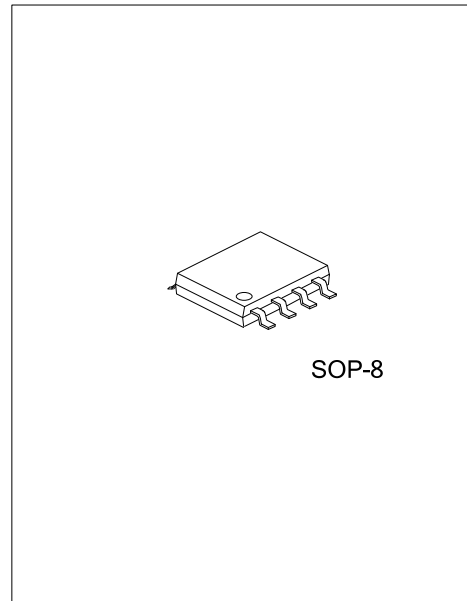




# HIGH AND LOW SIDE DRIVER

## DESCRIPTION

The **UTR2011** is a high power, high speed power MOSFET driver with independent high and low side referenced output channels. Logic inputs are compatible with standard CMOS or LSTTL output, 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 in the high side configuration which operates up to 200 volts. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction.



## FEATURES

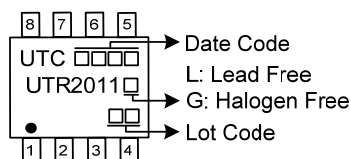
- \*Floating channel designed for bootstrap operation
- \*Fully operational to 200V
- \*Tolerant to negative transient voltage, dV/dt immune
- \*Gate drive supply range from 10 to 20V
- \*Independent low and high side channels
- \*Input logic HIN/LIN active high
- \*Undervoltage lockout for both channels
- \*3.3V and 5V logic compatible
- \*CMOS Schmitt-triggered inputs with pull-down
- \*Matched propagation delay for both channels

## ORDERING INFORMATION

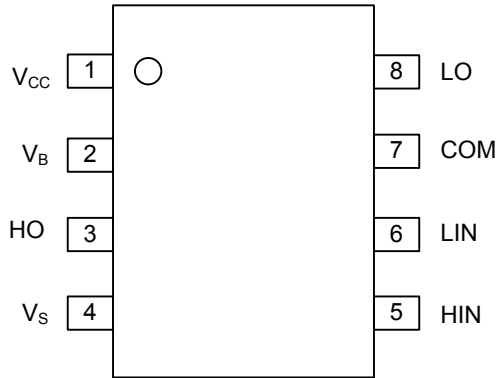
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UTR2011L-S08-R	UTR2011G-S08-R	SOP-8	Tape Reel

<p>UTR2011G-S08-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) S08: SOP-8</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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## MARKING



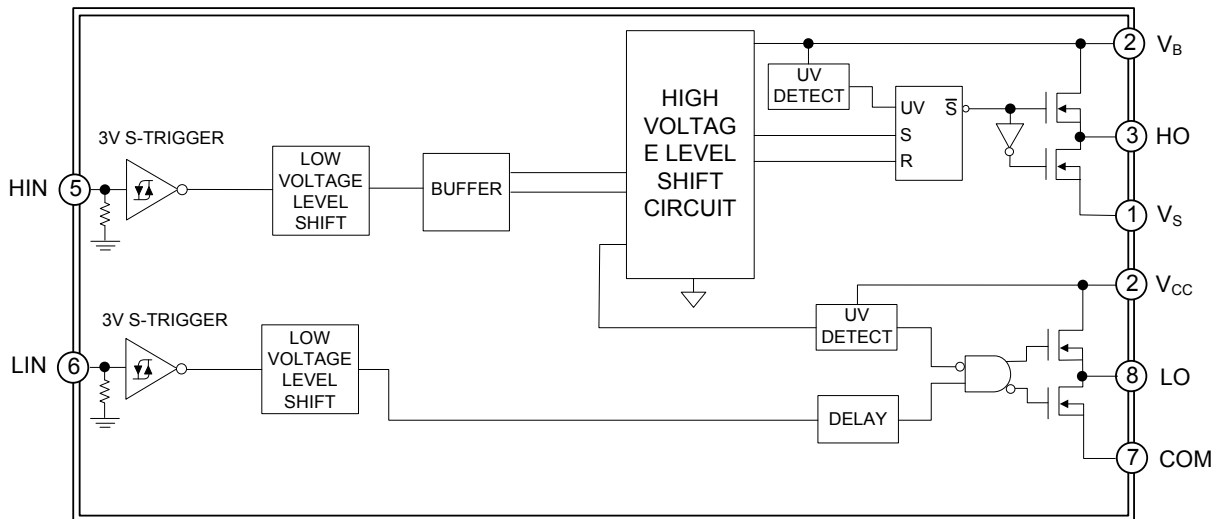
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V <sub>CC</sub>	Low side supply
2	V <sub>B</sub>	High side floating supply
3	HO	High side gate drive output
4	V <sub>S</sub>	High side floating supply return
5	HIN	Logic input for high side gate driver outputs (HO), in phase
6	LIN	Logic input for low side gate driver outputs (LO), in phase
7	COM	Low side return
8	LO	Low side gate drive output

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
High side floating supply voltage	V <sub>B</sub>	-0.3 ~ 220(Note 2)	V
High side floating supply offset voltage	V <sub>S</sub>	V <sub>B</sub> - 20 ~ V <sub>B</sub> + 0.3	V
High side floating output voltage	V <sub>HO</sub>	V <sub>S</sub> - 0.3 ~ V <sub>B</sub> + 0.3	V
Low side fixed supply voltage	V <sub>CC</sub>	-0.3 ~ 20	V
Low side output voltage	V <sub>LO</sub>	-0.3 ~ V <sub>CC</sub> + 0.3	V
Logic input voltage (HIN, LIN)	V <sub>IN</sub>	-0.3 ~ V <sub>CC</sub> + 0.3	V
Allowable offset supply voltage transient	dVs/dt	50	V
Power Dissipation	P <sub>D</sub>	1	W
Maximum Junction Temperature	T <sub>J</sub>	+150	°C
Maximum Storage Temperature Range	T <sub>STG</sub>	-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 supplies are fully tested at 25V and an internal 20V clamp exists for each supply.

■ RECOMMENDED OPERATING RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
High-Side Floating Absolute Voltage	V <sub>B</sub>	V <sub>S</sub> +10 ~ V <sub>S</sub> +20	V
High-Side Floating Supply Offset Voltage	V <sub>S</sub>	200 (Note)	V
High-Side Floating Output Voltage	V <sub>HO</sub>	V <sub>S</sub> ~ V <sub>B</sub>	V
Low-Side and logic Fixed Supply Voltage	V <sub>CC</sub>	10 ~ 20	V
Low-Side Output Voltage	V <sub>LO</sub>	0 ~ V <sub>CC</sub>	V
Logic Input Voltage (HIN & LIN)	V <sub>IN</sub>	COM ~ V <sub>CC</sub>	V
Ambient Temperature	T <sub>A</sub>	-40 ~ +125	°C

Note: Logic operational for V<sub>S</sub> of -5V to +600V. Logic state held for V<sub>S</sub> of -5V to -V<sub>BS</sub>..

■ THERMAL DATA

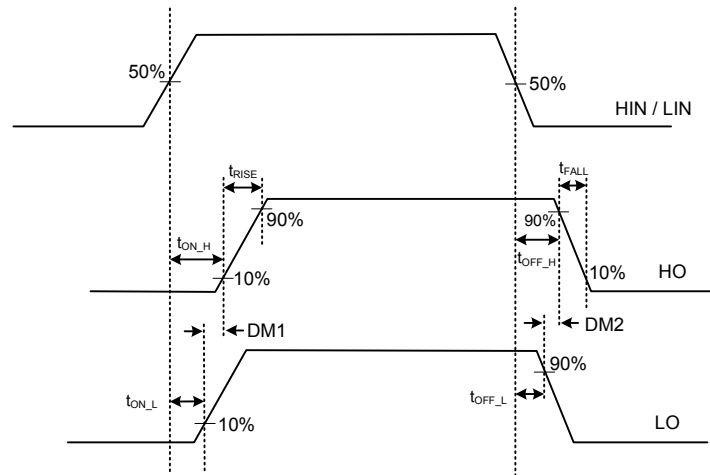
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ <sub>JA</sub>	125	°C/W

### ■ ELECTRICAL CHARACTERISTICS

[ $V_{BIAS}$  ( $V_{CC}$ ,  $V_{BS}$ )=15V and  $T_A=25^{\circ}C$  unless otherwise specified. The  $V_{IN}$ ,  $V_{TH}$ , and  $I_{IN}$  parameters are referenced to COM and are applicable to all logic input leads: HIN and LIN. The  $V_O$  and  $I_O$  parameters are referenced to COM and are applicable to the respective output leads: HO or LO.]

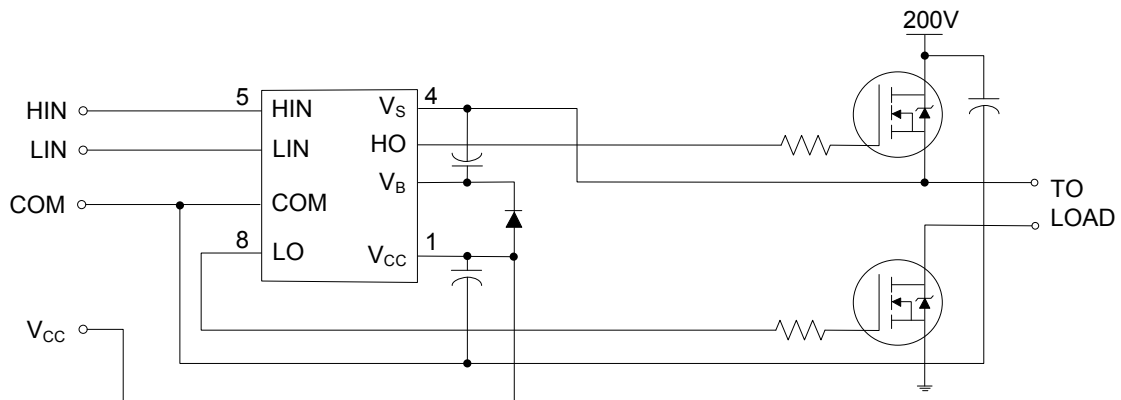
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Turn-ON Propagation Delay	$t_{ON}$	$V_S=0V$		60	80	ns
Turn-OFF Propagation Delay	$t_{OFF}$	$V_S=200V$		60	80	ns
Turn-ON Rise Time	$t_r$			25	40	ns
Turn-OFF Fall Time	$t_f$			15	35	ns
Turn-ON Delay matching ( $t_{ON\ H}-t_{ON\ L}$ )	DM1				20	ns
Turn-OFF Delay matching ( $t_{OFF\ H}-t_{OFF\ L}$ )	DM2				20	ns
Logic "1" Input Voltage	$V_{IH}$	$V_{CC}=10V\sim 20V$	2.5			V
Logic "0" Input Voltage	$V_{IL}$	$V_{CC}=10V\sim 20V$			0.7	V
High level Output Voltage, $V_{BIAS} - V_O$	$V_{OH}$	$I_O=0A$			1.4	V
Low Level Output Voltage, $V_O$	$V_{OL}$	$I_O=2mA$			0.1	V
Offset Supply Leakage Current	$I_{LK}$	$V_B=V_S=200V$			50	$\mu A$
Quiescent $V_{BS}$ Supply Current	$I_{QBS}$	$V_{IN}=0V$ or $3.6V$		120	210	$\mu A$
Quiescent $V_{CC}$ Supply Current	$I_{QCC}$			300	300	$\mu A$
Logic "1" Input Bias Current	$I_{IN+}$	$V_{IN}=3.6V$		3	10	$\mu A$
Logic "0" Input Bias Current	$I_{IN-}$	$V_{IN}=0V$			5	$\mu A$
$V_{BS}$ Supply Undervoltage Positive Going Threshold	$V_{BSUV+}$		8.3	9.0	9.7	V
$V_{BS}$ Supply Undervoltage Negative Going Threshold	$V_{BSUV-}$		7.5	8.2	8.9	V
$V_{CC}$ Supply Undervoltage Positive Going Threshold	$V_{CCUV+}$		8.3	9.0	9.7	V
$V_{CC}$ Supply Undervoltage Negative Going Threshold	$V_{CCUV-}$		7.5	8.2	8.9	V
Output High Short Circuit Pulsed Current	$I_{O+}$	$V_O=0V, P_W\leq 10\mu s$		1		A
Output Low Short Circuit Pulsed Current	$I_{O-}$	$V_O=15V, P_W\leq 10\mu s$		1		A

■ AND WAVEFORMS



TIMING DIAGRAM

■ TYPICAL APPLICATION CIRCUIT



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