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## QUAD INVERTING TRANSISTOR SWITCH

### 1 FEATURES

- OUTPUT VOLTAGE TO 50V
- OUTPUT CURRENT TO 1.2A
- VERY LOW SATURATION VOLTAGE
- TTL COMPATIBLE INPUTS
- INTEGRAL SUPPRESSION DIODE

### 2 DESCRIPTION

The L9222 monolithic quad transistor switch is designed for high current, high voltage switching applications.

Each of the four switches is controlled by a logic input and all four are controlled by a common enable input. All inputs are TTL-compatible for direct connection to logic circuits. Each switch consists of an open-collector transistor plus a clamp diode for applications with inductive loads.

Figure 1. Packages

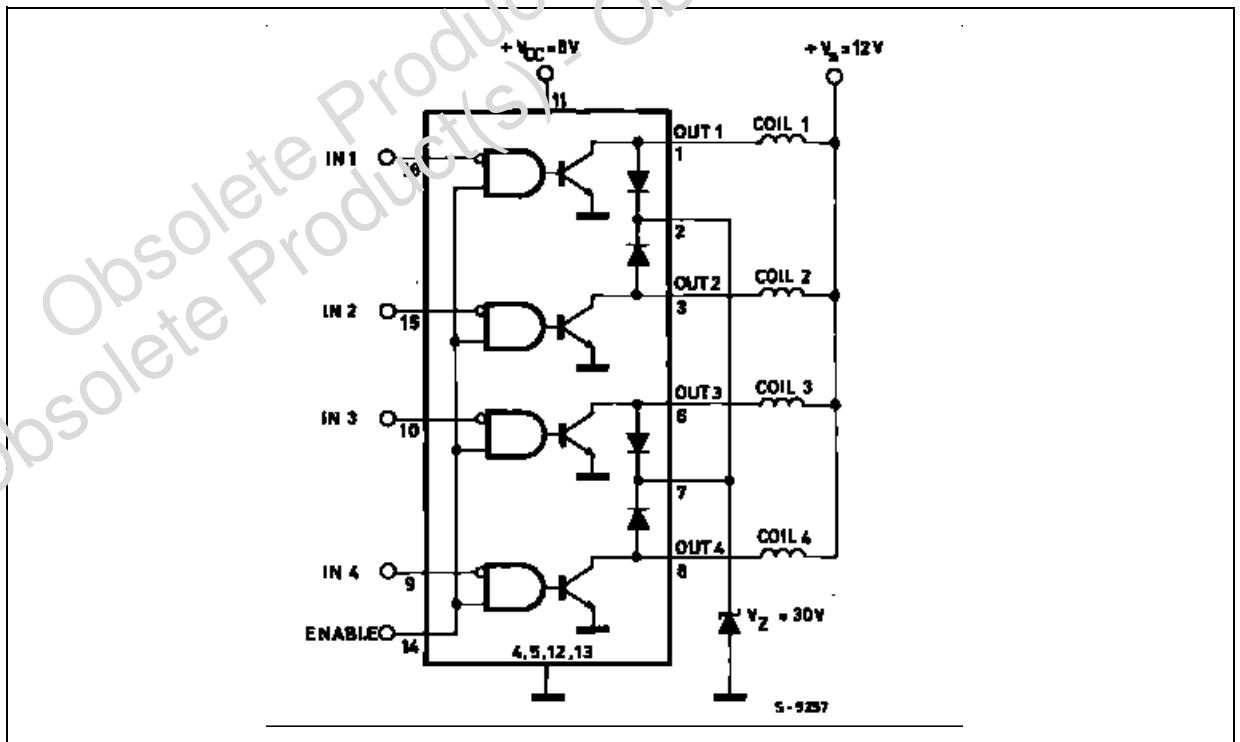


Table 1. Order Codes

| Part Number | Package       |
|-------------|---------------|
| L9222       | (PDIP 12+2+2) |
| L9222 D     | (SO20L)       |

The emitters of the four switches are connected together to GND. The switches of the same device may be paralleled. The device is intended to drive coils such as relays, solenoids, unipolar stepper motors, LED etc.

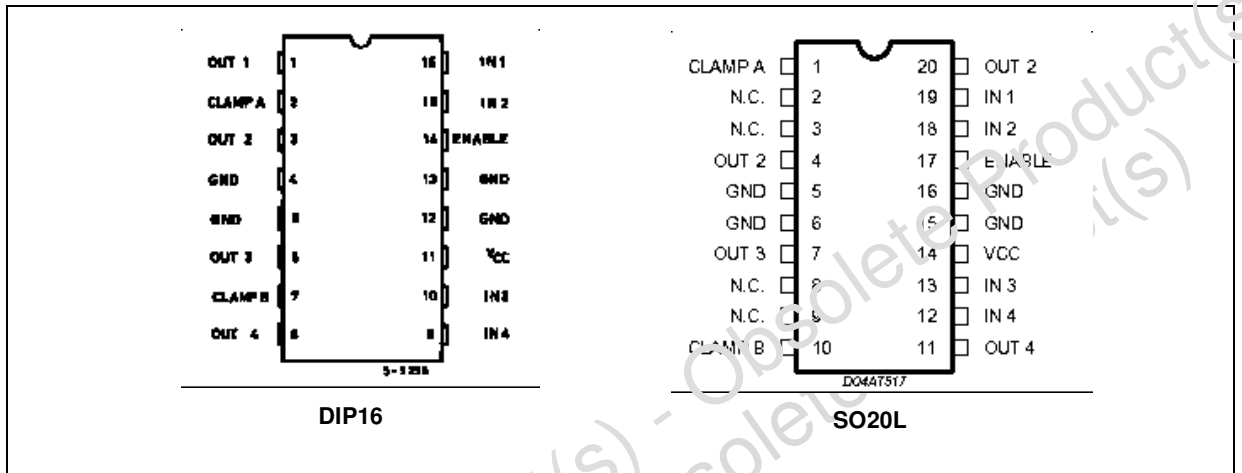
Figure 2. BLOCK DIAGRAM



**Table 2. ABSOLUTE MAXIMUM RATINGS**

| Symbol                           | Parameter                              | Value                          | Unit |
|----------------------------------|--|--------------------------------|------|
| V <sub>OUT</sub>                 | Output Voltage                         | - 0.7 to 50                    | V    |
| V <sub>CC</sub>                  | Logic Supply Voltage                   | 7                              | V    |
| V <sub>i</sub>                   | Input Voltage                          | - 0.7 to V <sub>CC</sub> + 0.3 | V    |
| T <sub>j</sub> , T <sub>ST</sub> | Junction and Storage Temperature Range | - 55 to 150                    | °C   |

**Figure 3. PIN CONNECTION (Top view)**



**Table 3. TRUTH TABLE**

| Enable | Input | Power Out |
|--------|-------|-----------|
| H      | L     | ON        |
| H      | H     | OFF       |
| L      | X     | OFF       |

For each input :  
 H= High level  
 L= Low level  
 X= Don't care

**Table 4. THERMAL DATA**

| Symbol                 | Parameter                              | Value  | Unit |
|------------------------|--|--------|------|
| R <sub>th j-amb</sub>  | Thermal Resistance Junction to ambient | Max 90 | °C/W |
| R <sub>th J-case</sub> | Thermal Resistance Junction to case    | Max 14 | °C/W |

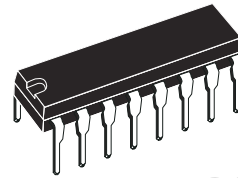
**Table 5. ELECTRICAL CHARACTERISTICS**
 $V_{CC} = 5V_{dc} \pm 5\%$   $V_{EN} = 5V - 40 \leq T_j \leq 125^\circ C$  unless otherwise specified

| Symbol        | Parameter  | Test Condition  | Min. | Typ. | Max.              | Unit        |
|---------------|--|---|------|------|-------------------|-------------|
| $V_{CE(sus)}$ | Output Sustaining Voltage                          | $V_{IN} = 2V$ $V_{EN} = 2V$ , $I_{OUT} = 100mA$   | 46   |      |                   | V           |
| $I_{CEX}$     | Output Leakage Current                             | $V_{CE} = 50V$ $V_{IN} = 2V$ , $V_{EN} = 0.8V$  |      |      | 1                 | mA          |
| $V_{CE(sat)}$ | Collector Emitter Saturation                       | $V_{IN} \geq 0.8V$<br>$I_{OUT} = 0.1A$<br>$I_{OUT} = 0.3A$<br>$I_{OUT} = 0.6A; -40 + 105^\circ C$ |      |      | 0.3<br>0.5<br>0.8 | V<br>V<br>V |
| $V_{IL}$      | Input Low Voltage                                  |   |      |      | 0.8               | V           |
| $I_{IL}$      | Input Low Current                                  | $V_{IN} = 0.4V$   | -15  |      |                   | $\mu A$     |
| $V_{IH}$      | Input High Voltage                                 |   | 2.0  |      |                   | V           |
| $I_{IH}$      | Input High Current                                 | $V_{IN} \geq 2.0V$  | -15  |      |                   | $\mu A$     |
| $I_S$         | Logic Supply Current                               | All Outputs ON $I_{OUT} = 06A$  |      | 50   | 90                | mA          |
|               |  | All Outputs OFF   |      | 10   | 20                | mA          |
| $I_R$         | Clamp Diode Leakage Current                        | $V_R = 50V$<br>Diode Reverse Voltage  |      |      | 100               | $\mu A$     |
| $V_F$         | Clamp Diode Forward Voltage                        | $I_F = 0.6A$  |      |      | 1.8               | V           |
|               |  | $I_F = 1.2A$  |      |      | 2.0               | V           |
| $I_{OUT}$     | Output Current                                     | $V_{IN} = 0.4V$ , $R = 10\Omega$ , $V_S = 13V$  | 0.9  | 1.2  |                   | A           |
| $T_{PHL}$     | Propagation Delay Time<br>(high to low transition) | $T_j = 25^\circ C$<br>$I_L = 600mA$   |      |      | 20                | $\mu s$     |
| $T_{PHL}$     | Propagation Delay Time<br>(low to high transition) | $I_L = 600mA$<br>$T_j = 25^\circ C$   |      |      | 20                | $\mu s$     |
| $V_{ENL}$     | Low Enable Voltage                                 |   |      |      | 0.8               | V           |
| $I_{ENL}$     | Low Enable Current                                 | $V_{EN} = 0.4V$   | -15  |      |                   | $\mu A$     |
| $V_{ENH}$     | High Enable Voltage                                |   | 2.0  |      |                   | V           |
| $I_{ENH}$     | High Enable Current                                | $V_{EN} \geq 2.0V$  | -15  |      | 15                | $\mu A$     |

Figure 4. Powerdip (12+2+2) Mechanical Data &amp; Package Dimensions

| DIM. | mm   |       |      | inch  |       |       |
|------|------|-------|------|-------|-------|-------|
|      | MIN. | TYP.  | MAX. | MIN.  | TYP.  | MAX.  |
| a1   | 0.51 |       |      | 0.020 |       |       |
| B    | 0.85 |       | 1.40 | 0.033 |       | 0.055 |
| b    |      | 0.50  |      |       | 0.020 |       |
| b1   | 0.38 |       | 0.50 | 0.015 |       | 0.020 |
| D    |      |       | 20.0 |       |       | 0.787 |
| E    |      | 8.80  |      |       | 0.346 |       |
| e    |      | 2.54  |      |       | 0.100 |       |
| e3   |      | 17.78 |      |       | 0.700 |       |
| F    |      |       | 7.10 |       |       | 0.280 |
| I    |      |       | 5.10 |       |       | 0.201 |
| L    |      | 3.30  |      |       | 0.130 |       |
| Z    |      |       | 1.27 |       |       | 0.050 |

### OUTLINE AND MECHANICAL DATA



**Powerdip 16**

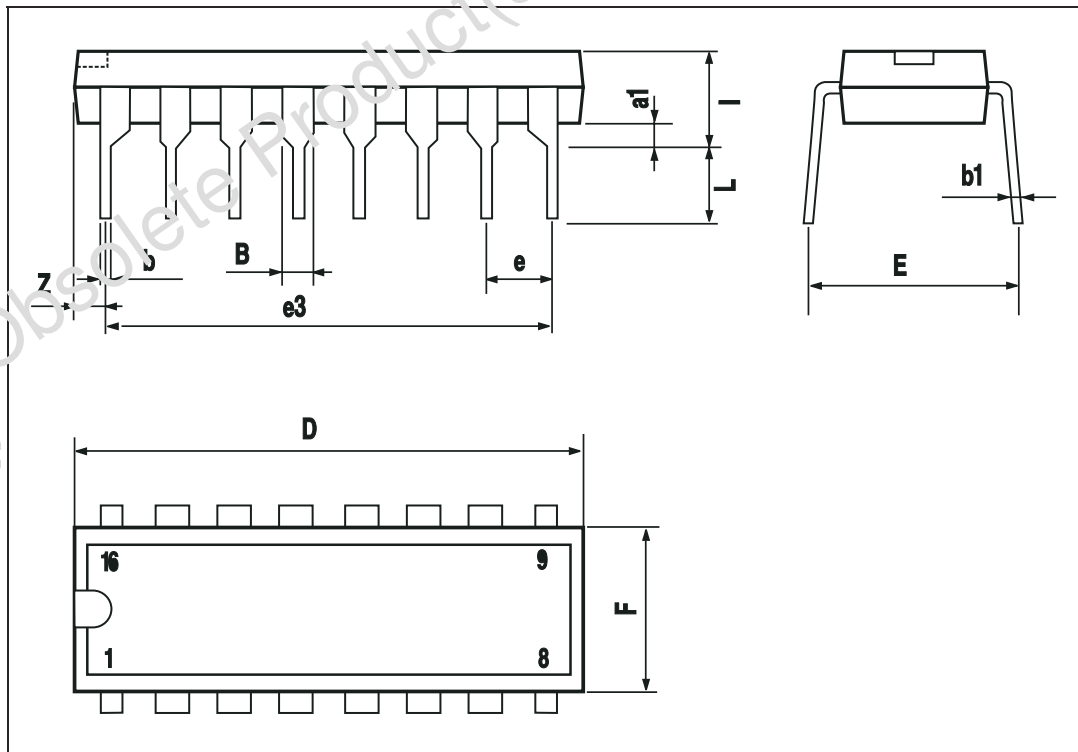
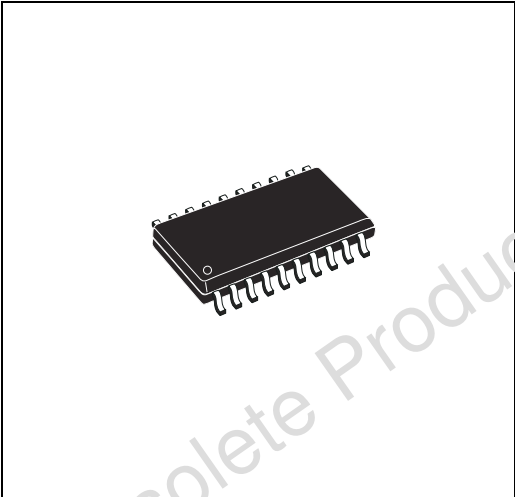


Figure 5. SO20L Mechanical Data & Package Dimensions

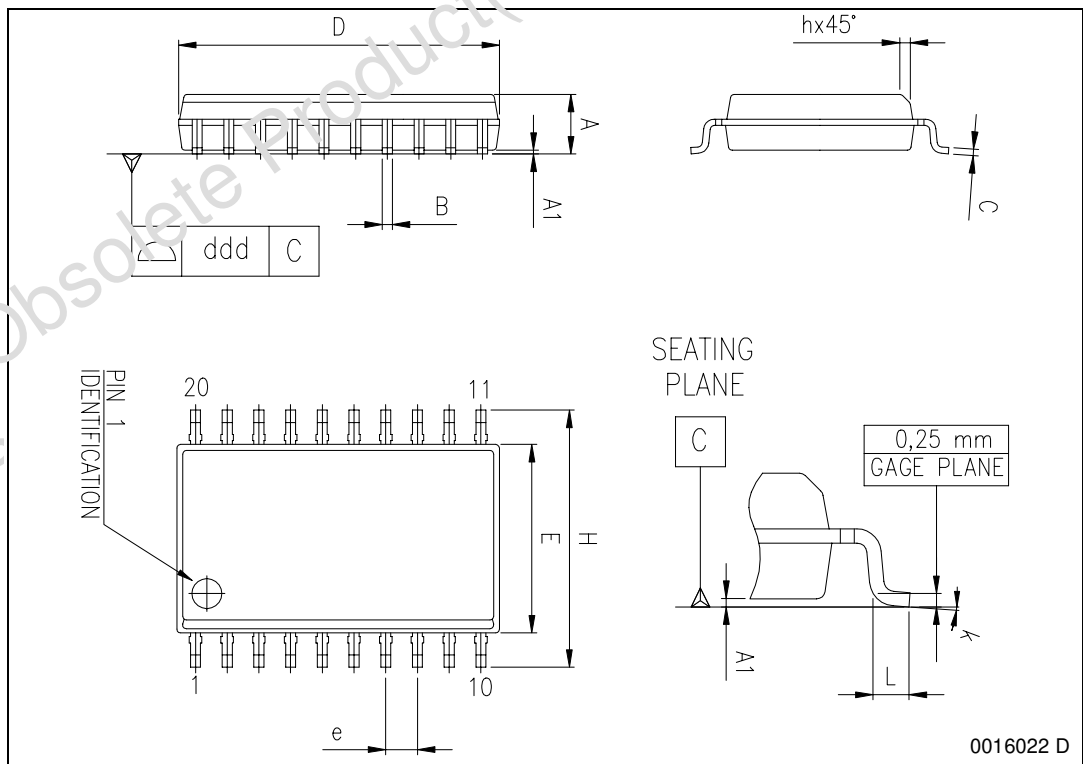
| DIM.  | mm                   |      |       | inch  |       |       |
|-------|----------------------|------|-------|-------|-------|-------|
|       | MIN.                 | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A     | 2.35                 |      | 2.65  | 0.093 |       | 0.104 |
| A1    | 0.10                 |      | 0.30  | 0.004 |       | 0.012 |
| B     | 0.33                 |      | 0.51  | 0.013 |       | 0.200 |
| C     | 0.23                 |      | 0.32  | 0.009 |       | 0.013 |
| D (1) | 12.60                |      | 13.00 | 0.496 |       | 0.512 |
| E     | 7.40                 |      | 7.60  | 0.291 |       | 0.299 |
| e     |                      | 1.27 |       |       | 0.050 |       |
| H     | 10.0                 |      | 10.65 | 0.394 |       | 0.419 |
| h     | 0.25                 |      | 0.75  | 0.010 |       | 0.030 |
| L     | 0.40                 |      | 1.27  | 0.016 |       | 0.050 |
| k     | 0° (min.), 8° (max.) |      |       |       |       |       |
| ddd   |                      |      | 0.10  |       |       | 0.004 |

(1) "D" dimension does not include mold flash, protusions or gate burrs. Mold flash, protusions or gate burrs shall not exceed 0.15mm per side.

**OUTLINE AND MECHANICAL DATA**



**SO20**



0016022 D

**Table 6. Revision History**

| <b>Date</b> | <b>Revision</b> | <b>Description of Changes</b>        |
|-------------|-----------------|--------------------------------------|
| March 2004  | 2               | Second Issue                         |
| May 2004    | 3               | Stylesheet update. No content change |

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