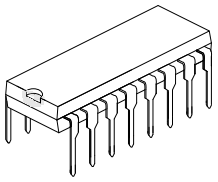
HIGH AND LOW SIDE DRIVER



DIP-16

■ DESCRIPTION

The **UTR2113** are high voltage, high speed power MOSFET and IGBT drivers with independent high-side and low-side referenced output channels. Pro-prietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. Logic in-puts are compatible with standard CMOS or LSTTL out-put, down to 3.3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. Propagation delays are matched to simplify use in high frequency applications. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high-side configuration which operates up to 500V or 600V.

■ FEATURES

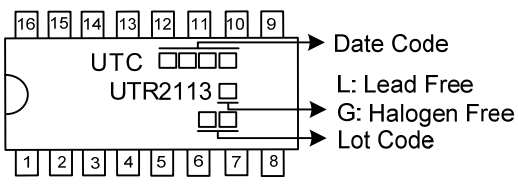
* Floating channel designed for bootstrap operation
* Fully operational to 500V or 600V
* Tolerant to negative transient voltage, dV/dt immune
* Gate drive supply range from 10V to 20V
* Undervoltage lockout for both channels
* 3.3V logic compatible
* Separate logic supply range from 3.3V to 20V
* Logic and power ground ± 5V offset
* CMOS Schmitt-triggered inputs with pull-down
* Cycle by cycle edge-triggered shutdown logic
* Matched propagation delay for both channels
* Outputs in phase with inputs

■ ORDERING INFORMATION

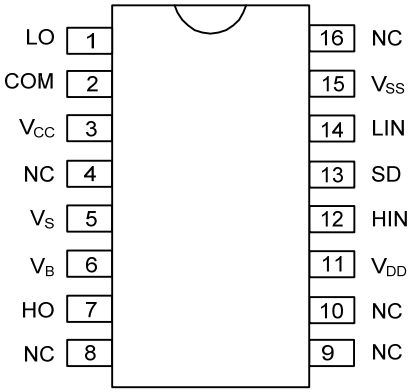
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UTR2113L-D16-T	UTR2113G-D16-T	DIP-16	Tube

UTR2113G-D16-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) D16: DIP-16 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



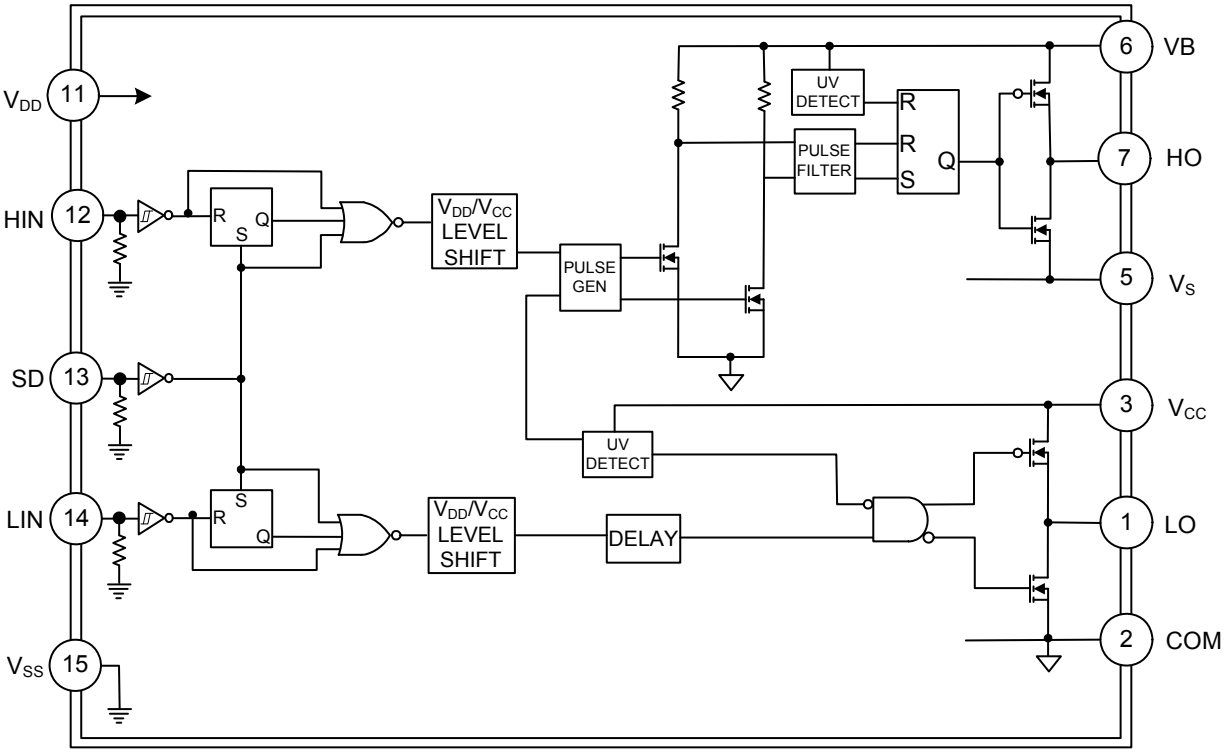
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	LO	Low-side gate drive output
2	COM	Low-side return
3	V_{CC}	Low-side supply
4, 8~10, 16	NC	
5	V_S	High-side floating supply return
6	V_B	High-side floating supply
7	HO	High-side gate drive output
11	V_{DD}	Logic supply
12	HIN	Logic input for high-side gate driver output (HO), in phase
13	SD	Logic input for shutdown
14	LIN	Logic input for low-side gate driver output (LO), in phase
15	V_{SS}	Logic ground

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
High-Side Floating Absolute Voltage	V_B	620 (Note 3)	V
High-Side Floating Supply Offset Voltage	V_S	V_B+0.3	V
High-Side Floating Output Voltage	V_{HO}	V_B+0.3	V
Low-Side and logic Fixed Supply Voltage	V_{CC}	20 (Note 3)	V
Low-Side Output Voltage	V_{LO}	V_{CC}+0.3	V
Logic Supply Voltage	V_{DD}	V_{SS}+20 (Note 3)	V
Logic Supply Offset Voltage	V_{SS}	V_{CC}	V
Logic Input Voltage (HIN &LIN)	V_{IN}	V_{DD}	V
Allowable Offset Supply Voltage Transient	dVs/dt	50	V
Power Dissipation	P_D	1.25	W
Maximum Junction Temperature	T_J	+150	°C
Maximum Storage Temperature Range	T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.
3. All supplies are fully tested at 25V, and an internal 20V clamp exists for each supply.

■ RECOMMENDED OPERATING RATINGS

(For proper operation, the device should be used within the recommended conditions. The V_S and V_{SS} offset ratings are tested with all supplies biased at a 15V differential.)

PARAMETER	SYMBOL	RATINGS	UNIT
High-Side Floating Supply Absolute Voltage	V_B	V_S+10 ~ V_S+20	V
High-Side Floating Supply Offset Voltage	V_S	600 (Note 1)	V
High-Side Floating Output Voltage	V_{HO}	V_S ~ V_B	V
Low-Side Fixed Supply Voltage	V_{CC}	10 ~ 20	V
Low-Side Output Voltage	V_{LO}	0 ~ V_{CC}	V
Logic Supply Voltage	V_{DD}	V_{SS}+3 ~ V_{SS}+20	V
Logic Supply Offset Voltage	V_{SS}	-5 ~ 5 (Note 2)	V
Logic Input Voltage (HIN, LIN & SD)	V_{IN}	V_{SS} ~ V_{DD}	V
Ambient Temperature	T_A	-40 ~ +125	°C

Notes: 1. Logic operational for V_S of -4V to +500V. Logic state held for V_S of -4 V to -V_{BS}.
2. When V_{DD} < 5 V, the minimum V_{SS} offset is limited to -V_{DD}.

■ THERMAL DATA

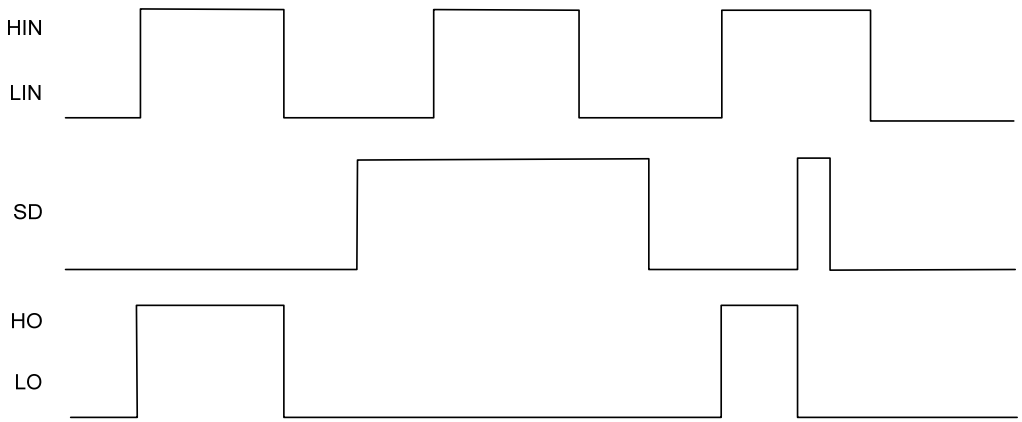
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	100	°C/W

■ ELECTRICAL CHARACTERISTICS

[V_{BIAS} (V_{CC}, V_{BS}, V_{DD})=15V, C_L=1000pF, V_{SS}=COM and T_A=25°C unless otherwise specified. The V_{IN}, V_{TH}, and I_{IN} parameters are referenced to V_{SS} and are applicable to all three logic input leads: HIN, LIN, and SD. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO or LO.]

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Turn-ON Propagation Delay	t_{on}	V_S=0V		180	250	ns
Turn-OFF Propagation Delay	t_{OFF}	V_S=600V		120	150	ns
Shutdown Propagation Delay	t_{SD}			130	160	ns
Turn-ON Rise Time	t_r			25	35	ns
Turn-OFF Fall Time	t_f			17	25	ns
Turn-ON/OFF	MT				20	ns
Logic “1” Input Voltage	V_{IH}		10			V
Logic “0” Input Voltage	V_{IL}				5.5	V
High level Output Voltage, V_{BIAS} - V_O	V_{OH}	I_O=0A			1.5	V
Low Level Output Voltage, V_O	V_{OL}	I_O=20mA			0.15	V
Offset Supply Leakage Current	I_{LK}	V_B=V_S=600V			50	μA
Quiescent V_{BS} Supply Current	I_{QBS}	V_{IN}=0V ~ V_{DD}		125	230	μA
Quiescent V_{CC} Supply Current	I_{QCC}			180	340	μA
Quiescent V_{DD} Supply Current	I_{QDD}			15	30	μA
Logic “1” Input Bias Current	II_{N+}	V_{IN}=V_{DD}		20	40	μA
Logic “0” Input Bias Current	II_{N-}	V_{IN}=0V			5.0	μA
V_{BS} supply undervoltage positive going threshold	V_{BSUV+}		7.5	8.6	9.7	V
V_{BS} Supply Undervoltage Negative Going Threshold	V_{BSUV-}		7.0	8.2	9.4	V
V_{CC} Supply Undervoltage Positive Going Threshold	V_{CCUV+}		7.4	8.5	9.6	V
V_{CC} Supply Undervoltage Negative Going Threshold	V_{CCUV-}		7.0	8.2	9.4	V
Output High Short Circuit Pulsed Current	I_{O+}	V_{IN}=V_{DD}, V_O=0V, P_W≤10μs	2.0	2.5		A
Output Low Short Circuit Pulsed Current	I_{O-}	V_{IN}=0V, V_O=15V, P_W≤15μs	2.0	2.5		A

■ TIMING DIAGRAM



■ TYPICAL APPLICATION CIRCUIT