



ULC3702

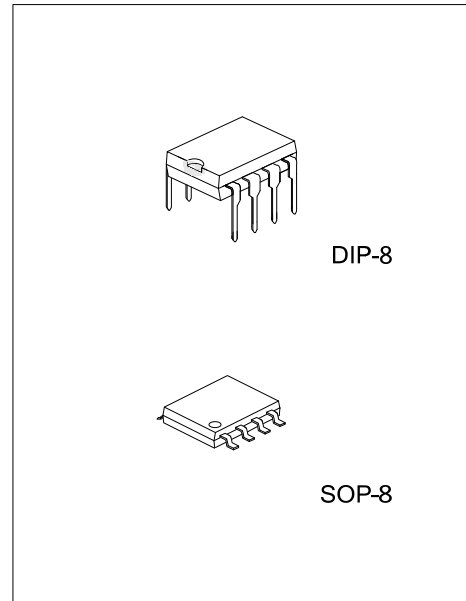
Advance

CMOS IC

DUAL MICROPOWER CMOS VOLTAGE COMPARATORS

■ 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.

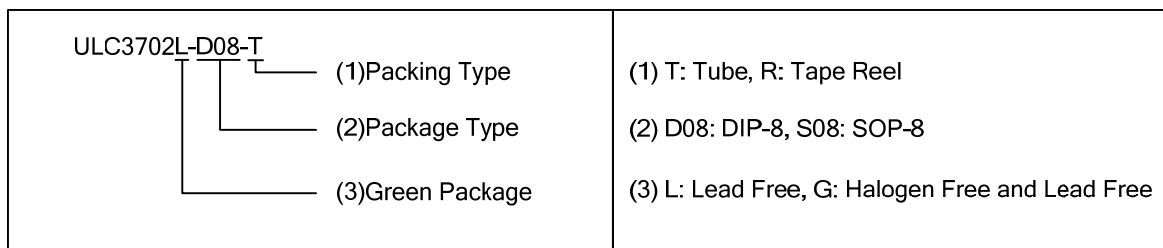


■ FEATURES

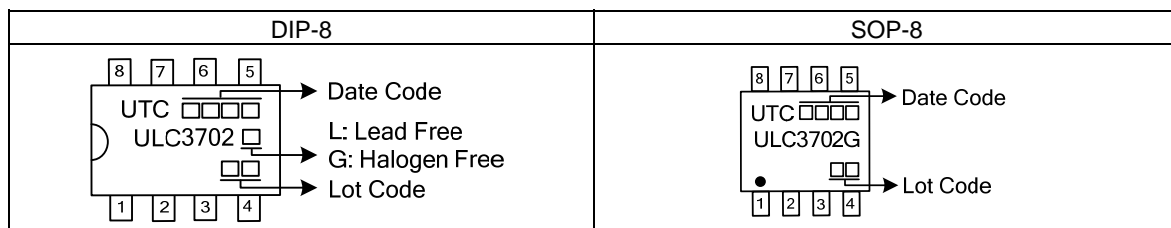
- * Push-Pull CMOS Output Drives Capacitive Loads Without Pullup Resistor, $I_o = \pm 8\text{mA}$
- * Very Low Power: $100\mu\text{W}$ (Typ.) at 5V
- * Fast Response Time $t_{PLH} = 2.7\mu\text{s}$ (Typ.) With 5-mV Overdrive
- * Single-Supply Operation: 3V ~ 16V

■ ORDERING INFORMATION

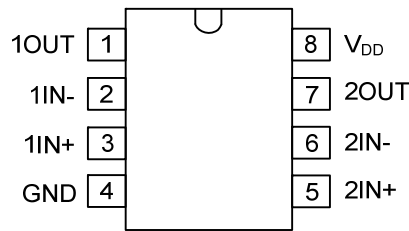
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULC3702L-D08-T	ULC3702G-D08-T	DIP-8	Tube
-	ULC3702G-S08-R	SOP-8	Tape Reel



■ MARKING



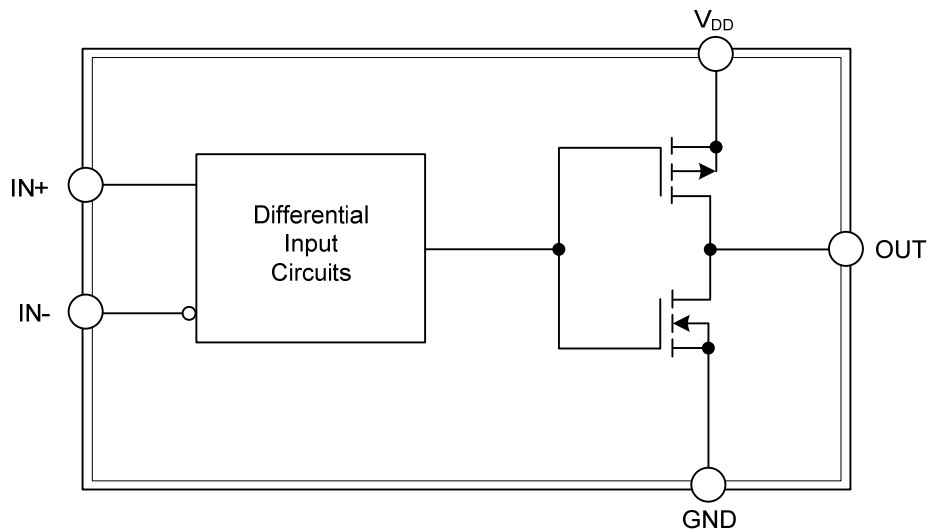
■ PIN CONFIGURATION



■ 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
	SOP-8		725
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}	$V_{DD}=5V\sim 10V$, $V_{IC}=V_{ICRmin}$, (Note 2)	$T_A=25^\circ C$	1.2	5	mV	
			$T_A=-40^\circ C\sim 85^\circ C$		7	mV	
Input Offset Current	I_{IO}	$V_{IC}=2.5V$	$T_A=25^\circ C$	1		pA	
			$T_A=85^\circ C$		1	nA	
Input Bias Current	I_{IB}	$V_{IC}=2.5V$	$T_A=25^\circ C$	5		pA	
			$T_A=85^\circ C$		2	nA	
Common Mode Input Voltage Range	V_{ICR}		$T_A=25^\circ C$	$0-V_{DD}-1$		V	
			$T_A=-40^\circ C\sim 85^\circ C$	$0-V_{DD}-1.5$		V	
Common-Mode Rejection Ratio	CMRR	$V_{IC}=V_{ICRmin}$	$T_A=25^\circ C$	84		dB	
			$T_A=85^\circ C$	84		dB	
			$T_A=-40^\circ C$	83		dB	
Supply-Voltage Rejection Ratio	k_{SVR}	$V_{DD}=5V\sim 10V$	$T_A=25^\circ C$	85		dB	
			$T_A=85^\circ C$	85		dB	
			$T_A=-40^\circ C$	83		dB	
High Level Output Voltage	V_{OH}	$V_{ID}=1V$, $I_{OH}=-4mA$	$T_A=25^\circ C$	4.5	4.7	V	
			$T_A=85^\circ C$	4.3		V	
Low Level Output Voltage	V_{OL}	$V_{ID}=-1V$, $I_{OH}=-4mA$	$T_A=25^\circ C$		210	300	mV
			$T_A=85^\circ C$			400	mV
Supply Current (Both Comparators)	I_{DD}	Outputs Low, No Load	$T_A=25^\circ C$	18	40	μA	
			$T_A=-40^\circ C\sim 85^\circ C$		65	μA	

Notes: 1. All characteristics are measured with zero common-mode voltage unless otherwise noted.

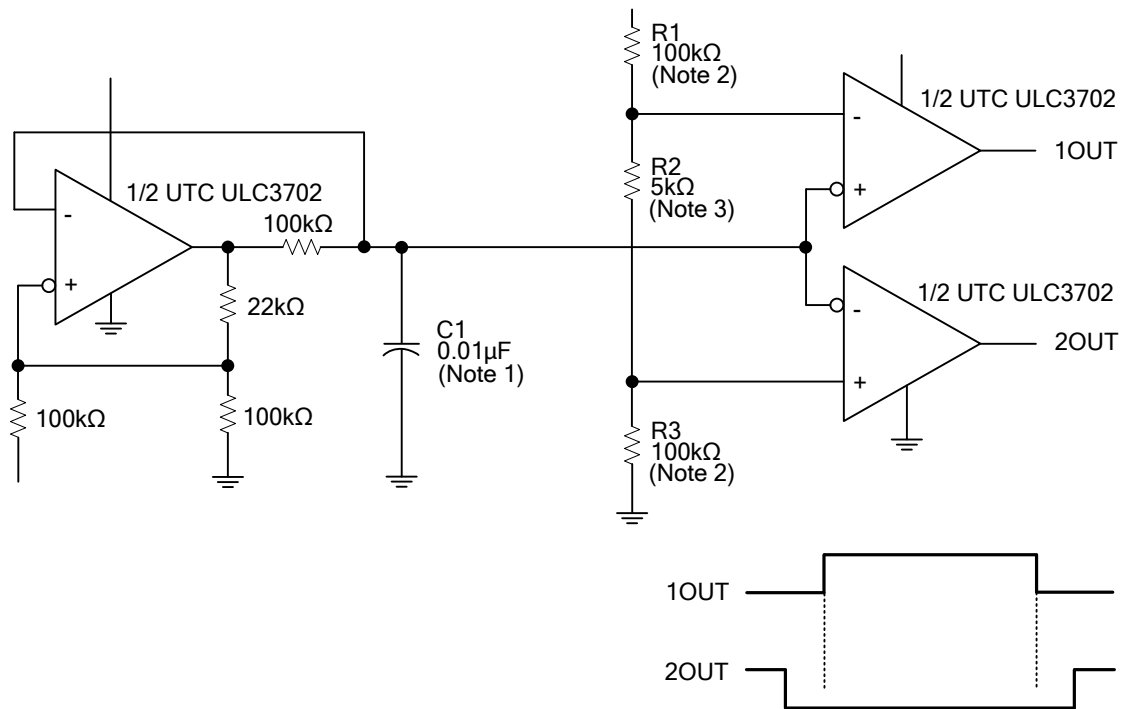
2. The offset voltage limits given are the maximum values required to drive the output up to 4.5 V or down to 0.3 V.

■ SWITCHING CHARACTERISTICS ($V_{DD}=5V$, $T_A=25^\circ C$, 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}	$f=10kHz$, $C_L=50pF$	$V_I=1.4V$ Step at IN+		1.1		μs
			Overdrive=2mV		4		μs
			Overdrive=5mV		2.3		μs
			Overdrive=10mV		1.5		μs
			Overdrive=20mV		0.95		μs
			Overdrive=40mV		0.65		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:
 $1/f = 1.85(100k\Omega)C1$
 2. Adjust R1 and R3 to change duty cycle
 3. Adjust R2 to change deadtime

Figure 1. Two-Phase Nonoverlapping Clock Generator

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