GS391

Low Power Low Offset Voltage Single Comparator

Product Description

The GS391 consists of a independent precision voltage comparator which was designed specifically to operate from a single power supply over a wide range of voltages.

Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

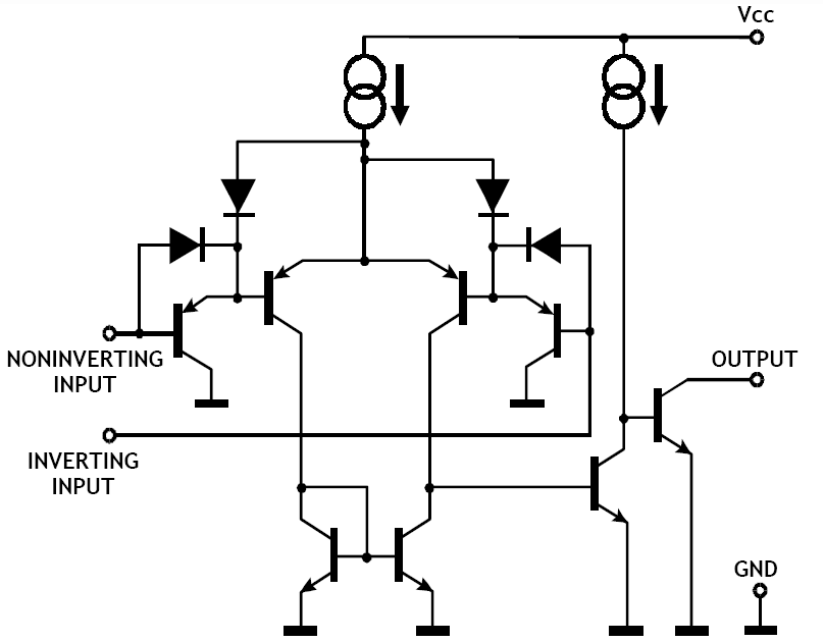
The comparator also has a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

The GS391 was designed to directly interface with TTL and CMOS. When operated from both plus and minus power supplies, the GS391 will directly interface with MOS logic where their low power drain is a distinct advantage over standard comparator.

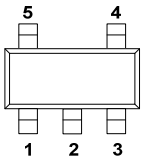
Features

- Wide supply Voltage range: 2.0V to 32V.
- Low supply current drain independent of supply voltage.
- Low input biasing current: 25 nA typ.
- Low input offset current: 5 nA typ.
- Low input offset voltage: 3 mV typ.
- Input common-mode voltage range includes GND.
- Differential input voltage range equal to the power supply voltage
- Low output saturation voltage.
- Output voltage compatible with TTL, MOS and CMOS logic.
- RoHS Compliant and Halogen Free

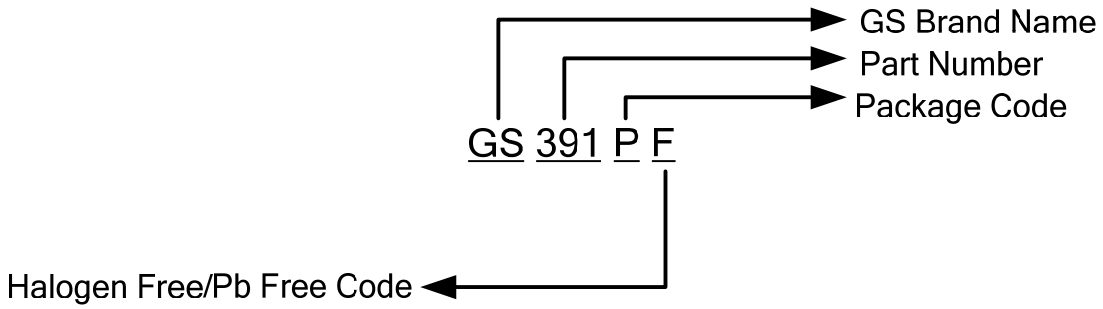
Block Diagram



Packages & Pin Assignments

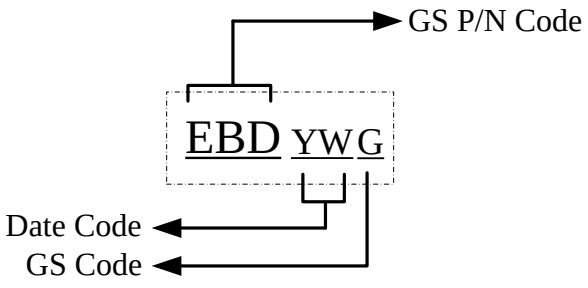
GS391LF(SOT-23-5L)	
	
1	IN(-)
2	GND
3	IN(+)
4	Output
5	V_{CC}

Ordering Information



GS Complete P/N	Package	Marking	Q'ty / Reel
GS391LF	SOT-23-5L	EBD_{YWG}	3K

Marking Information



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	36	V
V_{IDR}	Differential Input Voltage	36	V
V_{IN}	Input Voltage	-0.3 to +36	V
I_{IN}	Input Current	20	mA
P_D	Power Dissipation (Note 1)	500	mW
I_{OS}	Output Short-Circuit to GND	Continuous	
T_{PR}	Operating Temperature Range	0 to 70	ºC
T_{STG}	Storage temperature Range	-65 to 150	ºC
θ_{JA}	Junction to Ambient Thermal Resistance	250	ºC/W

Note 1: For operating at high temperatures, the GS391 must be derated based on a 125ºC maximum junction temperature and a thermal resistance of 170ºC /W which applies for the device soldered in a PCB, operating in a still air ambient. The low bias dissipation and the "ON-OFF" characteristic of the outputs keeps the chip dissipation very small ($P_D \leqq 100mW$), provided the output transistors are allowed to saturate.

Electrical Characteristics

at specified free-air temperature, V_{CC}=5V (Unless Otherwise Noted)

Symbol	Parameter	*Test conditions			Min	Typ	Max	Unit
V_{IO}	Input offset voltage	V_{CC} = 5 V to 30V, V_{IC} = V_{ICR} min, Vo=1.4 V		25 ºC		2	5	mV
				Full range			9	
I_{IO}	Input offset current	Vo=1.4 V		25 ºC		5	50	nA
				Full range			150	
I_{IB}	Input bias current	Vo=1.4 V		25 ºC		25	250	nA
				Full range			400	
V_{ICR}	**Common-mode input voltage range			25 ºC	0 to V_{CC} - 1.5			V
				Full range	0 to V_{CC} - 2.0			
A_{VD}	Large-signal differential voltage amplification	V_{CC} = 15 V, Vo=1.4V to 11.4 V, $R_L \geq 15 k\Omega$ to V_{CC}		25 ºC	50	200		V/mV
I_{OH}	High-level output current	V_{OH}=5V, V_{ID}=1V,		25 ºC		0.1	50	nA
		V_{OH}= 30V, V_{ID}=1V		Full range			1	µA
V_{OL}	Low-level output voltage	I_{OL} = 4mA, V_{ID}=-1V		25 ºC		150	400	mV
				Full range			700	
I_{OL}	Low-level output current	V_{OL}= 1.5V, V_{ID}=-1V		25 ºC	6			mA
I_{CC}	Supply current	R_L = ∞	V_{CC} = 5V	25 ºC		0.8	1	mA
			V_{CC} = 30V	Full range			2.5	

* Full range (MIN to MAX), for the GS391 is 0ºC to 70ºC. All characteristics are measured with zero common-mode input voltage unless otherwise specified.

** The voltage at either input or common-mode 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

Switching Characteristics V_{CC}=5V, T_A=25 °C

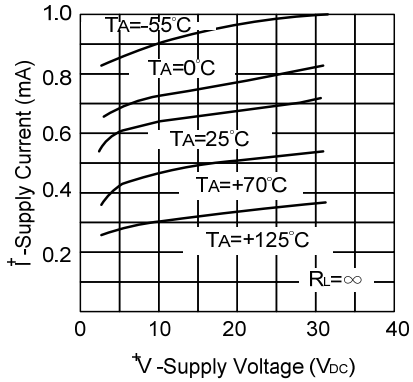
Parameter	Test conditions		Typ	Unit
Response time	R_L connected to 5V through 5.1 kΩ, C_L=15pF* (See Note 1)	100-mV input step with 5-mV overdrive	1.3	µs
		TTL-level input step	0.3	

*C_L includes probe and jig capacitance.

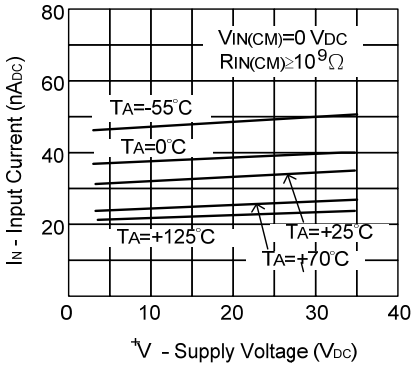
Note 1: The response time specified is the interval between the input step function and the instant when the output crosses 1.4V.

Typical Performance Characteristics

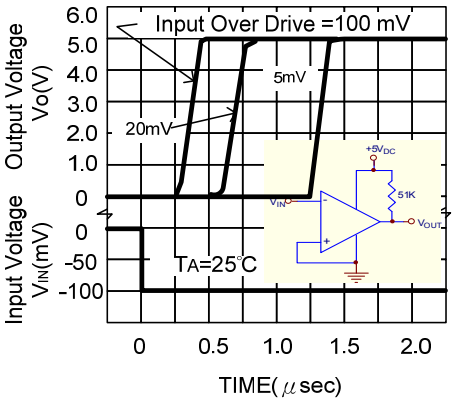
Supply Current



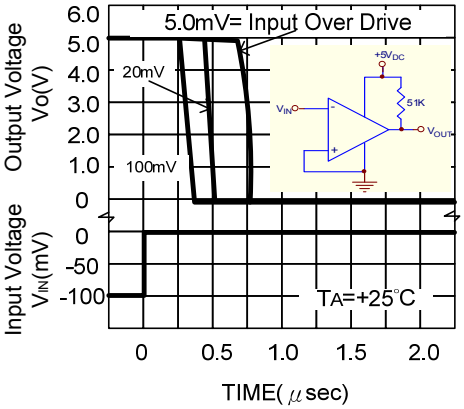
Input Current



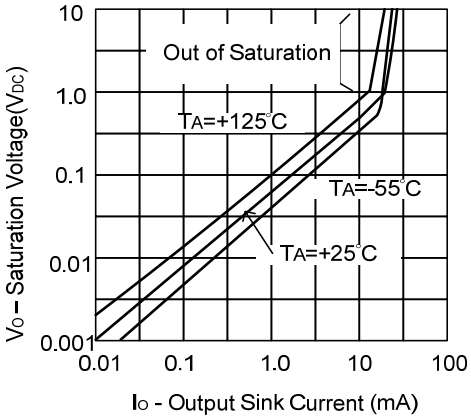
Response Time for Various Input Overdrives–Positive Transition



Response Time for Various Input Overdrives–Negative Transition

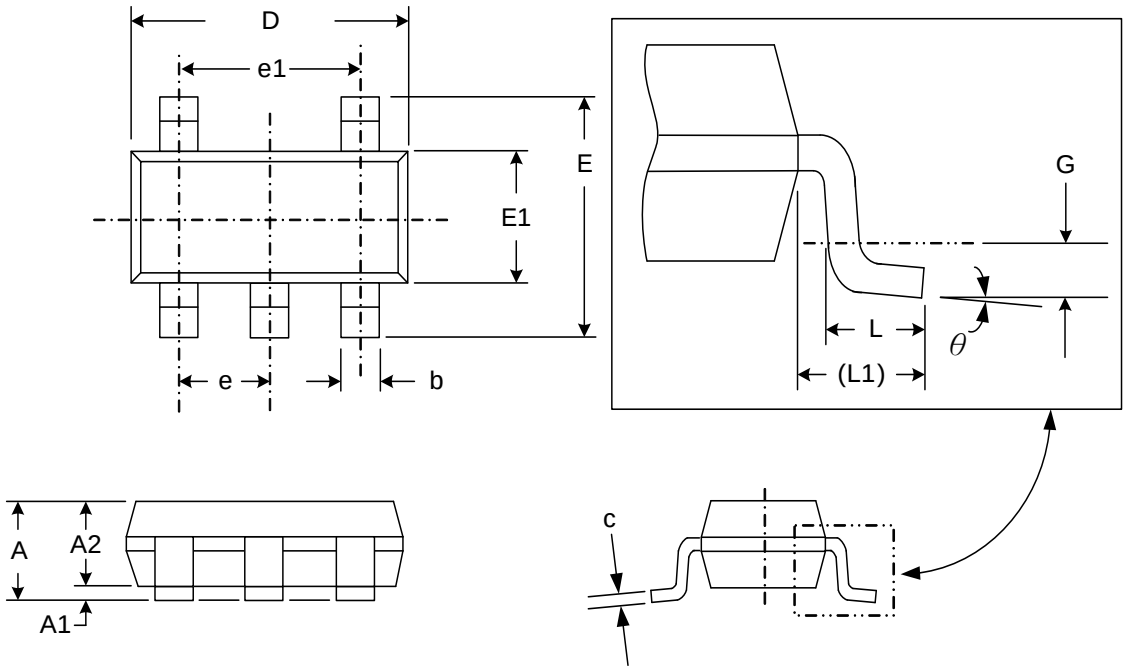


Output Saturation Voltage



Package Dimension

SOT-23-5L



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.95	1.45	.037	.057
A1	0.05	0.15	.002	.006
A2	0.90	1.30	.035	.051
b	0.30	0.50	.012	.020
c	0.08	0.20	.003	.008
D	2.80	3.00	.110	.118
E	2.60	3.00	.102	.118
E1	1.50	1.70	.059	.067
e	0.95 (TYP)		.037 (TYP)	
e1	1.90 (TYP)		.075 (TYP)	
L	0.35	0.55	.014	.022
L1	0.60 (TYP)		.024 (TYP)	
G	0.25 (TYP)		.010 (TYP)	
θ	0°	8°	0°	8°

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