

DIONICS INC.

65 RUSHMORE ST., WESTBURY, N.Y. 11590 (516) 997-7474



MONOLITHIC HIGH VOLTAGE CONSTANT CURRENT 7 SEGMENT DISPLAY DRIVERS

DESIGN FEATURES

- High Voltage Capability
- Externally Programable Current Levels
- Matched Output Currents
- TTL or MOS Drive Compatability
- Current Dimming Capability
- Short Circuit Proof

The DI257N and DI257P series of devices are high voltage, complementary, monolithic, integrated circuits designed for driving 7-segment gas discharge displays at matched, constant current levels.

The devices contain seven switched constant current sources capable of being operated directly from a high voltage supply of either positive or negative polarity.

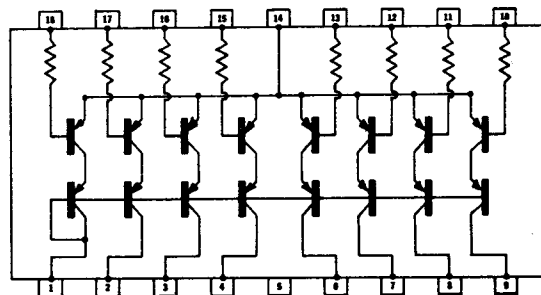
The current levels of all seven outputs are programmed by one external resistor which may be pre-selected and fixed for general usage, or may be partially variable where dimming control of the display being driven is desired.

All seven output currents are matched to ensure equal brightness of each segment of the display being controlled.

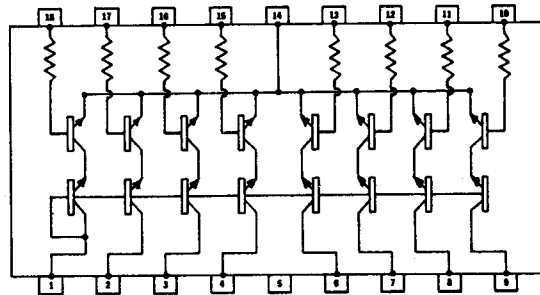
The Dionics monolithic drivers greatly increase reliability, while reducing the large number of discrete high voltage transistors and resistors normally used in this application, with an associated reduction of insertion costs and circuit board space requirements.

DI 257N	DI 257P
DI 267N	DI 267P
DI 277N	DI 277P
DI 287N	DI 287P
DI 297N	DI 297P

CIRCUIT DIAGRAMS

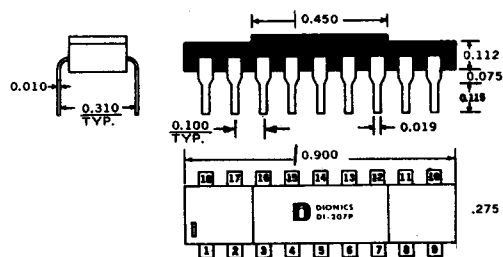


DI 257P



DI 257N

PHYSICAL DIMENSIONS



18 PIN
DUAL INLINE PACKAGE

MAXIMUM RATED VOLTAGE	225 VOLTS	200 VOLTS	175 VOLTS	150 VOLTS	125 VOLTS
NPN	DI 257N	DI 267N	DI 277N	DI 287N	DI 297N
PNP	DI 257P	DI 267P	DI 277P	DI 287P	DI 297P

ABSOLUTE MAXIMUM RATINGS

SYMBOL	CHARACTERISTIC	CONDITION	MAXIMUM LIMIT	UNIT
V-IN	Base input voltage	Switch inputs to common	6.0	Volts
I _O	Output Current	Per Line	2.0	MA
IR-IN	Input Leakage Current	V _{R-IN} = 5.0V	1.0	μA
IR-OUT	Output Leakage Current	All inputs off V _D = Max rated	1.0	μA
ΔI _O	Output Current Matching	I _O = 1.0 MA	± 10	%
ΔI _O	Output Current Matching	I _O = 0.5 MA	± 10	%
T-PD	Total Power Dissipation	@ 25°c Ambient (See figure 5)	1.0	Watt
PD.	Instantaneous Power Dissipation	@ 25°c Ambient Any one Line	250	MW

CIRCUIT OPERATION

The programmed constant current level of the circuit is established by the + V_P supply through the series connected R1 and programming transistor. (See figure 1) Although the collector of this transistor is tied to its own base, it is still very much in its active region, with the current flow dividing between the collector and base paths, as determined by the H_FE characteristic of the device.

Seven additional high voltage transistors have their emitter-base junctions in parallel with the emitter-base of the programming transistor. Since all devices have matched emitter-base characteristics and are in parallel, sharing a common V_{BE}, base currents identical to that established in the programming transistor will flow through each of seven paralleled emitter-base junctions when they are switched on.

The seven switching transistors serve only to quench the base currents of the regulating transistors which in turn, hold off the full supply voltage. The collectors of the current source transistors are connected to the high voltage + V_D supply through the cathodes of the gas discharge display device. (See figure 2)

The H_FE characteristic of all 7 regulating transistors are matched to each other and to the H_FE of the programming transistor. Because all devices are receiving identical base drives, they will have collector currents identical to the programmed current level established by R1. It can be seen that the regulation of the constant current outputs are independent of variations in the high voltage supply.

SHORT CIRCUIT PROTECTION

A momentary short circuit within the gas discharge segment being driven will not result in any increased current flow through the circuit. The current to the display remains at the previously programmed level, with the full supply voltage being absorbed across the collector-emitter junction of the current regulating output transistor. Repeated momentary shorts at programmed current levels of up to 1.0 milliamp may be sustained without damage to the circuit.

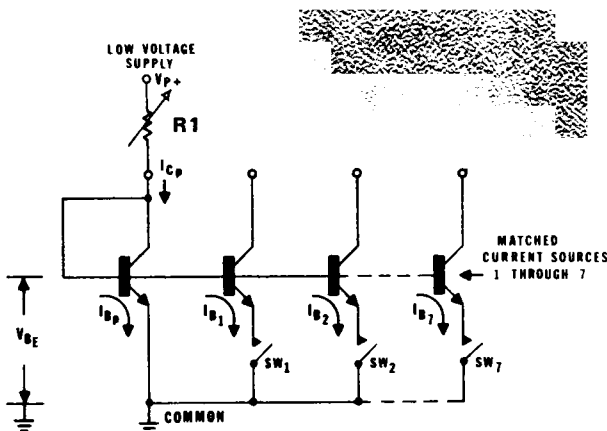


FIGURE 1

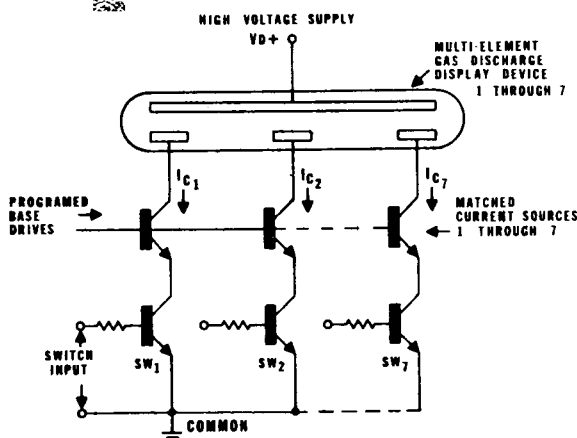


FIGURE 2

HIGH VOLTAGE INPUT DRIVE OPERATION

The base input resistors of switches SW-1 through SW-7 are designed for operation from a nominal 5 volt \pm 1 volt input voltage swing, with 6.0 volts being the absolute maximum rating.

When driving directly from M.O.S. circuitry where higher than 6 volt levels are involved, the addition of an external Zener diode (See Figure 3) will serve to clip the input voltages to the proper level. The Zener voltage should equal V_P less 5 volts.

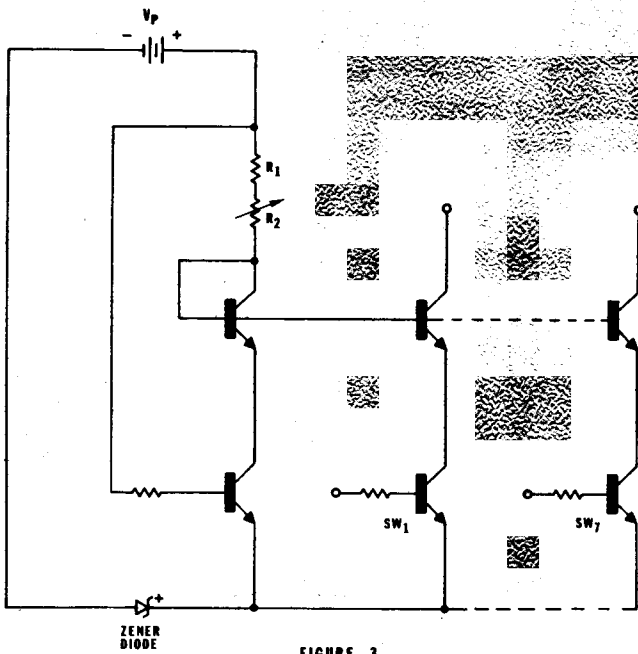


FIGURE 3

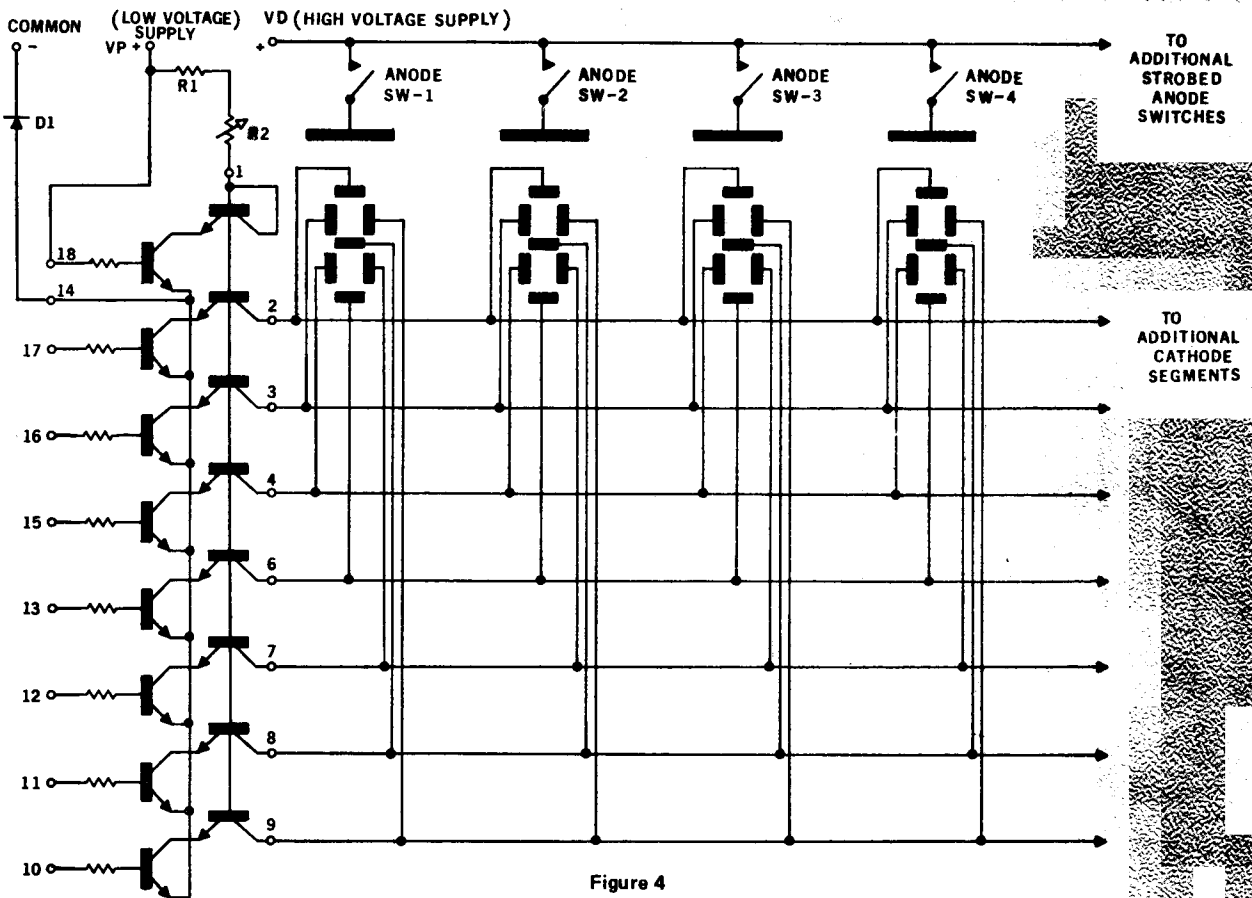


Figure 4

For operation in the multiplexed mode, master blanking of the driven display may be accomplished by inserting an external switching transistor in series with the current programming leg at the juncture of R1 and the programming power supply (+VP).

Diode D1 is optional and may be added where a few tenths of a volt reverse bias is desired to ensure rapid turn off of switches SW-1 through SW-7.

DI 207N — DI 247N
 DI 207P — DI 247P

For applications where segment current matching is extremely critical, an alternate series of devices are available.

MAXIMUM RATED VOLTAGE	225 VOLTS	200 VOLTS	175 VOLTS	150 VOLTS	125 VOLTS
NPN	DI 207N	DI 217N	DI 227N	DI 237N	DI 247N
PNP	DI 207P	DI 217N	DI 227P	DI 237N	DI 247N

The DI 207N — DI 247N and DI 207P — DI 247P are identical in all respects to the DI 257N — DI 297N and DI 257P — 297P with the exception that $\Delta I/O$ at 1.0MA and 0.5MA = $\pm 5\%$.

THERMAL INFORMATION
DISSIPATION DERATING CURVE

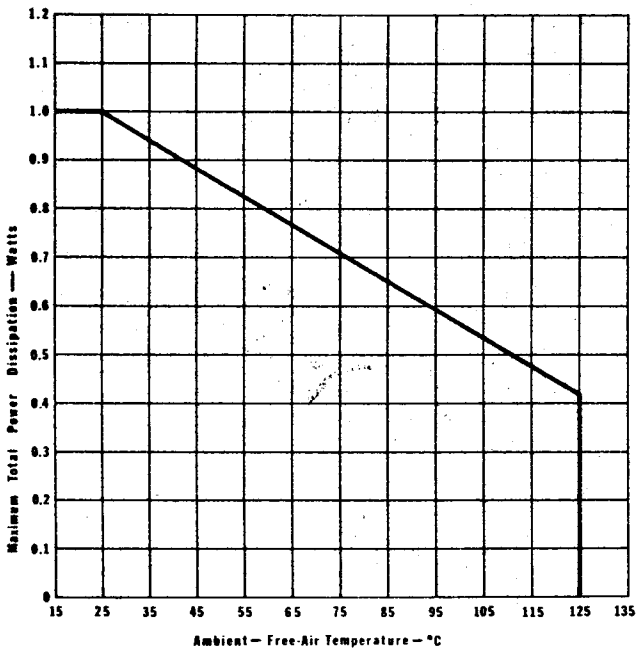
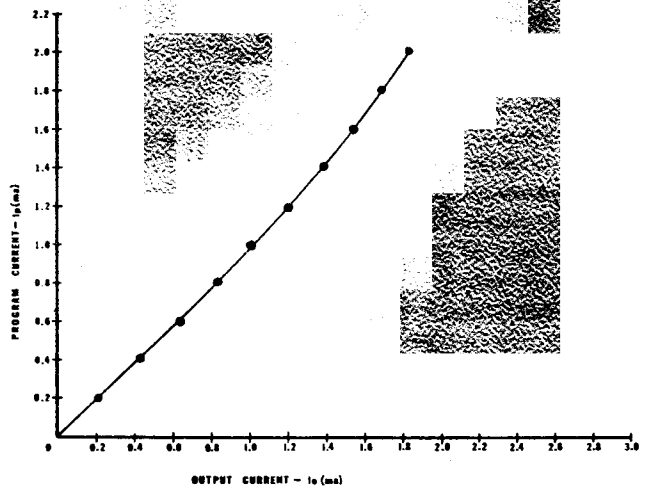
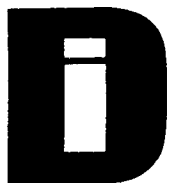


Figure 5

PROGRAM CURRENT
VS.
OUTPUT CURRENT



Represented In Your Area By:



DIONICS INC.

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