

## SUPPLY VOLTAGE SUPERVISORS

- POWER-ON RESET GENERATOR
- AUTOMATIC RESET GENERATION AFTER VOLTAGE DROP
- WIDE SUPPLY VOLTAGE RANGE ... 3V TO 18V
- PRECISION VOLTAGE SENSOR
- TEMPERATURE-COMPENSATED VOLTAGE REFERENCE
- TRUE AND COMPLEMENT RESET OUTPUTS
- EXTERNALLY ADJUSTABLE PULSE WIDTH

### DESCRIPTION

The TL7700A series are monolithic integrated circuit supply voltage supervisors specifically designed for use as reset controllers in microcomputer and microprocessor systems. During power-up the device tests the supply voltage and keeps the RESET and  $\overline{\text{RESET}}$  outputs active (high and low, respectively) as long as the supply voltage has not reached its nominal voltage value. Taking RESIN low has the same effect. To ensure that the microcomputer system has reset, the TL7700A then initiates an internal time delay that delays the return of the reset outputs to their inactive states. Since the time delay for most microcomputers and microprocessors is in the order of several machine cycles, the device internal time delay is determined by an external time delay is determined by an external capacitor connected to the  $C_T$  input (pin 3).

$$t_d = 1.3 \times 10^4 \times C_T$$

Where:  $C_T$  is in farads (F) and  $t_d$  in seconds (s). In addition, when the supply voltage drops below the nominal value, the outputs will be active until the supply voltage returns to the nominal value. An external capacitor (typically 0.1  $\mu\text{F}$ ) must be connected to the REF output (pin 1) to reduce the influence of fast transients in the supply voltage.

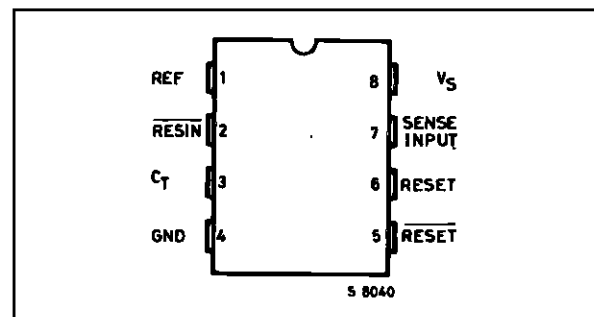
The TL7700AI series is characterized for operation from  $-25^\circ\text{C}$  to  $85^\circ\text{C}$ ; the TL7700AC series is characterized from  $0^\circ\text{C}$  to  $70^\circ\text{C}$ .



### ORDERING NUMBERS

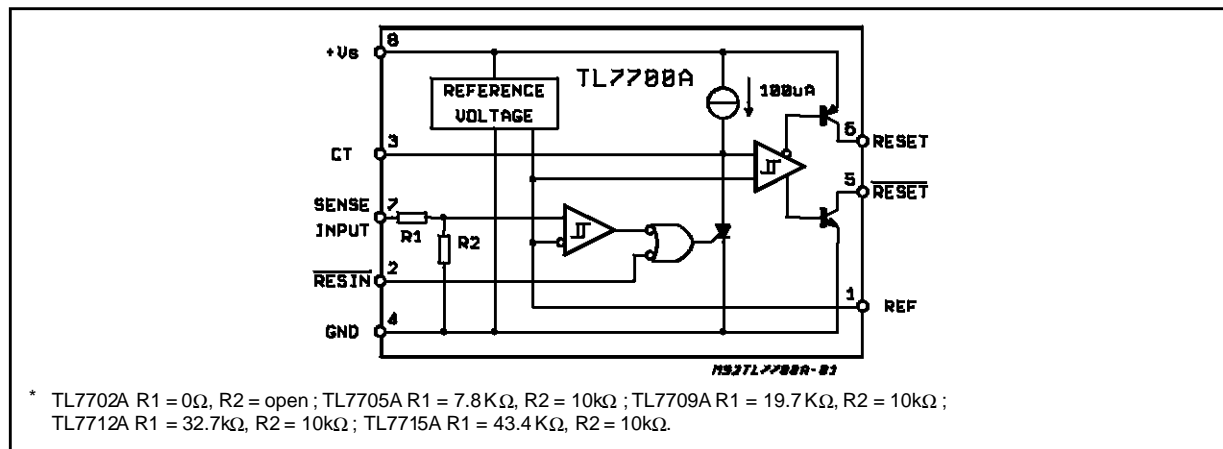
Temperature Range	Minidip	S08
0 to $70^\circ\text{C}$	TL77XXACP	TL77XXACD
$-25$ to $85^\circ\text{C}$	TL77XXAIP	TL77XXAID

### PIN CONNECTION (top view)



## TL7700A Series

### BLOCK DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>S</sub>	Supply Voltage, V <sub>CC</sub> - (see note 1)	20	V
V <sub>i</sub>	Input Voltage Range at $\overline{\text{RESIN}}$	-0.3 to 20	V
V <sub>i</sub>	Input Voltage at SENSE : TL7702A (see note 2) TL7705A TL7709A TL7712A TL7715A	-0.3 to 6 -0.3 to 10 -0.3 to 15 -0.3 to 20 -0.3 to 20	V
I <sub>OH</sub>	High-level Output Current at RESET	-30	mA
I <sub>OL</sub>	Low-level Output Current at RESET	30	mA
T <sub>amb</sub>	Operating Free-air Temperature Range : TL77XXAI TL77XXAC	-25 to 85 0 to 70	°C
T <sub>stg</sub>	Storage Temperature Range	-65 to 150	°C

- Notes :**
- All voltage values are with respect to the network ground terminal
  - For the TL7700A, the voltage applied to the SENSE terminal must never exceed V<sub>S</sub>.

### THERMAL DATA

Symbol	Parameter	Value	Unit
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient Max.	120	°C/W

### RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min.	Max.	Unit
V <sub>S</sub>	Supply Voltage	3.6	18	V
V <sub>IH</sub>	High-level Input Voltage at RESIN	2		V
V <sub>IL</sub>	Low-level Input Voltage at RESIN		0.6	V
V <sub>i</sub>	Voltage at Sense Input TL7702A TL7705A TL7709A TL7712A TL7715A	0 0 0 0 0	See note 3 10 15 20 20	V
I <sub>OH</sub>	High-level Output Current at RESET		-16	mA
I <sub>OL</sub>	Low-level Output Current at RESET		16	mA
T <sub>amb</sub>	Operating Free-air Temperature Range TL77-AI TL77-AC	-25 0	85 70	°C

- Note :**
- For proper operation of the TL7702A, the voltage applied to the SENSE terminal should not exceed V<sub>S</sub> - 1V or 6V, which ever is less.

**ELECTRICAL CHARACTERISTICS** these specifications unless otherwise specified, apply for :  
 $T_{amb} = -25$  to  $85^{\circ}\text{C}$  (TLXXAI),  $T_{amb} = 0$  to  $70^{\circ}\text{C}$  (TL77XXAC)

Symbol	Parameter	Test Conditions (1)	Min.	Typ.	Max.	Unit
$V_{OH}$	High-level Output Voltage at RESET	$I_{OH} = -16\text{mA}$	$V_s - 1.5$			V
$V_{OL}$	Low-Level Output Voltage at RESET	$I_{OL} = 16\text{mA}$		0.4		V
$V_{ref}$	Reference Voltage	$T_{amb} = 25^{\circ}\text{C}$	2.48	2.53	2.58	V
$V_T$	Threshold Voltage at SENSE Input	TL7702A TL7705A TL7709A TL7712A TL7715A $V_s = 3.6\text{V to }18\text{V}$ $T_{amb} = 25^{\circ}\text{C}$	2.48 4.5 7.5 10.6 13.2	2.53 4.55 7.6 10.8 13.5	2.58 4.6 7.7 11 13.8	V
$V_T$	Threshold Voltage at SENSE Input	TL7702A TL7705A TL7709A TL7712A TL7715At $V_s = 3.6\text{V to }18\text{V}$	2.45 4.45 7.4 10.4 13	2.53 4.55 7.6 10.8 13.5	2.58 4.6 7.7 11 13.8	V
$V_{T+}, V_{T-}$	Hysteresis (2) at SENSE Input	TL7702A TL7705A TL7709A TL7712A TL7715A $V_s = 3.6\text{V to }18\text{V}$ $T_{amb} = 25^{\circ}\text{C}$		10 15 20 35 45		mV
$I_i$	Input Current at RESIN Input	$V_i = 2.4\text{V to }V_s$ $V_i = 0.4\text{V}$		20 -100		$\mu\text{A}$
$I_i$	Input Current at SENSE Input	TL7702A $V_{ref} < V_i < V_s - 1.5\text{V}$		0.5	2	$\mu\text{A}$
$I_{OH}$	High-level Output Current at RESET	$V_O = 18\text{V}$		50		$\mu\text{A}$
$I_{OL}$	Low-level Output Current at RESET	$V_O = 0\text{V}$		-50		$\mu\text{A}$
$I_S$	Supply Current	All Inputs and out. open		1.8	3.3	mA

- Notes :**
- All characteristics are measured with  $C = 0.1\mu\text{F}$  from Pin 1 to GND, and with  $C = 0.1\mu\text{F}$  from Pin 3 to GND.
  - Hysteresis is the difference between the positive going input threshold voltage,  $V_{T+}$ , and the negative going input threshold voltage,  $V_{T-}$ .

### SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{pi}$	Pulse Width at SENSE Input	$V_{ih} = V_{ityp} + 0.04 \times V_i$ $V_{il} = V_{ityp} - 0.04 \times V_i$	0.9			$\mu\text{s}$
$t_{pi}$	Pulse Width at RESIN Input		0.4			$\mu\text{s}$
$t_{po}$	Pulse Width at Output	$C_T = 0.1\mu\text{F}$	0.65	1.3	2.6	ms
$t_{pdHL}$	Propagation Delay Time from RESIN to RESET	$C_L = 100\text{pF}, V_s = 5\text{V}, R_L = 4.7\text{k}\Omega$			1	$\mu\text{s}$
$t_{r/f}$	Rise/Falltime at RESET and RESET	$C_L = 10\text{pF}, V_s = 5\text{V}, R_L = 4.7\text{k}\Omega$			1	$\mu\text{s}$

Figure 1 : Multiple Power Supply System Reset Generation

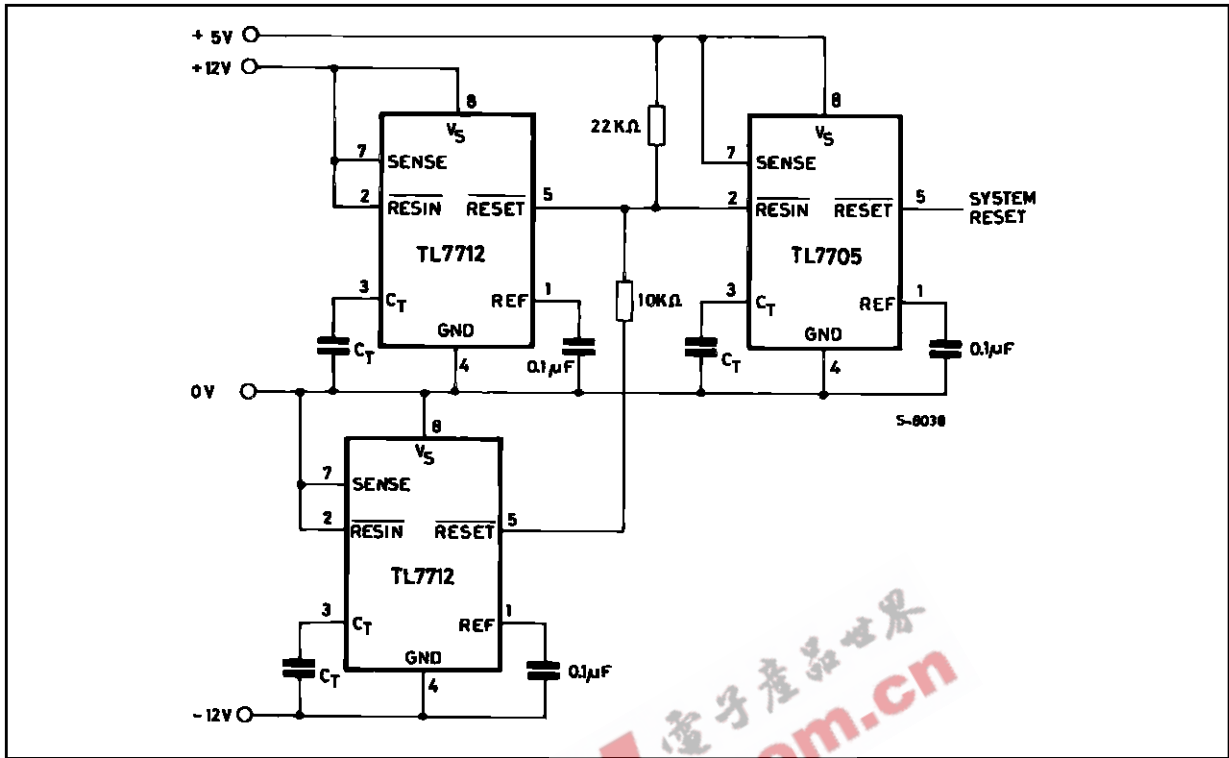
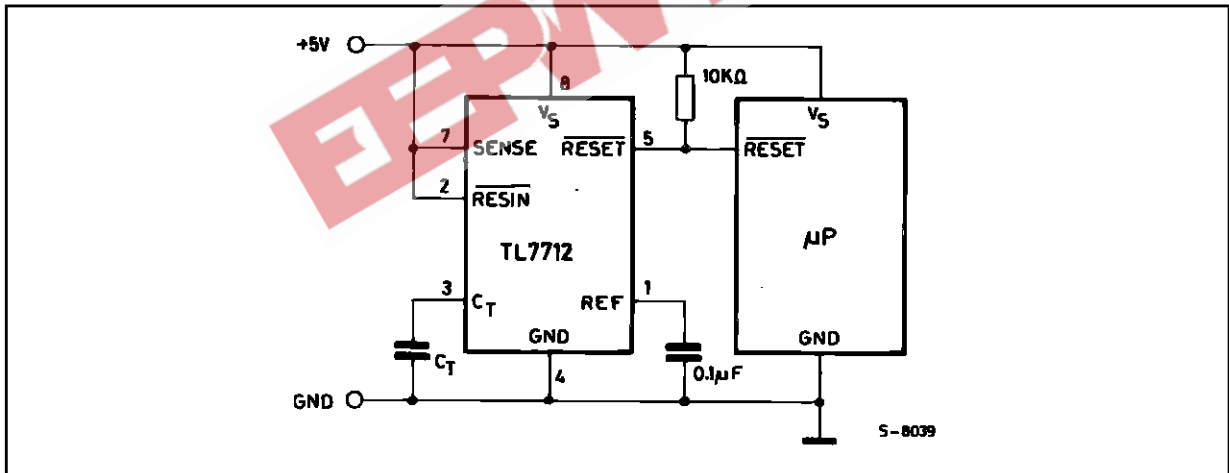
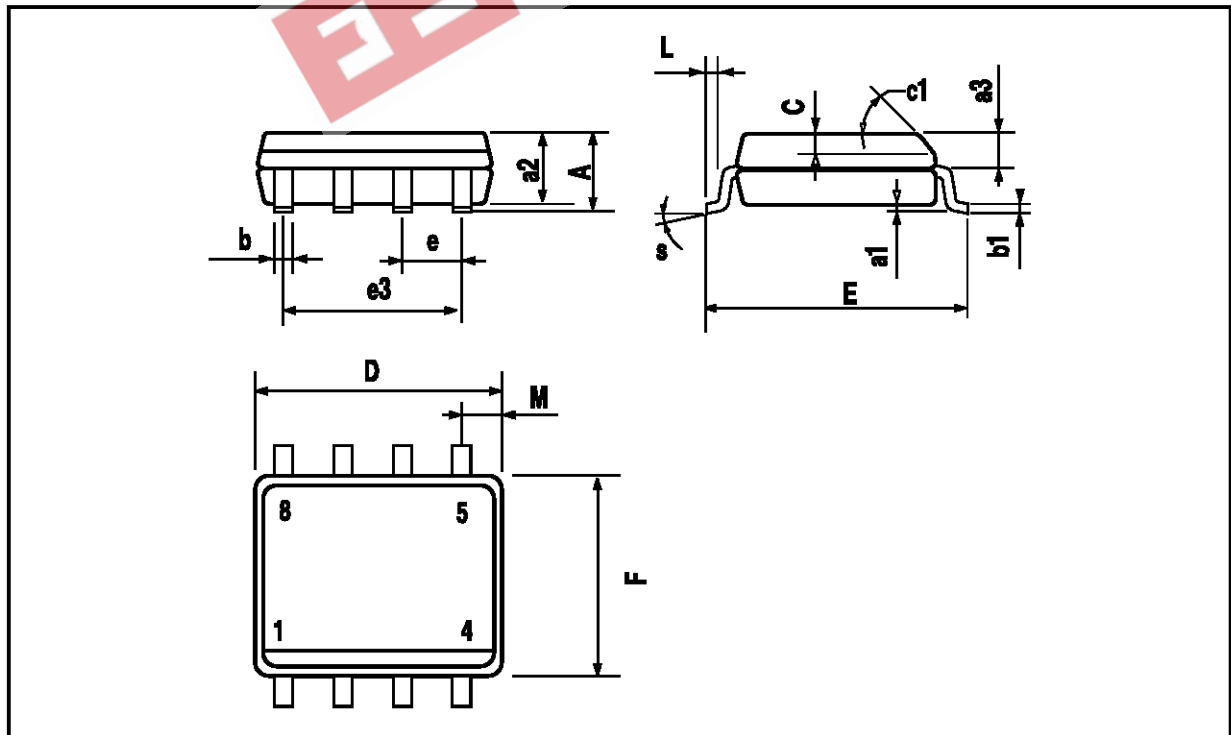


Figure 2 : Reset Controller for  $\mu$ P



SO8 PACKAGE MECHANICAL DATA

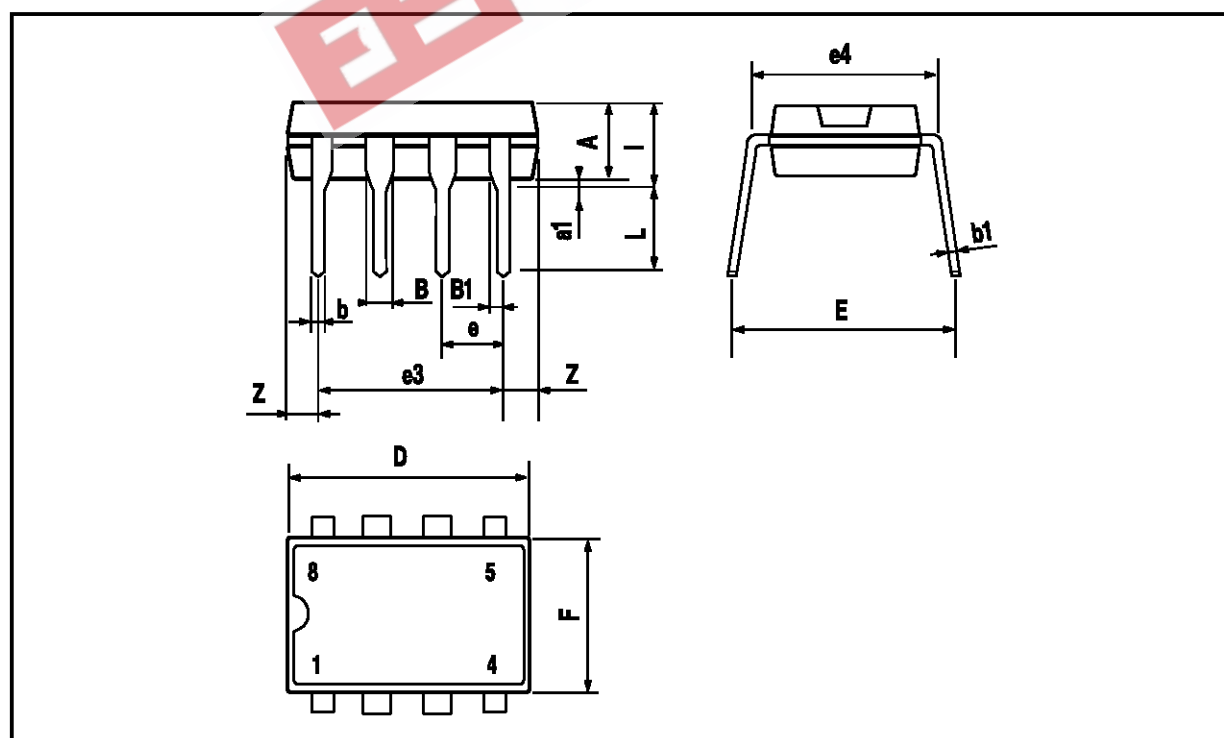
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.15		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					



## TL7700A Series

### MINIDIP PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060



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