

## 1.5 A low drop positive voltage regulator adjustable and fixed

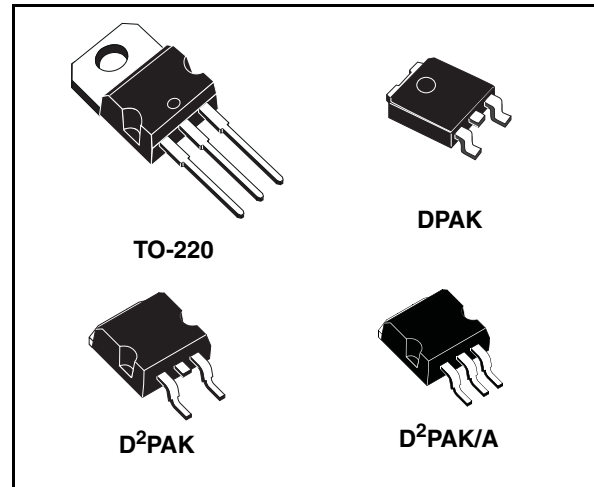
### Features

- Typical dropout 1.3 V at 1.5 A
- Three terminal adjustable or fixed output voltage 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V
- Automotive Grade product: adjustable  $V_{OUT}$  only in TO-220 and DPAK packages
- Guaranteed output current up to 1.5A
- Output tolerance  $\pm 1\%$  at 25 °C and  $\pm 2\%$  in full temperature range
- Internal power and thermal limit
- Wide operating temperature range -40 °C to 125 °C
- Package available: TO-220, D<sup>2</sup>PAK, D<sup>2</sup>PAK/A, DPAK
- Pinout compatibility with standard adjustable VREG

### Description

The LD1086 is a low drop voltage regulator able to provide 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 the older 3-terminal adjustable regulators, but has better performances in term of drop and output tolerance.

A 2.85 V output version is suitable for SCSI-2 active termination. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1086 quiescent current flows into



the load, so increase efficiency. Only a 10  $\mu$ F minimum capacitor is need for stability. The device is supplied in TO-220, D<sup>2</sup>PAK, D<sup>2</sup>PAK/A and DPAK. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within  $\pm 1\%$  at 25 °C.

The LD1086 is available as Automotive Grade in TO-220 and DPAK packages, for the option of adjustable output voltage whose commercial Part Numbers are shown in the [Table 17](#) (order codes). These devices are qualified according to the specification AEC-Q100 of the Automotive market, in the temperature range -40 °C to 125 °C, and the statistical tests PAT, SYL, SBL are performed.

**Table 1. Device summary**

Part numbers		
LD1086XX	LD1086XX18	LD1086XX50
LD1086XX12	LD1086XX25	
LD1086XX15	LD1086XX33	

### 3 Maximum ratings

**Table 2. 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 3. Thermal data**

Symbol	Parameter	TO-220	D <sup>2</sup> PAK D <sup>2</sup> PAK/A	DKPAK	Unit
$R_{thJC}$	Thermal resistance junction-case	3	3	8	°C/W
$R_{thJA}$	Thermal resistance junction-ambient	50	62.5		°C/W

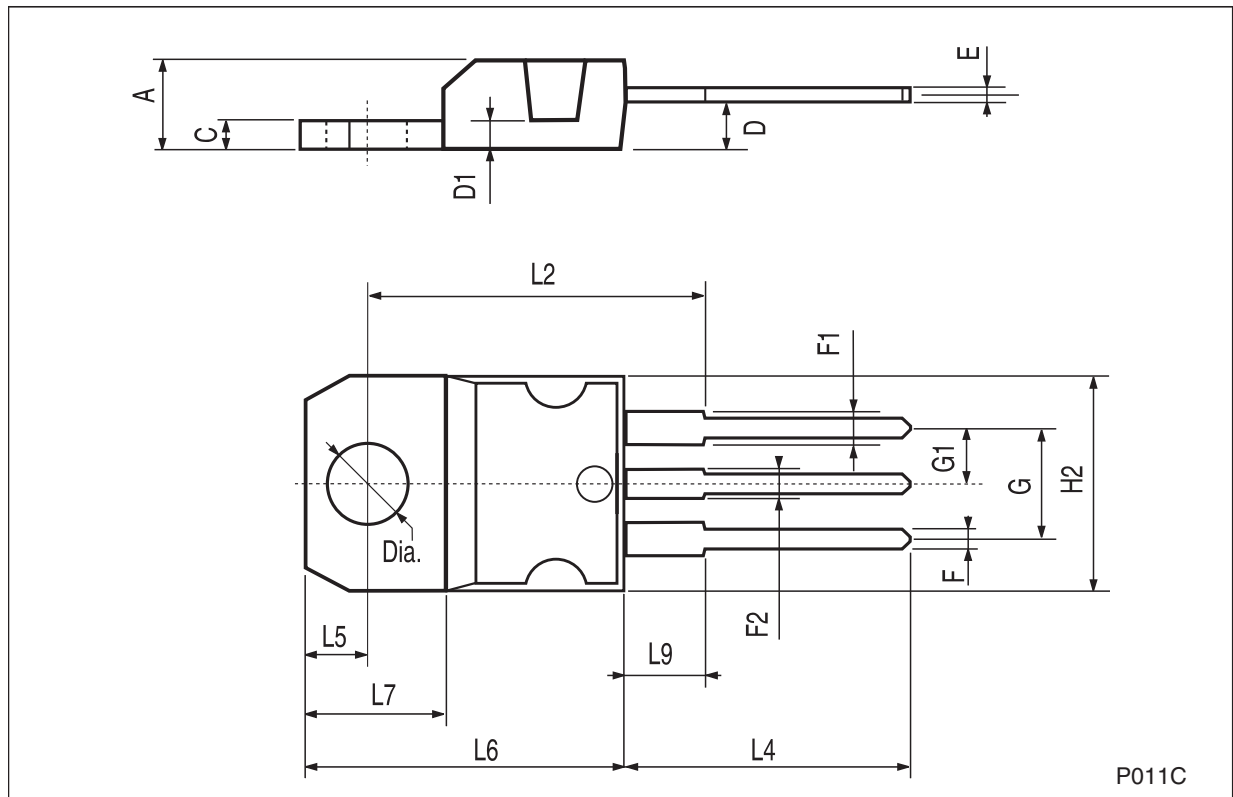
**Table 11. Electrical characteristics of LD1086#**  
 ( $V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\ \mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified).

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_O$	Output voltage <sup>(1)</sup>	$I_O = 10\text{mA}$ , $T_J = 25^\circ\text{C}$	1.237	1.25	1.263	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
$\Delta V_O$	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	%
$\Delta V_O$	Load Regulation	$I_O = 10\text{mA to }1.5\text{A}$ , $T_J = 25^\circ\text{C}$		0.1	0.3	%
		$I_O = 0\text{ to }1.5\text{A}$		0.2	0.4	%
$V_d$	Dropout Voltage	$I_O = 1.5\text{A}$		1.3	1.5	V
$I_{O(\text{min})}$	Minimum Load Current	$V_I = 30\text{V}$		3	10	mA
$I_{\text{sc}}$	Short Circuit Current	$V_I - V_O = 5\text{V}$	1.5	2.3		A
		$V_I - V_O = 25\text{V}$	0.05	0.2		A
	Thermal Regulation	$T_A = 25^\circ\text{C}$ , 30ms pulse		0.01	0.04	%/W
SVR	Supply Voltage Rejection	$f = 120\text{ Hz}$ , $C_O = 25\ \mu\text{F}$ , $C_{\text{ADJ}} = 25\ \mu\text{F}$ , $I_O = 1.5\text{A}$ , $V_I = 6.25 \pm 3\text{V}$	60	88		dB
$I_{\text{ADJ}}$	Adjust Pin Current	$V_I = 4.25\text{V}$ , $I_O = 10\ \text{mA}$		40	120	$\mu\text{A}$
$\Delta I_{\text{ADJ}}$	Adjust Pin Current Change <sup>(1)</sup>	$I_O = 10\text{mA to }1.5\text{A}$ , $V_I = 2.8\text{ to }16.5\text{V}$		0.2	5	$\mu\text{A}$
eN	RMS Output Noise Voltage (% of $V_O$ )	$T_A = 25^\circ\text{C}$ , $f = 10\text{Hz to }10\text{kHz}$		0.003		%
S	Temperature Stability			0.5		%
S	Long Term Stability	$T_A = 125^\circ\text{C}$ , 1000Hrs		0.5		%

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

**TO-220 mechanical data**

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



## 8 Order codes

Table 17. Order codes

Packages				
TO-220	D <sup>2</sup> PAK	D <sup>2</sup> PAK/A	DPAK	Output voltage
	LD1086D2T15R		LD1086DT15R	1.5 V
LD1086V18	LD1086D2T18TR		LD1086DT18TR	1.8 V
	LD1086D2T25TR		LD1086DT25TR	2.5 V
LD1086V33	LD1086D2T33TR	LD1086D2M33TR	LD1086DT33TR	3.3 V
	LD1086D2T50TR		LD1086DT50TR	5.0 V
	LD1086D2T12TR			12.0 V
LD1086V	LD1086D2TTR	LD1086D2MTR	LD1086DTTR	ADJ
LD1086VY <sup>(1)</sup>			LD1086DTTRY <sup>(1)</sup>	ADJ

1. Automotive Grade products.