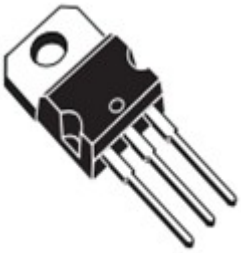
SP7812

DESCRIPTION

The SP7800 series of three-terminal positive regulators is available in TO-220 packages and several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltage and currents.

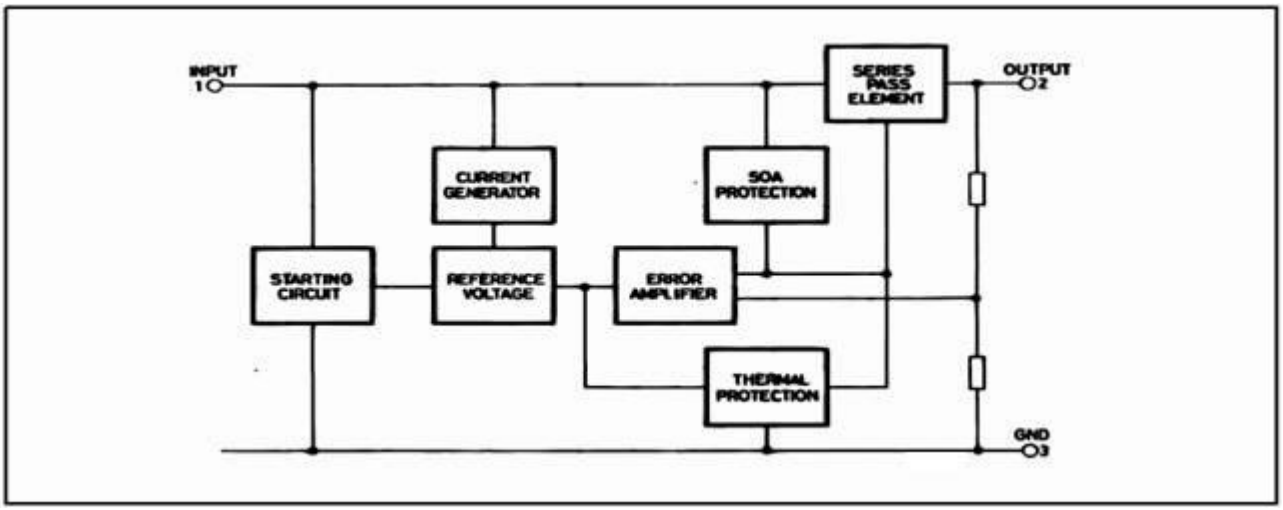
FEATURES

- Output current to 1.5A
- Output voltages of 5; 8;12V
- Thermal overload protection
- Short circuit protection
- Output transition soa protection



TO-220

SCHEMATIC DIAGRAM



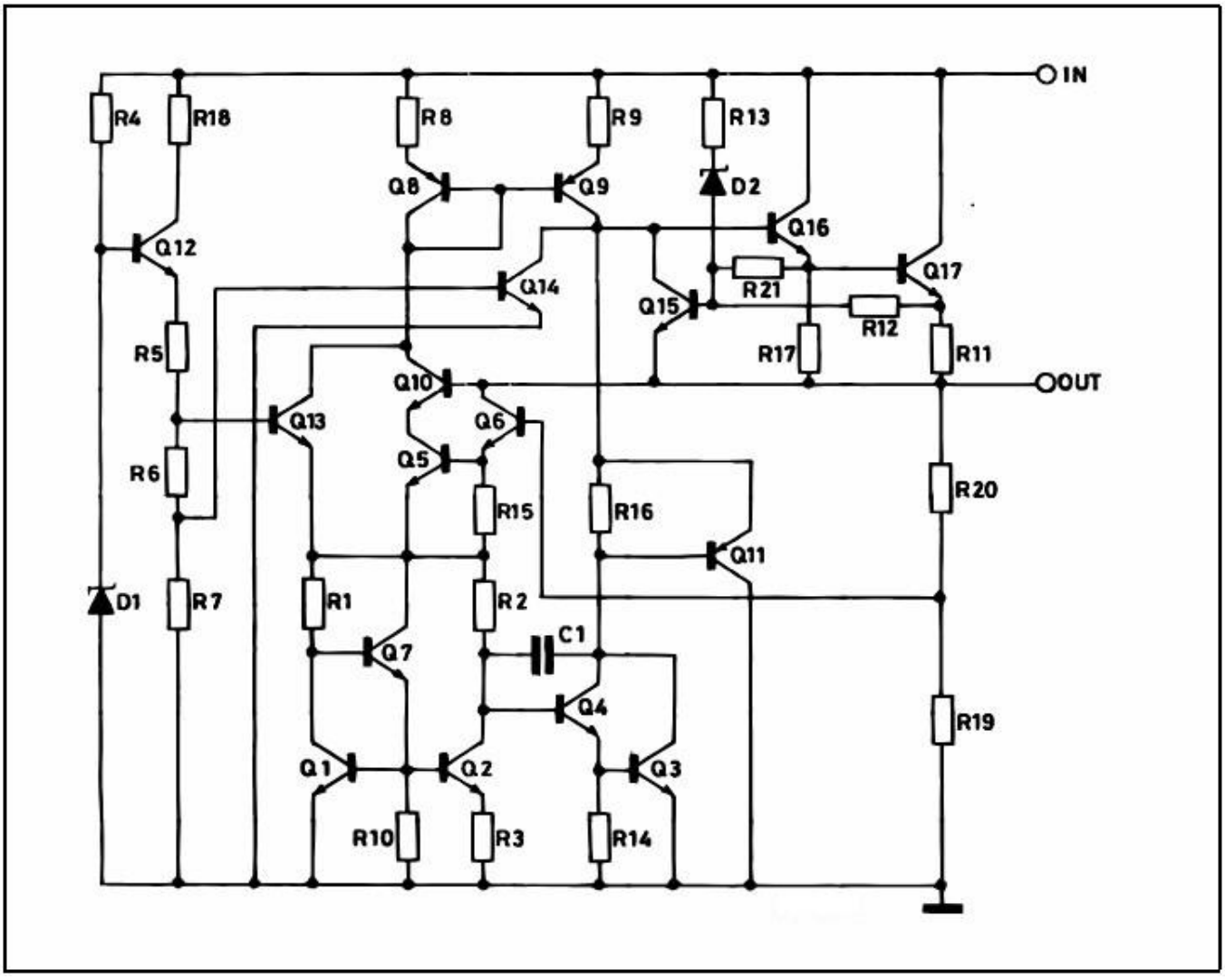
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter[2]	Value	Unit
V_I	DC Input Voltage	40	V
I_O	Output Current	Internally Limited	
P_{tot}	Power Dissipation	Internally Limited	
T_{stg}	Storage Temperature Range	-65 to 150	° C
T_{op}	Operating Junction Temperature Range	0 to 150	° C

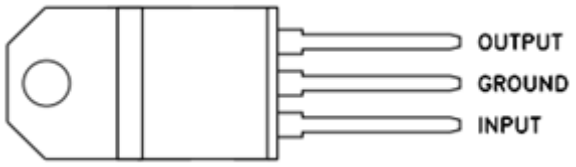
Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

THERMAL DATA

Symbol	Parameter	TO-220	Unit
$R_{thj\text{-}case}$	Thermal Resistance Junction-case Max	5	° C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient Max	50	° C/W



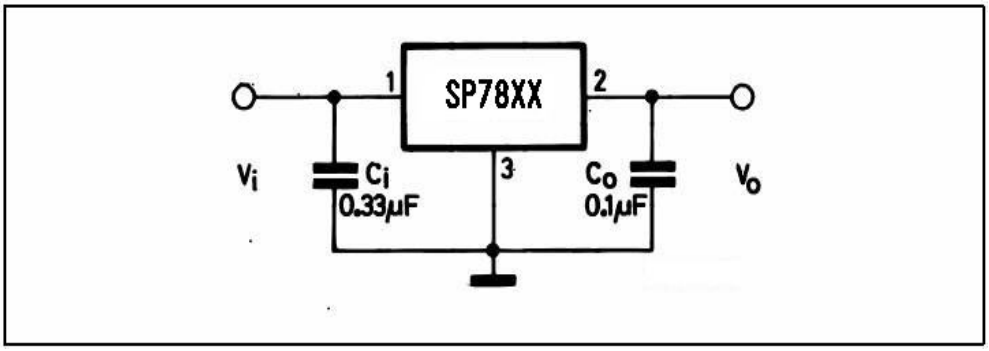
CONNECTION DIAGRAM (top view)



ORDERING CODES

TYPE	TO-220	OUTPUT VOLTAGE
L7805C	L7805CV	5 V
L7808C	L7808CV	8 V
L7812C	L7812CV	12 V

APPLICATION CIRCUITS



TEST CIRCUITS

Figure 1 : DC Parameter

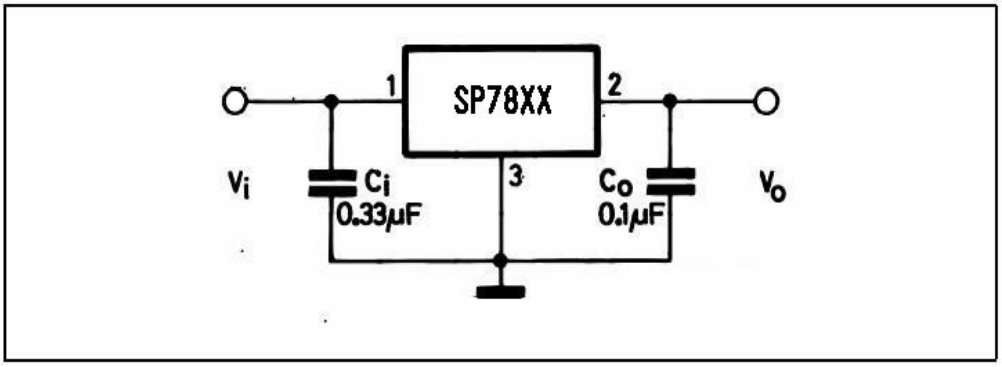


Figure 2 : Load Regulation

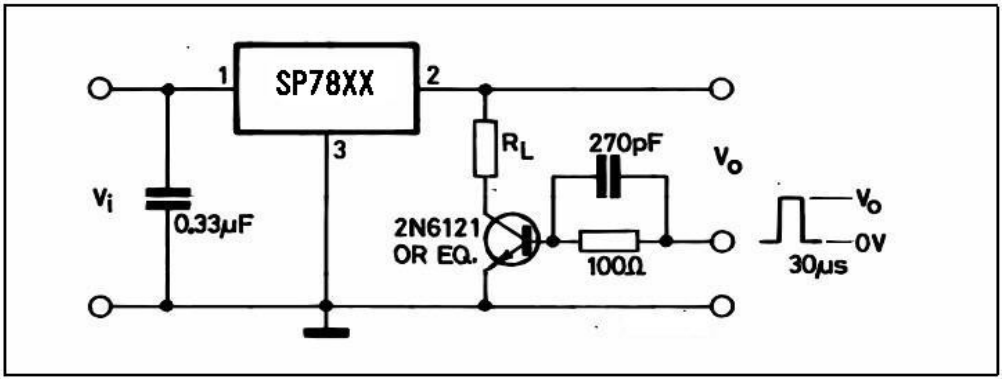
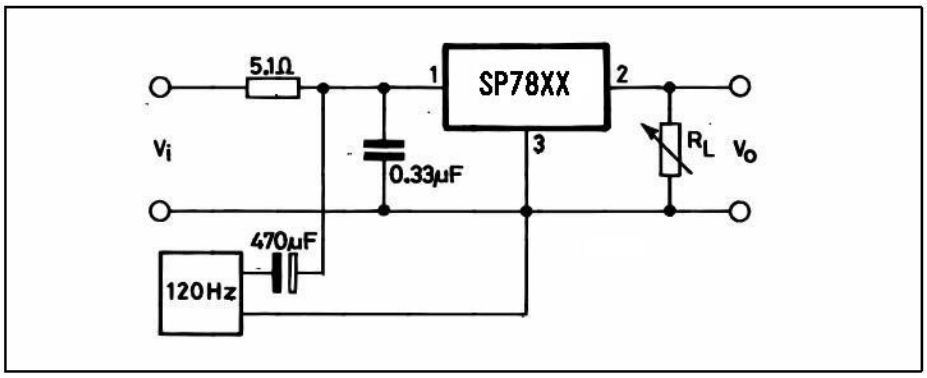


Figure 3 : Ripple Rejection



ELECTRICAL CHARACTERISTICS OF SP7805C (refer to the test circuits, T_J = -55 to 150°C, V_I= 10V,I_O =500mA,C_I=0.33μF,C_O = 0.1 μF unless otherwise specified).

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	T_J = 25°C	4.8	5	5.2	V
V_O	Output Voltage	I_O =5mAto1A $P_O \leqslant$ 15W V_I= 7 to 20 V	4.75	5	5.25	V
ΔV_O(*)	Line Regulation	V_I=7to25V T_J = 25°C		3	100	mV
		V_I=8to12V T_J = 25°C		1	50	
ΔV_O(*)	Load Regulation	I_O =5mAto1.5A T_J = 25°C			100	mV
		I_O = 250 to 750 mA T_J = 25°C			50	
I_d	Quiescent Current	T_J = 25°C			8	mA
ΔI_d	Quiescent Current Change	I_O =5mAto1A			0.5	mA
		V_I= 7 to 25 V			0.8	
$\Delta V_O/\Delta T$	Output Voltage Drift	I_O = 5 mA		-1.1		mV/°C
eN	Output Noise Voltage	B =10Hz to 100KHz T_J = 25°C		40		μV/V_O
SVR	Supply Voltage Rejection	VI= 8 to 18 V f = 120Hz	62			dB
V_d	Dropout Voltage	I_O =1A T_J = 25°C		2		V
R_O	Output Resistance	f = 1 KHz		17		mΩ
I_{sc}	Short Circuit Current	V_I=35V T_J = 25°C		0.75		A
I_{scp}	Short Circuit Peak Current	T_J = 25°C		2.2		A

(*) Load and line regulation are specified at constant junction temperature. Changes in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

ELECTRICAL CHARACTERISTICS OF SP7808C (refer to the test circuits, T_J = -55 to 150°C, V_I= 14V,I_O =500mA,C_I=0.33μF,C_O = 0.1 μF unless otherwise specified).

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	T_J = 25°C	7.7	8	8.3	V
V_O	Output Voltage	I_O =5mAto1A $P_O \leqslant$ 15W V_I= 10.5 to 25 V	7.6	8	8.4	V
ΔV_O(*)	Line Regulation	V_I=10.5to25V T_J = 25°C			160	mV
		V_I=11to17V T_J = 25°C			80	
ΔV_O(*)	Load Regulation	I_O =5mAto1.5A T_J = 25°C			160	mV
		I_O = 250 to 750 mA T_J = 25°C			80	
I_d	Quiescent Current	T_J = 25°C			8	mA
ΔI_d	Quiescent Current Change	I_O =5mAto1A			0.5	mA
		V_I= 10.5 to 25 V			1	
$\Delta V_O/\Delta T$	Output Voltage Drift	I_O = 5 mA		-0.8		mV/°C
eN	Output Noise Voltage	B =10Hz to 100KHz T_J = 25°C		52		μV/V_O
SVR	Supply Voltage Rejection	VI= 11.5 to 21.5 V f = 120Hz	56			dB
V_d	Dropout Voltage	I_O =1A T_J = 25°C		2		V
R_O	Output Resistance	f = 1 KHz		16		mΩ
I_{sc}	Short Circuit Current	V_I=35V T_J = 25°C		0.45		A
I_{scp}	Short Circuit Peak Current	T_J = 25°C		2.2		A

(*) Load and line regulation are specified at constant junction temperature. Changes in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

ELECTRICAL CHARACTERISTICS OF SP7812C (refer to the test circuits, T_J = -55 to 150°C, V_I= 19V,I_O =500mA,C_I=0.33μF,C_O = 0.1 μF unless otherwise specified).

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage	T_J = 25°C	11.5	12	12.5	V
V_O	Output Voltage	I_O =5mAto1A $P_O \leqslant$ 15W V_I= 14.5 to 27 V	11.4	12	12.6	V
ΔV_O(*)	Line Regulation	V_I=14.5to30V T_J = 25°C			240	mV
		V_I=16to22V T_J = 25°C			120	
ΔV_O(*)	Load Regulation	I_O =5mAto1.5A T_J = 25°C			240	mV
		I_O = 250 to 750 mA T_J = 25°C			120	
I_d	Quiescent Current	T_J = 25°C			8	mA
ΔI_d	Quiescent Current Change	I_O =5mAto1A			0.5	mA
		V_I= 14.5 to 30 V			1	
$\Delta V_O/\Delta T$	Output Voltage Drift	I_O = 5 mA		-1		mV/°C
eN	Output Noise Voltage	B =10Hz to 100KHz T_J = 25°C		75		μV/V_O
SVR	Supply Voltage Rejection	VI= 15 to 25 V f = 120Hz	55			dB
V_d	Dropout Voltage	I_O =1A T_J = 25°C		2		V
R_O	Output Resistance	f = 1 KHz		18		mΩ
I_{sc}	Short Circuit Current	V_I=35V T_J = 25°C		0.35		A
I_{scp}	Short Circuit Peak Current	T_J = 25°C		2.2		A

(*) Load and line regulation are specified at constant junction temperature. Changes in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

Figure 5 : Peak Output Current vs Input/output Differential Voltage

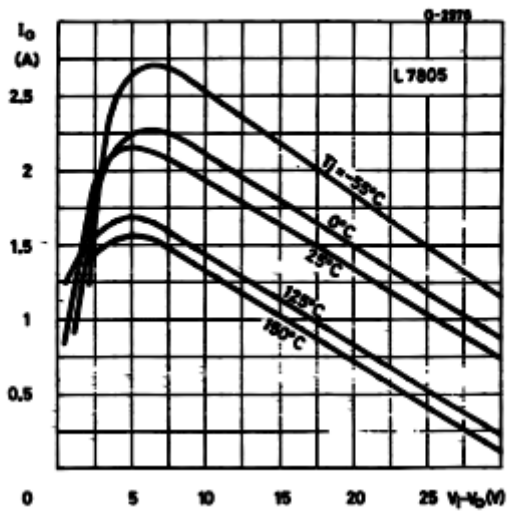


Figure 6 : Supply Voltage Rejection vs Frequency

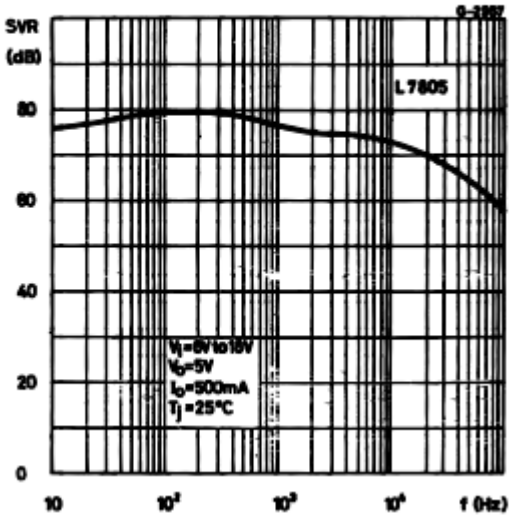


Figure 7 : Output Voltage vs Junction Temperature

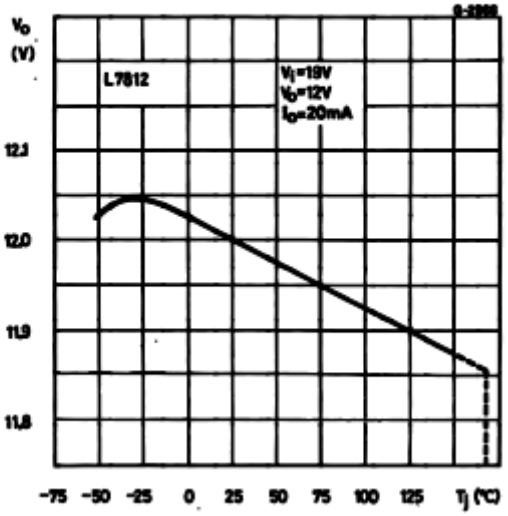


Figure 8 : Output Impedance vs Frequency

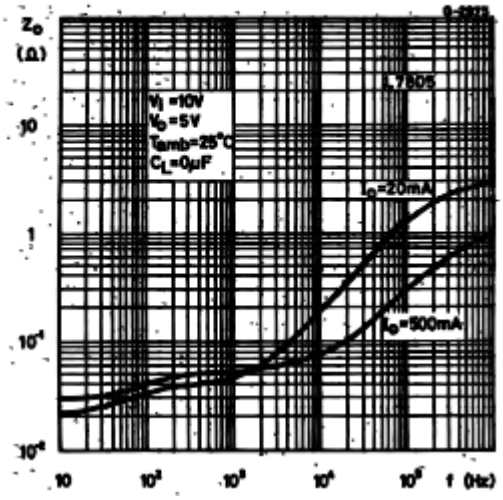


Figure 9 : Quiescent Current vs Junction Temperature

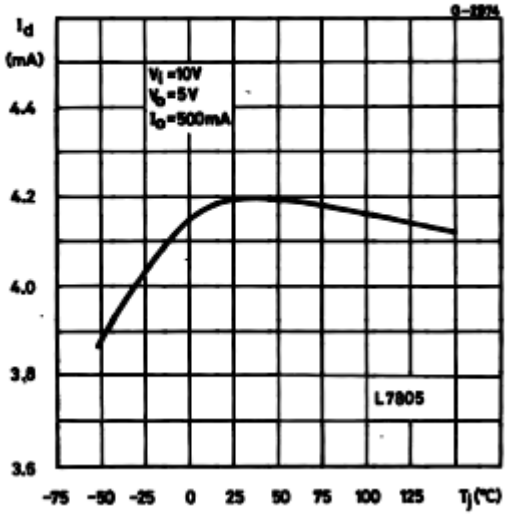


Figure 10 : Load Transient Response

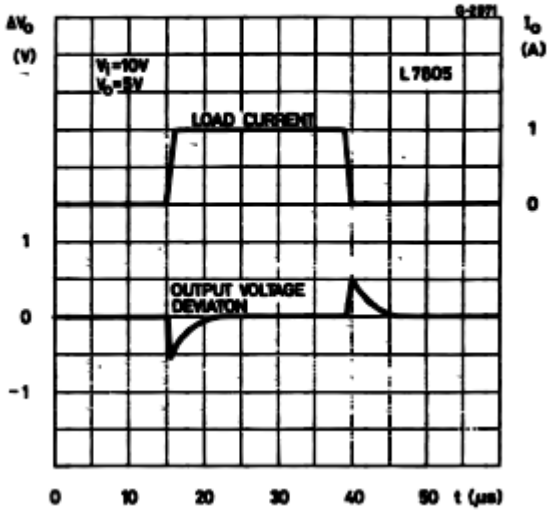


Figure 11 : Line Transient Response

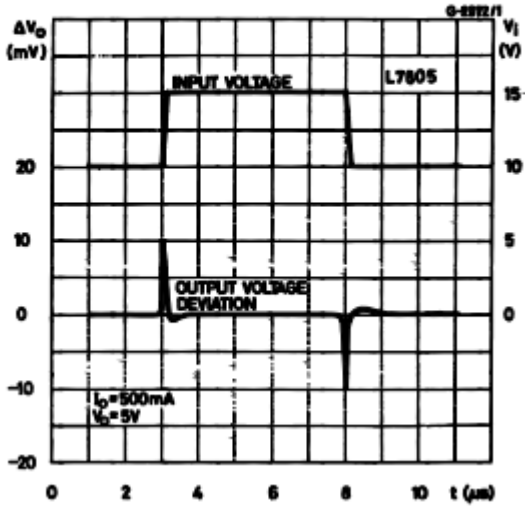
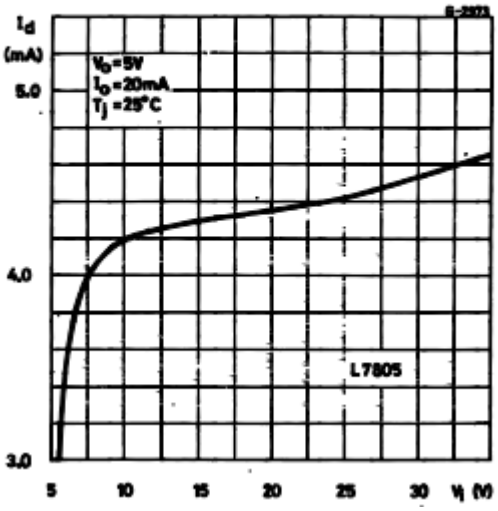
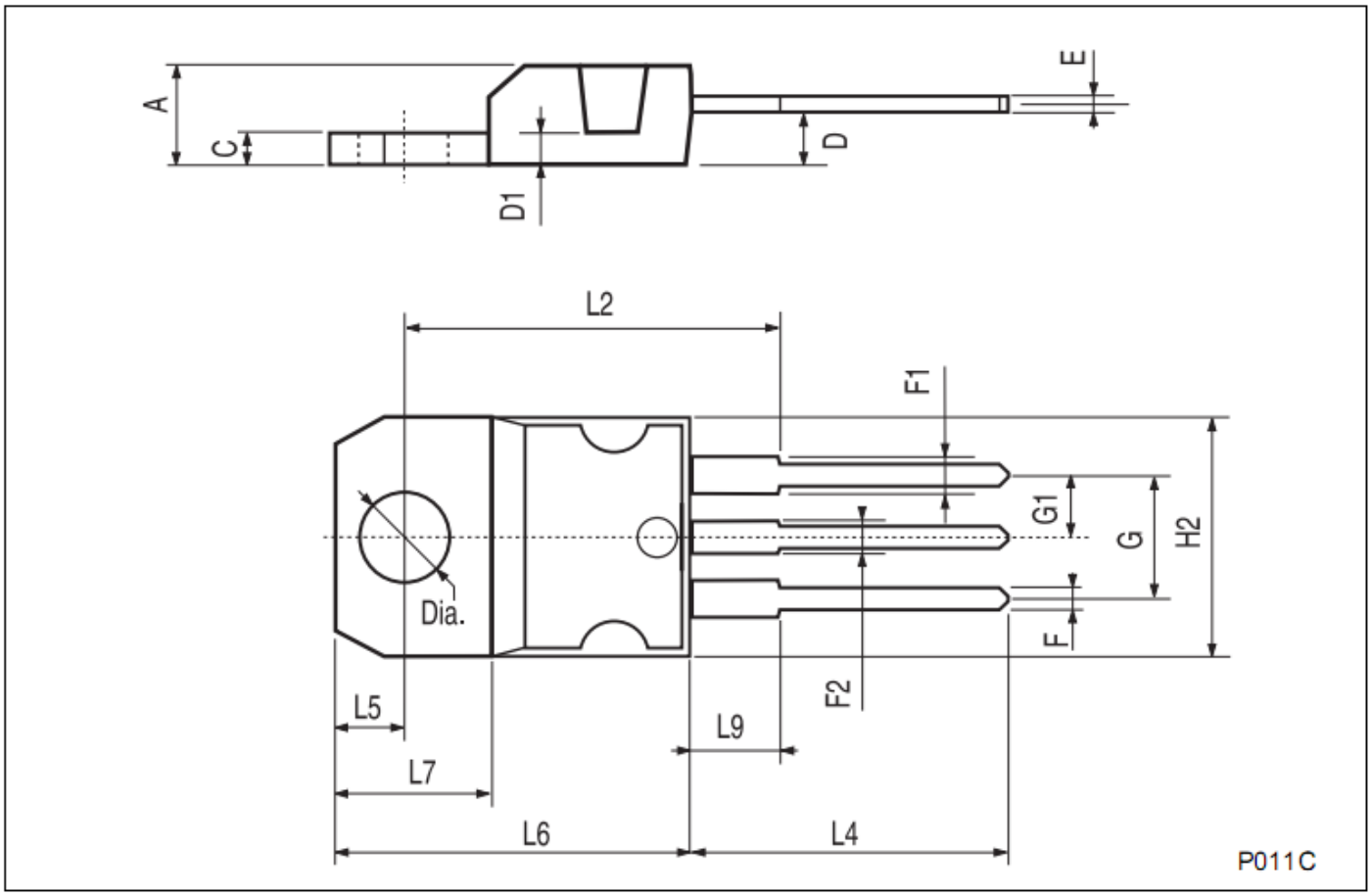


Figure 12 : Quiescent Current vs Input Voltage



PACKAGE DESCRIPTION

TO-220 PACKAGE OUTLINE DIMENSIONS



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