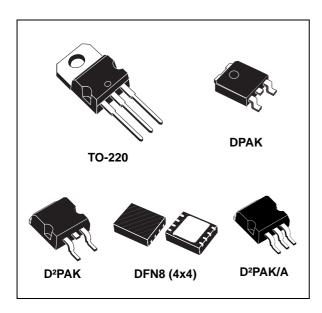


1.5 A adjustable and fixed low drop positive voltage regulator

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

Diagram 1

THERMAL PROTECTION VOUT SC14280

Figure 1. Schematic diagram

Pin configuration LD1086

2 Pin configuration

INPUT INPUT OUTPUT OUTPUT OUTPUT ADJ/GND ADJ/GND TO-220 D²PAK INPUT ⊐ INPUT OUTPUT OUTPUT ADJ/GND ADJ/GND CS00890 **DPAK** D²PAK/A 0 1 NC 8 IN IN NC 2 7 OUTPUT ADJ/GND 3 6 NC 5 NC NC 4 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 _{OP}	Operating junction temperature range	-40 to +125	°C

Note:

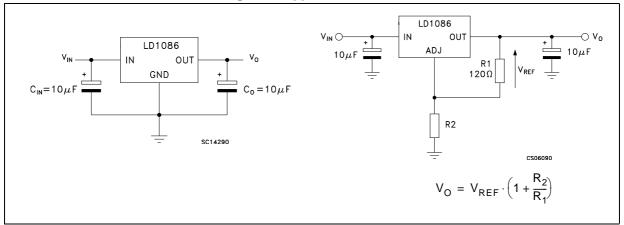
Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 2. Thermal data

Symbol	Parameter	TO-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



5 Electrical characteristics

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

Table 3. Electrical characteristics of LD1086#18

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
\ <u>/</u>	Output voltage (1)	I _O = 0 mA, T _J = 25 °C	1.782	1.8	1.818	V
Vo	Output voltage (*)	$I_O = 0$ to 1.5 A, $V_I = 3.4$ to 30 V	1.764	82	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
4)/	Lood regulation	I _O = 0 to 1.5 A, T _J = 25 °C		82	8	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 ≤ 30 V		5	10	mA
-	Oh ant airea it assument	$V_I - V_O = 5 V$	1.5	2		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 condition	Min.	Тур.	Max.	Unit
V	Output voltage ⁽¹⁾	$I_O = 0$ mA, $T_J = 25$ °C	2.475	2.5	2.525	V
VO	Output voltage V	$I_O = 0$ 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
4)/	Load regulation	$I_{O} = 0$ to 1.5 A, $T_{J} = 25$ °C		0.5	8	mV
Δνο	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 ≤ 30 V		5	10	mA
ΔV _O ΔV _O V _d I _q SVR SVR	Short circuit current	V _I - V _O = 5 V	1.5	2		Α
'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	$f = 120 \text{ Hz}, C_O = 25 \mu\text{F}, I_O = 1.5 \text{ A}$ $V_I = 7.5 \pm 3 \text{ V}$	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 condition	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 voltage (**)	$I_O = 0$ to 1.5 A, $V_I = 4.9$ to 30 V	3.234	71	V	
ΔV_{O}	Line regulation	$I_O = 0$ mA, $V_I = 4.9$ to 18 V, $T_J = 25$ °C		0.5	6	mV
		$I_O = 0$ mA, $V_I = 4.9$ to 18 V		1	6	mV
41/	Load regulation	I _O = 0 to 1.5 A, T _J = 25 °C	3.267 3.3 3 3.234 3.3 3 0.5 1 1 7 1.3 5 1.5 2 0.05 0.2 0.008 60 79 0.003 0.5	10	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
	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		0.008	0.04	%/W
SVR	Supply voltage rejection	f = 120 Hz, C_O = 25 $\mu F, I_O$ = 1.5 A V_I = 8.3 \pm 3 V	60	79		dB
eN	RMS output noise voltage (% of V _O)	$T_A = 25 ^{\circ}\text{C}$, 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 condition	Min.	Тур.	Max.	Unit
\/	Output voltage (1)	I _O = 0 mA, T _J = 25 °C	4.95	5	5.05	V
v _O	Output voltage V	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 mA, V _I = 6.6 to 20 V		1	10	mV
V _O Or AV _O Lin ΔV _O Lin ΔV _O Lin V _d Dr I _q Qr I _{sc} Sr Tr SVR Sr eN Ri (%) S Te	Load regulation	I _O = 0 to 1.5 A, T _J = 25 °C		5	20	mV
	Load regulation	I _O = 0 to 1.5 A		10	35	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
	Short circuit current	$V_I - V_O = 5 V$	1.5	2		Α
'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 \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 condition	Min.	Тур.	Max.	Unit
\/	Output voltage ⁽¹⁾	I _O = 0 mA, T _J = 25 °C	11.88	12	12.12	V
$\begin{array}{c} V_{O} \\ \\ \Delta V_{O} \\ \\ \Delta V_{O} \\ \\ V_{d} \\ \\ I_{q} \\ \\ I_{sc} \\ \\ \\ SVR \\ \\ eN \\ \\ S \\ \end{array}$	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		1	25	mV
		$I_O = 0 \text{ mA}, V_I = 13.8 \text{ to } 25 \text{ V}$		2	25	mV
41/	Load regulation	$I_{O} = 0$ to 1.5 A, $T_{J} = 25$ °C		12	36	mV
V_{O} O ΔV_{O} C C ΔV_{O} C	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 ≤ 30 V		5	10	mA
,		$V_I - V_O = 5 V$	1.5	2		Α
Isc	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 μ 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 condition	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
ΔVO	Line regulation	$I_O = 10 \text{ mA}, V_I = 2.8 \text{ to } 16.5 \text{ V},$ $T_J = 25 \text{ °C}$		0.015	0.2	%
$\begin{array}{c} V_{ref} \\ \\ \Delta V_{O} \\ \\ V_{d} \\ \\ I_{O(min)} \\ \\ I_{sc} \\ \\ \\ SVR \\ \\ I_{ADJ} \\ \\ \Delta I_{ADJ} \\ \\ eN \\ \\ S \\ \end{array}$	_	$I_O = 10 \text{ mA}, V_I = 2.8 \text{ to } 16.5 \text{ V}$		0.035	0.2	%
V_{ref} F ΔV_O F ΔV_O F ΔV_O F	Load regulation	I_{O} = 10 mA to 1.5 A, T_{J} = 25 °C		0.1	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 V		3	10	mA
	Oh ant airea it assument	$V_I - V_O = 5 V$	1.5	2.3		Α
ISC	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 \text{ Hz}, C_O = 25 \mu\text{F}, C_{ADJ} = 25 \mu\text{F}, \\ I_O = 1.5 \text{ A}, V_I = 6.25 \pm 3 \text{ V} $	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 condition	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
$\begin{array}{c} V_{ref} \\ \\ \Delta V_{O} \\ \\ V_{d} \\ \\ I_{O(min)} \\ \\ I_{sc} \\ \\ \\ SVR \\ \\ I_{ADJ} \\ \\ \Delta I_{ADJ} \\ \\ eN \\ \\ S \\ \end{array}$	Line regulation	$I_O = 10 \text{ mA}, V_I = 2.8 \text{ to } 16.5 \text{ V},$ $T_J = 25 ^{\circ}\text{C}$		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		I_{O} = 10 mA to 1.5 A, T_{J} = 25 °C		0.1	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 V		3	10	mA
	Short circuit current	$V_I - V_O = 5 V$	1.5	2.3		Α
V _{ref} V _{ref} V _{ref} V _{ref} V _o V _o	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		60	88		dB
I _{ADJ}	Adjust pin current	$V_{I} = 4.25 \text{ V}, I_{O} = 10 \text{ mA}$		40	120	μΑ
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.



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 condition	Min.	Тур.	Max.	Unit
V	Reference voltage ⁽¹⁾	I _O = 10 mA T _A = 25 °C	1.237	1.25	1.263	V
V _{ref}	Reference voltage V	$I_O = 10 \text{ mA to } 1.5 \text{ A}, V_I = 2.85 \text{ to } 30 \text{ V}$	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	I Chartaineit access	V _I - V _O = 5 V, T _A = 25 °C	1.5	2.3		Α
I _{sc} S	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		60	88		dB
I _{ADJ}	Adjust pin current	V _I = 4.25 V, I _O = 10 mA		40	120	μΑ
ΔI_{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		%

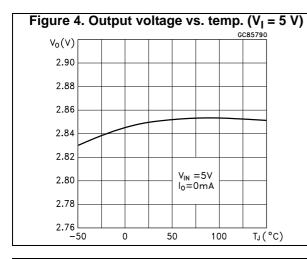
^{1.} See short-circuit current curve for available output current at fixed dropout.



LD1086 Typical application

6 Typical application

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



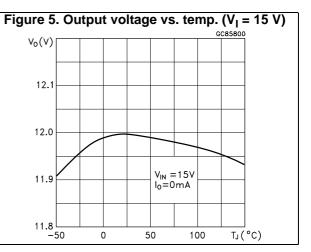


Figure 6. Output voltage vs. temperature
(V_I = 4.25 V)

V₀(V)

1.26

1.24

1.22

V_{IN} = 4.25V

I₀=10mA

1.20

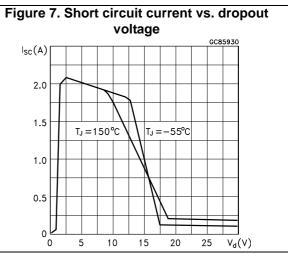
-50

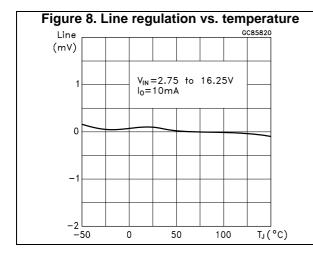
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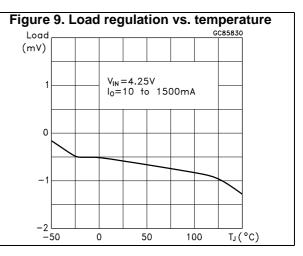
50

100

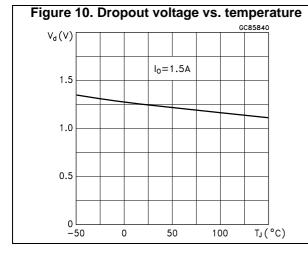
T_J(°C)

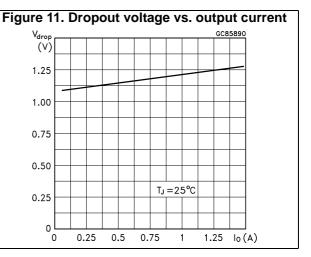


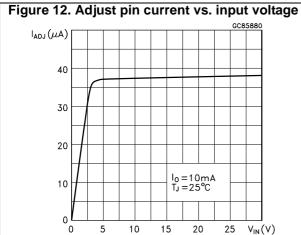


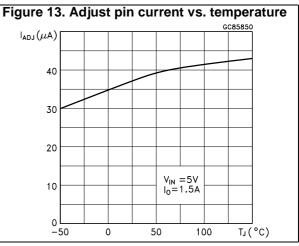


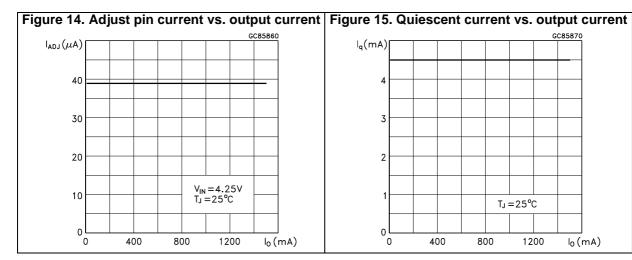
Typical application LD1086

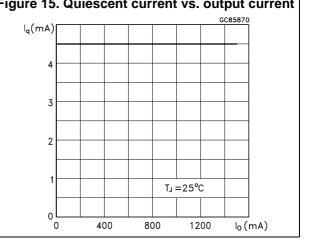








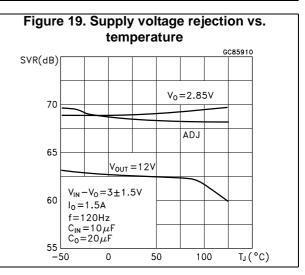


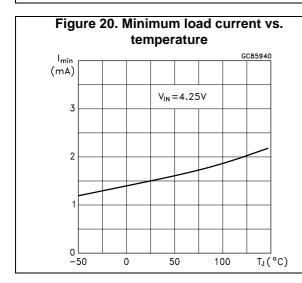


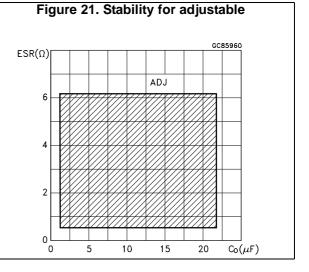
LD1086 Typical application

Figure 17. Supply voltage rejection vs. output current GC85950 SVR(dB) ADJ 70 $V_0 = 2.85V$ 65 $V_0 = 12V$ $V_{IN} - V_{O} = 3 \pm 1.5 V$ 60 $I_0=1.5A$ f=120Hz $C_{IN} = 10 \mu F$ $C_0 = 20 \mu F$ 1000 1250 lo(mA) 250 750 500

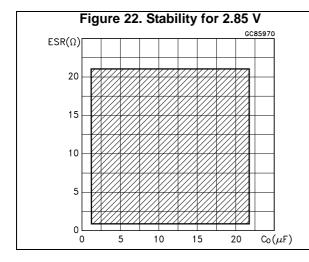
Figure 18. Supply voltage rejection vs. frequency SVR(dB) 80 ADJ 2.85 500mVpp 60 120 40 $V_{IN} = (V_0 + 3.5V) \pm 1.5V$ $I_0 = 1.5A$ $T_J = 25^{\circ}C$ 20 $C_{IN} = 10 \mu F$ $C_{O} = 20 \mu F$ 100 1000 10000 f(KHz)

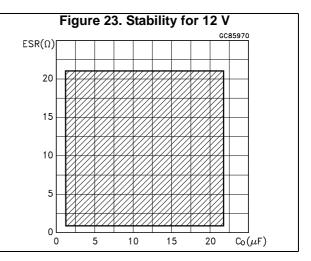


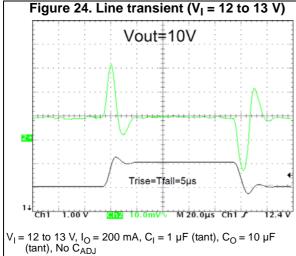


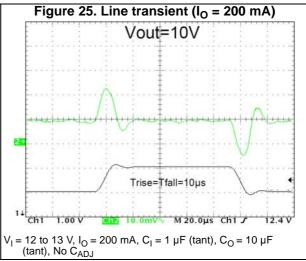


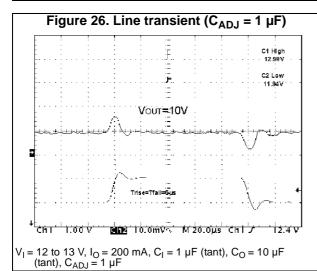
Typical application LD1086

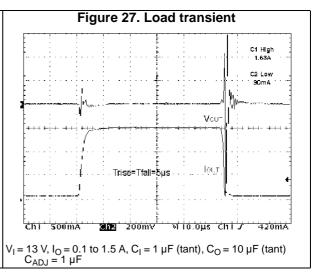




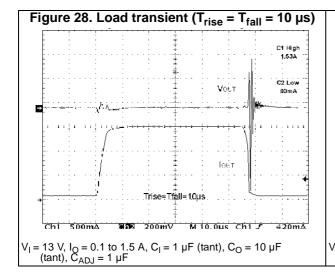


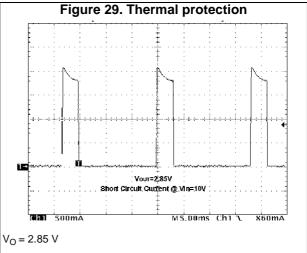






LD1086 Typical application





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.



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

Figure 30. TO-220 (STD-ST dual gauge) type A package outline øΡ H1 L20 L30 <u>L</u>1 b1(X3) b (X3)

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	
Е	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

7.2 TO-220 (STD-ST single gauge) package information

øΡ F Ξ Γ [3 J1 Gate Note 9-10 С b (x3) e1 8174627_revD

Figure 31. TO-220 (STD-ST single gauge) package outline

Table 12. TO-220 (STD-ST single gauge) mechanical data

D:		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
E	10		10.40
е	2.40		2.70
e1	4.95		5.15
F	0.51		0.60
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

7.3 DPAK package information

E -THERMAL PAD c2 L2 D 1 <u>L4</u> <u>b(</u>2x) R С SEATING PLANE *A2* (L1) *V2* GAUGE PLANE 0068772_K

Figure 32. DPAK package outline

Table 13. DPAK mechanical data

Dim.		mm	
Dim.	Min.	Тур.	Max.
А	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	
Е	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°

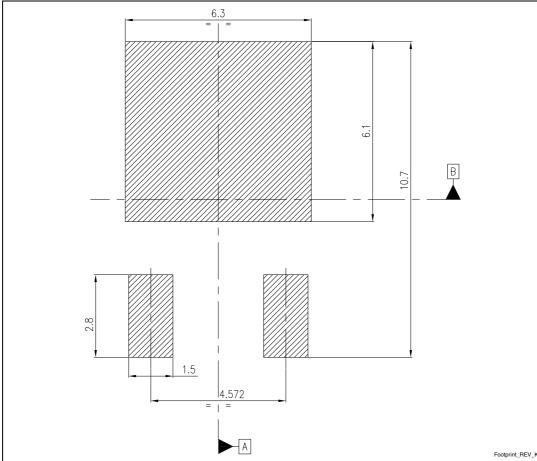


Figure 33. DPAK recommended footprint^(a)

a. All dimensions are in millimeters

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

SEATING PLANE
COPLANARITY A1

GALCE PLANE
V2

0079457. T

Figure 34. D2PAK (SMD 2L STD-ST) type A package outline

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Table 14. D²PAK (SMD 2L STD-ST) type A mechanical data

D:		mm	
Dim.	Min.	Тур.	Max.
А	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°

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

c2-(3x) b_ THERMAL PAD -**b2** (2x) SEATING PLANE A1 COPLANARITY 0.25 GAUGE PLANE 7106164_E

Figure 35. D²PAK (SMD 3L STD-ST) type A drawing

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Table 15. D²PAK (SMD 3L STD-ST) type A mechanical data

Dim	,	mm	
Dim.	Min.	Тур.	Max.
А	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°

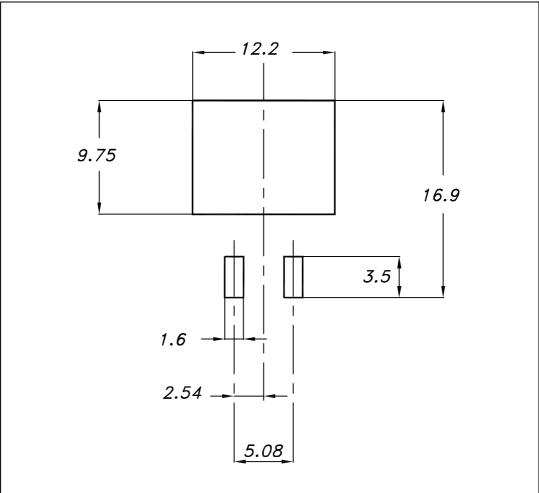


Figure 36. D²PAK (SMD 3L) footprint recommended

7.6 DPAK and D2PAK packing information

Figure 37. DPAK and D2PAK tape outline

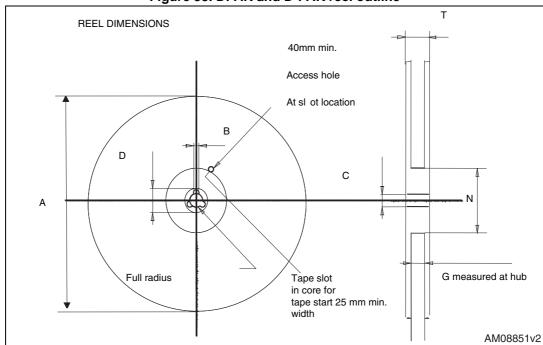


Figure 38. DPAK and D2PAK reel outline

Table 16. DPAK and D2PAK tape and reel mechanical data

Таре				Reel	
Dim.	n	nm	Dim.	mm	nm
Dilli.	Min.	Max.	Dilli.	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			

7.7 DFN8 (4x4) package information

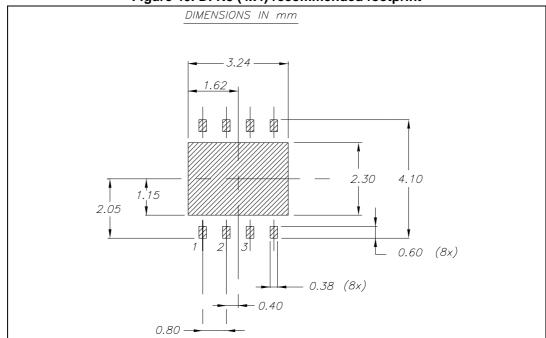
BOTTOM VIEW D2 -EXPOSED PAD PIN 1 ID -E2 - b 8x // 0.1 C -*A3* SEATING PLANE ○ 0.08 C LEADS COPLANARITY PIN 1 ID -**-**D/2→ TOP VIEW 7869653_B

Figure 39. DFN8 (4x4) package outline

Table 17. DFN8 (4x4) mechanical data

Dim.		mm.	
	Min.	Тур.	Max.
А	0.80	0.90	1
A1	0	0.02	0.05
A3		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 40. DFN8 (4x4) recommended footprint



7.8 DFN8 (4x4) packing information

-8,0000 - 2.0000 **-**-4.000¢ 0.3000-ڑے005∤ Ø0.6000 5.5000 12,0000 4.3500 1.1000--4.3500 <u>Section A - A</u> NOTES: 1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2 4,35 4,35 1,1 2. CABER IN COMPLIANCE WITH EIA 481
3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED
AS TRUE POSITION OF POCKET, NOT POCKET HOLE P₂ 2.0±0.1 (I) Po 4.0±0.1 (II) 0.30 ±0.05 E1 -1.75±0.1 \oplus $\widehat{\underline{\mathbb{B}}}$ SECTION Y-Y DETAIL 'A' 4.30 +/- 0.1 Во 4.30 +/- 0.1 1.10 +/- 0.1 Measured from centreline of sprocket hole to centreline of pocket. Cumulative tolerance of 10 sprocket holes is ± 0.20 . Measured from centreline of sprocket hole to centreline of pocket. Other material available. (1) (II) 8.00 +/- 0.1 12.00 +/- 0.3 (III) Р1 7279936 (IV)

Figure 41. DFN8 (4x4) tape outline (dimension are in mm)

Table 18. 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 D C C Note: Drawing not in scale

Figure 42. DFN8 (4x4) reel outline

LD1086 Order codes

8 Order codes

Table 19. Order codes

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

^{1.} TO-220 Dual Gauge frame.

^{2.} Automotive grade products.

Revision history LD1086

9 Revision history

Table 20. 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 19.
31-Jan-2008	20	Added new order codes for Automotive grade products.
18-Feb-2008	21	Modified: Table 19 on page 41.
14-Jul-2008	22	Modified: Table 1 on page 7 and Table 19 on page 41.
10-Mar-2010	23	Added: Table 12 on page 26, Figure 30 on page 23, Figure 31 on page 25, Figure 32 and Figure 33 on page 29.
15-Nov-2010	24	Modified: R _{thJC} value for TO-220 <i>Table 2 on page 7</i> .
11-Jul-2011	25	Modified: Figure 24, Figure 25 on page 20 and Table 19 on page 41.
10-Feb-2012	26	Added: order code LD1086V-DG Table 19 on page 41.
15-Mar-2012	27	Added: new order code LD1086PUR Table 19 on page 41 and new package mechanical data DFN8 (4x4 mm) Table 17 on page 38, Figure 39 on page 37, Figure 40 on page 38, Figure 41 on page 39 and Figure 42 on page 40.
19-Oct-2012	28	Added: R _{thJA} value for DPAK <i>Table 2 on page 7</i> .
13-Feb-2013	29	Modified: Output voltage in Voltage reference parameter <i>Table 8 on page 14</i> and <i>Table 10 on page 16</i> .
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 7.8: DFN8 (4x4) packing information. Updated Section 7: Package information and Table 19: Order codes. 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 19: Order codes. Minor text changes.
18-Dec-2014	33	Updated Table 6.: Electrical characteristics of LD1086#50, Section 7: Package information and Section 7.8: DFN8 (4x4) packing information. Minor text changes.
10-Feb-2015	34	Updated <i>Table 19: Order codes</i> . Minor text changes.

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