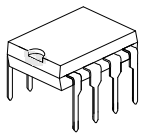
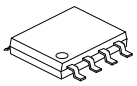
DUAL MICROPOWER CMOS VOLTAGE COMPARATORS



DIP-8



SOP-8

■ DESCRIPTION

The UTC **ULC3702** consists of two independent micropower voltage comparators designed to operate from a single supply and be compatible with modern HCMOS logic systems. The push-pull CMOS output stage drives capacitive loads directly without a power-consuming pullup resistor to achieve the stated response time. Eliminating the pullup resistor not only reduces power dissipation, but also saves board space and component cost. The output stage is also fully compatible with TTL requirements.

■ FEATURES

* Push-Pull CMOS Output Drives Capacitive Loads Without Pullup Resistor, I_O=± 8mA
* Very Low Power: 100μW (Typ.) at 5V
* Fast Response Time t_{PLH}=2.7μs (Typ.) With 5-mV Overdrive
* Single-Supply Operation: 3V ~ 16V

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULC3702L-D08-T	ULC3702G-D08-T	DIP-8	Tube
-	ULC3702G-S08-R	SOP-8	Tape Reel

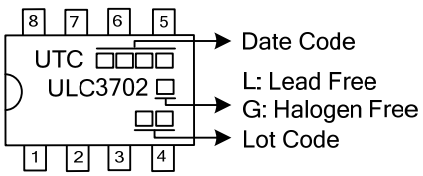
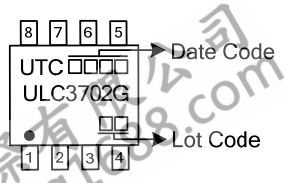
ULC3702L-D08-T

(1)Packing Type — (1) T: Tube, R: Tape Reel

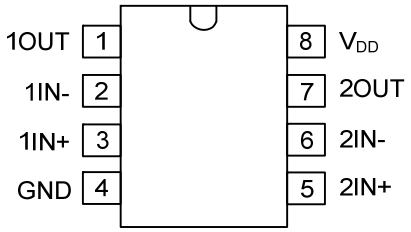
(2)Package Type — (2) D08: DIP-8, S08: SOP-8

(3)Green Package — (3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING

DIP-8	SOP-8
	

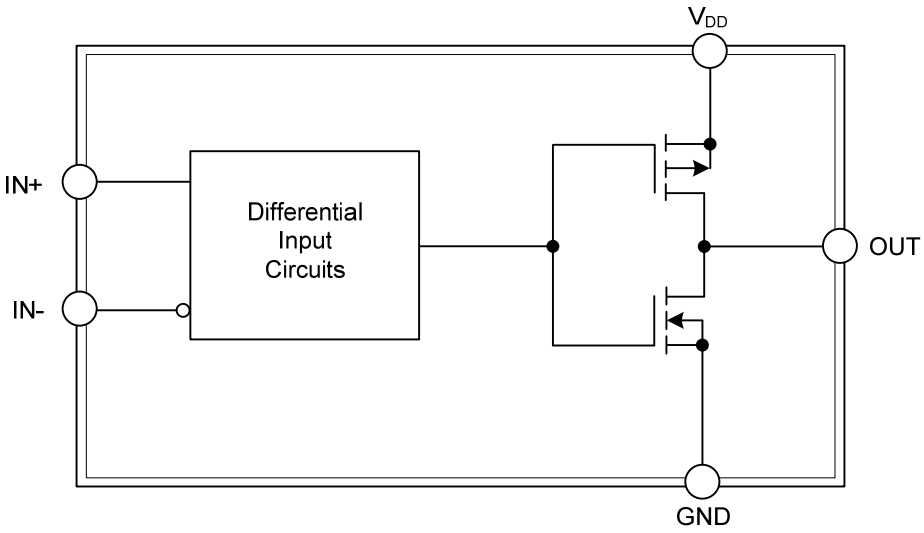
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	1OUT	Channel 1 output pin
2	1IN-	Inverting input for channel 1
3	1IN+	Non-inverting input for channel 1
4	GND	Ground
5	2IN+	Non-inverting input for channel 2
6	2IN-	Inverting input for channel 2
7	2OUT	Channel 2 output pin
8	V_{DD}	Supply voltage input pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage Range (Note 1)		V_{DD}	-0.3 ~ 18	V
Differential Input Voltage (Note 2)		V_{ID}	±18	V
Input Voltage Range		V_I	-0.3 ~ V_{DD}	V
Output Voltage Range		V_O	-0.3 ~ V_{DD}	V
Input Current		I_I	±5	mA
Output Current (Each Output)		I_O	±20	mA
Total Supply Current into V_{DD}			40	mA
Total Current Out of GND			40	mA
Power Dissipation	DIP-8	P_D	1000	mW
	SOP-8		725	mW
Lead Temperature 1,6 mm (1/16 Inch) from Case for 10 Seconds		T_L	260	°C
Operating Free-Air Temperature Range		T_A	-40~85	°C
Storage Temperature Range		T_{STG}	-65~150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. All voltage values, except differential voltages, are with respect to network ground.
3. Differential voltages are at IN+ with respect to IN-.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{DD}	3	5	16	V
Common-Mode Input Voltage	V_{IC}	-0.2		V_{DD}-1.5	V
High-Level Output Current	I_{OH}			-20	mA
Low-Level Output Current	I_{OL}			20	mA
Operating Free-Air Temperature	T_A	-40		85	°C

■ ELECTRICAL CHARACTERISTICS

(specified operating free-air temperature, V_{DD}=5V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS (Note 1)		MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{IO}	V_{DD}=5V~10V, V_{IC}=V_{ICRmin}, (Note 2)	T_A=25°C		1.2	5	mV
			T_A=-40°C~85°C			7	mV
Input Offset Current	I_{IO}	V_{IC}=2.5V	T_A=25°C		1		pA
			T_A=85°C			1	nA
Input Bias Current	I_{IB}	V_{IC}=2.5V	T_A=25°C		5		pA
			T_A=85°C			2	nA
Common Mode Input Voltage Range	V_{ICR}		T_A=25°C	0~V_{DD}-1			V
			T_A=-40°C~85°C	0~V_{DD}-1.5			V
Common-Mode Rejection Ratio	CMRR	V_{IC}=V_{ICRmin}	T_A=25°C		84		dB
			T_A=85°C		84		dB
			T_A=-40°C		83		dB
Supply-Voltage Rejection Ratio	k_{SVR}	V_{DD}=5V~10V	T_A=25°C		85		dB
			T_A=85°C		85		dB
			T_A=-40°C		83		dB
High Level Output Voltage	V_{OH}	V_{ID}=1V, I_{OH}=-4mA	T_A=25°C	4.5	4.7		V
			T_A=85°C	4.3			V
Low Level Output Voltage	V_{OL}	V_{ID}=-1V, I_{OH}=-4mA	T_A=25°C		210	300	mV
			T_A=85°C			400	mV
Supply Current (Both Comparators)	I_{DD}	Outputs Low, No Load	T_A=25°C		18	40	µA
			T_A=-40°C~85°C			65	µA

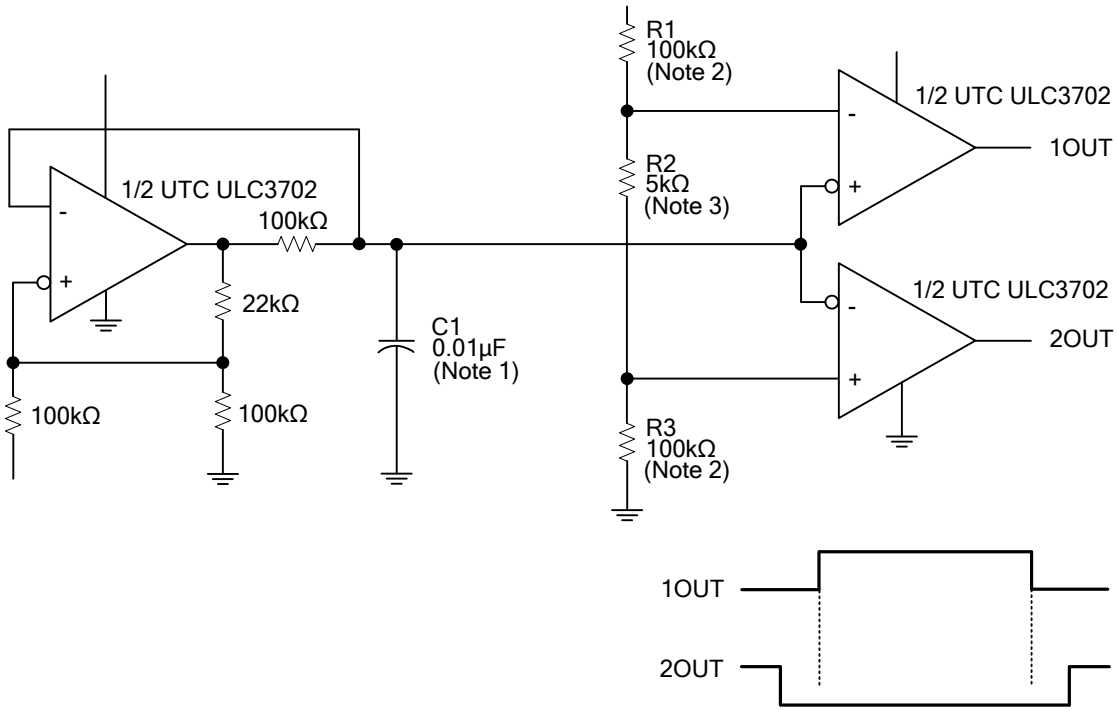
Notes: 1. All characteristics are measured with zero common-mode voltage unless otherwise noted.
2. The offset voltage limits given are the maximum values required to drive the output up to 4.5 V or down to 0.3 V.

■ SWITCHING CHARACTERISTICS (V_{DD}=5V, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation Delay Time, Low-to-High-Level Output (Note)	t_{PLH}	f=10kHz, C_L=50pF	Overdrive=2mV		4.5		µs
			Overdrive=5mV		2.7		µs
			Overdrive=10mV		1.9		µs
			Overdrive=20mV		1.4		µs
			Overdrive=40mV		1.1		µs
Propagation Delay Time, High-to-Low-Level Output (Note)	t_{PHL}	V_I=1.4V Step at IN+			1.1		µs
		f=10kHz, C_L=50pF	Overdrive=2mV		4		µs
			Overdrive=5mV		2.3		µs
			Overdrive=10mV		1.5		µs
			Overdrive=20mV		0.95		µs
			Overdrive=40mV		0.65		µs
		V_I=1.4V Step at IN+			0.15		µs
Fall Time	t_f	f=10kHz, C_L=50pF	Overdrive=50mV		50		ns
Rise Time	t_r	f=10kHz, C_L=50pF	Overdrive=50mV		125		ns

Note: Simultaneous switching of inputs causes degradation in output response.

■ TYPICAL APPLICATION CIRCUIT



Notes: 1. Adjust C1 for a change in oscillator frequency where:
1/f=1.85(100kΩ)C1
2. Adjust R1 and R3 to change duty cycle
3. Adjust R2 to change deadtime

Figure 1. Two-Phase Nonoverlapping Clock Generator