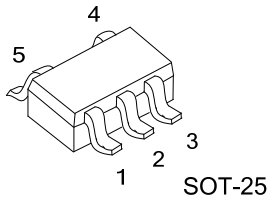
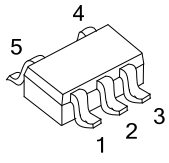
LOW POWER, SINGLE-SUPPLY, RAIL-TO-RAIL I/O COMPARATOR



SOT-25



SOT-353

■ DESCRIPTION

The **ULC8740** is a single high-speed comparator optimized for systems powered from a 3V or 5V supply. The device features high-speed response, low-power consumption, and rail-to-rail input range. Propagation delay is 45ns, while supply current is only 200μA.

The UTC **ULC8740** supports rail-to-rail input and output operation. The input common mode voltage range is from -0.1V to ($+V_S$) + 0.1V, and the output voltage swing is within 0.3V of the rails without external pull-up or pull-down resistor. The device can be compatible with CMOS and TTL logics. Any input or output pin has a continuous short-circuit protection to both power supply rails.

The UTC **ULC8740** has an internal hysteresis for reducing comparator sensitivity to noise, even when the input signals move slowly.

■ FEATURES

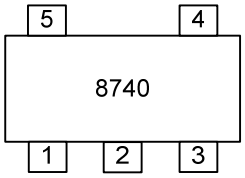
* Supply Voltage Range: 2.7V to 5.5V
* Low Supply Current: 200μA (Typ.) at V_+ = 5V
* Low Offset Voltage: 1mV (Typ.)
* Rail-to-Rail Input and Output
* Supports CMOS or TTL Logic
* Internal Hysteresis for Reducing Comparator Sensitivity to Noise

■ ORDERING INFORMATION

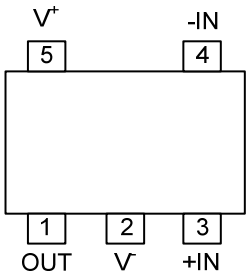
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULC8740L-AF5-R	ULC8740G-AF5-R	SOT-25	Tape Reel
ULC8740L-AL5-R	ULC8740G-AL5-R	SOT-353	Tape Reel

ULC8740G-AF5-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free, K: Lead Free

■ MARKING



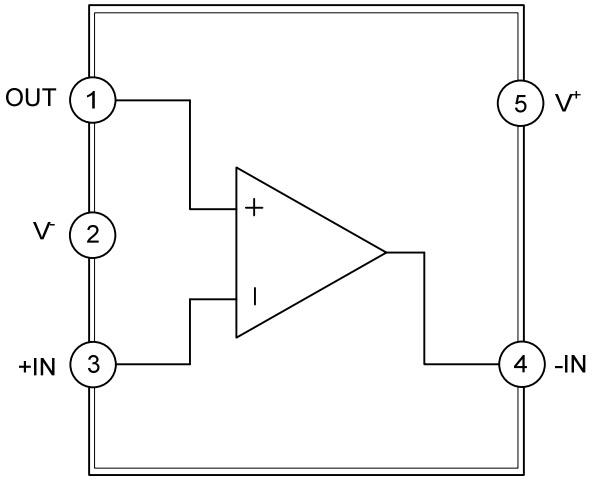
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OUT	Output
2	V^-	Negative power supply
3	+IN	Non-inverting Input
4	-IN	Inverting Input
5	V^+	Positive power supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	6	V
Input Voltage	V_{IN}	$V^- - 0.3 \sim V^+ + 0.3$	V
Differential Input Voltage	V_{ID}	V^+	V
Output Voltage	V_O	$V^- - 0.3 \sim V^- + 6$	V
Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Note: 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.

■ RECOMMENDED OPERATING CONDITIONS

Over operating free-air temperature range (unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	$V^+ - V^-$	2.7		5.5	V
Operating Free-Air Temperature	T_{OPR}	-40		+85	°C

■ ELECTRICAL CHARACTERISTICS

(V^+=5.0V, V_{CM}=0V, C_L=15pF, typical values are at T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current/Amplifier	I_Q	V^+= 3V, I_{OUT}= 0mA		190	240	μA
		V^+= 5V, I_{OUT}= 0mA		200	250	μA
Power Supply Rejection Ratio	PSRR	V_{CM}= 0V, V^+= 2.7V to 5.5V	59	70		dB
Input Offset Voltage (Note 3)	V_{OS}	V^+= 5V, V_{CM}= 0V		1	5	mV
Input Common Mode Voltage Range	V_{CM}		-0.1		V^++ 0.1	V
Common Mode Rejection Ratio (Note4)	CMRR	V^+= 5V, V_{CM}= 0V to 5V	60	75		dB
Input Hysteresis (Note 5)	V_{HYST}	V^+= 5V, V_{CM}= 0V		3.5		mV
Output Short-Circuit Current	I_{SOURCE}	V^+= 5V, Out to V_S/2	21	28		mA
	I_{SINK}	V^+= 5V, Out to V_S/2		-28	-20	mA
Output Voltage Swing from Rail	V_{OH}	V^+= 5V, I_{OUT}= 4mA		240	450	mV
	V_{OL}	V^+= 5V, I_{OUT}= -4mA		200	231	mV
Propagation Delay (Low to High)	t_{PLH}	V^+= 3V, Overdrive = 10mV		35		ns
		V^+= 3V, Overdrive = 100mV		30		ns
Propagation Delay (High to Low)	t_{PHL}	V^+= 3V, Overdrive = 10mV		45		ns
		V^+= 3V, Overdrive = 100mV		30		ns
Rise Time	t_{RISE}	V^+= 3V, Overdrive = 10mV		9		ns
		V^+= 3V, Overdrive = 100mV		8		ns
Fall Time	t_{FALL}	V^+= 3V, Overdrive = 10mV		8		ns
		V^+= 3V, Overdrive = 100mV		5		ns

Notes: 1. V_{OS} is the midway voltage for the hysteresis zone of the comparator.
2. CMRR is defined over the condition of whole input common mode range.
3. The input hysteresis is the gap between the upper threshold where the output of the comparator switches to high position and the lower threshold where the output of the comparator switches to low position.

■ TYPICAL APPLICATION CIRCUIT

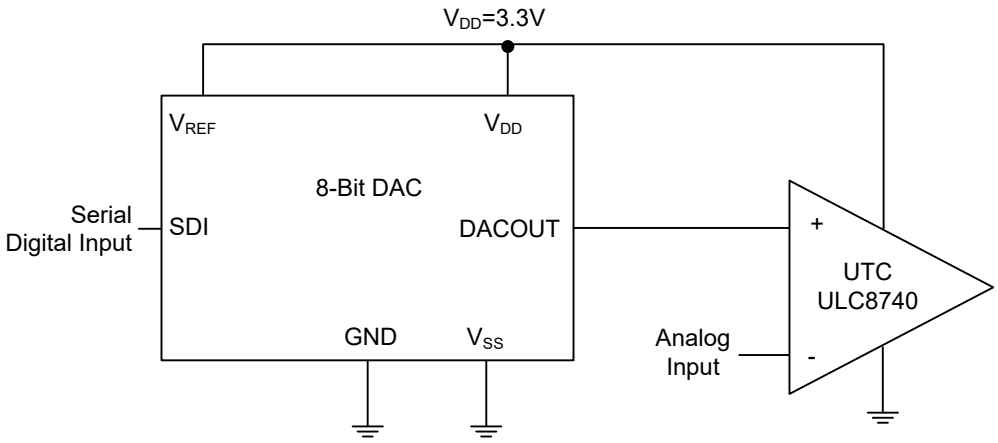


Figure 1. A Threshold Detector Controlled by 8-Bit DAC

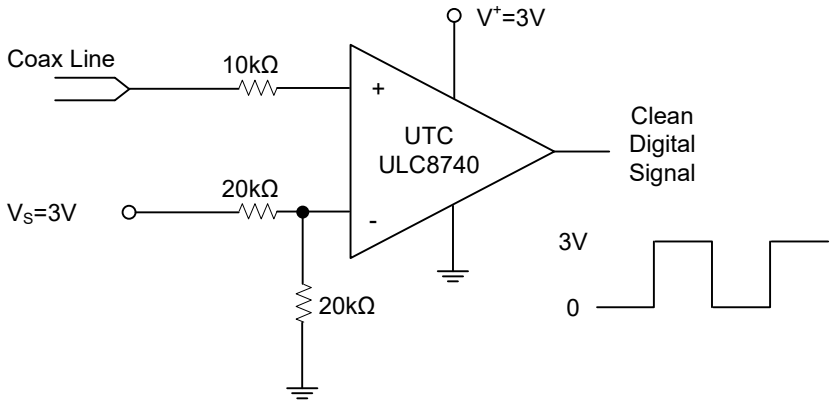


Figure 2. The Application of Line Receiver

■ TYPICAL CHARACTERISTICS