



ULC77241

CMOS IC

RAIL-TO-RAIL INPUT, OPEN-DRAIN OUTPUT LOW POWER CMOS COMPARATOR

DESCRIPTION

The UTC **ULC77241** is rail-to-rail input CMOS comparator featuring low-power and open-drain output.

The comparator operates from 1.8V to 5.5V and low supply current of 6μA. typ. This feature is suitable for battery powered application.

FEATURES

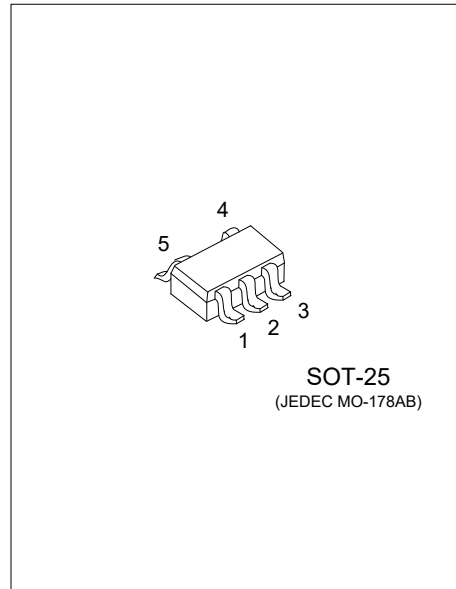
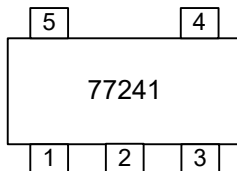
- * Operating Voltage: 1.8 ~ 5.5V
- * Input Offset Voltage: 6mV max.
- * Rail-to-Rail Input
- * Open-Drain Output
- * Supply Current: 6μA/ch typ.
- * Propagation Delay: 940ns typ.
- * Integrated EMI filter EMIRR=62dB typ. @ f=900MHz

ORDERING INFORMATION

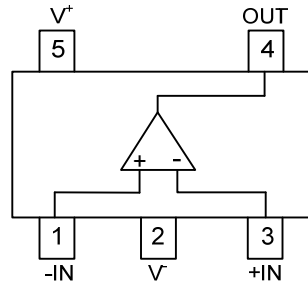
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULC77241L-AF5-R	ULC77241G-AF5-R	SOT-25	Tape Reel

<p>ULC77241G-AF5-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AF5: SOT-25 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



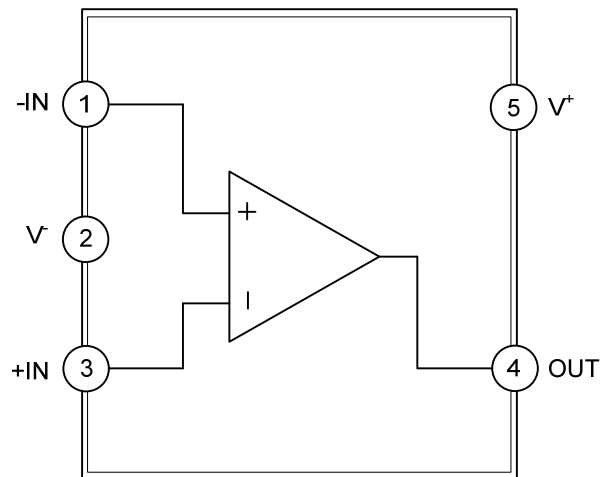
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	-IN	Inverting Input
2	V ⁻	Negative power supply
3	+IN	Non-inverting Input
4	OUT	Output
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 ⁻	7	V
Input Voltage (Note 1, 2)	V _{IN}	V ⁻ - 0.3 ~ V ⁺ + 0.3	V
Input Current (Note 2)	I _{IN}	10	mA
Differential Input Voltage (Note 3)	V _{ID}	±7	V
Output Terminal Input Voltage (Note 4)	V _O	V ⁻ - 0.3 ~ V ⁻ +7	V
Junction Temperature	T _J	+150	°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. The absolute maximum input voltage is limited at 7V.

3. Input voltages outside the supply voltage will be clamped by ESD protection diodes. If the input voltage exceeds the supply voltage, the input current must be limited 10mA or less by using a restriction resistance.

4. Differential voltage is the voltage difference between +IN and -IN. For supply voltage less than +7V, the absolute maximum rating is equal to the supply voltage.

5. The absolute maximum of Output Terminal Input Voltage is limited at 7V.

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ _{JA}	230	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	Single Supply	V ⁺ - V ⁻	1.8	5.5	V
	Dual Supply		±0.9	±2.75	V
Output Terminal Input Voltage	V _O	V ⁻		V ⁻ +5.5	V
Operating Free-Air Temperature	T _{OPR}	-40		+125	°C

■ ELECTRICAL CHARACTERISTICS

(V⁺=3V, V⁻=0V, T_A=+25°C, unless otherwise specified)

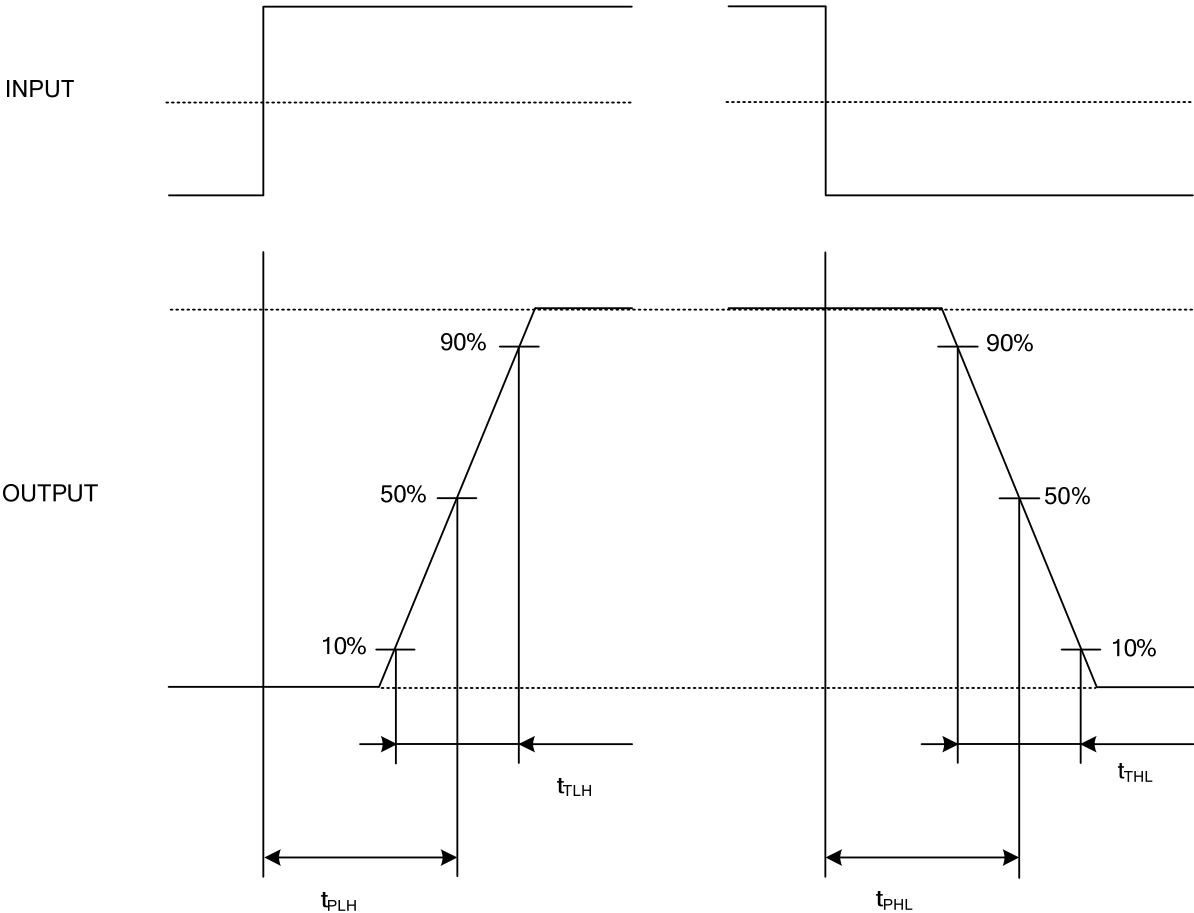
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current/Comparator	I _Q	V _{ID} = 100mV, V _{CM} = 0V, R _L = ∞		6	10	μA
		V _{ID} = 100mV, V _{CM} = 3V, R _L = ∞		9	14	μA
Power Supply Rejection Ratio	PSRR	V _{CM} = 0V, V ⁺ = 1.8V ~ 5.5V	65	105		dB
Input Offset Voltage	V _{IO}	V _{CM} = V ⁻		1	6	mV
		V _{CM} = V ⁺		1	7	mV
Input Bias Current	I _B			1		pA
Input Offset Current	I _{OS}			1		pA
Common Mode Voltage Range	V _{CM}	CMRR ≥ 50dB	0		3	V
Common-Mode Rejection Ratio	CMRR	V _{CM} = 0V ~ 3V	50	70		dB
Open-Loop Voltage Gain	A _V	R _L = 5.1kΩ		100		dB
Low-level Output Voltage	V _{OL}	I _{SINK} = 3mA		0.2	0.3	V
Output Leakage Current	I _{LEAK}	V _O = V ⁺		0.001	500	nA

■ SWITCHING CHARACTERISTICS

($V^+ = +3V$, $V^- = 0V$, $C_L = 15pF$, $R_L = 5.1k\Omega$, $T_A = +25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay Low to High	t_{PLH}	Overdrive=100mV		940		ns
Propagation Delay High to Low	t_{PHL}	Overdrive =100mV		450		ns
Output Signal Rising Time	t_{TLH}	Overdrive =100mV		170		ns
Output Signal Falling Time	t_{THL}	Overdrive =100mV		7		ns

TIMING WAVEFORM

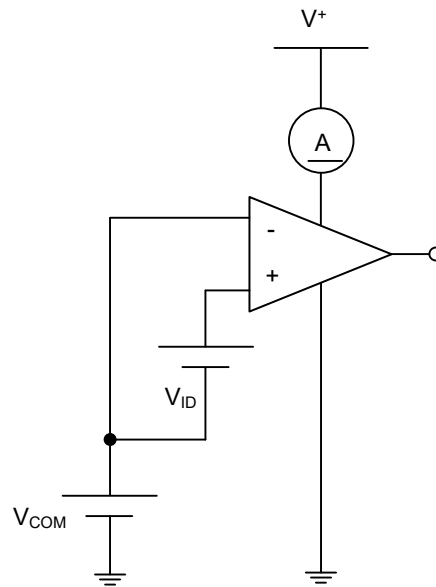


■ TYPICAL TEST CIRCUIT

1. Supply Current (I_{SUPPLY})

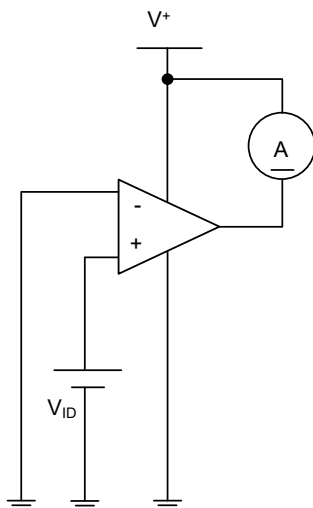
$V^+ = 3V, V^- = 0V, V_{CM} = 0V, V_{ID} = 100mV$

$V^+ = 3V, V^- = 0V, V_{CM} = 3V, V_{ID} = 100mV$



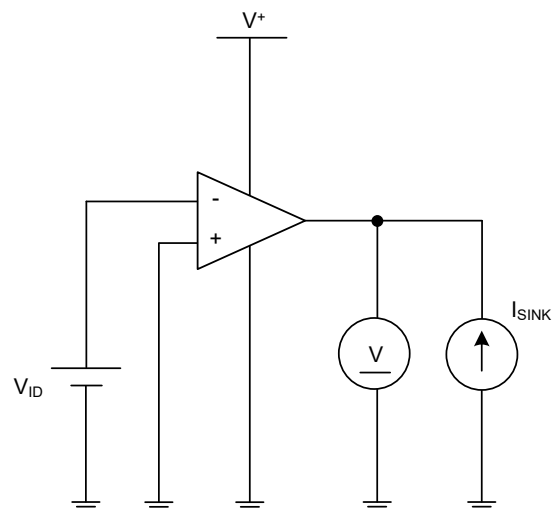
2. Output Leakage Current (I_{LEAK})

$V^+ = 3V, V^- = 0V, V_{ID} = 100mV, V_o = 3V$



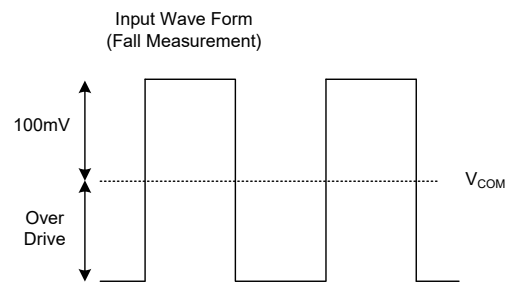
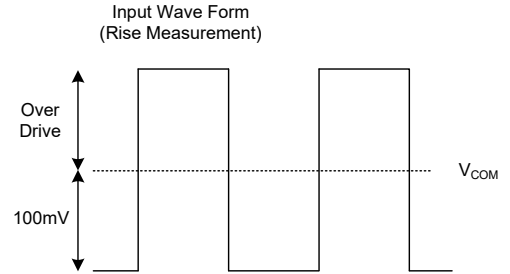
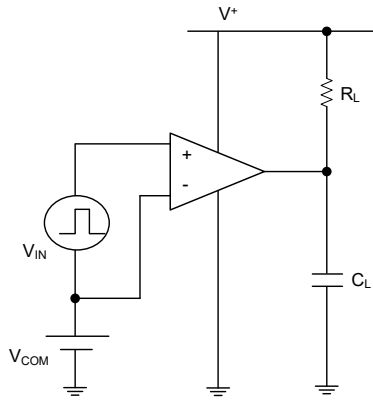
3. Low-level Output Voltage (V_{OL})

$V^+ = 3V, V^- = 0V, I_{SINK} = 3mA, V_{ID} = 100mV$

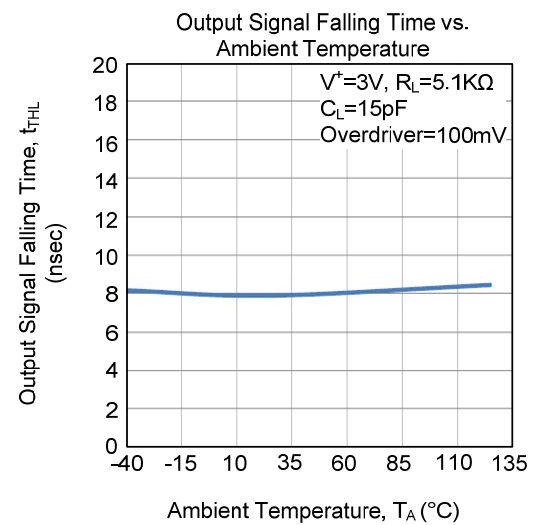
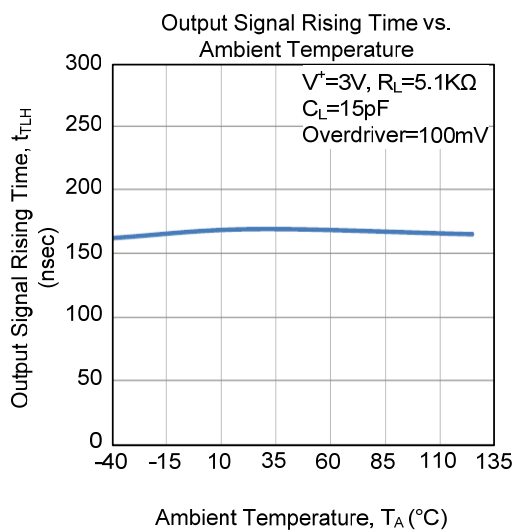
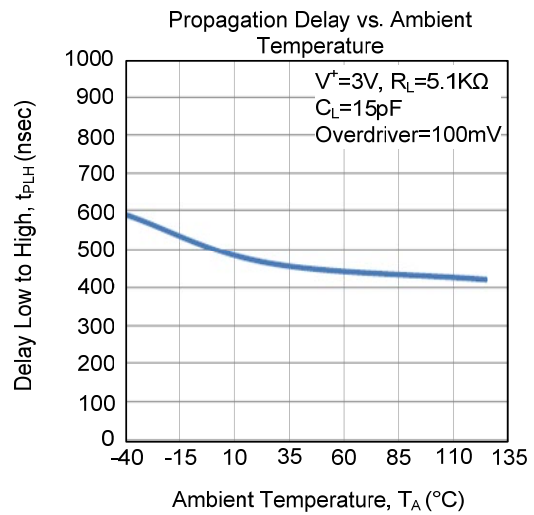
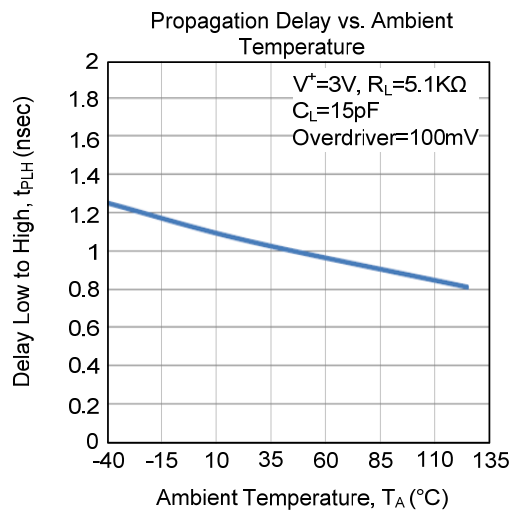
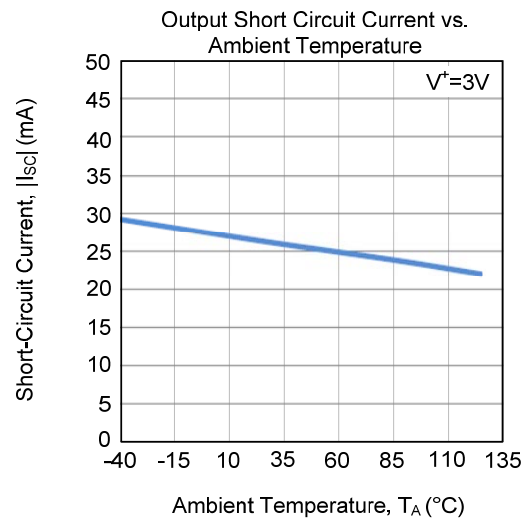
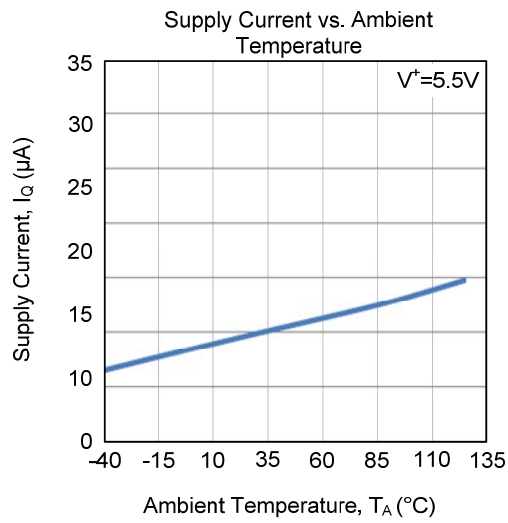


■ TYPICAL TEST CIRCUIT (Cont.)

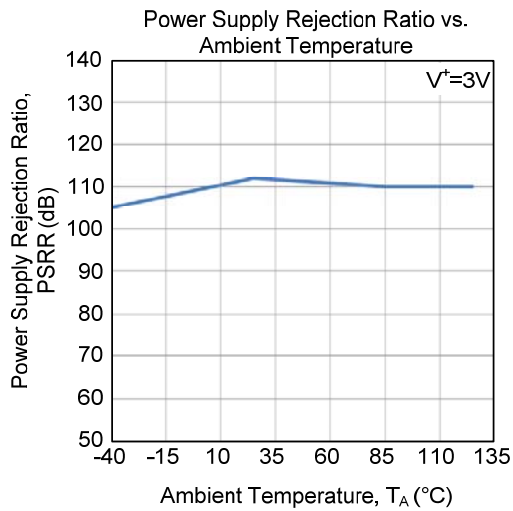
4. Propagation Delay (t_{PLH} , t_{PHL}), Output Signal Rising Time (t_{TLH}), Output Signal Falling Time (t_{THL})
 $V^+ = 3V$, $V^- = 0V$, $V_{COM} = 0V$, $R_L = 5.1k\Omega$, $C_L = 15pF$, Over drive = 100mV



TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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