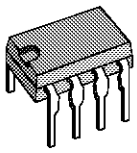
SGS-THOMSON MICROELECTRONICS

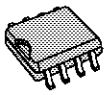
TS3V3702

3V MICROPOWER DUAL VOLTAGE COMPARATORS

- DEDICATED TO **3.3V** OR **BATTERY SUPPLY** (specified at 3V and 5V)
- PUSH-PULL CMOS OUTPUT (NO EXTERNAL PULL-UP RESISTOR REQUIRED)
- EXTREMELY LOW SUPPLY CURRENT : **7µA typ / comparator**
- WIDE SINGLE SUPPLY RANGE **2.7V TO 16V**
- EXTREMELY LOW INPUT CURRENTS : **1pA TYP**
- INPUT COMMON-MODE VOLTAGE RANGE INCLUDES GND
- FAST RESPONSE TIME : 2µs typ for 5mV overdrive
- PIN-TO-PIN AND FUNCTIONALLY COMPATIBLE WITH BIPOLAR LM393



N
DIP8
(Plastic Package)



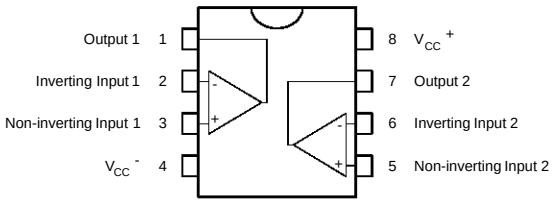
D
SO8
(Plastic Micropackage)

ORDER CODES

Part Number	Temperature Range	Package	
		N	D
TS3V3702I	-40°C, +125°C	●	●

3702-01.TBL

PIN CONNECTIONS (top view)



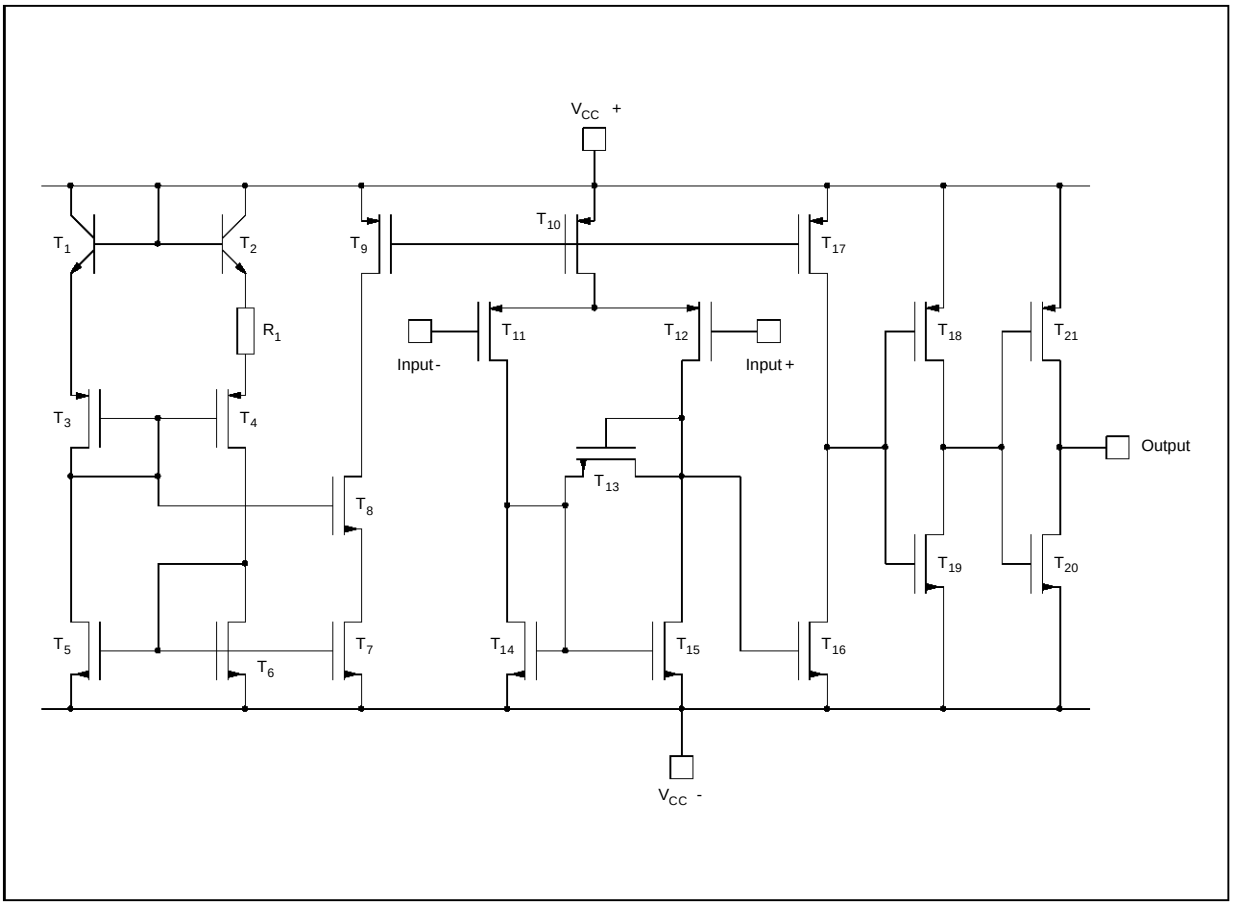
3702-01.EPS

DESCRIPTION

The TS3V3702 is a micropower dual CMOS voltage comparator with extremely low consumption of 7µA typ / comparator (20 times less than bipolar LM393). The push-pull CMOS output stage allows power and space saving by eliminating the external pull-up resistor required by usual open-collector output comparators.

Thus response times remain similar to the LM393.

SCHEMATIC DIAGRAM (for 1/2 TS3V3702)



MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC+}	Supply Voltage - (note 1)	18	V
V_{id}	Differential Input Voltage - (note 2)	±18	V
V_i	Input Voltage - (note 3)	18	V
V_O	Output Voltage	18	V
I_O	Output Current	20	mA
T_{oper}	Operating Free-Air Temperature Range TS3V3702I	-40 to +125	°C
T_{stg}	Storage Temperature Range	-65 to +150	°C

3702-02.TBL

Notes : 1. All voltage values, except differential voltage, are with respect to network ground terminal.
2. Differential voltages are the non-inverting input terminal with respect to the inverting input terminal.
3. The magnitude of the input and the output voltages must never exceed the magnitude of the positive supply voltage.
4. Short circuit from outputs to V_{CC+} can cause excessive heating and eventual destruction.

OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC+}	Supply Voltage	2.7 to 16	V
V_{icm}	Common Mode Input Voltage Range	0 to V_{CC}^+ -1.5	V

3702-03.TBL

ELECTRICAL CHARACTERISTICS

V_{CC}^+ = 3V, V_{CC}^- = 0V, T_{amb} = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{io}	Input Offset Voltage - (note 1) V_{ic} = 1.5V $T_{min.} \leq T_{amb} \leq T_{max.}$			 5 6.5	mV
I_{io}	Input Offset Current - (note 2) V_{ic} = 1.5 V $T_{min.} \leq T_{amb} \leq T_{max.}$		 1	 300	pA
I_{ib}	Input Bias Current - (note 2) V_{ic} = 1.5 V $T_{min.} \leq T_{amb} \leq T_{max.}$		 1	 600	pA
V_{icm}	Input Common Mode Voltage Range $T_{min.} \leq T_{amb} \leq T_{max.}$	0 to V_{CC}^+-1.2 0 to V_{CC}^+ -1.5			V
CMR	Common-mode Rejection Ratio $V_{ic} = V_{icm\ min.}$		 80		dB
SVR	Supply Voltage Rejection Ratio V_{CC}^+ = 3V to 5V		 75		dB
V_{OH}	High Level Output Voltage V_{id} = 1V, I_{OH} = -4mA $T_{min.} \leq T_{amb} \leq T_{max.}$	 2 1.8	 2.4		V
V_{OL}	Low Level Output Voltage V_{id} = -1V, I_{OL} = 4mA $T_{min.} \leq T_{amb} \leq T_{max.}$		 300	 400 450	mV
I_{CC}	Supply Current (each comparator) No load - Outputs low $T_{min.} \leq T_{amb} \leq T_{max.}$		 7	 20 25	µA
t_{PLH}	Response Time Low to High V_{ic} = 0V, f = 10kHz, C_L = 50pF, Overdrive = 5mV TTL Input		 1.5 0.7		µs
t_{PHL}	Response Time High to Low V_{ic} = 0V, f = 10kHz, C_L = 50pF, Overdrive = 5mV TTL Input		 2.2 0.15		µs

3702-04.TBL

Note : 1. The specified offset voltage is the maximun value required to drive the output up to 4.5V or down to 0.3V.
2. Maximum values including unavoidable inaccuracies of the industrial test.

ELECTRICAL CHARACTERISTICS

V_{CC}^+ = 5V, V_{CC}^- = 0V, T_{amb} = 25°C (unless otherwise specified)

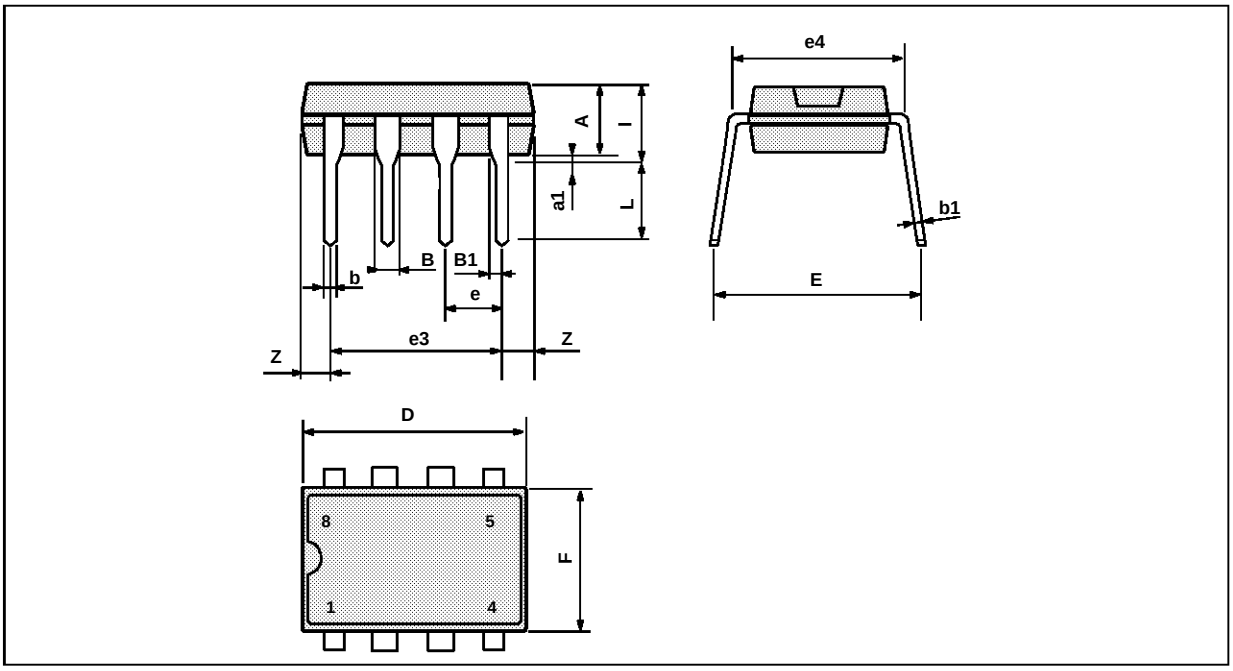
Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{io}	Input Offset Voltage - (note 1) V_{ic} = 2.5V $T_{min.} \leq T_{amb} \leq T_{max.}$		1.2	5 6.5	mV
I_{io}	Input Offset Current - (note 2) V_{ic} = 2.5 V $T_{min.} \leq T_{amb} \leq T_{max.}$		1	300	pA
I_{ib}	Input Bias Current - (note 2) V_{ic} = 2.5 V $T_{min.} \leq T_{amb} \leq T_{max.}$		1	600	pA
V_{icm}	Input Common Mode Voltage Range $T_{min.} \leq T_{amb} \leq T_{max.}$	0 to V_{CC}^+-1.2 0 to V_{CC}^+ -1.5			V
CMR	Common-mode Rejection Ratio $V_{ic} = V_{icm\ min.}$		80		dB
SVR	Supply Voltage Rejection Ratio V_{CC}^+ = +5V to +10V		90		dB
V_{OH}	High Level Output Voltage V_{id} = 1V, I_{OH} = -4mA $T_{min.} \leq T_{amb} \leq T_{max.}$	4.5 4.3	4.7		V
V_{OL}	Low Level Output Voltage V_{id} = -1V, I_{OL} = 4mA $T_{min.} \leq T_{amb} \leq T_{max.}$		200	300 375	mV
I_{CC}	Supply Current (per comparator) No load - Outputs low $T_{min.} \leq T_{amb} \leq T_{max.}$		9	20 25	µA
t_{PLH}	Response Time Low to High V_{ic} = 0V, f = 10kHz, C_L = 50pF, Overdrive = 5mV TTL Input		1.5 0.7		µs
t_{PHL}	Response Time High to Low V_{ic} = 0V, f = 10kHz, C_L = 50pF, Overdrive = 5mV TTL Input		2.2 0.15		µs

3702-05.TBL

Note : 1. The specified offset voltage is the maximun value required to drive the output up to 4.5V or down to 0.3V.
2. Maximum values including unavoidable inaccuracies of the industrial test.

PACKAGE MECHANICAL DATA

8 PINS - PLASTIC DIP



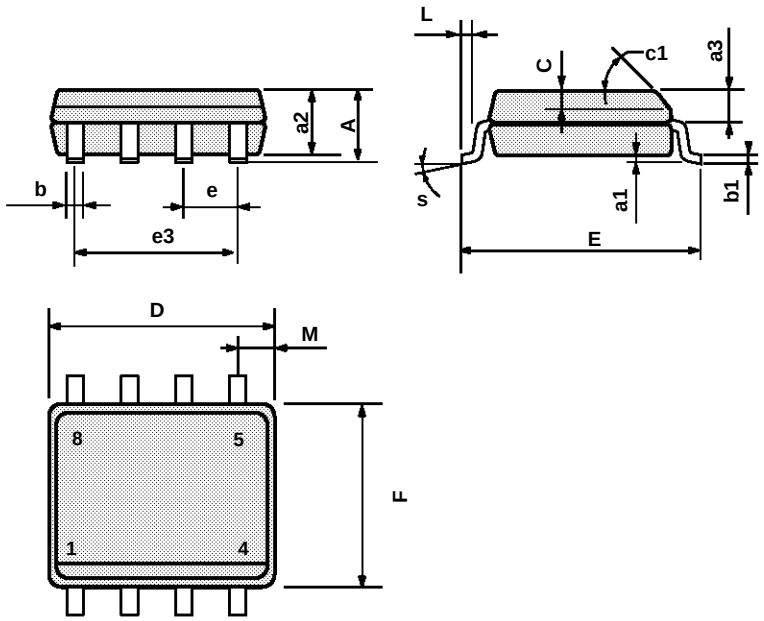
PM-DIP8.EPS

Dimensions	Millimeters			Inches		
	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			0260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

DIP8.TBL

PACKAGE MECHANICAL DATA

8 PINS - PLASTIC MICROPACKAGE (SO)



PM-S08.EPS

Dimensions	Millimeters			Inches		
	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^o (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	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8^o (max.)					

SO8.TBL

ORDER CODE :