

# DS8669

*DS8669 2-Digit BCD to 7-Segment Decoder/Driver*



Literature Number: SNOSBM8A

## DS8669 2-Digit BCD to 7-Segment Decoder/Driver

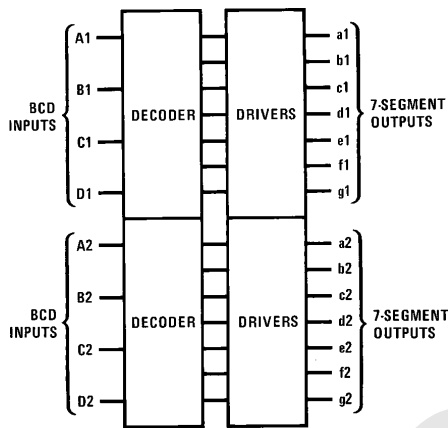
### General Description

The DS8669 is a 2-digit BCD to 7-segment decoder/driver for use with common anode LED displays. The DS8669 drives 2 7-segment LED displays without multiplexing. Outputs are open-collector, and capable of sinking 25 mA/segment. Applications include TV and CB channel displays.

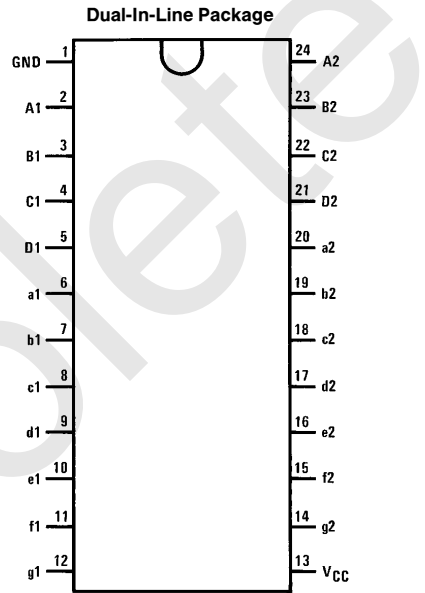
### Features

- Direct 7-segment drive
- 25 mA/segment current sink capability
- Low power requirement—16 mA typ
- Very low input currents—2  $\mu$ A typ
- Input clamp diodes to both  $V_{CC}$  and ground
- No multiplexing oscillator noise

### Logic and Connection Diagrams



TL/F/5836-1



TL/F/5836-2

Top View

Order Number DS8669N  
See NS Package Number N24A

## Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Current	20 mA
Output Voltage	12V
Storage Temperature Range	-65°C to +150°C

Maximum Power Dissipation* at 25°C	2005 mW
Molded Package	
Lead Temperature (Soldering, 10 seconds)	300°C
*Derate molded package 16.04 mW/°C above 25°C.	

## Operating Conditions

	Min	Max	Units
Supply Voltage ( $V_{CC}$ )	4.5	6.0	V
Temperature ( $T_A$ )	0	+70	°C

## Electrical Characteristics $V_{CC} = 5.25V$ , (Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{IH}$	Logical "1" Input Voltage	$V_{CC} = \text{Min}$	2.0		$V_{CC} + 0.6$	V
$V_{IL}$	Logical "0" Input Voltage	$V_{CC} = \text{Min}$	-0.3		0.8	V
$I_O$	Logical "1" Output Leakage Current	$V_{CC} = \text{Max}$ , $V_{OUT} = 10V$			50	$\mu A$
$V_{OL}$	Logical "0" Output Voltage	$I_{OL} = 25 \text{ mA}$ , $V_{CC} = \text{Min}$		0.4	0.8	V
$I_{IH}$	Logical "1" Input Current	$V_{IN} = V_{CC} = \text{Max}$		2.0	10	$\mu A$
$I_{IL}$	Logical "0" Input Current	$V_{IN} = 0V$ , $V_{CC} = \text{Max}$		-0.1	-10	$\mu A$
$I_{CC}$	Supply Current	All Outputs Low, $V_{CC} = \text{Max}$		16	25	mA
$V_{IC}$	Input Clamp Voltage	$I_{IN} = 10 \text{ mA}$			$V_{CC} + 1.5V$	V
		$I_{IN} = -10 \text{ mA}$			-1.5V	V
$t_{pd0}$	Propagation Delay to a Logical "0" from Any Input to Any Output	$R_L = 400\Omega$ $C_L = 50 \text{ pF}$ $T_A = 25^\circ C$			10	$\mu s$
$t_{pd1}$	Propagation Delay to a Logical "1" from Any Input to Any Output				10	$\mu s$

**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°C to +70°C range for the DS8669. All typicals are given for  $V_{CC} = 5.25V$  and  $T_A = 25^\circ C$ .

**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.

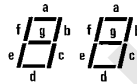
## Truth Table

INPUT LEVELS				SEGMENT OUTPUTS														DISPLAY 1	DISPLAY 2		
D <sub>N</sub>	C <sub>N</sub>	B <sub>N</sub>	A <sub>N</sub>	a1	b1	c1	d1	e1	f1	g1	a2	b2	c2	d2	e2	f2	g2				
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0		
0	0	0	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1		
0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0		
0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0		
0	1	0	0	1	1	0	0	1	1	0	0	1	0	0	1	1	0	0	0		
0	1	0	1	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0		
0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0		
0	1	1	1	0	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1		
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0		
1	0	1	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0		
1	0	1	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	1		
1	1	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	0		
1	1	0	1	0	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0		
1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
																				(Blank)	(Blank)

"0" = Segment ON  
 "1" = Segment OFF

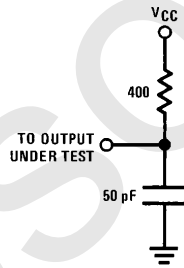
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### Display Segment Notation



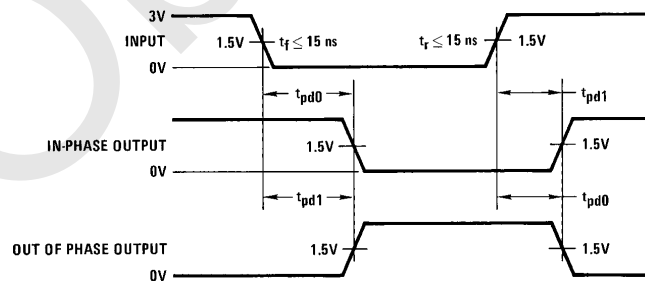
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### AC Test Circuit



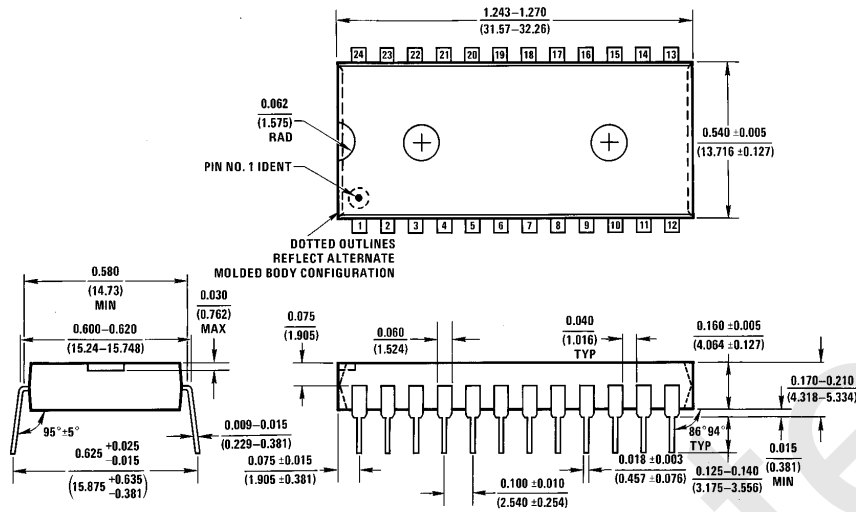
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### Switching Time Waveforms



TL/F/5836-6

**Physical Dimensions** inches (millimeters)



**Molded Dual-In-Line Package (N)**  
**Order Number DS8669N**  
**NS Package Number N24A**

N24A (REV E)

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