

## *Dual Low Side Driver*

### Features

- Gate drive supply range from 6V to 20V
- CMOS Schmitt-triggered inputs
- Matched propagation delay for both channels
- Outputs in phase with inputs

### Product Summary

|                |             |
|----------------|-------------|
| $I_{O+/-}$     | 1.5A / 1.5A |
| $V_{OUT}$      | 6V – 20V    |
| Ton/off (typ.) | 85 & 65 ns  |

### Description

The IR25600(S) is a low voltage, high speed power MOSFET and IGBT driver. Proprietary latch immune CMOS technologies enable ruggedized monolithic construction. Logic inputs are compatible with standard CMOS or LSTTL outputs. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. Propagation delays between two channels are matched.

### Package Options



8 Lead SOIC

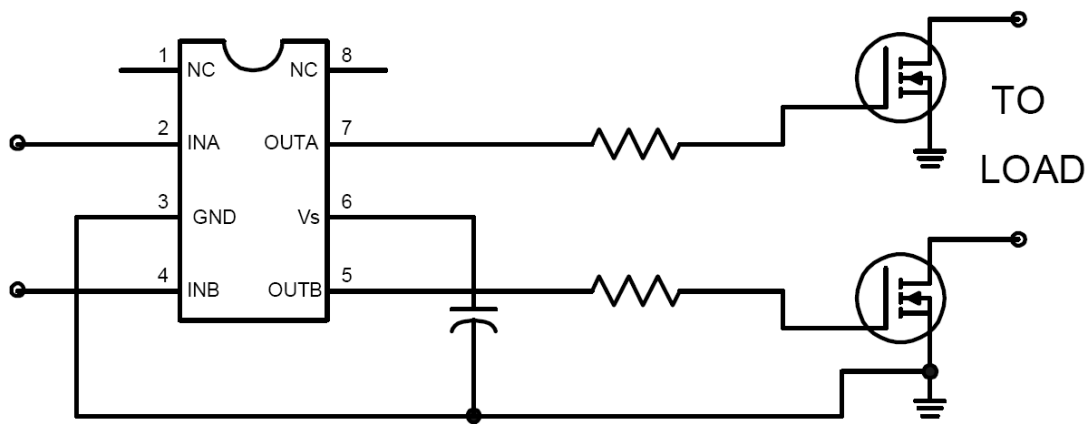


8 Lead PDIP

### Ordering Information

| Base Part Number | Package Type | Standard Pack |          | Orderable Part Number |
|------------------|--------------|---------------|----------|-----------------------|
|                  |              | Form          | Quantity |                       |
| IR25600SPBF      | SO8N         | Tube          | 95       | IR25600SPBF           |
| IR25600SPBF      | SO8N         | Tape and Reel | 2500     | IR25600STRPBF         |
| IR25600PBF       | PDIP8        | Tube          | 50       | IR25600PBF            |

## Typical Connection Diagram



## Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to GND. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

| Symbol     | Definition                                               | Min.        | Max.        | Units              |
|------------|----------------------------------------------------------|-------------|-------------|--------------------|
| $V_S$      | Fixed supply voltage                                     | -0.3        | 25          | V                  |
| $V_O$      | Output voltage                                           | -0.3        | $V_S + 0.3$ |                    |
| $V_{IN}$   | Logic input voltage                                      | -0.3        | $V_S + 0.3$ |                    |
| $P_D$      | Package power dissipation @ $T_A \leq +25^\circ\text{C}$ | 8 lead PDIP | 1           | W                  |
|            |                                                          | 8 lead SOIC | 0.625       |                    |
| $R_{thJA}$ | Thermal resistance, junction to ambient                  | 8 lead PDIP | 125         | $^\circ\text{C/W}$ |
|            |                                                          | 8 lead SOIC | 200         |                    |
| $T_J$      | Junction temperature                                     | —           | 150         | $^\circ\text{C}$   |
| $T_S$      | Storage temperature                                      | -55         | 150         |                    |
| $T_L$      | Lead temperature (soldering, 10 seconds)                 | —           | 300         |                    |

## Recommended Operating Conditions

For proper operation the device should be used within the recommended conditions. All voltage parameters are absolute voltages references to GND.

| Symbol   | Definition                    | Min. | Max.  | Units            |
|----------|-------------------------------|------|-------|------------------|
| $V_S$    | Fixed supply voltage          | 6    | 20    | V                |
| $V_O$    | Output voltage                | 0    | $V_S$ |                  |
| $V_{IN}$ | Logic input voltage (IN & SD) | 0    | $V_S$ |                  |
| $T_A$    | Ambient temperature           | -40  | 125   | $^\circ\text{C}$ |

## Dynamic Electrical Characteristics

$V_{BIAS} (V_S) = 15V$ ,  $CL = 1000 \text{ pF}$  and  $T_A = 25^\circ\text{C}$  unless otherwise specified.

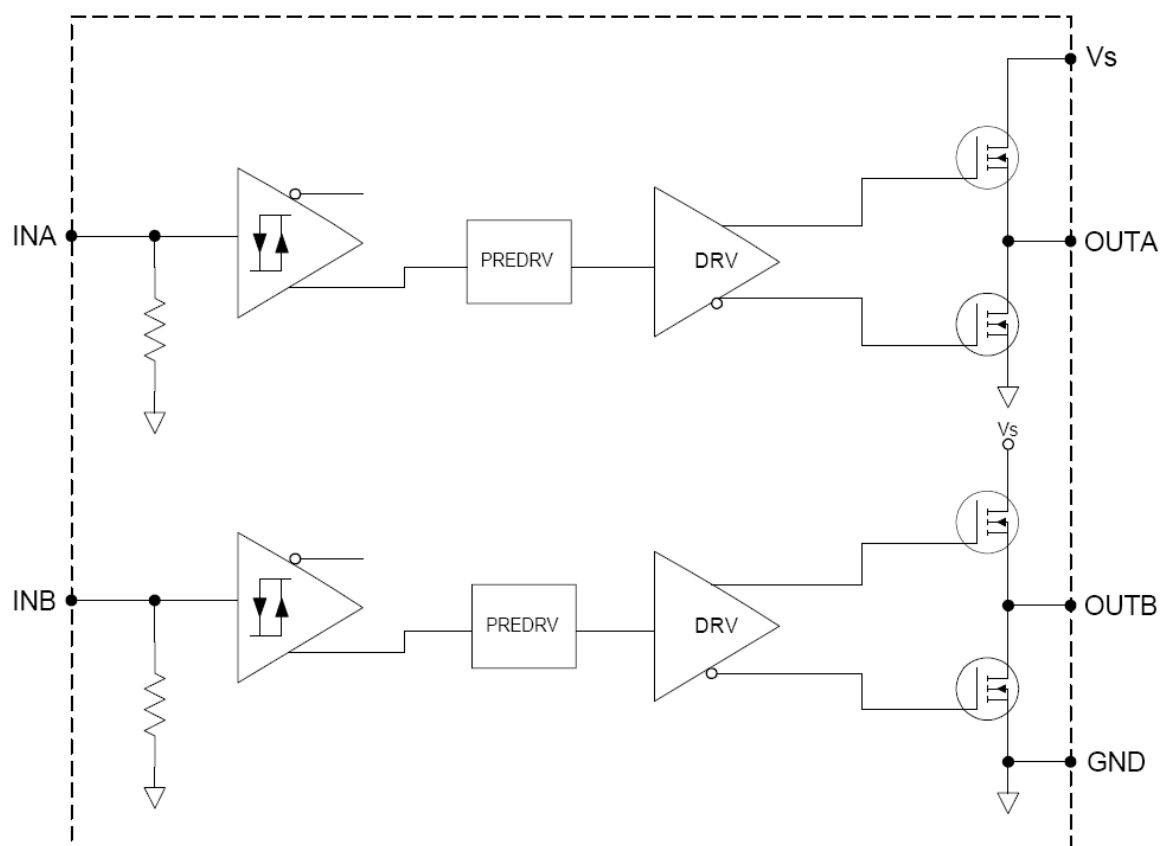
| Symbol    | Definition                 | Min. | Typ. | Max. | Units | Test Conditions |
|-----------|----------------------------|------|------|------|-------|-----------------|
| $t_{on}$  | Turn-on propagation delay  | —    | 85   | 160  | ns    | Figure 2        |
| $t_{off}$ | Turn-off propagation delay | —    | 65   | 150  |       |                 |
| $t_r$     | Turn-on rise time          | —    | 15   | 35   |       |                 |
| $t_f$     | Turn-off fall time         | —    | 10   | 25   |       |                 |

## Static Electrical Characteristics

$V_{BIAS} (V_S) = 15V$  and  $T_A = 25^\circ\text{C}$  unless otherwise specified. The  $V_{IN}$  and  $I_{IN}$  parameters are referenced to GND and are applicable to input leads INA and INB. The  $V_O$  and  $I_O$  parameters are referenced to GND and are applicable to the respective output leads: OUTA and OUTB.

| Symbol    | Definition                                        | Min. | Typ. | Max. | Units   | Test Conditions                                   |
|-----------|---------------------------------------------------|------|------|------|---------|---------------------------------------------------|
| $V_{IH}$  | Logic "1" input voltage (OUTA = HI and OUTB = HI) | 2.7  | —    | —    | V       |                                                   |
| $V_{IL}$  | Logic "0" input voltage (OUTA = LO and OUTB = LO) | —    | —    | 0.8  |         |                                                   |
| $V_{OH}$  | High level output voltage, $V_{BIAS} - V_O$       | —    | —    | 1.2  |         | $I_O = 0A$                                        |
| $V_{OL}$  | Low level output voltage, $V_O$                   | —    | —    | 0.1  |         | $I_O = 0A$                                        |
| $I_{QS}$  | Quiescent $V_S$ supply current                    | —    | 100  | 200  | $\mu A$ | $V_{IN} = 0V \text{ or } V_S$                     |
| $I_{IN+}$ | Logic "1" input bias current (OUT = HI)           | —    | 5    | 15   |         | $V_{IN} = V_S$                                    |
| $I_{IN-}$ | Logic "0" input bias current (OUT = LO)           | —    | -10  | -30  |         | $V_{IN} = 0V$                                     |
| $I_{O+}$  | Output high short circuit pulsed current          | 1.5  | 2.3  | —    | A       | $V_O = 0V$ , $V_{IN} = V_S$<br>$PW \leq 10 \mu s$ |
| $I_{O-}$  | Output low short circuit pulsed current           | 1.5  | 3.3  | —    |         | $V_O = 15V$ , $V_{IN} = 0V$<br>$PW \leq 10 \mu s$ |

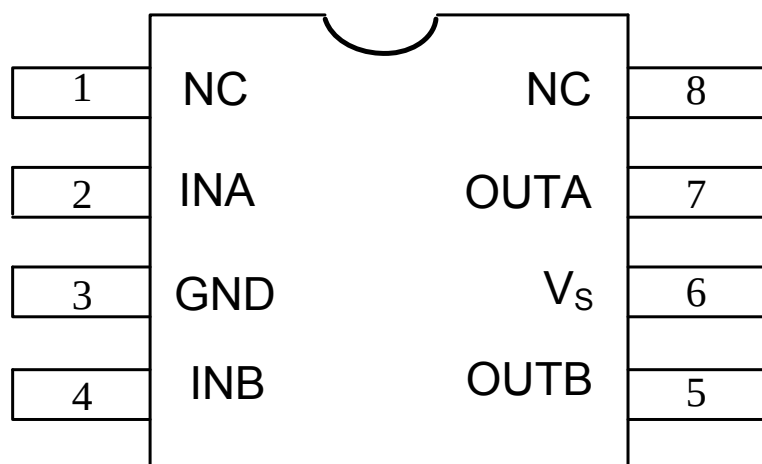
# Functional Block Diagram



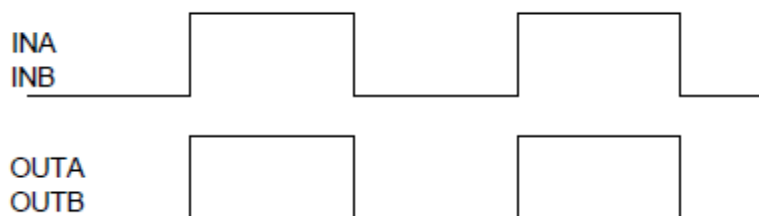
## Lead Definitions

| Symbol         | Description                                     |
|----------------|-------------------------------------------------|
| INA            | Logic input gate driver output (OUTA), in phase |
| INB            | Logic input gate driver output (OUTB), in phase |
| OUTA           | Gate drive output A                             |
| OUTB           | Gate drive output B                             |
| V <sub>S</sub> | Supply Voltage                                  |
| GND            | Ground                                          |

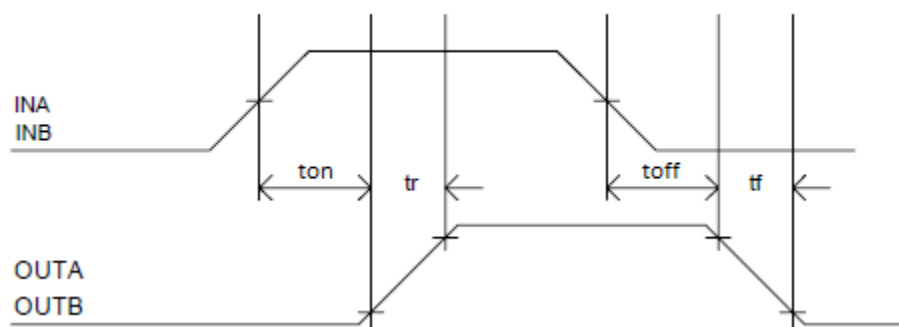
## Lead Assignments



## Application Information and Additional Information

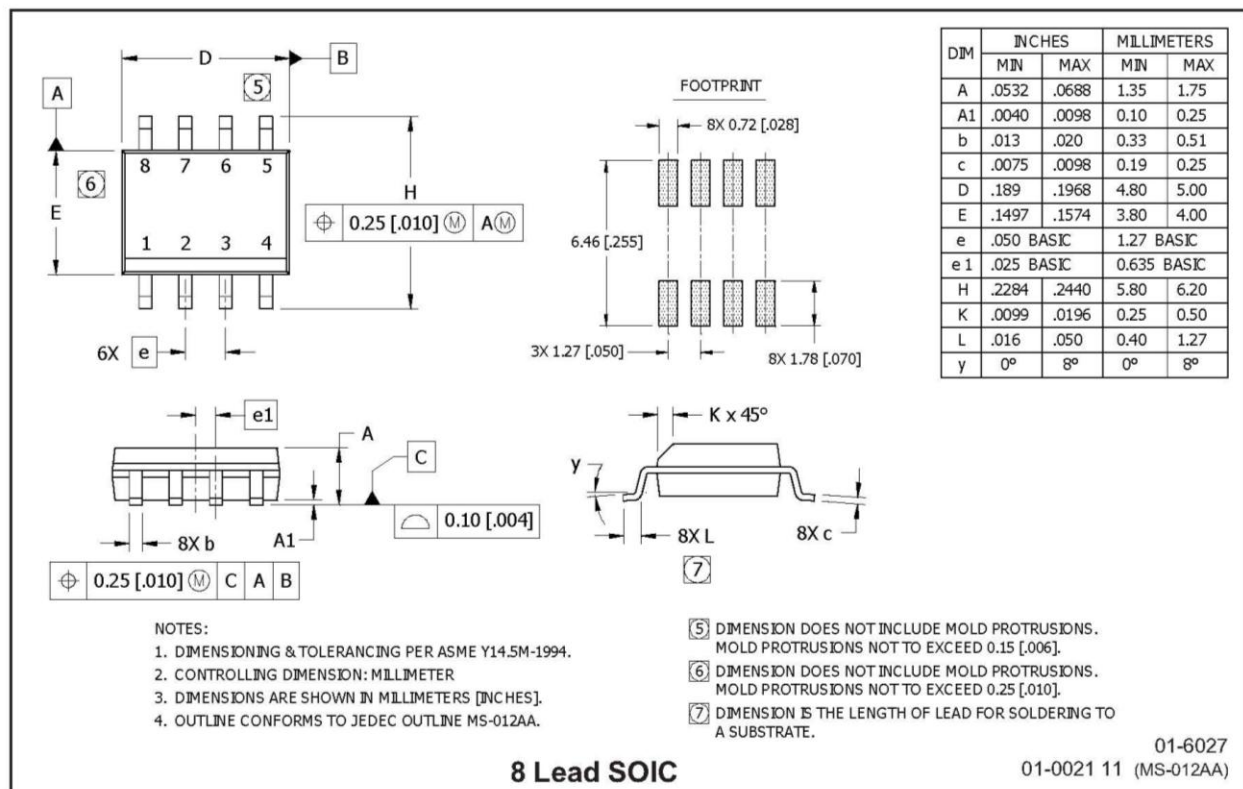
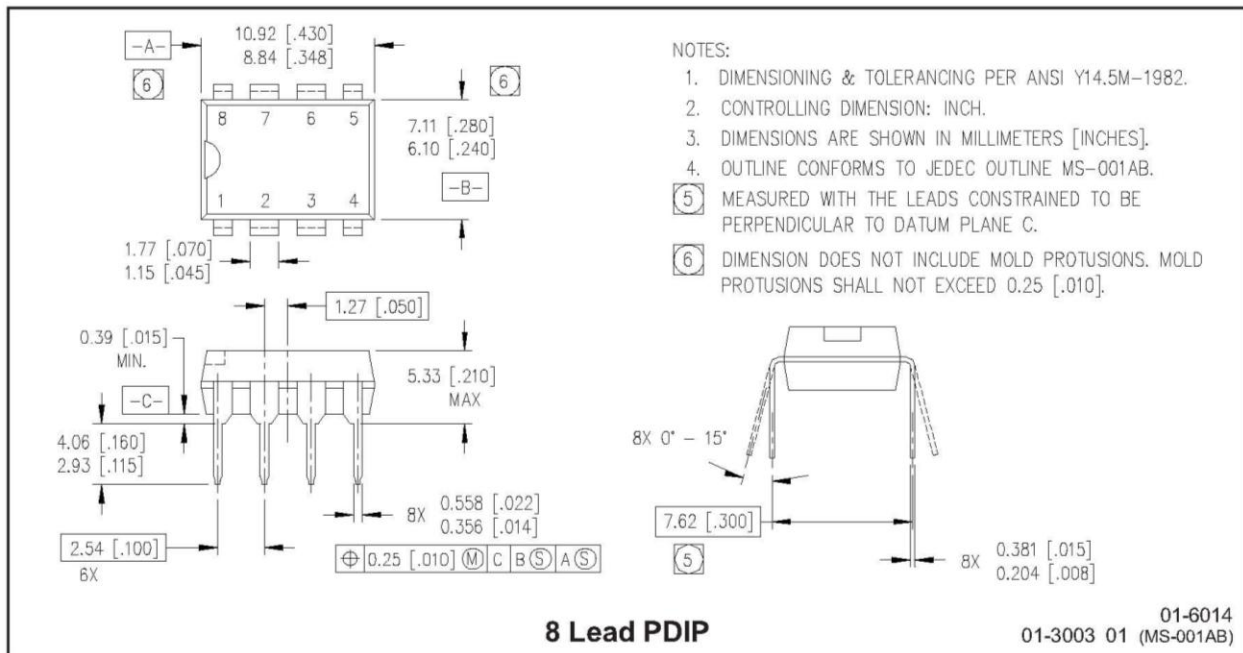


**Figure 1. Input/Output Timing Diagram**



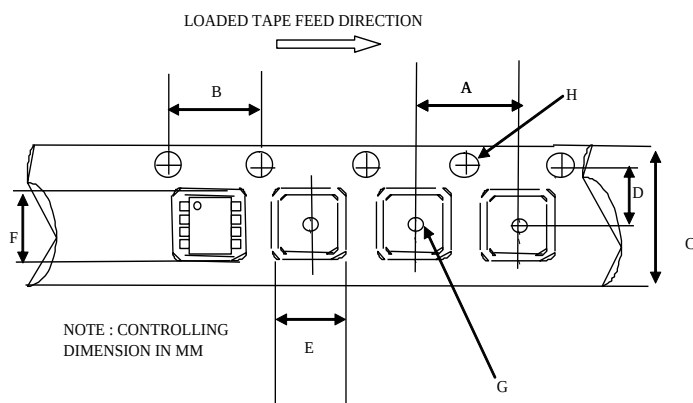
**Figure 2. Switching Time Waveform Definitions**

## Package Details



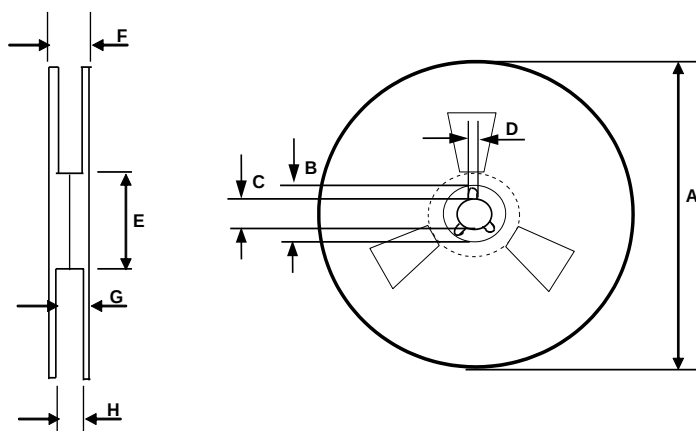


## Tape and Reel Details, SO8N



CARRIER TAPE DIMENSION FOR 8SOICN

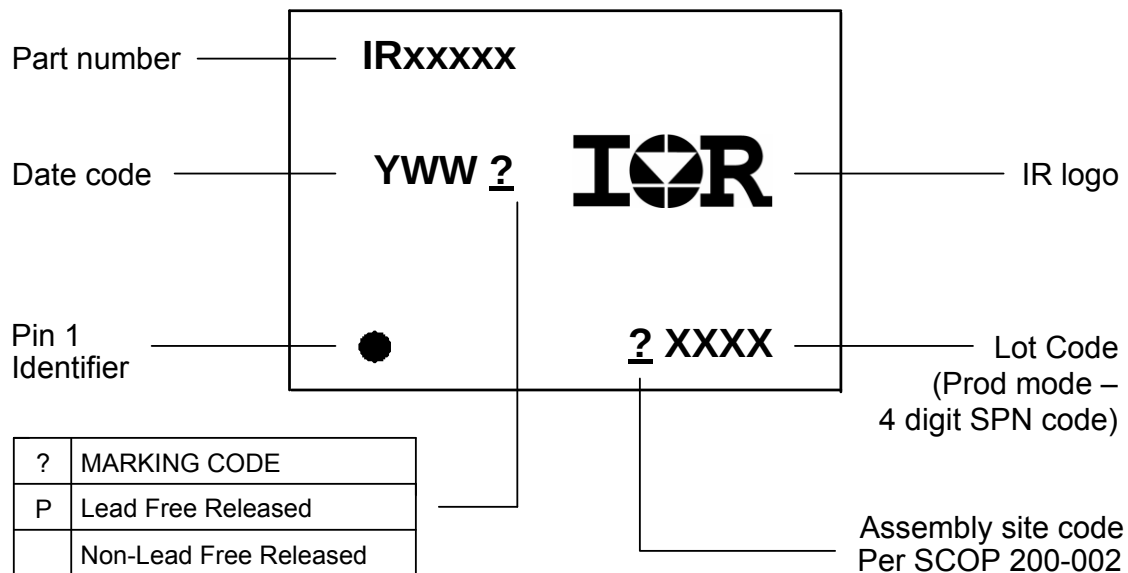
| Code | Metric |       | Imperial |       |
|------|--------|-------|----------|-------|
|      | Min    | Max   | Min      | Max   |
| A    | 7.90   | 8.10  | 0.311    | 0.318 |
| B    | 3.90   | 4.10  | 0.153    | 0.161 |
| C    | 11.70  | 12.30 | 0.46     | 0.484 |
| D    | 5.45   | 5.55  | 0.214    | 0.218 |
| E    | 6.30   | 6.50  | 0.248    | 0.255 |
| F    | 5.10   | 5.30  | 0.200    | 0.208 |
| G    | 1.50   | n/a   | 0.059    | n/a   |
| H    | 1.50   | 1.60  | 0.059    | 0.062 |



REEL DIMENSIONS FOR 8SOICN

| Code | Metric |        | Imperial |        |
|------|--------|--------|----------|--------|
|      | Min    | Max    | Min      | Max    |
| A    | 329.60 | 330.25 | 12.976   | 13.001 |
| B    | 20.95  | 21.45  | 0.824    | 0.844  |
| C    | 12.80  | 13.20  | 0.503    | 0.519  |
| D    | 1.95   | 2.45   | 0.767    | 0.096  |
| E    | 98.00  | 102.00 | 3.858    | 4.015  |
| F    | n/a    | 18.40  | n/a      | 0.724  |
| G    | 14.50  | 17.10  | 0.570    | 0.673  |
| H    | 12.40  | 14.40  | 0.488    | 0.566  |

## Part Marking Information



**Qualification Information<sup>†</sup>**

|                                   |                                                                                                                                                                     |                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Qualification Level</b>        | Industrial <sup>††</sup><br>(per JEDEC JESD 47)                                                                                                                     |                                                     |
|                                   | Comments: This family of ICs has passed JEDEC's Industrial qualification. IR's Consumer qualification level is granted by extension of the higher Industrial level. |                                                     |
| <b>Moisture Sensitivity Level</b> | SOIC8N                                                                                                                                                              | MSL2 <sup>†††</sup><br>(per IPC/JEDEC J-STD 020)    |
|                                   | PDIP8                                                                                                                                                               | Not applicable<br>(non-surface mount package style) |
| <b>RoHS Compliant</b>             | Yes                                                                                                                                                                 |                                                     |

† Qualification standards can be found at International Rectifier's web site <http://www.irf.com/>

†† Higher qualification ratings may be available should the user have such requirements. Please contact your International Rectifier sales representative for further information.

††† Higher MSL ratings may be available for the specific package types listed here. Please contact your International Rectifier sales representative for further information.

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