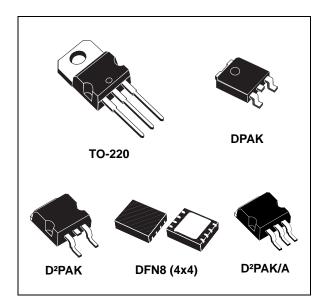


1.5 A adjustable and fixed low drop positive voltage regulator

Datasheet - production data



Features

- Typical dropout: 1.3 V at 1.5 A
- Three-terminal adjustable or fixed output voltage: 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V
- Automotive grade (adjustable V_{OUT} in TO-220 and DPAK packages only)
- Output current guaranteed up to 1.5 A
- Output tolerance: ± 1% at 25 °C and ± 2% in full temperature range
- Internal power and thermal limit
- Wide operating temperature range 40 °C to 125 °C
- Package available: TO-220, D²PAK, D²PAK/A, DPAK and DFN8 (4x4)
- Pinout compatibility with standard adjustable voltage regulators

Description

The LD1086 is a low drop voltage regulator capable of providing up to 1.5 A of output current. Dropout is guaranteed at a maximum of 1.2 V at the maximum output current, decreasing at lower loads. The LD1086 is pin-to-pin compatible with older 3-terminal adjustable regulators, but has better performance in terms of drop and output tolerance. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1086 quiescent current flows into the load, increasing efficiency. Only a 10 µF (minimum) capacitor is needed for stability. The device is available in a TO-220, D2PAK, D2PAK/A, DPAK or DFN8 (4x4) package. On-chip trimming allows the regulator to reach a very tight output voltage tolerance; within ± 1% at 25 °C. The LD1086 is available as automotive grade for adjustable output voltages in the TO-220 and DPAK packages. The PAT, SYL, SBL statistical tests have been performed, and the devices are qualified according to the AEC-Q100 specification for the automotive market in the temperature range of - 40 °C to 125 °C.

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LD1086 Diagram

1 Diagram

THERMAL PROTECTION VOUT

Figure 1. Schematic diagram

SC14280

Pin configuration LD1086

2 Pin configuration

INPUT INPUT OUTPUT OUTPUT OUTPUT ADJ/GND ADJ/GND PC12260 TO-220 D²PAK > INPUT INPUT OUTPUT OUTPUT ADJ/GND ADJ/GND CS00890 **DPAK** D²PAK/A 0 8 IN NC 1 2 IN NC OUTPUT 6 NC 3 ADJ/GND 4 5 NC NC **DFN8 (4x4)**

Figure 2. Pin connections (top view)

Note: The TAB is physically connected to the output (this is valid for the TO-220 package too).

LD1086 Maximum ratings

3 Maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V _I	DC input voltage	30	V
I _O	Output current	Internally Limited	mA
P_{D}	Power dissipation	Internally Limited	mW
T _{STG}	Storage temperature range	-55 to +150	°C
T _J	Junction temperature range	-40 to +150	°C

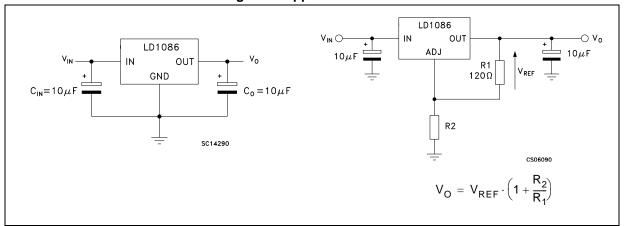
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

Table 2. Thermal data

Symbol	Parameter	TO-220	D²PAK D²PAK/A	DPAK	DFN8 (4x4)	Unit
R _{thJC}	Thermal resistance junction-case	5	3	8	1.5	°C/W
R_{thJA}	Thermal resistance junction-ambient	50	62.5	100	33	°C/W

4 Schematic application

Figure 3. Application circuit



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5 Electrical characteristics

 V_I = 4.8 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 $^{\circ}C,\, unless$ otherwise specified.

Table 3. Electrical characteristics of LD1086#18

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
\/	Output voltage (1)	I _O = 0 mA, T _J = 25 °C	1.782	1.8	1.818	V
Vo	Output voltage V	$I_O = 0$ to 1.5 A, $V_I = 3.4$ to 30 V	1.764	1.8	1.836	V
ΔV _O	Line regulation	$I_O = 0$ mA, $V_I = 3.4$ to 18 V, $T_J = 25$ °C		0.2	4	mV
		$I_O = 0$ mA, $V_I = 3.4$ to 15 V		0.4	4	mV
41/	Lood regulation	I _O = 0 to 1.5 A, T _J = 25 °C		0.5	8	mV
ΔV_{O}	Load regulation	I _O = 0 to 1.5 A		1.8 1.8 0.2 0.4	16	mV
V _d	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
Iq	Quiescent current	$V_I \le 30 \text{ V}$		5	10	mA
	Short-circuit current	$V_I - V_O = 5 V$	1.5	2	10	Α
I _{sc}	Short-circuit current	V _I - V _O = 25 V	0.05	0.02		Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$f = 120 \text{ Hz}, C_O = 25 \mu\text{F}, I_O = 1.5 \text{ A} $ $V_I = 6.8 \pm 3 \text{ V}$	60	82		dB
eN	RMS output noise voltage (% of V _O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

^{1.} See short-circuit current curve for available output current at fixed dropout.

Electrical characteristics LD1086

 V_I = 5.5 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 °C, unless otherwise specified.

Table 4. Electrical characteristics of LD1086#25

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
\/	Output voltage (1)	I _O = 0 mA, T _J = 25 °C	2.475	2.5	2.525	V
Vo	Output voltage ()	I _O = 0 to 1.5 A, V _I = 4.1 to 30 V	2.45	2.5	2.55	V
ΔV _O	Line regulation	$I_O = 0$ mA, $V_I = 4.1$ to 18 V, $T_J = 25$ °C		0.2	4	mV
		$I_O = 0 \text{ mA}, V_I = 4.1 \text{ to } 18 \text{ V}$		0.4	4	mV
۸\/ .	Load regulation	I _O = 0 to 1.5 A, T _J = 25 °C		0.5	2.525 2.55 2.525 2.2 4 2.4 4 2.5 8 1 16 3 1.5 5 10 2 2 2.2 2 2008 0.04 31	mV
ΔV_{O}	Load regulation	I _O = 0 to 1.5 A		1	16	mV
V _d	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
Iq	Quiescent current	$V_I \le 30 \text{ V}$		5	10	mA
1	Short-circuit current	V _I - V _O = 5 V	1.5	5 10	Α	
I _{sc}	Short-circuit current	V _I - V _O = 25 V	0.05	0.2		Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.008	0.04	%/W
SVR	Supply voltage rejection	f = 120 Hz, C_O = 25 μ F, I_O = 1.5 A V_I = 7.5 \pm 3 V	60	81		dB
eN	RMS output noise voltage (% of V_O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

^{1.} See short-circuit current curve for available output current at fixed dropout.



 V_I = 6.3 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 °C, unless otherwise specified.

Table 5. Electrical characteristics of LD1086#33

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
W	Output voltage ⁽¹⁾	I _O = 0 mA, T _J = 25 °C	3.267	3.3	3.333	V
Vo	Output voitage (*)	$I_O = 0$ to 1.5 A, $V_I = 4.9$ to 30 V	3.234	3.3	3.366	V
ΔV _O	Line regulation	$I_O = 0$ mA, $V_I = 4.9$ to 18 V, $T_J = 25$ °C		0.5	6	mV
		$I_O = 0 \text{ mA}, V_I = 4.9 \text{ to } 18 \text{ V}$		1	6	mV
A\/	Lood regulation	I _O = 0 to 1.5 A, T _J = 25 °C		67 3.3 3.333 34 3.3 3.366 0.5 6 1 6 1 10 7 25 1.3 1.5 5 10 5 2 0.5 0.2 0.008 0.04	mV	
ΔV_{O}	Load regulation	I _O = 0 to 1.5 A		7	25	mV
V_{d}	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
Iq	Quiescent current	V _I ≤ 30 V		5	10	mA
		V _I - V _O = 5 V	1.5	2		Α
I _{sc}	Short-circuit current	$V_1 - V_0 = 25 \text{ V}$	0.05	0.2		Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.008	0.04	%/W
SVR	Supply voltage rejection	$f = 120 \text{ Hz}, C_O = 25 \mu\text{F}, I_O = 1.5 \text{ A} $ $V_I = 8.3 \pm 3 \text{ V}$	60	79		dB
eN	RMS output noise voltage (% of V _O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

^{1.} See short-circuit current curve for available output current at fixed dropout.

Electrical characteristics LD1086

 V_I = 8 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 °C, unless otherwise specified.

Table 6. Electrical characteristics of LD1086#50

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
\/	Output voltage ⁽¹⁾	I _O = 0 mA, T _J = 25 °C	4.95	5	5.05	V
Vo	Output voltage (*)	$I_O = 0$ to 1.5 A, $V_I = 6.6$ to 30 V	4.9	5	5.1	V
ΔV _O	Line regulation	$I_O = 0$ mA, $V_I = 6.6$ to 20V, $T_J = 25$ °C		0.5	10	mV
		$I_O = 0 \text{ mA}, V_I = 6.6 \text{ to } 20 \text{ V}$		1	10	mV
4)/	Lood regulation	I _O = 0 to 1.5 A, T _J = 25 °C		5	5 5.05 5 5.1 0.5 10 1 10 5 20 10 35 1.3 1.5 5 10 2 0.2 0.01 0.04 75	mV
ΔV_{O}	Load regulation	I _O = 0 to 1.5 A		10		mV
V _d	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
Iq	Quiescent current	V _I ≤ 30 V		5	10	mA
1	01	$V_I - V_O = 5 V$	1.5	2		Α
I _{sc}	Short-circuit current	$V_1 - V_0 = 25 \text{ V}$	0.05	0.2		Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$f = 120 \text{ Hz}, C_O = 25 \mu\text{F}, I_O = 1.5 \text{ A} $ $V_I = 10 \pm 3 \text{ V}$	60	75		dB
eN	RMS output noise voltage (% of V _O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

^{1.} See short-circuit current curve for available output current at fixed dropout.



 V_I = 15 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 °C, unless otherwise specified.

Table 7. Electrical characteristics of LD1086#12

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
V	Output voltage (1)	I _O = 0 mA, T _J = 25 °C	11.88	12	12.12	V
V _O	Output voltage V	I _O = 0 to 1.5 A, V _I = 13.8 to 30 V	11.76	12	12.24	V
ΔV _O	Line regulation	$I_O = 0$ mA, $V_I = 13.8$ to 25 V, $T_J = 25$ °C		8 12 12.3 6 12 12.3 1 25 2 25 12 36 24 72 1.3 1.5 5 10 2 0.2	25	mV
		I _O = 0 mA, V _I = 13.8 to 25 V		2	25	mV
41/	Load regulation	I _O = 0 to 1.5 A, T _J = 25 °C		12	36	mV
ΔV _O	Load regulation	I _O = 0 to 1.5 A		24	72	mV
V _d	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
Iq	Quiescent current	$V_I \le 30 \text{ V}$		5	10	mA
	Short-circuit current	V _I - V _O = 5 V	1.5	2		Α
I _{sc}	Short-circuit current	V _I - V _O = 25 V	0.05	0.2		Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	f = 120 Hz, C_O = 25 $\mu F, I_O$ = 1.5 A V_I = 17 \pm 3 V	54	66		dB
eN	RMS output noise voltage (% of V _O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

^{1.} See short-circuit current curve for available output current at fixed dropout.

Electrical characteristics LD1086

 V_I = 4.25 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 °C, unless otherwise specified.

Table 8. Electrical characteristics of LD1086B#

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
		I _O = 10 mA T _J = 25 °C	1.231	1.25	1.269	V
V _{ref}	Reference voltage (1)	$I_O = 10$ mA to 1.5 A, $V_I = 2.85$ to 30 V	1.219	1.25	1.281	V
ΔV _O	Line regulation	$I_O = 10$ mA, $V_I = 2.8$ to 16.5 V, $T_J = 25$ °C		0.015	0.2	%
Ü		$I_O = 10 \text{ mA}, V_I = 2.8 \text{ to } 16.5 \text{ V}$		0.035	0.2	%
41/	Lond regulation	I_{O} = 10 mA to 1.5 A, T_{J} = 25 °C		1.25 9 1.25 0.015 0.035 0.1 0.2 1.3 3 5 2.3 5 0.2 0.01	0.3	%
ΔV_{O}	Load regulation	I _O = 0 to 1.5 A		0.2	0.4	%
V _d	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
I _{O(min)}	Minimum load current	V _I = 30 V		3	10	mA
1	Short-circuit current	$V_I - V_O = 5 V$	1.5	2.3		Α
I _{sc}	Short-circuit current	V _I - V _O = 25 V	0.05	0.2	1.269 1.281 0.2 0.2 0.3 0.4 1.5	Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection		60	88		dB
I _{ADJ}	Adjust pin current	V _I = 4.25 V, I _O = 10 mA		40	120	μA
Δl _{ADJ}	Adjust pin current change ⁽¹⁾	$I_O = 10$ mA to 1.5 A, $V_I = 2.8$ to 16.5 V		0.2	5	μΑ
eN	RMS output noise voltage (% of V _O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

^{1.} See short-circuit current curve for available output current at fixed dropout.



 V_I = 4.25 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 °C, unless otherwise specified.

Table 9. Electrical characteristics of LD1086#

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
		$I_O = 10 \text{ mA T}_J = 25 \text{ °C}$	1.237	1.25	1.263	V
V _{ref}	Reference voltage ⁽¹⁾	$I_O = 10$ mA to 1.5 A, $V_I = 2.85$ to 30 V	1.225	1.25	1.275	V
ΔV _O	Line regulation	I_{O} = 10 mA, V_{I} = 2.8 to 16.5 V, T_{J} = 25 °C		0.015	0.2	%
· ·	-	$I_O = 10 \text{ mA}, V_I = 2.8 \text{ to } 16.5 \text{ V}$		0.035	0.2	%
ΔV _O	Load regulation	I_O = 10 mA to 1.5 A, T_J = 25 °C		37 1.25 25 1.25 0.015 0.035 0.1 0.2 1.3 3 5 2.3 5 0.2 0.01 0 88 40 0.2 0.003 0.5	0.3	%
ΔνΟ	Load regulation	I _O = 0 to 1.5 A		0.2	0.4	%
V _d	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
I _{O(min)}	Minimum load current	$V_I = 30 \text{ V}$		3	10	mA
1	Short-circuit current	$V_I - V_O = 5 V$	1.5	2.3		Α
I _{sc}	Short-circuit current	$V_{I} - V_{O} = 25 \text{ V}$	0.05	0.2	1.263 1.275 0.2 0.2 0.3 0.4 1.5 10 0.04 120 5	Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection		60	88		dB
I _{ADJ}	Adjust pin current	$V_{I} = 4.25 \text{ V}, I_{O} = 10 \text{ mA}$		40	120	μΑ
ΔI_{ADJ}	Adjust pin current change (1)	$I_O = 10$ mA to 1.5 A, $V_I = 2.8$ to 16.5 V		0.2	5	μΑ
eN	RMS output noise voltage (% of V _O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

^{1.} See short-circuit current curve for available output current at fixed dropout.

Electrical characteristics LD1086

 V_I = 4.25 V, C_I = C_O =10 $\mu F,\, T_A$ = -40 to 125 °C, unless otherwise specified.

Table 10. Electrical characteristics of LD1086DTTRY and LD1086VY (Automotive grade)

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
V	Deference voltage (1)	$I_O = 10 \text{ mA } T_A = 25 \text{ °C}$		1.25	1.263	V
V _{ref}	Reference voltage (1)	I_{O} = 10 mA to 1.5 A, V_{I} = 2.85 to 30 V	1.225	1.25	1.275	V
ΔV_{O}	Line regulation	$I_O = 10 \text{ mA}, V_I = 2.8 \text{ to } 16.5 \text{ V}$		0.035	0.2	%
ΔV_{O}	Load regulation	I _O = 0 to 1.5 A		0.2	0.4	%
V _d	Dropout voltage	I _O = 1.5 A		1.3	1.5	V
I _{O(min)}	Minimum load current	V _I = 30 V		3	10	mA
1	Chart aircuit aurrant	V _I - V _O = 5 V, T _A = 25 °C	1.5	2.3		Α
I _{sc}	Short-circuit current	V _I - V _O = 25 V, T _A = 25 °C	0.05	0.2		Α
	Thermal regulation	T _A = 25 °C, 30 ms pulse		0.01	0.04	%/W
SVR	Supply voltage rejection	$ \begin{array}{l} f = 120 \; Hz, \; C_O = 25 \; \mu F, C_{ADJ} = 25 \; \mu F, \\ I_O = 1.5 \; A, \; V_I = 6.25 \pm 3 \; V, \; T_A = 25 \; ^{\circ}C \\ \end{array} $	60	88		dB
I _{ADJ}	Adjust pin current	V _I = 4.25 V, I _O = 10 mA		40	120	μΑ
Δl _{ADJ}	Adjust pin current change (1)	$I_O = 10 \text{ mA to } 1.5 \text{ A}, V_I = 2.8 \text{ to } 16.5 \text{ V}$		0.2	5	μΑ
eN	RMS output noise voltage (% of V _O)	T _A = 25 °C, f =10 Hz to 10 kHz		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	T _A = 125 °C, 1000 Hrs		0.5		%

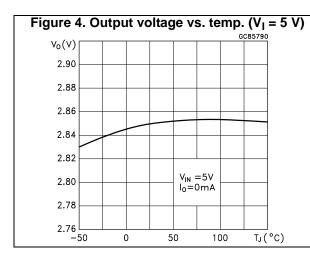
^{1.} See short-circuit current curve for available output current at fixed dropout.



LD1086 Typical application

6 Typical application

Unless otherwise specified $T_J = 25$ °C, $C_I = C_O = 10 \mu F$.



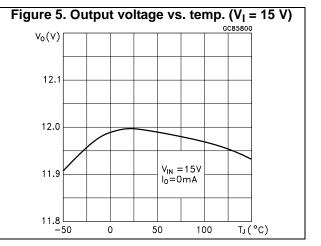


Figure 6. Output voltage vs. temperature
(V_I = 4.25 V)

V_O(V)

1.26

1.24

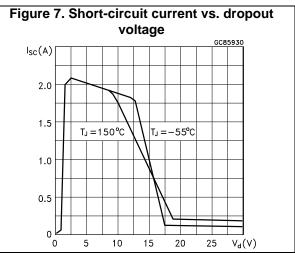
1.22

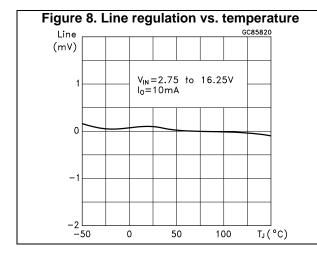
V_{IN} = 4.25 V

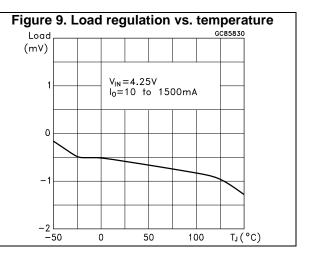
I_O = 10 mA

50

100

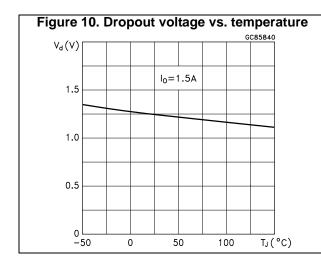






T_J(°C)

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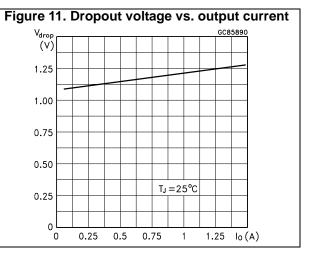
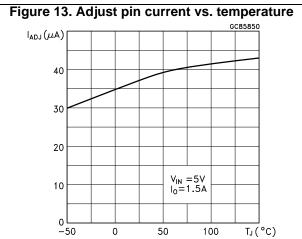
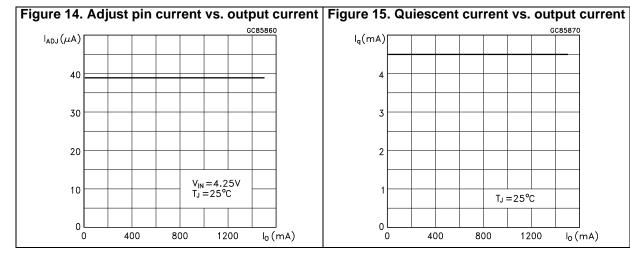
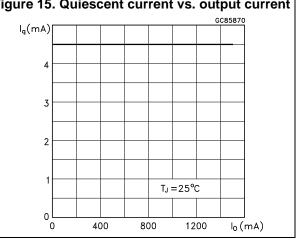


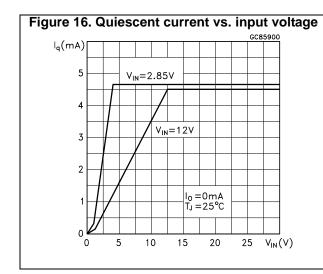
Figure 12. Adjust pin current vs. input voltage $I_{ADJ}(\mu A)$ 40 30 20 l₀=10mA T_J=25°C 10 $V_{IN}(V)$ 5 10 15 20







LD1086 Typical application



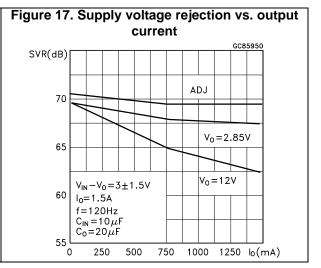
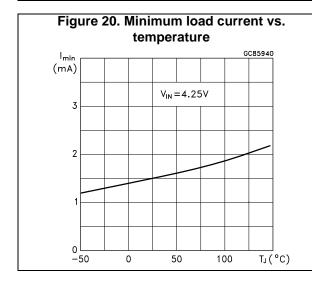
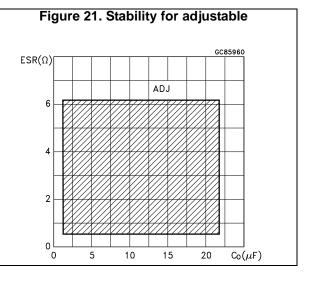


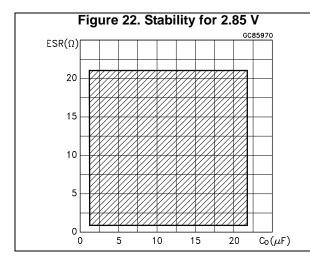
Figure 18. Supply voltage rejection vs. frequency SVR(dB) 80 ADJ|||| 500mVpp 60 2.85V 1201 40 $V_{IN} = (V_0 + 3.5V) \pm 1.5V$ $I_0 = 1.5A$ $T_J = 25$ °C 20 $C_{IN} = 10 \mu F$ $C_{O} = 20 \mu F$ 0 L 10 1000 10000 f(KHz)

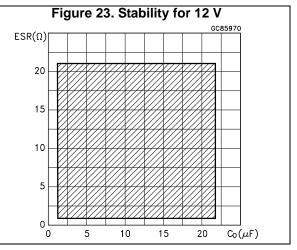
Figure 19. Supply voltage rejection vs. temperature GC85910 SVR(dB) $V_0 = 2.85V$ 70 ADJ 65 $V_{OUT} = 12V$ $V_{IN} - V_{O} = 3 \pm 1.5 V$ $I_0 = 1.5A$ f=120Hz $C_{IN} = 10 \mu F$ 55 <u></u> $C_0 = 20 \mu F$ T_J(°C)

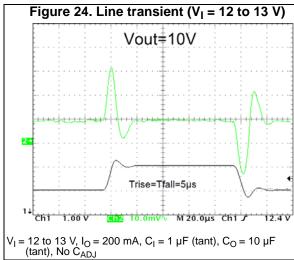


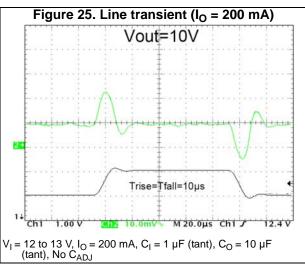


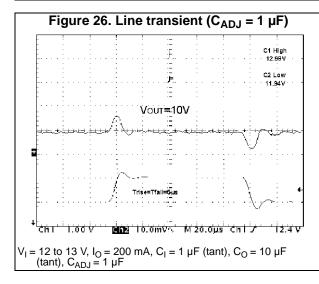
Typical application LD1086

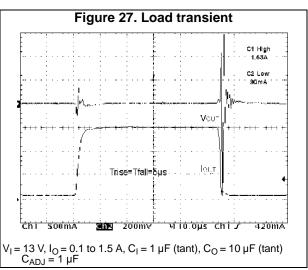






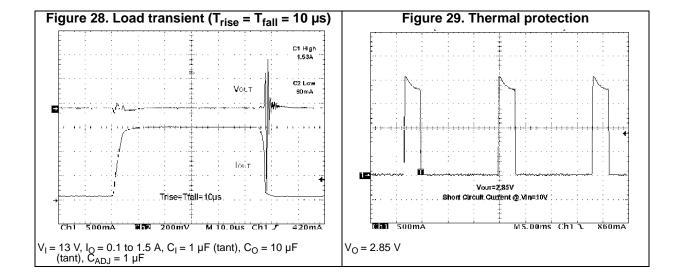






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LD1086 Typical application



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.



LD1086 Package information

7.1 TO-220 (STD-ST dual gauge) type A package information

øΡ H1 D <u>D1</u> L20 L30 *L*[†]1 b1(X3) b (X3) _e1__

Figure 30. TO-220 (STD-ST dual gauge) type A package outline

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0015988_typeA_Rev_T

Table 11. TO-220 (STD-ST dual gauge) type A mechanical data

Dim		mm	
Dim.	Min.	Тур.	Max.
А	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
С	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
е	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
ØP	3.75		3.85
Q	2.65		2.95

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LD1086 Package information

7.2 DPAK package information

Ε THERMAL PAD c2 L2 D₁ <u>L4</u> <u>b(</u>2x) R c SEATING PLANE (L1) *V2* 0,25 0068772_K

Figure 31. DPAK package outline

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Table 12. DPAK mechanical data

Dim		mm	
Dim.	Min.	Тур.	Max.
Α	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
С	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	
е		2.28	
e1	4.40		4.60
Н	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°

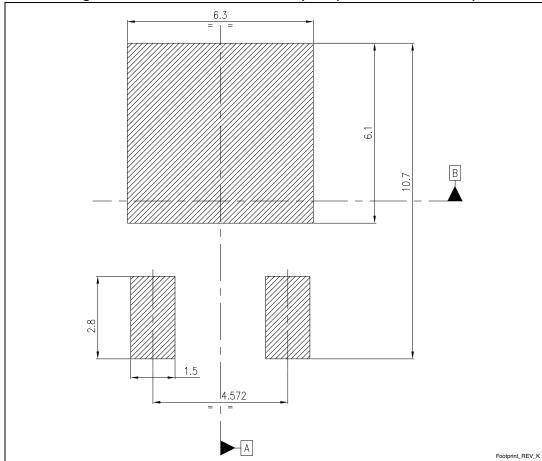


Figure 32. DPAK recommended footprint (dimension are in mm)

7.3 D²PAK (SMD 2L STD-ST) type A package information

SEATING PLANE
COPLANARITY A1

R

GAUGE PLANE
V2

0079457. T

Figure 33. D²PAK (SMD 2L STD-ST) type A package outline



Table 13. D2PAK (SMD 2L STD-ST) type A mechanical data

Dim	mm		
Dim.	Min.	Тур.	Max.
Α	4.40		4.60
A1	0.03		0.23
b	0.70		0.93
b2	1.14		1.70
С	0.45		0.60
c2	1.23		1.36
D	8.95		9.35
D1	7.50		
E	10		10.40
E1	8.50		
е		2.54	
e1	4.88		5.28
Н	15		15.85
J1	2.49		2.69
L	2.29		2.79
L1	1.27		1.40
L2	1.30		1.75
R		0.4	
V2	0°		8°

7.4 D²PAK (SMD 3L STD-ST) type A package information

c2-<u>L1</u> Ď1 Н (3x) b_ THERMAL PAD **b2** (2x) SEATING PLANE A1 COPLANARITY R 0.25 GAUGE PLANE 7106164_E

Figure 34. D²PAK (SMD 3L STD-ST) type A outline



Table 14. D2PAK (SMD 3L STD-ST) type A mechanical data

Dim	mm		
Dim.	Min.	Тур.	Max.
Α	4.40		4.60
A1	0.03		0.23
b	0.70		0.93
b1	0.80		1.30
b2	1.14		1.70
С	0.45		0.60
c2	1.23		1.36
D	8.95		9.35
D1	7.50		
E	10		10.40
E1	8.50		
е		2.54	
e1	4.88		5.28
Н	15		15.85
J1	2.49		2.69
L	2.29		2.79
L1	1.27		1.40
R		0.4	
V2	0°		8°

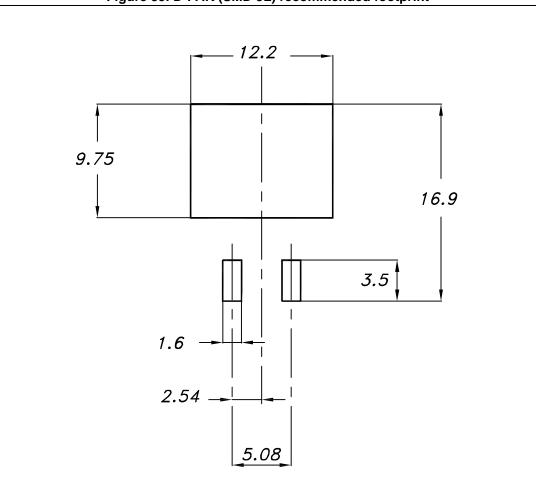


Figure 35. D²PAK (SMD 3L) recommended footprint



LD1086 Package information

7.5 DPAK and D2PAK packing information

Figure 36. DPAK and D2PAK tape outline

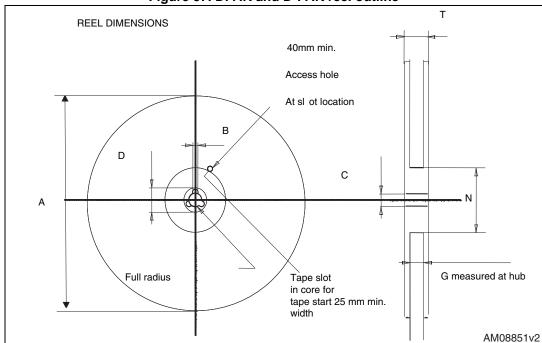


Figure 37. DPAK and D2PAK reel outline

Table 15. DPAK and D2PAK tape and reel mechanical data

	Таре			Reel		
Dim.	m	nm	Dim.	n	ım	
Dim.	Min.	Max.	Julii.	Min.	Max.	
A0	6.8	7	А		330	
В0	10.4	10.6	В	1.5		
B1		12.1	С	12.8	13.2	
D	1.5	1.6	D	20.2		
D1	1.5		G	16.4	18.4	
Е	1.65	1.85	N	50		
F	7.4	7.6	Т		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					
Т	0.25	0.35				
W	15.7	16.3				

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LD1086 Package information

7.6 DFN8 (4x4) package information

BOTTOM VIEW D2 EXPOSED PAD PIN 1 ID -2 E2 - **b** 8x // 0.1 C -A3 SEATING PLANE A1-C ○ 0.08 C LEADS COPLANARITY PIN 1 ID --D/2-TOP VIEW 7869653_B

Figure 38. DFN8 (4x4) package outline

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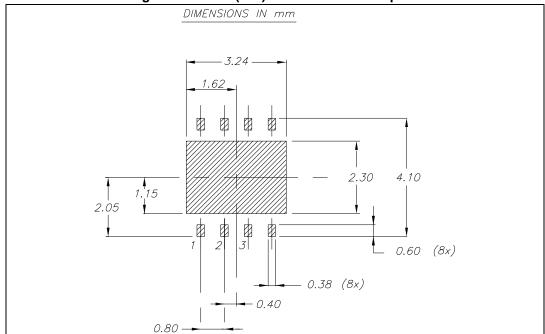
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Table 16. DFN8 (4x4) mechanical data

Dim.		mm.	
Dilli.	Min.	Тур.	Max.
A	0.80	0.90	1
A1	0	0.02	0.05
А3		0,20	
b	0.23	0.30	0.38
D	3.90	4	4.10
D2	2.82	3	3.23
E	3.90	4	4.10
E2	2.05	2.20	2.30
е		0.80	
L	0.40	0.50	0.60

Figure 39. DFN8 (4x4) recommended footprint



7.7 DFN8 (4x4) packing information

-8.0000 - -2.0000 **-**-4.000 0.3000-أـ005 Ø0.6000 5.5000 12.0000 4.3500 -<u>A</u> 1.1000-4.3500 SECTION A - A NOTES 1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2 2. CAMBER IN COMPLIANCE WITH EIA 481 3. POCKET POSITION, RELATIVE TO SPROCKET HOLE MEASURED $A_0 = 4.35$ Ko = 1.1 AS TRUE POSITION OF POCKET, NOT POCKET HOLE Po 4.0±0.1 (II) P₂ 2.0±0.1 (I) 0.30 ±0.05 E1 _1.75±0.1 D1 ø1.5 MIN. \equiv SECTION Y-Y DETAIL 'A' (1) Measured from centreline of sprocket hole to centreline of pocket.
(II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
(III) Measured from centreline of sprocket hole to centreline of pocket.
(IV) Other material available. 4.30 +/- 0.1 1.10 +/- 0.1 Во Κo 5.50 +/- 0.1 8.00 +/- 0.1 12.00 +/- 0.3 7279936

Figure 40. DFN8 (4x4) tape outline (dimension are in mm)

Table 17. DFN8 (4x4) reel mechanical data

Dim.		mm.			inch.	
	Min.	Тур.	Max.	Min.	Тур.	Max.
А			330			12.992
С	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
Т			22.4			0.882



A Note: Drawing not in scale

Figure 41. DFN8 (4x4) reel outline



8 Ordering information

Table 18. Order code

Packages					
TO-220 D²PAK		D²PAK/A	DPAK	DFN8 (4x4)	Output voltages
LD1086V18-DG	LD1086D2T18TR		LD1086DT18TR		1.8 V
			LD1086DT25TR		2.5 V
LD1086V33-DG	LD1086D2T33TR	LD1086D2M33TR	LD1086DT33TR		3.3 V
	LD1086D2T50TR		LD1086DT50TR		5.0 V
	LD1086D2T12TR				12.0 V
LD1086V-DG	LD1086D2TTR	LD1086D2MTR	LD1086DTTR	LD1086PUR	ADJ
LD1086VY ⁽¹⁾			LD1086DTTRY (2)		ADJ
LD1086BV-DG	LD1086BD2TTR	LD1086BD2MTR	LD1086BDTTR		ADJ

^{1.} Automotive grade products.

Revision history LD1086

9 Revision history

Table 19. Document revision history

Date	Revision	Changes	
16-May-2006	14	Order codes updated and new template.	
19-Jan-2007	15	D²PAK mechanical data updated and add footprint data.	
05-Apr-2007	16	Order codes updated.	
07-Jun-2007	17	Order codes updated.	
19-Jul-2007	18	Add note on Figure 2.	
03-Dec-2007	19	Modified: Table 18.	
31-Jan-2008	20	Added new order codes for Automotive grade products.	
18-Feb-2008	21	Modified: Table 18 on page 39.	
14-Jul-2008	22	Modified: Table 1 on page 7 and Table 18 on page 39.	
10-Mar-2010	23	Added: Table 12 on page 26, Figure 30 on page 23, Figure 31 on page 25, Figure 31 and Figure 32 on page 27.	
15-Nov-2010	24	Modified: RthJC value for TO-220 Table 2 on page 7.	
11-Jul-2011	25	Modified: Figure 24, Figure 25 on page 20 and Table 18 on page 39.	
10-Feb-2012	26	Added: order code LD1086V-DG Table 18 on page 39.	
15-Mar-2012	27	Added: new order code LD1086PUR Table 18 on page 39 and new package mechanical data DFN8 (4x4 mm) Table 16 on page 36, Figure 38 on page 35, Figure 39 on page 36, Figure 40 on page 37 and Figure 41 on page 38.	
19-Oct-2012	28	Added: RthJA value for DPAK Table 2 on page 7.	
13-Feb-2013	29	Modified: Output voltage in Voltage reference parameter Table 8 on page 14 and Table 10 on page 16.	
01-Mar-2013	30	Modified: DFN8 (4 x 4) pin configuration Figure 2 on page 6.	
17-Jun-2013	31	Added Table 8: Electrical characteristics of LD1086B# and Section 7.7: DFN8 (4x4) packing information. Updated Section 7: Package information and Table 18: Order code. Minor text changes.	
22-Oct-2013	32	RPN LD1086xx changed to LD1086. Updated the Description in cover page. Cancelled Table 1: Device summary. Updated Figure 2: Pin connections (top view), Section 5: Electrical characteristics, Section 7: Package information and Table 18: Order code. Minor text changes.	
18-Dec-2014	33	Updated Table 6.: Electrical characteristics of LD1086#50, Section 7: Package information and Section 7.7: DFN8 (4x4) packing information. Minor text changes.	
10-Feb-2015	34	Updated Table 18: Order code. Minor text changes.	

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LD1086 Revision history

Table 19. Document revision history (continued)

Date	Revision	Changes
16-Nov-2015	35	Updated Section 7: Package information and Table 18: Order code Minor text changes.
19-Dec-2017	36	Updated T _J value in <i>Table 1: Absolute maximum ratings</i> .

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