

Isolated Drive Transmitter

FEATURES

- 500mA Output Drive, Source or Sink
- 8 to 35V Operation
- Transmits Logic Signal Instantly
- Programmable Operating Frequency
- Under-Voltage Lockout
- Able To Pass DC Information Across Transformer
- Up To 600kHz Operation

DESCRIPTION

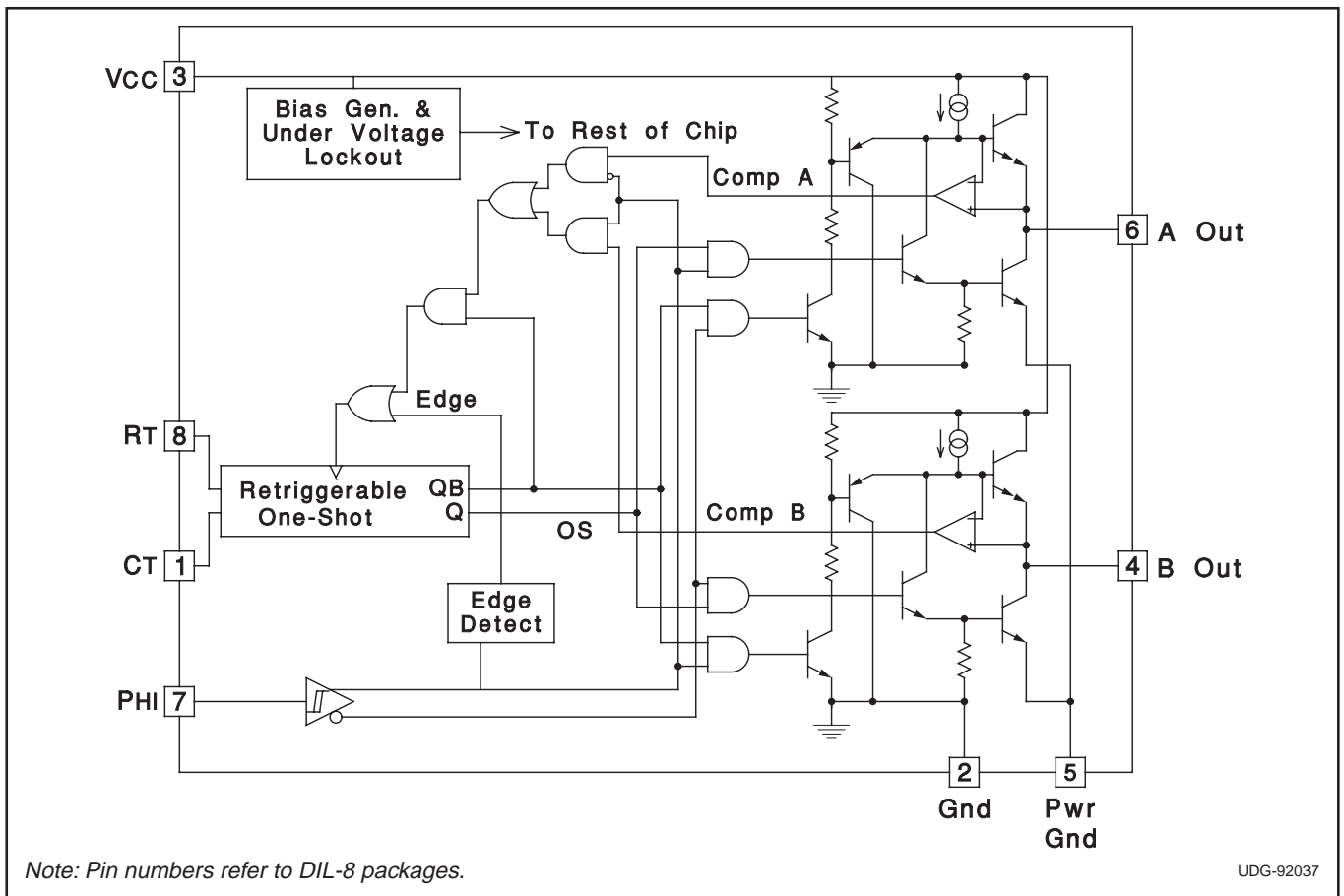
The UC1724 family of Isolated Drive Transmitters, along with the UC1725 Isolated Drivers, provide a unique solution to driving isolated power MOSFET gates. They are particularly suited to drive the high-side devices on a high-voltage H-bridge. The UC1724 devices transmit drive logic, and drive power, to the isolated gate circuit using a low cost pulse transformer.

This drive system utilizes a duty-cycle modulation technique that gives instantaneous response to the drive control transistions, and reliably passes steady-state, or DC, conditions. High frequency operation, up to 600kHz, allows the cost and size of the coupling transformer to be minimized.

These devices will operate over an 8 to 35 Volt supply range. The dual high current totem pole outputs are disabled by an under-voltage lockout circuit to prevent spurious responses during startup or low voltage conditions.

These devices are available in 8 pin plastic or ceramic dual-inline packages, as well as 16 pin SOIC package.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| | |
|---|---------------------------|
| Supply Voltage V_{IN} | 40V |
| Source/Sink Current (Pulsed) | 1A |
| Source/Sink Current (Continuous) | 0.5A |
| Output Voltage (Pins 4, 6) | -0.3 to $(V_{IN} + 0.3)V$ |
| Φ_{HI} , R_T , and C_T inputs (Pins 1, 7, and 8) | -0.3 to 6V |
| Operating Junction Temperature (Note 2) | 150°C |
| Storage Temperature Range | -65°C to 150°C |
| Lead Temperature (Soldering, 10 Seconds) | 300°C |

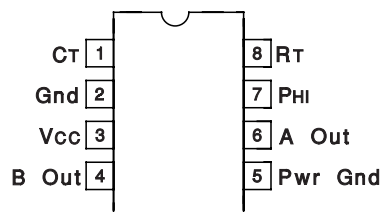
Note 1: All voltages are with respect to GND (Pin 2); all currents are positive into, negative out of part.

Note 2: Consult Unitorde Integrated Circuit Databook for thermal limitations and considerations of package.

Note 3: Pin numbers refer to DIL-8 packages.

CONNECTION DIAGRAMS

**DIL-8 (Top View)
J Or N Package**



RECOMMENDED OPERATION CONDITIONS

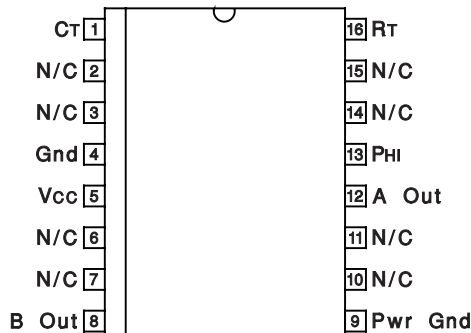
| | |
|--|-----------------------|
| Input Voltage | +9V to +35V |
| Sink/Source Load Current (each output) | 0 to 500mA |
| Timing Resistor | 2kW to 10kW |
| Timing Capacitor | 300pF to 3nF |
| Operating Temperature Range (UC1724) | -55°C < T_A < 125°C |
| Operating Temperature Range (UC3724) | 0°C < T_A < 70°C |

Note 4: Range over which the device is functional and parameter limits are guaranteed.

ORDERING INFORMATION

| | TEMPERATURE RANGE | PACKAGE |
|----------|-------------------|-----------|
| UC1724J | -55°C to +125°C | CDIP |
| UC2724DW | -25°C to +85°C | SOIC-Wide |
| UC2724N | | PDIP |
| UC3724DW | 0°C to +70°C | SOIC-Wide |
| UC3724N | | PDIP |

**SOIC-16 (Top View)
DW Package**



ELECTRICAL CHARACTERISTICS: Unless otherwise stated, $V_{CC} = 20V$, $R_T = 4.3k\Omega$, $C_T = 1000pF$, no load on any output and these specifications apply for: -55°C < T_A < 125°C for the UC1724, -25°C < T_A < 85°C for the UC2724, and 0°C < T_A < 70°C for the UC3724. $T_A = T_J$.

| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|-------------------------------|---|------|------|------|---------|
| Under-Voltage Lockout | | | | | |
| Start-Up Threshold | V_{IN} Rising | | 7.75 | 9.5 | V |
| Threshold Hysteresis | | 0.4 | 1.0 | 1.5 | V |
| Retriggerable One-Shot | | | | | |
| Initial Accuracy | $T_J = 25^\circ C$ | 1.54 | 1.9 | 2.25 | μs |
| Temperature Stability | Over Operating T_J | 1.0 | | 2.9 | μs |
| Voltage Stability | $V_{IN} = 10$ to 35V | | 0.2 | 0.5 | %/V |
| Operating Frequency | $L_{LOAD} = 1.4mH$ | 100 | 150 | 200 | kHz |
| Minimum Pulse Width | $R_T = 2k$ $C_T = 300pF$ | 100 | 500 | 1200 | ns |
| Operating Frequency | $R_T = 2k$ $C_T = 300pF$ $L_{LOAD} = 1.4mH$ | 500 | 750 | 1100 | kHz |

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, $V_{CC} = 20V$, $R_T = 4.3k\Omega$, $C_T = 1000pF$, no load on any output and these specifications apply for: $-55^{\circ}C < T_A < 125^{\circ}C$ for the UC1724, $-25^{\circ}C < T_A < 85^{\circ}C$ for the UC2724, and $0^{\circ}C < T_A < 70^{\circ}C$ for the UC3724. $T_A = T_J$.

| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|-----------------------|------|------|-----|---------|
| Phi Input (Control Input) | | | | | |
| HIGH Input Voltage | | 2.0 | | | V |
| LOW Input Voltage | | | | 0.8 | V |
| HIGH Input Current | $V_{IH} = +2.4V$ | -220 | -130 | | μA |
| LOW Input Current | $V_{IL} = +0.4V$ | -600 | -300 | | μA |
| Delay to One-Shot | | | | 350 | ns |
| Delay to Output | | | | 250 | ns |
| Output Drivers | | | | | |
| Output Low Level | $I_{SINK} = 50mA$ | | 0.3 | 0.4 | V |
| | $I_{SINK} = 250mA$ | | 0.5 | 2.1 | V |
| Output High Level (Volts Below V_{CC}) | $I_{SOURCE} = 50 mA$ | | 1.5 | 2.1 | V |
| | $I_{SOURCE} = 250 mA$ | | 1.7 | 2.5 | V |
| Rise/Fall Time | No load | | 30 | 90 | ns |
| Total Supply Current | | | | | |
| Supply Current | $C_T = 1.4V$ | | 15 | 30 | mA |

Additional Information

Please refer to the following Unitrode application topics.

[1] Application Note U-127, *Unique Chip Pair Simplified Isolated High-Side Switch Drive* by John A. O'Connor.

[2] Design Note DN-35, *IGBT Drive Using MOSFET Gate Drivers* by John A. O'Conner.

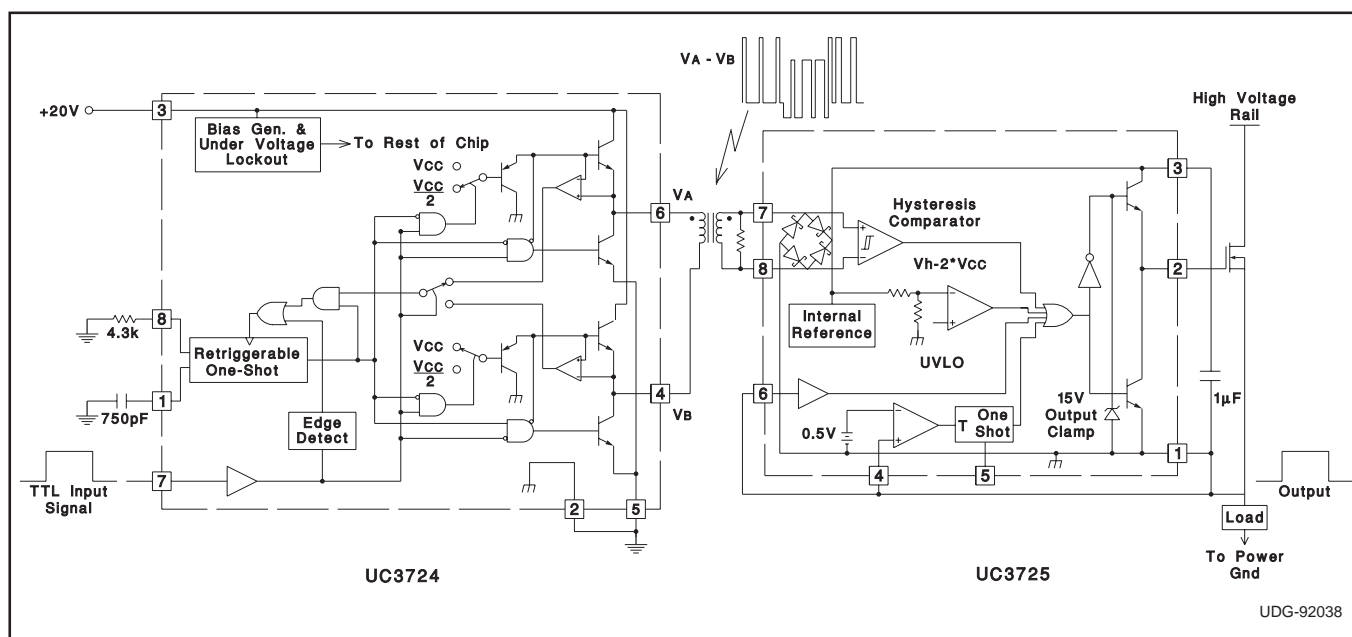


Figure 1. Typical application

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