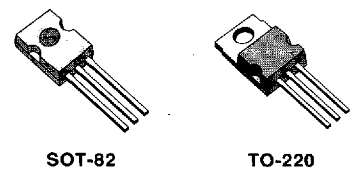
VERY LOW DROP VOLTAGE REGULATORS

- INPUT/OUTPUT DROP TYP. 0.4V
- 400mA OUTPUT CURRENT
- LOW QUIESCENT CURRENT
- REVERSE POLARITY PROTECTION
- OVERVOLTAGE PROTECTION (± 60V)
- FOLDBACK CURRENT LIMITING
- THERMAL SHUTDOWN

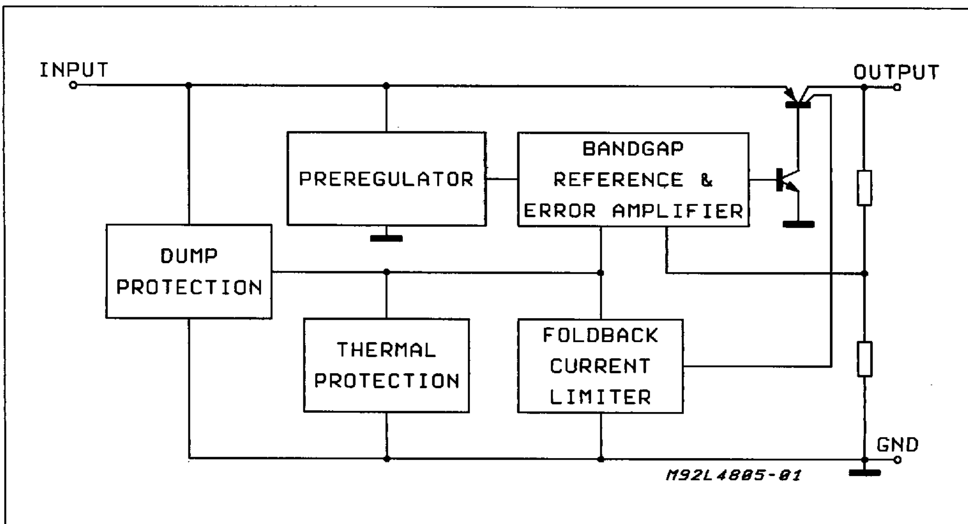


DESCRIPTION

L4800 series devices are voltage regulators with a very low voltage drop (typically 0.4V at full rated current), output current up to 400mA, low quiescent current and comprehensive on-chip protection. These devices are protected against load dump and field decay transients of ± 60V, polarity reversal and overheating. A foldback current limiter protects against load short circuits. Available in 5V, 8.5V, 9.2V, 10V and 12V versions (all ± 4%, $T_j = 25°C$) these regulators are designed for automotive, industrial and consumer applications where low consumption is particularly important.

In automotive applications the L4805 is ideal for 5V logic supplies because it can operate even when the battery voltage falls below 6V. In battery backup and standby applications the low consumption of these devices extends battery life.

BLOCK DIAGRAM



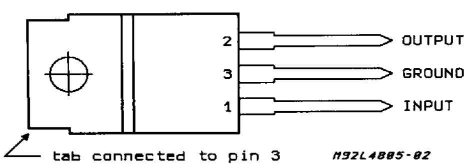
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_I	DC Input Voltage	+ 35	V
	DC Input Reverse Voltage	- 18	V
	Transient Input Overvoltages : Load Dump : 5ms ≤ T_{rise} ≤ 10ms, τ_f Fall Time Constant = 100ms, R_{source} ≤ 0.5Ω	60	V
	Field Decay : 5ms ≤ t_{fall} ≤ 10ms, R_{source} ≤ 10Ω τ_r Rise Time Constant = 33ms	- 60	V
T_j, T_{stg}	Junction and Storage Temperature Range	- 55 to + 150	°C

THERMAL DATA

			SOT-82	TO-220
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	8 °C/W	4 °C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	100 °C/W	75 °C/W

PIN CONNECTION (top view)



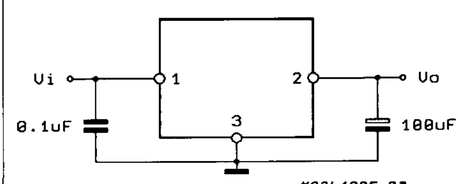
Order Codes		Output Voltage
TO-220	SOT-82	
L4805CV	L4805CX	5V
L4808CV	L4808CX	8V
L4885CV	L4885CX	8.5 V
L4892CV	L4892CX	9.2 V
L4810CV	L4810CX	10 V
L4812CV	L4812CX	12 V

TEST AND APPLICATION CIRCUIT

The output capacitor is required for stability. Though the 100 µF shown is the minimum recommended value, actual size and type may vary depending upon the application load and temperature range. Capacitor effective series resistance (ESR) also factors in the IC stability. Since ESR varies from one brand to the next, some bench work may be required to determine the minimum capacitor value to use in production. Worst-case is usually determined at the minimum ambient temperature and maximum load expected.

Output capacitors can be increased in size to any desired value above the minimum. One possible purpose of this would be to maintain the output voltages during brief conditions of negative input transients that might be characteristics of a particular system.

Capacitors must also be rated at all ambient temperature expected in the system. Many aluminum type electrolytics will freeze at temperatures less than – 30 °C, reducing their effective capacitance to zero. To maintain regulator stability down to – 40 °C, capacitors rated at that temperature (such as tantalums) must be used.



ELECTRICAL CHARACTERISTICS (V_I = 14.4V; C_O = 100µF; T_j = 25°C unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 5mA to 400mA (L4805)	4.80	5.00	5.20	V
		I_O = 5mA to 400mA (L4808)	7.68	8.00	8.32	V
		I_O = 5mA to 400mA (L4810)	8.16	8.50	8.84	V
		I_O = 5mA to 400mA (L4812)	8.83	9.20	9.57	V
		I_O = 5mA to 400mA (L4885)	9.60	10.00	10.40	V
		I_O = 300mA (L4892)	11.50	12.00	12.50	V
V_I	Operating Input Voltage				26	V
$\Delta V_O/V_O$	Line Regulation	VI = 13 to 26V; I_O = 5mA		1	10	mV/V
$\Delta V_O/V_O$	Load Regulation	IO = 5 to 400mA*		3	15	mV/V
$V_I - V_O$	Dropout Voltage	I_O = 400mA*		0.4	0.7	V
		I_O = 150mA		0.2	0.4	V
I_q	Quiescent Current	I_O = 0mA		0.8	2	mA
		I_O = 150mA		25	45	mA
		I_O = 400mA*		65	90	mA
$\frac{\Delta V_O}{\Delta T \bullet V_O}$	Temperature Output Voltage Drift			0.1		$\frac{mV}{°C \bullet V}$
SVR	Supply Voltage Rejection	I_O = 350mA; f = 320Hz; C_O = 100µF; $V_I = V_O + 3V + 2V_{pp}$		60		dB
I_O	Max Output Current			800		mA
I_{SC}	Output Short Circuit Current (fold back condition)			350	500	mA

* only for L4892 the current test conditions is I_O = 300mA

ELECTRICAL CHARACTERISTICS (V_I = 14.4V; C_O = 100µF; T_j = -40 to 125°C (note 1) unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 5mA to 400mA (L4805)	4.70	5.00	5.30	V
		I_O = 5mA to 400mA (L4808)	7.50	8.00	8.50	V
		I_O = 5mA to 400mA (L4810)	8.00	8.50	9.00	V
		I_O = 5mA to 400mA (L4812)	8.65	9.20	9.75	V
		I_O = 5mA to 400mA (L4885)	9.40	10.00	10.60	V
		I_O = 300mA (L4892)	11.30	12.00	12.70	V
V_I	Operating Input Voltage	see note 2			26	V
$\Delta V_O/V_O$	Line Regulation	VI = 14 to 26V; I_O = 5mA		2	15	mV/V
$\Delta V_O/V_O$	Load Regulation	IO = 5 to 400mA*		5	25	mV/V
$V_I - V_O$	Dropout Voltage	I_O = 400mA*		0.5	0.9	V
		I_O = 150mA		0.25	0.5	V
I_q	Quiescent Current	I_O = 0mA		1.2	3	mA
		I_O = 150mA		40	70	mA
		I_O = 400mA*		80	140	mA
I_O	Max Output Current			870		mA
I_{SC}	Output Short Circuit Current (fold back condition)			230		mA

Notes : 1. This limits are guaranteed by design, correlation and statistical control on production samples over the indicated temperature and supply voltage ranges..

2. For a DC voltage 26V < Vi < 35V the device is not operating.

Figure 1: Dropout Voltage vs. Output Current

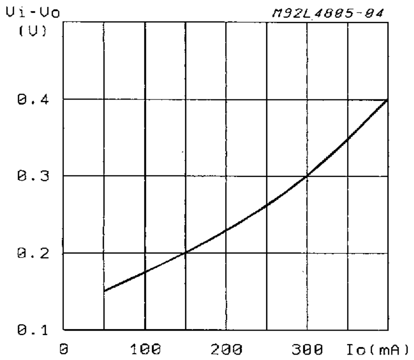


Figure 2: Quiescent Current vs. Output Current

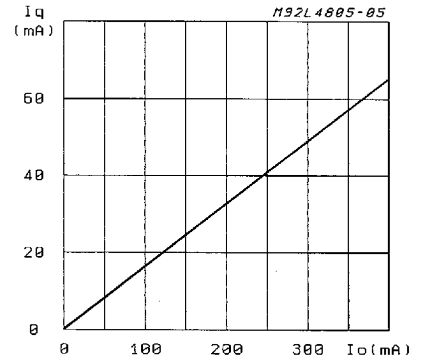


Figure 3: Output Voltage vs. Temperature

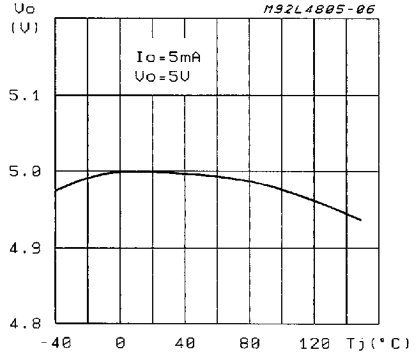


Figure 4: Foldback Current Limiting(L4805)

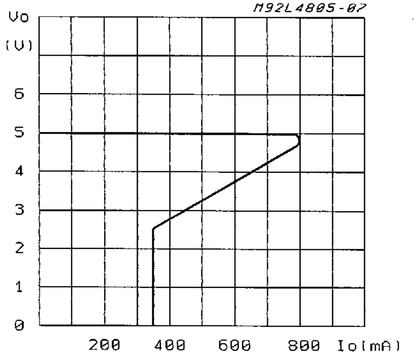


Figure 5: Preregulator for Distributed Supplies