

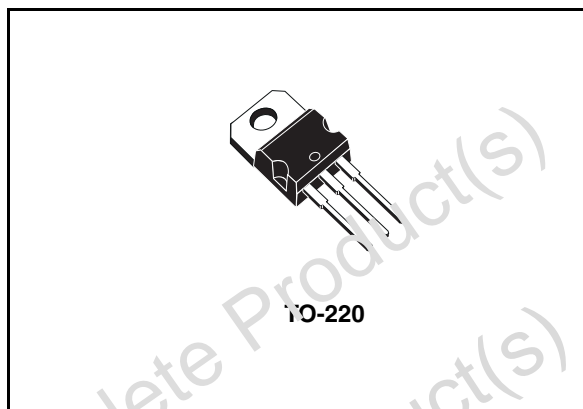


# LD1585CXX

## 5 A low dropout fast response positive voltage regulator adjustable

### Features

- Typical dropout 1.2 V
- Fast transient response
- Three terminal adjustable
- Guaranteed output current up to 5 A
- Output tolerance  $\pm 1\%$  at 25 °C and  $\pm 2\%$  in full temperature range
- Internal power and thermal limit
- Wide operating temperature range 0 °C to 125 °C
- Package available: TO-220
- Pinout compatibility with standard adjustable VREG



The device is supplied in TO-220. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within  $\pm 1\%$  at 25 °C.

### Description

The LD1585C is a low drop voltage regulator able to provide up to 5 A of output current. Dropout is guaranteed at a maximum of 1.4 V at the maximum output current, decreasing at lower loads. The device has been improved to be utilized in low voltage applications where transient response and minimum input voltage are critical.

The most important feature of the device consist in lower dropout voltage and very fast transient response. A 2.85 V output version is suitable for SCSI-2 active termination. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1585C quiescent current flows into the load, so increase efficiency. Only a 10  $\mu$ F minimum capacitor is need for stability.

Table 1. Device summary

Part number	Order code	Output voltage
LD1585CXX	LD1585CV	ADJ

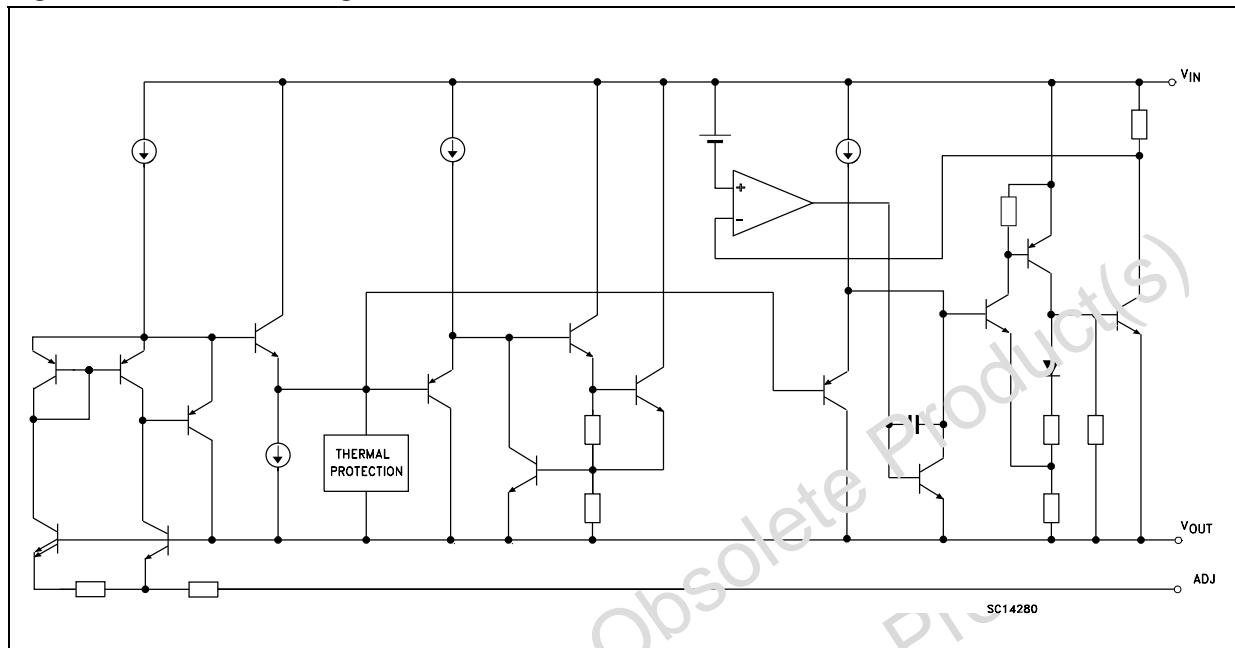
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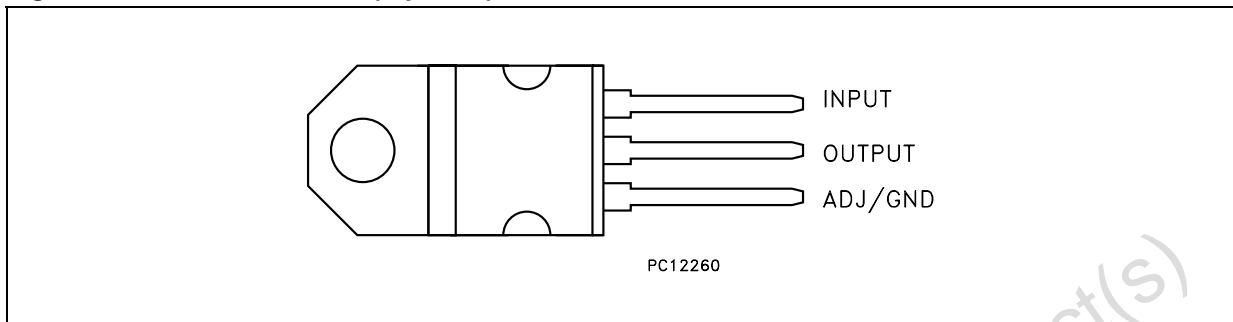
# 1 Diagram

Figure 1. Schematic diagram



## 2 Pin configuration

Figure 2. Pin connections (top view)



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### 3 Maximum ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_I$	DC input voltage	30	V
$I_O$	Output current	Internally limited	mA
$P_D$	Power dissipation	Internally limited	mW
$T_{STG}$	Storage temperature range	-55 to +150	°C
$T_{OP}$	Operating junction temperature range	0 to +125	°C

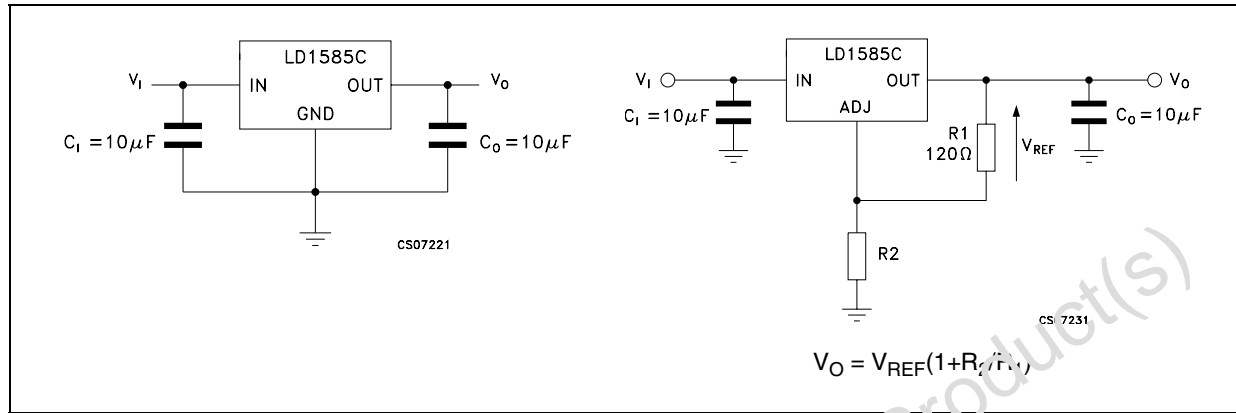
*Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.*

**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 Typical application

Figure 3. Application circuits



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## 5 Electrical characteristics

**Table 4. Electrical characteristics of LD1585C#** ( $V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\ \mu\text{F}$ ,  $T_J = 0\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified.)

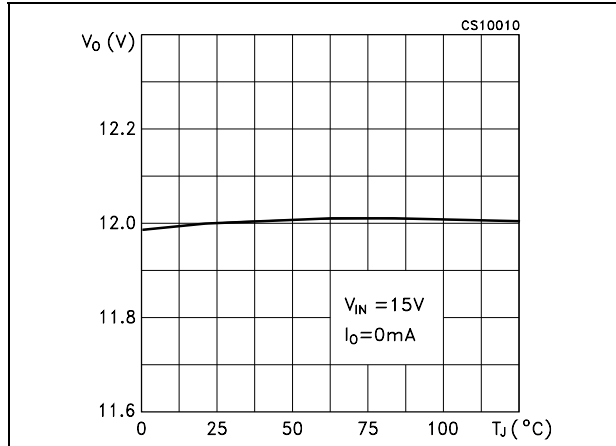
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_O$	Output voltage	$I_O = 10\text{mA}$ , $V_I - V_O = 3\text{V}$ , $T_J = 25^\circ\text{C}$	1.237	1.25	1.263	V
		$I_O = 10\text{mA to }5\text{A}$ , $V_I - V_O = 1.5\text{ to }25\text{V}^{(1)}$	1.225	1.25	1.275	V
$\Delta V_O$	Line regulation	$I_O = 10\text{mA}$ , $V_I = 2.75\text{ to }15\text{V}$ , $T_J = 25^\circ\text{C}$		0.015	0.2	%
		$I_O = 10\text{mA}$ , $V_I = 2.75\text{ to }15\text{V}$		0.1	0.2	%
$\Delta V_O$	Load regulation	$I_O = 10\text{mA to }5\text{A}$ , $T_J = 25^\circ\text{C}$		0.1	0.3	%
		$I_O = 0\text{ to }5\text{A}$		0.25	0.5	%
$V_d$	Dropout voltage	$I_O = 5\text{A}$		1.2	1.4	V
$I_{O(\text{min})}$	Minimum load current	$V_I = 25\text{V}$		3	10	mA
$I_{\text{sc}}$	Short circuit current	$V_I - V_O = 5.5\text{V}$	5.5	7		A
	Thermal regulation	$T_J = 25^\circ\text{C}$ , 30ms pulse		0.004	0.02	%/W
SVR	Supply voltage rejection	$f = 120\text{ Hz}$ , $C_O = 25\ \mu\text{F}$ , $C_{\text{ADJ}} = 25\ \mu\text{F}$ , $I_O = 5\text{A}$ , $V_I - V_O = 2 \pm 1\text{V}$	60	75		dB
$I_{\text{ADJ}}$	Adjust pin current	$I_O = 10\text{ mA}$		50	100	$\mu\text{A}$
$\Delta I_{\text{ADJ}}$	Adjust pin current change	$I_O = 10\text{mA to }5\text{A}$ , $V_I = 3\text{ to }25\text{V}^{(1)}$		0.2	5	$\mu\text{A}$
eN	RMS output noise voltage (% of $V_O$ )	$T_J = 25^\circ\text{C}$ , $f = 10\text{Hz to }10\text{kHz}$		0.003		%
S	Temperature stability			0.5		%
S	Long term stability	$T_J = 125^\circ\text{C}$ , 1000Hrs		0.5		%

1. See short-circuit current curve for available output current at fixed dropout.

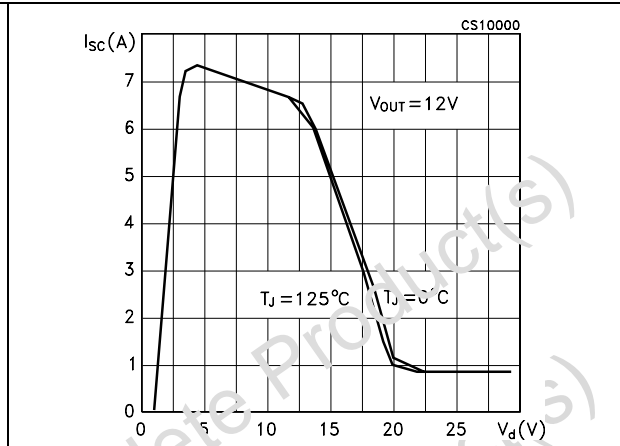
## 6 Typical characteristics

(unless otherwise specified  $T_J = 25\text{ }^\circ\text{C}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$  tant.)

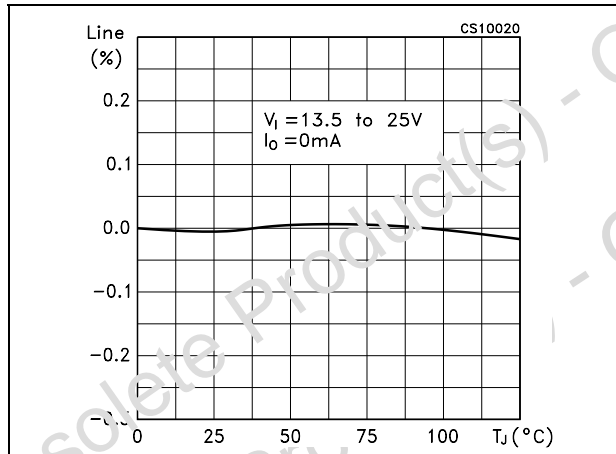
**Figure 4. Output voltage vs temperature**



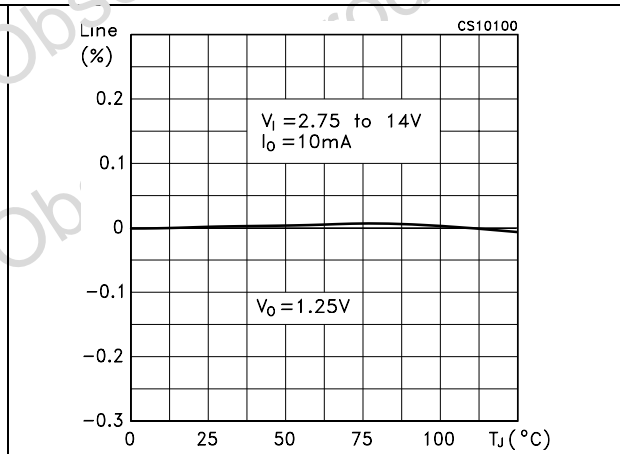
**Figure 5. Short circuit current vs dropout voltage**



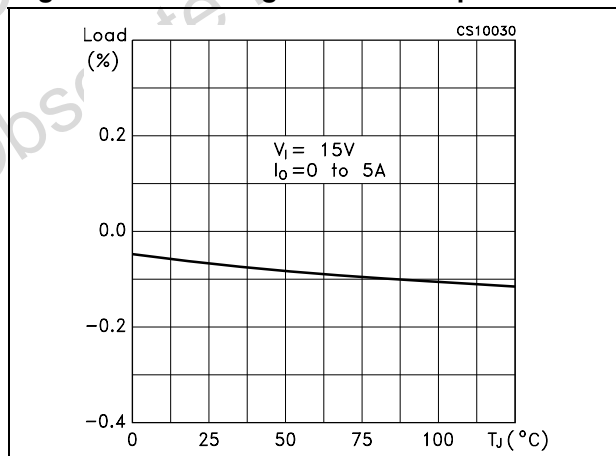
**Figure 6. Line regulation vs temperature**



**Figure 7. Line regulation vs temperature**



**Figure 8. Load regulation vs temperature**



**Figure 9. Load regulation vs temperature**

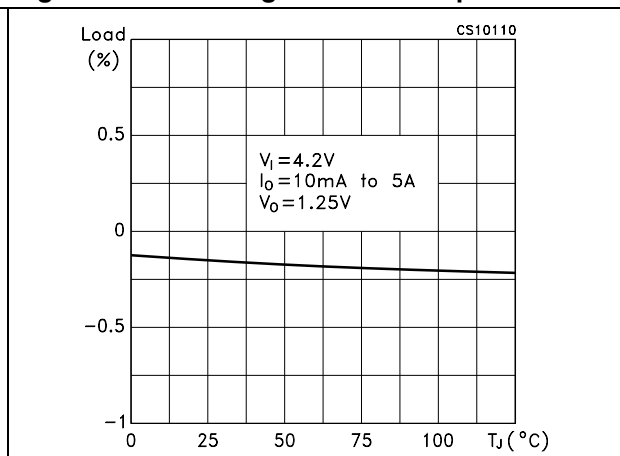




Figure 10. Dropout voltage vs temperature

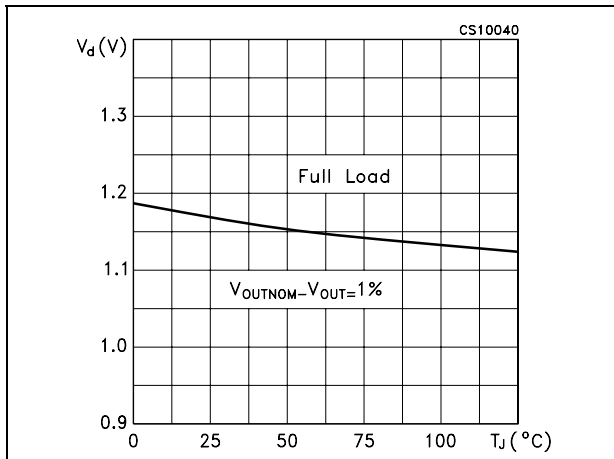


Figure 11. Dropout voltage vs output current

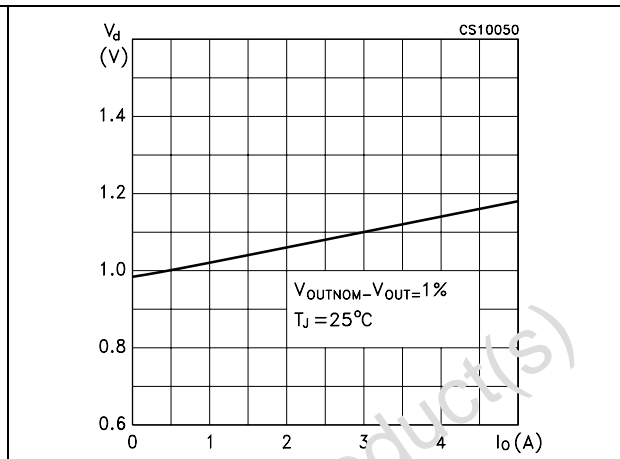


Figure 12. Adjust pin current vs input voltage

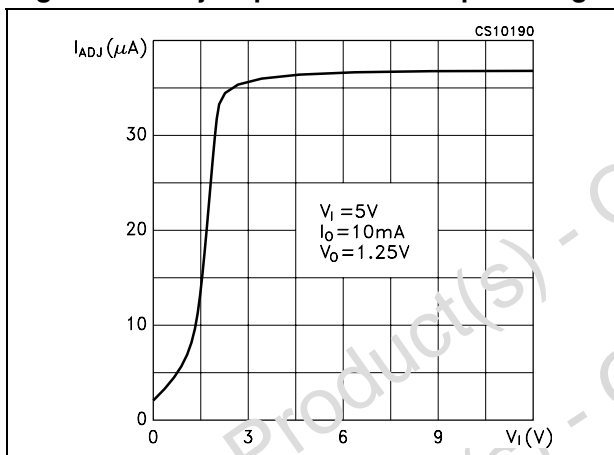


Figure 13. Adjust pin current vs temperature

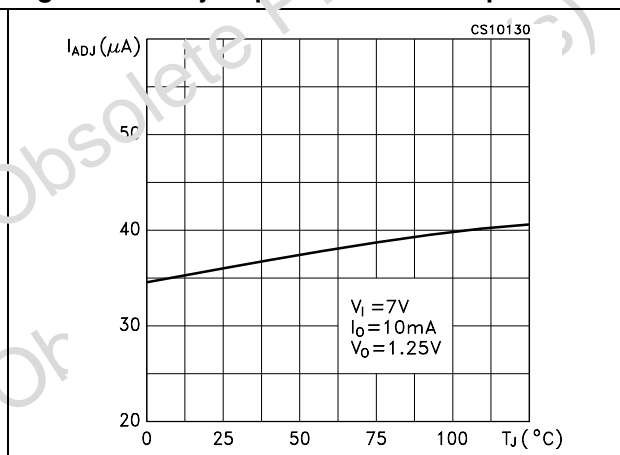


Figure 14. Adjust pin current change vs temperature

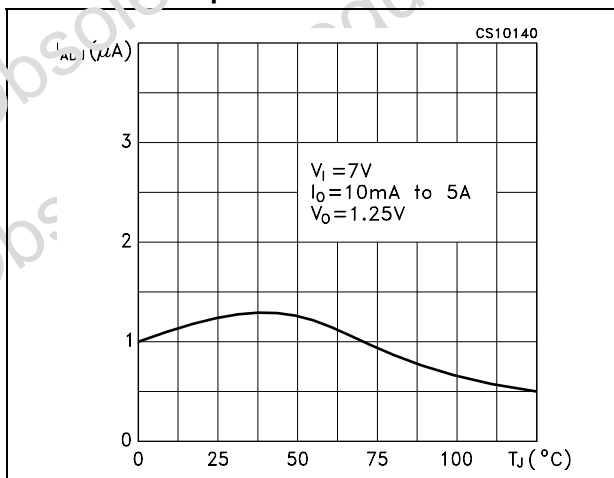


Figure 15. Quiescent current vs temperature

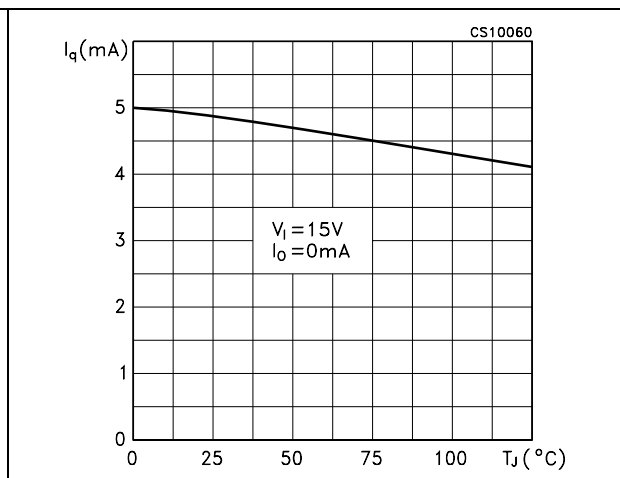


Figure 16. Reference voltage vs temperature

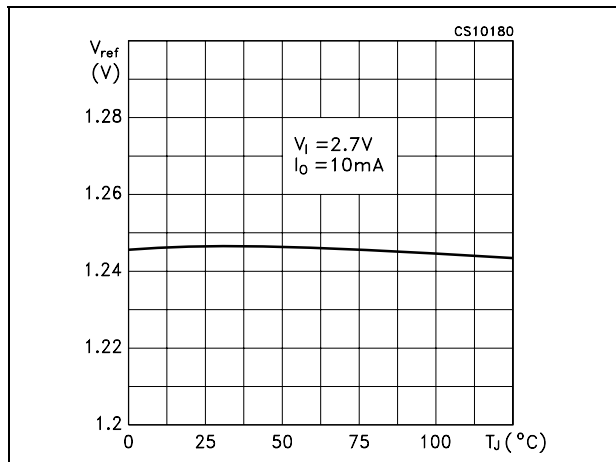


Figure 17. Minimum load current vs temperature

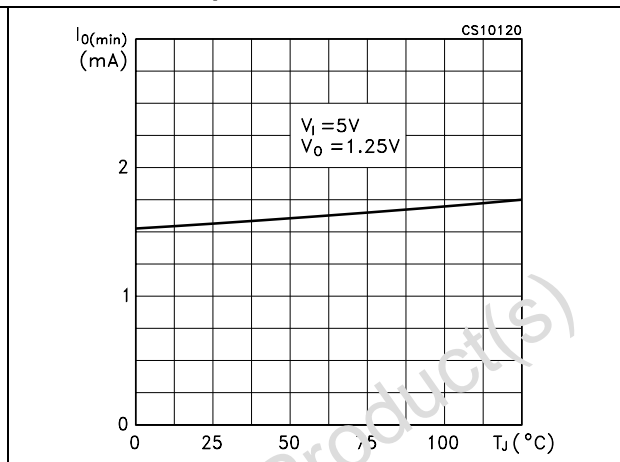


Figure 18. Supply voltage rejection vs output current

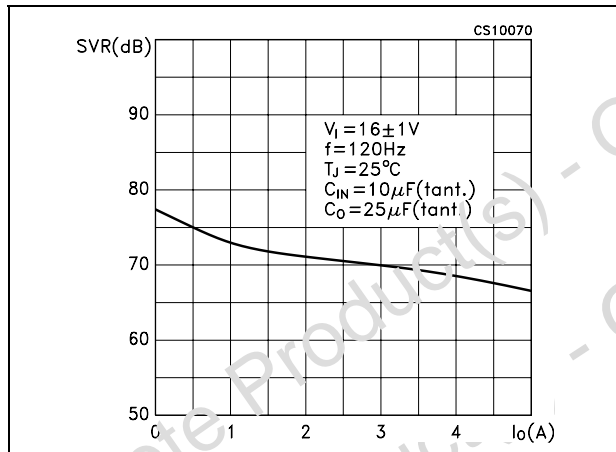


Figure 19. Supply voltage rejection vs output current

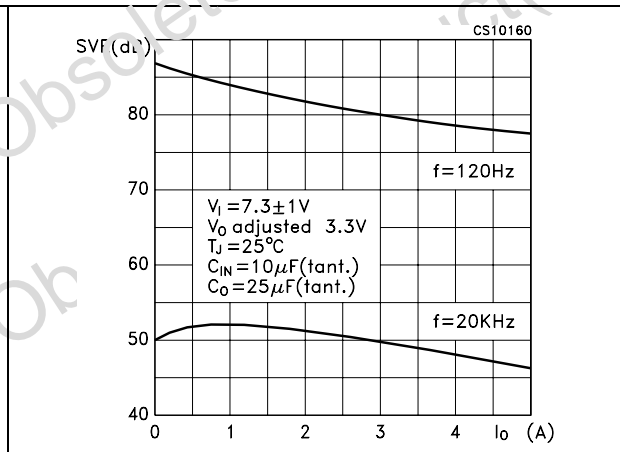


Figure 20. Supply voltage rejection vs frequency

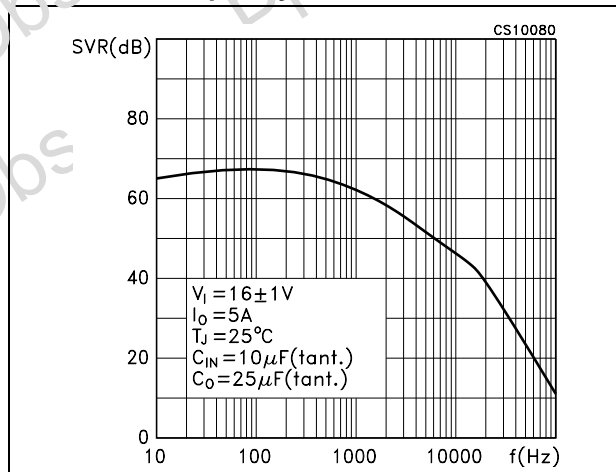


Figure 21. Supply voltage rejection vs frequency

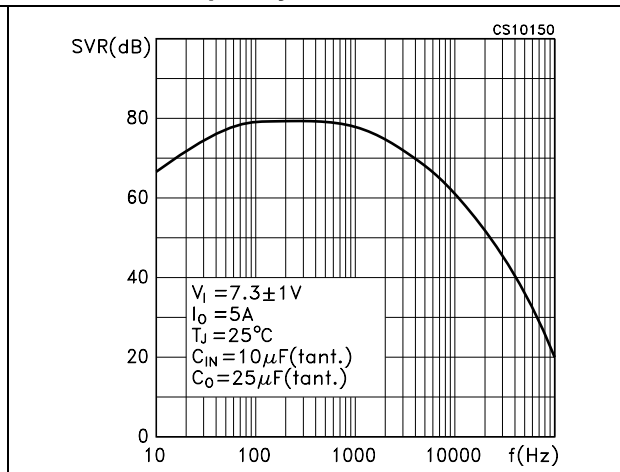


Figure 22. Supply voltage rejection vs temperature

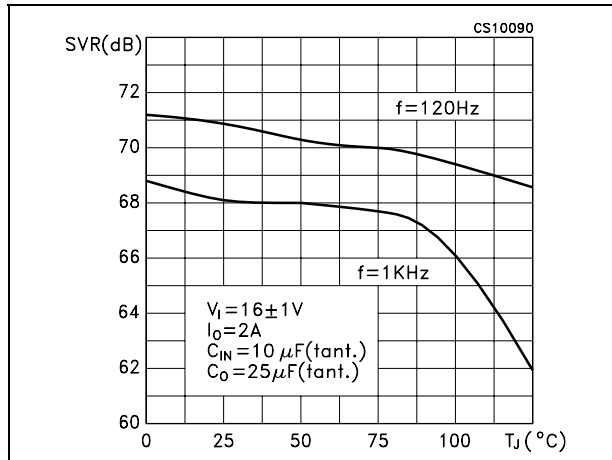


Figure 23. Supply voltage rejection vs temperature

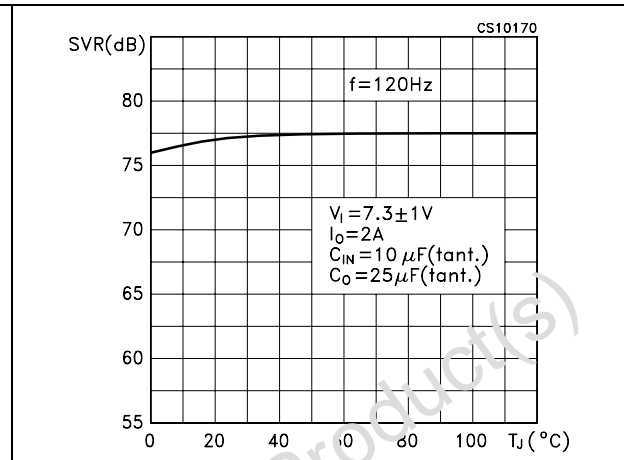


Figure 24. Line transient

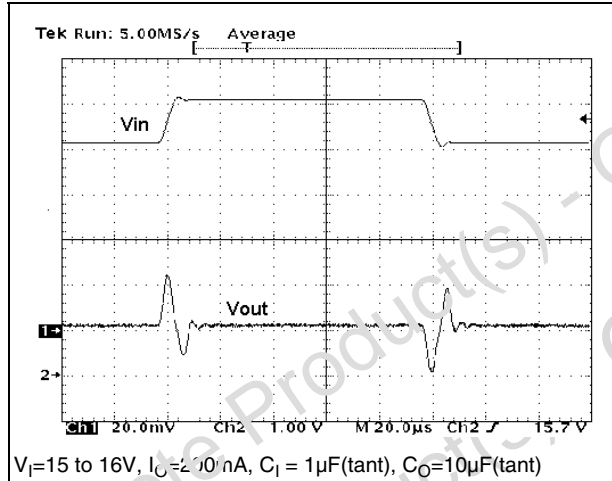


Figure 25. Load transient

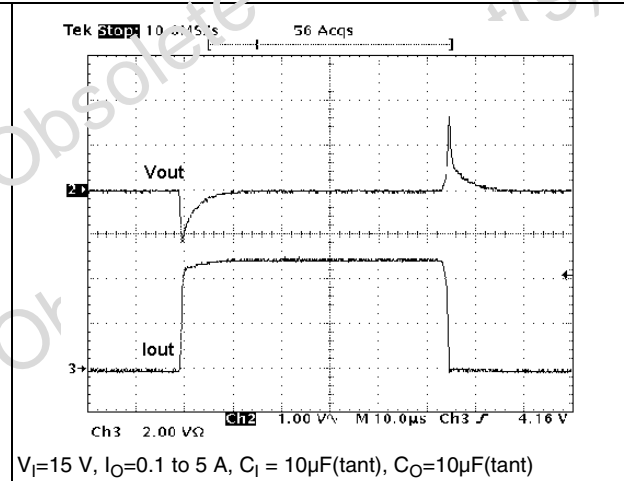
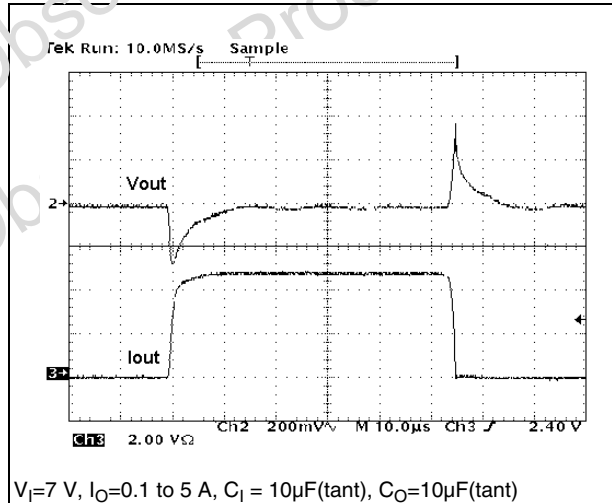


Figure 26. Load transient



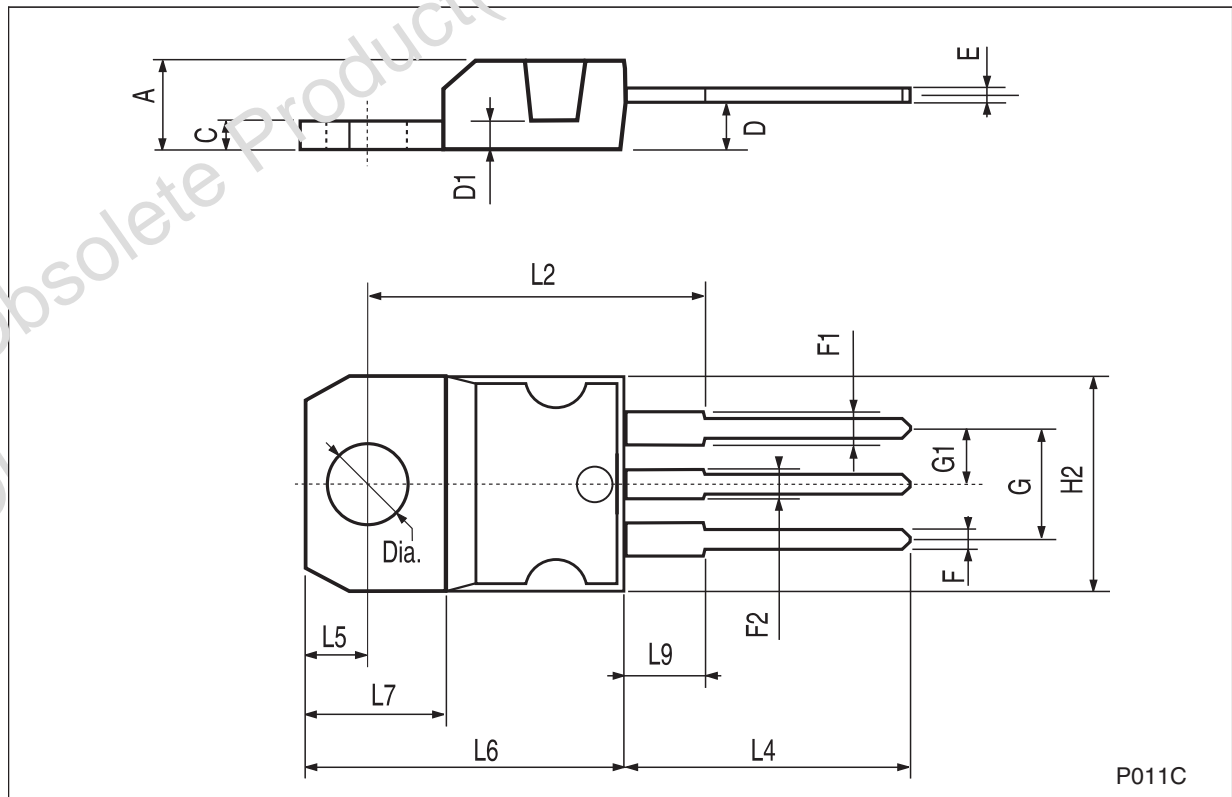
## 7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

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**TO-220 mechanical data**

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



## 8 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
07-Oct-2004	3	Mistake order codes - Table 1.
20-Oct-2005	4	Order codes has been updated.
08-Jun-2007	5	Order codes updated.
29-Nov-2007	6	Added <a href="#">Table 1</a> .
16-Apr-2008	7	Modified: <a href="#">Table 1 on page 1</a> .
14-Jul-2008	8	Modified: <a href="#">Table 1 on page 1</a> .

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