UNITRODE

High Current FET Driver

FEATURES

- Totem Pole Output with 6A Source/Sink Drive

- 3ns Delay

- 20ns Rise and Fall Time into 2.2nF

- 8ns Rise and Fall Time into 30nF

- 4.7V to 18V Operation

- Inverting and Non-Inverting Outputs

- Under-Voltage Lockout with Hysteresis

- Thermal Shutdown Protection

- MINIDIP and Power Packages

DESCRIPTION

The UC1710 family of FET drivers is made with a high-speed Schottky process to interface between low-level control functions and very high-power switching devices-particularly power MOSFET's. These devices accept low-current digital inputs to activate a high-current, totem pole output which can source or sink a minimum of 6A.

Supply voltages for both V_{IN} and V_C can independently range from 4.7V to 18V. These devices also feature under-voltage lockout with hysteresis.

The UC1710 is packaged in an 8-pin hermetically sealed dual in-line package for –55°C to +125°C operation. The UC2710 and UC3710 are specified for a temperature range of –40°C to +85°C and 0°C to +70°C respectively and are available in either an 8-pin plastic dual in-line or a 5-pin, TO-220 package. Surface mount devices are also available.
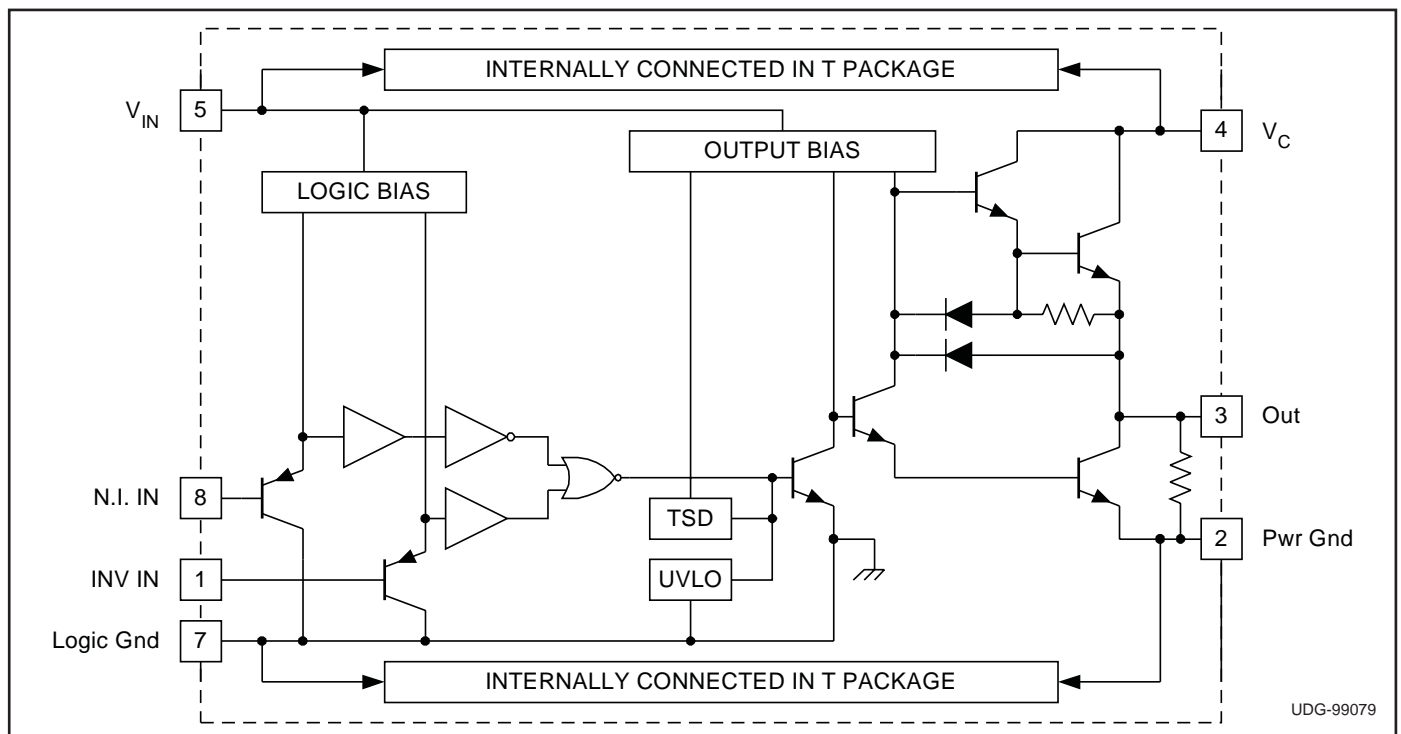
TRUTH TABLE

INV	N.I.	Out
H	H	L
L	H	H
H	L	L
L	L	L

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

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

ORDERING INFORMATION

	TEMPERATURE RANGE	PACKAGE
UC1710J	–55°C to +125°C	8 pin CDIP
UC2710DW	–40°C to +85°C	16 pin SOIC-wide
UC2710J		8 pin CDIP
UC2710N		8 pin PDIP
UC2710T		5 pin TO220
UC3710DW	0°C to +70°C	16 pin SOIC-wide
UC3710N		8 pin PDIP
UC3710T		5 pin TO220

BLOCK DIAGRAM

UDG-99079

ABSOLUTE MAXIMUM RATINGS

	N-Package	J-Package	T-Package
Supply Voltage, Vin	20V	20V	20V
Collector Supply Voltage, V_C	20V	20V	20V
Operating Voltage	18V	18V	18V
Output Current (Source or Sink)			
Steady-State	$\pm$ 500mA	$\pm$ 500mA	$\pm$ 1A
Digital Inputs	$-0.3V-V_{IN}$	$-0.3V - V_{IN}$	$-0.3V - V_{IN}$
Power Dissipation at Ta=25°C	1W	1W	3W
Power Dissipation at T (Case) = 25°C	2W	2W	25W
Operating Junction Temperature	$-55°C$ to $+150°C$	$-55°C$ to $+150°C$	$-55°C$ to $+150°C$
Storage Temperature	$-65°C$ 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 1: All currents are positive into, negative out of the specified terminal.

Note 2: Consult Unitrode Integrated Circuits databook for information regarding thermal specifications and limitations of packages.

CONNECTION DIAGRAMS
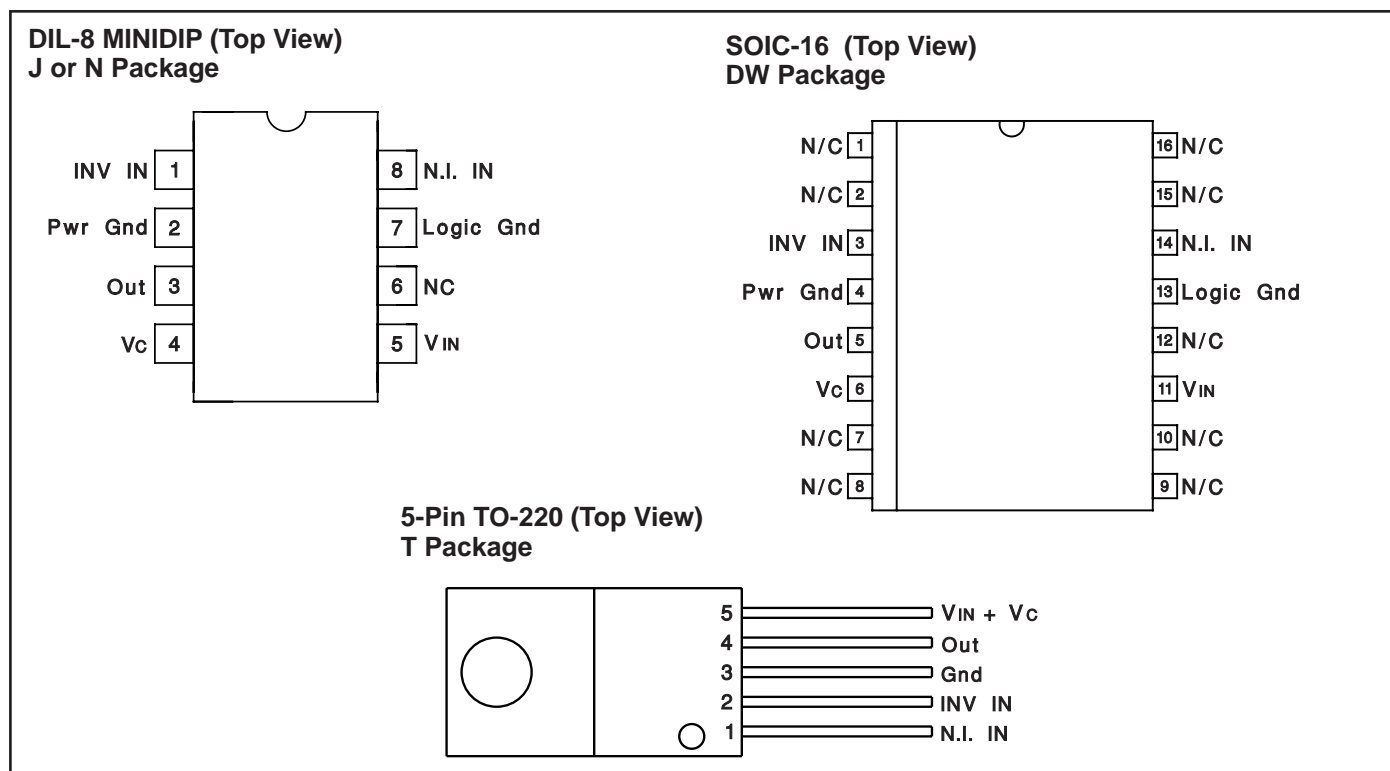
DIL-8 MINIDIP (Top View)
J or N Package

INV IN 1	8 N.I. IN
Pwr Gnd 2	7 Logic Gnd
Out 3	6 NC
Vc 4	5 V IN

SOIC-16 (Top View)
DW Package

N/C 1	16 N/C
N/C 2	15 N/C
INV IN 3	14 N.I. IN
Pwr Gnd 4	13 Logic Gnd
Out 5	12 N/C
Vc 6	11 V IN
N/C 7	10 N/C
N/C 8	9 N/C

5-Pin TO-220 (Top View)
T Package

5	V IN + Vc
4	Out
3	Gnd
2	INV IN
1	N.I. IN

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for V_{IN} = V_C = 15V, No load, T_A = T_J.

PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN} Supply Current	V_{IN} =18V, V_C =18V, Output Low		26	35	mA
	V_{IN} =18V, V_C =18V, Output High		21	30	mA
V_C Supply Current	V_{IN} =18V, V_C =18V, Output Low		1.5	5.0	mA
	V_{IN} =18V, V_C =18V,Output High		5.0	8	mA
UVLO Threshold	V_{IN} High to Low	3.8	4.1	4.4	V
	V_{IN} Low to High	4.1	4.4	4.8	V

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for $V_{IN} = V_C = 15V$, No load, $T_A = T_J$.

PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
UVLO Threshold Hysteresis		0.1	0.3	0.5	V
Digital Input Low Level				0.8	V
Digital Input High Level		2.0			V
Digital Input Current	Digital Input = 0.0V	−70	−4.0		μA
Output High Sat., $V_C − V_O$	$I_O = −100mA$		1.35	2.2	V
	$I_O = −6A$		3.2	4.5	V
Output Low Sat., V_O	$I_O = 100mA$		0.25	0.6	V
	$I_O = 6A$		3.4	4.5	V
Thermal Shutdown			165		°C
From Inv., Input to Output (Note 3, 4):					
Rise Time Delay	CL = 0		35	70	ns
	CL = 2.2nF		35	70	ns
	CL = 30nF		35	70	ns
10% to 90% Rise	CL = 0		20	40	ns
	CL = 2.2nF		25	40	ns
	CL = 30nF		85	150	ns
Fall Time Delay	CL = 0		35	70	ns
	CL = 2.2nF		35	70	ns
	CL = 30nF		35	80	ns
90% to 10% Fall	CL = 0		15	40	ns
	CL = 2.2nF		20	40	ns
	CL = 30nF		85	150	ns
From N.I. Input to Output (Note 3,4):					
Rise Time Delay	CL = 0		35	70	ns
	CL = 2.2nF		35	70	ns
	CL = 30nF		35	70	ns
10% to 90% Rise	CL = 0		20	40	ns
	CL = 2.2nF		25	40	ns
	CL = 30nF		85	150	ns
Fall Time Delay	CL = 0		35	70	ns
	CL = 2.2nF		35	70	ns
	CL = 30nF		35	80	ns
90% to 10% Fall	CL = 0		15	40	ns
	CL = 2.2nF		20	50	ns
	CL = 30nF		85	150	ns
Total Supply Current at 200kHz Input Switching Frequency	$T_A = 25°C$ (Note 5) CL = 0		30	40	mA

Note: 3. Delay measured from 50% input change to 10% output change.

Note: 4. Those parameters with CL = 30nF are not tested in production.

Note: 5. Inv. Input pulsed at 50% duty cycle with N.I. Input = 3V. or N.I. Input pulsed at 50% duty cycle with Inv. Input = 0V.

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