

## HIGH SIDE DRIVER

ADVANCE DATA

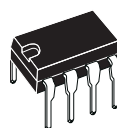
- OPERATING SUPPLY VOLTAGE UP TO 25V
- DC CURRENT 0.3A
- $R_{ON} < 800m\Omega$
- DIAGNOSTIC AND PROTECTION FUNCTIONS
- $\mu P$  COMPATIBLE
- ENABLE INPUT FOR STAND-BY MODE

### DESCRIPTION

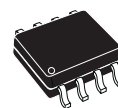
The L9820 High Side Driver realized with Multipower - BCD mixed technology, drives resistive or inductive loads with one side connected to ground.

The ENABLE input is TTL compatible and a diagnostic output provides an indication of short circuit and device status (thermal and overvoltage shut-down). Onchip thermal protection and short circuit protection are provided.

### MULTIPOWER BCD TECHNOLOGY



Minidip



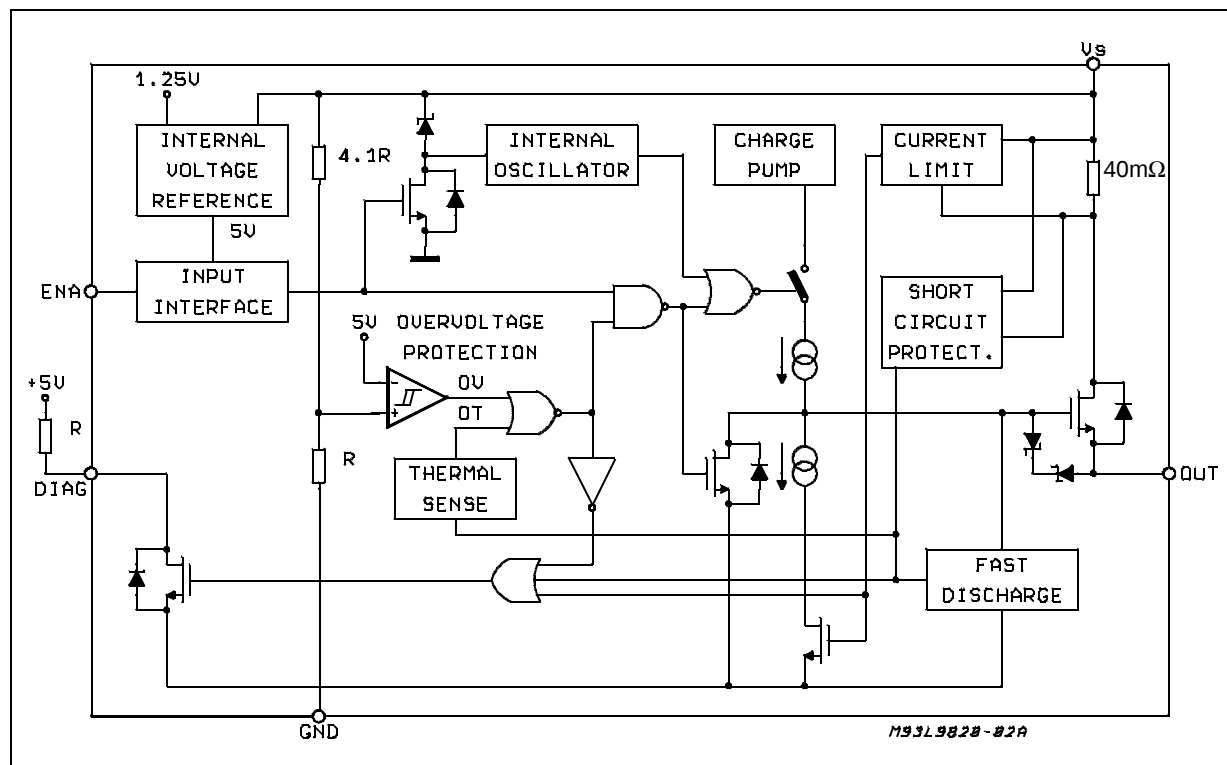
SO8

### ORDERING NUMBERS:

L9820

L9820D

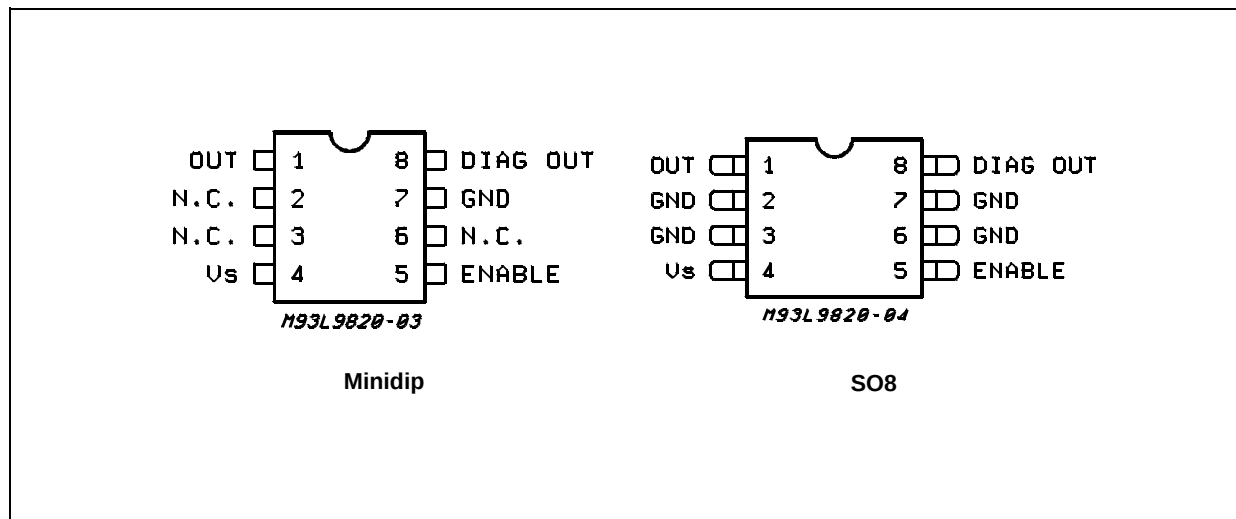
### BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Symbol         | Parameter                              | Value              | Unit |
|----------------|----------------------------------------|--------------------|------|
| $V_S$          | Max Forward Voltage                    | 50                 | Vdc  |
| $I_R$          | Reverse Bias Current at -1.3V          | -0.46              | A    |
| $V_5$          | Input Voltage (to GND)                 | -0.3 to 20         | V    |
| $V_8$          | Diag. Output Voltage (to GND)          | -0.3 to 20         | V    |
| $V_1$          | Output Voltage (to GND)                | -0.3 to 25         | V    |
| $I_4$          | Supply Current                         | Internally limited |      |
| $I_5$          | Enable Input Current                   | 0.5                | mA   |
| $I_8$          | Diag. Out Current (sink)               | 10                 | mA   |
| $I_1$          | Output Current                         | Internally limited |      |
| $T_{op}$       | Operation Temperature                  | -40 to 85          | °C   |
| $T_j, T_{stg}$ | Junction and Storage Temperature Range | -55 to 150         | °C   |
| $T_{jp}$       | Detecting Temperature                  | 150                | °C   |

## PIN CONNECTION (Top views)



## THERMAL DATA

| Symbol          | Parameter                           | Minidip  | SO8 | Unit |
|-----------------|-------------------------------------|----------|-----|------|
| $R_{th\ j-amb}$ | Thermal Resistance Junction-ambient | Max. 100 | 200 | °C/W |

## TRUTH TABLE

H: high level

L: low level

| ENABLE | FUNCTION                      | DIAG. STATUS | POWER STATUS |
|--------|-------------------------------|--------------|--------------|
| L      | Operating OFF                 | H            | L            |
| H      | Normal Operation              | H            | H            |
| H      | Overvoltage Protection ON     | L            | L            |
| H      | Overcurrent Protection ON     | L            | L            |
| H      | Overtemperature Protection ON | L            | L            |

## PIN FUNCTIONS

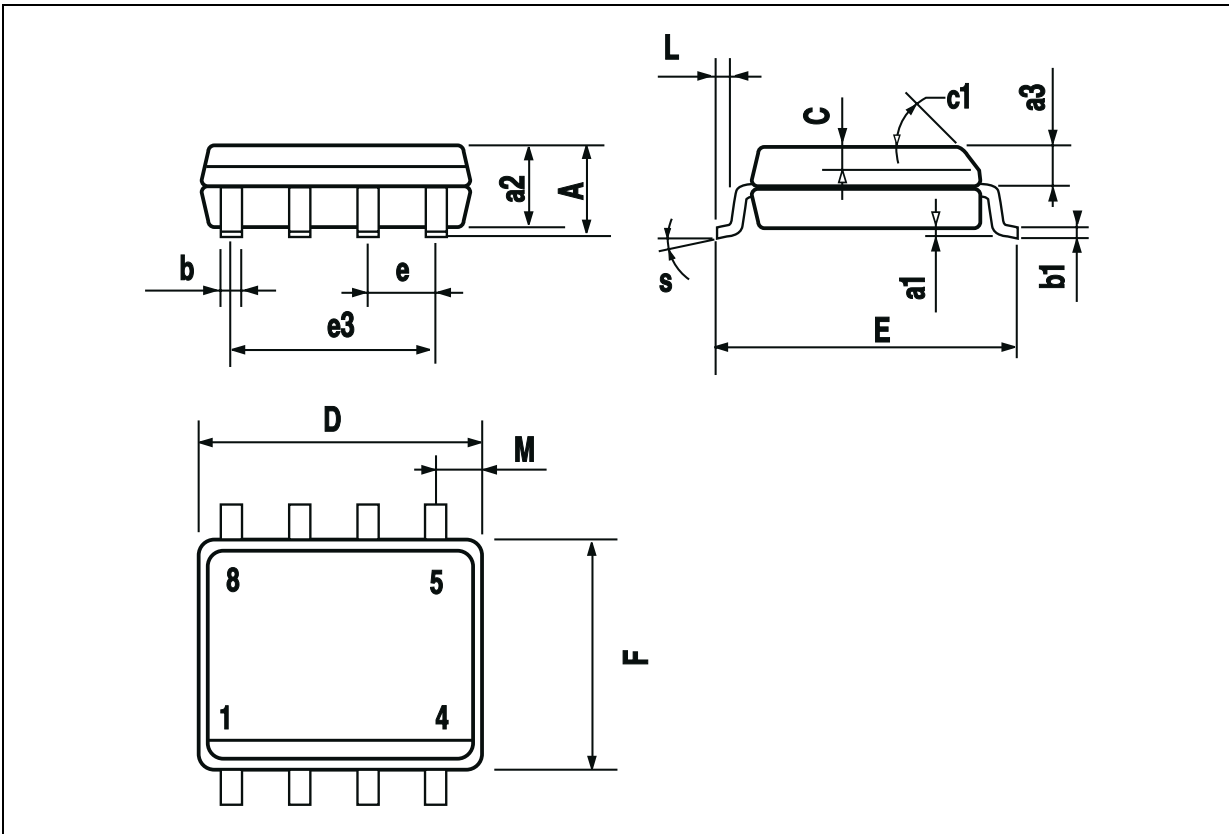
| N. | Name                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | POWER OUTPUT        | The device is provided with short circuit protection.                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4  | POWER SUPPLY        | Supply voltage input.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5  | ENABLE INPUT        | TTL compatible input. High level on this pin means output current ON. The low level voltage switches off the charge pump, the power stage and the diagnostic output reducing to the minimum value the quiescent current.                                                                                                                                                                                                                               |
| 7  | GROUND              | This pin must be connected to ground.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 8  | DIAGNOSTIC FEEDBACK | The diagnostic circuit is active in input high level condition. This output detects with Typically 50µs delay at T <sub>amb</sub> = 25°C the following faults:<br>– Overvoltage condition.<br>– Thermal shutdown.<br>– Short circuit. The power stage current is internally limited at 1.5A.<br>The diagnostic output is active low. The diagnostic delay time allows to avoid spurious diagnosys(i.e.: turn ON overcurrent, overvoltage spikes etc.). |

ELECTRICAL CHARACTERISTICS (V<sub>S</sub> = 14.4V, –40°C ≤ T<sub>j</sub> ≤ +85°C, unless otherwise specified.)

| Symbol             | Parameter                           | Test Condition                                                | Min. | Typ. | Max.       | Unit     |
|--------------------|-------------------------------------|---------------------------------------------------------------|------|------|------------|----------|
| V <sub>S</sub>     | Operating Supply Voltage            |                                                               | 6    |      | 25         | V        |
| R <sub>on</sub>    | On Resistance                       | Input > 2V, T <sub>j</sub> = 25°C<br>Input > 2V, Full T range |      | 0.6  | 0.8<br>1.2 | Ω<br>Ω   |
| I <sub>off</sub>   | Off State Supply Current            | T <sub>j</sub> < 35°C<br>T <sub>j</sub> = 85°C                |      |      | 130<br>300 | µA<br>µA |
| I <sub>on</sub>    | On State Supply Current             |                                                               |      |      | 4          | mA       |
| V <sub>EL</sub>    | Enable Low Level                    |                                                               |      |      | 0.8        | V        |
| V <sub>EH</sub>    | Enable High Level                   |                                                               | 2    |      |            | V        |
| I <sub>E</sub>     | Enable Current                      | 0V < V <sub>i</sub> < 5V                                      |      |      | 10         | µA       |
| I <sub>leakd</sub> | Diagnostic Output Leakage Current   | V <sub>CC</sub> = 5V Diagnostic Output High                   |      |      | 10         | µA       |
| V <sub>satd</sub>  | Diagnostic Output Saturated Voltage | I <sub>sink</sub> < 3.5mA                                     |      |      | 0.4        | V        |
| t <sub>dd</sub>    | Diagnostic Delay Time               | T <sub>j</sub> = 25°C                                         |      | 30   |            | µs       |
| t <sub>don</sub>   | Output ON Delay Time                | T <sub>j</sub> = 25°C                                         |      | 30   |            | µs       |
| t <sub>r</sub>     | Output ON Rise Time                 | T <sub>j</sub> = 25°C                                         |      | 100  |            | µs       |
| t <sub>doff</sub>  | Output OFF Delay Time               | T <sub>j</sub> = 25°C                                         |      | 80   |            | µs       |
| t <sub>f</sub>     | Output OFF Fall Time                | T <sub>j</sub> = 25°C                                         |      | 100  |            | µs       |
| V <sub>don</sub>   | Overvoltage Detection ON            |                                                               | 25   |      |            | V        |
| V <sub>dth</sub>   | Overvoltage Hysteresis              |                                                               | 2    |      | 5          | V        |
| I <sub>don</sub>   | Overcurrent Detection ON            |                                                               | 0.5  |      | 1.5        | A        |
| T <sub>don</sub>   | Overtemperature Detection ON        |                                                               | 150  |      |            | °C       |
| T <sub>dth</sub>   | Overtemperature Hysteresis          |                                                               |      | 25   | 50         | °C       |

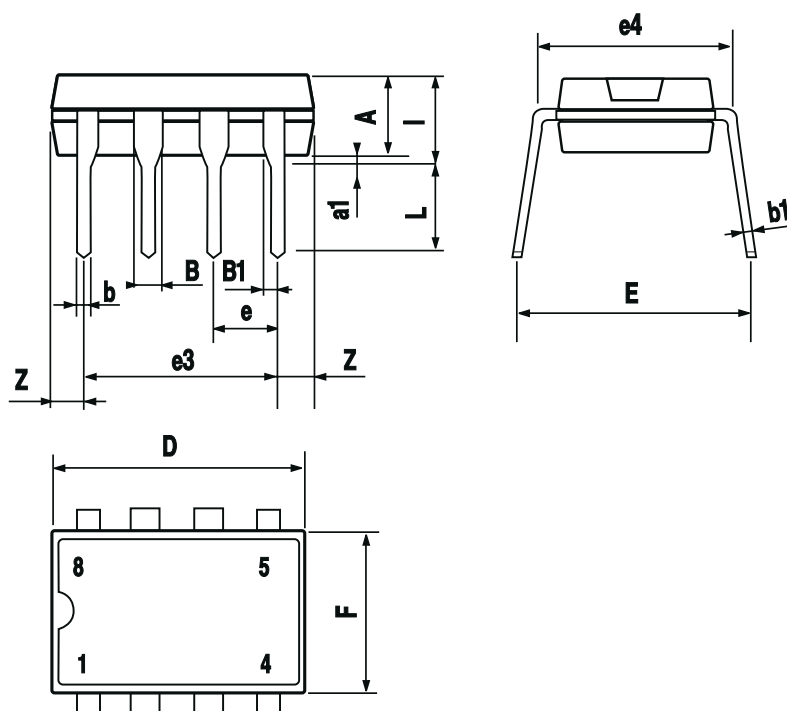
SO8 PACKAGE MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN  | TYP  | MAX  | MIN   | TYP   | MAX   |
| A    |      |      | 1.75 |       |       | 0.069 |
| a1   | 0.1  |      | 0.25 | 0.004 |       | 0.010 |
| a2   |      |      | 1.65 |       |       | 0.065 |
| a3   | 0.65 |      | 0.85 | 0.026 |       | 0.033 |
| b    | 0.35 |      | 0.48 | 0.014 |       | 0.019 |
| b1   | 0.19 |      | 0.25 | 0.007 |       | 0.010 |
| C    | 0.25 |      | 0.5  | 0.010 |       | 0.020 |
| c1   |      | 45   |      |       | 1.772 |       |
| D    |      | 1    | 4.8  |       | 0.039 | 0.189 |
| E    | 5.8  |      | 6.2  | 0.228 |       | 0.244 |
| e    |      | 1.27 |      |       | 0.050 |       |
| e3   |      | 3.81 |      |       | 0.150 |       |
| F    |      | 1    | 3.8  |       | 0.039 | 0.150 |
| G    |      |      |      |       |       |       |
| L    | 0.4  |      | 1.27 | 0.016 |       | 0.050 |
| M    |      |      | 0.6  |       |       | 0.024 |
| S    |      |      | 8    |       |       | 0.315 |



## MINIDIP PACKAGE MECHANICAL DATA

| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    |       | 3.32 |       |       | 0.131 |       |
| a1   | 0.51  |      |       | 0.020 |       |       |
| B    | 1.15  |      | 1.65  | 0.045 |       | 0.065 |
| b    | 0.356 |      | 0.55  | 0.014 |       | 0.022 |
| b1   | 0.204 |      | 0.304 | 0.008 |       | 0.012 |
| D    |       |      | 10.92 |       |       | 0.430 |
| E    | 7.95  |      | 9.75  | 0.313 |       | 0.384 |
| e    |       | 2.54 |       |       | 0.100 |       |
| e3   |       | 7.62 |       |       | 0.300 |       |
| e4   |       | 7.62 |       |       | 0.300 |       |
| F    |       |      | 6.6   |       |       | 0.260 |
| I    |       |      | 5.08  |       |       | 0.200 |
| L    | 3.18  |      | 3.81  | 0.125 |       | 0.150 |
| Z    |       |      | 1.52  |       |       | 0.060 |



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