

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 $+125^{\circ}\text{C}$ operation. The UC2710 and UC3710 are specified for a temperature range of -40°C to $+85^{\circ}\text{C}$ and 0°C to $+70^{\circ}\text{C}$ 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

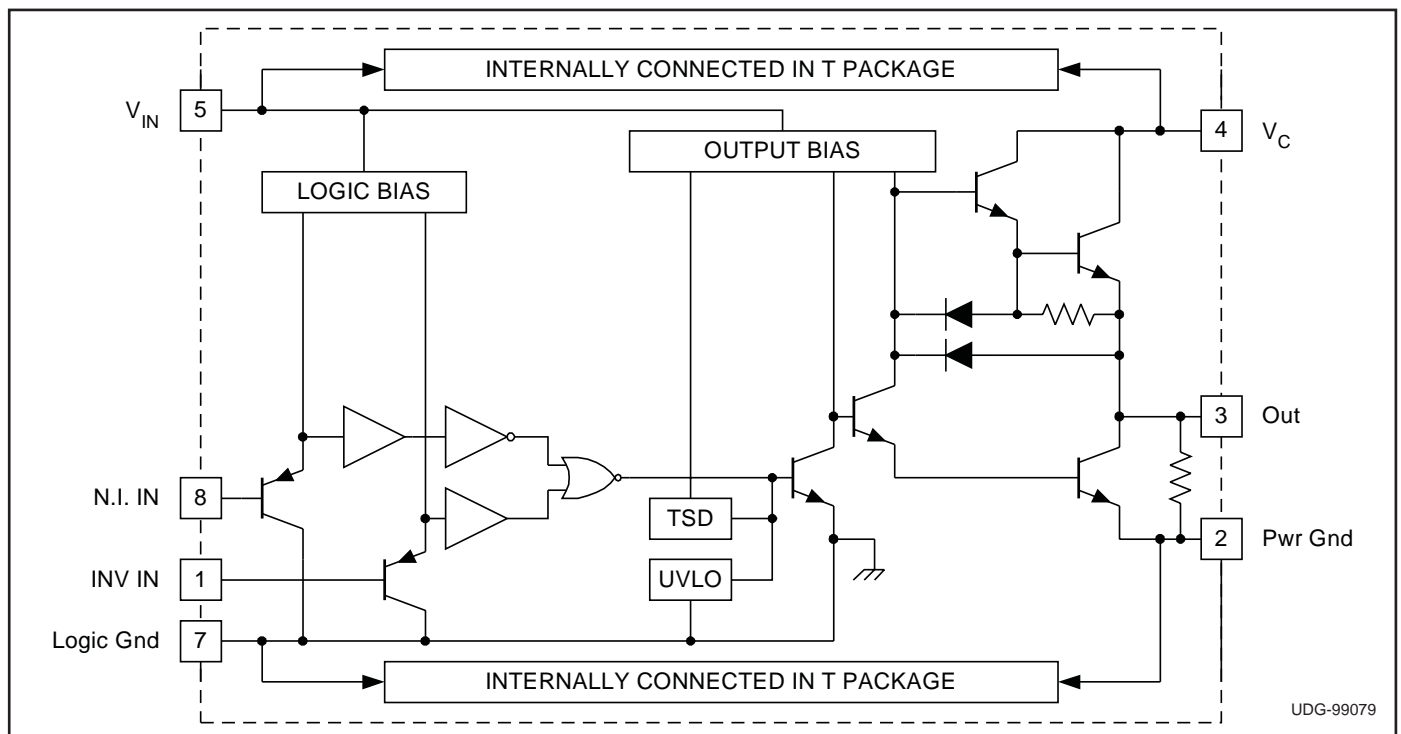
INV	N.I.	Out
H	H	L
L	H	H
H	L	L
L	L	L

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

ORDERING INFORMATION

	TEMPERATURE RANGE	PACKAGE
UC1710J	-55°C to $+125^{\circ}\text{C}$	8 pin CDIP
UC2710DW	-40°C to $+85^{\circ}\text{C}$	16 pin SOIC-wide
UC2710J		8 pin CDIP
UC2710N		8 pin PDIP
UC2710T		5 pin TO220
UC3710DW	0°C to $+70^{\circ}\text{C}$	16 pin SOIC-wide
UC3710N		8 pin PDIP
UC3710T		5 pin TO220

BLOCK DIAGRAM



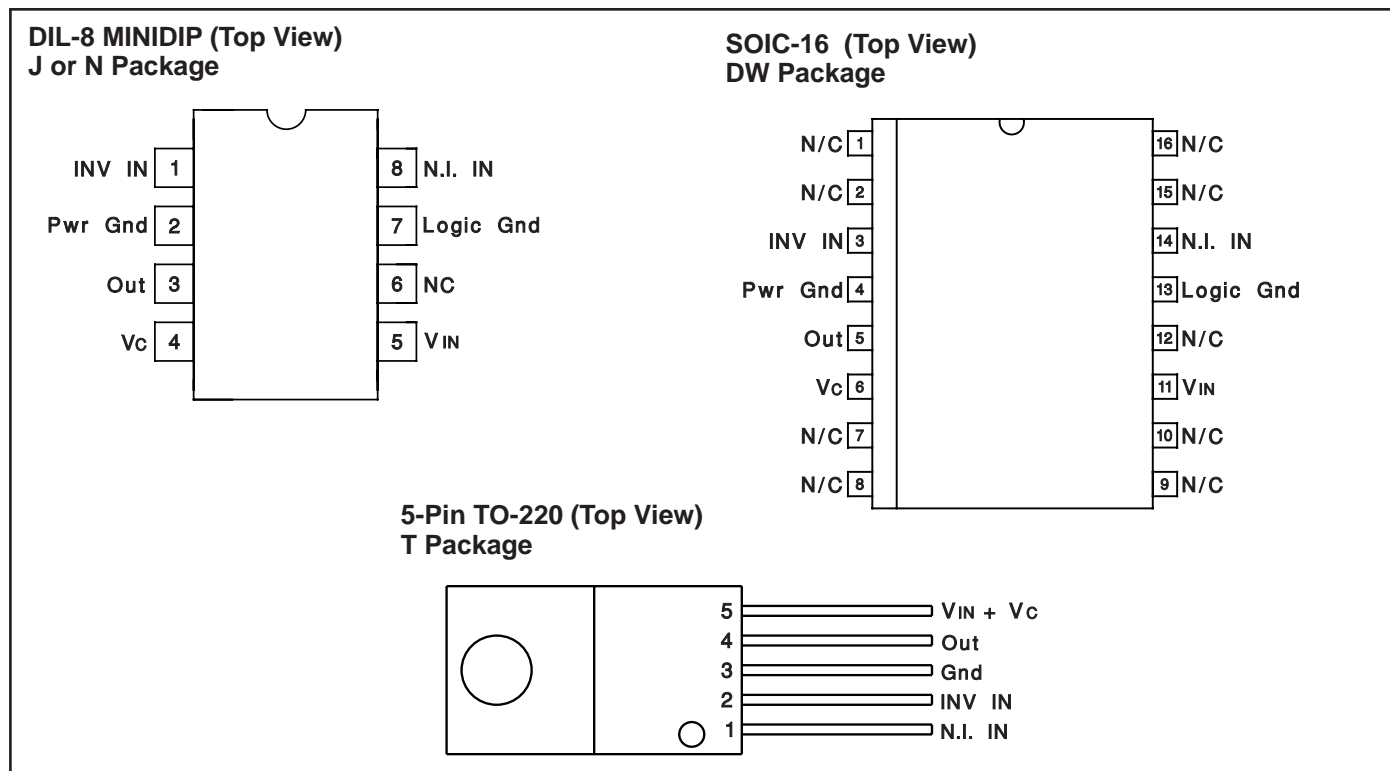
ABSOLUTE MAXIMUM RATINGS

	N-Package	J-Package	T-Package
Supply Voltage, V_{IN}	20V	20V	20V
Collector Supply Voltage, V_C	20V	20V	20V
Operating Voltage	18V	18V	18V
Output Current (Source or Sink)			
Steady-State	$\pm 500\text{mA}$	$\pm 500\text{mA}$	$\pm 1\text{A}$
Digital Inputs	$-0.3\text{V} - V_{IN}$	$-0.3\text{V} - V_{IN}$	$-0.3\text{V} - V_{IN}$
Power Dissipation at $T_a=25^\circ\text{C}$	1W	1W	3W
Power Dissipation at T (Case) = 25°C	2W	2W	25W
Operating Junction Temperature	-55°C to $+150^\circ\text{C}$	-55°C to $+150^\circ\text{C}$	-55°C to $+150^\circ\text{C}$
Storage Temperature	-65°C to $+150^\circ\text{C}$	-65°C to $+150^\circ\text{C}$	-65°C to $+150^\circ\text{C}$
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 Unitorde Integrated Circuits databook for information regarding thermal specifications and limitations of packages.

CONNECTION DIAGRAMS



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

PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN} Supply Current	$V_{IN}=18\text{V}$, $V_C=18\text{V}$, Output Low		26	35	mA
	$V_{IN}=18\text{V}$, $V_C=18\text{V}$, Output High		21	30	mA
V_C Supply Current	$V_{IN}=18\text{V}$, $V_C=18\text{V}$, Output Low		1.5	5.0	mA
	$V_{IN}=18\text{V}$, $V_C=18\text{V}$, 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		$^{\circ}C$
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	$T_A = 25^{\circ}C$ (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.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
5962-0152001QPA	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	0152001QPA UC1710	Samples
5962-0152001VPA	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	0152001VPA UC1710	Samples
5962-0152001VXA	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	0152001VXA	Samples
UC1710J	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	UC1710J	Samples
UC1710J883B	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	0152001QPA UC1710	Samples
UC1710L883B	OBSOLETE	TO/SOT	L	20		TBD	Call TI	Call TI	-55 to 125		
UC1710SP	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI	-55 to 125		
UC2710N	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type	-40 to 85	UC2710N	Samples
UC2710NG4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type	-40 to 85	UC2710N	Samples
UC2710T	ACTIVE	TO-220	KC	5	50	Green (RoHS & no Sb/Br)	CU SN	N / A for Pkg Type	-40 to 85	UC2710T	Samples
UC2710TG3	ACTIVE	TO-220	KC	5	50	Green (RoHS & no Sb/Br)	CU SN	N / A for Pkg Type	-40 to 85	UC2710T	Samples
UC3710DW	ACTIVE	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3710DW	Samples
UC3710DWG4	ACTIVE	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	0 to 70	UC3710DW	Samples
UC3710N	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type	0 to 70	UC3710N	Samples
UC3710NG4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type	0 to 70	UC3710N	Samples
UC3710T	ACTIVE	TO-220	KC	5	50	Green (RoHS & no Sb/Br)	CU SN	N / A for Pkg Type	0 to 70	UC3710T	Samples
UC3710TG3	ACTIVE	TO-220	KC	5	50	Green (RoHS & no Sb/Br)	CU SN	N / A for Pkg Type	0 to 70	UC3710T	Samples

(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.

OBSELETE: 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.

⁽⁴⁾ There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

⁽⁵⁾ Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

Important Information and Disclaimer:The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF UC1710, UC1710-SP, UC3710 :

● Catalog: [UC3710](#), [UC1710](#)

● Military: [UC1710](#)

● Space: [UC1710-SP](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Applications Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community

e2e.ti.com