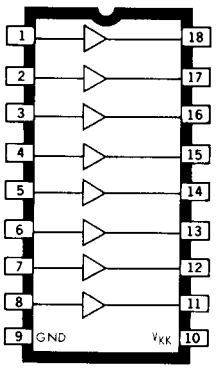
SERIES UDN-7180A
GAS DISCHARGE DISPLAY SEGMENT DRIVERS

FEATURES

- Reliable Monolithic Construction
- High Output Breakdown Voltage
- Low Power
- TTL/MOS Compatible Inputs



Dwg. No. A-9640A

Description

Series UDN-7180A segment drivers are monolithic high-voltage bipolar integrated circuits for interfacing between MOS or other low-voltage circuits and the cathode of gas-discharge display panels.

These drivers reduce substantially the number of discrete components required with panels (Beckman, Burroughs, Dale, Matsushita, NEC, Pantek, etc) in calculator, clock and instrumentation applications.

The UDN-7183A, UDN-7184A, and UDN-7186A drivers contain appropriate level shifting, signal amplification, current limiting, and output OFF-state voltage bias. The UDN-7180A driver requires external current limiting and is intended for higher-current applications or where individual outputs are operated at different current levels (i.e. with alpha-numeric displays). All inputs have pull-down resistors for direct connection to open-drain PMOS logic.

These devices provide output currents suitable for display segments in a wide variety of display sizes and number of display digits. Either a fixed split supply operation or a feedback-controlled scheme is allowed.

Applications

The Series UDN-7180A drivers can be used in a wide variety of low-level to high-voltage applications utilizing gas discharge displays such as those found in calculators, clocks, point-of-sale terminals, and instruments. Their high reliability combined with minimum size, ease of installation, and the cost advantages of a complete monolithic interface make them the ideal choice in many applications. A typical application showing the use of these devices, and their counterpart anode drivers, is shown.

ABSOLUTE MAXIMUM RATINGS at +25°C

Supply Voltage, V_{KK} ..... −115 V
Input Voltage, V_{IN} ..... +20 V
Output Current, I_{OUT}: UDN-7180A ..... 20 mA
UDN-7183A ..... 3.25 mA
UDN-7184A ..... 2.0 mA
UDN-7186A ..... 1.0 mA
Power Dissipation, P_D ..... 1.13 W*
Operating Temperature Range, T_A ..... −20°C to +85°C
Storage Temperature Range, T_S ..... −65°C to +150°C

*Derate at the rate of 9.1 mW/°C above 25°C

Due to the high input impedance of these devices, they are susceptible to static discharge damage sometimes associated with handling and testing. Therefore, techniques similar to those used for handling MOS devices should be employed.

ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{KK} = 110 V (unless otherwise specified)

Characteristic	Symbol	Test Conditions	Test Fig.	UDN-7180/83A			UDN-7184A			UDN-7186A			Units
				Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Output ON Voltage UDN-7183/84/86A	V_{ON}	All inputs at 2.4 V	1	−100	−104	—	−98	−102	—	−97	−100	—	V
		All inputs at 2.4 V, V_{KK} = −70 V	1	—	−66	—	—	−65*	—	—	−63	—	V
Output ON Voltage UDN-7180A	V_{ON}	All inputs at 2.4 V, I_{ON} = 14 mA		−105	−108	—	—	—	—	—	—	—	V
Output OFF Voltage	V_{OFF}	All inputs at 0.4 V, Reference V_{KK}	2	76	84	—	76	84	—	76	84	—	V
Output Current ($I_{LIMITING}$)	I_{ON}	All inputs at 2.4 V, V_{KK} = −110 V, Test output held at −60 V	3A	* UDN-7183A only 1475	1850	2450	910	1140	1520	440	550	725	μA
Output Current (I_{SENSE})	I_{ON}	All inputs at 0.4 V, V_{KK} = −110 V, Test output held at −66 V	3B	−95	−120	−155	−65	−85	−115	−50	−65	−90	μA
Input High Current	I_{IH}	Test input at 2.4 V, Other inputs at 0 V	4	—	100	200	—	100	200	—	100	200	μA
Input Low Current	I_{IL}	Test input at 0.4 V, One input at 2.4 V, Other inputs at 0.4 V	5	—	1	10	—	1	10	—	1	10	μA
Supply Current	I_{KK}	All inputs at 0 V	6	—	−125	−175	—	−125	−175	—	−125	−175	μA

NOTES:
1. All voltage measurements are referenced to pin 9 unless otherwise specified.
2. All voltage measurements made with 10MΩ DVM or VTVM.
3. Recommended V_{KK} operating range: −85 to −110 V.
4. Positive (negative) current is defined as going into (coming out of) the specified device pin.

TEST CIRCUITS

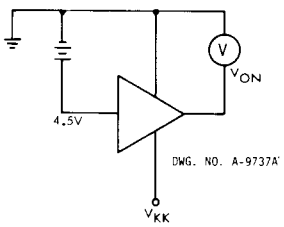


FIGURE 1

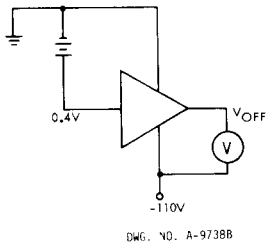


FIGURE 2

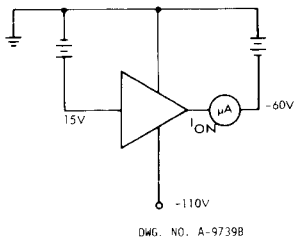


FIGURE 3A

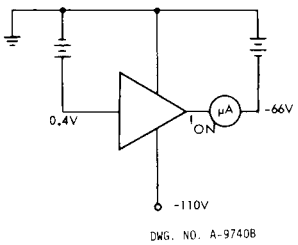


FIGURE 3B

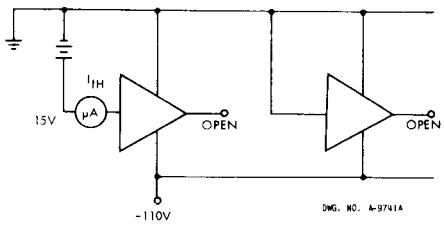


FIGURE 4

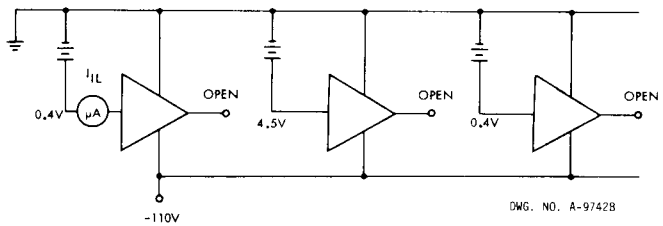


FIGURE 5

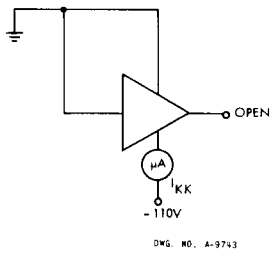
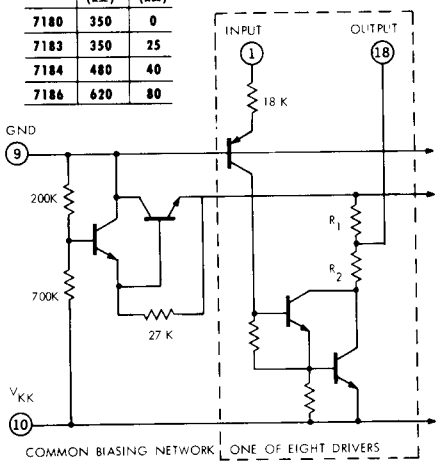


FIGURE 6

PARTIAL SCHEMATIC

	R_1 (kΩ)	R_2 (kΩ)
7180	350	0
7183	350	25
7184	480	40
7186	620	80



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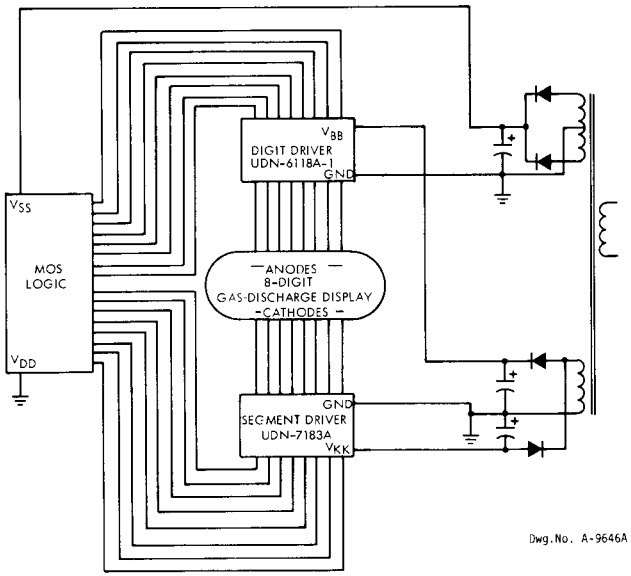
TYPICAL APPLICATION



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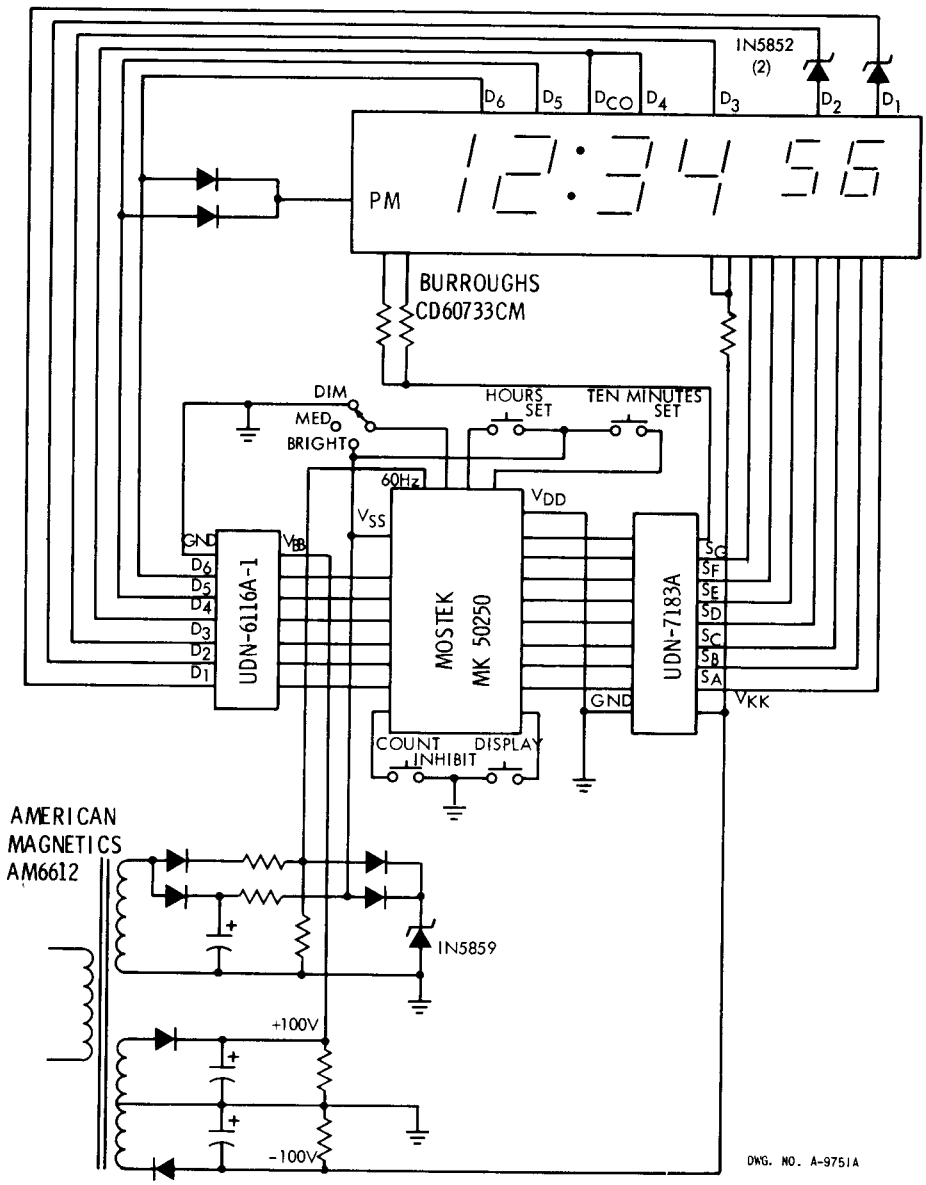
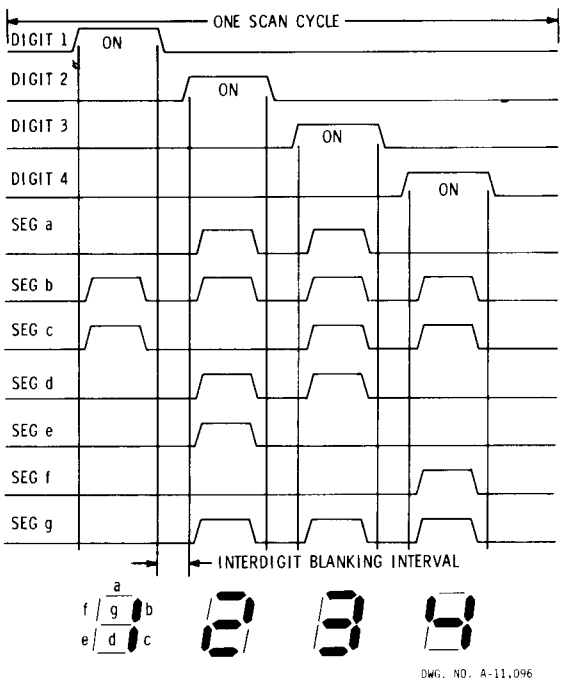
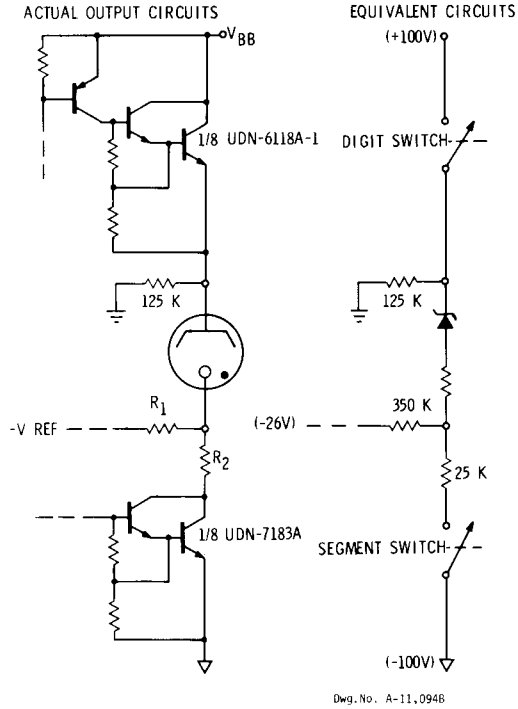
TYPICAL SIX-DIGIT CLOCK







ANODE AND CATHODE WAVEFORMS