

## FEATURES

- Second source to Linear Technology
- Low dropout performance
- Fixed models @ 3.3V, 5V, 12V
- Adjustable output down to 1.2V
- Line regulation typically 0.015%/V
- Load regulation typically 0.01%
- Standard 3-terminal, TO-3 packages or cost effective TO-220 packages
- MIL-temperature performance

## DESCRIPTION

The LT1086 voltage regulators are monolithic integrated circuits designed for use in applications requiring a well regulated positive output voltage with low input-output differential voltage requirements. Outstanding features include full power usage up to 1.5A of load current, internal current limiting and thermal shutdown. Safe area protection on the die is also included, providing protection of the series pass Darlington under most operating conditions. Hermetically sealed TO-3 packages are utilized for high reliability and low thermal resistance. TO-220 packages are available for cost effective applications.

## DEVICE SELECTION GUIDE

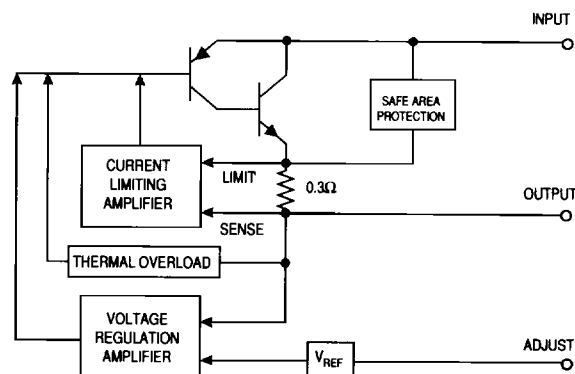
DEVICE	OPERATING JUNCTION TEMPERATURE RANGE	PACKAGE
LT1086MK-3.3 LT1086MK-5 LT1086MK-12 LT1086MK (ADJ)	MILITARY	TO-3
LT1086CK-3.3 LT1086CK-5 LT1086CK-12 LT1086CK (ADJ)	COMMERCIAL	
LT1086CT-3.3 LT1086CT-5 LT1086CT12 LT1086CT (ADJ)		TO-220

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Maximum	Units
Input Voltage Transient <sup>(1)</sup>	$V_{IN}$	30	V
Operating Input Voltage <sup>(1)</sup>		25	
Power Dissipation	$P_D$	Internally Limited <sup>(2)</sup>	W
Thermal Resistance Junction to Case TO - 3 Control / Power	$\theta_{JC}$	1.7 / 4.0	°C/W
TO-220 Control / Power		1.5 / 4.0	
Operating Junction Temperature Range Military Control Military Power	$T_J$	-55 to 150	°C
Commercial Control Commercial Power		0 to 125 0 to 150	
Storage Temperature Range		$T_{STG}$	
Lead Temperature (Soldering) 60 Sec. for TO-3 10 Sec. for TO-220	$T_{LEAD}$	300	
		260	

- (1) In case of short circuit, with input-output voltages approaching  $V_{INmax}$ , regulator may require the cycling of input voltage to recover.
- (2) Although power dissipation is internally limited, these specifications are applicable for power dissipations of 30 Watts and is only achievable over a limited range of  $V_{IN}-V_{OUT}$

## BLOCK DIAGRAM



## ELECTRICAL CHARACTERISTICS

Unless otherwise specified, Military  $V_{IN}-V_{OUT} = 1.5V$  to  $35V$ ; Commercial  $V_{IN} - V_{OUT} = 1.5V$  to  $30V$ , or the maximum input, whichever is less;  $I_O = 10mA$  to  $1.5A$

PARAMETER	SYMBOL	Test Conditions <sup>(1)</sup>			Test Limits			UNITS
		$V_{IN} - V_{OUT}$	$I_O$	$T_J^{(6)}$	MIN	TYP	MAX	
Output Voltage <sup>(2)</sup> Fixed Voltage	$V_O$	$V_O + 3V$	10 mA	25	.99 vo	%	1.01 vo	V
				Over Temp.	.98 vo		1.02 vo	
Reference Voltage <sup>(2)</sup> Adj Voltage	$V_{REF}$	$V_O + 3V$	10 mA	25	1.238	1.250	1.262	
				Over Temp.	1.225		1.270	
Line Regulation <sup>(2)</sup>	$REG_{(LINE)}$	1.5 to 15V	10 mA	25		0.015	0.2	%
				Over Temp.		0.035		
Load Regulation <sup>(2)</sup>	$REG_{(LOAD)}$	3		25		0.1	0.3	
				Over Temp.		0.2	0.4	
Dropout Voltage $\Delta V_{OUT}, \Delta V_{REF} = 1\%$	$V_D$			Over Temp.		1.3	1.5	V
Current Limit	$I_{CL}$	5V			1.5	1.6	2.5	A
		25V			0.05	0.10		
Quiescent Current	$I_Q$					5	10	mA
Thermal Regulation <sup>(3)</sup>	$REG_{(THERM)}$			25		0.002	0.01	%/ W
Adjust Pin Current	$I_{PIN}$					55		$\mu A$
Adjust Pin Current Change	$\Delta I_{PIN}$						120	
Temperature Stability	$T_S$	5V	0.5A	Over Temp.		0.2	5	%
Minimum Load Current	$I_O$	25V				0.5		%
RMS Output Noise <sup>(4)</sup>	$V_N$			25		.003		$\%V_O$
Ripple Rejection Ratio <sup>(5)</sup>	$R_A$	3V	1.5A	Over Temp.	60	72		dB

NOTE: Nominal output voltages are specified under Device Selection Guide.

- (1) Although power dissipation is internally limited, these specifications are applicable for power dissipations of 15 Watts and is only achievable over a limited range of  $V_{IN}-V_{OUT}$
- (2) Low duty cycle pulse testing with Kelvin connections required. Changes in output voltage due to heating effects are covered under the specification for thermal regulation.
- (3) 30ms pulse
- (4) Bandwidth of 10Hz to 10kHz.
- (5) 120Hz input ripple, 15V = 54B Min.;  $C_{OUT}$  & ( $C_{ADJ}$  for ADJ) = 25  $\mu F$
- (6) Over Temp. = over specified operating junction temperature range.