L4705
L4785
L4710

LINEAR INTEGRATED CIRCUITS

PRELIMINARY DATA

VERY LOW DROP VOLTAGE REGULATORS

- INPUT/OUTPUT DROP TYP. 0.6V
- 500 mA OUTPUT CURRENT
- 80V LOAD DUMP PROTECTION
- -80V TRANSIENT PROTECTION
- REVERSE POLARITY PROTECTION
- OVERVOLTAGE PROTECTION
- OUTPUT CURRENT LIMITING
- THERMAL SHUTDOWN

L4700 series voltage regulators feature a very low voltage drop, an output current of 500 mA and protection against load dump transients of ± 80V. Available in 5V, 8.5V and 10V (±4%) versions, these regulators also include reverse polarity protection, overvoltage protection, output current limiting and a thermal shutdown circuit.
L4700 series regulators are specially designed for automotive and industrial applications where the electrical environment is very demanding and low voltage drop is required. For example, the L4705 can be used in 5V automotive applications, continuing to function even when the battery voltage falls to 6V, a common event during starting. Moreover, the L4705 is fully protected against the transients, overvoltages and polarity reversal encountered on the battery rail.

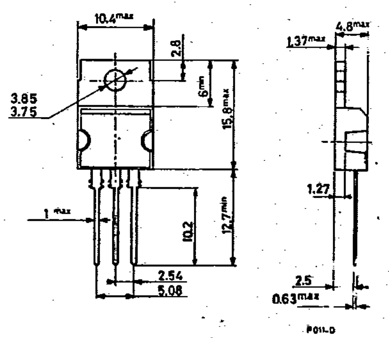
ABSOLUTE MAXIMUM RATINGS

V_i	Forward input voltage	35	V
V_i	Reverse input voltage	-18	V
V_t	Positive transient peak voltage (t = 300 ms)	+80	V
V_t	Negative transient peak voltage (t = 100 ms)	-80	V
T_{op}	Operating junction temperature	-40 to 150	°C
T_{stg}	Storage temperature	-55 to 150	°C

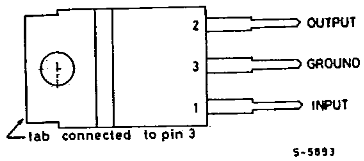
ORDERING NUMBER: L4705CV (5V), L4785CV (8.5V), L4710CV (10V)

MECHANICAL DATA

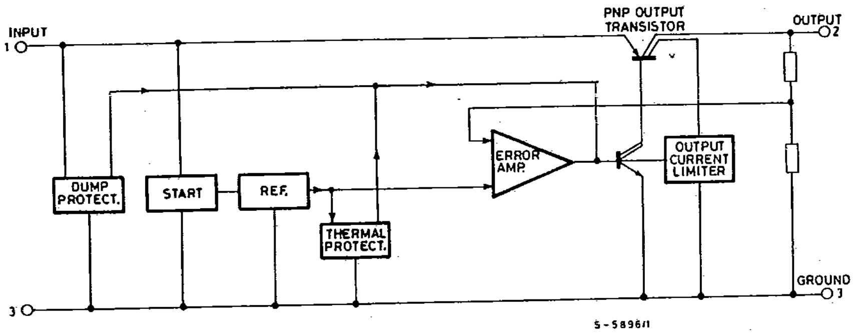
Dimensions in mm



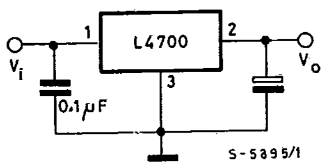
CONNECTION DIAGRAM (top view)



BLOCK DIAGRAM



TEST AND APPLICATION CIRCUIT



The output capacitor is required for stability. Though the 47μF 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 characteristic 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.

THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal resistance junction-case	max	4	°C/W

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ELECTRICAL CHARACTERISTICS (V_i = 14.4V, T_j = 25°C)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
V_o	Output voltage	I_o = 5 mA to 500 mA	4.80	5	5.20	V
			8.16	8.5	8.84	V
			9.6	10	10.4	V
V_i	Operating input voltage	(*) see note			28	V
$\Delta V_o/V_o$	Line regulation	V_i = 11 to 26V I_o = 5 mA		1		mV/V
$\Delta V_o/V_o$	Load regulation	I_o = 5 to 500 mA		3		mV/V
V_i-V_o	Dropout voltage	I_o = 500 mA		0.6	0.9	V
I_q	Quiescent current	I_o = 0 mA		6		mA
		I_o = 150 mA		20	40	mA
		I_o = 500 mA		130		mA
$\frac{\Delta V_o}{\Delta T \cdot V_o}$	Temperature output voltage drift			0.1		$\frac{mV}{°C \cdot V}$
SVR	Supply voltage rejection	I_o = 350 mA f = 120 Hz C_o = 100 μF $V_i=V_o+3V+2V_{pp}$		55		dB
I_{sc}	Output short circuit current			800		mA

(*) For a DC input voltage 28V < V_i < 35V the device is not operating.

Fig. 1 - Dropout voltage vs. output current

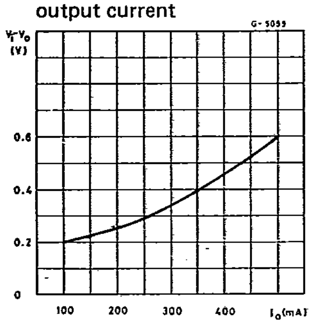

Fig. 2 - Quiescent current vs. output current

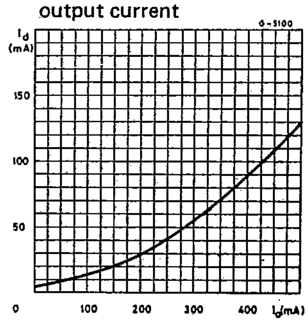

Fig. 3 - Output voltage vs. temperature