## Gate-Driver IC Simplifies Power Train Design In Hybrid And Electric Vehicles

International Rectifier's AUIR0815S automotive-qualified IC produces output current in excess of 10 A to drive large IGBTs or MOSFETs in inverter stages for the power train of hybrid and electrical vehicles (see the figure and Table 1.) The AUIR0815S' very low output impedance and power losses allow operation in harsh and high-temperature environments.

Typical output resistance is 90 mΩ sink and 180 mΩ source. According to the vendor, these values are significantly lower than those of competing devices (Table 2.) The AUIR0815S also features negative Vgs driving and continuous on-state capability as a result of an integrated PMOS output in parallel to the high-side pull-up NMOS. The OUTH and OUTL separated outputs allow selection of two different external resistors for charging and discharging the gate essential for controlling EMI and CdV/dT effect in high-power motor driver and SMPS applications.

"The AUIR0815 simplifies the design of inverter systems by offering high current drive capability with all of the necessary protection features and qualification requirements for the harsh automotive drive train environment," says Davide Giacomini, director of product management and applications, IR's Automotive Products Business Unit.

At low input state on the IN pin, the OUTL is pulled down to VEE, allowing negative gate driving for margination and wide range of IGBT selection. Internal shoot-through prevention logic controls the OUTH and OUTL outputs to avoid simultaneous conduction to optimize deadtime delay. In addition, a low current consumption mode can be activated through an LPM input pin, which reduces the IC consumption at the expense of longer operation delays.

The device is qualified according to AEC-Q100 standards, housed in an industry-standard SO-8 that features a lead-free and RoHS-compliant bill of materials, and is part of IR's automotive quality initiative targeting zero defects. Datasheets and qualification standards are available at www.irf.com. Pricing for the AUIR0815S begins at $0.99 each in 10,000-unit quantities.

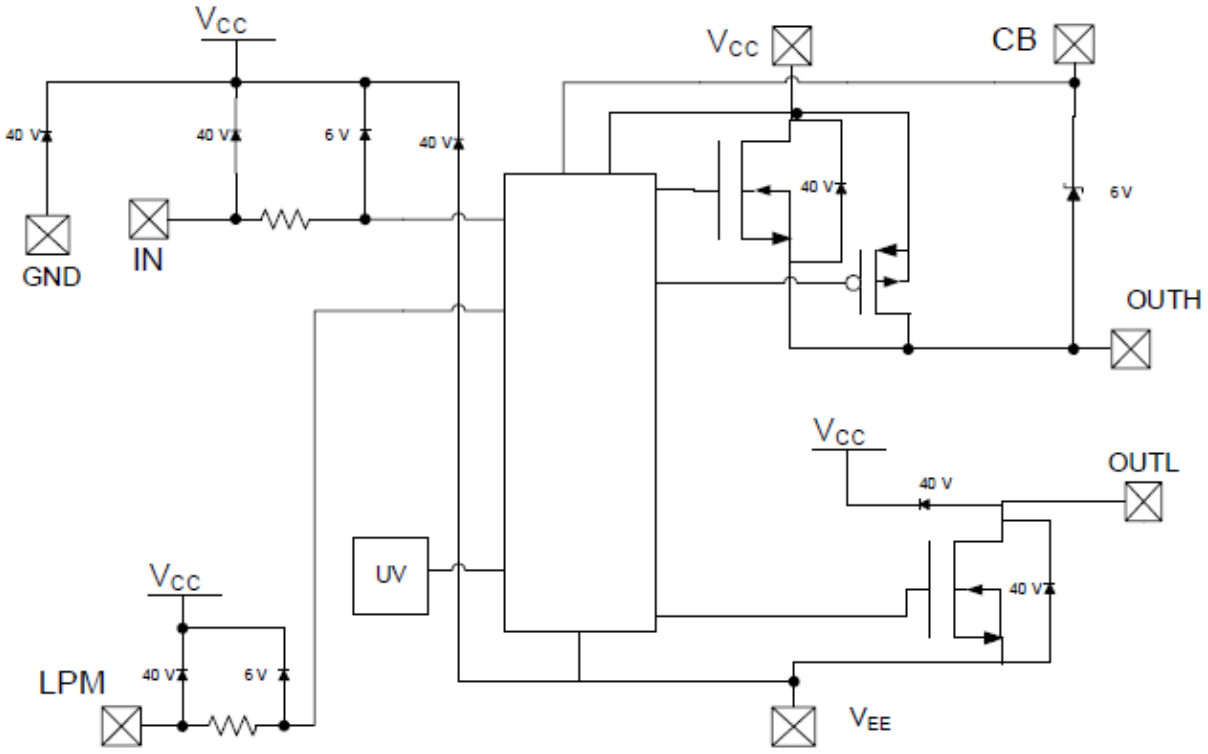


*Figure. Block diagram of AUIR0815S buffer gate driver IC. The device's very low output impedance and power losses allow operation in harsh and high-temperature environments.*

Table 1. Key specifications for the AUIR0815S gate driver IC.

| Part Number | Package | Io | Vcc-VEE | Rout | Ton Toff | Tr/Tf |
|---|---|---|---|---|---|---|
| AUIR0815S | SO-8 | Io>10 A | 10 V to 30 V | 90 mΩ / 180 mΩ typ | 250 ns typ | 250 ns/150 ns max |

Table 2. Vendor comparison of specifications for the AUIR0815S with competing devices.

| part number | company | Out Source typ resistance (mOhm) | Out Sink typ resistance (mOhm) | Max Operating Supply Voltage (V) | Two different pins for gate charge/discharge paths | Intrinsic Negative Turn Off Bias Capability | Undervoltage Lockout | AU qualified |
|---|---|---|---|---|---|---|---|---|
| AUIR0815 | IR | 90 | 180 | 30 | yes | yes | yes | yes |
| FAN3121(2) | Fairchild | 1000 | 600 | 18 | no | no | yes | no |
| ZXGD300E6 | Zedex Diodes Incorporated | 1200 | 1300 | 25 | yes | no | no | no |
| IXDD409 | IXYS | 800 | 800 | 35 | no | no | no | no |
| UCC27321 | TI | 1500 | 1100 | 15 | no | no | no | no |