INTEGRATED CIRCUITS
UNITRODE

UC1705
UC2705
UC3705

High Speed Power Driver

FEATURES

- 1.5A Source/Sink Drive
- 100 nsec Delay
- 40 nsec Rise and Fall into 1000pF
- Inverting and Non-Inverting Inputs
- Low Cross-Conduction Current Spike
- Low Quiescent Current
- 5V to 40V Operation
- Thermal Shutdown Protection
- MINIDIP and Power Packages

DESCRIPTION

The UC1705 family of power drivers is made with a high speed Schottky process to interface between low-level control functions and high-power switching devices - particularly power MOSFETs. These devices are also an optimum choice for capacitive line drivers where up to 1.5 amps may be switched in either direction. With both Inverting and Non-Inverting inputs available, logic signals of either polarity may be accepted, or one input can be used to gate or strobe the other.

Supply voltages for both Vs and Vc can independently range from 5V to 40V. For additional application details, see the UC1707/3707 data sheet.

The UC1705 is packaged in an 8-pin hermetically sealed CERDIP for -55°C to +125°C operation. The UC3705 is specified for a temperature range of 0°C to +70°C and is available in either a plastic minidip or a 5-pin, power TO-220 package.

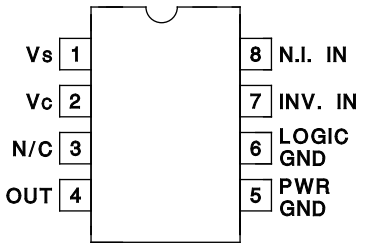
TRUTH TABLE

INV	N.I	OUT
H	H	L
L	H	H
H	L	L
L	L	L

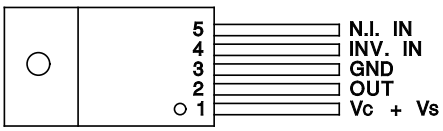
$\underline{OUT} = \overline{INV}$ and $\underline{N.I.}$
$\underline{OUT}$ = INV or $\underline{N.I.}$

CONNECTION DIAGRAMS

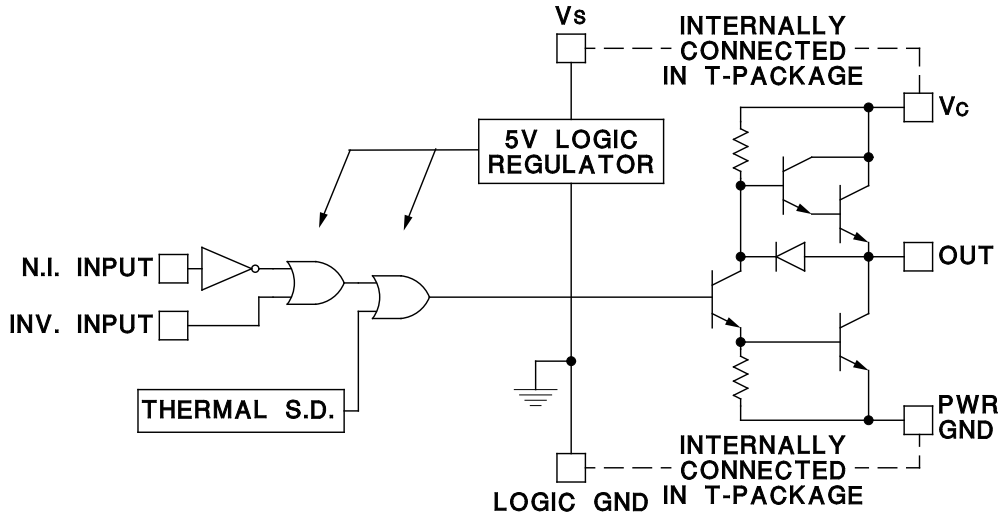
DIL-8 MINIDIP, SOIC-8
(TOP VIEW)
N or J Package, D Package



5-PIN TO-220
(TOP VIEW)
T Package



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

	N-Pkg	J-Pkg	T-Pkg
Supply Voltage, V_{IN}	40V	40V	40V
Collector Supply Voltage, V_C	40V	40V	40V
Output Current (Source or Sink)			
Steady-State	±500mA	±500mA	±1.0A
Peak Transient	±1.5A	±1.0A	±2.0A
Capacitive Discharge Energy	20µJ	15µJ	50µJ
Digital Inputs (See Note)	5.5V	5.5V	5.5V
Power Dissipation at T_A = 25°C (See Note)	1W	1W	3W
Power Dissipation at T_A (Leads/Case) = 25°C (See Note)	3W	2W	25W
Operating Temperature Range	0°C to +70°C	-55°C to +125°C	0°C to +70°C
Storage Temperature Range	-65°C to +150°C	-65°C to +150°C	-65°C to +150°C
Lead Temperature (Soldering, 10 seconds)	300°C	300°C	300°C

Note: All currents are positive into, negative out of the specified terminal.
Digital Drive can exceed 5.5V if input current is limited to 10mA
Consult Packaging Section of Databook for thermal limitations and considerations of package.

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for T_A = -55°C to +125°C for the UC1705, -25°C to +85°C for the UC2705, and 0°C to +70°C for the UC3705; V_S = V_C = 20V, T_A = T_J.

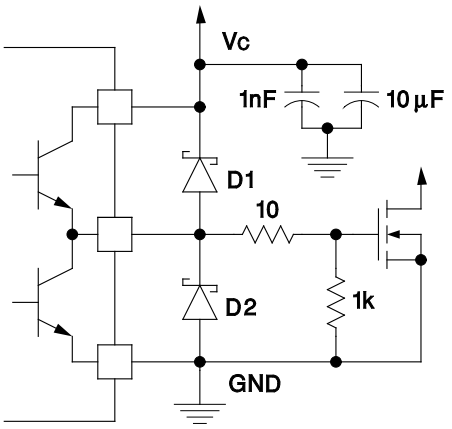
PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_S Supply Current	V_S = 40V, (Outputs High, T Pkg)		6	8	mA
	V_S = 40V, (Outputs Low, T Pkg)		8	12	mA
V_C Supply Current (N, J Only)	V_C = 40V, Outputs Low		2	4	mA
V_C Leakage Current (N, J Only)	V_S = 0, V_C = 30V		.05	0.1	mA
Digital Input Low Level				0.8	V
Digital Input High Level		2.2			V
Input Current	V_I = 0		-0.6	-1.0	mA
Input Leakage	V_I = 5V		0.5	0.1	mA
Output High Sat., V_C-V_O	I_O = -50mA			2.0	V
	I_O = -500mA			2.5	V
Output Low Sat., V_O	I_O = 50mA			0.4	V
	I_O = 500mA			2.5	V
Thermal Shutdown			155		°C

TYPICAL SWITCHING CHARACTERISTICS: V_S = V_C = 20V, T_A = 25°C. Delays measured to 10% output change.

PARAMETERS	TEST CONDITIONS	OUTPUT C_L =			UNIT
From Inv. Input to Output:		open	1.0	2.2	nF
Rise Time Delay		60	60	60	ns
10% to 90% Rise		20	40	60	ns
Fall Time Delay		60	60	60	ns
90% to 10% Fall		25	40	50	ns
From N. I. Input to Output:					
Rise Time Delay		90	90	90	ns
10% to 90% Rise		20	40	60	ns
Fall Time Delay		60	60	60	ns
90% to 10% Fall		25	40	50	ns
V_C Cross-Conduction Current Spike Duration	Ouput Rise	25			ns
	Output Fall	0			ns

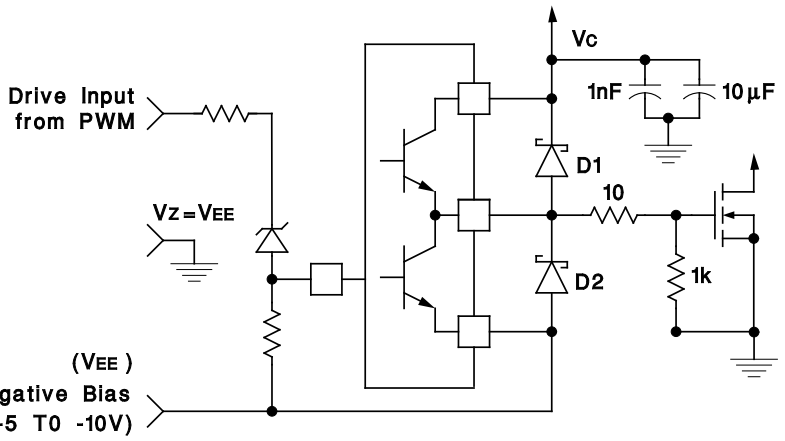
APPLICATIONS

Power MOSFET Drive Circuit



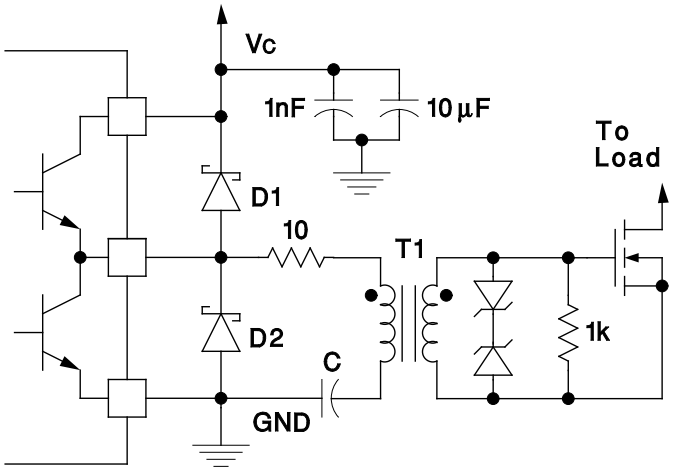
D1, D2: UC3611 Schottky Diodes

Power MOSFET Drive Circuit using Negative Bias Voltage and Level Shifting to Ground Referenced PWMs.



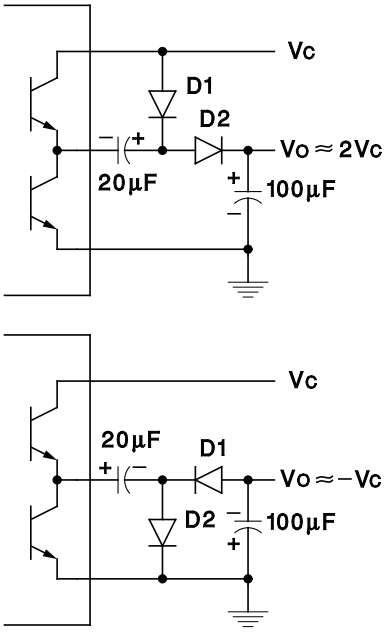
D1, D2: UC3611 Schottky Diodes

Transformer Coupled MOSFET Drive Circuit



D1, D2: UC3611 Schottky Diodes

Charge Pump Circuits



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