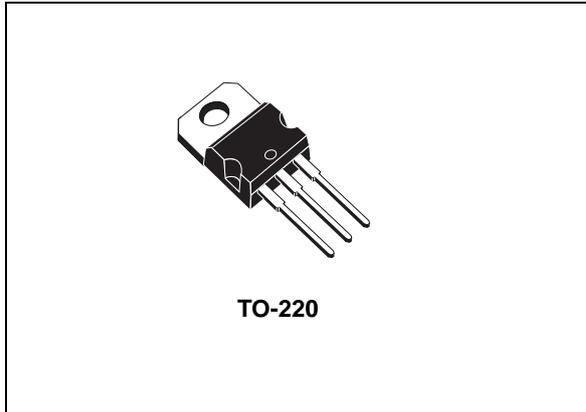


Three-terminal 3 A adjustable voltage regulators

Datasheet - production data



Features

- Output current: 3 A
- Internal current and thermal limiting
- Typical output impedance: 0.01 Ω
- Minimum input voltage: 7.5 V
- Power dissipation: 30 W

Description

The LM323 are three-terminal positive voltage regulators with a preset 5 V output and a load driving capability of 3 A. New circuit design and processing techniques are used to provide the high output current without sacrificing the regulation characteristics of lower current devices.

The 3 A regulator is virtually blowout proof.

Current limiting, power limiting and thermal shut-down provide high level of reliability. An overall worst case specification for the combined effects of input voltage, load current, ambient temperature, and power dissipation ensure that the LM323 will perform satisfactorily as a system element.

Table 1. Device summary

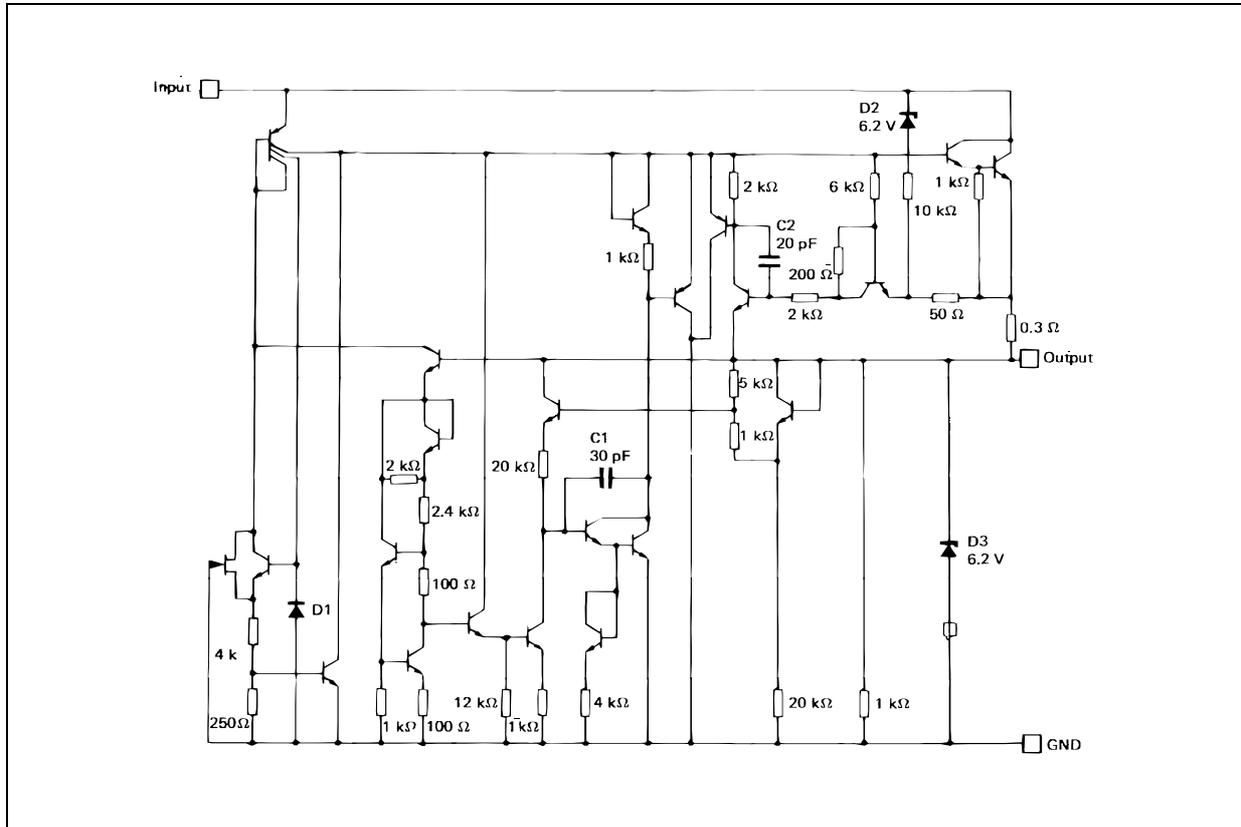
TO-220	Temperature range
LM323T	0°C to 125°C

Contents

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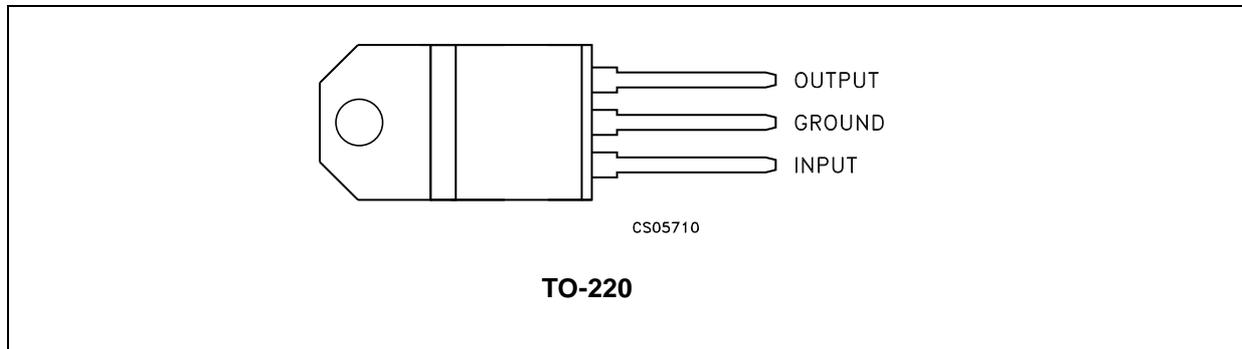
1 Diagram

Figure 1. Schematic diagram



2 Pin configuration

Figure 2. Pin connections (tot view)



3 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_I	Input voltage	20	V
I_O	Output current	Internally limited	
P_D	Power dissipation	Internally limited	
T_{STG}	Storage temperature range	-65 to 150	°C
T_{OP}	Operating junction temperature range	0 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	Value	Unit
R_{thJC}	Thermal resistance junction-case	3	°C/W
R_{thJA}	Thermal resistance junction-ambient	50	°C/W

4 Electrical characteristics

Table 4. Electrical characteristics ($T_J = 0$ to 125 °C, unless otherwise specified ⁽¹⁾)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage range	$T_J = 25^\circ\text{C}$, $V_I = 7.5\text{ V}$, $I_O = 0$	4.8	5	5.2	V
V_O	Output voltage range	$T_J = T_{\min}$ to T_{\max} , $P \leq P_{\max}$ $V_I = 7.5$ to 15 V , $I_O = 0$ to 3 A	4.75		5.25	V
K_{VI}	Line regulation ⁽²⁾	$V_I = 7.5$ to 15 V , $T_J = 25^\circ\text{C}$		5	25	mV
K_{VO}	Load regulation ⁽²⁾	$I_O = 0$ to 3 A , $V_I = 7.5\text{ V}$, $T_J = 25^\circ\text{C}$		25	100	mV
I_{IB}	Quiescent current	$V_I = 7.5$ to 15 V , $I_O = 0$ to 3 A		12	20	mA
V_{NO}	Output noise voltage	$T_J = 25^\circ\text{C}$, $f = 10\text{ Hz}$ to 100 kHz		40		μV_{RMS}
I_{OS}	Short circuit current limit	$V_I = 15\text{ V}$, $T_J = 25^\circ\text{C}$		3	4.5	A
		$V_I = 7.5\text{ V}$, $T_J = 25^\circ\text{C}$		4	5	
K_{VH}	Long term stability				35	mV

1. Although power dissipation is internally limited, specifications apply only for $P \leq 30\text{ W}$.
2. Load and line regulation are specified at constant junction temperature. Pulse testing is required with a pulse width $\leq 1\text{ ms}$ and duty cycle $\leq 5\%$.

5 Typical characteristics

Figure 3. Output noise voltage

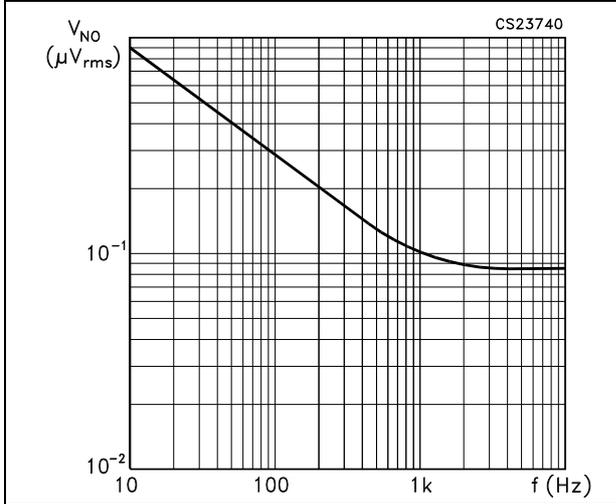


Figure 4. Output impedance

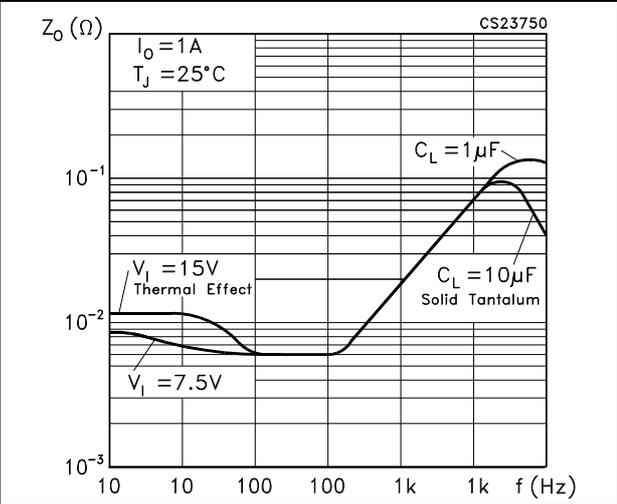


Figure 5. Peak available output current

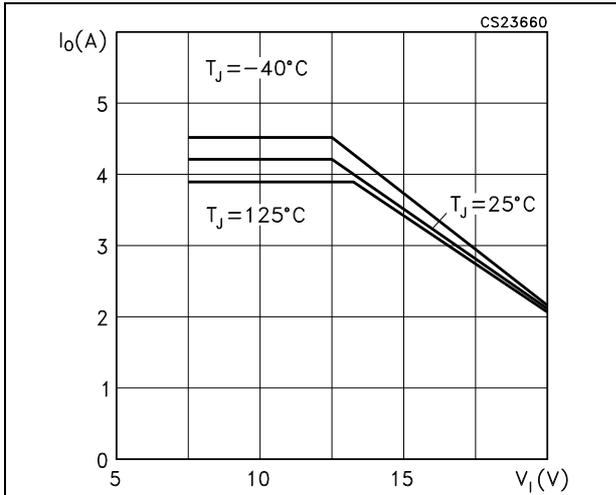


Figure 6. Short circuit current

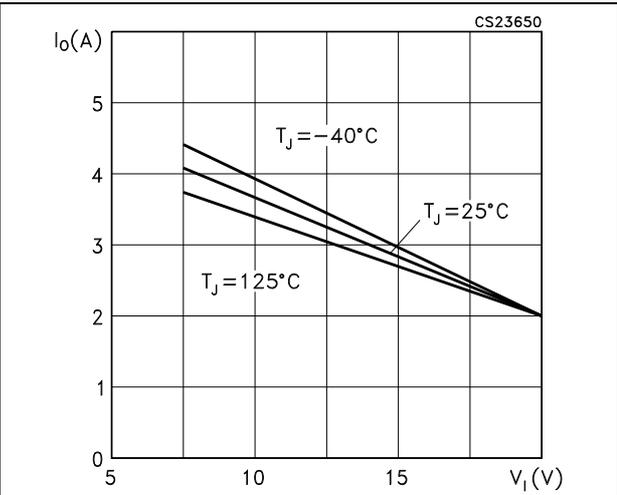


Figure 7. Ripple rejection

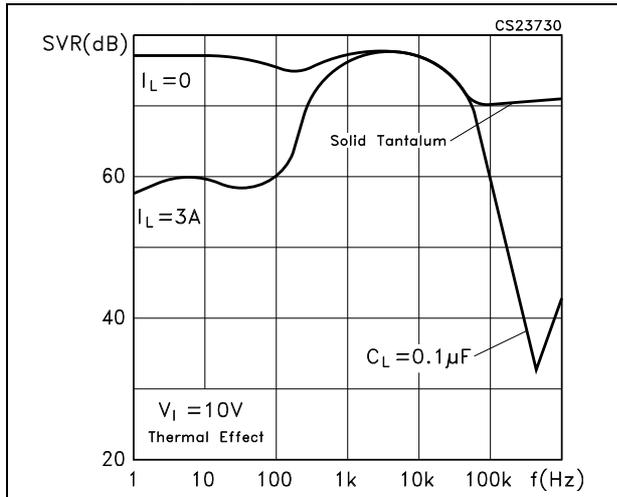


Figure 8. Dropout voltage

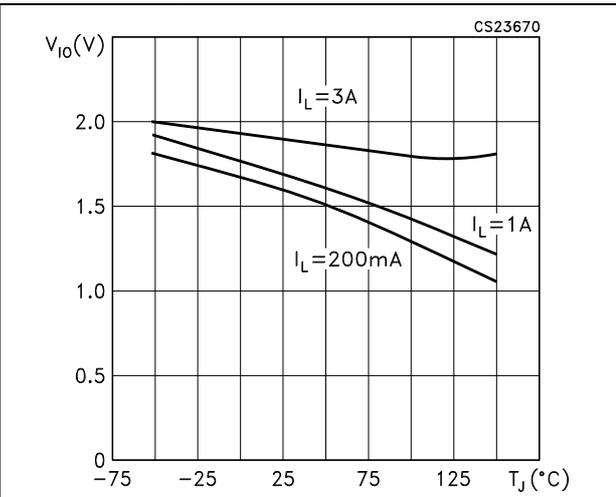


Figure 9. Line transient response

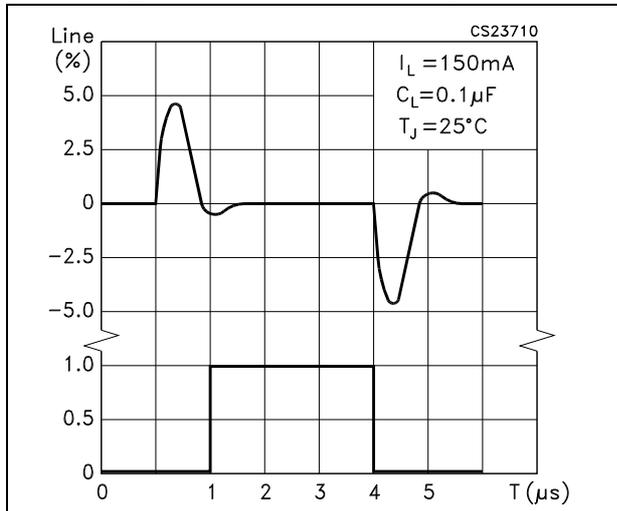


Figure 10. Output voltage

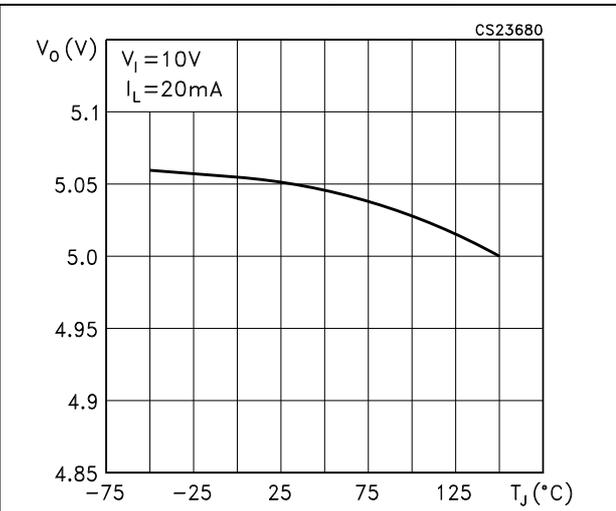


Figure 11. Quiescent current

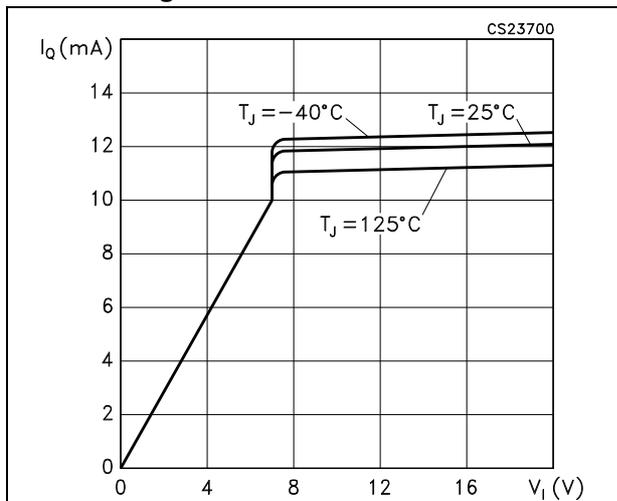
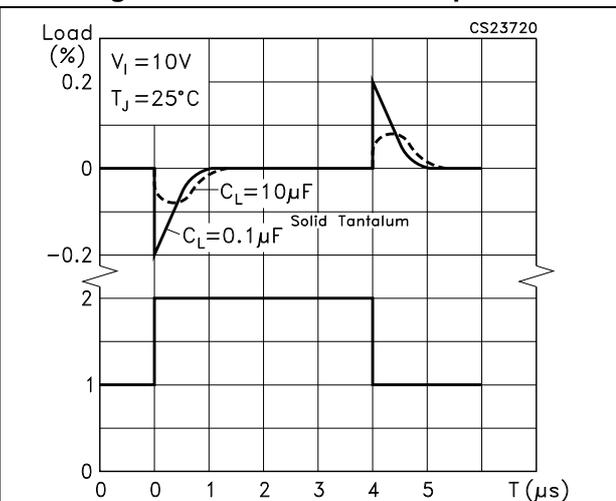
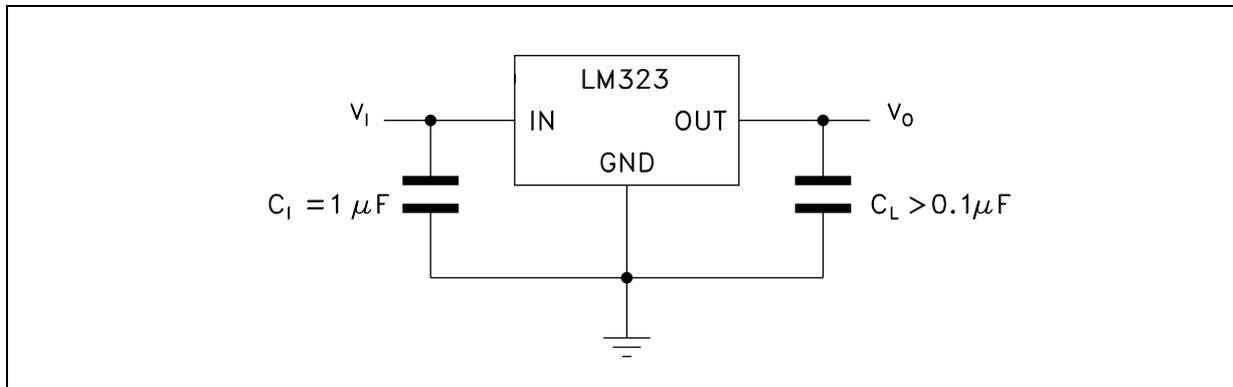


Figure 12. Load transient response



6 Typical application

Figure 13. Basic 3 A regulator



C_1 = Required if regulator is distant from filter capacitors.

C_L = Regulator is stable with no load capacitor into resistive loads.

Figure 14. Trimming output to 5 V

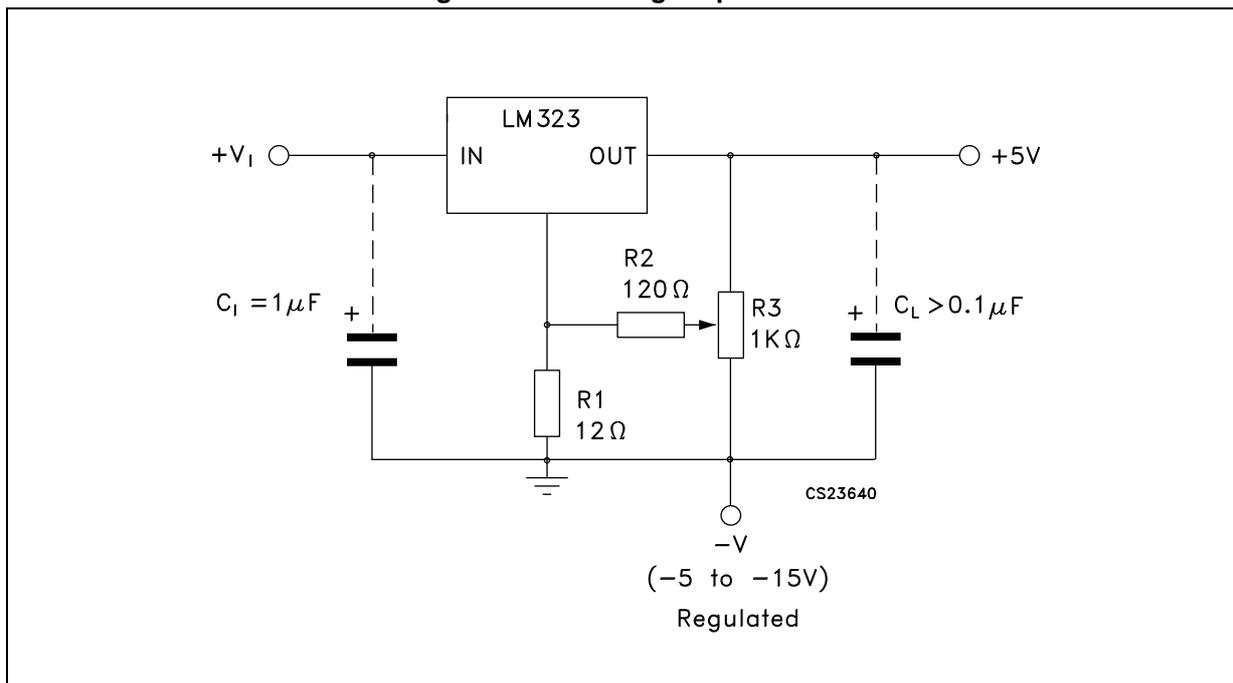
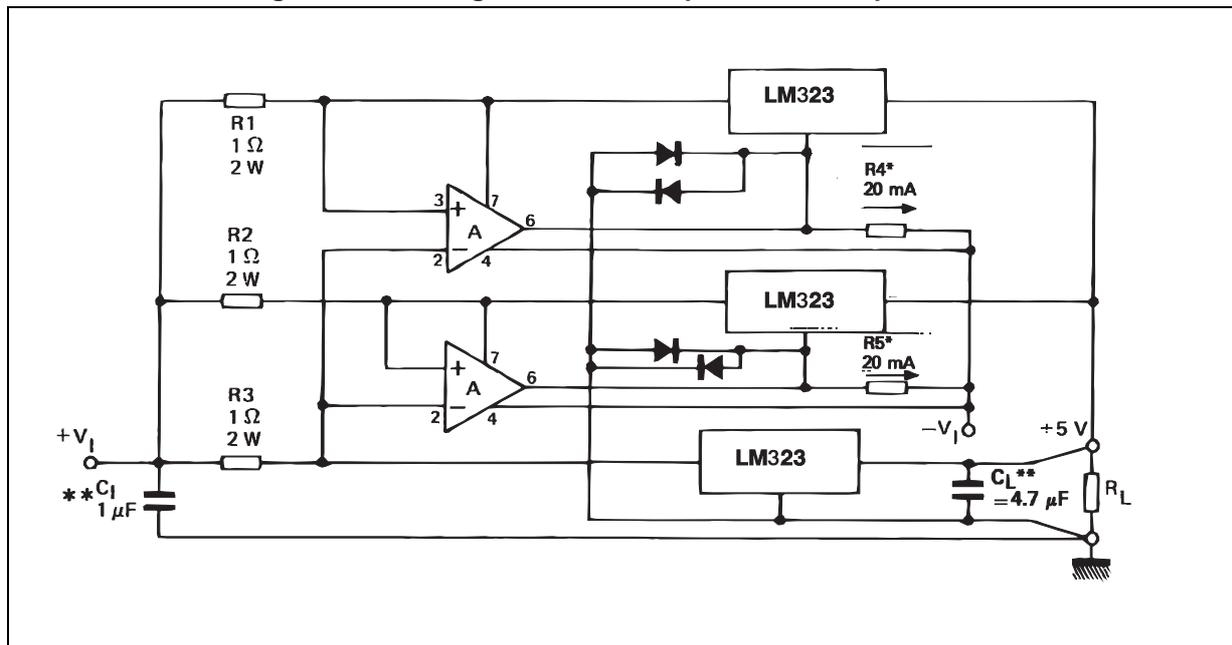


Figure 15. 10 A regulator with complete overload protection

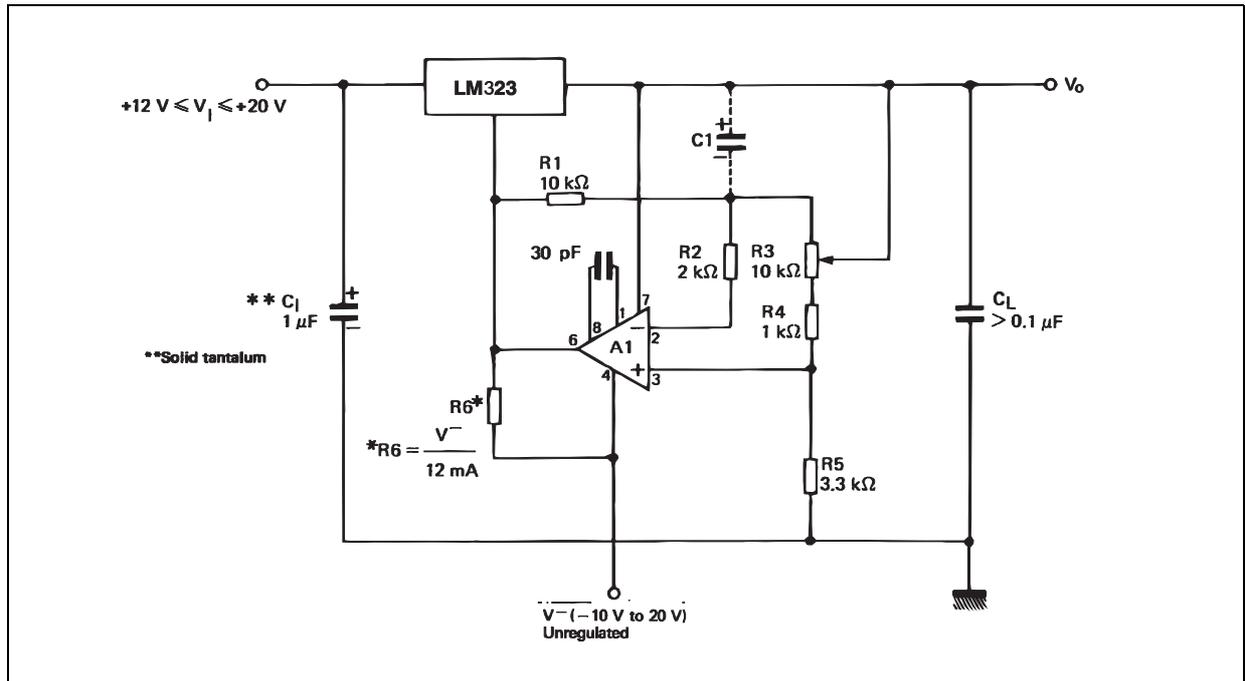


* Selected for 20 mA current from unregulated negative supply.

** Solid tantalum.

A = LM201A, LM301A.

Figure 16. Adjustable regulator 0 - 10 V / 3 A



A1 = LM201A, LM301A.

C₁ = 2 μF optional - improves ripple rejection, noise and transient response.

7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Figure 17. TO-220 drawing

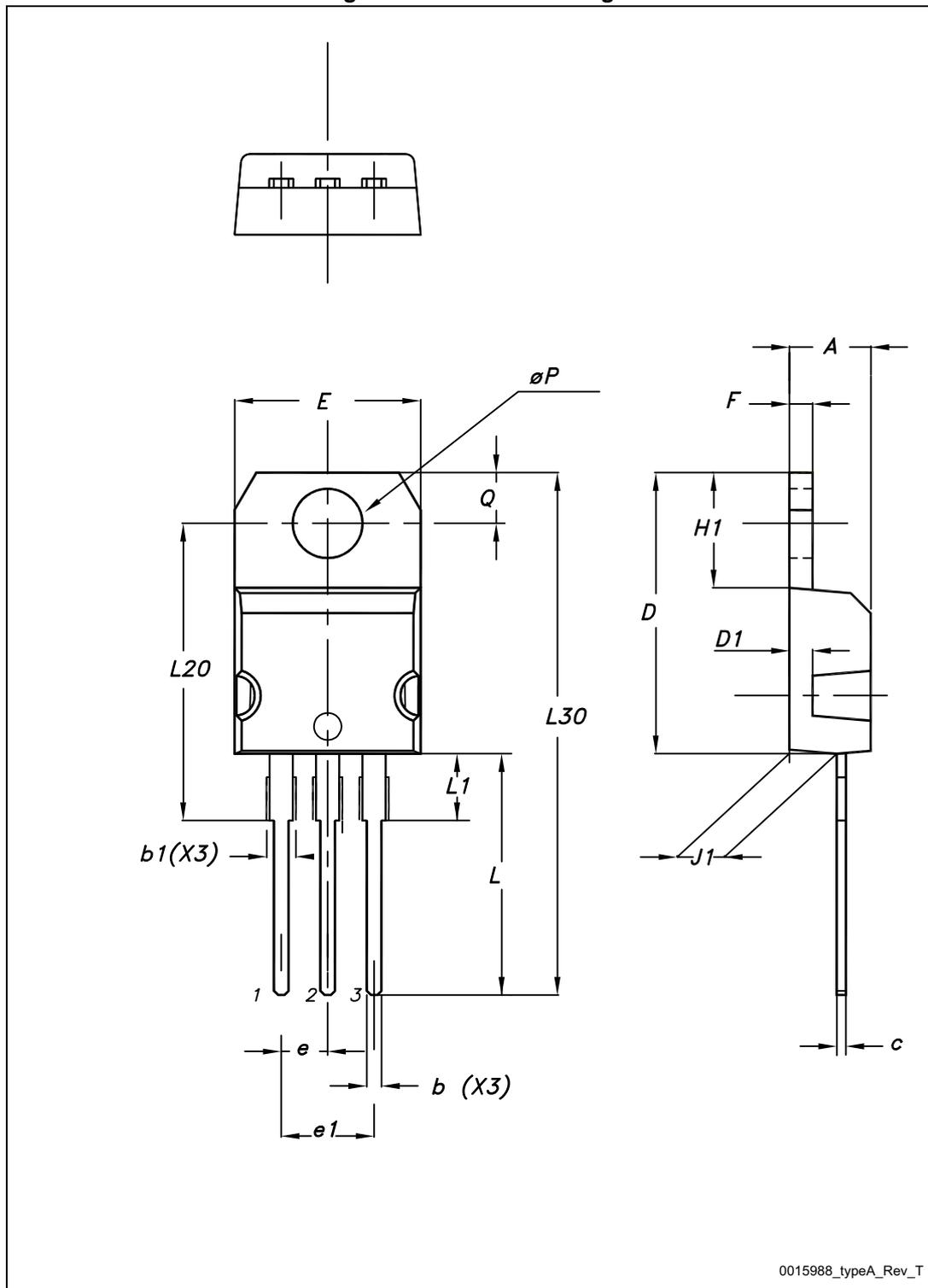


Table 5. TO-220 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
ØP	3.75		3.85
Q	2.65		2.95

8 Revision history

Table 6. Document revision history

Date	Revision	Changes
04-Nov-2005	3	Updated curves, no content change.
12-Feb-2008	4	Added: Table 1 on page 1 .
09-Apr-2014	5	Removed TO-3 package. Updated Section 2: Pin configuration , Section 3: Maximum ratings , Section 6: Typical application and Section 7: Package mechanical data . Minor text changes.

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