Display Drivers

DM8885 MOS to high voltage cathode buffer

general discription

The DM8885 interfaces MOS calculator or counter-latch-decoder-driver circuits directly to seven-segment high-voltage gas-filled displays. The six inputs A, B, D, E, F, G are decoded to drive the seven segments of the tube.

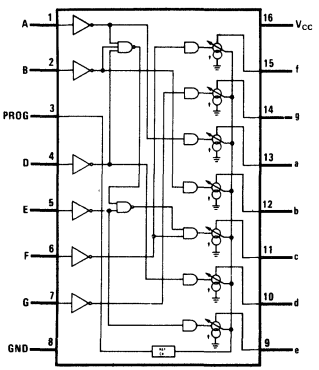
Each output constitutes a switchable, adjustable current source which provides constant current to the tube segment, even with high tube anode supply tolerance or fluctuation. These current sources have a voltage compliance from 3V to at least 80V. Each current source is ratioed to the b-output current as required for even illumination of all segments. Output currents may be varied over the 0.2 to 1.5 mA range for driving various tube types or multiplex operation The output current is adjusted by connecting a program resistor (R_P) from V_{CC} to the program input.

features

- Current source outputs
- Adjustable output currents 0.2 to 1.5 mA
- High output breakdown voltage 80V min
- Suitable for multiplex operation
- Low fan-in and low power
- Blanking via program input
- Also drives overrange, polarity, decimal point cathodes

connection diagram

Dual-In-Line Package



TOP VIEW

Order Number DM8885J
See Package 17

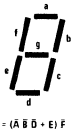
Order Number DM8885N
See Package 23

truth tables

A	B	D	E	F	G	DISPLAY
1	1	1	1	1	0	0
0	1	0	0	0	0	1
1	1	1	1	0	1	2
1	1	1	0	0	1	3
0	1	0	0	1	1	4
1	0	1	0	1	1	5
1	0	1	1	1	1	6
1	1	0	0	0	0	7
1	1	1	1	1	1	8
1	1	1	0	1	1	9
0	0	1	1	1	1	b
1	1	0	0	1	1	q
1	1	0	1	1	1	A
0	1	0	1	1	1	H
0	1	1	1	1	0	U
0	0	0	0	0	1	E
0	0	0	0	0	0	

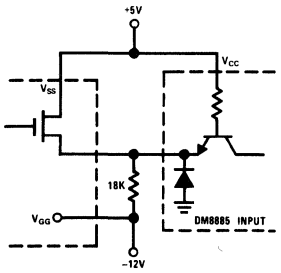
INPUT*	OUTPUT*
0	1 (OFF)
1	0 (ON)

*Positive Logic

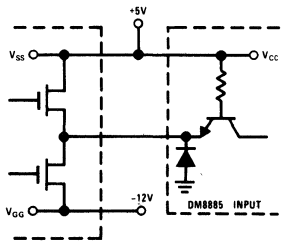


$C = (\bar{A}\,\bar{B}\,\bar{D} + E)\,\bar{F}$

typical applications



Open-Drain MOS Output



Push-Pull MOS Output

absolute maximum ratings

V_{CC}	7V
Input Voltage	6V
Segment Output Voltage	80V
Power Dissipation (Note 1)	600 mW
Transient Segment Output Current (Note 2)	50 mA
Operating Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 sec)	300°C

electrical characteristics (Note 3)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Logic "1" Input Voltage	V_{CC} = 4 75V	2 0			V
Logic "0" Input Voltage	V_{CC} = 4 75V			0 8	V
Logic "1" Input Current	V_{CC} = 5 25V, V_{IN} = 2 4V		2	15	μA
	V_{CC} = 5 25V, V_{IN} = 5 5V		4	400	μA
Logic "0" Input Current	V_{CC} = 5 25V, V_{IN} = 0 4V		-300	-600	μA
Power Supply Current	V_{CC} = 5 25V, All Inputs = 0V, R_P = 2 2k		22	31	mA
Input Diode Clamp Voltage	V_{CC} = 5V, I_{IN} = −12 mA, T_A = 25°C		-0 9	-1 5	V
Segment Outputs					
Outputs a, f, g On Current Ratio	All Outputs = 50V, Output b Curr = Ref	0 84	0 93	1 02	
Output c On Current Ratio	All Outputs = 50V, Output b Curr = Ref	1 12	1 25	1 38	
Output d On Current Ratio	All Outputs = 50V, Output b Curr = Ref	0 90	1 00	1 10	
Output e On Current Ratio	All Outputs = 50V, Output b Curr = Ref	0 99	1 10	1 21	
Output b On Current	V_{CC} = 5V, V_{OUT} b = 50V, T_A = 25°C, R_P = 18 1k	0 18	0 20	0 22	mA
	V_{CC} = 5V, V_{OUT} b = 50V, T_A = 25°C, R_P = 7 03k	0 45	0 50	0 55	mA
	V_{CC} = 5V, V_{OUT} b = 50V, T_A = 25°C, R_P = 3 40k	0 90	1 00	1 10	mA
	V_{CC} = 5V, V_{OUT} b = 50V, T_A = 25°C, R_P = 2 20k	1 35	1 50	1 65	mA
Output Saturation Voltage	V_{CC} = 4 75V, I_{OUT} b = 2 mA, R_P = 1k ± 5% (Note 4)		0 8	2 5	V
Output Leakage Current	V_{OUT} = 75V, V_{IN} = 0 8V, R_P = 1k		0 003	3	μA
	V_{OUT} = 75V, V_{PROG} = 0 4V		0 003	3	μA
Output Breakdown Voltage	I_{OUT} = 250 μA, V_{IN} = 0 8V	80	110		V
Propagation Delays					
Input to Segment Output	V_{CC} = 5V, T_A = 25°C		0 4	10	μs

Note 1: Maximum junction temperature is 130°C. For operating at elevated temperatures, the device must be derated based on a thermal resistance of 150°C/W θ_{JA}.

Note 2: In all applications transient segment output current must be limited to 50 mA. This may be accomplished in DC applications by connecting a 2 2k resistor from the anode-supply filter capacitor to the display anode, or by current limiting the anode driver in multiplex applications.

Note 3: Min/max limits apply across the guaranteed operating temperature range of 0°C to +70°C, unless otherwise specified Typicals are for V_{CC} = 5V, T_A = 25°C. Positive current is defined as current into the referenced pin

Note 4: For saturation mode the segment output currents are externally limited and ratioed

typical performance characteristics (see DM7880 data sheet)