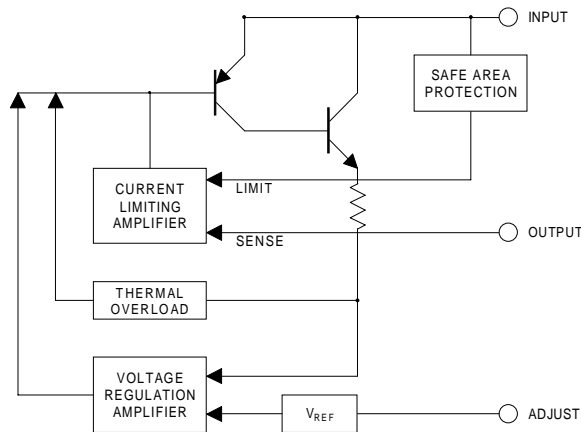


3 AMP POSITIVE VOLTAGE REGULATOR

FEATURES

- Low Dropout Performance
- Fixed or Adjustable Voltages
- Fixed Output Voltages of 3.3V, 5V & 12V
- Adjustable Output Voltage Range From 1.2V
- Line Regulation 0.015% / V Typical.
- Load Regulation 0.01% Typical.
- Available in Hermetically Sealed TO-3, SMD1 and TO-257 (isolated & non-isolated) Packages.
- Military Temperature Range (-55 to +150°C)



DESCRIPTION

The LT1085 voltage regulators are monolithic integrated circuits designed for use in applications requiring a well regulated positive output voltage with low input-output differential voltage.

Features include full power usage of up to 3A load current, internal current limiting and thermal shutdown. Safe area protection on the die is also included, providing protection of the series pass Darlington transistor under most conditions. The hermetically sealed packages are utilised for high reliability and low thermal resistance, whilst the SMD1 package is also designed for surface mount applications.

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C unless otherwise stated)

Parameter	Description	TO-3	TO-257	Control	Power	Value
V _{IN}	Input - Output Voltage Differential					35V
P _D	Power Dissipation					Internally limited *
R _{θJC}	Thermal Resistance Junction To Case	TO-3	TO-3	Control	Power	0.93°C / W 3.0°C / W
R _{θJC}	Thermal Resistance Junction To Case	SMD1	SMD1	Control	Power	0.79°C / W 4.0°C / W
R _{θJC}	Thermal Resistance Junction To Case	TO-257	TO-257	Control	Power	0.79°C / W 4.0°C / W
T _J	Operating Junction Temperature Range					-55 to 150°C -55 to 200°C
T _{STG}	Storage Temperature Range					-65 to 150°C
T _{LEAD}	Lead Temperature (for 10 sec.)					300°C

* These ratings are only applicable for power dissipations of 28 Watts over a limited range of V_{IN} - V_{OUT}.

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise stated) **ALL VARIANTS EXCEPT IG**

The ♦ denotes specification is applicable over full operating temperature range.

Parameter	Output Voltage	Test Conditions	Min.	Typ.	Max.	Unit
V_O Output Voltage ^{3,4,6}	3.3V	$V_{IN} = 5V, I_{OUT} = 0, T_J = 25^\circ\text{C}$ (K Pack)	3.270	3.300	3.333	V
		$4.8V \leq V_{IN} \leq 15V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$ ♦	3.235	3.300	3.365	
	5.0V	$V_{IN} = 8V, I_{OUT} = 0, T_J = 25^\circ\text{C}$ (K Pack)	4.950	5.000	5.050	V
		$6.5V \leq V_{IN} \leq 20V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$ ♦	4.900	5.000	5.100	
	12V	$V_{IN} = 15V, I_{OUT} = 0, T_J = 25^\circ\text{C}$ (K Pack)	11.88	12.00	12.12	V
		$13.5V \leq V_{IN} \leq 25V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$ ♦	11.76	12.00	12.24	
V_{REF} Reference Voltage ⁴	ADJ.	$(V_{IN} - V_{OUT}) = 3V, I_{OUT} = 10mA, T_J = 25^\circ\text{C}$	1.238	1.250	1.262	V
		$1.5V \leq (V_{IN} - V_{OUT}) \leq 25V, 10mA \leq I_{OUT} \leq I_{MAXLOAD}$ ♦	1.225	1.250	1.270	
$REG_{(LINE)}$ Line Regulation ^{2,3}	3.3V	$4.8V \leq V_{IN} \leq 15V, I_{OUT} = 0, T_J = 25^\circ\text{C}$		0.5	6	mV
		$4.8V \leq V_{IN} \leq 15V, I_{OUT} = 0$ ♦		1.0	6	
	5.0V	$6.5V \leq V_{IN} \leq 20V, I_{OUT} = 0, T_J = 25^\circ\text{C}$		0.5	10	mV
		$6.5V \leq V_{IN} \leq 20V, I_{OUT} = 0$ ♦		1.0	10	
	12V	$13.5V \leq V_{IN} \leq 25V, I_{OUT} = 0, T_J = 25^\circ\text{C}$		1.0	25	mV
		$13.5V \leq V_{IN} \leq 25V, I_{OUT} = 0$ ♦		2.0	25	
	ADJ.	$1.5V \leq (V_{IN} - V_{OUT}) \leq 15V, I_{LOAD} = 10mA, T_J = 25^\circ\text{C}$		0.015	0.2	%
		$1.5V \leq (V_{IN} - V_{OUT}) \leq 15V, I_{LOAD} = 10mA$ ♦		0.035	0.2	
$15V \leq (V_{IN} - V_{OUT}) \leq 35V$ ♦			0.050	0.5		
$REG_{(LOAD)}$ Load Regulation ^{2,3,4}	3.3V	$V_{IN} = 5V, 0 \leq I_{OUT} \leq 3A, T_J = 25^\circ\text{C}$		3	15	mV
		$V_{IN} = 5V, 0 \leq I_{OUT} \leq 3A$ ♦		7	20	
	5.0V	$V_{IN} = 8V, 0 \leq I_{OUT} \leq I_{MAXLOAD}, T_J = 25^\circ\text{C}$		5	20	mV
		$V_{IN} = 8V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$ ♦		10	35	
	12V	$V_{IN} = 15V, 0 \leq I_{OUT} \leq I_{MAXLOAD}, T_J = 25^\circ\text{C}$		12	36	mV
		$V_{IN} = 15V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$ ♦		24	72	
ADJ.	$(V_{IN} - V_{OUT}) = 3V, 10mA \leq I_{OUT} \leq I_{MAXLOAD}, T_J = 25^\circ\text{C}$		0.1	0.3	%	
	$(V_{IN} - V_{OUT}) = 3V, 10mA \leq I_{OUT} \leq I_{MAXLOAD}$ ♦		0.2	0.4		
V_D Dropout Voltage ⁵	3.3V	$\Delta V_{OUT} = 33mV, I_{OUT} = I_{MAXLOAD}$	♦	1.3	1.5	V
	5.0V	$\Delta V_{OUT} = 50mV, I_{OUT} = I_{MAXLOAD}$	♦	1.3	1.5	
	12V	$\Delta V_{OUT} = 120mV, I_{OUT} = I_{MAXLOAD}$	♦	1.3	1.5	
	ADJ.	$\Delta V_{OUT} = 1\%V, I_{OUT} = I_{MAXLOAD}$	♦	1.3	1.5	

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise stated) **LT1085IG VARIANT**

The ♦ denotes specification is applicable over full operating temperature range.

Parameter	Output Voltage	Test Conditions	Min.	Typ.	Max.	Unit		
V_O Output Voltage ^{3,4,6}	3.3V	$V_{IN} = 5V, I_{OUT} = 0, T_J = 25^\circ\text{C}$ (K Pack)		3.270	3.300	3.333	V	
		$4.8V \leq V_{IN} \leq 15V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$	♦	3.235	3.300	3.365		
	5.0V	$V_{IN} = 8V, I_{OUT} = 0, T_J = 25^\circ\text{C}$ (K Pack)		4.950	5.000	5.050	V	
		$6.5V \leq V_{IN} \leq 20V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$	♦	4.900	5.000	5.100		
	12V	$V_{IN} = 15V, I_{OUT} = 0, T_J = 25^\circ\text{C}$ (K Pack)		11.88	12.00	12.12	V	
		$13.5V \leq V_{IN} \leq 25V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$	♦	11.76	12.00	12.24		
V_{REF} Reference Voltage ⁴	ADJ.	$(V_{IN} - V_{OUT}) = 3V, I_{OUT} = 10\text{mA}, T_J = 25^\circ\text{C}$		1.231	1.250	1.268	V	
		$1.5V \leq (V_{IN} - V_{OUT}) \leq 25V, 10\text{mA} \leq I_{OUT} \leq I_{MAXLOAD}$	♦	1.219	1.250	1.281		
$REG_{(LINE)}$ Line Regulation ^{2,3}	3.3V	$4.8V \leq V_{IN} \leq 15V, I_{OUT} = 0, T_J = 25^\circ\text{C}$			0.5	6	mV	
		$4.8V \leq V_{IN} \leq 15V, I_{OUT} = 0$	♦		1.0	6		
	5.0V	$6.5V \leq V_{IN} \leq 20V, I_{OUT} = 0, T_J = 25^\circ\text{C}$			0.5	10	mV	
		$6.5V \leq V_{IN} \leq 20V, I_{OUT} = 0$	♦		1.0	10		
	12V	$13.5V \leq V_{IN} \leq 25V, I_{OUT} = 0, T_J = 25^\circ\text{C}$			1.0	25	mV	
		$13.5V \leq V_{IN} \leq 25V, I_{OUT} = 0$	♦		2.0	25		
	ADJ.		$1.5V \leq (V_{IN} - V_{OUT}) \leq 15V, I_{LOAD} = 10\text{mA}, T_J = 25^\circ\text{C}$			0.015	0.2	%
			$1.5V \leq (V_{IN} - V_{OUT}) \leq 15V, I_{LOAD} = 10\text{mA}$	♦		0.035	0.2	
$15V \leq (V_{IN} - V_{OUT}) \leq 35V$			♦		0.050	0.5		
$REG_{(LOAD)}$ Load Regulation ^{2,3,4}	3.3V	$V_{IN} = 5V, 0 \leq I_{OUT} \leq 3A, T_J = 25^\circ\text{C}$			3	15	mV	
		$V_{IN} = 5V, 0 \leq I_{OUT} \leq 3A$	♦		7	20		
	5.0V	$V_{IN} = 8V, 0 \leq I_{OUT} \leq I_{MAXLOAD}, T_J = 25^\circ\text{C}$			5	20	mV	
		$V_{IN} = 8V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$	♦		10	35		
	12V	$V_{IN} = 15V, 0 \leq I_{OUT} \leq I_{MAXLOAD}, T_J = 25^\circ\text{C}$			12	36	mV	
		$V_{IN} = 15V, 0 \leq I_{OUT} \leq I_{MAXLOAD}$	♦		24	72		
	ADJ.		$(V_{IN} - V_{OUT}) = 3V, 10\text{mA} \leq I_{OUT} \leq I_{MAXLOAD}, T_J = 25^\circ\text{C}$			0.7	1.25	%
			$(V_{IN} - V_{OUT}) = 3V, 10\text{mA} \leq I_{OUT} \leq I_{MAXLOAD}$	♦		0.8	1.65	
V_D Dropout Voltage ⁵	3.3V	$\Delta V_{OUT} = 33\text{mV}, I_{OUT} = I_{MAXLOAD}$	♦		1.3	1.5	V	
	5.0V	$\Delta V_{OUT} = 50\text{mV}, I_{OUT} = I_{MAXLOAD}$	♦		1.3	1.5		
	12V	$\Delta V_{OUT} = 120\text{mV}, I_{OUT} = I_{MAXLOAD}$	♦		1.3	1.5		
	ADJ	$\Delta V_{OUT} = 1\%V, I_{OUT} = I_{MAXLOAD}$	♦		1.3	1.5		

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise stated)

The ♦ denotes specification is applicable over full operating temperature range.

Parameter	Output Voltage	Test Conditions		Min.	Typ.	Max.	Unit
I_L Current Limit	3.3V	$V_{IN} = 8V$	♦	3.2	4.0		A
	5.0V	$V_{IN} = 10V$	♦	3.2	4.0		
	12V	$V_{IN} = 17V$	♦	3.2	4.0		
	ADJ.	$(V_{IN}-V_{OUT}) = 5V$ $(V_{IN}-V_{OUT}) = 25V$	♦	3.2	4.0		
I_Q Quiescent/MinLoad Current	3.3V	$V_{IN} = 18V$	♦		5.0	10.0	mA
	5.0V	$V_{IN} \leq 20V$	♦		5.0	10.0	
	12V	$V_{IN} \leq 25V$	♦		5.0	10.0	
	ADJ.	$(V_{IN}-V_{OUT}) = 25V$	♦		5.0	10.0	
I_{PIN} Adjust Pin Current		Over Full Operating Temperature Range	♦			120	μA
ΔI_{PIN} Adjust Pin Current Change	ADJ.	$1.5V \leq (V_{IN} - V_{OUT}) \leq 25V, 10\text{mA} \leq I_{OUT} \leq I_{MAXLOAD}$	♦		0.2	5.0	
Thermal Regulation	ALL	$T_A = 25^\circ\text{C}, 30\text{ms Pulse}$			0.004	0.020	%/W
Ripple Rejection ⁴	3.3V	$V_{IN} = 6.3V, f = 120\text{Hz}, C_{OUT}=25\mu\text{F}, I_{OUT} = 3A$	♦	60	72		dB
	5.0V	$V_{IN} = 8V, f = 120\text{Hz}, C_{OUT}=25\mu\text{F}, I_{OUT} = 3A$	♦	60	68		
	12V	$V_{IN} = 15V, f = 120\text{Hz}, C_{OUT}=25\mu\text{F}, I_{OUT} = 3A$	♦	54	60		
	ADJ.	$(V_{IN}-V_{OUT}) = 3V, f = 120\text{Hz}, C_{OUT}=25\mu\text{F}, C_{ADJ}=25\mu\text{F}, I_{OUT} = I_{MAXLOAD}$	♦	60	75		
Temperature Stability	ALL	Over Full Operating Temperature Range	♦		0.5		%
Long Term Stability	ALL	$T_A = 125^\circ\text{C}, 1000 \text{Hours}$			0.3	1.0	%
RMS Output Noise (% of V_{OUT})	ALL	$T_A = 25^\circ\text{C}, 10\text{Hz} \leq f \leq 10\text{kHz}$			0.003		%

Note 1 : Absolute Maximum Rating area those values beyond which the life of a device may be impaired.

Note 2 : 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.

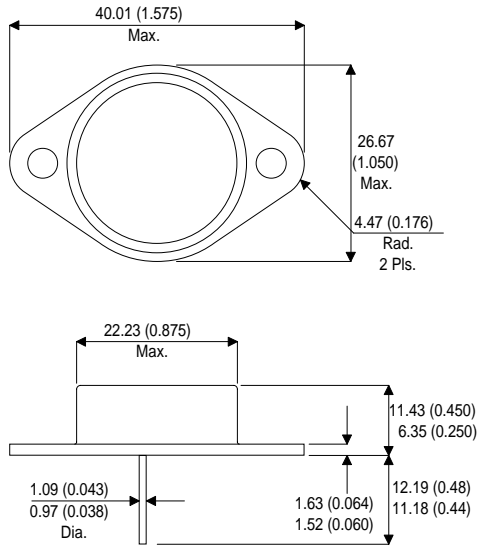
Note 3 : Line and load regulation are guaranteed up to the maximum power dissipation of 30W. Power dissipation is determined by the input/output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Note 4 : $I_{MAXLOAD}$ curve is defined as the minimum value of current limit as a function of input to output voltage. Note that the 30W power dissipation for the LT1085 series is only achievable over a limited range of input to output.voltage.

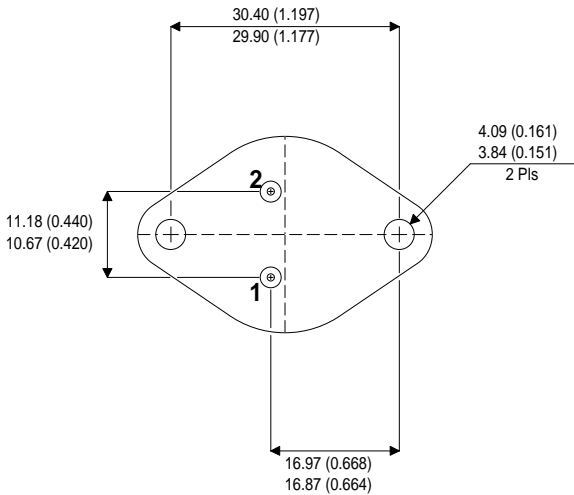
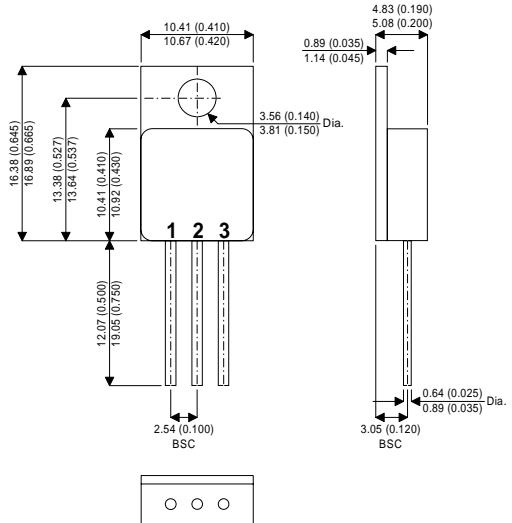
Note 5 : Dropout voltage is specified over the full output current range of the device.

Note 6 : Full load current is not available at all input-output voltages. See Notes 3, 4,

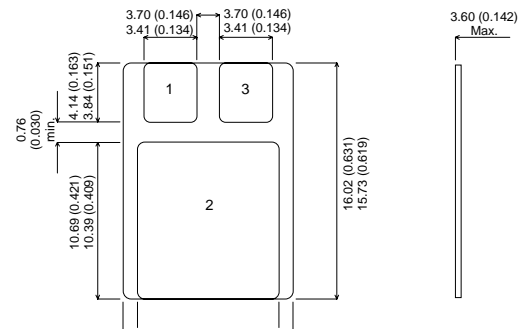
K Package (TO-3)



G & IG Packages (TO-257)



SMD1 PACKAGE



LT1085

Pin	Fixed	Adjustable
1	COMMON	ADJUST
2	INPUT	INPUT
Case is OUTPUT		

LT1085SMD

Pin	Fixed	Adjustable
1	COMMON	ADJUST
2	OUTPUT	OUTPUT
3	INPUT	INPUT

LT1085G

Pin	Fixed	Adjustable
1	COMMON	ADJUST
2	OUTPUT	OUTPUT
3	INPUT	INPUT
Case is OUTPUT		

LT1085IG

Pin	Fixed	Adjustable
1	COMMON	ADJUST
2	OUTPUT	OUTPUT
3	INPUT	INPUT
Case is ISOLATED		

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.