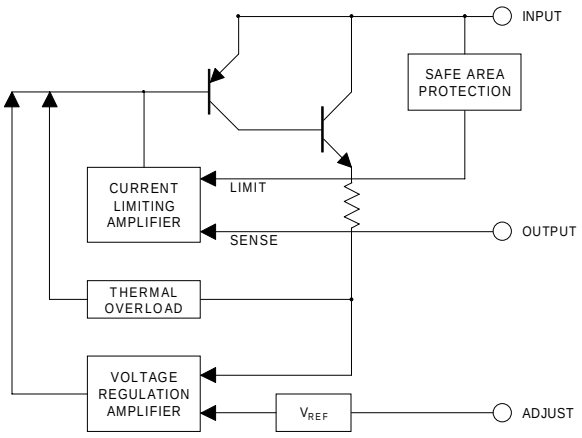
LT1085
LT1085G
LT1085IG
LT1085SMD

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)**

DEVICE(1)	PACKAGE
LT1085K–XX	TO–3
LT1085G–XX	TO–257
LT1085IG–XX	Isolated TO–257
LT1085SMD–XX	SMD1

Note

1) –XX = Voltage Option: 3.3, 5 or 12
–XX = Left blank for Adjustable Option.

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)

V_{IN}	Input – Output Voltage Differential			35V
P_D	Power Dissipation			Internally limited *
$R_{\theta JC}$	Thermal Resistance Junction To Case	TO–3	Control	0.93°C / W
		TO–3	Power	3.0°C / W
$R_{\theta JC}$	Thermal Resistance Junction To Case	SMD1	Control	0.79°C / W
		SMD1	Power	4.0°C / W
$R_{\theta JC}$	Thermal Resistance Junction To Case	TO–257	Control	0.79°C / W
		TO–257	Power	4.0°C / W
T_J	Operating Junction Temperature Range		Control	–55 to 150°C
			Power	–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 $V_{IN} – V_{OUT}$.

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

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

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ELECTRICAL CHARACTERISTICS (T_A = 25°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	♦	3.2	4.0		
		(V_{IN}-V_{OUT}) = 25V	♦	0.2	0.5		
I_Q Quiescient/MinLoad Current	3.3V	V_{IN} = 18V	♦		5.0	10.0	mA
	5.0V	V_{IN} ≤ 20V	♦		5.0	10.0	
	12V	V_{IN} ≤ 25V	♦		5.0	10.0	
	ADJ.	(V_{IN}-V_{OUT}) = 25V	♦		5.0	10.0	
I_{PIN} Adjust Pin Current	ADJ.	Over Full Operating Temperature Range	♦			120	µA
ΔI_{PIN} Adjust Pin Current Change		1.5V ≤(V_{IN} - V_{OUT})≤ 25V, 10mA ≤ I_{OUT} ≤ $I_{MAXLOAD}$	♦		0.2	5.0	
Thermal Regulation	ALL	T_A = 25°C, 30ms Pulse			0.004	0.020	%/W
Ripple Rejection[4]	3.3V	V_{IN} = 6.3V, f = 120Hz, C_{OUT}=25µF, I_{OUT} = 3A	♦	60	72		dB
	5.0V	V_{IN} = 8V, f = 120Hz, C_{OUT}=25µF, I_{OUT} = 3A	♦	60	68		
	12V	V_{IN} = 15V, f = 120Hz, C_{OUT}=25µF, I_{OUT} = 3A	♦	54	60		
	ADJ.	(V_{IN}-V_{OUT}) = 3V, f = 120Hz, C_{OUT}=25µF, C_{ADJ}=25µF, I_{OUT} = IMAXLOAD ,	♦	60	75		
Temperature Stability	ALL	Over Full Operating Temperature Range	♦		0.5		%
Long Term Stability	ALL	T_A = 125°C, 1000 Hours			0.3	1.0	%
RMS Output Noise (% of V_{OUT})	ALL	T_A = 25°C, 10Hz ≤ f ≤ 10kHz			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,

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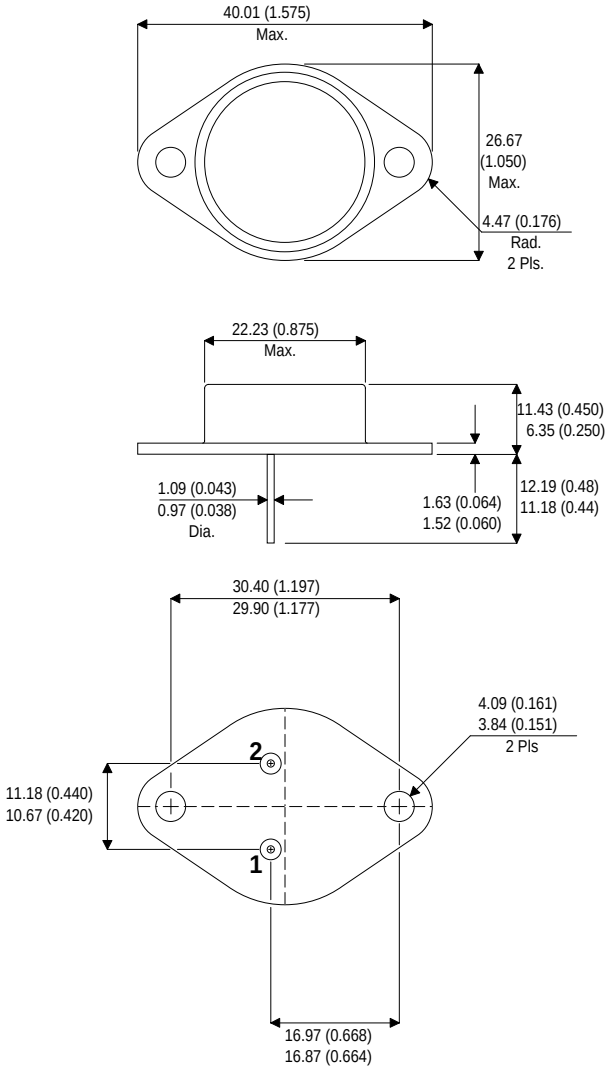
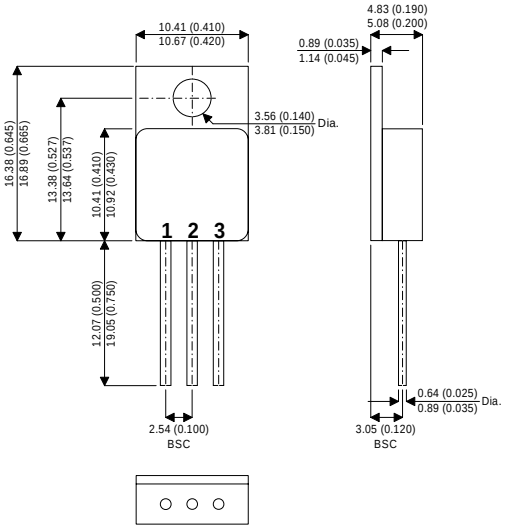
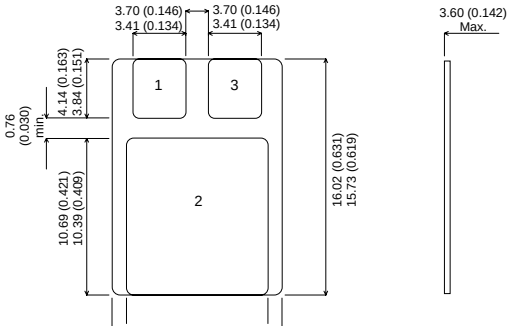
K Package (TO–3)



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		

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