

**SERIES UHD-400, UHD-400-1, AND UHD-500  
POWER AND RELAY DRIVERS**

**MIL-STD-883 Compliant**

**FEATURES**

- 500 mA Output Current-Sink Capability
- Four Logic Types
- Pinning Compatible with 54/74 Logic Series
- High-Voltage Output:
  - 100 V Series UHD-500
  - 70 V Series UHD-400-1
  - 40 V Series UHD-400

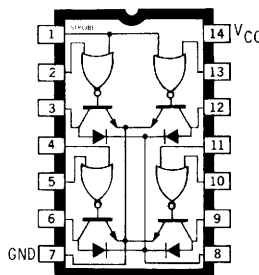
COMBINING LOGIC GATES and high-current switching transistors, these hermetically packaged, monolithic devices are used to drive incandescent or LED lamps, relays, solenoids, small dc motors, and other peripheral power loads in military and aerospace applications. Drivers with internal transient-suppression diodes are recommended for use with inductive loads.

Three minimum output-breakdown voltage ratings are available: 40 V (Series UHD-400), 70 V (Series UHD-400-1), and 100 V (Series UHD-500). All devices can sink 250 mA continuous, or 500 mA peak.

The inputs are compatible with standard TTL and CMOS logic levels. Four of eight available logic/output configurations are shown at right.

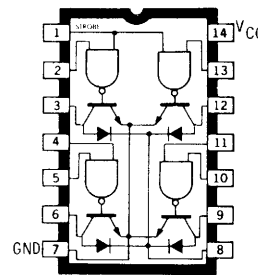
These devices are supplied in ceramic/metal side-brazed 14-pin hermetic packages. The package conforms to the dimensional requirements of MIL-M-38510 and is rated for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ . Power and relay drivers in flat-pack packages, Series UHC-400, UHC-400-1, and UHC-500, continue to be available on special order.

Monolithic construction enables cost-effective and reliable systems design. Reverse-bias burn-in and 100% high-reliability screening to MIL-STD-883, Class B, is standard for all devices.



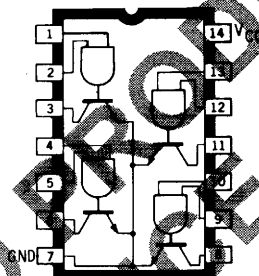
Dwg. No. A-9130B

**UHD-403  
UHD-403-1  
UHD-503**



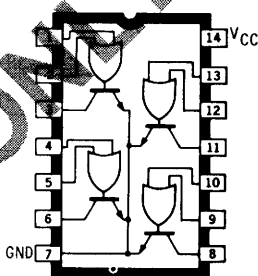
Dwg. No. A-7880B

**UHD-406  
UHD-406-1  
UHD-506**



Dwg. No. A-12,388

**UHD-408  
UHD-408-1  
UHD-508**



Dwg. No. A-12,389

**UHD-432  
UHD-432-1  
UHD-532**

**Device Part Number Designation**

| Part Numbers* |       |     | Function                      |
|---------------|-------|-----|-------------------------------|
| 400           | 400-1 | 500 | Quad 2-Input AND              |
| 402           | 402-1 | 502 | Quad 2-Input OR               |
| 403           | 403-1 | 503 | Quad OR for Inductive Loads   |
| 406           | 406-1 | 506 | Quad AND for Inductive Loads  |
| 407           | 407-1 | 507 | Quad NAND for Inductive Loads |
| 408           | 408-1 | 508 | Quad 2-Input NAND             |
| 432           | 432-1 | 532 | Quad 2-Input NOR              |
| 433           | 433-1 | 533 | Quad NOR for Inductive Loads  |

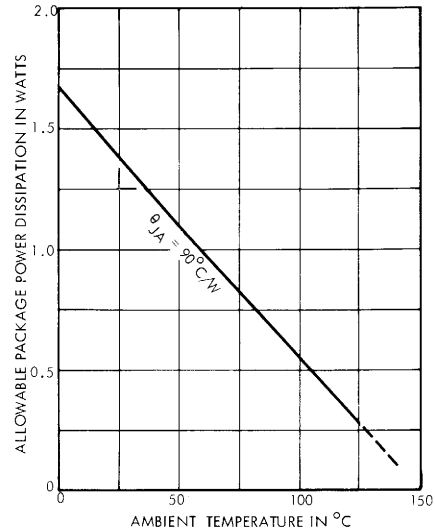
\*Complete part number includes the prefix UHD.

**SERIES UHD-400, UHD-400-1, AND UHD-500  
POWER AND RELAY DRIVERS**

**ABSOLUTE MAXIMUM RATINGS**

|   |                 |
|---|-----------------|
| Supply Voltage, $V_{CC}$ .....                    | 7 V             |
| Output Voltage, $V_{IN}$ .....                    | 5.5 V           |
| Output Off-State Voltage, $V_{OFF}$               |                 |
| Series UHD-400 .....                              | 40 V            |
| Series UHD-400-1 .....                            | 70 V            |
| Series UHD-500 .....                              | 100 V           |
| Output On-State Sink Current, $I_{ON}$            |                 |
| (one driver) .....                                | 500 mA          |
| (total package) .....                             | 1 A             |
| Suppression Diode Off-State Voltage, $V_R$        |                 |
| Series UHD-400 .....                              | 40 V            |
| Series UHD-400-1 .....                            | 70 V            |
| Series UHD-500 .....                              | 100 V           |
| Suppression Diode On-State Current, $I_F$ .....   | 500 mA          |
| Operating Free-Air Temperature Range, $T_A$ ..... | -55°C to +125°C |
| Storage Temperature Range, $T_S$ .....            | -65°C to +150°C |

**ALLOWABLE PACKAGE POWER DISSIPATION**



Dwg. No. A-10.884B

**RECOMMENDED OPERATING CONDITIONS**

|                                    | Min. | Nom. | Max. | Units |
|------------------------------------|------|------|------|-------|
| Supply Voltage ( $V_{CC}$ )        | 4.5  | 5.0  | 5.5  | V     |
| Operating Temperature Range        | -55  | +25  | +125 | °C    |
| Current into Any Output (ON State) | —    | —    | 250  | mA    |

**SWITCHING CHARACTERISTICS at  $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 5.0\text{ V}$**

| Characteristic                       | Series    | Test Conditions (Note 3)                        | Limits |      |      | Units |
|--------------------------------------|-----------|---|--------|------|------|-------|
|                                      |           |   | Min.   | Typ. | Max. |       |
| Turn-On Delay Time<br>( $t_{pd0}$ )  | UHD-400   | $V_S = 40\text{ V}$ , $R_L = 265\Omega$ (6 W)   | —      | 200  | 500  | ns    |
|                                      | UHD-400-1 | $V_S = 70\text{ V}$ , $R_L = 465\Omega$ (10 W)  | —      | 200  | 500  | ns    |
|                                      | UHD-500   | $V_S = 100\text{ V}$ , $R_L = 670\Omega$ (15 W) | —      | 200  | 500  | ns    |
| Turn-Off Delay Time<br>( $t_{pd1}$ ) | UHD-400   | $V_S = 40\text{ V}$ , $R_L = 265\Omega$ (6 W)   | —      | 300  | 750  | ns    |
|                                      | UHD-400-1 | $V_S = 70\text{ V}$ , $R_L = 465\Omega$ (10 W)  | —      | 300  | 750  | ns    |
|                                      | UHD-500   | $V_S = 100\text{ V}$ , $R_L = 670\Omega$ (15 W) | —      | 300  | 750  | ns    |

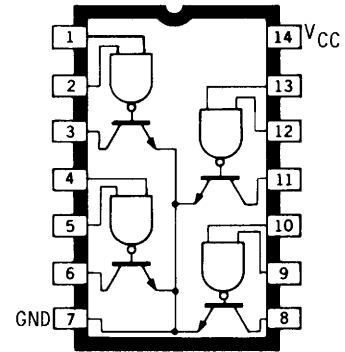
**NOTES:**

- Each input tested separately.
- Voltage values shown in the test-circuit waveforms are with respect to network ground terminal.
- $C_i = 15\text{ pF}$ . Capacitance value specified includes probe and test fixture capacitance.

**INPUT PULSE CHARACTERISTICS**

|                            |                          |                                |
|----------------------------|--------------------------|--------------------------------|
| $V_{in(0)} = 0\text{ V}$   | $t_f \leq 7.0\text{ ns}$ | $t_p = 1.0\text{ }\mu\text{s}$ |
| $V_{in(1)} = 3.5\text{ V}$ | $t_r \leq 14\text{ ns}$  | PRR = 500 kHz                  |

## UHD-400, UHD-400-1, UHD-500 Quad 2-Input AND Power Drivers



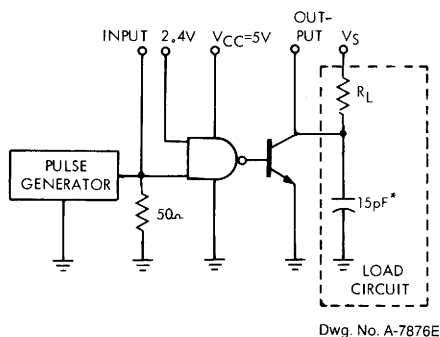
Dwg. No. A-7606

### ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

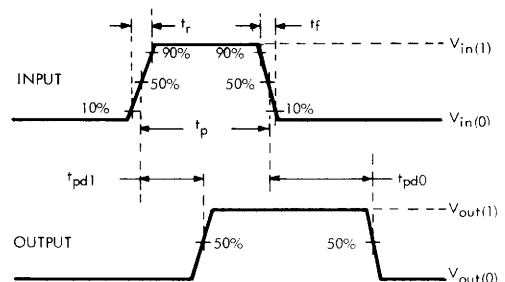
| Characteristic             | Symbol               | Temp.          | Applicable Devices | Test Conditions |              |             |        | Limits |      |      |       |
|----------------------------|----------------------|----------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                            |                      |                |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. | Units |
| Output Reverse Current     | I <sub>CEX</sub>     | —              | UHD-400            | 4.5 V           | 2.0 V        | 2.0 V       | 40 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-400-1          | 4.5 V           | 2.0 V        | 2.0 V       | 70 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-500            | 4.5 V           | 2.0 V        | 2.0 V       | 100 V  | —      | —    | 100  | μA    |
| Output Voltage             | V <sub>CE(SAT)</sub> | -55°C to +25°C | All                | 4.5 V           | 0.8 V        | 4.5 V       | 150 mA | —      | —    | 0.5  | V     |
|                            |                      |                |                    | 4.5 V           | 0.8 V        | 4.5 V       | 250 mA | —      | —    | 0.7  | V     |
|                            |                      |                | All                | 4.5 V           | 0.8 V        | 4.5 V       | 150 mA | —      | —    | 0.6  | V     |
|                            |                      |                |                    | 4.5 V           | 0.8 V        | 4.5 V       | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage              | V <sub>IN(1)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                            | V <sub>IN(0)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)     | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                            | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                            |                      |                |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Supply Current (Each Gate) | I <sub>CC(1)</sub>   | +25°C          | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 4.0  | 7.5  | mA    |
|                            | I <sub>CC(0)</sub>   | +25°C          | All                | 5.5 V           | 0 V          | 0 V         | —      | —      | 17.5 | 26.5 | mA    |

**NOTES:**

1. All typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = +25°C.
2. Each input is tested separately.



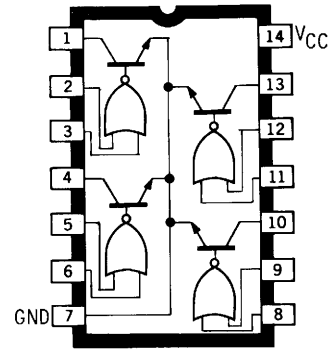
Dwg. No. A-7876E



Dwg. No. A-7628C

\*Includes probe and test fixture capacitance.

**UHD-402, UHD-402-1, UHD-502  
Quad 2-Input OR Power Drivers**



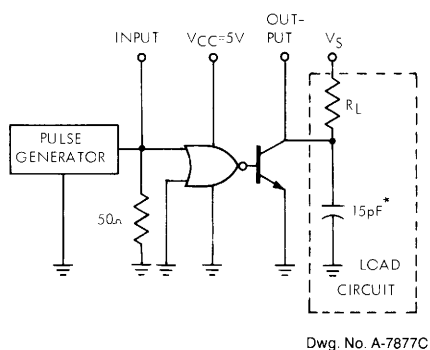
Dwg. No. A-7608

**ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)**

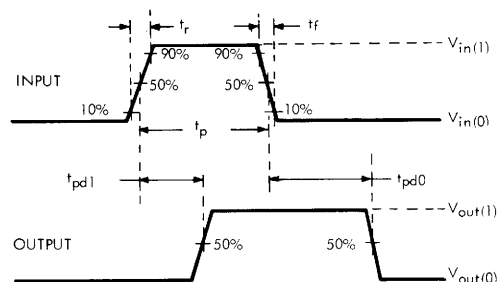
| Characteristic             | Symbol               | Temp.          | Applicable Devices | Test Conditions |              |             |        | Limits |      |      |       |
|----------------------------|----------------------|----------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                            |                      |                |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. | Units |
| Output Reverse Current     | I <sub>CEX</sub>     | —              | UHD-402            | 4.5 V           | 2.0 V        | 0 V         | 40 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-402-1          | 4.5 V           | 2.0 V        | 0 V         | 70 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-502            | 4.5 V           | 2.0 V        | 0 V         | 100 V  | —      | —    | 100  | μA    |
| Output Voltage             | V <sub>CE(SAT)</sub> | -55°C to +25°C | All                | 4.5 V           | 0.8 V        | 0.8 V       | 150 mA | —      | —    | 0.5  | V     |
|                            |                      |                |                    | 4.5 V           | 0.8 V        | 0.8 V       | 250 mA | —      | —    | 0.7  | V     |
|                            |                      | +125°C         | All                | 4.5 V           | 0.8 V        | 0.8 V       | 150 mA | —      | —    | 0.6  | V     |
|                            |                      |                |                    | 4.5 V           | 0.8 V        | 0.8 V       | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage              | V <sub>IN(1)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                            | V <sub>IN(0)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)     | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                            | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                            |                      |                |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Supply Current (Each Gate) | I <sub>CC(1)</sub>   | +25°C          | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 4.1  | 7.5  | mA    |
|                            | I <sub>CC(0)</sub>   | +25°C          | All                | 5.5 V           | 0 V          | 0 V         | —      | —      | 18   | 26.5 | mA    |

**NOTES:**

1. All typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = +25°C.
2. Each input is tested separately.



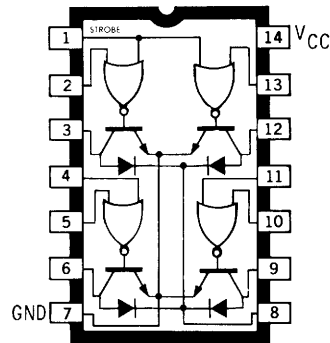
Dwg. No. A-7877C



Dwg. No. A-7628C

\*Includes probe and test fixture capacitance.

## UHD-403, UHD-403-1, UHD-503 Quad OR Relay Drivers



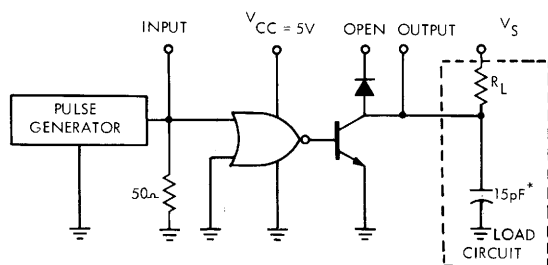
Dwg. No. A-9130B

### ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

| Characteristic                 | Symbol               | Temp.              | Applicable Devices | Test Conditions |              |             |        | Limits |      |      |       |
|--------------------------------|----------------------|--------------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                                |                      |                    |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. | Units |
| Output Reverse Current         | I <sub>CEX</sub>     | —                  | UHD-403            | 4.5 V           | 2.0 V        | 0 V         | 40 V   | —      | —    | 100  | μA    |
|                                |                      |                    | UHD-403-1          | 4.5 V           | 2.0 V        | 0 V         | 70 V   | —      | —    | 100  | μA    |
|                                |                      |                    | UHD-503            | 4.5 V           | 2.0 V        | 0 V         | 100 V  | —      | —    | 100  | μA    |
| Output Voltage                 | V <sub>CE(SAT)</sub> | -55°C to +25°C     | All                | 4.5 V           | 0.8 V        | 0.8 V       | 150 mA | —      | —    | 0.5  | V     |
|                                |                      |                    |                    | 4.5 V           | 0.8 V        | 0.8 V       | 250 mA | —      | —    | 0.7  | V     |
|                                |                      |                    | All                | 4.5 V           | 0.8 V        | 0.8 V       | 150 mA | —      | —    | 0.6  | V     |
|                                |                      |                    |                    | 4.5 V           | 0.8 V        | 0.8 V       | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage                  | V <sub>IN(1)</sub>   | —                  | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                                | V <sub>IN(0)</sub>   | —                  | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)         | I <sub>IN(0)</sub>   | —                  | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                                |                      |                    |                    | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                                |                      |                    |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Strobe Input Current           | I <sub>IN(0)</sub>   | —                  | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -1.6 | mA    |
|                                |                      |                    |                    | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 100  | μA    |
|                                |                      |                    |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Diode Leakage Current (Note 3) | I <sub>R</sub>       | —                  | All                | 5.0 V           | 0 V          | 0 V         | Open   | —      | —    | 200  | μA    |
| Diode Forward Voltage          | V <sub>F</sub>       | —                  | All                | 5.0 V           | 5.0 V        | 5.0 V       | 200 mA | —      | 1.5  | 1.75 | V     |
| Supply Current (Each Gate)     | I <sub>CC(1)</sub>   | +25°C              | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 6.0  | 7.5  | mA    |
|                                |                      | I <sub>CC(0)</sub> | +25°C              | All             | 5.5 V        | 0 V         | 0 V    | —      | —    | 20   | 26.5  |

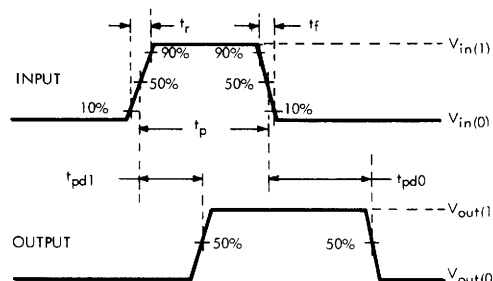
**NOTES:**

1. All typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = +25°C.
2. Excluding strobe input; each input is tested separately.
3. All diodes tested simultaneously at pin 8 at rated V<sub>OFF</sub>.



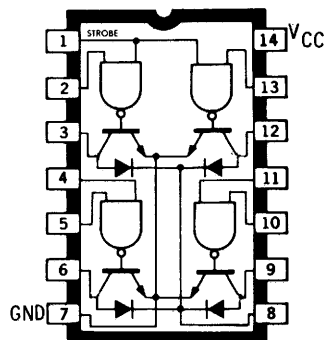
Dwg. No. A-9123C

\*Includes probe and test fixture capacitance.



Dwg. No. A-7628C

**UHD-406, UHD-406-1, UHD-506  
Quad AND Relay Drivers**



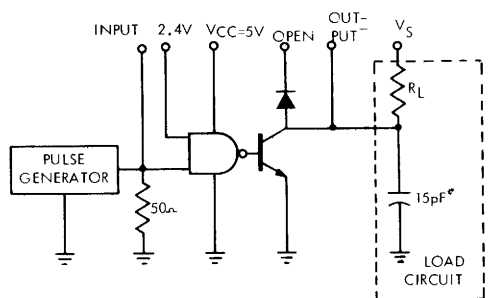
Dwg. No. A-7880B

**ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)**

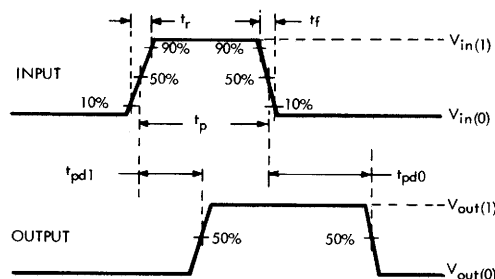
| Characteristic                 | Symbol               | Temp.          | Applicable Devices | Test Conditions |              |             |        | Limits |      |      |       |
|--------------------------------|----------------------|----------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                                |                      |                |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. | Units |
| Output Reverse Current         | I <sub>CEX</sub>     | —              | UHD-406            | 4.5 V           | 2.0 V        | 2.0 V       | 40 V   | —      | —    | 100  | μA    |
|                                |                      |                | UHD-406-1          | 4.5 V           | 2.0 V        | 2.0 V       | 70 V   | —      | —    | 100  | μA    |
|                                |                      |                | UHD-506            | 4.5 V           | 2.0 V        | 2.0 V       | 100 V  | —      | —    | 100  | μA    |
| Output Voltage                 | V <sub>CE(SAT)</sub> | -55°C to +25°C | All                | 4.5 V           | 0.8 V        | 4.5 V       | 150 mA | —      | —    | 0.5  | V     |
|                                |                      |                | All                | 4.5 V           | 0.8 V        | 4.5 V       | 250 mA | —      | —    | 0.7  | V     |
|                                |                      | +125°C         | All                | 4.5 V           | 0.8 V        | 4.5 V       | 150 mA | —      | —    | 0.6  | V     |
|                                |                      |                | All                | 4.5 V           | 0.8 V        | 4.5 V       | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage                  | V <sub>IN(1)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                                | V <sub>IN(0)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)         | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                                | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                                |                      |                |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Strobe Input Current           | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -1.6 | mA    |
|                                | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 100  | μA    |
|                                |                      |                |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Diode Leakage Current (Note 3) | I <sub>R</sub>       | —              | All                | 5.0 V           | 0 V          | 0 V         | Open   | —      | —    | 200  | μA    |
| Diode Forward Voltage          | V <sub>F</sub>       | —              | All                | 5.0 V           | 5.0 V        | 5.0 V       | 200 mA | —      | 1.5  | 1.75 | V     |
| Supply Current (Each Gate)     | I <sub>CC(1)</sub>   | +25°C          | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 4.0  | 7.5  | mA    |
|                                | I <sub>CC(0)</sub>   | +25°C          | All                | 5.5 V           | 0 V          | 0 V         | —      | —      | 17.5 | 26.5 | mA    |

**NOTES:**

1. All typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = +25°C.
2. Excluding strobe input; each input is tested separately.
3. All diodes tested simultaneously at pin 8 at rated V<sub>OFF</sub>.



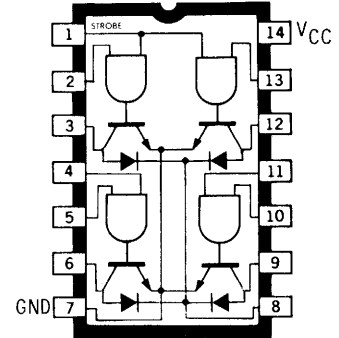
Dwg. No. A-7878C



Dwg. No. A-7628C

\*Includes probe and test fixture capacitance.

## UHD-407, UHD-407-1, UHD-507 Quad NAND Relay Drivers



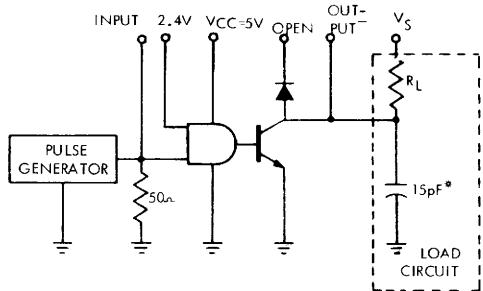
Dwg. No. A-7973B

### ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

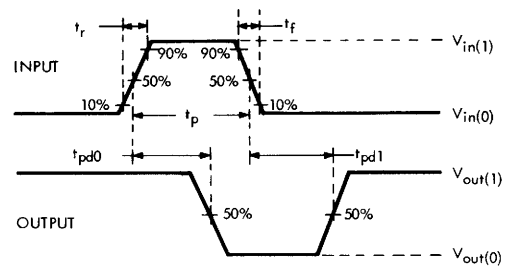
| Characteristic                 | Symbol               | Temp.          | Applicable Devices | Test Conditions |              |             |        | Limits |      |      |       |
|--------------------------------|----------------------|----------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                                |                      |                |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. | Units |
| Output Reverse Current         | I <sub>CEX</sub>     | —              | UHD-407            | 4.5 V           | 0.8 V        | 4.5 V       | 40 V   | —      | —    | 100  | μA    |
|                                |                      |                | UHD-407-1          | 4.5 V           | 0.8 V        | 4.5 V       | 70 V   | —      | —    | 100  | μA    |
|                                |                      |                | UHD-507            | 4.5 V           | 0.8 V        | 4.5 V       | 100 V  | —      | —    | 100  | μA    |
| Output Voltage                 | V <sub>CE(SAT)</sub> | -55°C to +25°C | All                | 4.5 V           | 2.0 V        | 2.0 V       | 150 mA | —      | —    | 0.5  | V     |
|                                |                      |                | All                | 4.5 V           | 2.0 V        | 2.0 V       | 250 mA | —      | —    | 0.7  | V     |
|                                |                      | +125°C         | All                | 4.5 V           | 2.0 V        | 2.0 V       | 150 mA | —      | —    | 0.6  | V     |
|                                |                      |                | All                | 4.5 V           | 2.0 V        | 2.0 V       | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage                  | V <sub>IN(1)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                                | V <sub>IN(0)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)         | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                                | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                                |                      | —              | All                | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Strobe Input Current           | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -1.6 | mA    |
|                                |                      | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 100  | μA    |
|                                | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Diode Leakage Current (Note 3) | I <sub>R</sub>       | —              | All                | 5.0 V           | 5.0 V        | 5.0 V       | Open   | —      | —    | 200  | μA    |
| Diode Forward Voltage          | V <sub>F</sub>       | —              | All                | 5.0 V           | 0 V          | 0 V         | 200 mA | —      | 1.5  | 1.75 | V     |
| Supply Current (Each Gate)     | I <sub>CC(1)</sub>   | +25°C          | All                | 5.5 V           | 0 V          | 0 V         | —      | —      | 6.0  | 7.5  | mA    |
|                                | I <sub>CC(0)</sub>   | +25°C          | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 20   | 26.5 | mA    |

**NOTES:**

1. All typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = +25°C.
2. Excluding strobe input; each input is tested separately.
3. All diodes tested simultaneously at pin 8 at rated V<sub>OFF</sub>.



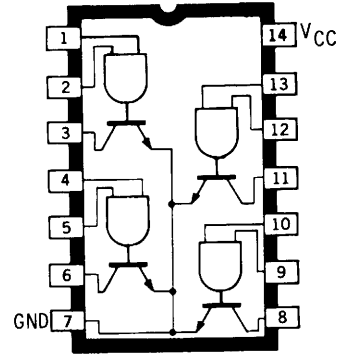
Dwg. No. A-7899C



Dwg. No. A-7900A

\*Includes probe and text fixture capacitance.

**UHD-408, UHD-408-1, UHD-508  
Quad 2-Input NAND Power Drivers**



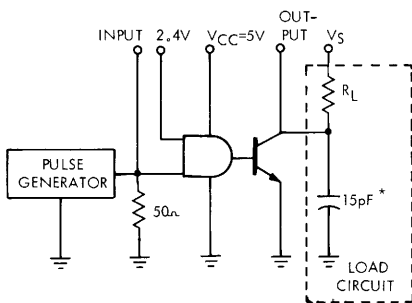
Dwg. No. 12,388

**ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)**

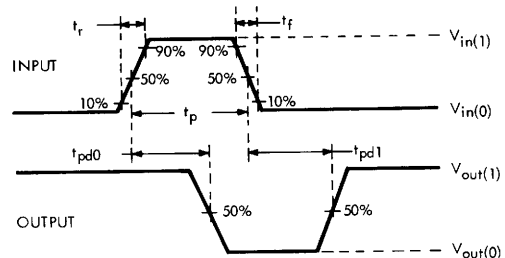
| Characteristic             | Symbol               | Temp.          | Applicable Devices | Test Conditions |              |             |        | Limits |      |      |       |
|----------------------------|----------------------|----------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                            |                      |                |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. | Units |
| Output Reverse Current     | I <sub>CEX</sub>     | —              | UHD-408            | 4.5 V           | 0.8 V        | 4.5 V       | 40 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-408-1          | 4.5 V           | 0.8 V        | 4.5 V       | 70 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-508            | 4.5 V           | 0.8 V        | 4.5 V       | 100 V  | —      | —    | 100  | μA    |
| Output Voltage             | V <sub>CE(SAT)</sub> | -55°C to +25°C | All                | 4.5 V           | 2.0 V        | 2.0 V       | 150 mA | —      | —    | 0.5  | V     |
|                            |                      |                |                    | 4.5 V           | 2.0 V        | 2.0 V       | 250 mA | —      | —    | 0.7  | V     |
|                            |                      | +125°C         | All                | 4.5 V           | 2.0 V        | 2.0 V       | 150 mA | —      | —    | 0.6  | V     |
|                            |                      |                |                    | 4.5 V           | 2.0 V        | 2.0 V       | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage              | V <sub>IN(1)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                            | V <sub>IN(0)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)     | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                            | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                            |                      |                |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Supply Current (Each Gate) | I <sub>CC(1)</sub>   | +25°C          | All                | 5.5 V           | 0 V          | 0 V         | —      | —      | 6.0  | 7.5  | mA    |
|                            | I <sub>CC(0)</sub>   | +25°C          | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 20   | 26.5 | mA    |

**NOTES:**

1. All typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = +25°C.
2. Each input is tested separately.



Dwg. No. A-9638A

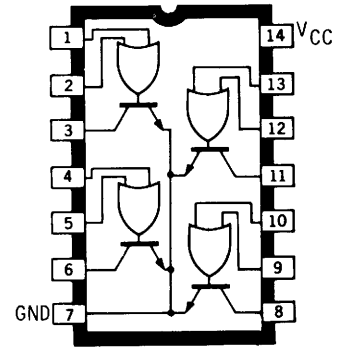


Dwg. No. A-7900A

\*Includes probe and test fixture capacitance.



## UHD-432, UHD-432-1, UHD-532 Quad 2-Input NOR Power Drivers



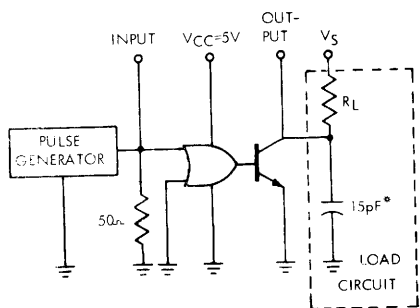
Dwg. No. A-12,389

### ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

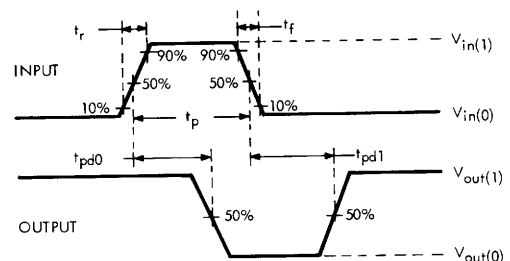
| Characteristic             | Symbol               | Temp.          | Applicable Devices | Test Conditions |              |             |        | Limits |      |      |       |
|----------------------------|----------------------|----------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                            |                      |                |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. | Units |
| Output Reverse Current     | I <sub>CEX</sub>     | —              | UHD-432            | 4.5 V           | 0.8 V        | 0.8 V       | 40 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-432-1          | 4.5 V           | 0.8 V        | 0.8 V       | 70 V   | —      | —    | 100  | μA    |
|                            |                      |                | UHD-532            | 4.5 V           | 0.8 V        | 0.8 V       | 100 V  | —      | —    | 100  | μA    |
| Output Voltage             | V <sub>CE(SAT)</sub> | -55°C to +25°C | All                | 4.5 V           | 2.0 V        | 0 V         | 150 mA | —      | —    | 0.5  | V     |
|                            |                      |                |                    | 4.5 V           | 2.0 V        | 0 V         | 250 mA | —      | —    | 0.7  | V     |
|                            |                      |                | All                | 4.5 V           | 2.0 V        | 0 V         | 150 mA | —      | —    | 0.6  | V     |
|                            |                      |                |                    | 4.5 V           | 2.0 V        | 0 V         | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage              | V <sub>IN(1)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                            | V <sub>IN(0)</sub>   | —              | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)     | I <sub>IN(0)</sub>   | —              | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                            | I <sub>IN(1)</sub>   | —              | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                            |                      |                |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Supply Current (Each Gate) | I <sub>CC(1)</sub>   | +25°C          | All                | 5.5 V           | 0 V          | 0 V         | —      | —      | 6.0  | 7.5  | mA    |
|                            | I <sub>CC(0)</sub>   | +25°C          | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 20   | 26.5 | mA    |

**NOTES:**

1. All typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = +25°C.
2. Each input is tested separately.



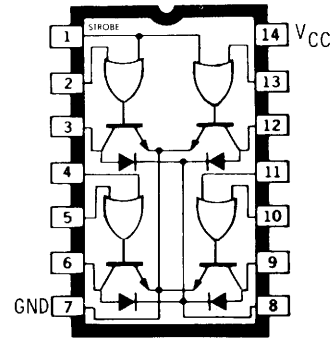
Dwg. No. A-7902C



Dwg. No. A-7900A

\*Includes probe and test fixture capacitance.

**UHD-433, UHD-433-1, UHD-533  
Quad NOR Relay Drivers**



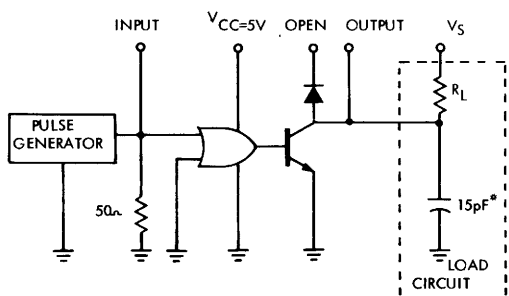
Dwg. No. A-12.390A

**ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)**

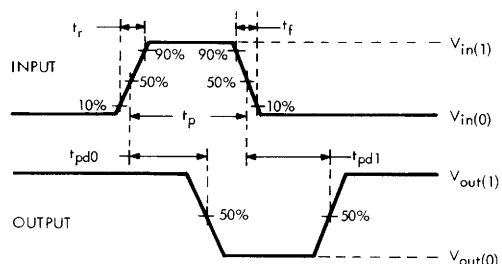
| Characteristic                 | Symbol               | Temp.            | Applicable Devices | Test Conditions |              |             |        | Limits |      |      | Units |
|--------------------------------|----------------------|------------------|--------------------|-----------------|--------------|-------------|--------|--------|------|------|-------|
|                                |                      |                  |                    | V <sub>CC</sub> | Driven Input | Other Input | Output | Min.   | Typ. | Max. |       |
| Output Reverse Current         | I <sub>CEX</sub>     | —                | UHD-433            | 4.5 V           | 0.8 V        | 0.8 V       | 40 V   | —      | —    | 100  | μA    |
|                                |                      |                  | UHD-433-1          | 4.5 V           | 0.8 V        | 0.8 V       | 70 V   | —      | —    | 100  | μA    |
|                                |                      |                  | UHD-533            | 4.5 V           | 0.8 V        | 0.8 V       | 100 V  | —      | —    | 100  | μA    |
| Output Voltage                 | V <sub>CE(SAT)</sub> | - 55°C to + 25°C | All                | 4.5 V           | 2.0 V        | 0 V         | 150 mA | —      | —    | 0.5  | V     |
|                                |                      |                  |                    | 4.5 V           | 2.0 V        | 0 V         | 250 mA | —      | —    | 0.7  | V     |
|                                |                      |                  | All                | 4.5 V           | 2.0 V        | 0 V         | 150 mA | —      | —    | 0.6  | V     |
|                                |                      |                  |                    | 4.5 V           | 2.0 V        | 0 V         | 250 mA | —      | —    | 0.8  | V     |
| Input Voltage                  | V <sub>IN(1)</sub>   | —                | All                | 4.5 V           | —            | —           | —      | 2.0    | —    | —    | V     |
|                                | V <sub>IN(0)</sub>   | —                | All                | 4.5 V           | —            | —           | —      | —      | —    | 0.8  | V     |
| Input Current (Note 2)         | I <sub>IN(0)</sub>   | —                | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -800 | μA    |
|                                |                      | —                | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 40   | μA    |
|                                |                      |                  |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Strobe Input Current           | I <sub>IN(0)</sub>   | —                | All                | 5.5 V           | 0.4 V        | 4.5 V       | —      | —      | —    | -1.6 | mA    |
|                                |                      | —                | All                | 5.5 V           | 2.4 V        | 0 V         | —      | —      | —    | 100  | μA    |
|                                |                      |                  |                    | 5.5 V           | 5.5 V        | 0 V         | —      | —      | —    | 1000 | μA    |
| Diode Leakage Current (Note 3) | I <sub>R</sub>       | —                | All                | 5.0 V           | 5.0 V        | 5.0 V       | Open   | —      | —    | 200  | μA    |
| Diode Forward Voltage          | V <sub>F</sub>       | —                | All                | 5.0 V           | 0 V          | 0 V         | 200 mA | —      | 1.5  | 1.75 | V     |
| Supply Current (Each Gate)     | I <sub>CC(1)</sub>   | + 25°C           | All                | 5.5 V           | 0 V          | 0 V         | —      | —      | 6.0  | 7.5  | mA    |
|                                |                      | + 25°C           | All                | 5.5 V           | 5.0 V        | 5.0 V       | —      | —      | 20   | 26.5 | mA    |

**NOTES:**

1. All typical values at are V<sub>CC</sub> = 5.0 V, T<sub>a</sub> = + 25°C.
2. Excluding strobe input; each input is tested separately.
3. All diodes tested simultaneously at pin 8 at rated V<sub>OFF</sub>.



Dwg. No. A-9135C

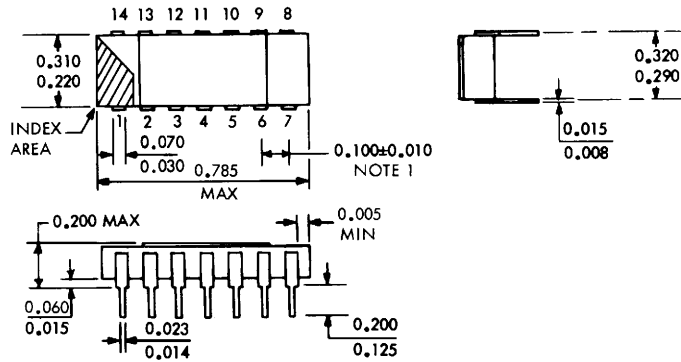


Dwg. No. A-7900A

\*Includes probe and test fixture capacitance.

## HERMETIC CERAMIC/METAL PACKAGE

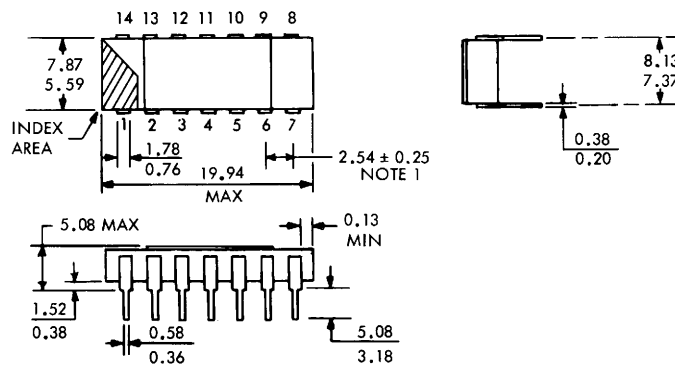
### DIMENSIONS IN INCHES



Dwg. No. A-9767C IN

### DIMENSIONS IN MILLIMETERS

Based on 1" = 25.4 mm



Dwg. No. A-9767C MM

This package conforms to military specification MIL-M-38510, case outline D-1, Configuration 3.

These devices are marked to indicate compliance to the latest issue of MIL-STD-883. For example: UHD400-883 or UHD433-1-883.

**NOTES:**

1. Lead spacing tolerance is non-cumulative.
2. Exact body and lead configuration at vendor's option within limits shown.
3. Lead gauge plane is 0.030 in. (0.76 mm) max. below seating plane.

**SALES OFFICES**

**UNITED STATES**

**ALABAMA**

EPI Inc.  
Suite 13 — 9694 Hwy. 20 W  
Madison 35758  
Tel. 205/461-7000

**Electramark Inc.**

Suite 21  
3322 South Memorial Parkway  
Huntsville 35801  
Tel. 205/883-9948

**ARIZONA**

Sprague Electric Company  
Suite 209 — 1819 S. Dobson Rd.  
Mesa 85202 — 5690  
Tel. 602/244-0154  
Tel. 602/831-6762

**Sprague Electric Company**

Suite 601  
1150 E. Pennsylvania Street  
Tucson 85714 — 1640  
Tel. 602/746-0955

**CALIFORNIA (Metro. L.A.)**

Sprague Electric Company  
Suite 150 — 3100 S. Harbor Blvd.  
Santa Ana 92704  
Tel. 714/549-9913

**Sprague Electric Company**

Suite 459  
15350 Sherman Way  
Van Nuys 91406  
Tel. 818/994-6500

**(Northern)**

William J. Purdy Company  
770 Airport Blvd.  
Burlingame 94010 — 1927  
Tel. 415/347-7701

**(San Diego)**

Miner Associates, Inc.  
Suite 117 — 10721 Treena Street  
San Diego 92131 — 1009  
Tel. 619/566-9891

**COLORADO**

William J. Purdy Company  
5570 E. Yale Ave.  
Denver 80222 — 6907  
Tel. 303/753-6800

**Todd & Fry Associates**

P.O. Box 1689  
Longmont 80502 — 1689  
Tel. 303/776-7331

**CONNECTICUT**

Sprague Electric Company  
88 Main Street South  
Southbury 06488  
Tel. 203/264-9595

**Sprague Electric Company**

120 Hartford Turnpike South  
P.O. Box 578  
Wallingford 06492 — 0578  
Tel. 203/284-8300

**Data Mark Inc.**

Unit 7C-2514 Boston Post Road  
Guilford 06437  
Tel. 203/453-0575

**DIST. OF COLUMBIA**

Sprague Electric Company  
Suite 311

14333 Laurel-Bowie Road  
Laurel, MD 20708 — 1130  
Tel. 301/953-1717

**Trinkle Sales Inc.**

P.O. Box 5320  
Cherry Hill, NJ 08034 — 0460  
Tel. 609/795-4200

**FLORIDA**

Sprague Electric Company  
P.O. Box 1410  
Altamonte Springs 32715 — 1410  
Tel. 305/831-3636

**Sprague Electric Company**

Suite 419 — 1500 N.W. 62nd Street  
Ft. Lauderdale 33309 — 1802  
Tel. 305/491-7411

**Sprague Electric Company**

Suite T, Building 501  
8001 North Dale Mabry  
Tampa 33614 — 3265  
Tel. 813/935-8203

**GEORGIA**

Electramark Inc.  
6030 — I Unity Drive  
Norcross 30071 — 3583  
Tel. 404/446-7915

**Electronic Marketing Associates**

Suite 101  
6695 Peachtree Industrial Blvd.  
Atlanta 30360 — 2116  
Tel. 404/448-1215

**ILLINOIS (Northern)**

**D. Dolin Sales**

609 Academy Drive  
Northbrook 60062  
Tel. 312/249-6770

**(Southern)**

EPI Inc.  
Suite 201 — 103 W. Lockwood  
St. Louis, MO 63119 — 2915  
Tel. 314/962-1411

**INDIANA**

Sprague Electric Company  
Suite 290 — 8200 Haverstick Road  
Indianapolis 46240  
Tel. 317/253-4247

**IOWA**

J. R. Sales Engineering, Inc.  
1930 St. Andrews, N. E.  
Cedar Rapids 52402  
Tel. 319/393-2232

**KANSAS**

EPI Inc.  
9016 West 83rd Street  
Overland Park 66204  
Tel. 913/341-2024

**KENTUCKY**

Sprague Electric Company  
821 Corporate Drive  
Unit #16, Suite 200  
Lexington 40503  
Tel. 606/224-4230

**MARYLAND**

Sprague Electric Company  
Suite 311  
14333 Laurel-Bowie Road  
Laurel 20708 — 1130  
Tel. 301/792-4890

**Trinkle Sales Inc.**

P.O. Box 5320  
Cherry Hill, NJ 08034 — 0460  
Tel. 609/795-4200

**MASSACHUSETTS**

New England Technical Sales Corp.  
101 Cambridge Street  
Burlington 01803  
Tel. 617/272-0434

**MICHIGAN**

Sprague Electric Company  
Suite 301 — 2155 Jackson Road  
Ann Arbor 48103 — 3917  
Tel. 313/761-2014

**MINNESOTA**

HMR, Inc.  
9065 Lyndale Ave. South  
Minneapolis 55420 — 3520  
Tel. 612/888-2122

**MISSISSIPPI**

EPI Inc.  
Suite 13 — 9694 Hwy. 20 W  
Madison, AL 35758  
Tel. 205/461-7000

**MISSOURI**

EPI Inc.  
Suite 201 — 103 W. Lockwood  
St. Louis 63119 — 2915  
Tel. 314/962-1411

**NEBRASKA**

J. R. Sales Engineering, Inc.  
1930 St. Andrews, N. E.  
Cedar Rapids, Iowa 52402  
Tel. 319/393-2232

**NEW HAMPSHIRE**

New England Technical Sales Corp.  
101 Cambridge Street  
Burlington, MA 01803  
Tel. 617/272-0434

**NEW JERSEY (Northern)**

Sprague Electric Company  
P.O. Box 1612  
Wayne 07470 — 0701  
Tel. 201/696-8200

**(Southern)**

Trinkle Sales Inc.  
P.O. Box 5320  
Cherry Hill 08034 — 0460  
Tel. 609/795-4200

**NEW MEXICO**

William J. Purdy Company  
120 LaVeta Drive NE  
Albuquerque 87108 — 1613  
Tel. 505/266-7959

**NEW YORK (Downstate)**

Sprague Electric Company  
2001 Palmer Ave.  
Larchmont 10538 — 2420  
Tel. 914/834-4439

**(Long Island)**

Sprague Electric Company  
P.O. Box 541  
Central Islip 11722 — 0541  
Tel. 516/234-8700

**(Upstate)**

Sprague Electric Company  
2002 Teall Ave.  
Syracuse 13206 — 1542  
Tel. 315/437-7311

**Paston-Hunter Co., Inc.**

2002 Teall Ave.  
Syracuse 13206 — 1596  
Tel. 315/437-2843

**NORTH CAROLINA**

Sprague Electric Company  
9741-M Southern Pine Blvd.  
Charlotte 28210 — 5560  
Tel. 704/527-1306

**Electronic Marketing Associates**

9225 Honeycutt Creek Rd.  
Raleigh 27609 — 1523  
Tel. 919/847-8800

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Dublin 43017 — 1375  
Tel. 614/761-1881

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16209 S.E. McGillivray Boulevard  
Vancouver, WA 98664 — 9025  
Tel. 503/225-0493  
Tel. 206/892-0361

**William J. Purdy Company**

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Tel. 503/641-9373

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Cherry Hill, NJ 08034 — 0460  
Tel. Phila. 215/922-2080

**SOUTH CAROLINA**

Electronic Marketing Associates  
210 W. Stone Ave.  
Greenville 29609 — 5499  
Tel. 803/233-4637

**TENNESSEE (Eastern)**

Electronic Marketing Associates  
9225 Honeycutt Creek Road  
Raleigh, NC 27609 — 1523  
Tel. 919/847-8800

**(Western)**

EPI Inc.  
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Madison, AL 35758  
Tel. 205/461-7000

**TEXAS**

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Dallas 75243 — 3403  
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**Sprague Electric Company**

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**Sprague Electric Company**

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**WISCONSIN**

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Milwaukee 53207 — 5991  
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**PUERTO RICO**

Electronic Sales Associates  
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Country Club 3rd Ext.  
Rio Piedras  
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**Birde Marketing, Inc.**

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Sprague World Trade Corp.  
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In the construction of the components described, the full intent of the specification will be met. The Sprague Electric Company, however, reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the design of its products. Components made under military approvals will be in accordance with the approval requirements.

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