UNITRODE

Isolated Drive Transmitter

UC1724
UC2724
UC3724

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

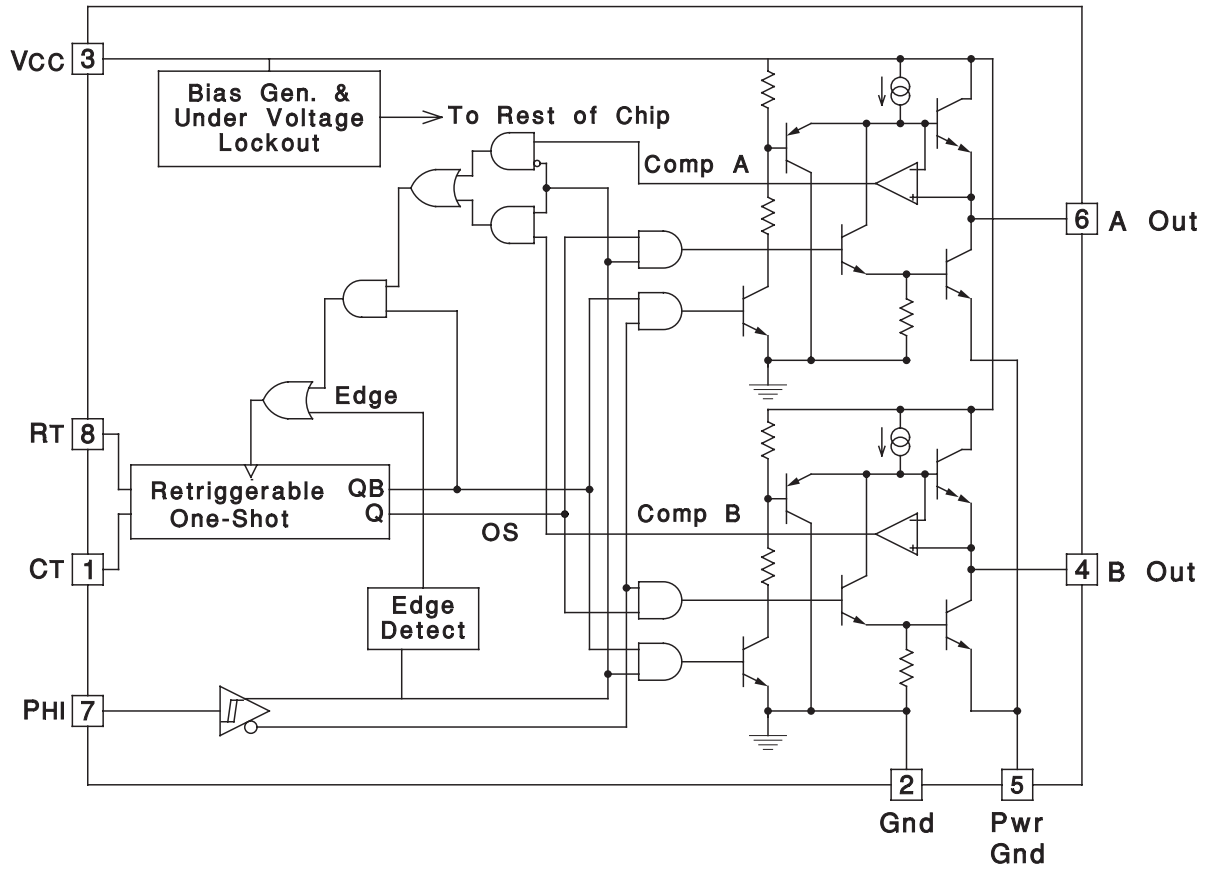
The UC1724 family of Isolated Drive Transmitters, along with the UC1725 Isolated Drivers, provide a unique solution to driving isolated power MOSFET gates. They are particularly suited to drive the high-side devices on a high-voltage H-bridge. The UC1724 devices transmit drive logic, and drive power,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



Note: Pin numbers refer to DIL-8 packages.

UDG-92037

ABSOLUTE MAXIMUM RATINGS

Supply Voltage V_{IN} 40V
Source/Sink Current (Pulsed) 1A
Source/Sink Current (Continuous) 0.5A
Ouput Voltage (Pins 4, 6). . . . . –0.3 to (V_{IN} +0.3)V
PHI, RT, and CT 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. . . . . 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

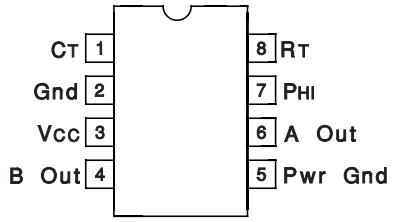
***Note 4:** Range over which the device is functional and parameter limits are guaranteed.*

ORDERING INFORMATION

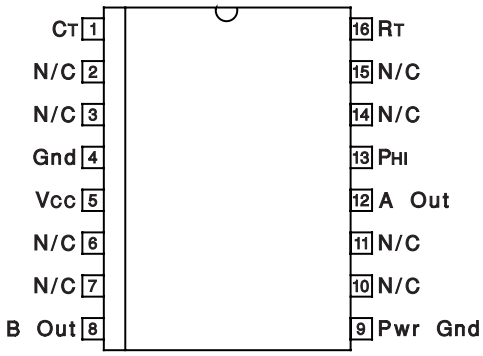
	TEMPERATURE RANGE	PACKAGE
UC1724J	–55°C to +125°C	CDIP
UC2724DW	–25°C to +85°C	SOIC-Wide
UC2724N		PDIP
UC3724DW	0°C to +70°C	SOIC-Wide
UC3724N		PDIP

CONNECTION DIAGRAMS

DIL-8 (Top View)
J Or N Package



SOIC-16 (Top View)
DW Package



ELECTRICAL CHARACTERISTICS: Unless otherwise stated, V_{CC} = 20V, R_T = 4.3kΩ, 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°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	RT = 2k CT = 300pF	100	500	1200	ns
Operating Frequency	RT = 2k CT = 300pF L_{LOAD} = 1.4mH	500	750	1100	kHz

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, V_{CC} = 20V, R_T = 4.3kΩ, 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
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.

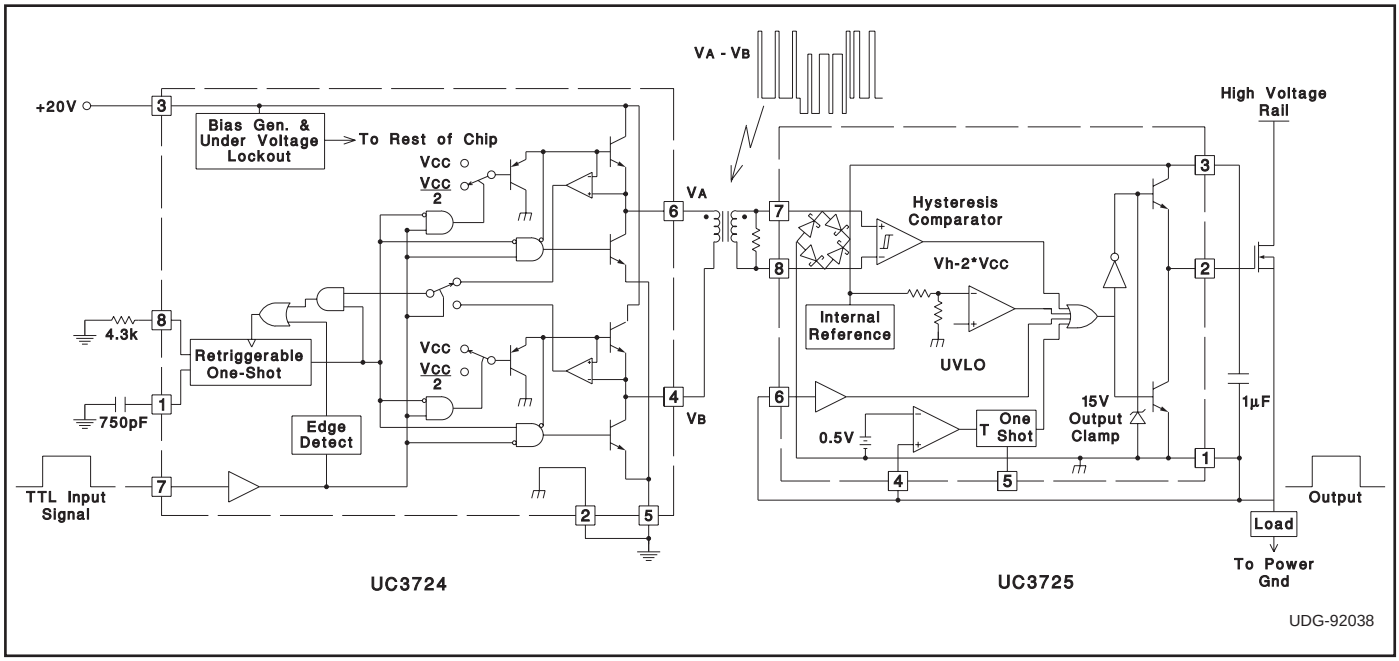


Figure 1. Typical application

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