

# L4931CDT33-TR Datasheet



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DiGi Electronics Part Number	L4931CDT33-TR-DG
Manufacturer	<a href="#">STMicroelectronics</a>
Manufacturer Product Number	L4931CDT33-TR
Description	IC REG LINEAR 3.3V 250MA DPAK
Detailed Description	Linear Voltage Regulator IC Positive Fixed 1 Output 250mA DPAK

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## Purchase and inquiry

Manufacturer Product Number:

L4931CDT33-TR

Series:

-

Output Configuration:

Positive

Number of Regulators:

1

Voltage - Output (Min/Fixed):

3.3V

Voltage Dropout (Max):

0.8V @ 250mA

Current - Quiescent (Iq):

1 mA

PSRR:

73dB ~ 55dB (120Hz ~ 10kHz)

Protection Features:

Over Current, Over Temperature

Mounting Type:

Surface Mount

Supplier Device Package:

DPAK

Manufacturer:

STMicroelectronics

Product Status:

Active

Output Type:

Fixed

Voltage - Input (Max):

20V

Voltage - Output (Max):

-

Current - Output:

250mA

Current - Supply (Max):

6 mA

Control Features:

-

Operating Temperature:

-40°C ~ 125°C

Package / Case:

TO-252-3, DPAK (2 Leads + Tab), SC-63

Base Product Number:

L4931

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8542.39.0001

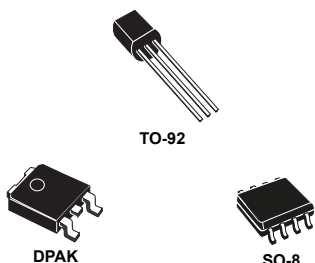
Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

## Very low drop voltage regulators with inhibit



### Features

- Very low dropout voltage (0.4 V)
- Very low quiescent current
- Typ. 50  $\mu$ A in OFF mode, 600  $\mu$ A in ON mode
- Output current up to 250 mA
- Logic controlled electronic shutdown
- Output voltages: 3.3; 3.5; 5;
- Automotive-grade product: 3.3 V  $V_{OUT}$  in SO-8 package only
- Internal current and thermal limit
- Only 2.2  $\mu$ F for stability
- Available in  $\pm 1$  % (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 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.

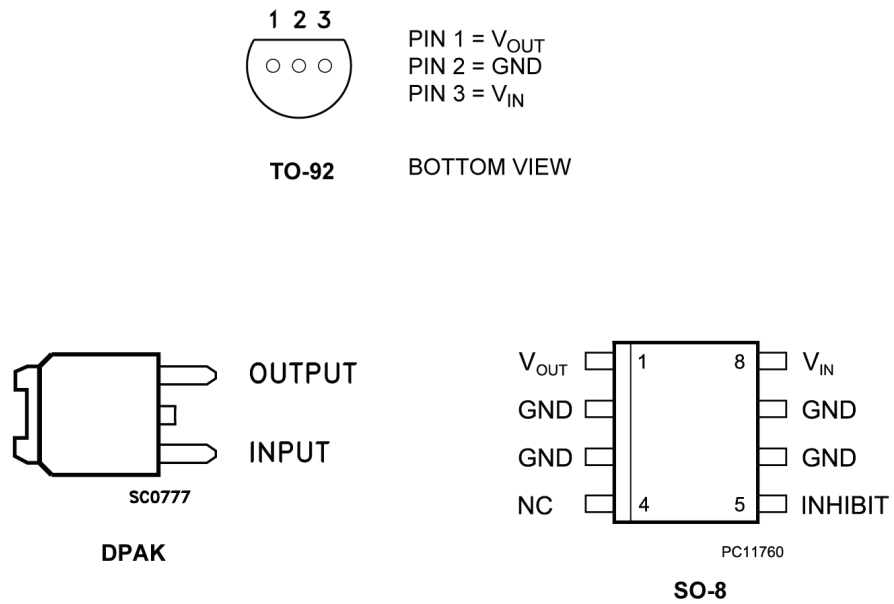
A TTL compatible shutdown logic control function is available in PPAK and SO-8 packages. This means that when the device is used as a local regulator, a part of the board can be put in standby mode, decreasing the total power consumption. It requires only a 2.2  $\mu$ F capacitor for stability allowing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



## 2 Pin configuration

Figure 2. Pin connections (top view)





### 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

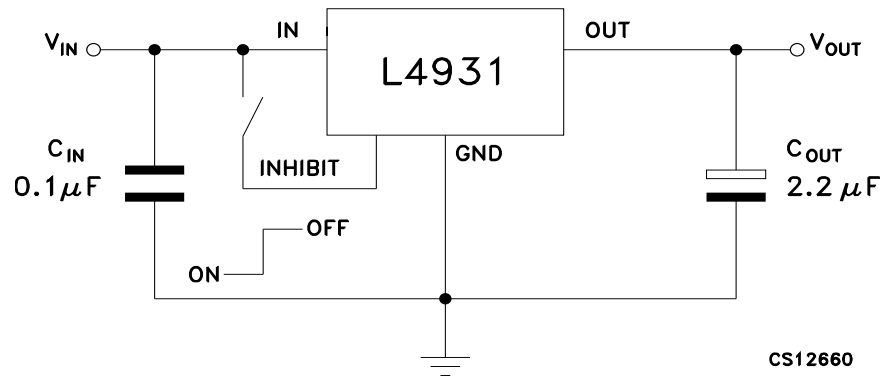
*Note:* Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

**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



AMG050320171502MT



## 5 Electrical characteristics

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

**Table 3. L4931ABxx33 electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 5\text{ mA}$ , $V_I = 5.3\text{ V}$	3.267	3.3	3.333	V
		$I_O = 5\text{ mA}$ , $V_I = 5.3\text{ V}$ , $T_A = -25\text{ to }85\text{ °C}$	3.234		3.366	
$V_I$	Operating input voltage	$I_O = 250\text{ mA}$			20	V
$I_{out}$	Output current limit			300		mA
$\Delta V_O$	Line regulation	$V_I = 4\text{ to }20\text{ V}$ , $I_O = 0.5\text{ mA}$		3	15	mV
$\Delta V_O$	Load regulation <sup>(1)</sup>	$V_I = 4.2\text{ V}$ , $I_O = 0.5\text{ to }250\text{ mA}$		3	15	mV
$I_d$	Quiescent current ON mode	$V_I = 4.2\text{ to }20\text{ V}$ , $I_O = 0\text{ mA}$		0.6	1	mA
		$V_I = 4.2\text{ to }20\text{ V}$ , $I_O = 250\text{ mA}$		4	6	
	OFF mode	$V_I = 6\text{ V}$		50	100	$\mu\text{A}$
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$ $V_I = 5.2 \pm 1\text{ V}$	$f = 120\text{ Hz}$	73		dB
			$f = 1\text{ kHz}$	70		
			$f = 10\text{ kHz}$	55		
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		$\mu\text{V}$
$V_d$	Dropout voltage <sup>(1)</sup>	$I_O = 250\text{ mA}$		0.4	0.6	V
		$I_O = 250\text{ mA}$ , $T_A = -40\text{ to }125\text{ °C}$			0.8	V
$V_{IL}$	Control input logic low	$T_A = -40\text{ to }125\text{ °C}$			0.8	V
$V_{IH}$	Control input logic high	$T_A = -40\text{ to }125\text{ °C}$	2			V
$I_I$	Control input current	$V_I = 6\text{ V}$ , $V_C = 6\text{ V}$		10		$\mu\text{A}$
$C_O$	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\text{ }\Omega$ , $I_O = 0\text{ to }250\text{ mA}$	2	10		$\mu\text{F}$

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

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

**Table 4. L4931Cxx33 electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 5\text{ mA}$ , $V_I = 5.3\text{ V}$	3.234	3.3	3.366	V
		$I_O = 5\text{ mA}$ , $V_I = 5.3\text{ V}$ , $T_A = -25\text{ to }85\text{ °C}$	3.168		3.432	
$V_I$	Operating input voltage	$I_O = 250\text{ mA}$			20	V
$I_{out}$	Output current limit			300		mA
$\Delta V_O$	Line regulation	$V_I = 4.1\text{ to }20\text{ V}$ , $I_O = 0.5\text{ mA}$		3	18	mV
$\Delta V_O$	Load regulation <sup>(1)</sup>	$V_I = 4.3\text{ V}$ , $I_O = 0.5\text{ to }250\text{ mA}$		3	18	mV
$I_d$	Quiescent current ON mode	$V_I = 4.3\text{ to }20\text{ V}$ , $I_O = 0\text{ mA}$		0.6	1	mA
		$V_I = 4.3\text{ to }20\text{ V}$ , $I_O = 250\text{ mA}$		4	6	
	OFF mode	$V_I = 6\text{ V}$		50	100	$\mu\text{A}$
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$		$f = 120\text{ Hz}$	73	dB



Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
SVR	Supply voltage rejection	$V_I = 5.3 \pm 1 \text{ V}$	$f = 1 \text{ kHz}$		70	dB
			$f = 10 \text{ kHz}$		55	
eN	Output noise voltage	$B = 10 \text{ Hz to } 100 \text{ kHz}$		50		$\mu\text{V}$
$V_d$	Dropout voltage <sup>(1)</sup>	$I_O = 250 \text{ mA}$		0.4	0.6	V
		$I_O = 250 \text{ mA}, T_A = -40 \text{ to } 125 \text{ }^\circ\text{C}$			0.8	V
$V_{IL}$	Control input logic low	$T_A = -40 \text{ to } 125 \text{ }^\circ\text{C}$			0.8	V
$V_{IH}$	Control input logic high	$T_A = -40 \text{ to } 125 \text{ }^\circ\text{C}$	2			V
$I_I$	Control input current	$V_I = 6 \text{ V}, V_C = 6 \text{ V}$		10		$\mu\text{A}$
$C_O$	Output bypass capacitance	$\text{ESR} = 0.1 \text{ to } 10 \text{ } \Omega, I_O = 0 \text{ to } 250 \text{ mA}$	2	10		$\mu\text{F}$

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

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

**Table 5. L4931CD33-TRY (automotive-grade) electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 5 \text{ mA}, V_I = 5.3 \text{ V}, T_A = 25 \text{ }^\circ\text{C}$	3.234	3.3	3.366	V
		$I_O = 5 \text{ mA}, V_I = 5.3 \text{ V}$	3.168		3.432	
$V_I$	Operating input voltage	$I_O = 250 \text{ mA}$			20	V
$I_{out}$	Output current limit	$T_A = 25 \text{ }^\circ\text{C}$		300		mA
$\Delta V_O$	Line regulation	$V_I = 4.1 \text{ to } 20 \text{ V}, I_O = 0.5 \text{ mA}$			20	mV
$\Delta V_O$	Load regulation	$V_I = 4.3 \text{ V}, I_O = 0.5 \text{ to } 250 \text{ mA}$			38	mV
$I_d$	Quiescent current ON mode	$V_I = 4.3 \text{ to } 20 \text{ V}, I_O = 0 \text{ mA}$			1	mA
		$V_I = 4.3 \text{ to } 20 \text{ V}, I_O = 250 \text{ mA}$			11	mA
	OFF mode	$V_I = 6 \text{ V}$			100	$\mu\text{A}$
SVR	Supply voltage rejection	$I_O = 5 \text{ mA}, V_I = 5.3 \pm 1 \text{ V}, T_A = 25 \text{ }^\circ\text{C}$	$f = 120 \text{ Hz}$	73		dB
			$f = 1 \text{ kHz}$	70		
			$f = 10 \text{ kHz}$	55		
eN	Output noise voltage	$B = 10 \text{ Hz to } 100 \text{ kHz}, T_A = 25 \text{ }^\circ\text{C}$		50		$\mu\text{V}$
$V_d$	Dropout voltage	$I_O = 250 \text{ mA}, T_A = 25 \text{ }^\circ\text{C}$		0.4	0.6	V
		$I_O = 250 \text{ mA}$			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	$V_I = 6 \text{ V}, V_C = 6 \text{ V}, T_A = 25 \text{ }^\circ\text{C}$		10		$\mu\text{A}$
$C_O$	Output bypass capacitance	$\text{ESR} = 0.1 \text{ to } 10 \text{ } \Omega, I_O = 0 \text{ to } 250 \text{ mA}, T_A = 25 \text{ }^\circ\text{C}$	2	10		$\mu\text{F}$

**Table 6. L4931ABxx35 electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 5 \text{ mA}, V_I = 5.5 \text{ V}$	3.465	3.5	3.535	V
		$I_O = 5 \text{ mA}, V_I = 5.5 \text{ V}, T_A = -25 \text{ to } 85 \text{ }^\circ\text{C}$	3.43		3.57	
$V_I$	Operating input voltage	$I_O = 250 \text{ mA}$			20	V



Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{out}$	Output current limit			300		mA
$\Delta V_O$	Line regulation	$V_I = 4.2$ to $20$ V, $I_O = 0.5$ mA		3	15	mV
$\Delta V_O$	Load regulation <sup>(1)</sup>	$V_I = 4.4$ V, $I_O = 0.5$ to $250$ mA		3	15	mV
$I_d$	Quiescent current	$V_I = 4.4$ to $20$ V, $I_O = 0$ mA		0.6	1	mA
	ON mode	$V_I = 4.4$ to $20$ V, $I_O = 250$ mA		4	6	
	OFF mode	$V_I = 6$ V		50	100	$\mu$ A
SVR	Supply voltage rejection	$I_O = 5$ mA $V_I = 5.4 \pm 1$ 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		$\mu$ V
$V_d$	Dropout voltage <sup>(1)</sup>	$I_O = 250$ 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		$\mu$ A
$C_O$	Output bypass capacitance	ESR = $0.1$ to $10$ $\Omega$ , $I_O = 0$ to $250$ mA	2	10		$\mu$ F

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,  $C_I = 0.1$   $\mu$ F,  $C_O = 2.2$   $\mu$ F unless otherwise specified).

**Table 7. 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
$\Delta V_O$	Line regulation	$V_I = 5.8$ to $20$ V, $I_O = 0.5$ mA		3.5	17.5	mV
$\Delta V_O$	Load regulation <sup>(1)</sup>	$V_I = 6$ V, $I_O = 0.5$ to $250$ mA		3	15	mV
$I_d$	Quiescent current	$V_I = 6$ to $20$ V, $I_O = 0$ mA		0.6	1	mA
	ON mode	$V_I = 6$ to $20$ V, $I_O = 250$ mA		4	6	
	OFF mode	$V_I = 6$ V		50	100	$\mu$ A
SVR	Supply voltage rejection	$I_O = 5$ mA $V_I = 7 \pm 1$ 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		$\mu$ V
$V_d$	Dropout voltage <sup>(1)</sup>	$I_O = 250$ 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



Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_I$	Control input current	$V_I = 6\text{ V}, V_C = 6\text{ V}$		10		$\mu\text{A}$
$C_O$	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\ \Omega, I_O = 0\text{ to }250\text{ mA}$	2	10		$\mu\text{F}$

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

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

**Table 8. L4931Cxx50 electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 5\text{ mA}, V_I = 7\text{ V}$	4.9	5	5.1	V
		$I_O = 5\text{ mA}, V_I = 7\text{ V}, T_A = -25\text{ to }85\text{ }^\circ\text{C}$	4.8		5.2	
$V_I$	Operating input voltage	$I_O = 250\text{ mA}$			20	V
$I_{out}$	Output current limit			300		mA
$\Delta V_O$	Line regulation	$V_I = 5.8\text{ to }20\text{ V}, I_O = 0.5\text{ mA}$		3.5	17.5	mV
$\Delta V_O$	Load regulation <sup>(1)</sup>	$V_I = 6\text{ V}, I_O = 0.5\text{ to }250\text{ mA}$		3	15	mV
$I_d$	Quiescent current ON mode	$V_I = 6\text{ to }20\text{ V}, I_O = 0\text{ mA}$		0.6	1	mA
		$V_I = 6\text{ to }20\text{ V}, I_O = 250\text{ mA}$		4	6	
	OFF mode	$V_I = 6\text{ V}$		50	100	$\mu\text{A}$
SVR	Supply voltage rejection	$I_O = 5\text{ mA}$ $V_I = 7 \pm 1\text{ V}$	$f = 120\text{ Hz}$	70		dB
			$f = 1\text{ kHz}$	67		
			$f = 10\text{ kHz}$	55		
eN	Output noise voltage	$B = 10\text{ Hz to }100\text{ kHz}$		50		$\mu\text{V}$
$V_d$	Dropout voltage <sup>(1)</sup>	$I_O = 250\text{ mA}$		0.4	0.6	V
		$I_O = 250\text{ mA}, T_A = -40\text{ to }125\text{ }^\circ\text{C}$			0.8	V
$V_{IL}$	Control input logic low	$T_A = -40\text{ to }125\text{ }^\circ\text{C}$			0.8	V
$V_{IH}$	Control input logic high	$T_A = -40\text{ to }125\text{ }^\circ\text{C}$	2			V
$I_I$	Control input current	$V_I = 6\text{ V}, V_C = 6\text{ V}$		10		$\mu\text{A}$
$C_O$	Output bypass capacitance	$\text{ESR} = 0.1\text{ to }10\ \Omega, I_O = 0\text{ to }250\text{ mA}$	2	10		$\mu\text{F}$

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

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

**Table 9. L4931ABxx120 electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 5\text{ mA}, V_I = 14\text{ V}$	11.88	12	12.12	V
		$I_O = 5\text{ mA}, V_I = 14\text{ V}, T_A = -25\text{ to }85\text{ }^\circ\text{C}$	11.76		12.24	
$V_I$	Operating input voltage	$I_O = 250\text{ mA}$			20	V
$I_{out}$	Output current limit			300		mA
$\Delta V_O$	Line regulation	$V_I = 12.8\text{ to }20\text{ V}, I_O = 0.5\text{ mA}$		4	20	mV
$\Delta V_O$	Load regulation <sup>(1)</sup>	$V_I = 13\text{ V}, I_O = 0.5\text{ to }250\text{ mA}$		3	15	mV
$I_d$	Quiescent current	$V_I = 13\text{ to }20\text{ V}, I_O = 0\text{ mA}$		0.8	1.6	mA



Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_d$	ON mode	$V_I = 13 \text{ to } 20 \text{ V}$ , $I_O = 250 \text{ mA}$		4.5	7	mA
	OFF mode	$V_I = 6 \text{ V}$		90	180	$\mu\text{A}$
SVR	Supply voltage rejection	$I_O = 5 \text{ mA}$ $V_I = 14 \pm 1 \text{ V}$	$f = 120 \text{ Hz}$	64		dB
			$f = 1 \text{ kHz}$	61		
			$f = 10 \text{ kHz}$	55		
eN	Output noise voltage	$B = 10 \text{ Hz to } 100 \text{ kHz}$		50		$\mu\text{V}$
$V_d$	Dropout voltage <sup>(1)</sup>	$I_O = 250 \text{ mA}$		0.4	0.6	V
		$I_O = 250 \text{ mA}$ , $T_A = -40 \text{ to } 125 \text{ }^\circ\text{C}$			0.8	V
$V_{IL}$	Control input logic low	$T_A = -40 \text{ to } 125 \text{ }^\circ\text{C}$			0.8	V
$V_{IH}$	Control input logic high	$T_A = -40 \text{ to } 125 \text{ }^\circ\text{C}$	2			V
$I_I$	Control input current	$V_I = 6 \text{ V}$ , $V_C = 6 \text{ V}$		10		$\mu\text{A}$
$C_O$	Output bypass capacitance	$\text{ESR} = 0.1 \text{ to } 10 \text{ } \Omega$ , $I_O = 0 \text{ to } 250 \text{ mA}$	2	10		$\mu\text{F}$

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



## 6 Typical application

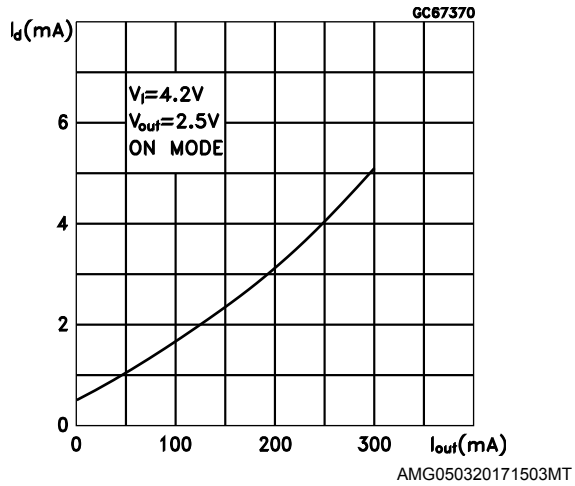
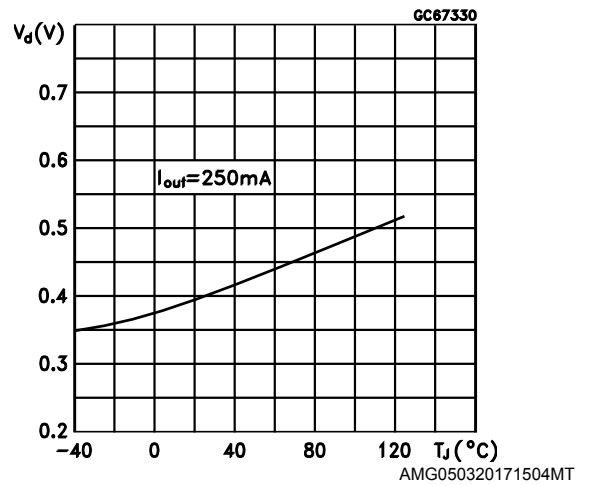
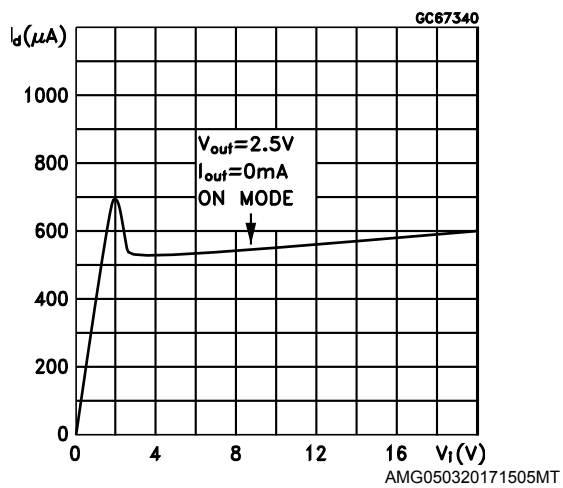
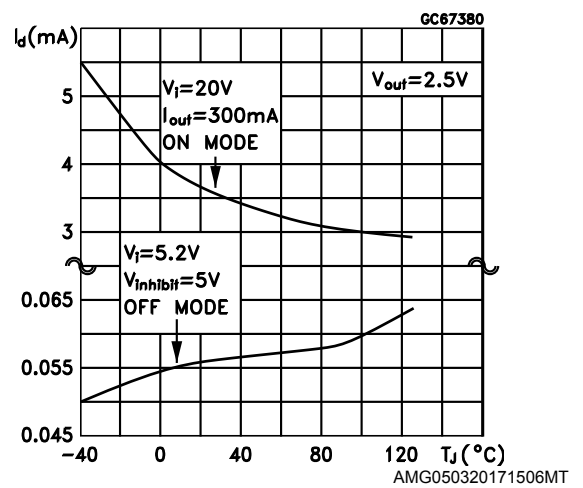
**Figure 4. Line regulation vs temperature**

**Figure 5. Dropout voltage vs temperature**

**Figure 6. Supply current vs input voltage**

**Figure 7. Supply current vs temperature**




Figure 8. Short-circuit current vs dropout voltage

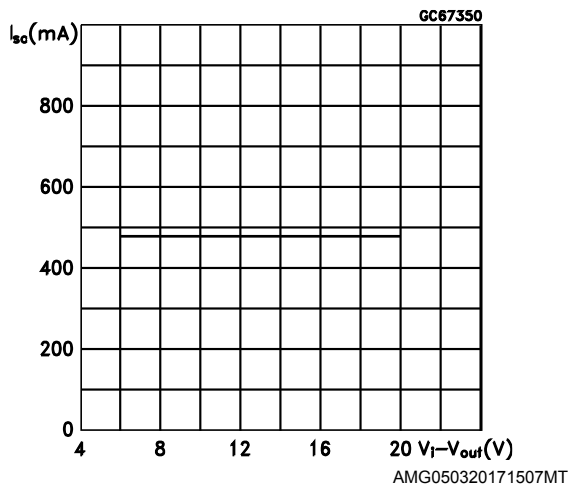
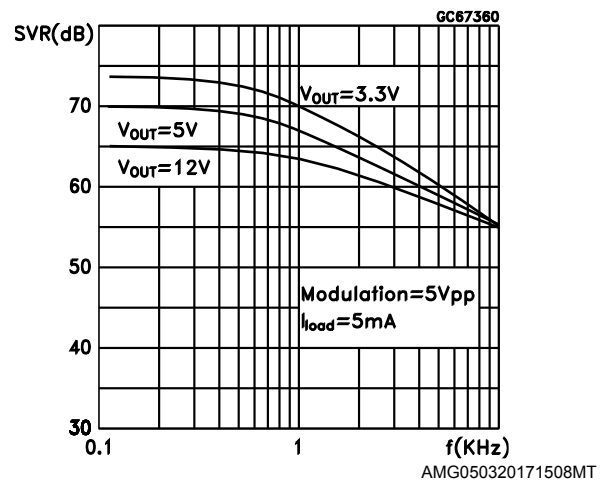


Figure 9. SVR vs input voltage signal frequency

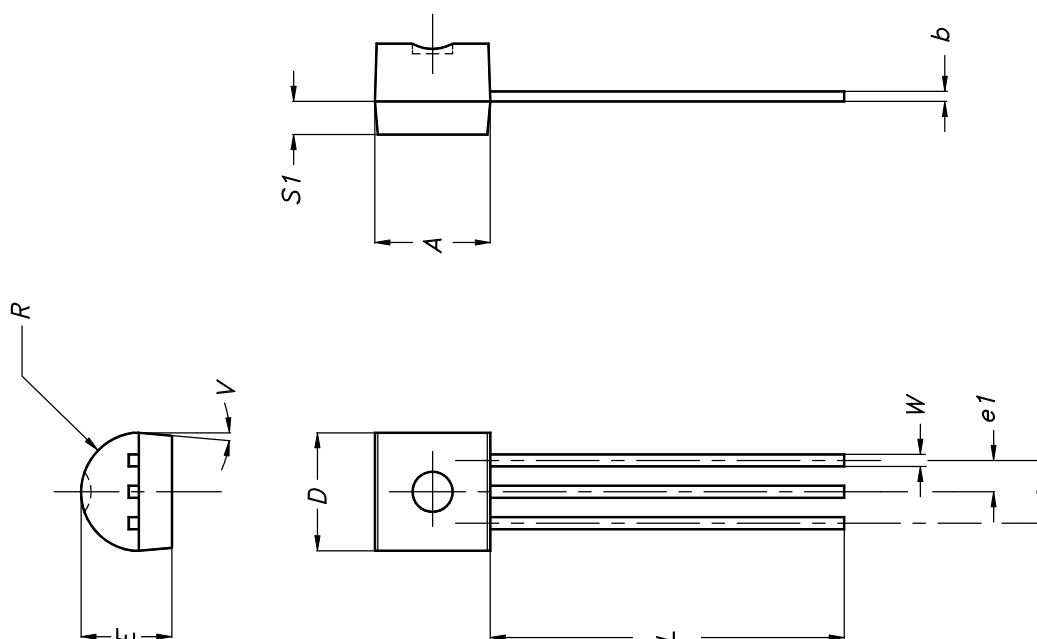


## 7 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 7.1 TO-92 package information

Figure 10. TO-92 package outline

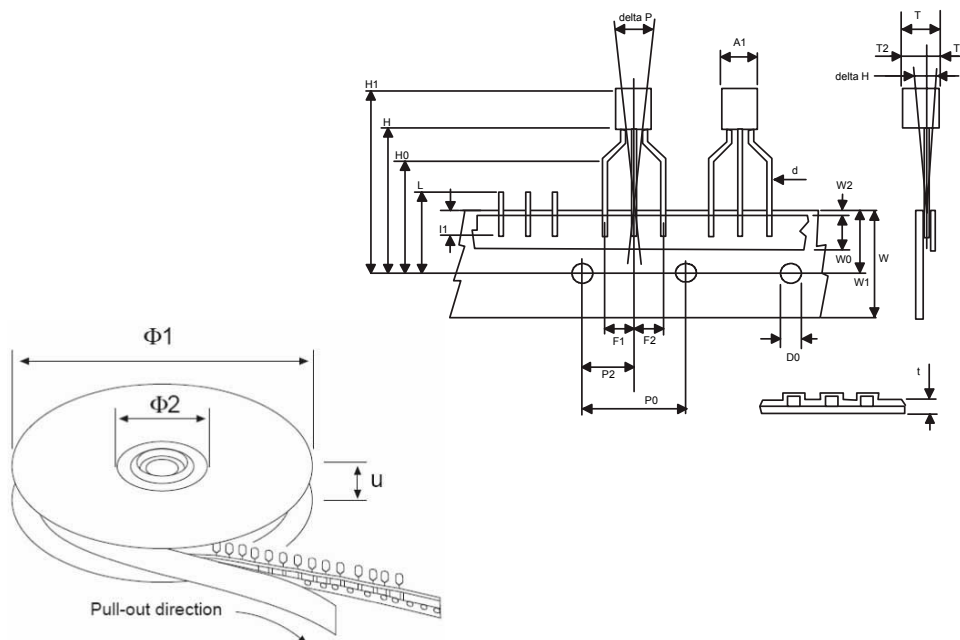


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Table 10. TO-92 mechanical data

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

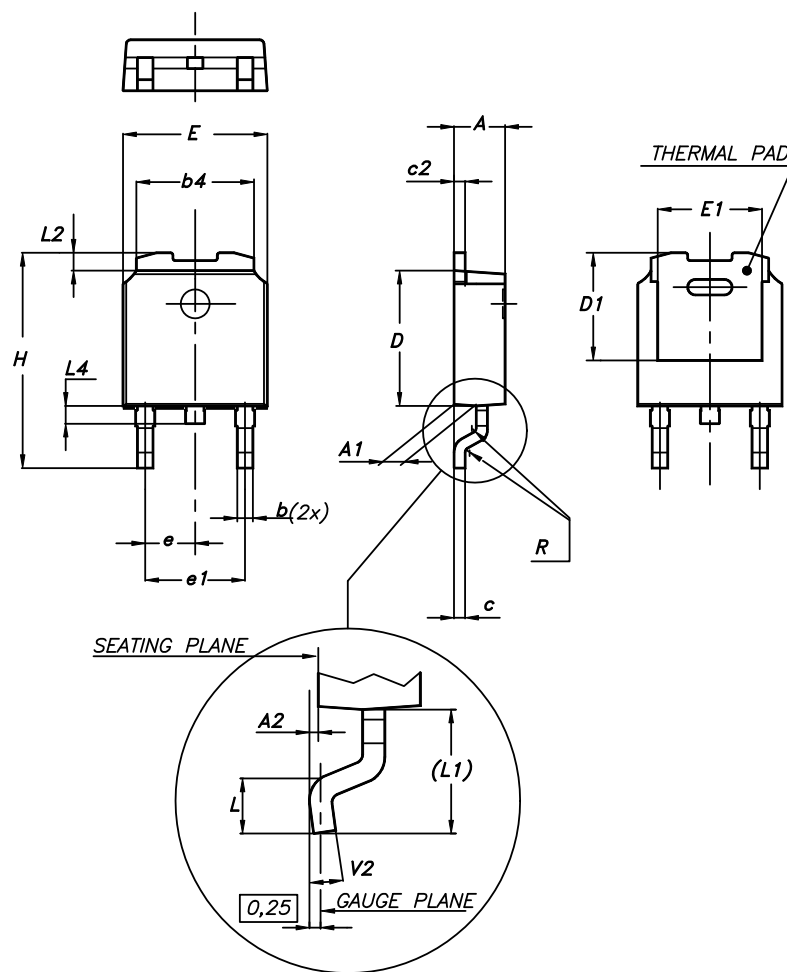
**Figure 11. TO-92 Ammopak tape and reel outline**

**Table 11. 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 DPAK package information

Figure 12. DPAK package outline



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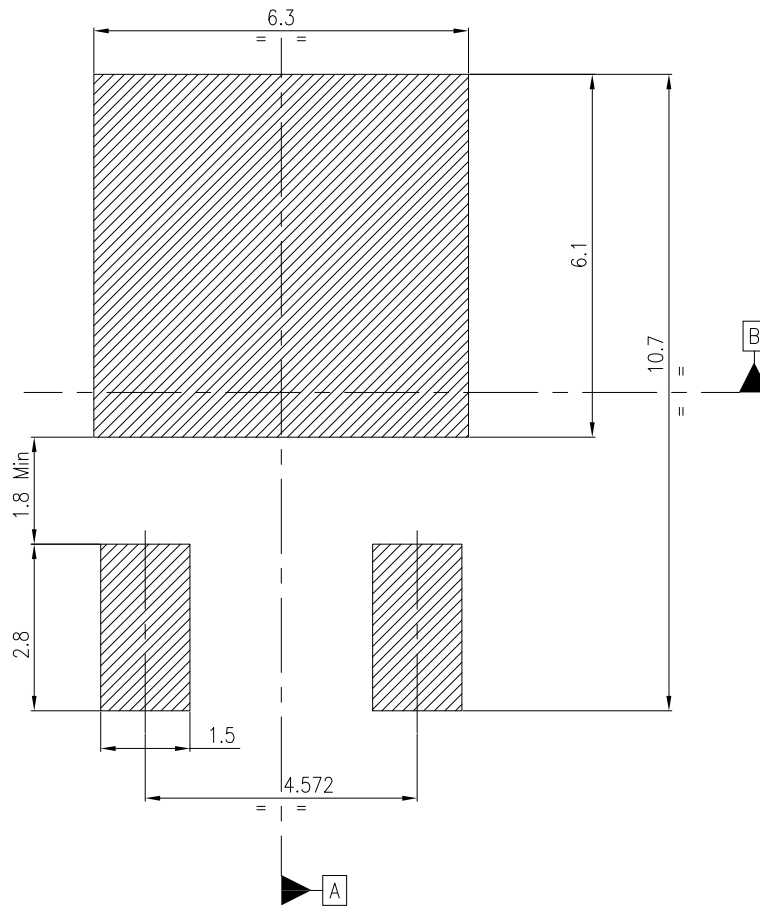
Table 12. DPAK mechanical data

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



Dim.	mm		
	Min.	Typ.	Max.
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
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 13. DPAK recommended footprint (dimensions are in mm)

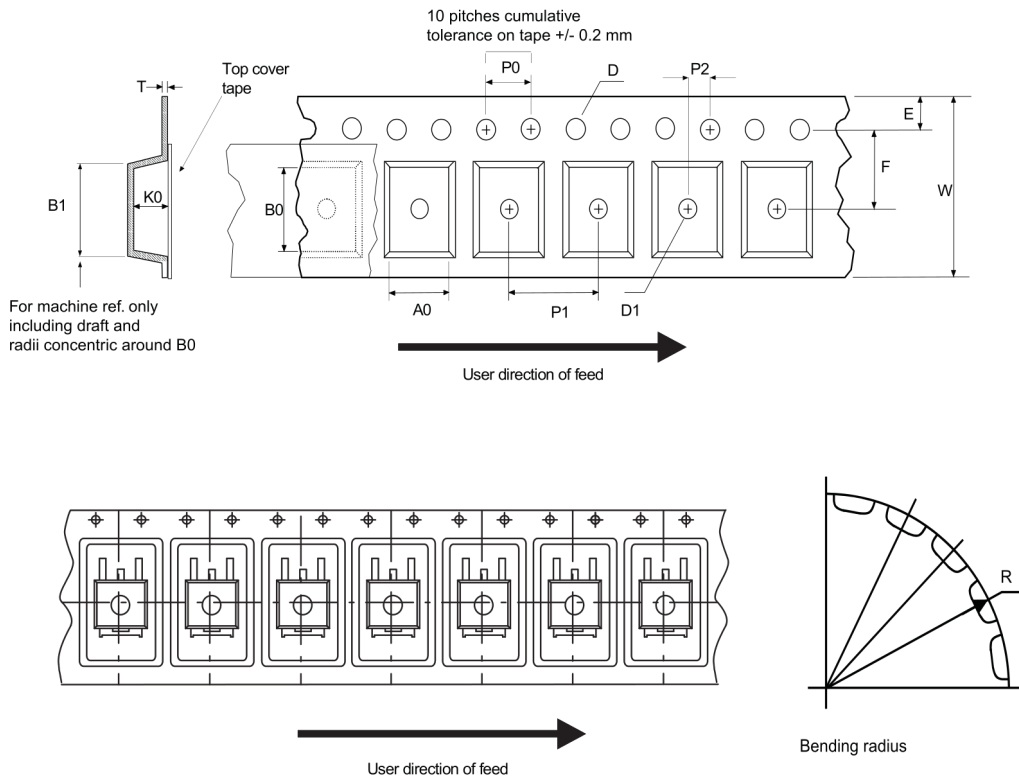


Footprint\_0068772



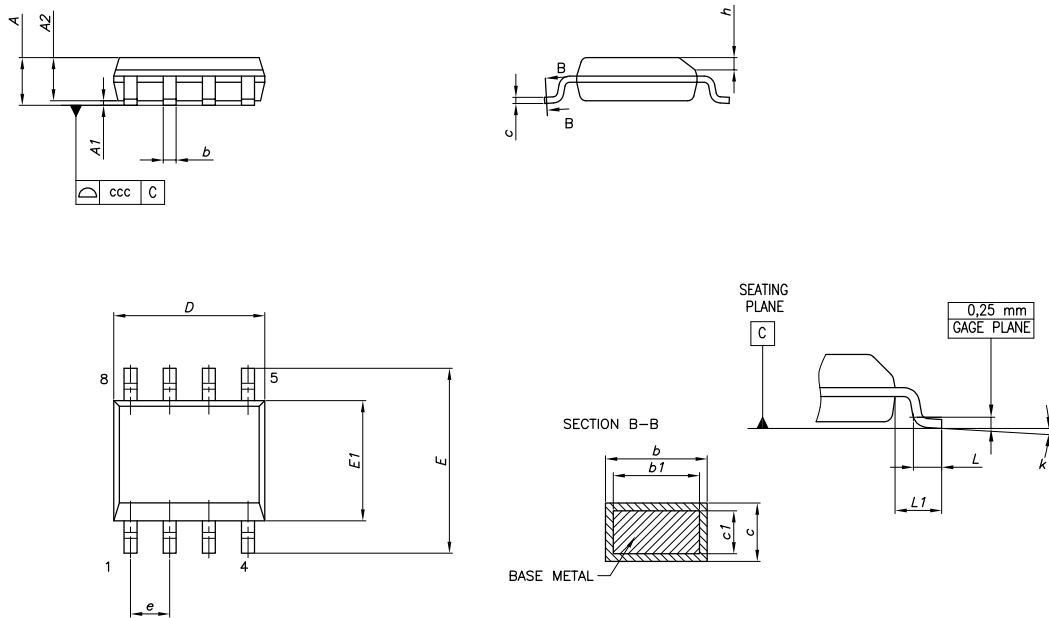
## 7.4 DPAK\_PPAK packing information

Figure 14. PPAK and DPAK tape



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## 7.5 SO8 package information

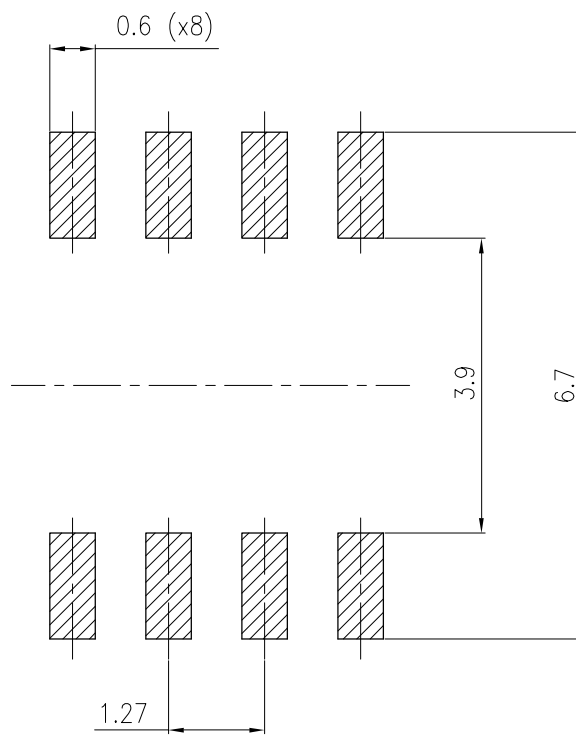
**Figure 15. SO-8 package outline**


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**Table 13. SO-8 mechanical data**

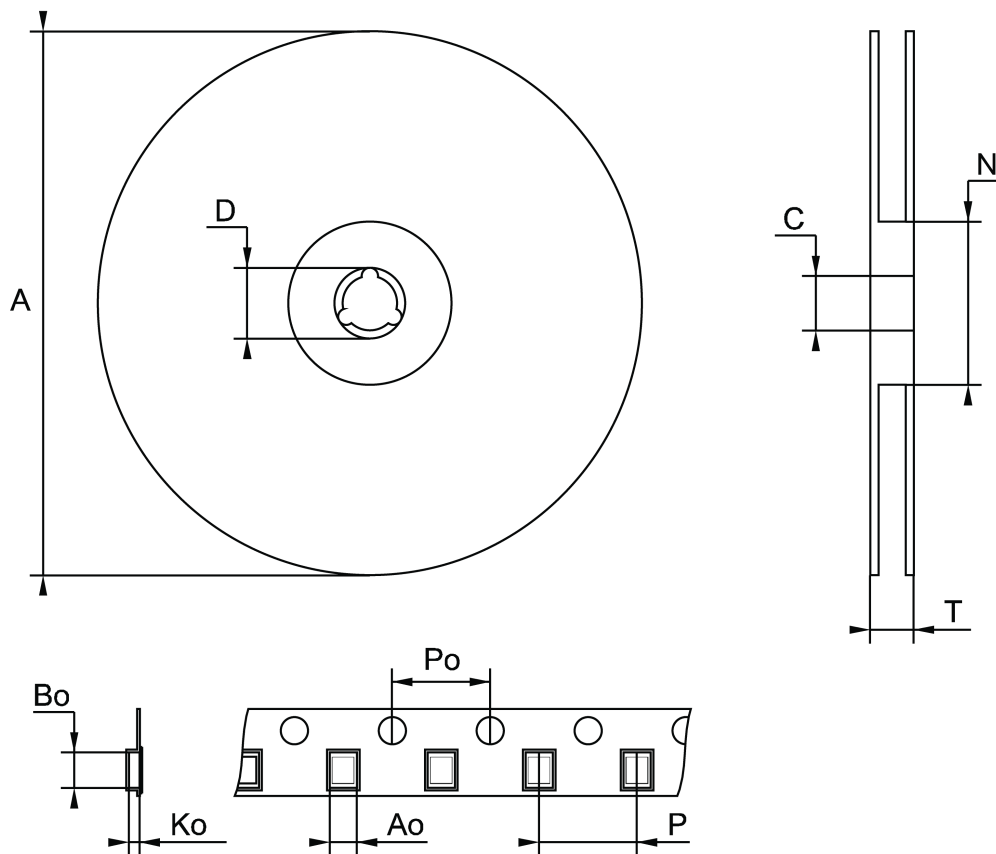
Dim.	mm		
	Min.	Typ.	Max.
A			1.75
A1	0.10		0.25
A2	1.25		
b	0.28		0.48
c	0.17		0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27	
h	0.25		0.50
L	0.40		1.27
L1		1.04	
k	0°		8°
ccc			0.10

Figure 16. SO-8 recommended footprint



0016023\_1

## 7.6 SO8-batwing packing information

**Figure 17. SO8-batwing tape and reel outline**


Note: Drawing not in scale

**Table 14. 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 15. Order codes**

Package				Output voltage
TO-92	SO-8 (automotive-grade)	DPAK	SO-8	
L4931CZ33-AP	L4931CD33-TRY <sup>(1)</sup>	L4931CDT33-TR	L4931CD33-TR	3.3 V
		L4931ABDT33-TR		3.3 V
L4931CZ50-AP		L4931CDT50-TR	L4931CD50-TR	5 V
			L4931ABD50-TR	5 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 16. 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	<p>Changed the L4931ABxx and L4931Cxx to L4931.</p> <p>Updated: Description in cover page.</p> <p>Deleted table1: Device summary.</p> <p>Updated Figure 2: Pin connections (top view), Table 2: Thermal data, Section 5: Electrical characteristics and Section 7: Package mechanical data.</p> <p>Added Section 8: Packaging mechanical data.</p> <p>Minor text changes.</p>
02-Aug-2017	19	<p>Updated features in cover page.</p> <p>Deleted table 3: L4931Cxx27 electrical characteristics, table 4: L4931Cxx27-TRY (automotive-grade) electrical characteristics, table 12:L4931ABxx80 electrical characteristics, table 13: L4931Cxx80 electrical characteristics.</p> <p>Updated Table 19. Order codes.</p> <p>Minor text changes.</p>
29-Jan-2024	20	Updated Table 5.
09-Aug-2024	21	<p>Updated features and description on the cover page.</p> <p>Removed PPAK package information , updated Table 15</p>
28-Oct-2024	22	updated Table 15

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