

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

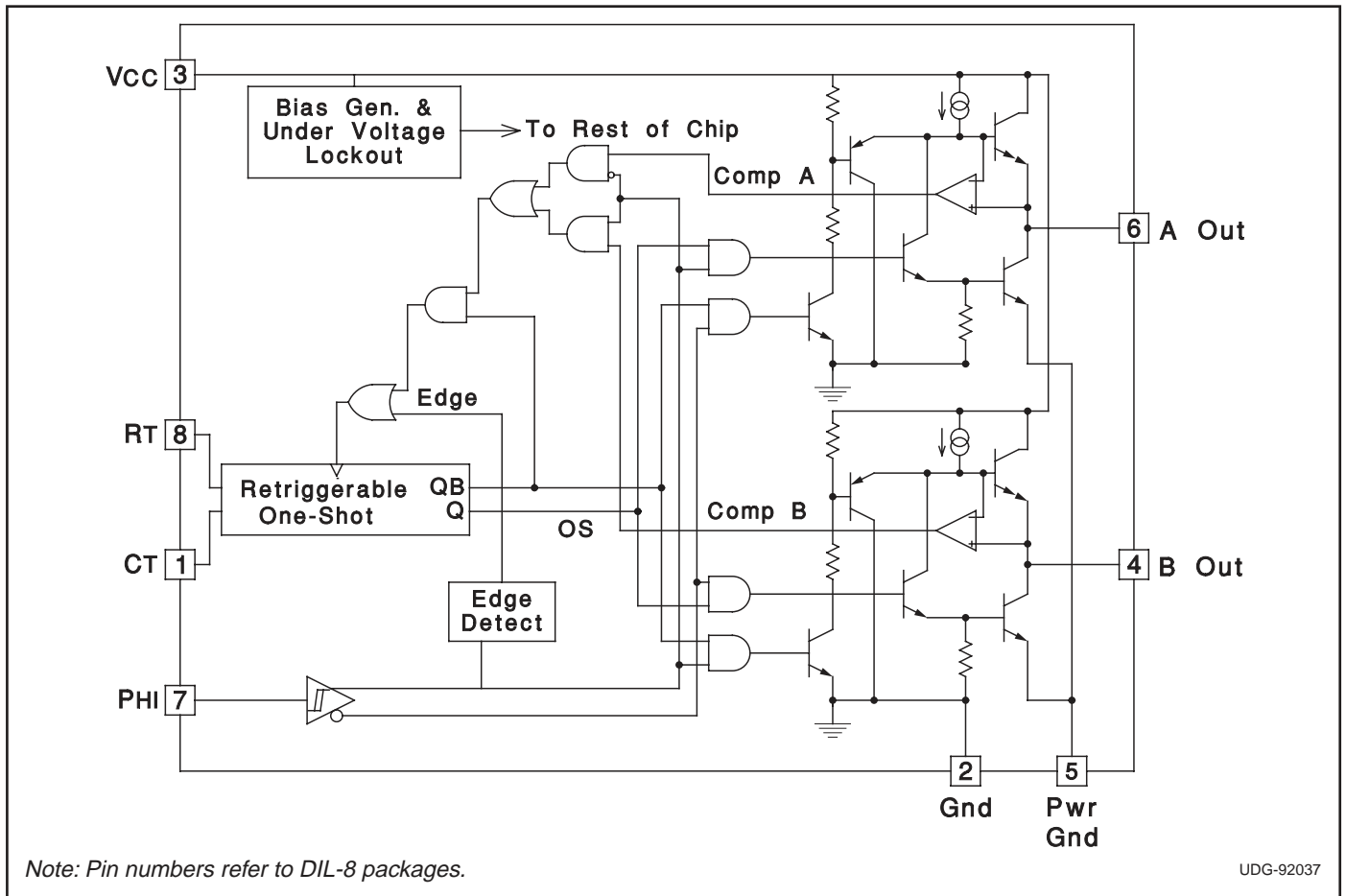
The UC1724 family of Isolated Drive Transmitters, along with the UC1725 Isolated Drivers, provide a unique solution to driving isolated power MOSFET gates. They are particularly suited to drive the high-side devices on a high-voltage H-bridge. The UC1724 devices transmit drive logic, and drive power,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

RECOMMENDED OPERATION CONDITIONS

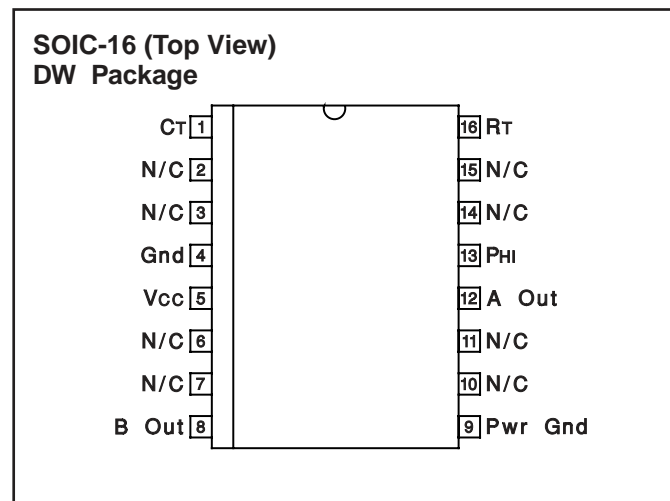
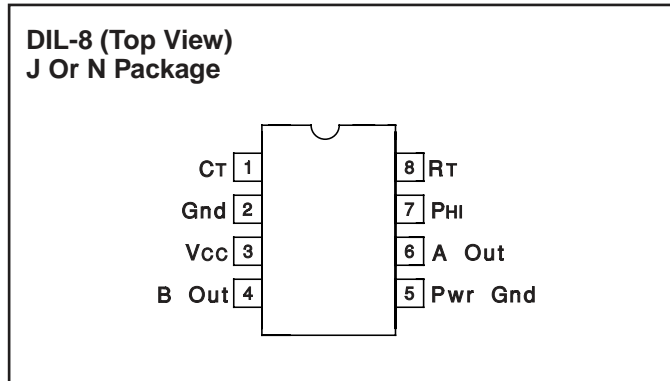
Input Voltage +9V to +35V
 Sink/Source Load Current (each output) 0 to 500mA
 Timing Resistor 2k Ω to 10k Ω
 Timing Capacitor 300pF to 3nF
 Operating Temperature Range (UC1724) $-55^\circ\text{C} < T_A < 125^\circ\text{C}$
 Operating Temperature Range (UC3724) $0^\circ\text{C} < T_A < 70^\circ\text{C}$

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

ORDERING INFORMATION

	TEMPERATURE RANGE	PACKAGE
UC1724J	-55°C to $+125^\circ\text{C}$	CDIP
UC2724DW	-25°C to $+85^\circ\text{C}$	SOIC-Wide
UC2724N		PDIP
UC3724DW	0°C to $+70^\circ\text{C}$	SOIC-Wide
UC3724N		PDIP

CONNECTION DIAGRAMS



ELECTRICAL CHARACTERISTICS: Unless otherwise stated, $V_{CC} = 20\text{V}$, $R_T = 4.3\text{k}\Omega$, $C_T = 1000\text{pF}$, no load on any output and these specifications apply for: $-55^\circ\text{C} < T_A < 125^\circ\text{C}$ for the UC1724, $-25^\circ\text{C} < T_A < 85^\circ\text{C}$ for the UC2724, and $0^\circ\text{C} < T_A < 70^\circ\text{C}$ 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	$T_J = 25^\circ\text{C}$	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	$L_{LOAD} = 1.4\text{mH}$	100	150	200	kHz
Minimum Pulse Width	$R_T = 2\text{k}$ $C_T = 300\text{pF}$	100	500	1200	ns
Operating Frequency	$R_T = 2\text{k}$ $C_T = 300\text{pF}$ $L_{LOAD} = 1.4\text{mH}$	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 Unitorde 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.

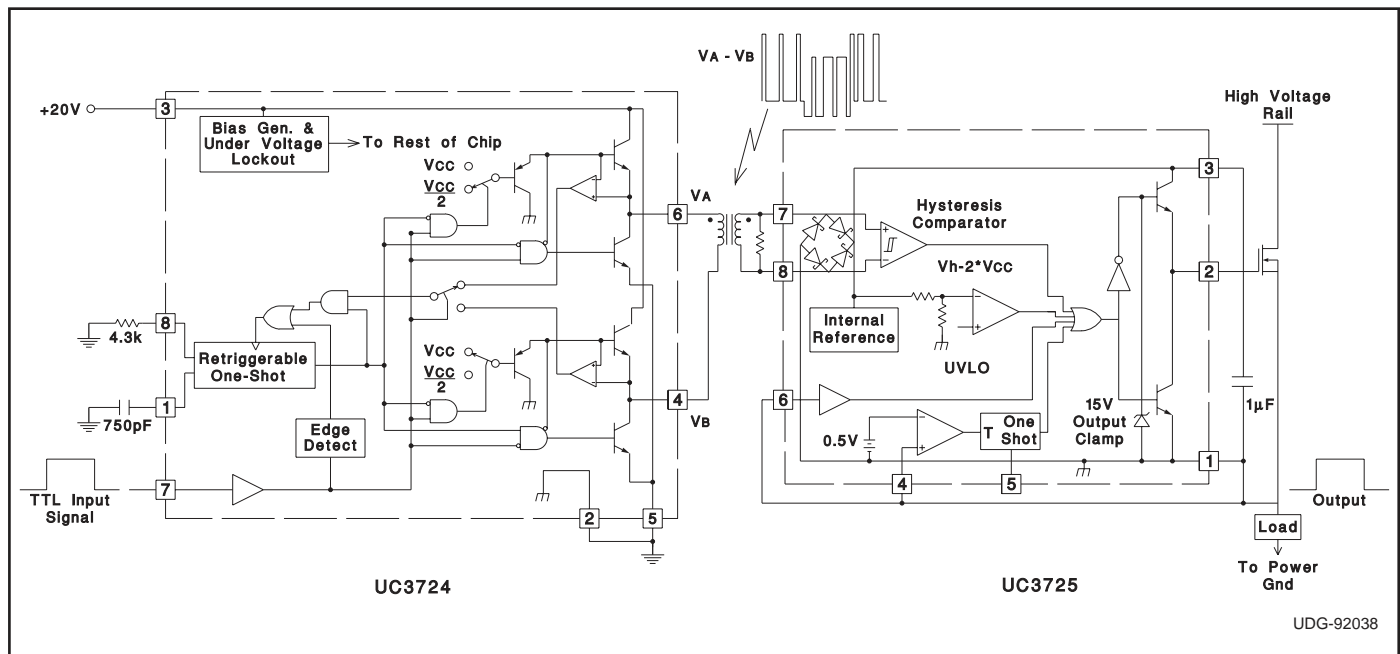


Figure 1. Typical application

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
UC1724J	OBSOLETE	CDIP	J	8		TBD	Call TI	Call TI
UC2724J	OBSOLETE	CDIP	J	8		TBD	Call TI	Call TI
UC2724N	OBSOLETE	PDIP	P	8		TBD	Call TI	Call TI
UC3724DW	OBSOLETE	SOIC	DW	16		TBD	Call TI	Call TI
UC3724DWTR	OBSOLETE	SOIC	DW	16		TBD	Call TI	Call TI
UC3724J	OBSOLETE	CDIP	J	8		TBD	Call TI	Call TI
UC3724N	OBSOLETE	PDIP	P	8		TBD	Call TI	Call TI

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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