SGS-THOMSON MICROELECTRONICS

L4920
L4921

VERY LOW DROP ADJUSTABLE REGULATORS

PRELIMINARY DATA

- VERY LOW DROP VOLTAGE
- ADJUSTABLE OUTPUT VOLTAGE FROM 1.25V TO 20V
- 400mA OUTPUT CURRENT
- LOW QUIESCENT CURRENT
- OVERVOLTAGE AND REVERSE VOLTAGE PROTECTION
- +60/-60V TRANSIENT PEAK VOLTAGE
- SHORT CIRCUIT PROTECTION WITH FOLDBACK CHARACTERISTICS
- THERMAL SHUT-DOWN

The L4920 and L4921 are adjustable voltage regulators with a very low voltage drop (0.4V typ. at 0.4A), low quiescent current and comprehensive on-chip protection.

These devices are protected against load dump transients of ± 60V, input overvoltage, polarity reversal and over heating.

A foldback current limiter protects against load short circuits.

The output voltage is adjustable through an external divider from 1.25V to 20V. The minimum operating input voltage is 5.2V.

These regulators are designed for automotive, industrial and consumer applications where low consumption is particularly important.

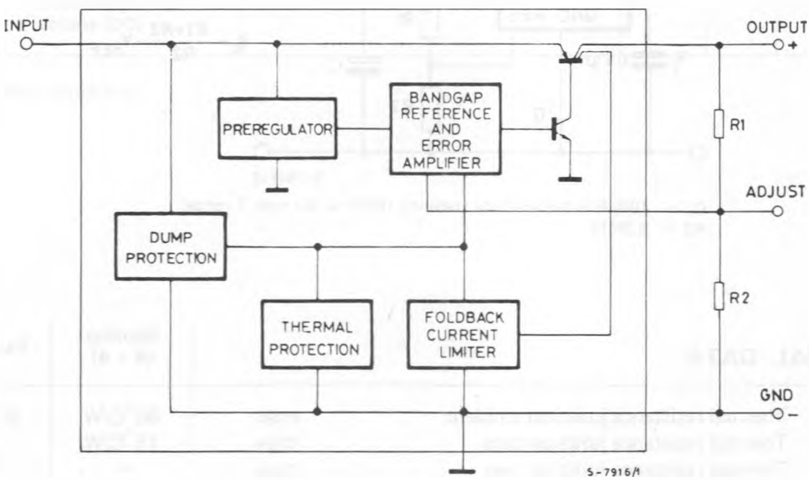
In battery backup and standby applications the low consumption of these devices extends battery life.

Pentawatt Minidip (4 + 4)

ORDERING NUMBERS:

L4920 L4921

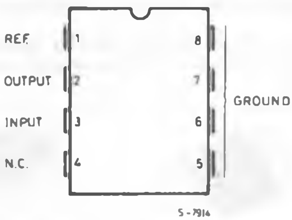
BLOCK DIAGRAM



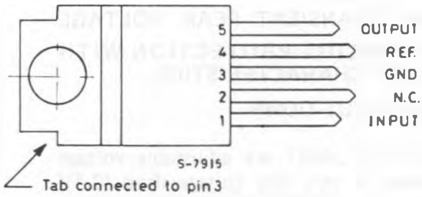
ABSOLUTE MAXIMUM RATINGS

V_i	DC input operating voltage	26	V
V_t	Positive transient peak voltage (t = 300ms 1% duty cycle)	+60	V
V_t	Negative transient peak voltage (t = 100ms 1% duty cycle)	-60	V
V_i	Reverse input voltage	-18	V
T_{stg}	Storage temperature	-55 to 150	°C
T_{op}	Operating junction temperature	-40 to 150	°C

CONNECTION DIAGRAMS (top view)

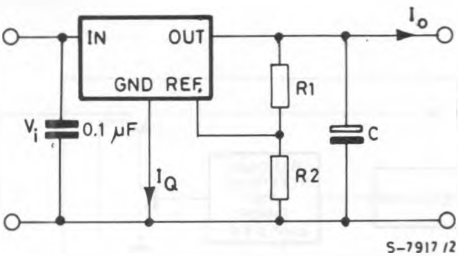


Minidip



Pentawatt

APPLICATION CIRCUIT



$$V_O = \frac{R1 + R2}{R2} V_{REF}$$

C = 100μF is required for stability (ESR ≤ 3Ω over T range)
R2 = 6.2KΩ.

THERMAL DATA

			Minidip (4 + 4)	Pentawatt
$R_{th\ j\text{-}amb}$	Thermal resistance junction ambient	max	80°C/W	60°C/W
$R_{th\ j\text{-}pins}$	Thermal resistance junction pins	max	15°C/W	–
$R_{th\ j\text{-}case}$	Thermal resistance junction case	max	–	4°C/W

ELECTRICAL CHARACTERISTICS (For V_i = 14.4V, V_o = 5V; T_j = 25°C; C = 100µF; R2 = 6.2KΩ unless otherwise noted)

	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_I	Operating input voltage	$V_O \geq 4.5V$ I_O = 400mA	$V_O + 0.7$		26	V
		$V_{REF} \leq V_O < 4.5V$ I_O = 400mA	5.2		26	V
V_{REF}	Reference voltage	$5.2V < V_I < 26V$ $I_O \leq 400mA$ (*)	1.20	1.25	1.30	V
ΔV_O	Line regulation	$V_O + 1V < V_I < 26V$ $V_O \geq 4.5V$ I_O = 5mA		1	10	mV/V_O
ΔV_O	Load regulation	$5mA < I_O < 400mA$ (*) $V_O \geq 4.5V$		3	15	mV/V_O
V_D	Dropout voltage	I_O = 10mA I_O = 150mA I_O = 400mA		0.05 0.2 0.4	 0.4 0.7	V V V
I_D	Quiescent current	I_O = 0mA $V_O + 1V < V_I < 26V$		0.8	3	mA
		I_O = 400mA (*) $V_O + 1V < V_I < 26V$		65	100	mA
I_O	Maximum output current			750	1000	mA
I_{OSC}	Short circuit output current (*)		200	350	500	mA
V_R	Reverse polarity input voltage (DC)	$V_O \geq -1.5V$ $R_L \leq 500\Omega$			-18	V

(*) Foldback protection

Fig. 1 - Output voltage vs. temperature

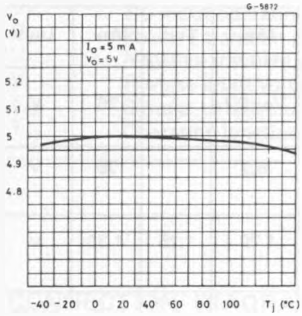


Fig. 2 - Foldback current limiting

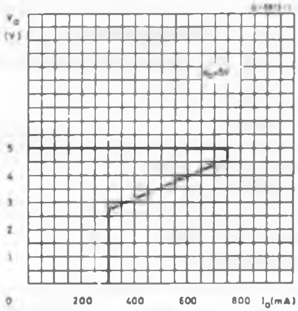
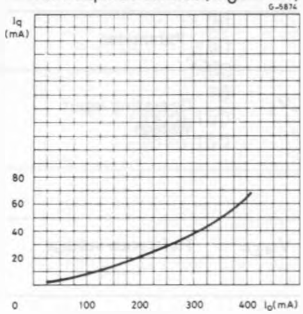


Fig. 3 - Quiescent current vs. output current (V_o = 5V)



APPLICATION INFORMATION

1) The L4920 and L4921 have $V_{REF} \cong 1.25V$. Then the output voltage can be set down to V_{REF} but V_I must be greater than 5.2V.
2) As the regulator reference voltage source works in closed loop, the reference voltage may change in foldback condition.
3) For applications with high V_I the total power dissipation of the device with respect to the thermal resistance of the package may be limiting the application. The total power dissipation is:

$$P_{tot} = V_I \, I_q + (V_I - V_o) \, I_o$$

A typical curve giving the quiescent current I_q as a function of the output current I_o is shown in fig. 3.