

## SERIES UDN-6100A AND UDN-6100R FLUORESCENT DISPLAY DRIVERS

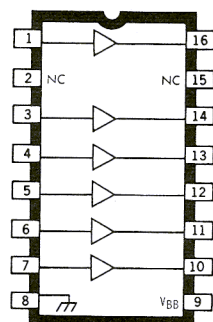
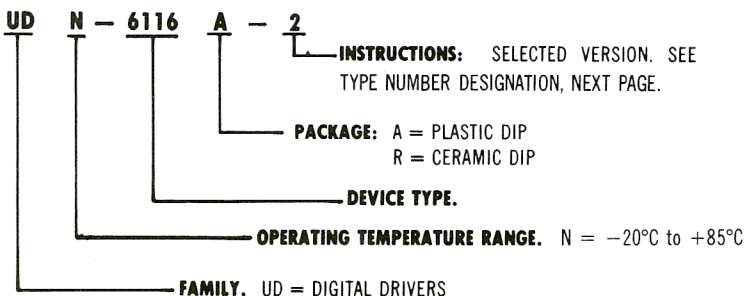
### FEATURES

- Digit or Segment Drivers
- Low Input Current
- Integral Output Pull-Down Resistors
- High Output Breakdown Voltage
- Single or Split Supply Operation

CONSISTING of six or eight NPN Darlington output stages and the associated common-emitter input stages, these drivers are designed to interface between low-level digital logic and vacuum fluorescent displays. All devices are capable of driving the digits and/or segments of these displays and are designed to permit all outputs to be activated simultaneously. Pull-down resistors are incorporated into each output and no external components are required for most fluorescent display applications. The highest voltage parts (suffix A-1) are also used in gas-discharge display applications as anode (digit) drivers.

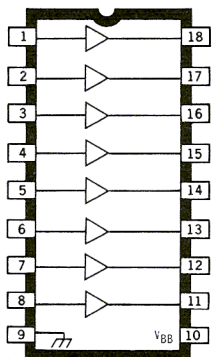
Twenty-four standard devices are listed, so that a circuit designer may select the optimum device for his application. Input characteristics, number of drivers, package style, and output voltage are tabulated for each device in the Device Type Number Designation chart. With any device, the output load is activated when the input is pulled towards the positive supply (active 'high'). All units operate over the temperature range of  $-20^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

\*Always specify complete part number, such as:



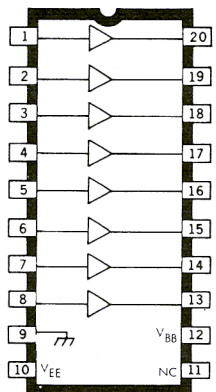
Dwg. No. A-9643A

UDN-6116\*



Dwg. No. A-9641A

UDN-6118\*  
UDN-6128\*



Dwg. No. A-11,222

UDN-6138\*

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**DEVICE TYPE NUMBER DESIGNATION**

Input Compatibility	No. of Drivers	$V_{OUT}$	No. of Pins	Type Number	
				Plastic DIP	Ceramic DIP
5V TTL, CMOS	6	60 V	16	UDN-6116A-2	UDN-6116R-2
		80 V	16	UDN-6116A	UDN-6116R
		110 V	16	UDN-6116A-1	—
	8	60 V	18	UDN-6118A-2	UDN-6118R-2
		80 V	18	UDN-6118A	UDN-6118R
		110 V	18	UDN-6118A-1	—
		$\pm 30$ V	20	UDN-6138A-2	—
		$\pm 40$ V	20	UDN-6138A	—
6-15V CMOS, PMOS	8	60 V	18	UDN-6128A-2	UDN-6128R-2
		80 V	18	UDN-6128A	UDN-6128R
		110 V	18	UDN-6128A-1	—

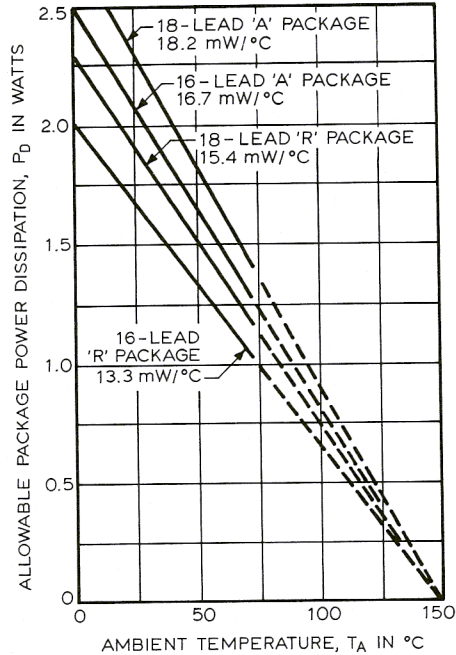
**ABSOLUTE MAXIMUM RATINGS at  $T_A = +25^\circ\text{C}$**

(Voltages are with reference to ground unless otherwise shown)

- Supply Voltage,  $V_{BB}$  (all devices, suffix A or R) . . . . . 85 V  
(UDN-6138A or R, ref.  $V_{EE}$ ) . . . . . 85 V  
(all devices, suffix A-1) . . . . . 115 V  
(all devices, suffix A-2 or R-2) . . . . . 65 V  
(UDN-6138A-2 or R-2, ref.  $V_{EE}$ ) . . . . . 65 V
- Supply Voltage,  $V_{EE}$  (UDN-6138 all suffixes) . . . . . -40 V
- Input Voltage,  $V_{IN}$  (all devices) . . . . . 20 V  
(UDN-6138 all suffixes, ref.  $V_{EE}$ ) . . . . . 55 V
- Output Current,  $I_{OUT}$  . . . . . -40 mA
- Allowable Package Power Dissipation,  $P_D$  . . . . . See Graph
- Operating Temperature Range,  $T_A$  . . . . . -20°C to +85°C
- Storage Temperature Range,  $T_S$  . . . . . -55°C to +150°C

*Caution: The high input impedance of these devices makes them susceptible to static discharge damage associated with handling and testing. Techniques similar to those used for handling MOS devices should be employed.*

**ALLOWABLE PACKAGE POWER DISSIPATION AS A FUNCTION OF TEMPERATURE**



**SERIES UDN-6100A AND UDN-6100R  
FLUORESCENT DISPLAY DRIVERS**

**DEVICE TYPE NUMBER DESIGNATION**

Input Compatibility	No. of Drivers	V <sub>OUT</sub>	No. of Pins	Type Number	
				Plastic DIP	Ceramic DIP
5V TTL, CMOS	6	60 V	16	UDN-6116A-2	UDN-6116R-2
		80 V	16	UDN-6116A	UDN-6116R
		110 V	16	UDN-6116A-1	—
	8	60 V	18	UDN-6118A-2	UDN-6118R-2
		80 V	18	UDN-6118A	UDN-6118R
		110 V	18	UDN-6118A-1	—
		± 30 V	20	UDN-6138A-2	—
		± 40 V	20	UDN-6138A	—
6-15V CMOS, PMOS	8	60 V	18	UDN-6128A-2	UDN-6128R-2
		80 V	18	UDN-6128A	UDN-6128R
		110 V	18	UDN-6128A-1	—

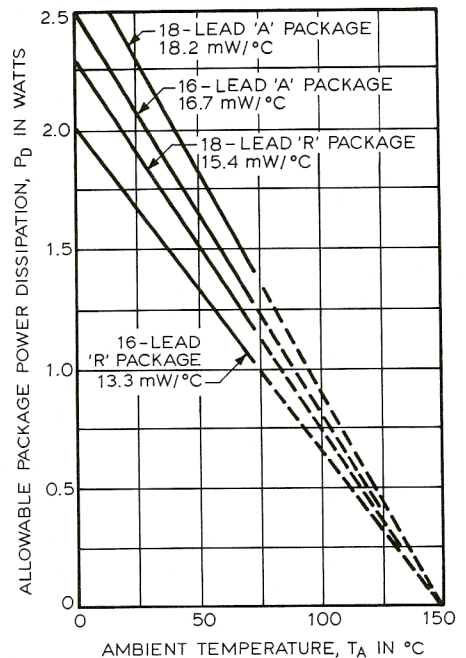
**ABSOLUTE MAXIMUM RATINGS at T<sub>A</sub> = +25°C**

(Voltages are with reference to ground unless otherwise shown)

Supply Voltage, V <sub>BB</sub> (all devices, suffix A or R)	85 V
(UDN-6138A or R, ref. V <sub>EE</sub> )	85 V
(all devices, suffix A-1)	115 V
(all devices, suffix A-2 or R-2)	65 V
(UDN-6138A-2 or R-2, ref. V <sub>EE</sub> )	65 V
Supply Voltage, V <sub>EE</sub> (UDN-6138 all suffixes)	-40 V
Input Voltage, V <sub>IN</sub> (all devices)	20
(UDN-6138 all suffixes, ref. V <sub>EE</sub> )	55 V
Output Current, I <sub>OUT</sub>	-40 mA
Allowable Package Power Dissipation, P <sub>D</sub>	See Graph
Operating Temperature Range, T <sub>A</sub>	-20°C to +85°C
Storage Temperature Range, T <sub>S</sub>	-55°C to +150°C

*Caution: The high input impedance of these devices makes them susceptible to static discharge damage associated with handling and testing. Techniques similar to those used for handling MOS devices should be employed.*

**ALLOWABLE PACKAGE POWER DISSIPATION  
AS A FUNCTION OF TEMPERATURE**



Dwg. No. A-14,318

**ELECTRICAL CHARACTERISTICS (over operating temperature range)**

**Note: All Values Specified At \_\_\_\_\_**

Suffixes	A	R	A-1	A-2	R-2	
<b>V<sub>BB</sub> =</b>	<b>80</b>	<b>80</b>	<b>110</b>	<b>60</b>	<b>60</b>	<b>Volts</b>
<b>*V<sub>EE</sub> =</b>	<b>0</b>	<b>0</b>	<b>NA</b>	<b>0</b>	<b>0</b>	<b>Volts</b>

**\*UDN-6138**

Characteristic	Symbol	Applicable Devices		Test Conditions	Limits			
		Basic Part. No.	Suffix		Min.	Typ.	Max.	Units
Output Leakage Current	I <sub>OUT</sub>	All	All	V <sub>IN</sub> = 0.4 V	—	—	15	μA
Output OFF Voltage	V <sub>OUT</sub>	All	All	V <sub>IN</sub> = 0.4 V	—	—	1.0	V
Output Pull-Down Current	I <sub>OUT</sub>	All	A or R	Input Open, V <sub>OUT</sub> = V <sub>BB</sub>	450	650	1100	μA
			A-1		600	900	1500	μA
			A-2 or R-2		350	500	775	μA
Output ON Voltage	V <sub>OUT</sub>	UDN-6116/18/38	A or R	V <sub>IN</sub> = 2.4 V, I <sub>OUT</sub> = -25 mA	77	78	—	V
			A-1		107	108	—	V
			A-2 or R-2		57	58	—	V
		UDN-6128	A or R	V <sub>IN</sub> = 4.0 V, I <sub>OUT</sub> = -25 mA	77	78	—	V
			A-1		107	108	—	V
			A-2 or R-2		57	58	—	V
Input ON Current	I <sub>IN</sub>	UDN-6116/18/38	All	V <sub>IN</sub> = 2.4 V	—	120	225	μA
				V <sub>IN</sub> = 5.0 V	—	375	650	μA
		UDN-6128		V <sub>IN</sub> = 4.0 V	—	130	250	μA
				V <sub>IN</sub> = 15 V	—	675	1150	μA
Supply Current	I <sub>BB</sub>	All	All	All Inputs Open	—	10	100	μA
		UDN-6116	A or R	All Inputs = 2.4 V	—	5.0	7.5	mA
			A-1	Two Inputs = 2.4 V	—	2.5	4.5	mA
			A-2 or R-2	All Inputs = 2.4 V	—	4.0	6.0	mA
		UDN-6118/38	A or R	All Inputs = 2.4 V	—	6.0	9.0	mA
			A-1	Two Inputs = 2.4 V	—	2.5	4.5	mA
			A-2 or R-2	All Inputs = 2.4 V	—	5.5	8.0	mA
		UDN-6128	A or R	All Inputs = 4.0 V	—	6.0	9.0	mA
			A-1	Two Inputs = 4.0 V	—	2.5	4.5	mA
			A-2 or R-2	All Inputs = 4.0 V	—	5.5	8.0	mA

**RECOMMENDED OPERATING CONDITIONS**

Supply Voltage	V <sub>BB</sub>	UDN-6116/18/28	A or R	5.0	—	70	V
			A-1	5.0	—	100	V
			A-2 or R-2	5.0	—	50	V
	V <sub>EE</sub>	UDN-6138	A	5.0	—	-40	V
			A-2	5.0	—	-30	V
			A	0	—	-40	V
Input ON Voltage	V <sub>IN</sub>	UDN-6116/18/38	All	2.4	—	15	V
		UDN-6128	All	4.0	—	15	V
Output ON Current	I <sub>OUT</sub>	All	All	—	—	-25	mA

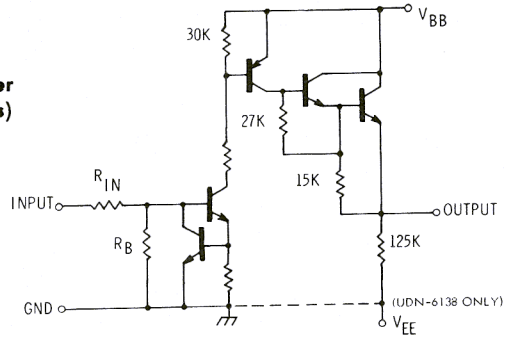
NOTE: Positive (negative) current is defined as going into (coming out of) the specified device pin.

**SERIES UDN-6100A AND UDN-6100R  
FLUORESCENT DISPLAY DRIVERS**

**PARTIAL SCHEMATIC**

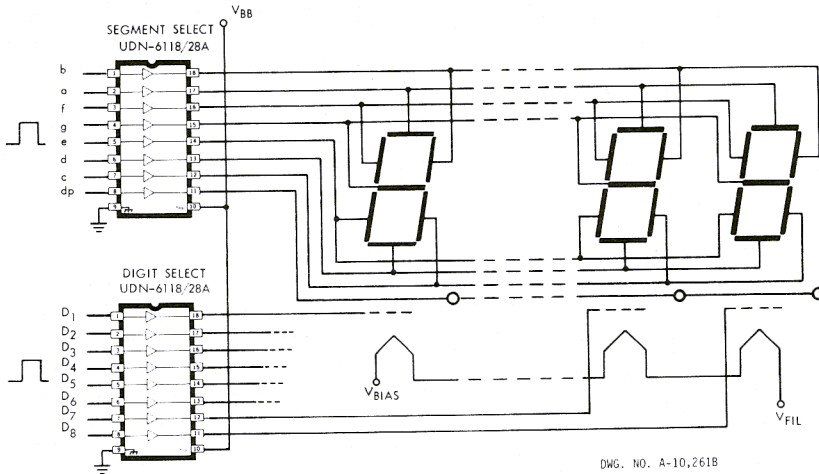
**One Driver  
(All Types)**

Type (All Suffixes)	$R_{IN}$	$R_B$
UDN-6116/18/38	10 k $\Omega$	30 k $\Omega$
UDN-6128	20 k $\Omega$	20 k $\Omega$



DWG. NO. A-10,592C

**TYPICAL MULTIPLEXED FLUORESCENT DISPLAY**



DWG. NO. A-10,261B