

TECHNICAL DATA

AN EXCLUSIVE RADIO SHACK SERVICE TO THE EXPERIMENTER

ICM7201 LOW BATTERY VOLTAGE INDICATOR

DESCRIPTION

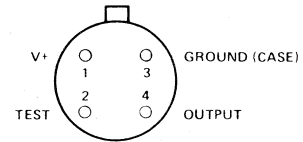
The ICM7201 is intended to be used in battery operated systems which require an indication of when the battery stack has depleted to a fixed voltage. When used with an LED lamp the lamp will light at voltages below 2.9 volts. At voltages above 2.9 volts the lamp may be lit by connecting the "TEST" terminal to the "GROUND" terminal.

The ICM7201 has hysteresis designed into its threshold voltage trigger point so that the lamp will not flicker with supply voltage noise and also will not gradually be turned on at the trigger voltage. Under all normal circumstances the lamp will either be fully on or fully off.

FEATURES:

- Accurate voltage indication: $2.9V \leq V_{TH} \leq 3.3V$
- Simple to use: requires only an additional LED lamp for complete system
- Low power consumption: 4.5 mW at $V_{SUPPLY} = 3.6V$
- Good noise rejection – 0.2V of hysteresis for device threshold voltage

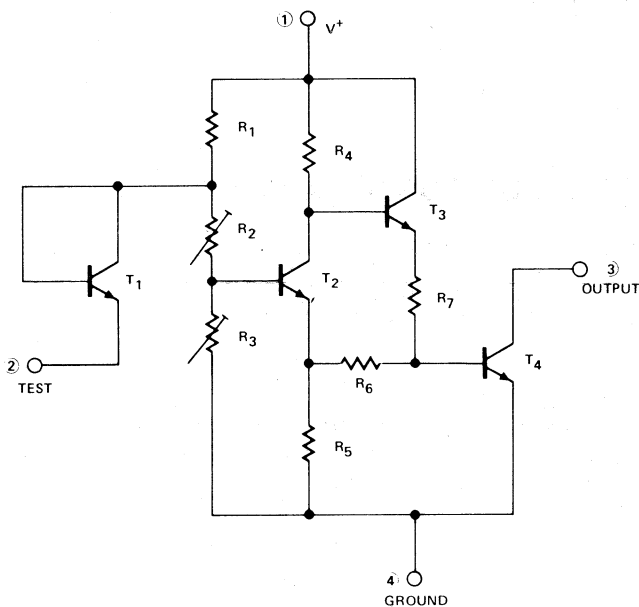
CONNECTION DIAGRAM



ABSOLUTE MAXIMUM RATINGS

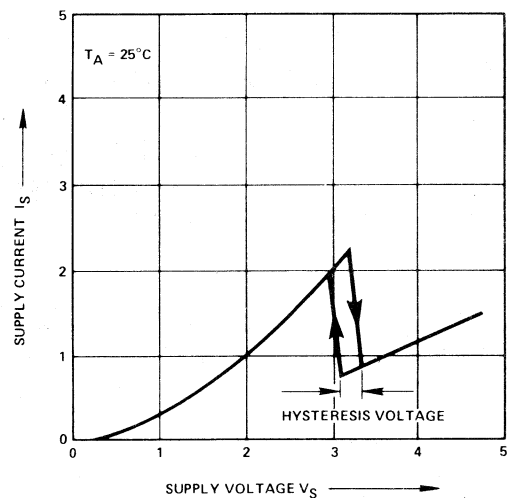
| | |
|--|-----------------|
| Power Dissipation | 100 mW |
| Maximum Supply Voltage | 5.5V |
| Maximum Output Current* Note 1 | 100 mA |
| Operating Temperature | -20°C to + 70°C |
| Storage Temperature | -55°C to 125°C |

SCHEMATIC ICM7201



TYPICAL OPERATING CHARACTERISTICS

SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



APPLICATION NOTES:

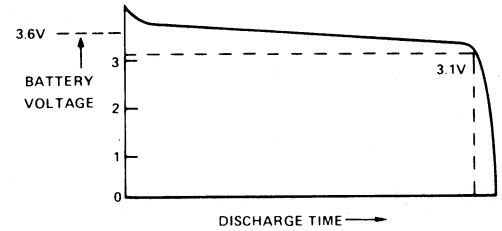
The ICM7201 is designed to provide adequate warning that a 3-cell nickel-cadmium battery stack is depleted.

The nickel-cadmium battery maintains an almost constant voltage (3.6V) during approximately 95% of its discharge, and then the voltage collapses rapidly. If a higher nominal threshold voltage had been selected for the ICM7201, this would restrict the useful temperature range with a 3-cell nickel-cadmium stack because of the $-12\text{mV}/^\circ\text{C}$ temperature coefficient. On the other hand, if a very low threshold voltage were chosen, the extremely rapid battery discharge at low voltages would result in an insufficient warning signal time.

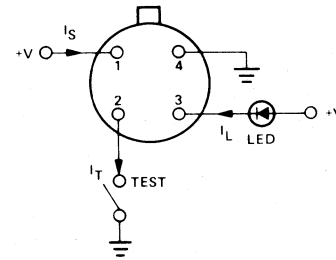
OPTIONS

The ICM7201 can be supplied with maximum supply voltage options up to 15 volts and threshold voltage ranges starting from 1.8 volts.

Ni-Cad 3-CELL DISCHARGE



TEST CIRCUIT



| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|--|--------|--|-----|-----|-----|----------------------------|
| Supply Current | I_S | Bulb off, $V_S = +3.6\text{ V}$ | | 1.2 | 2 | mA |
| Trigger Voltage | V_T | | 2.9 | 3.1 | 3.3 | V |
| Temperature Coefficient of Trigger Voltage | T_C | | | -12 | | $\text{mV}/^\circ\text{C}$ |
| Hysteresis Voltage | V_H | | | 0.2 | | V |
| Lamp Current at Trigger Voltage | I_L | V_F of LED approx. 1.7 V $V_S = 3.1\text{ V}$ | | 15 | | mA |
| Test Current | I_T | $V_{\text{SUPPLY}} = 3.6\text{ V}$ | | 0.5 | 1.5 | mA |

NOTE 1: At high supply voltages (approaching 5 volts) it is necessary to include a current limiting resistor in series with the LED light bulb to limit the output current to 100 mA maximum.

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