

UTC TS391/A/B LINEAR INTEGRATED CIRCUIT

LOW POWER SINGLE VOLTAGE COMPARATOR

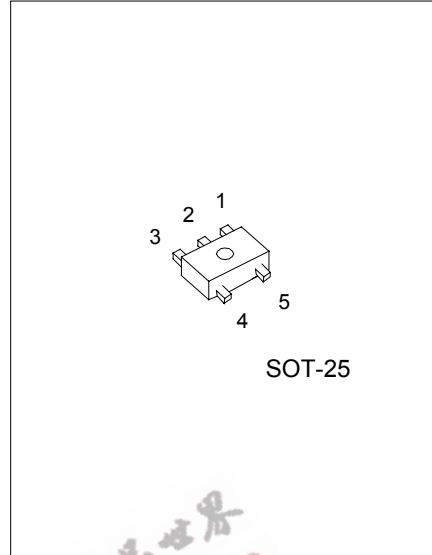
DESCRIPTION

The UTC TS391/A/B consist of a low power voltage comparator designed specifically to operate from a single supply over a wide range of voltages. Operation from split power supplies is also possible.

This comparator also a unique characteristic in that the input common-mode voltage range includes ground even though operated from a single power supply voltage.

FEATURES

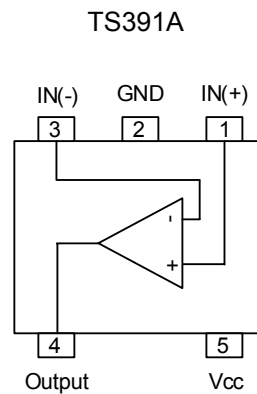
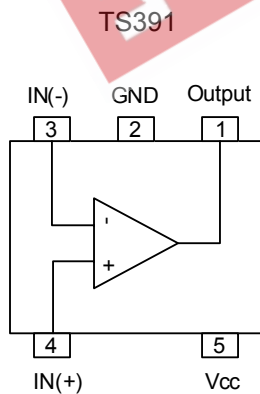
- *Wide single supply voltage range or dual supplies +2V to +34V or $\pm 1V$ to $\pm 18V$
- *Very low supply current (0.2mA) independent of supply voltage (1 mW /comparator at +5V)
- *Low input bias current: 25nA typ.
- *Low input offset current: $\pm 5nA$ typ.
- *Low input offset voltage: $\pm 1mV$ typ
- *Input common-mode voltage range includes ground.
- *Low output saturation voltage: 250mV typ. ($I_o=4mA$).
- *Differential input voltage range equal to the supply voltage.



MARKING

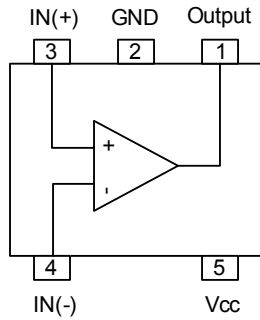
Part Number	Marking
TS391	S1
TS391A	SA
TS391B	SB

PIN CONNECTIONS (top view)

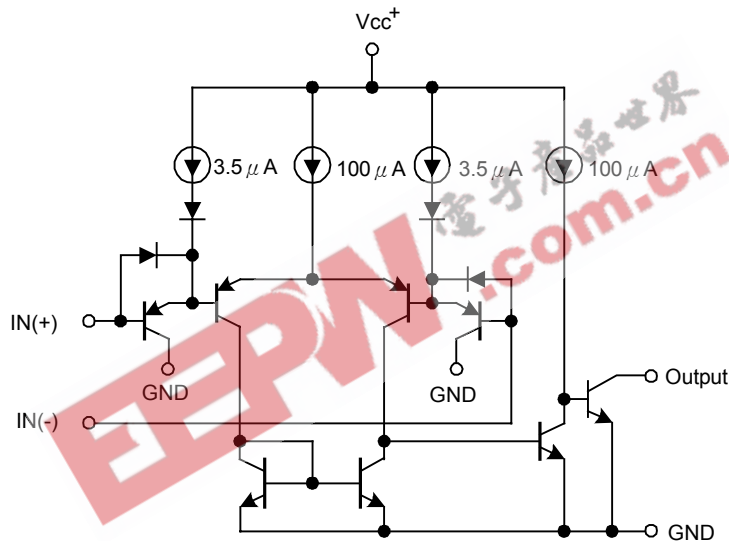


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TS391B



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	Vcc	± 18 or 36	V
Differential Input Voltage	Vid	± 36	V
Input Voltage	Vi	-0.3 ~ +36	V
Output Short-circuit to Ground ¹⁾		Infinite	
Power Dissipation ²⁾	Pd	500	mW
Operating Free Air Temperature Range	Topr	-40 ~ +125	°C
Storage Temperature Range	Tstg	-65 ~ +150	°C

- Short-circuit from the output to Vcc can cause excessive heating and eventual destruction. The maximum output current is approximately 20mA, independent of the magnitude of Vcc.
- Tj=150°C, Tamb=25°C with Rthja=250°C/W for SOT25 Package.

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ELECTRICAL CHARACTERISTICS

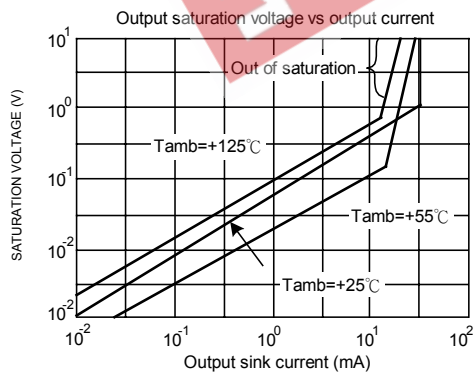
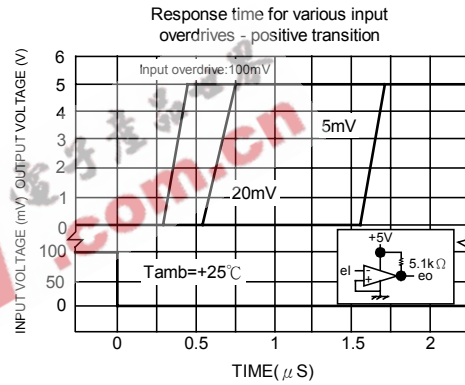
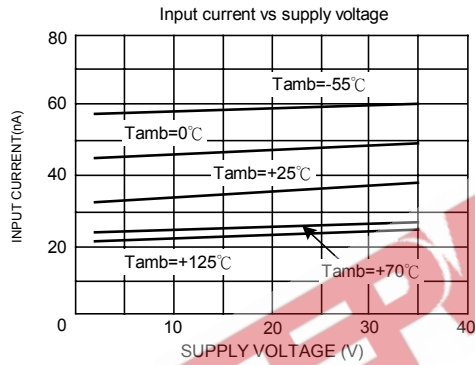
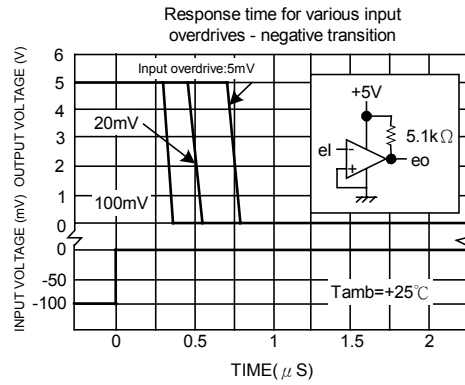
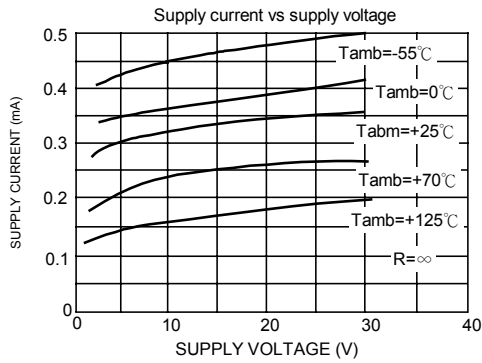
V_{cc}=5.0V, All voltage referenced to GND, T_{amb}=25°C(unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage ¹⁾	V _{io}	T _{amb} =+25°C T _{min.} ≤ T _{amb} ≤ T _{max.}		1	5 9	mV
Input Bias Current ²⁾	I _{ib}	T _{amb} =+25°C T _{min.} ≤ T _{amb} ≤ T _{max.}		25	250 400	nA
Input Offset Current	I _{io}	T _{amb} =+25°C T _{min.} ≤ T _{amb} ≤ T _{max.}		5	50 150	nA
Large Signal Voltage Gain	G _v	V _{cc} =15V, R _L =15k, V _o =1 to 11V	50	200		V/mV
Supply Current	I _{cc}	V _{cc} =5V, no load V _{cc} =30V, no load		0.2 0.5	0.5 1.25	mA
Input Common Mode Voltage Range ³⁾	V _{icm}	T _{amb} =+25°C T _{min.} ≤ T _{amb} ≤ T _{max.}	0 0		V _{cc} -1.5 V _{cc} -2	mV
Differential Input Voltage ⁴⁾	V _{id}				V _{cc}	mV
Output sink current	I _{sink}	V _{id} =-1V, V _o =1.5V	6	16		mA
Low Level Output Voltage	V _{OL}	V _{id} =1V, V _{cc} =V _o =30V T _{amb} =+25°C T _{min.} ≤ T _{amb} ≤ T _{max.}		250	400 700	mV
High Level Output Current	I _{OH}	V _{id} =1V, V _{cc} =V _o =30V T _{amb} =+25°C T _{min.} ≤ T _{amb} ≤ T _{max.}		0.1	1	nA μA
Response Time	t _{re}	R _L =5.1kΩ to V _{cc} ⁵⁾		1.3		μs
Large Signal Response Time	t _{rel}	V _i =TTL, V _{ref} =+1.4V, R _L =5.1kΩ to V _{cc}		300		ns

1. At output switch point, V_o=1.4V, R_s=0Ω with V_{cc} from 5V to 30V and over the full input common-mode range(0V to V_{cc} -1.5V).
2. The direction of the input current is out of the IC due to the PN P input stage. This current is essentially constant, independent of the state of the output, so no loading charge exists on the reference or input lines.
3. The input common-mode voltage of either input signal voltage should not be allowed to go negative by more than 0.3V. The upper end of the common-mode voltage range is V_{cc} -1.5V, but either or both inputs can go to +30V without damage.
4. Positive excursions of input voltage may exceed the power supply level. As long as the other voltage remains within the common-mode range the comparator will provide a proper output state.
The low input voltage state must not be less than -0.3V(or 0.3V below the negative power supply, if used).
5. The response time specified is for a 100mV input step with 5mV overdrive. For larger overdrive signals 300ns can be obtained.

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TYPICAL PERFORMANCE CHARACTERISTICS



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