

DESCRIPTION

The LM1086 is designed to provide 1.5A with higher efficiency than currently available devices. All internal circuitry is designed to operate down to 1V input to output differential and the dropout voltage is fully specified as a function of load current. Dropout is guaranteed at a maximum of 1.5V at maximum output current, decreasing at lower load currents. On-chip trimming adjusts the reference output voltage to 1%. Current limit is also trimmed, minimising the stress on both the regulator and power source circuitry under overload conditions.

The LM1086 is pin compatible with older 3 terminal adjustable regulators. A 10 μ F output capacitor is required on these new devices; however, this is usually included in most regulator designs.

Unlike PNP regulators, where up to 10% of the output current is wasted as quiescent current, the LM1086 quiescent current flows into the load, increasing efficiency.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

Parameter	Output Voltage	Test Conditions	Min.	Typ.	Max.	Unit
V _O Output Voltage	5	V _{IN} = 6.5 to 20V I _O = 0 to 1.5A T _J = -55 to 150°C	4.90	5	5.10	V
	12	V _{IN} = 13.5V to 25V I _O = 0 to 1.5A T _J = -55 to 150°C	11.76	12	12.24	
V _{REF} Reference Voltage	ADJ.	V _{IN} - V _{OUT} = 1.5 to 15V I _O = 10mA to 1.5A T _J = -55 to 150°C	1.225	1.25	1.270	
REG _(LINE) Line Regulation	5	V _{IN} = 6.5 to 20V I _O = 0 T _J = -55 to 150°C		0.5	10	mV
	12	V _{IN} = 13.5 to 25V I _O = 0 T _J = -55 to 150°C		1	25	
	ADJ.	V _{IN} - V _{OUT} = 1.5 to 15V I _{LOAD} = 10mA T _J = -55 to 150°C		0.015	0.2	%
REG _(LOAD) Load Regulation See notes 1,2	5	V _{IN} = 8V I _O = 0 to 1.5A T _J = -55 to 150°C		5	20	mV
	12	V _{IN} = 15V I _O = 0 to 1.5A T _J = -55 to 150°C		12	36	
	ADJ.	V _{IN} - V _{OUT} = 3V I _O = 10mA to 1.5A T _J = -55 to 150°C		0.1	0.3	%
V _D Dropout Voltage See note 3	5	Δ V _{OUT} = 50mV I _{OUT} = 1.5A T _J = -55 to 150°C		1.3	1.5	V
	12	Δ V _{OUT} = 120mV I _{OUT} = 1.5A T _J = -55 to 150°C		1.3	1.5	
	ADJ.	Δ V _{REF} = 1% I _{OUT} = 1.5A T _J = -55 to 150°C		1.3	1.5	

ELECTRICAL CHARACTERISTICS ($T_J = -55$ to $+150^\circ\text{C}$ unless otherwise stated)

Parameter	Output Voltage	Test Conditions		Min.	Typ.	Max.	Unit	
I_{CL}	Current Limit	$V_{IN} - V_{OUT} = 5\text{V}$	$T_J = -55$ to 150°C	1.5	1.6	2.5	A	
		$V_{IN} - V_{OUT} = 25\text{V}$	$T_J = -55$ to 150°C	0.075	0.15			
I_Q	Quiescent Current	5	$V_{IN} \leq 20\text{V}$	$T_J = -55$ to 150°C		5	mA	
		12	$V_{IN} \leq 25\text{V}$	$T_J = -55$ to 150°C		5		
	Minimum Load Current ⁴	ADJ.	$V_{IN} - V_{OUT} = 25\text{V}$	$T_J = -55$ to 150°C		5	10	
$REG_{(THERM)}$	Thermal Regulation		$T_P = 30\text{ms}$	$T_A = 25^\circ\text{C}$		0.008	0.04	%/W
R_A	Ripple Rejection	5	$T_J = -55$ to 150°C	$V_{IN} = 8\text{V}$	60	68	dB	
		12	$C_{OUT} = 25\mu\text{F}$ Tantalum $f = 120\text{Hz}$ $I_O = 1.5\text{A}$	$V_{IN} = 15\text{V}$	54	60		
		ADJ.		$V_{IN} - V_{OUT} = 3\text{V}$ $C_{ADJ} = 25\mu\text{F}$	60	75		
I_{PIN}	Adjust Pin Current		$T_J = -55$ to 150°C			55	120	μA
ΔI_{PIN}	Adjust Pin Current Change		$V_{IN} - V_{OUT} = 1.5$ to 15V $I_O = 10\text{mA}$ to 1.5A	$T_J = -55$ to 150°C		0.2	5	μA
T_S	Temperature Stability		$T_J = -55$ to 150°C		0.5		%	
	Long Term Stability		$T_A = 125^\circ\text{C}$	$T = 1000$ Hrs		0.3	1	%
V_N	RMS Output Noise		$f = 10\text{Hz}$ to 10kHz	$T_A = 25^\circ\text{C}$		0.003		%
$R_{\theta JC}$	Thermal Resistance		Control Circuitry		TBA		$^\circ\text{C/W}$	
	Junction – Case		Power Transistor		TBA			

Notes:

- See thermal regulation specifications for changes in output voltage due to heating effects. Load and line regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead $\approx 1/8$ " from the package.
- Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the input - output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input - output voltage range.
- Dropout voltage is specified over the full output current range of the device.
- Minimum load current is defined as the minimum output current required to maintain regulation. At 25V input-output differential the device is guaranteed to regulate if the output current is greater than 10mA.