20	mV
ΔV_O	Load regulation	V_I = 4.3 V, I_O = 0.5 to 250 mA				38	mV
I_d	Quiescent current ON mode	V_I = 4.3 to 20 V, I_O = 0 mA				1	mA
		V_I = 4.3 to 20 V, I_O = 250 mA				11	mA
	OFF mode	V_I = 6 V				100	µA
SVR	Supply voltage rejection	I_O = 5 mA V_I = 5.3 ± 1 V T_A = 25 °C	f = 120 Hz		73		dB
			f = 1 kHz		70		
			f = 10 kHz		55		

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
eN	Output noise voltage	B = 10 Hz to 100 kHz, T_A = 25 °C			50		µV
V_d	Dropout voltage	I_O = 250 mA, T_A = 25 °C			0.4	0.6	V
		I_O = 250 mA				0.82	V
V_{IL}	Control input logic low					0.82	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 250 mA, T_A = 25 °C		2	10		µF

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 6. L4931ABxx35 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 5.5 V		3.465	3.5	3.535	V
		I_O = 5 mA, V_I = 5.5 V, T_A=-25 to 85 °C		3.43		3.57	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 4.2 to 20 V, I_O = 0.5 mA			3	15	mV
ΔV_O	Load regulation (1)	V_I = 4.4 V, I_O = 0.5 to 250 mA			3	15	mV
I_d	Quiescent current ON mode	V_I = 4.4 to 20 V, I_O = 0 mA			0.6	1	mA
		V_I = 4.4 to 20 V, I_O = 250 mA			4	6	
	OFF mode	V_I = 6 V			50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA, V_I = 5.4 ± 1 V	f = 120 Hz		73		dB
			f = 1 kHz		70		
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. *For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.*

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 7. L4931Cxx35 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 5.5 V		3.43	3.5	3.57	V
		I_O = 5 mA, V_I = 5.5 V, T_A=-25 to 85 °C		3.36		3.64	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 4.3 to 20 V, I_O = 0.5 mA			3	18	mV
ΔV_O	Load regulation (1)	V_I = 4.5 V, I_O = 0.5 to 250 mA			3	18	mV
I_d	Quiescent current ON mode	V_I = 4.5 to 20 V, I_O = 0 mA			0.6	1	mA
		V_I = 4.5 to 20 V, I_O = 250 mA			4	6	
	OFF mode	V_I = 6 V			50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA V_I = 5.5 ± 1 V	f = 120 Hz		73		dB
			f = 1 kHz		70		
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. *For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.*

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 8. L4931ABxx50 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 7 V		4.95	5	5.05	V
		I_O = 5 mA, V_I = 7 V, T_A=-25 to 85 °C		4.9		5.1	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 5.8 to 20 V, I_O = 0.5 mA			3.5	17.5	mV
ΔV_O	Load regulation (1)	V_I = 6 V, I_O = 0.5 to 250 mA			3	15	mV
I_d	Quiescent current ON mode	V_I = 6 to 20 V, I_O = 0 mA			0.6	1	mA
		V_I = 6 to 20 V, I_O = 250 mA			4	6	
	OFF mode	V_I = 6 V			50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA	f = 120 Hz		70		dB

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
SVR	Supply voltage rejection	V_I = 7 ± 1 V	f = 1 kHz		67		dB
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. *For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.*

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 9. L4931Cxx50 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 7 V		4.9	5	5.1	V
		I_O = 5 mA, V_I = 7 V, T_A=-25 to 85 °C		4.8		5.2	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 5.8 to 20 V, I_O = 0.5 mA			3.5	17.5	mV
ΔV_O	Load regulation (1)	V_I = 6 V, I_O = 0.5 to 250 mA			3	15	mV
I_d	Quiescent current ON mode	V_I = 6 to 20 V, I_O = 0 mA			0.6	1	mA
		V_I = 6 to 20 V, I_O = 250 mA			4	6	
	OFF mode	V_I = 6 V			50	100	µA
SVR	Supply voltage rejection	I_O = 5 mA V_I = 7 ± 1 V	f = 120 Hz		70		dB
			f = 1 kHz		67		
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. *For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.*

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 10. L4931ABxx120 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 14 V		11.88	12	12.12	V
		I_O = 5 mA, V_I = 14 V, T_A=-25 to 85 °C		11.76		12.24	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 12.8 to 20 V, I_O = 0.5 mA			4	20	mV
ΔV_O	Load regulation (1)	V_I = 13 V, I_O = 0.5 to 250 mA			3	15	mV
I_d	Quiescent current ON mode	V_I = 13 to 20 V, I_O = 0 mA			0.8	1.6	mA
		V_I = 13 to 20 V, I_O = 250 mA			4.5	7	
	OFF mode	V_I = 6 V			90	180	µA
SVR	Supply voltage rejection	I_O = 5 mA V_I = 14 ± 1 V	f = 120 Hz		64		dB
			f = 1 kHz		61		
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. *For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.*

(Refer to the test circuits, T_A = 25 °C, C_I = 0.1 µF, C_O = 2.2 µF unless otherwise specified).

Table 11. L4931Cxx120 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_O	Output voltage	I_O = 5 mA, V_I = 14 V		11.76	12	12.24	V
		I_O = 5 mA, V_I = 14 V, T_A=-25 to 85 °C		11.52		12.48	
V_I	Operating input voltage	I_O = 250 mA				20	V
I_{out}	Output current limit				300		mA
ΔV_O	Line regulation	V_I = 12.9 to 20 V, I_O = 0.5 mA			4	24	mV
ΔV_O	Load regulation (1)	V_I = 13.1 V, I_O = 0.5 to 250 mA			3	18	mV
I_d	Quiescent current ON mode	V_I = 13.1 to 20 V, I_O = 0 mA			0.8	1.6	mA
		V_I = 13.1 to 20 V, I_O = 250 mA			4.5	7	
	OFF mode	V_I = 6 V			90	180	µA
SVR	Supply voltage rejection	I_O = 5 mA V_I = 14.1 ± 1 V	f = 120 Hz		64		dB

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
			f = 1 kHz		61		
			f = 10 kHz		55		
eN	Output noise voltage	B = 10 Hz to 100 kHz			50		µV
V_d	Dropout voltage(1)	I_O = 250 mA			0.4	0.6	V
		I_O = 250 mA, T_A= -40 to 125 °C				0.8	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 250 mA		2	10		µF

1. For SO-8 package the maximum limit of load regulation and dropout should be increased by 20 mV.

6 Typical application

Figure 4. Line regulation vs temperature

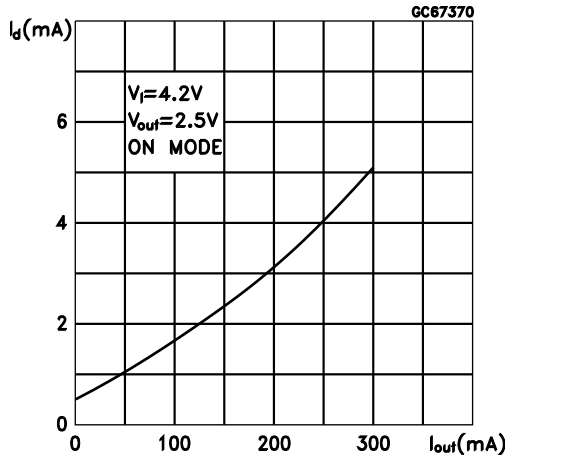

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Figure 5. Dropout voltage vs temperature

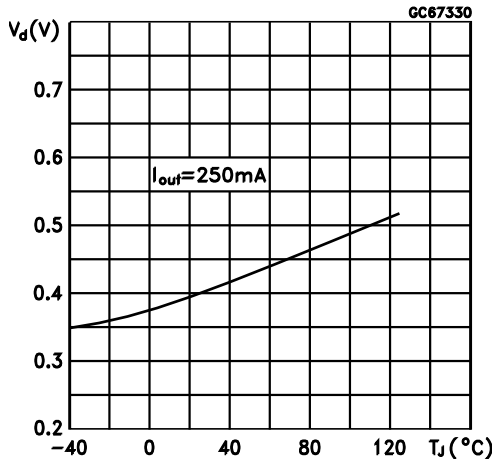

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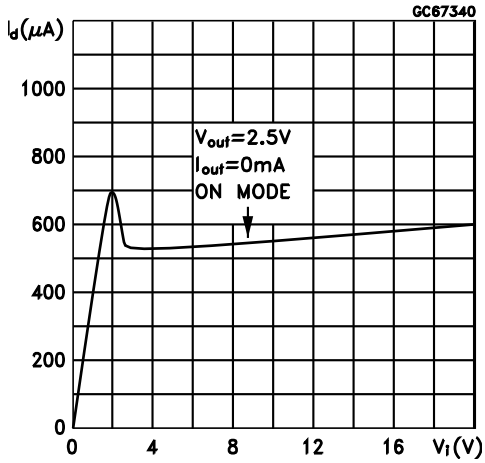
Figure 6. Supply current vs input voltage



AMG050320171505MT

Figure 7. Supply current vs temperature

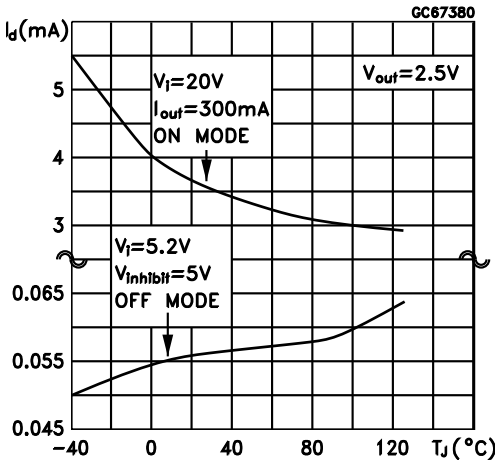


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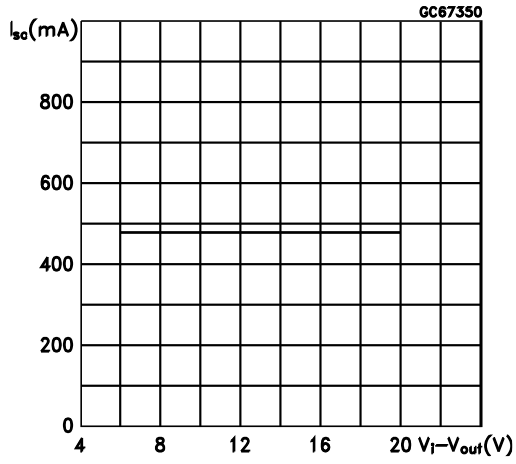
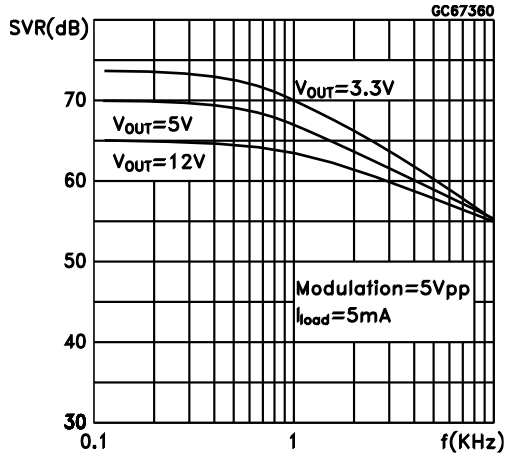
Figure 8. **Short-circuit current vs dropout voltage**



AMG050320171507MT

Figure 9. **SVR vs input voltage signal frequency**



AMG050320171508MT

7 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

7.1 TO-92 package information

Figure 10. **TO-92 package outline**

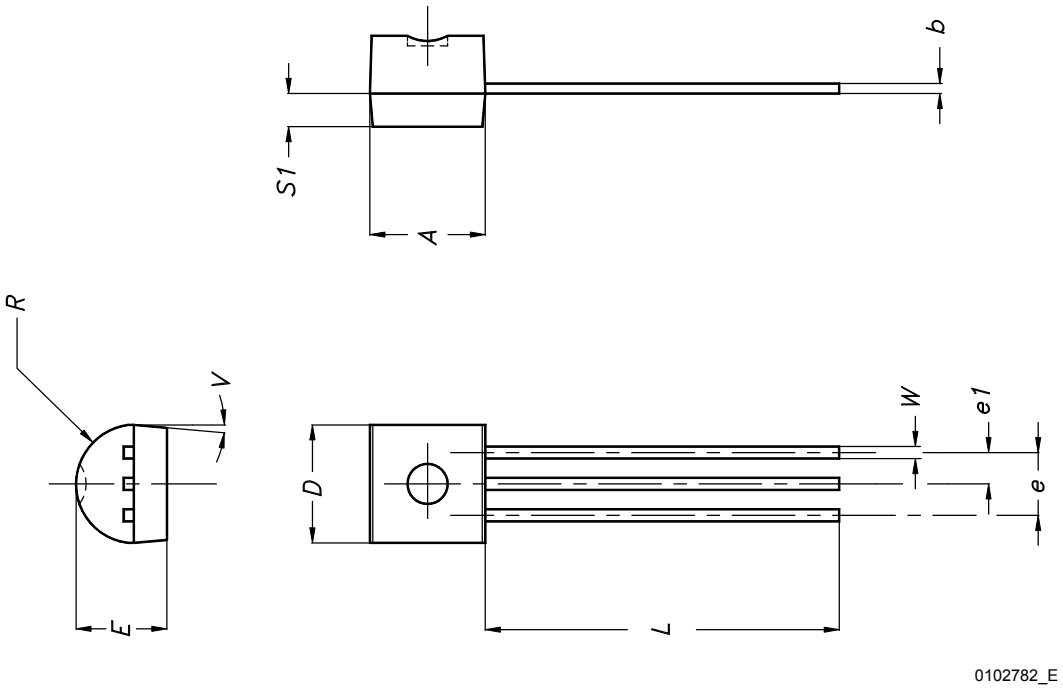


Table 12. **TO-92 mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	0.92		1.52
W	0.41		0.56
V		5°	

7.2 TO-92 Ammopak packing information

Figure 11. **TO-92 Ammopak tape and reel outline**

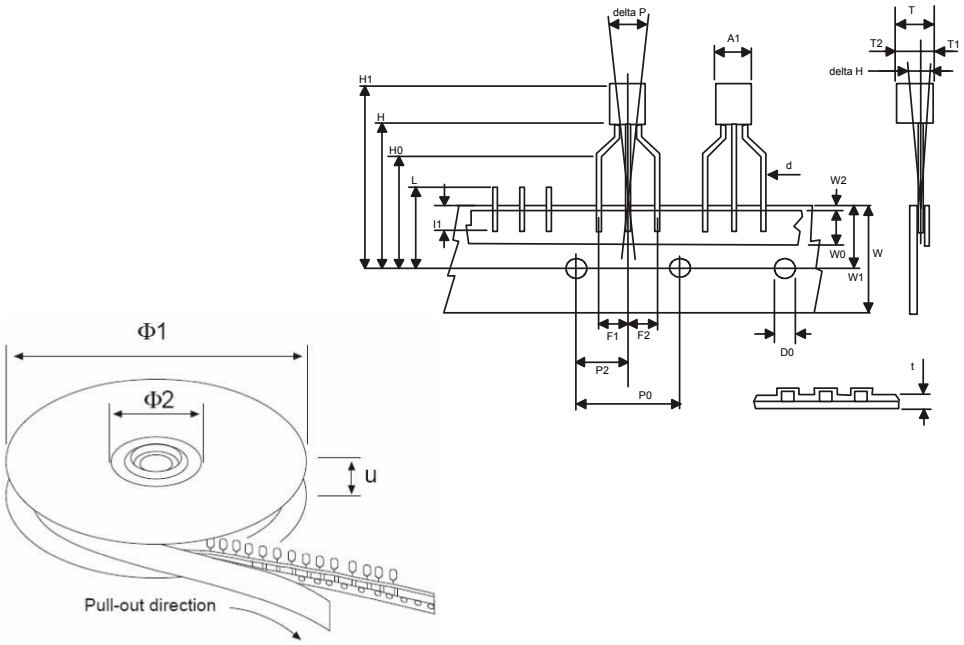


Table 13. **TO-92 Ammopak tape and reel mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A1			4.80
T			3.80
T1			1.60
T2			2.30
d	0.45	0.47	0.48
P0	12.50	12.70	12.90
P2	5.65	6.35	7.05
F1, F2	2.40	2.50	2.94
F3	4.98	5.08	5.48
delta H	-2.00		2.00
W	17.50	18.00	19.00
W0	5.5	6.00	6.5
W1	8.50	9.00	9.25
W2			0.50
H		18.50	21
H3	0.5	1	2
H0	15.50	16.00	18.8
H1		25.0	27.0
D0	3.80	4.00	4.20

Dim.	mm		
	Min.	Typ.	Max.
t			0.90
L			11.00
l1	3.00		
delta P	-1.00		1.00

7.3 PPAK package information

Figure 12. **PPAK package outline**

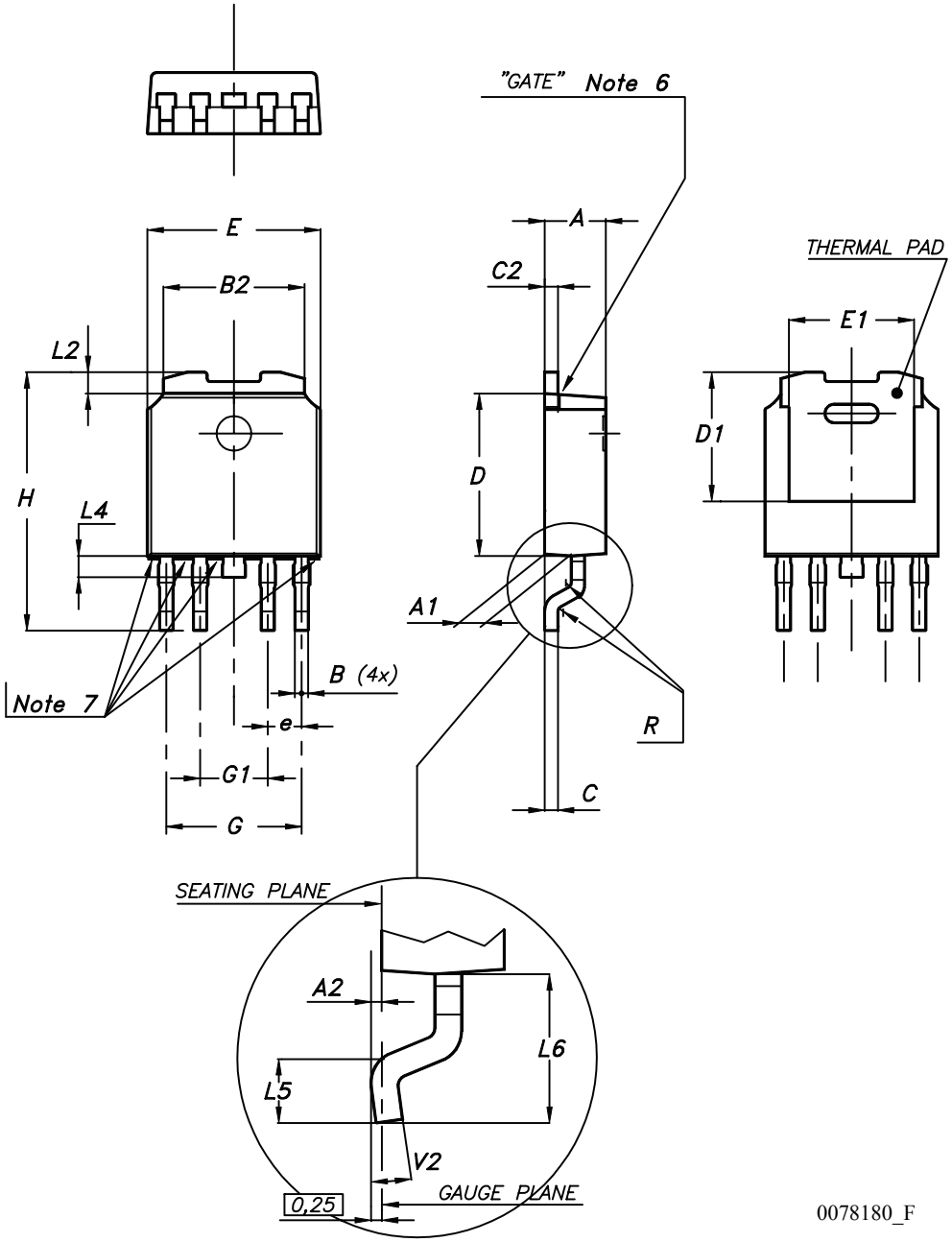


Table 14. **PPAK mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	2.2		2.4
A1	0.9		1.1
A2	0.03		0.23
B	0.4		0.6
B2	5.2		5.4
C	0.45		0.6
C2	0.48		0.6
D	6		6.2
D1		5.1	
E	6.4		6.6
E1		4.7	
e		1.27	
G	4.9		5.25
G1	2.38		2.7
H	9.35		10.1
L2		0.8	1
L4	0.6		1
L5	1		
L6		2.8	
R		0.20	
V2	0°		8°

7.4 DPAK package information

Figure 13. **DPAK package outline**

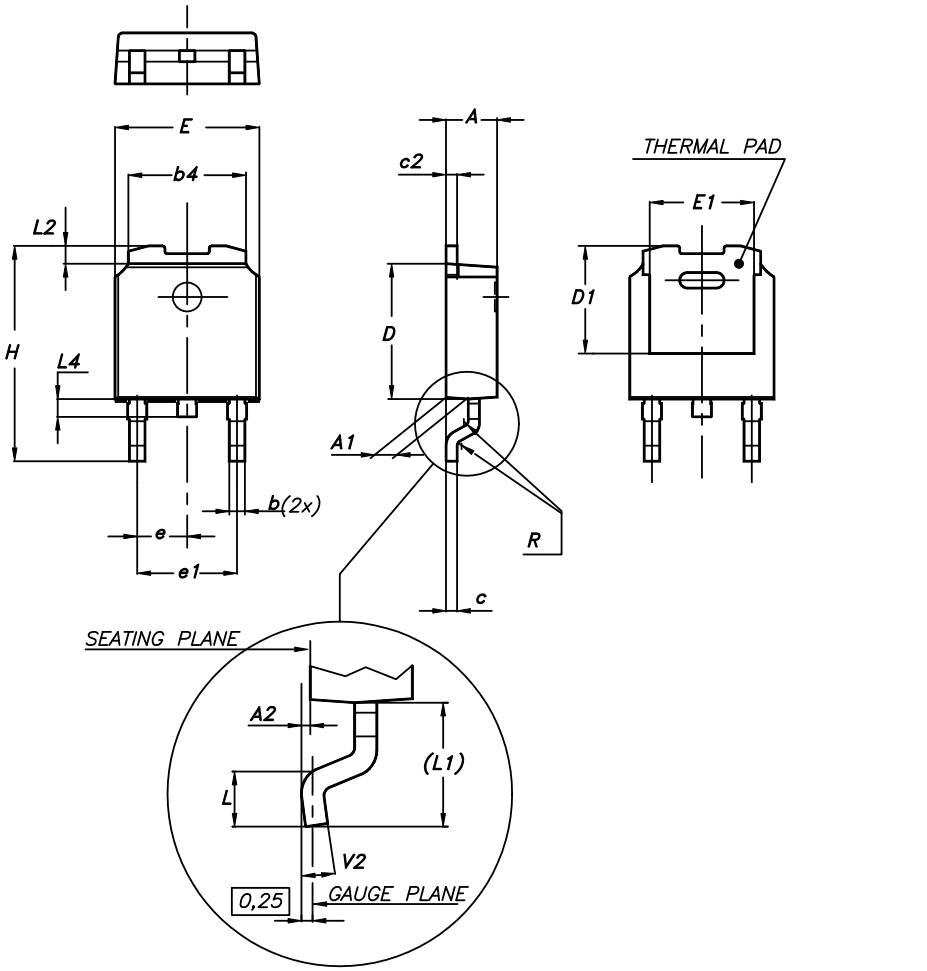
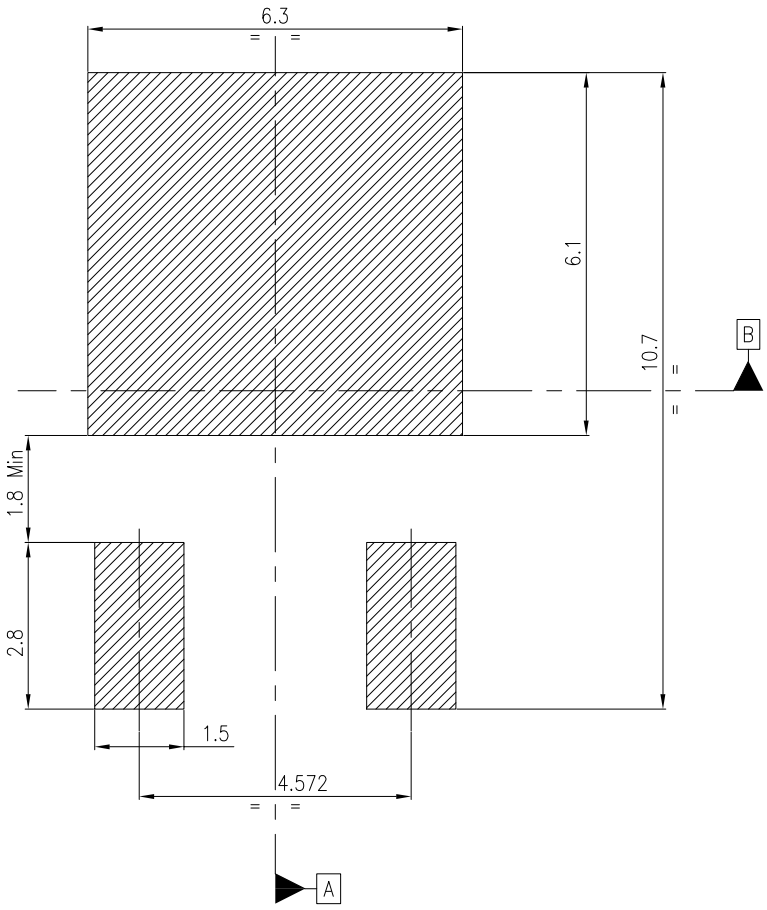


Table 15. **DPAK mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1		5.10	
E	6.40		6.60

Dim.	mm		
	Min.	Typ.	Max.
E1		4.70	
e		2.28	
e1	4.40		4.60
H	9.35		10.10
L	1.00		1.50
(L1)		2.80	
L2		0.80	
L4	0.60		1.00
R		0.20	
V2	0°		8°

Figure 14. DPAK recommended footprint (dimensions are in mm)



7.5 DPAK_PPAK packing information

Figure 15. **PPAK and DPAK tape**

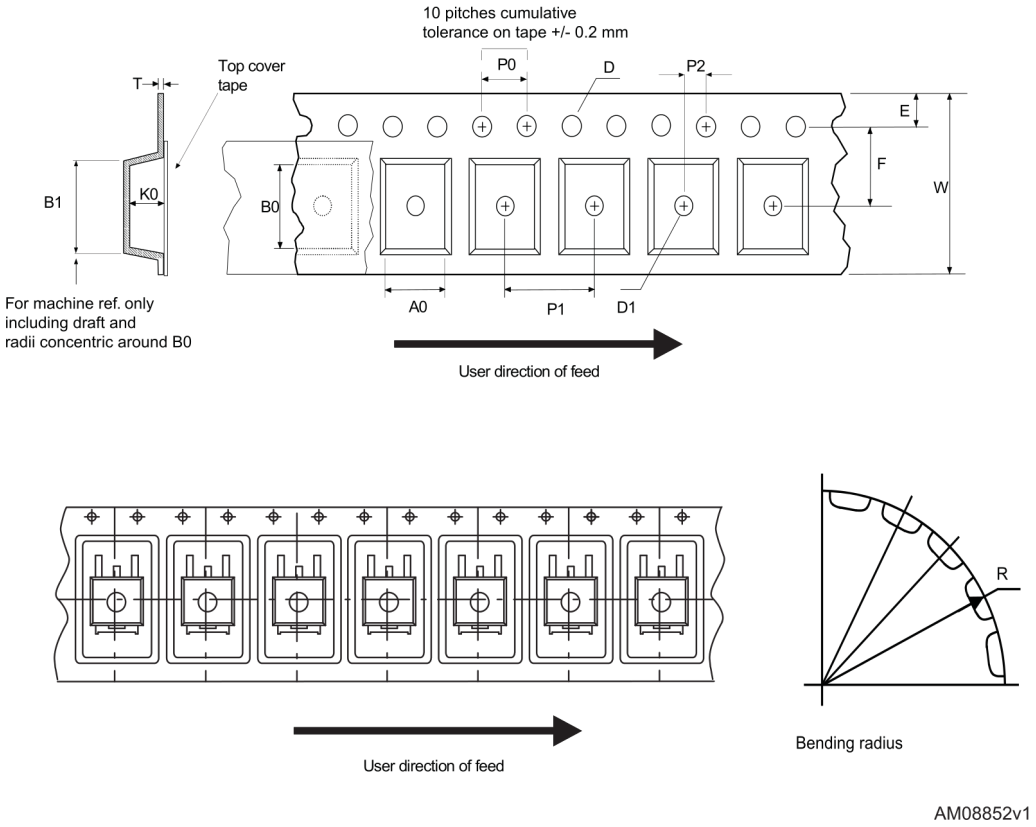


Figure 16. **PPAK and DPAK reel**

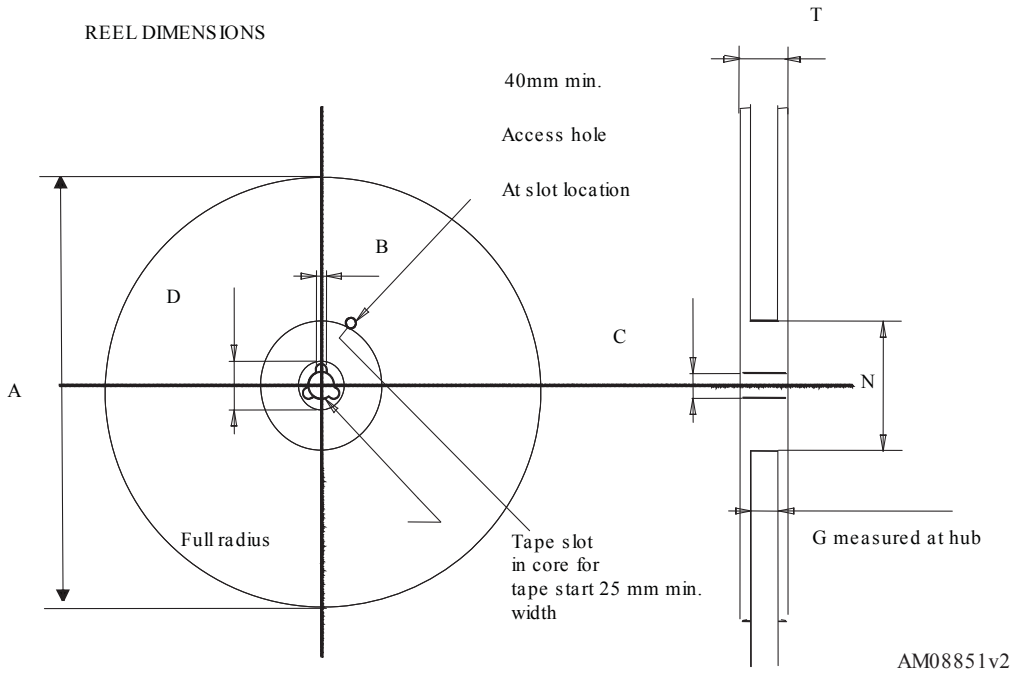


Table 16. **PPAK and DPAK tape and reel mechanical data**

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		22.4
K0	2.55	2.75			
P0	3.9	4.1	Base qty.		2500
P1	7.9	8.1	Bulk qty.		2500
P2	1.9	2.1			
R	40				
T	0.25	0.35			
W	15.7	16.3			

7.6 SO8 package information

Figure 17. **SO-8 package outline**

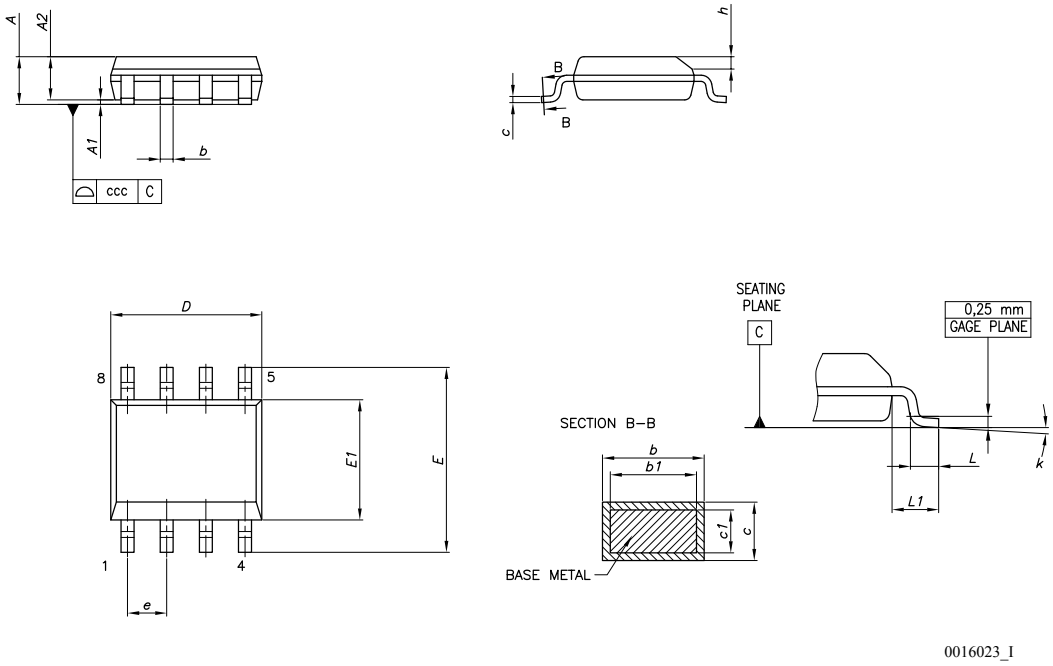
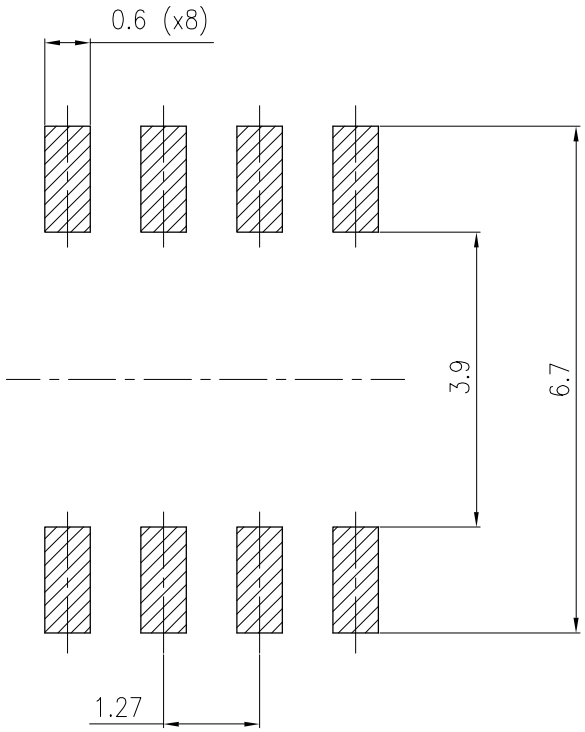


Table 17. **SO-8 mechanical data**

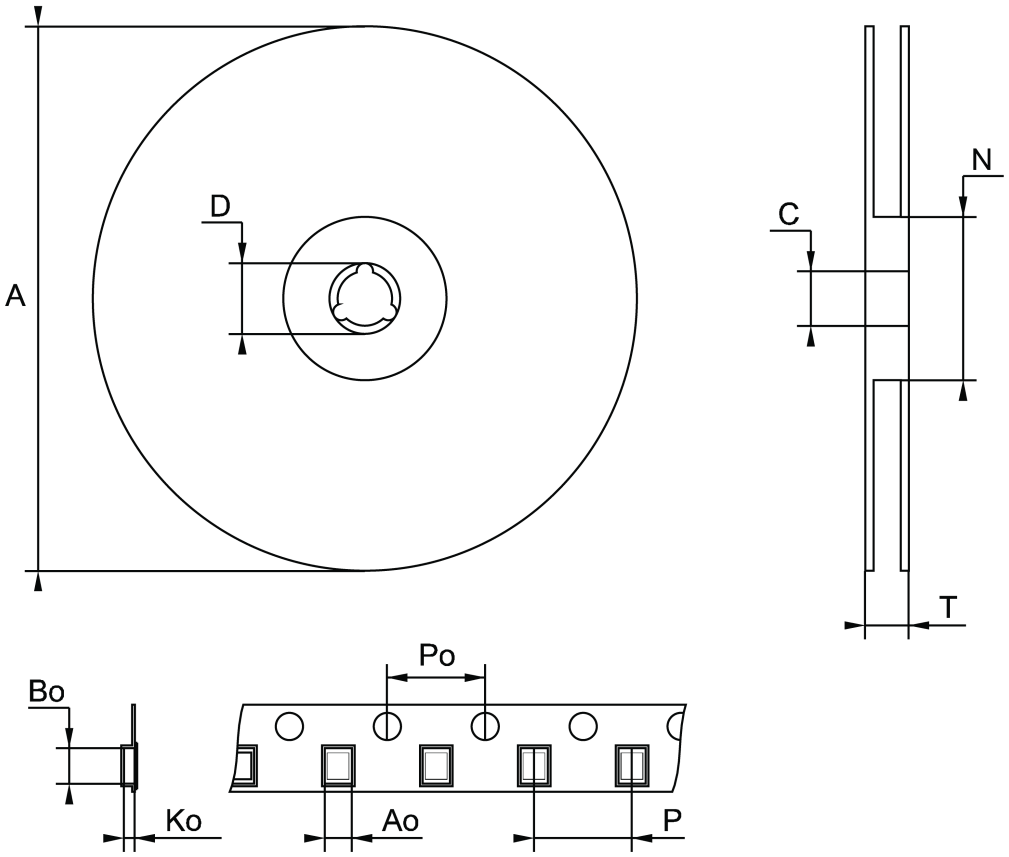
Dim.	mm		
	Min.	Typ.	Max.
A			1.75
A1	0.10		0.25
A2	1.25		
b	0.28		0.48
c	0.17		0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27	
h	0.25		0.50
L	0.40		1.27
L1		1.04	
k	0°		8°
ccc			0.10

Figure 18. **SO-8 recommended footprint**



7.7 SO8-batwing packing information

Figure 19. **SO8-batwing tape and reel outline**



Note: Drawing not in scale

Table 18. **SO8-batwing mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A		-	330
C	12.8		13.2
D	20.2		
N	60		
T			22.4
A0	8.1		8.5
B0	5.5		5.9
K0	2.1		2.3
P0	3.9		4.1
P	7.9		8.1

8 Ordering information

Table 19. **Order codes**

Package					Output voltage
TO-92	PPAK	DPAK	SO-8	SO-8 (automotive-grade)	
			L4931CD27-TR	L4931CD27-TRY (1)	2.7 V
L4931CZ33-AP		L4931CDT33-TR	L4931CD33-TR	L4931CD33-TRY(1)	3.3 V
		L4931ABDT33-TR	L4931ABD33-TR		3.3 V
			L4931CD35-TR		3.5 V
		L4931ABDT35TR	L4931ABD35-TR		3.5 V
L4931CZ50-AP	L4931CPT50-TR	L4931CDT50-TR	L4931CD50-TR		5 V
		L4931ABDT50-TR	L4931ABD50-TR		5 V
			L4931CD80-TR		8 V
		L4931ABDT80-TR			8 V
			L4931CD120-TR		12 V
			L4931ABD120TR		12 V

1. *Qualified and characterized according to AEC Q100 and Q003 or equivalent, advanced screening according to AEC Q001 and Q002 or equivalent.*

Revision history

Table 20. **Document revision history**

Date	Revision	Changes
21-Jun-2004	11	Document updating.
14-Jun-2006	12	Order codes updated.
31-Jan-2008	13	Added: Table 1 and new order codes for Automotive grade products.
20-Feb-2008	14	Modified: Table 23 on page 36.
11-Mar-2008	15	Modified: Table 1 on page 1 and Table 23 on page 36.
15-Jul-2008	16	Modified: Table 1 on page 1 and Table 23 on page 36.
18-Aug-2008	17	Modified: Table 23 on page 36.
30-Oct-2013	18	Changed the L4931ABxx and L4931Cxx to L4931. Updated: Description in cover page. Deleted table1: Device summary. Updated Figure 2: Pin connections (top view), Table 2: Thermal data, Section 5: Electrical characteristics and Section 7: Package mechanical data. Added Section 8: Packaging mechanical data. Minor text changes.
02-Aug-2017	19	Updated features in cover page. Deleted table 3: L4931Cxx27 electrical characteristics, table 4: L4931Cxx27-TRY (automotive-grade) electrical characteristics, table 12:L4931ABxx80 electrical characteristics, table 13: L4931Cxx80 electrical characteristics. Updated Table 19. Order codes. Minor text changes.
29-Jan-2024	20	Updated Table 5