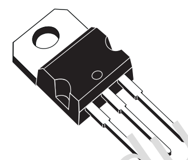
LD1585CXX

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 ± 1 % at 25 °C and ± 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



TO-220

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 µF minimum capacitor is need for stability.

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

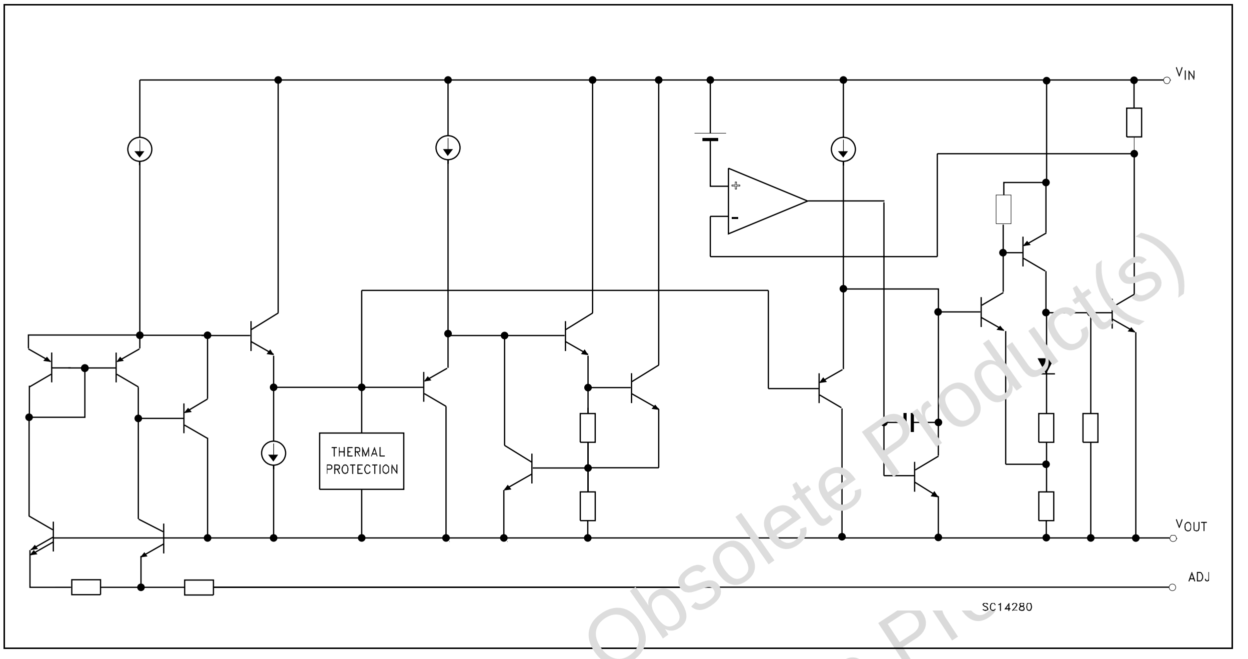
Table 1. Device summary

Part number	Order code	Output voltage
LD1585CXX	LD1585CV	ADJ

Contents

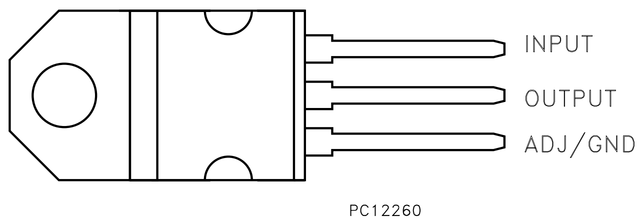
1 Diagram

Figure 1. Schematic diagram



2 Pin configuration

Figure 2. Pin connections (top view)



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

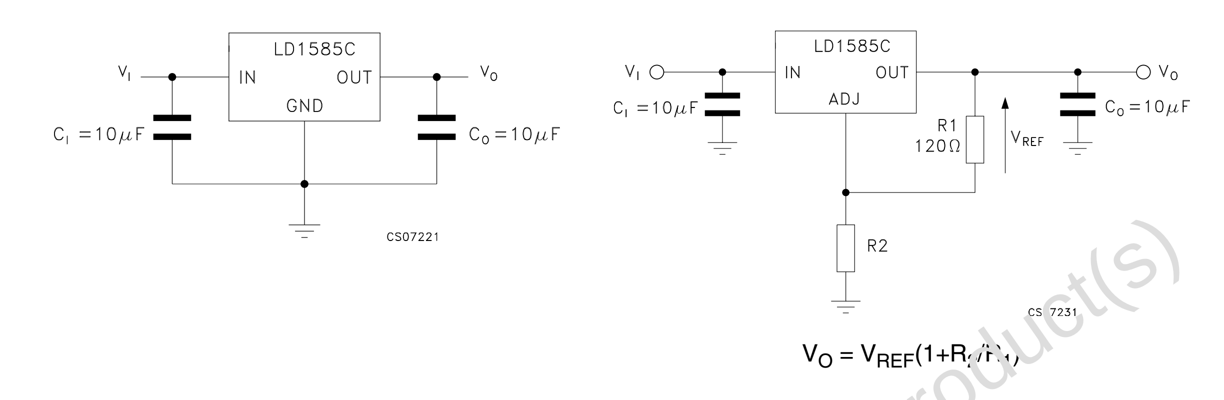
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

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



5 Electrical characteristics

Table 4. Electrical characteristics of LD1585C# (V_I = 4.25 V, C_I = C_O =10 µF, T_J = 0 to 125 °C, unless otherwise specified.)

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

Figure 4. Output voltage vs temperature

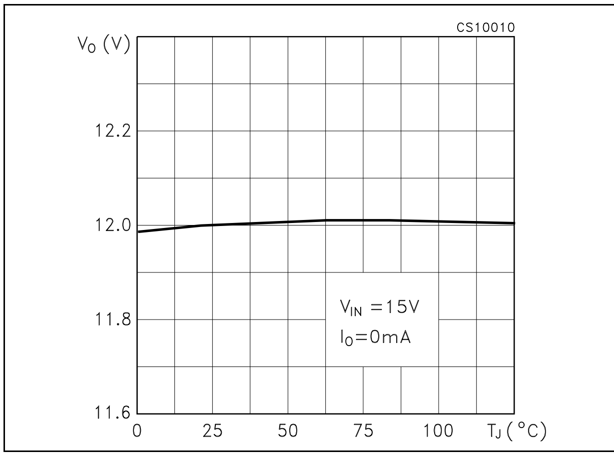


Figure 5. Short circuit current vs dropout voltage

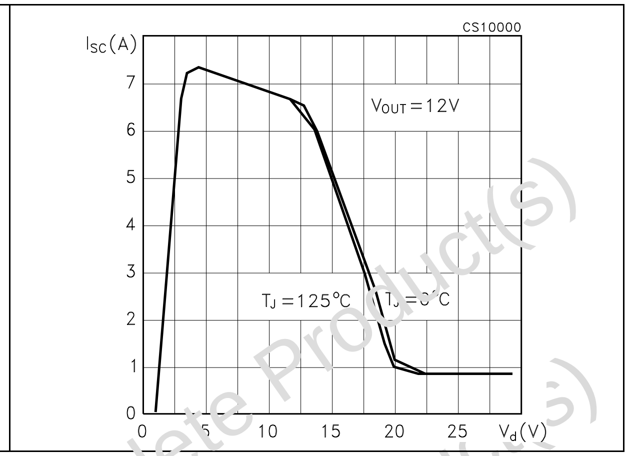


Figure 6. Line regulation vs temperature

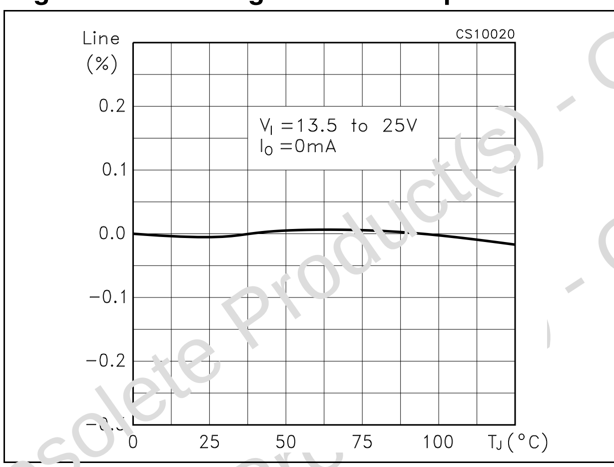


Figure 7. Line regulation vs temperature

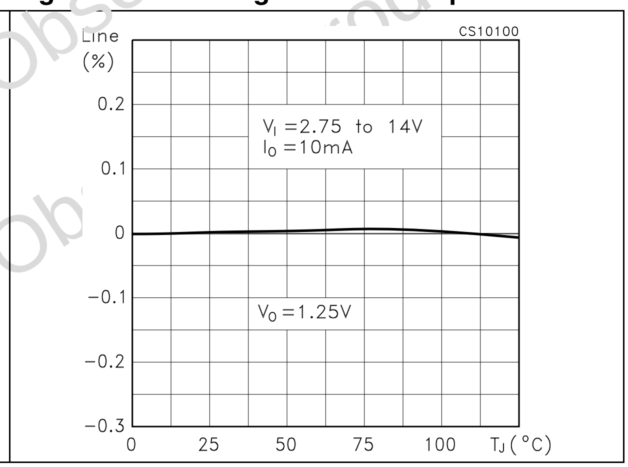


Figure 8. Load regulation vs temperature

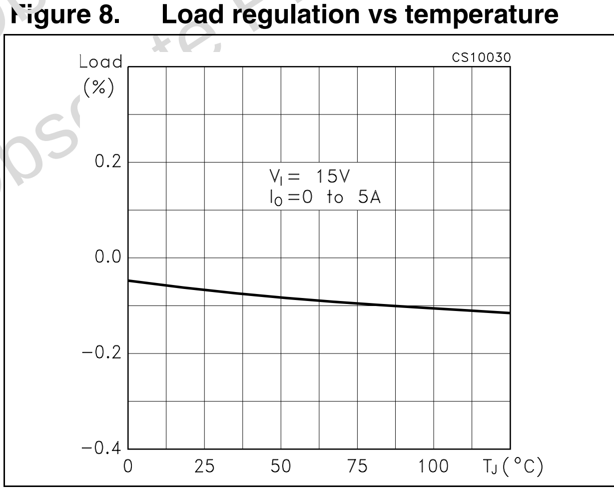


Figure 9. Load regulation vs temperature

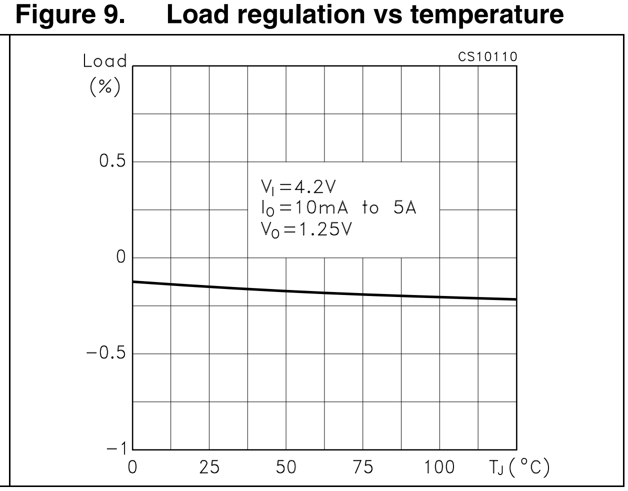


Figure 10. Dropout voltage vs temperature

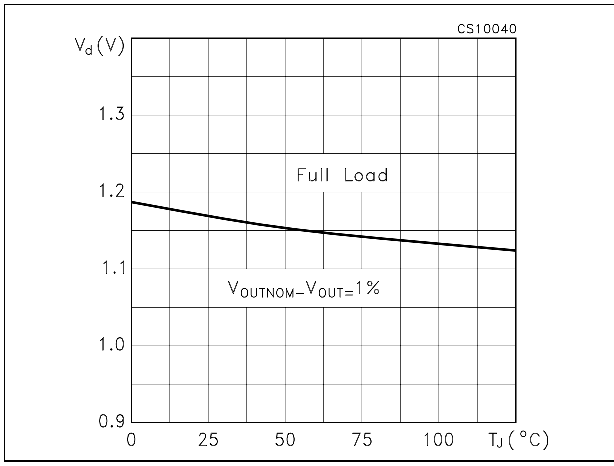


Figure 11. Dropout voltage vs output current

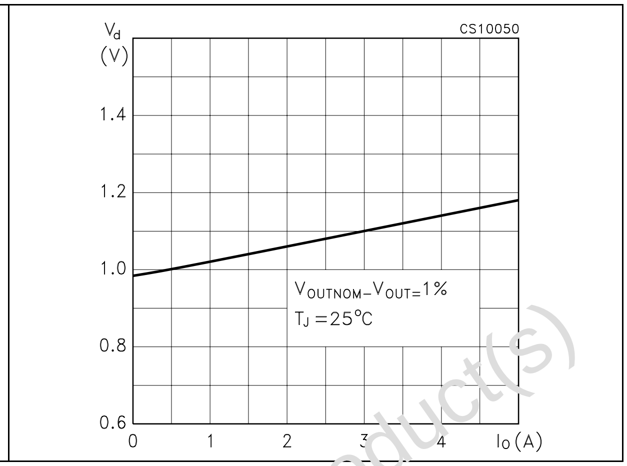


Figure 12. Adjust pin current vs input voltage

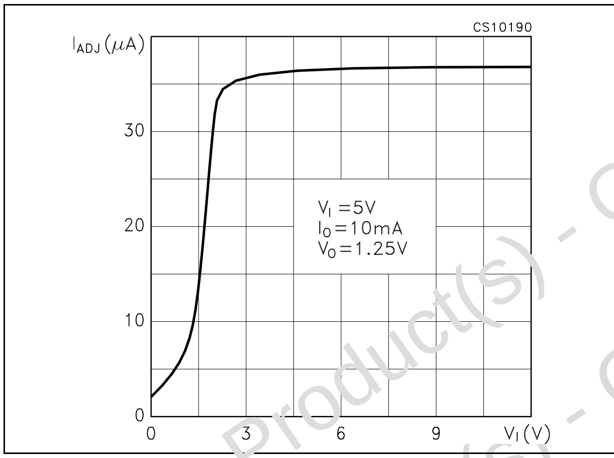


Figure 13. Adjust pin current vs temperature

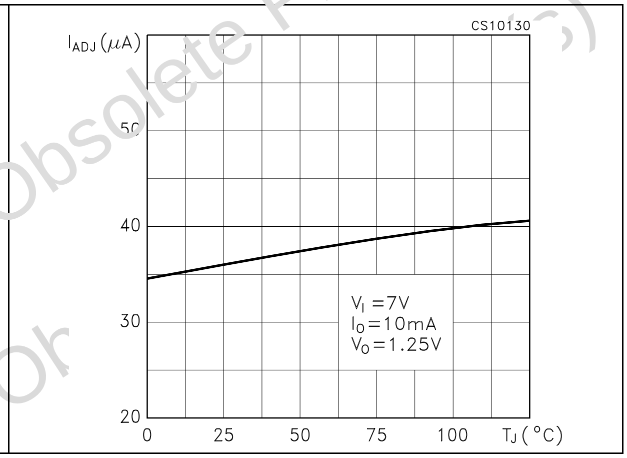


Figure 14. Adjust pin current change vs temperature

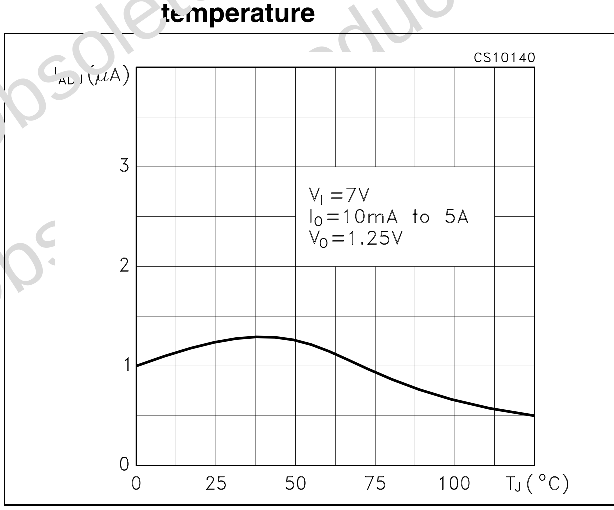


Figure 15. Quiescent current vs temperature

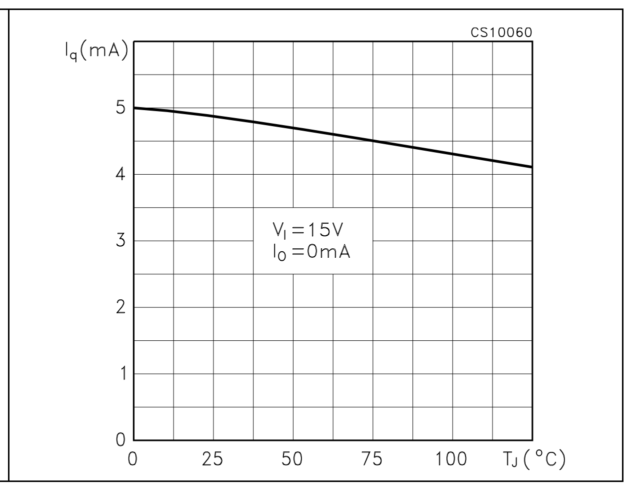


Figure 16. Reference voltage vs temperature

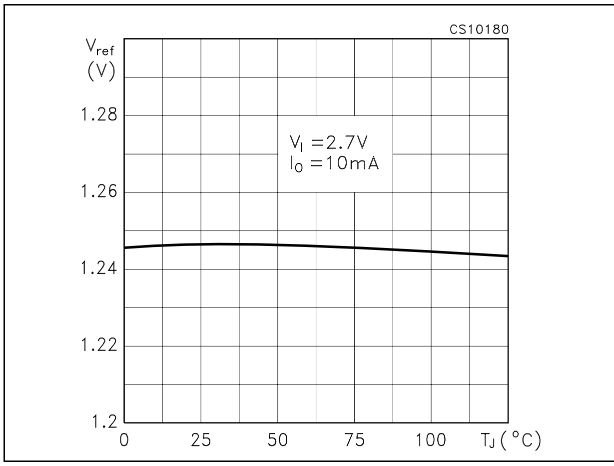


Figure 17. Minimum load current vs temperature

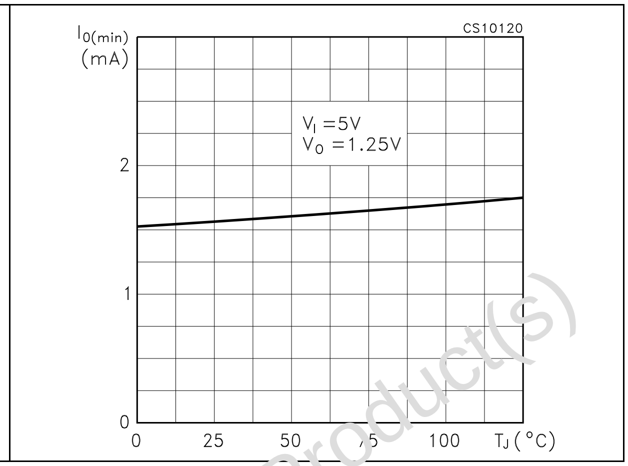


Figure 18. Supply voltage rejection vs output current

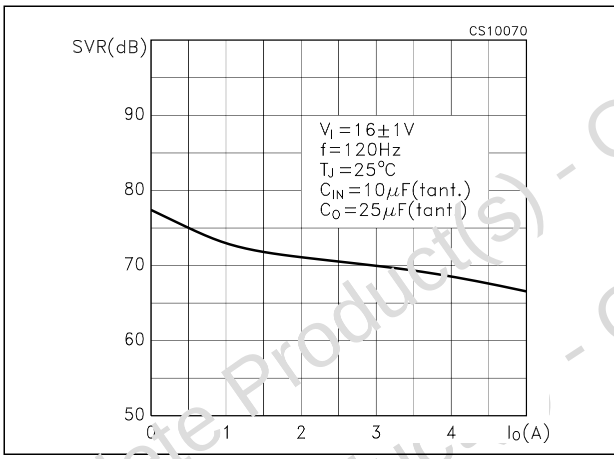


Figure 19. Supply voltage rejection vs output current

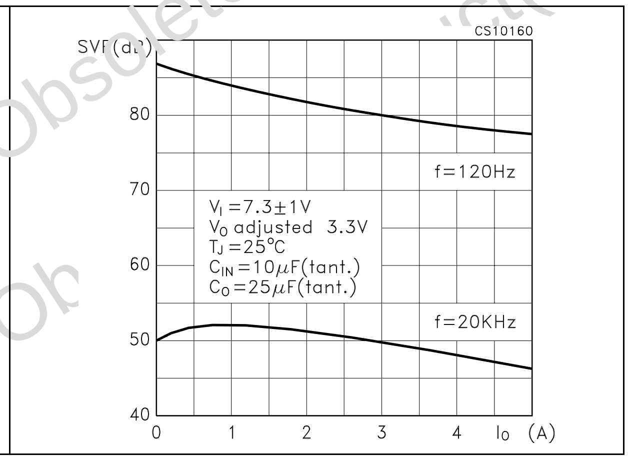


Figure 20. Supply voltage rejection vs frequency

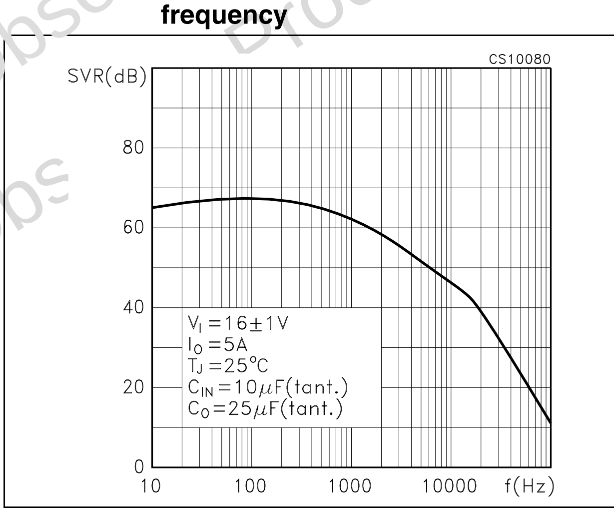


Figure 21. Supply voltage rejection vs frequency

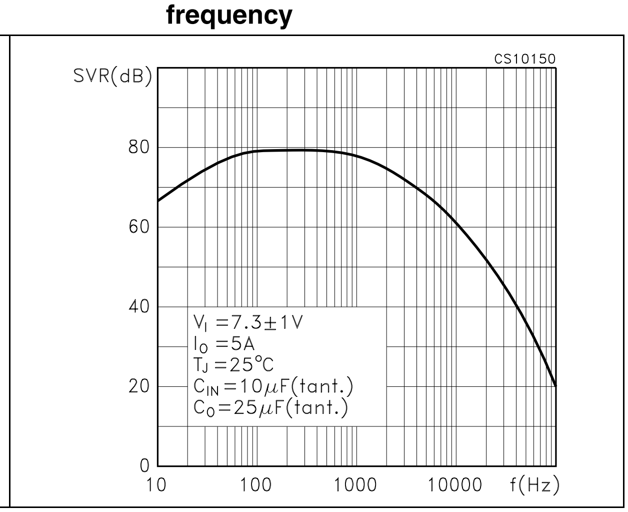


Figure 22. Supply voltage rejection vs temperature

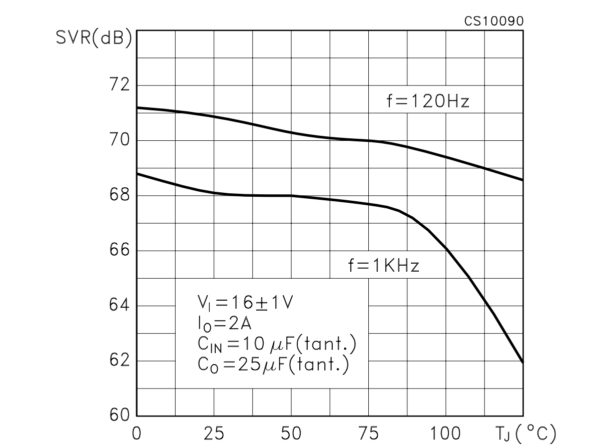


Figure 23. Supply voltage rejection vs temperature

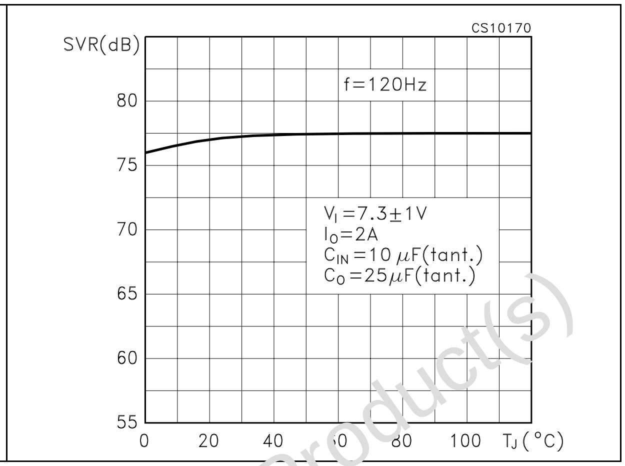
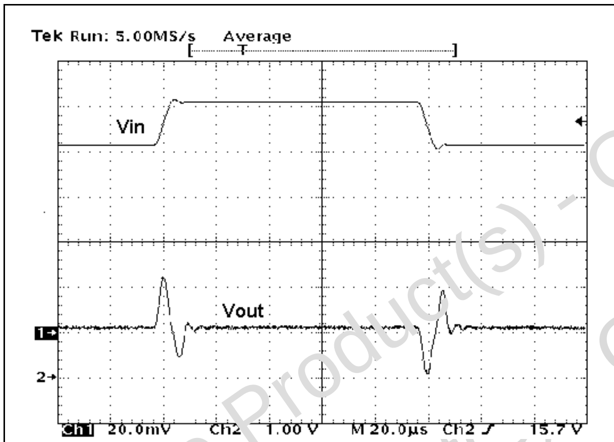
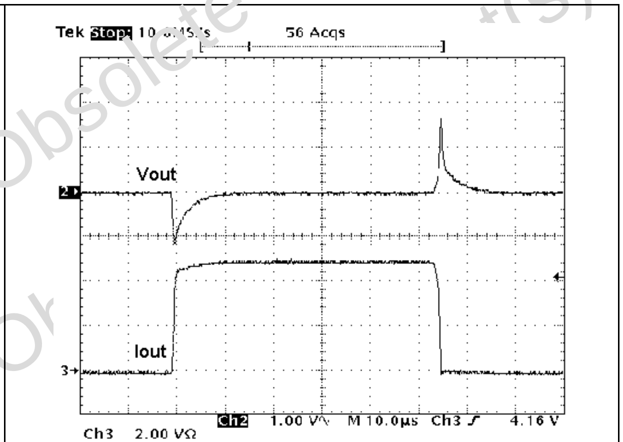


Figure 24. Line transient



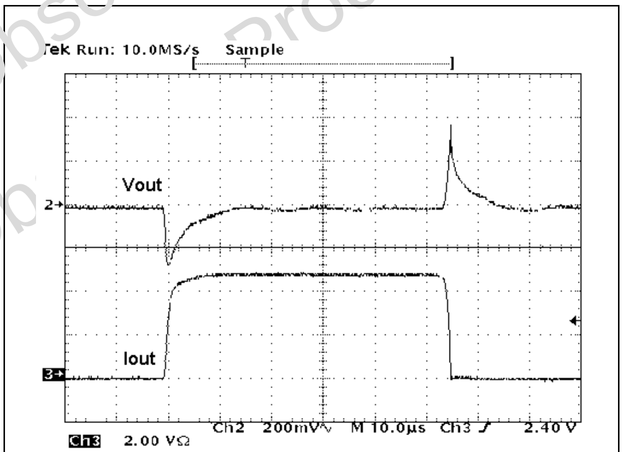
V_I=15 to 16V, I_O=200mA, C_I = 1µF(tant), C_O=10µF(tant)

Figure 25. Load transient



V_I=15 V, I_O=0.1 to 5 A, C_I = 10µF(tant), C_O=10µF(tant)

Figure 26. Load transient



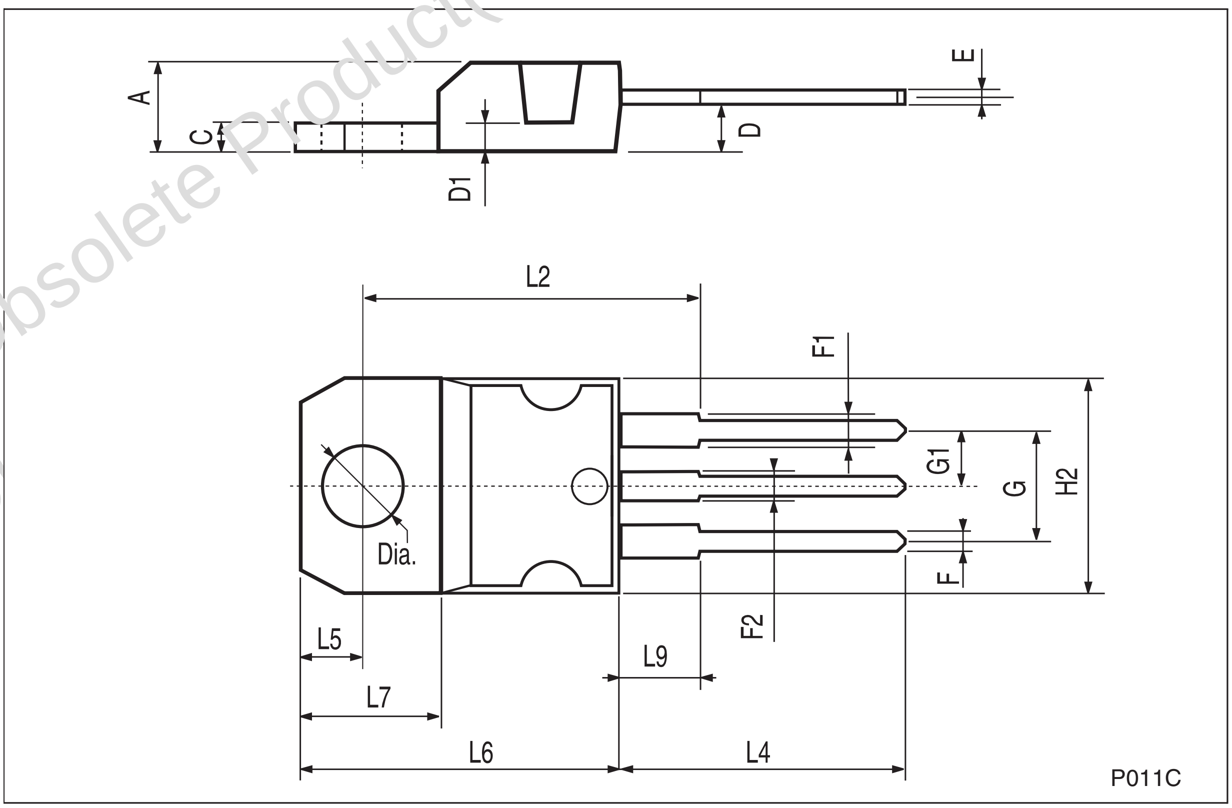
V_I=7 V, I_O=0.1 to 5 A, C_I = 10µF(tant), C_O=10µF(tant)

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.

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 *Table 1*.
16-Apr-2008	7	Modified: *Table 1 on page 1*.
14-Jul-2008	8	Modified: *Table 1 on page 1*.