

- D **1.5 Amp Source/Sink Drive**
- D **Pin Compatible with 0026 Products**
- D **40 ns Rise and Fall into 1000pF**
- D **Low Quiescent Current**
- D **5 V to 40 V Operation**
- D **Thermal Protection**

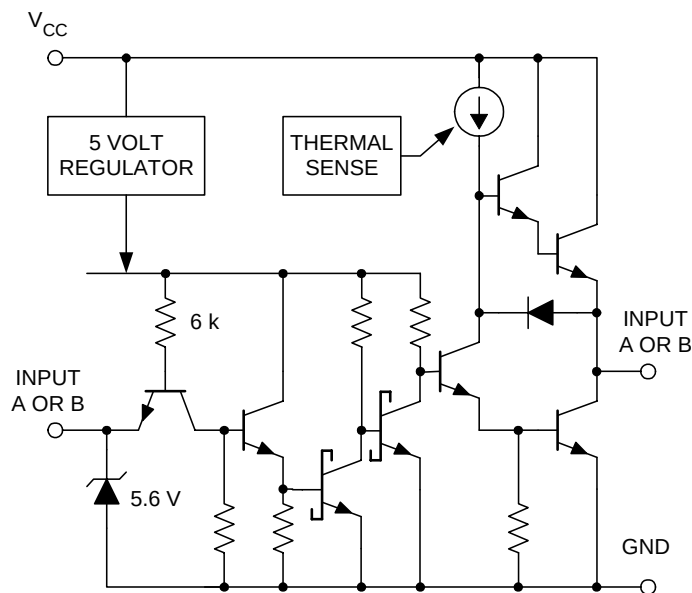
description

The UC3709 family of power drivers is an effective low-cost solution to the problem of providing fast turn-on and off for the capacitive gates of power MOSFETs. Made with a high-speed Schottky process, these devices will provide up to 1.5 A of either source or sink current from a totem-pole output stage configured for minimal cross-conduction current spike.

The UC3709 is pin compatible with the MMH0026 or DS0026, and while the delay times are longer, the supply current is much less than these older devices.

With inverting logic, these units feature complete TTL compatibility at the inputs with an output stage that can swing over 30 V. This design also includes thermal shutdown protection.

simplified schematic (only one driver shown)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)^{†‡}

Parameter	DW PACKAGE	J PACKAGE	L PACKAGE	N PACKAGE	UNIT
Supply Voltage, V_{CC}	40	40	40	40	V
Output Current (Source or Sink)					
..... Steady-State	±500	±500	±500	±500	mA
..... Peak Transient	±1.5	±1.0	±1.0	±1.5	A
..... Capacitive Discharge Energy	20	15	15	20	mJ
Digital Inputs}	5.5	5.5	5.5	5.5	V
Power Dissipation at $T_A = 25^\circ\text{C}$	1	1	1	1	W
Power Dissipation at $T_C = 25^\circ\text{C}$	3	2	2	3	W
Operating Junction Temperature Range (T_J)	-55 to 125	-55 to 125	-55 to 125	-55 to 125	$^\circ\text{C}$
Storage Temperature Range	-65 to 150	-65 to 150	-65 to 150	-65 to 150	$^\circ\text{C}$
Lead Temperature (Soldering, 10 Seconds)	300	300	300	300	$^\circ\text{C}$

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

[‡] All currents are positive into and negative out of the specified terminals. Digital drive can exceed 5.5V if input is limited to 10A. Consult the Packaging Section of the Databook for thermal limitations and considerations of the package.



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

UC1709, UC2709, UC3709

DUAL HIGH-SPEED FET DRIVER

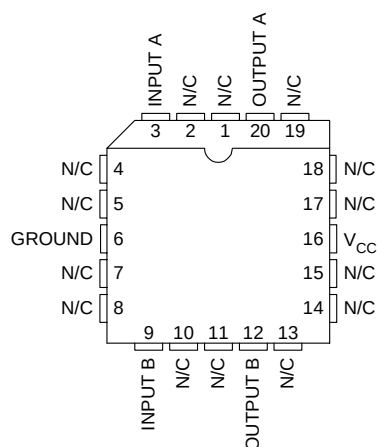
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THERMAL RESISTANCE TABLE

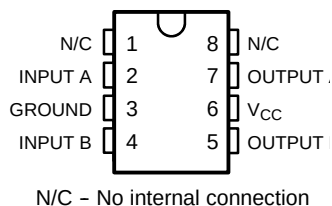
PACKAGE	$\theta_{jc} (^{\circ}\text{C/W})$	$\theta_{ja} (^{\circ}\text{C/W})$
SOIC-16 (DW)	20 ⁽¹⁾	35 to 58 ⁽³⁾
DIL-16 (J)	28 ⁽²⁾	125 to 160
LCC-16 (L)	20 ⁽²⁾	70 to 80
DIL-16 (N)	45	90 ⁽³⁾

- NOTES: (1) Specified thermal resistance is θ_{jl} (junction to lead) where noted.
 (2) θ_{jc} data values stated were derived from MIL-STD-1835B. MIL-STD-1835B states, "The baseline values shown are worst case (mean +2s) for a 60x60 mil microcircuit device silicon die and applicable for devices with die sizes up to 14400 square mils. For device die sizes greater than 14400 square mils use the following values; dual-in-line, 11°C/W; flat pack, 10°C/W; pin grid array, 10°C/W".
 (3) Specified θ_{ja} (junction to ambient) is for devices mounted to 5-inch² FR4 PC board with one ounce copper where noted. When resistance range is given, lower values are for 5 inch² aluminum PC board. Test PWB was 0.062 inch thick and typically used 0.635-mm trace widths for power packages and 1.3-mm trace widths for non-power packages with a 100-mil x 100-mil probe land area at the end of each trace.

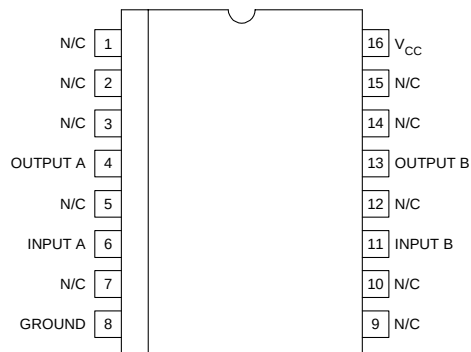
**LCC-20 (TOP VIEW)
L PACKAGES**



**8 PIN DIL N OR J PACKAGE
(TOP VIEW)**



**SOIC-16 (TOP VIEW)
DW PACKAGE**



UC1709, UC2709, UC3709 DUAL HIGH-SPEED FET DRIVER

SLUS196B - NOVEMBER 1996 - REVISED MARCH 2004

electrical characteristics over recommended operating free-air temperature range, $T_A = 55^\circ\text{C}$ to 125°C for the UC1709, -40°C to 85°C for the UC2709, and 0°C to 70°C for the UC3709;
 $V_{CC} = 20\text{ V}$, $T_A = T_J$.

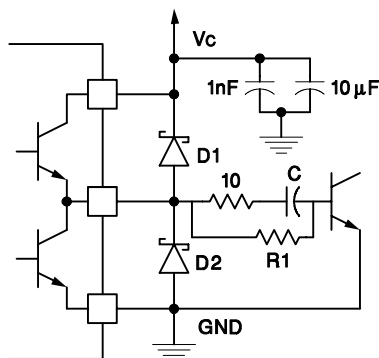
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply current	Both outputs low		10	12	mA
	Both outputs high		7	10	mA
Logic 0 input voltage				0.8	V
Logic 1 input voltage		2.2			V
Input current	$V_I = 0$		-0.6	-1.0	mA
Input leakage	$V_I = 5\text{ V}$		0.05	0.1	mA
Output high saturation $V_{CC}-V_O$	$I_O = -50\text{ mA}$		1.5	2.0	V
	$I_O = -500\text{ mA}$		2.0	2.5	V
Output low saturation V_O	$I_O = 50\text{ mA}$		0.1	0.4	V
	$I_O = 500\text{ mA}$		2.0	2.5	V
Thermal shutdown			155		mA

typical switching characteristics, $V_{CC} = 20\text{ V}$, $T_A = 25^\circ\text{C}$, delays measured to 10% output change

PARAMETER	TEST CONDITIONS	OUTPUT $C_L =$		UNITS
		0 nF	2.2 nF	
Rise time delay		80	80	ns
10% to 90% rise		20	40	ns
Fall time delay		60	80	ns
10% to 90% fall		20	40	ns
VCC cross-conduction current spike duration	Output rise	25		ns
	Output fall	0		ns

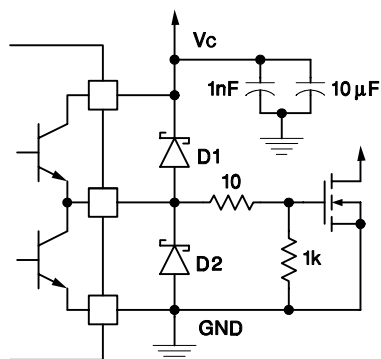
NOTE: Refer to UC1705 specifications for further information.

APPLICATION INFORMATION



D1, D2: UC3611 Schottky Diodes

Figure 1. Power bipolar drive circuit.



D1, D2: UC3611 Schottky Diodes

Figure 2. Power MOSFET drive circuit.

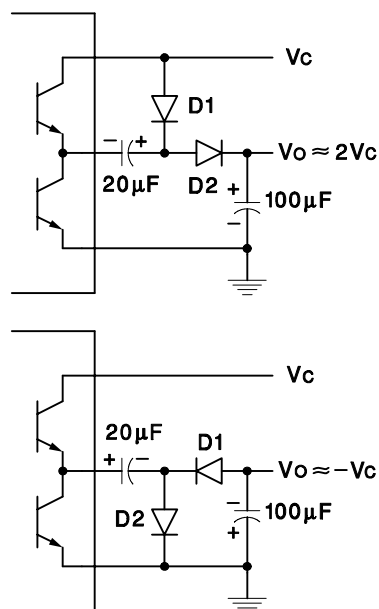


Figure 3. Charge pump circuits.

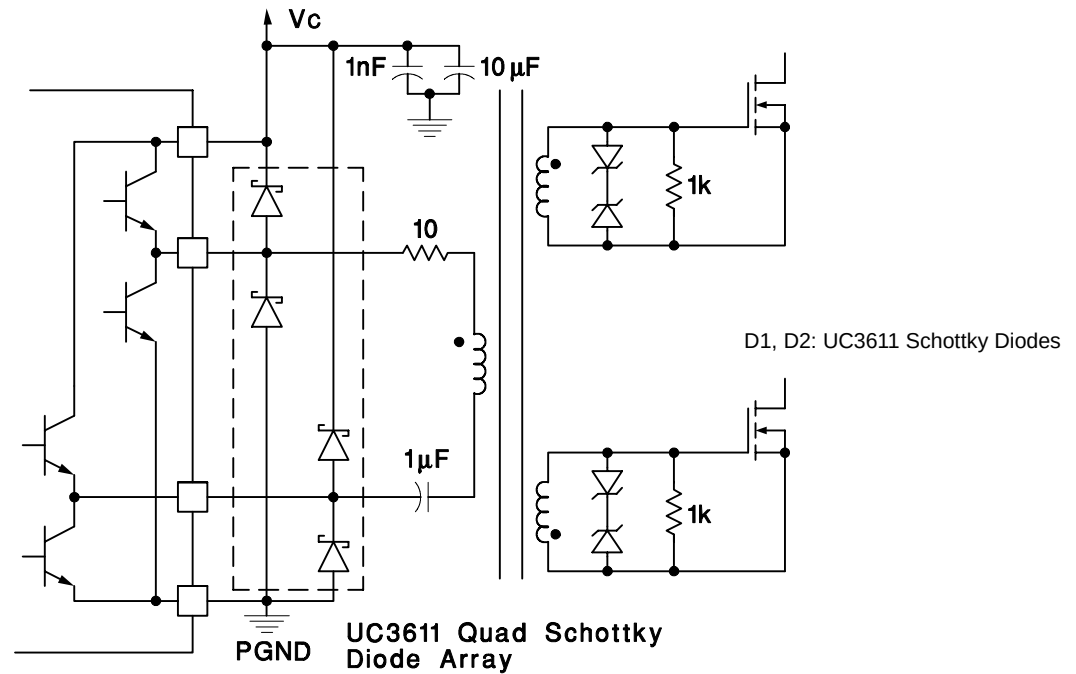


Figure 4. Transformer coupled push-pull MOSFET drive circuit.

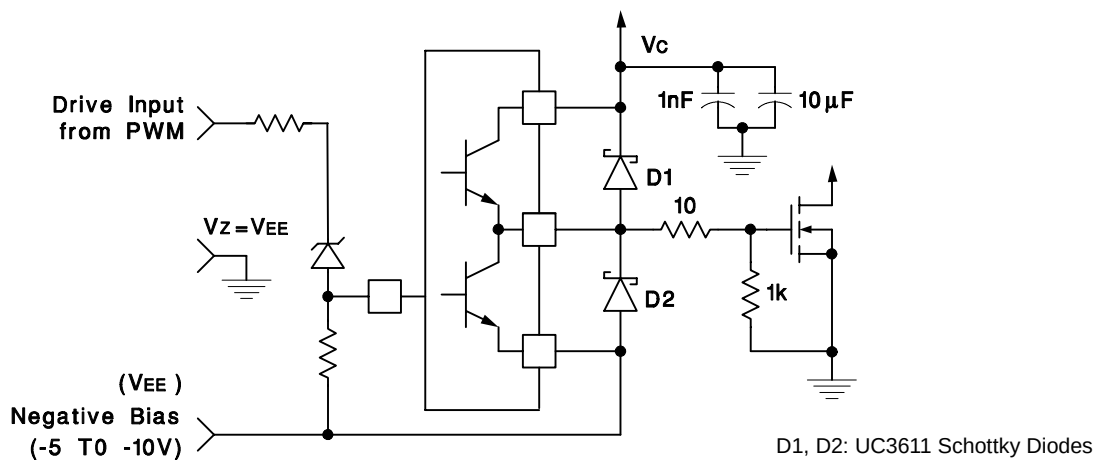
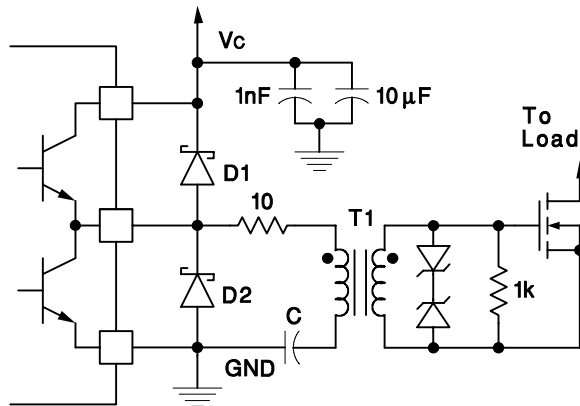


Figure 5. Power MOSFET drive circuit using negative bias voltage and level shifting to ground referenced PWM

UC1709, UC2709, UC3709 DUAL HIGH-SPEED FET DRIVER

SLUS196B - NOVEMBER 1996 - REVISED MARCH 2004



D1, D2: UC3611 Schottky Diodes

Figure 6. Transformer coupled MOSFET drive circuit.

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