

DS8871, DS8872, DS8873 Saturating LED Cathode Drivers

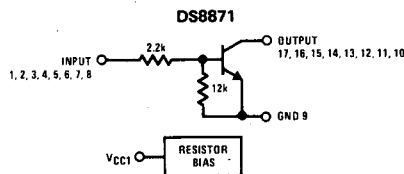
General Description

The DS8871, DS8872, and DS8873 are bipolar integrated circuits designed to interface between MOS calculator circuits and common cathode LED displays operating in the multiplexed mode with a digit current of up to 40 mA. The DS8871 is an 8-digit driver; the DS8872 is a 9-digit driver; and the DS8873 is a 9-digit driver with a built-in battery condition indicator that turns on the digit 9 decimal point when the battery voltage drops to 6.5V (typical). In a typical calculator system operating on a 9V battery, the low battery indicator comes on as a warning that the battery should be replaced. But the calculator (MM5737 or equivalent) will still function properly for awhile.

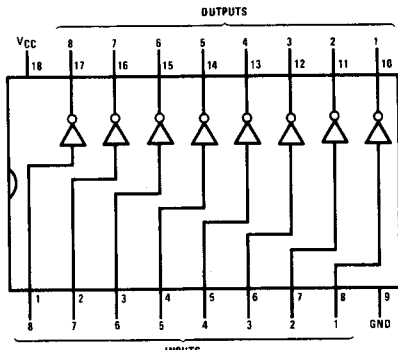
Features

- Single saturating transistor output
- Low battery indicator
- MOS compatible inputs
- Inputs and outputs clustered for easy wiring
- Drivers consume no standby power

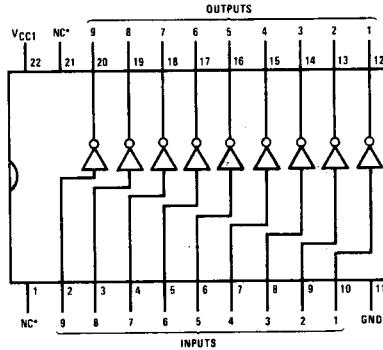
Schematic Diagram



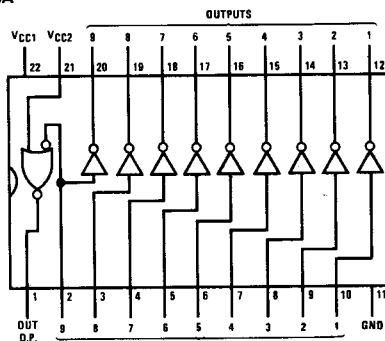
Connection Diagrams (Dual-In-Line Packages, Top Views)



Order Number DS8871N
See NS Package N18A



Order Number DS8872N
See NS Package N22A



Order Number DS8873N
See NS Package N22A

Absolute Maximum Ratings (Note 1)

Supply Voltage	$V_{CC1} = 11V$
Supply Voltage (Note 4)	$V_{CC2} = 11V$
Input Voltage	11V
Output Voltage	8V
Storage Temperature Range	$-65^{\circ}C$ to $+150^{\circ}C$
Maximum Power Dissipation at $25^{\circ}C$	
Molded Package (DS8871)*	1563 mW
Molded Package (DS8872, DS8873)†	1771 mW
Lead Temperature (Soldering, 10 seconds)	$300^{\circ}C$

*Derate molded package 12.5 mW/ $^{\circ}C$ above $25^{\circ}C$.

†Derate molded package 14.17 mW/ $^{\circ}C$ above $25^{\circ}C$.

Operating Conditions

	MIN	MAX	UNITS
Supply Voltage, V_{CC1}	4.0	9.5	V
Supply Voltage, V_{CC2} (Note 4)	4.0	9.5	V
Temperature, T_A	0	+70	$^{\circ}C$

Electrical Characteristics (Notes 2 and 3)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
I_{IL} Logical "0" Input Current	$V_{IN} = 0.4V$		28	45	μA
I_{IH} Logical "1" Input Current	$V_{IN} = 4.5V$		1.7	2.5	mA
V_{OL} Logical "0" Output Voltage	$V_{IN} = 3.2V$, $I_{OL} = 40$ mA		0.35	0.5	V
I_{OL} Logical "0" Output Current	$V_{IN} = 3.2V$, $V_{OL} = 0.5V$			40	mA
I_{CEX} Output Leakage Current	$V_{OH} = 6V$, $I_{IN} = 25 \mu A$			40	μA
$I_{DP(ON)}$ Decimal Point Output Current	$V_{CC2} = 6.25V$, $V_{DP} = 2.5V$, $V_{IN9} = 3.2V$, (Note 4)	-5.0	-7.0		mA
$I_{DP(OFF)}$ Decimal Point Output Current	$V_{CC2} = 7V$, $V_{IN9} = 3.2V$, $V_{DP} = 1V$, (Note 4)		-1	-100	μA
I_{CC1} Supply Current, V_{CC1}	$V_{CC1} = 6.5V$, $V_{IN} = 0V$		1	100	μA
I_{CC2} Supply Current, V_{CC2}	$V_{CC2} = 9.5V$, $V_{IN9} = 4.5V$, (Note 4)		0.9	1.2	mA

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

Note 2: Unless otherwise specified min/max limits apply across the $0^{\circ}C$ to $+70^{\circ}C$ range.

Note 3: All currents into device pins shown as positive, out of device pins as negative, all voltages referenced to ground unless otherwise noted. All values shown as max or min on absolute value basis.

Note 4: Applies to DS8873 only.

Typical Applications

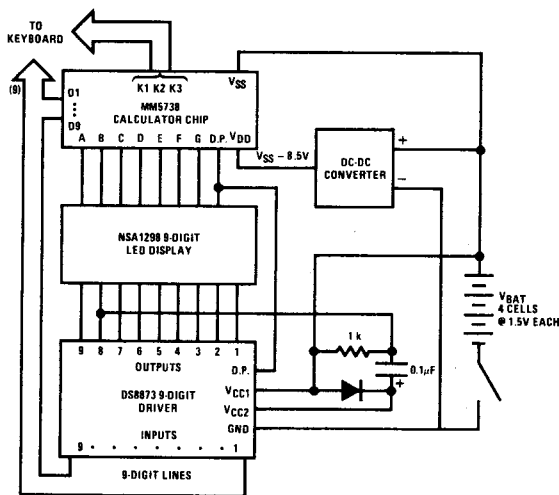


FIGURE 1. 4-Cell System

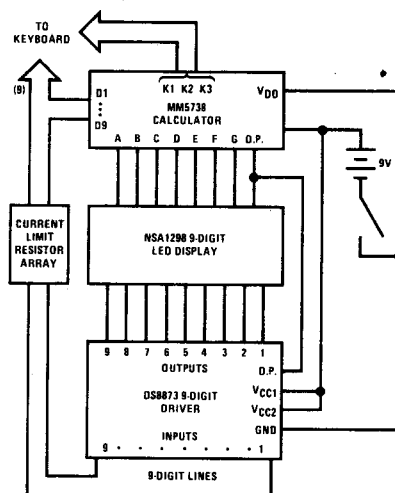


FIGURE 2. 9V System