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.

Note: Pin numbers refer to DIL-8 packages.
**ABSOLUTE MAXIMUM RATINGS**

- Supply Voltage $V_{IN}$: $-40V$ to $+40V$
- Source/Sink Current (Pulsed): $1A$
- Source/Sink Current (Continuous): $0.5A$
- Output Voltage (Pins 4, 6): $-0.3$ to $(V_{IN} + 0.3V)$
- $\phi_1$, $R_T$, 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 Unitrode Integrated Circuit Databook for thermal limitations and considerations of package.

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

**RECOMMENDED OPERATION CONDITIONS**

- Input Voltage: $+9V$ to $+35V$
- Sink/Source Load Current (each output): $0$ to $500mA$
- Timing Resistor: $2k\Omega$ to $10k\Omega$
- 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**

<table>
<thead>
<tr>
<th>TEMPERATURE RANGE</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC1724J</td>
<td>CDIP</td>
</tr>
<tr>
<td>UC2724DW</td>
<td>SOIC-Wide</td>
</tr>
<tr>
<td>UC2724N</td>
<td>PDIP</td>
</tr>
<tr>
<td>UC3724DW</td>
<td>SOIC-Wide</td>
</tr>
<tr>
<td>UC3724N</td>
<td>PDIP</td>
</tr>
</tbody>
</table>

**TEMPERATURE RANGE**

- UC1724J: $-55°C$ to $+125°C$
- UC2724DW: $-25°C$ to $+85°C$
- UC2724N: $-25°C$ to $+85°C$
- UC3724DW: $0°C$ to $+70°C$
- UC3724N: $0°C$ to $+70°C$

**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. $T_A= T_J$.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under-Voltage Lockout</td>
<td>$V_{IN}$ Rising</td>
<td>7.75</td>
<td>9.5</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Threshold Hysteresis</td>
<td></td>
<td>0.4</td>
<td>1.0</td>
<td>1.5</td>
<td>V</td>
</tr>
<tr>
<td>Retriggerable One-Shot</td>
<td>$T_J = 25°C$</td>
<td>1.54</td>
<td>1.9</td>
<td>2.25</td>
<td>$\mu$s</td>
</tr>
<tr>
<td>Temperature Stability</td>
<td>Over Operating $T_J$</td>
<td>1.0</td>
<td>2.9</td>
<td></td>
<td>$\mu$s</td>
</tr>
<tr>
<td>Voltage Stability</td>
<td>$V_{IN}$ = 10 to 35V</td>
<td>0.2</td>
<td>0.5</td>
<td></td>
<td>%/V</td>
</tr>
<tr>
<td>Operating Frequency</td>
<td>$L_{LOAD} = 1.4mH$</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>kHz</td>
</tr>
<tr>
<td>Minimum Pulse Width</td>
<td>$R_T = 2k \phi_1$; $C_T = 300pF$</td>
<td>100</td>
<td>500</td>
<td>1200</td>
<td>kHz</td>
</tr>
<tr>
<td>Operating Frequency</td>
<td>$R_T = 2k \phi_1$; $C_T = 300pF$; $L_{LOAD} = 1.4mH$</td>
<td>500</td>
<td>750</td>
<td>1100</td>
<td>kHz</td>
</tr>
</tbody>
</table>
**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 $V_{IH} = +2.4V$ | $-220$ | $-130$ | $\mu A$
- LOW Input Current $V_{IL} = +0.4V$ | $-600$ | $-300$ | $\mu A$
- Delay to One-Shot | 350 | ns
- Delay to Output | 250 | ns

### Output Drivers
- Output Low Level $I_{SINK} = 50mA$ | 0.3 | 0.4 | V
- Output High Level (Volts Below $V_{CC}$) $I_{SOURCE} = 50 mA$ | 1.5 | 2.1 | 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.


---

**Figure 1. Typical application**
IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE (“CRITICAL APPLICATIONS”). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER’S RISK.

In order to minimize risks associated with the customer’s applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party’s products or services does not constitute TI’s approval, warranty or endorsement thereof.

Copyright © 1999, Texas Instruments Incorporated