Low Voltage High Performance Comparator

General Description

The ET8202 is a low power comparator that typically consumes less than 10μA supply current. Guaranteed to operate at a low voltage of 1.5V and fully operational up to 5.5V, it is convenient for use battery powered systems.

The ET8202 has a complementary push-pull P- and N-channel output stage capable of driving a rail-to-rail output swing with a load ranging up to 5.0mA.

The device is available in an ultra small DFN6 package. is suitable for space-limited portable device applications.

Features

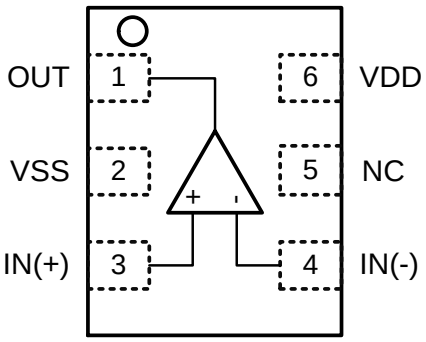
- Low Supply Current is 7μA Typical
- Single Power Supply Operation
- Wide Input Voltage Range from 1.5V to 5.5V
- Wide Common-Mode Input Voltage Range from Rail-to-Rail
- Push-Pull Output Circuit
- Low Input Bias Current
- Internal Hysteresis
- Package information:

Part No.	Package	MSL
ET8202	DFN6 (1.45mm × 1.0mm)	Level 1

Application

- Mobile Phones
- Alarm and Security Systems
- Personal Digital Assistant

Pin Configuration



TOP VIEW

Pin Function

Pin NO.	Pin Name	Description
1	OUT	Comparator Output
2	VSS	Negative Supply Voltage
3	IN(+)	Non-Inverting Input of Comparator
4	IN(-)	Inverting Input of Comparator
5	NC	No Connect
6	VDD	Positive Supply Voltage

Block Diagram

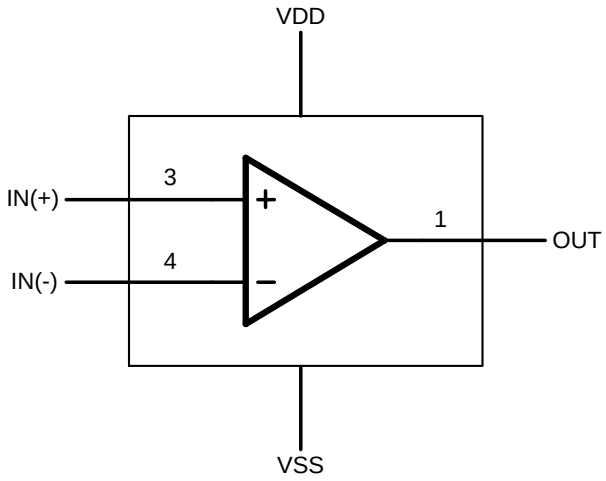


Figure 2

Functional Description

Inputs	Outputs
IN(-) > IN(+)	Output LOW
IN(+) > IN(-)	Output HIGH

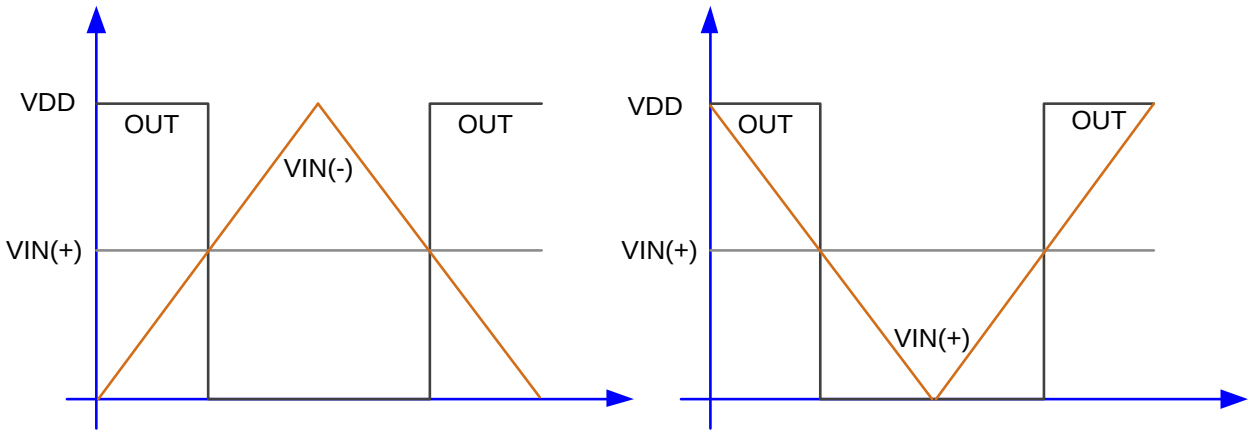


Figure 3. V_{IN} vs V_{OUT}

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended.In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Min	Max	Unit
V_{DD} to V_{SS}	Supply Voltage		8.0	V
DV_{IN}	Differential Input Voltage		± 8.0	V
V_{IN}	Input Voltage		V_{SS} to V_{DD}	V
T_J	Max Junction Temperature	-40	+150	°C
T_{STG}	Storage Temperature Range	-55	+150	°C
P_D(1)	Power Dissipation		220	mW

Note1: The maximum total power dissipation must not be exceeded.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. It is not recommended exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Condition	Min.	Typ	Max.	Unit
V_{DD} to V_{SS}	Power Supply				5.5	V
V_{DD}	Power Supply	V_{SS}=0V	1.5		5.5	V
V_{IN}	Input Voltage		V_{SS}		V_{DD}	V
I_{OH}/I_{OL}	Output Sink/Source Current	V_{DD}=3.0V			15	mA
		V_{DD}=1.8V			8	
		V_{DD}=1.5V			5	
T_A	Operating Temperature, Free Air		-40		+85	°C

Electrical Characteristics

V_{DD}=3.0V,V_{SS}=GND, T_A=+25°C

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{HYS}	Input Hysteresis	V_{CM}=0.5V_{DD}		4		mV
V_{IO}	Input Offset Voltage(2)	V_{CM}=0.5V_{DD}	-6	±1	+6	mV
I_{IO}	Input Offset Current			10		pA
I_I	Input Bias Current			10		pA
V_{CM}	Common Mode Input Voltage		V_{SS}		V_{DD}	V
CMRR	Common Mode Rejection Ratio(3)	V_{CM}=V_{DD}		68		dB
I_{DD}	Supply Current			7	17	μA
PSRR	Power Supply Rejection Ratio(3)	ΔV_{DD}=0.5V	45	80		dB
V_{OL}	Low-Level Output Voltage	I_{SINK}=5.0mA		0.15	0.4	V
V_{OH}	High-Level Output Voltage	I_{SOURCE}=5.0mA	2.6	2.85		V
t_{PLH}	Propagation Delay (Turn-On)	Overdrive=100mV, C_L=15pF		0.60		μs
t_{PHL}	Propagation Delay (Turn-On)			1		μs
t_{TLH}	Response Time, Output Rise/Fall(4)	C_L=50pF		30		ns
t_{THL}				24		

Electrical Characteristics (Continued)

V_{DD}=1.8V,V_{SS}=GND, T_A=+25°C

Symbol	Parameter	Condition	Min	Typ.	Max	Unit
V_{HYS}	Input Hysteresis	V_{CM}=0.5V_{DD}		4		mV
V_{IO}	Input Offset Voltage(2)	V_{CM}=0.5V_{DD}	-6	±1	+6	mV
I_{IO}	Input Offset Current			10		pA
I_I	Input Bias Current			10		pA
V_{CM}	Common Mode Input Voltage		V_{SS}		V_{DD}	V
CMRR	Common Mode Rejection Ratio(3)	V_{CM}=V_{DD}		60		dB
I_{DD}	Supply Current(x) Per Comparator			6	15	μA
PSRR	Power Supply Rejection Ratio(3)	ΔV_{DD}=0.5V	45	70		dB
V_{OL}	Low-Level Output Voltage	I_{SINK}=3.0mA		0.15	0.4	V
V_{OH}	High-Level Output Voltage	I_{SOURCE}=3.0mA	1.4	1.65		V
t_{PLH}	Propagation Delay (Turn-On)	Overdrive=20mV,		0.59		μs
t_{PHL}	Propagation Delay (Turn-On)	C_L=15pF		1		μs
t_{TLH}	Response Time, Output Rise/Fall(4)	C_L=50pF		26		ns
				33		

V_{DD}=1.5V, V_{SS}=GND, T_A=+25°C

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
V_{HYS}	Input Hysteresis	V_{CM}=0.5V_{DD}		3.5		mV
V_{IO}	Input Offset Voltage(2)	V_{CM}=0.5V_{DD}	-6	±1	+6	mV
I_{IO}	Input Offset Current			10		pA
I_I	Input Bias Current			10		pA
V_{CM}	Common Mode Input Voltage		V_{SS}		V_{DD}	V
CMRR	Common Mode Rejection Ratio(3)	V_{CM}=V_{DD}		56		dB
I_{DD}	Supply Current(x) Per Comparator			5	13	μA
PSRR	Power Supply Rejection Ratio(3)	ΔV_{DD}=0.5V	45	70		dB
V_{OL}	Low-Level Output Voltage	I_{SINK}=1.5mA		0.15	0.4	V
V_{OH}	High-Level Output Voltage	I_{SOURCE}=1.5mA	1.1	1.35		V
t_{PLH}	Propagation Delay (Turn-On)	Overdrive=20mV,		0.6		μs
t_{PHL}	Propagation Delay (Turn-On)	C_L=15pF		1		μs
t_{TLH}	Response Time, Output Rise/Fall(4)	C_L=50pF		30		ns
t_{THL}				42		

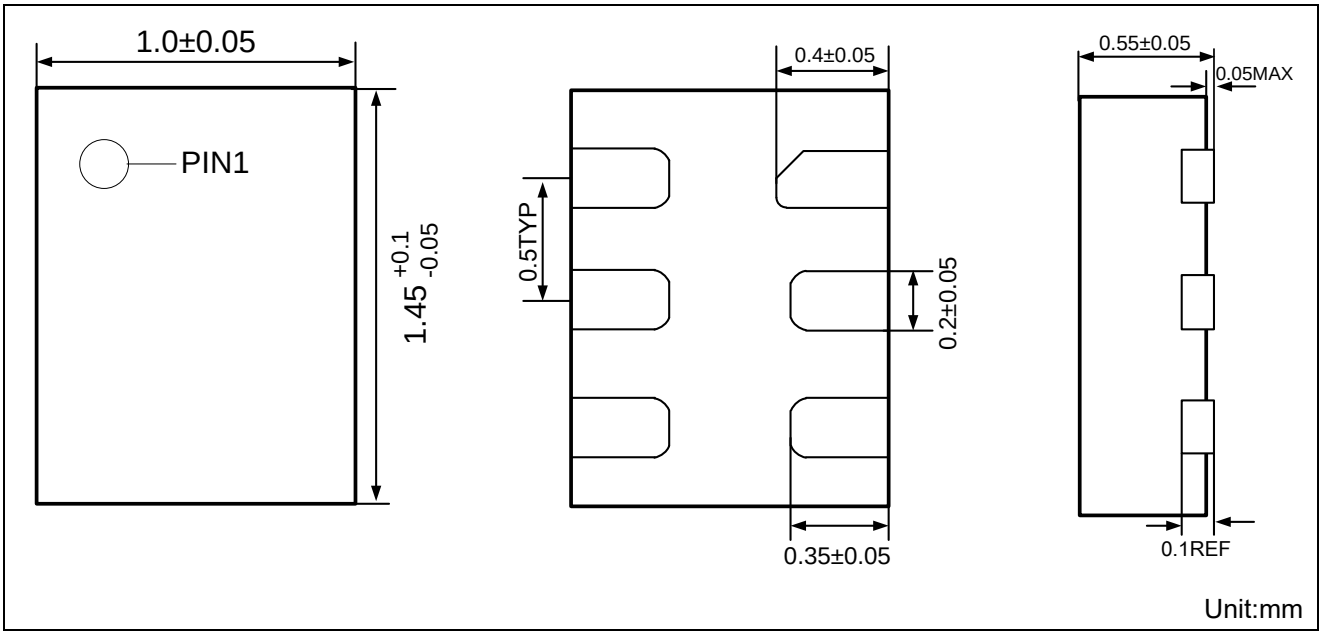
Note2. Differential input switching level is guaranteed at the minimum or maximum offset voltage, minus or plus half the maximum hysteresis voltage.

Note3. Guaranteed by design and characterization data.

Note4. Input signal: 1kHz, square-wave signal with 10ns edge rate.

Package Dimension

DFN6(1.45mm x1.0mm)



Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.1	2016-04-20	1.VDD: Change from 1.5~4.6V to 1.5~5.5V 2. Supply Voltage: Change from 6V to 8V	Huang Xingxing	Zhu Jun Li	Zhu Jun Li
1.2	2020-03-16	Documents check and formalize	Shib	Liujy	Liujy
1.3	2021-1-20	Update Package Size	Shib	Liujy	Liujy
1.4	2022-10-19	Update Typeset	Huyt	Liujy	Liujy