



UNI-SEMICONDUCTOR CO., LTD
宇力半导体有限公司



U3115S-6S Data Sheet

V 3.1

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Half-bridge of power MOSFET/IGBT Driver

General Description

The U3115S/U3116S Fully operated to +300V is high voltage, high speed power MOSFET and IGBT driver with dependent high and low side referenced output channels.

The logic input is 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. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 300 volts.

Product Summary

V_{OFFSET}	300V max
$I_{\text{O+/-}}$	1.2 A / 1.5A
$V_{\text{CCon/off (typ.)}}$	10V & 8V
$t_{\text{on/off (typ.)}}$	450 & 190ns
Deadtime (typ.)	250 ns
Work Tem	-40 ~150 °C

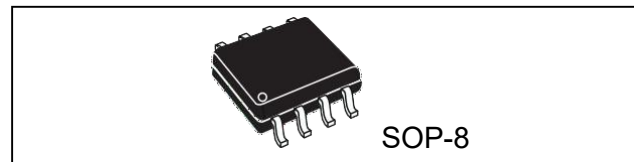
Key Features

- Floating channel designed for bootstrap operation
- Fully operational to +300V
- Tolerant to negative transient voltage dV/dt immune
- Gate drive supply range from 9 to 20V
- Undervoltage lockout
- 3.3V, 5V and 15V input logic compatible
- Cross-conduction prevention logic
- Matched propagation delay for both channels

Applications

- Home appliances
- Industrial applications and drives
- Motor drivers
- DC, AC, PMDC and PMAC motors
- Induction heating
- HVAC

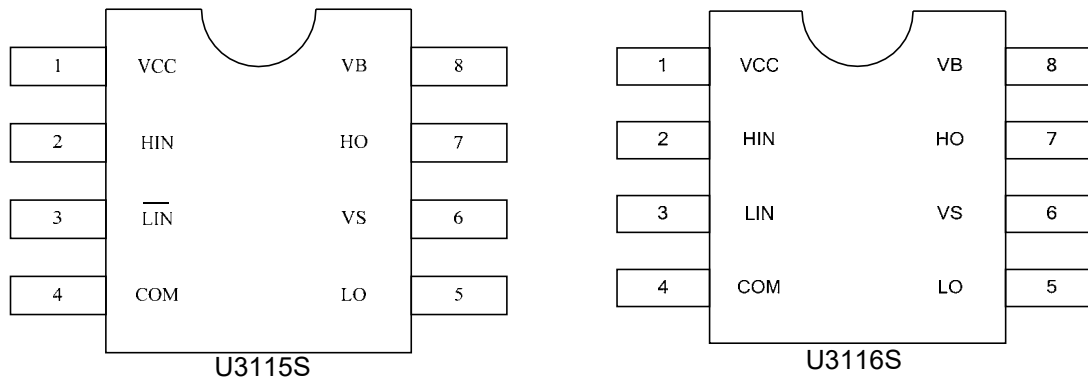
Packages



Products Information

Base Part Number	Package Type	Standard OUT		V_{OFFSET}	Logic Control
		IO+	IO-		
U3115S	SOP8	1.2A	1.5A	300V	HIN & $\overline{\text{LIN}}$
U3116S	SOP8	1.2A	1.5A	300V	HIN & LIN

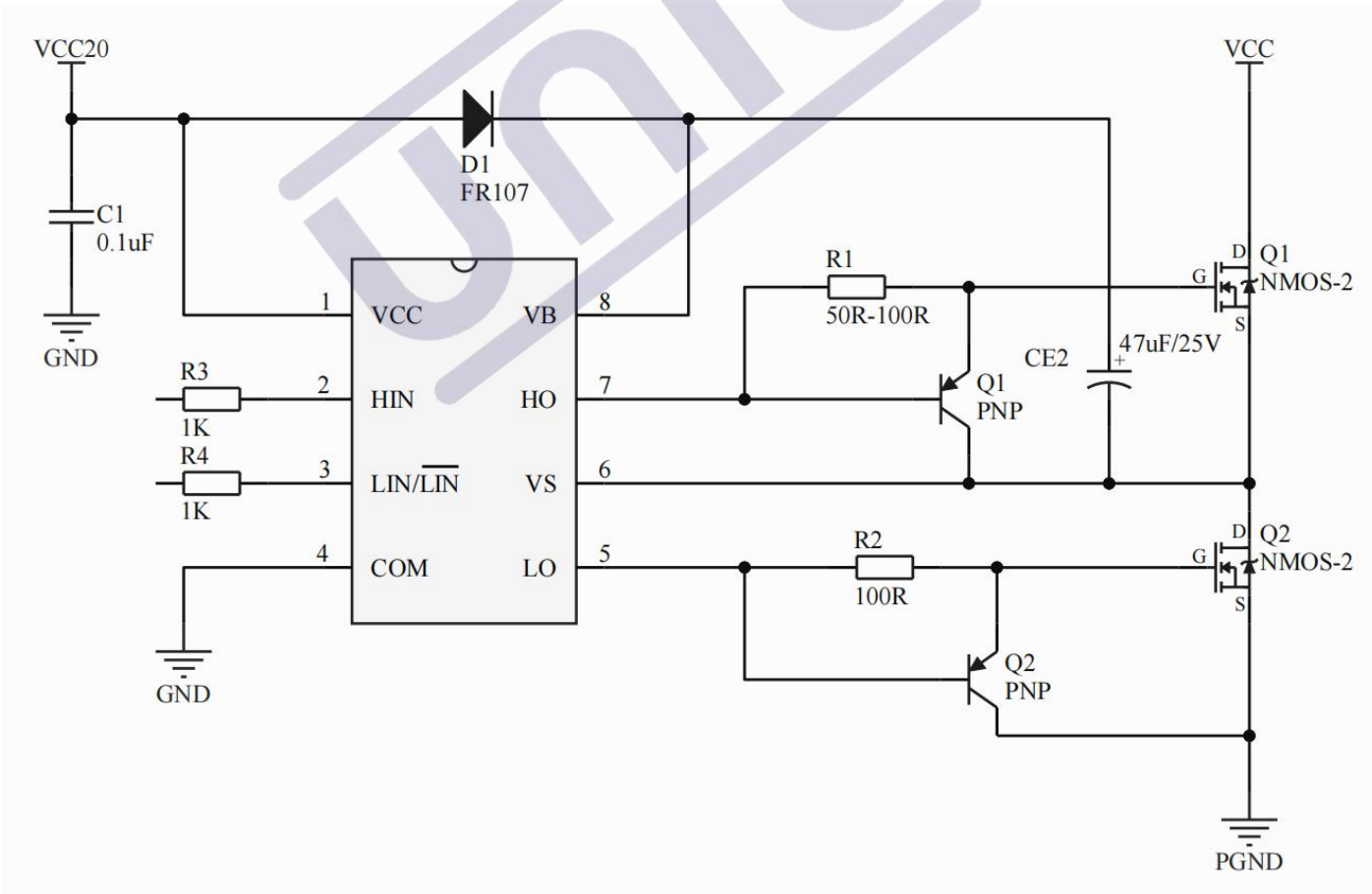
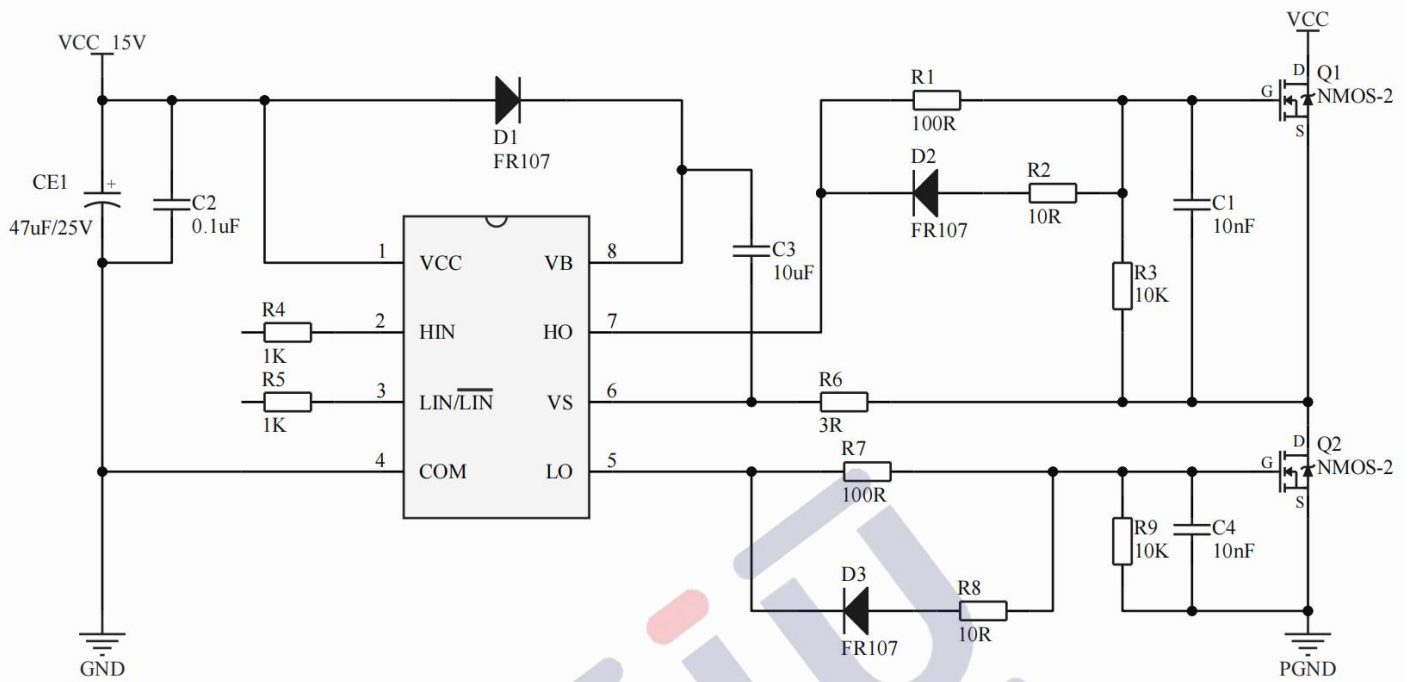
Pin Assignments



Pin Function

Number	Symbol	Type	Description
1	VCC	P	Low side and logic fixed supply
2	HIN	I	High-side driver logic input (active high)
3	LIN	I	Low side-driver logic input (active high)
	$\overline{\text{LIN}}$	I	Low side-driver logic input (active low)
4	COM	P	Low side return
5	LO	O	Low side gate drive output
6	VS	P	High side floating supply return
7	HO	O	High side gate drive output
8	VB	P	High side floating supply

Typical Connection



Much Big POWER application

Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. 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.

Symbol	Definition	Min.	Max.	Units
VB	High side floating absolute voltage	-0.3	325	V
VS	High side floating supply offset voltage	VB-25	VB+0.3	
VHO	High side floating output voltage	VS-0.3	VB+0.3	
VLO	Low side output voltage	-0.3	Vcc+0.3	
Vcc	Low side and logic fixed supply voltage	-0.3	25	
VIN	Logic input voltage (HIN & LIN)	-0.3	Vcc+0.3	
dVS/dt	Allowable offset supply voltage transient	—	55	V/ns
PD	Package power dissipation @ TA≤+25°C , DIP-8	—	1	W
	Package power dissipation @ TA≤+25°C , SOIC-8	—	0.625	
RthJA	Thermal resistance, junction to ambient , DIP-8	—	125	°C/W
	Thermal resistance, junction to ambient , SOIC-8	—	200	
TJ	Junction temperature	-35	150	°C
TS	Storage temperature	-55	150	
TL	Lead temperature (soldering, 10 seconds)	—	300	

Recommended Operating Conditions

The Input/Output logic timing diagram is shown in Figure 1. For proper operation the device should be used within the recommended conditions. The VS offset rating is tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
VB	High side floating supply absolute voltage	VS + 9	VS + 20	V
VS	High side floating supply offset voltage	-6(Note1)	200	
VHO	High side floating output voltage	VS	VB	
VLO	Low side output voltage	0	VCC	
VCC	Low side and logic fixed supply voltage	9	20	
VIN	Logic input voltage (HIN&LIN)	0	VCC	
TA	Ambient temperature	-40	125	°C

Note1:Logic operational for VS of -6 to +200V.Logic state held for VS of -6V to -VBS.

Dynamic Electrical Characteristics

$V_{BIAS} (V_{CC}, V_{BS}) = 12V$, Typical Connection Figure 1 and $T_A = 25^\circ C$ unless otherwise specified.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
t_{on}	Turn-on propagation delay	—	450	530	ns	$V_S = 0V$
t_{off}	Turn-off propagation delay	—	190	230		$V_S = 90V$
t_r	Turn-on rise time	—	600	750		
t_f	Turn-off fall time	—	190	300		
DT	Deadtime, LS turn-off to HS turn-on & HS turn-on to LS turn-off	200	250	320		
MT	Delay matching, HS & LS turn-on/off	—	—	60		

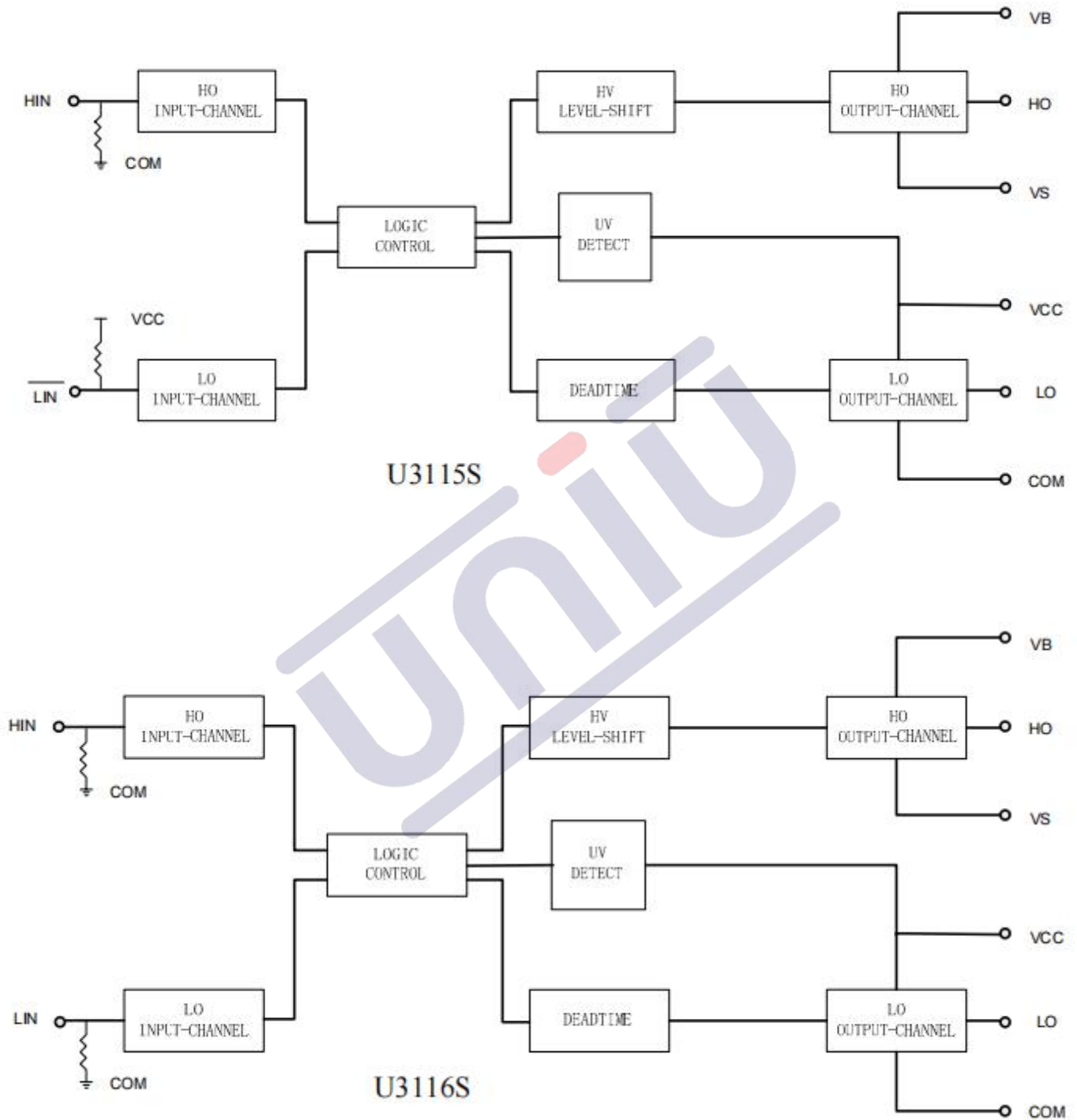
Electrical Characteristic

$V_{CC} = V_{BS} = V_{BIAS} = 15V$ $T_A = 25^\circ C$ unless otherwise specified.

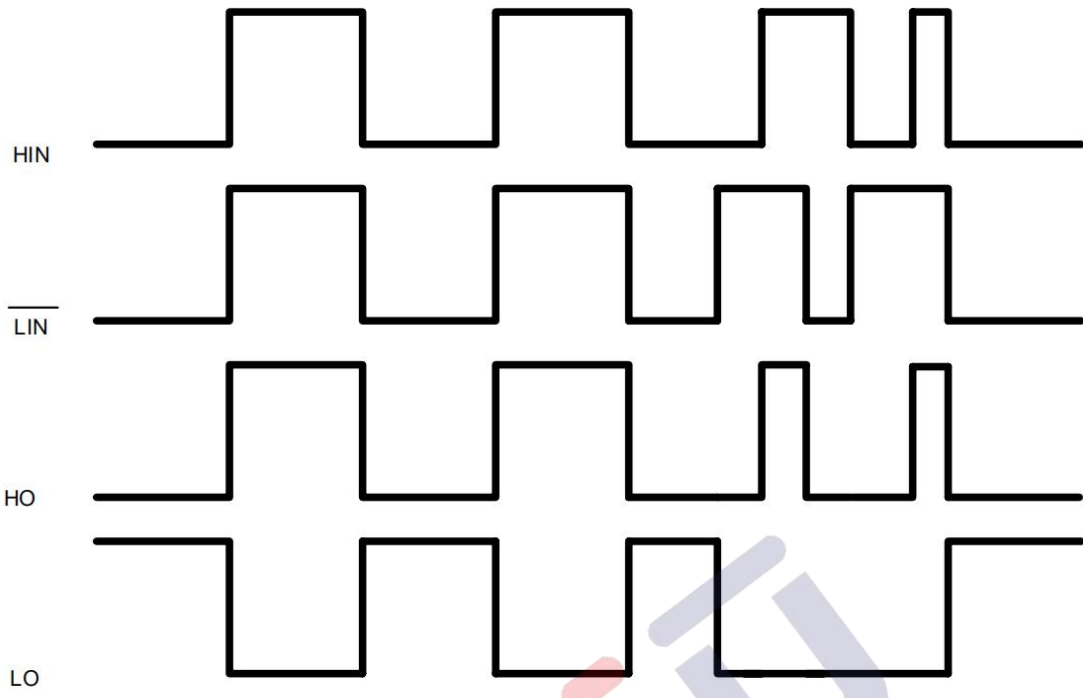
Symbol	Definition	Min	Typ	Max	Units	Test Conditions
Low Side Power Supply Characteristics						
V_{CCUV+}	VCC supply under-voltage positive going threshold (U3115S)	8.6	9.4	10.2	V	
V_{CCUV-}	VCC supply under-voltage negative going threshold (U3115S)	8.0	8.8	9.6		
V_{CCHYS}	VCC supply under-voltage lockout hysteresis (U3115S)	0.4	0.6	—		
V_{CCUV+}	VCC supply under-voltage positive going threshold (U3116S)	6.4	7.2	8.0		
V_{CCUV-}	VCC supply under-voltage negative going threshold (U3116S)	6.0	6.8	7.6		
V_{CCHYS}	VCC supply under-voltage lockout hysteresis (U3116S)	0.3	0.4	—		
High Side Floating Power Supply Characteristics						
V_{BSUV+}	High side VBS supply under-voltage positive going threshold (U3115S)	5.8	6.6	7.4	V	
V_{BSUV-}	High side VBS supply under-voltage negative going threshold (U3115S)	5.2	6.0	6.8		
$V_{BSUVHYS}$	High side VBS supply under-voltage lockout hysteresis ⁶ (U3115S)	0.4	0.6	—		
V_{BSUV+}	High side VBS supply under-voltage positive going threshold (U3116S)	5.6	6.4	7.2		
V_{BSUV-}	High side VBS supply under-voltage negative going threshold (U3116S)	5.2	6.0	6.8		
$V_{BSUVHYS}$	High side VBS supply under-voltage lockout hysteresis ⁶ (U3116S)	0.3	0.4	—		
IQCC	Quiescent VCC supply current	—	300	500	uA	$V_{in} = 0V$ or $5V$
IQBS	Quiescent VBS supply current	—	100	200		$V_{in} = 0V$ or $5V$

ILK	Offset supply leakage current	—	—	50	uA	$V_B = V_S = 90V$
VIH	Logic "1" (HO) & Logic "0" (LO) input voltage	2.5	—	—	V	$V_{CC} = 10V \text{ to } 20V$
VIL	Logic "0" (HO) & Logic "1" (LO) input voltage	—	1.6	—		$V_{CC} = 10V \text{ to } 20V$
IIN+	Logic "1" input bias current	—	3	10	uA	$V_{IN} = 5V \ L_{IN} = 0V$
IIN-	Logic "0" input bias current	—	—	1		$V_{IN} = 5V \ L_{IN} = 0V$
VOH	High level output voltage, $V_{BIAS} - V_O$	—	—	100	mV	$I_o = 0A$
VOL	Low level output voltage, V_O	—	—	100		$I_o = 0A$
IO+	Output high short circuit pulsed current	—	1200	—	mA	$V_O = 0V \ V_{IN} = V_{IH}$ $PW = 10 \mu s$
IO-	Output low short circuit pulsed current	—	1500	—		

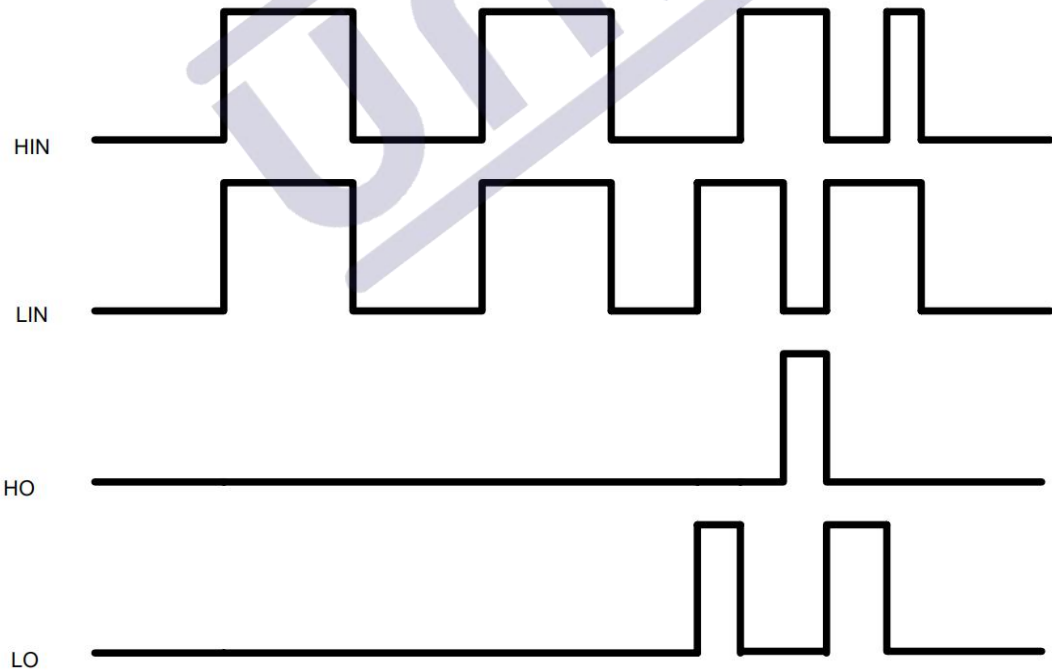
Block Diagram



Time waveform

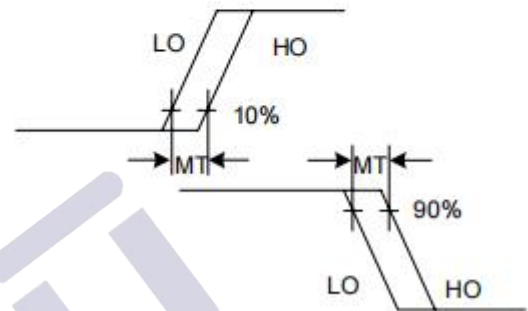
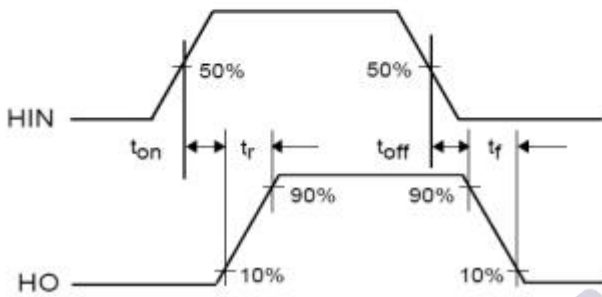
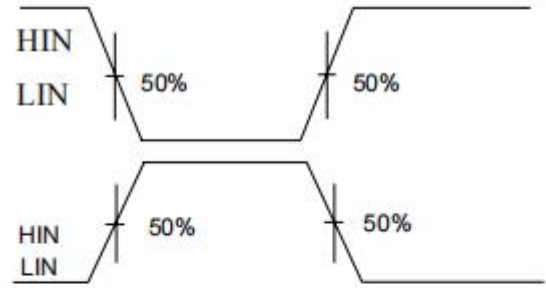
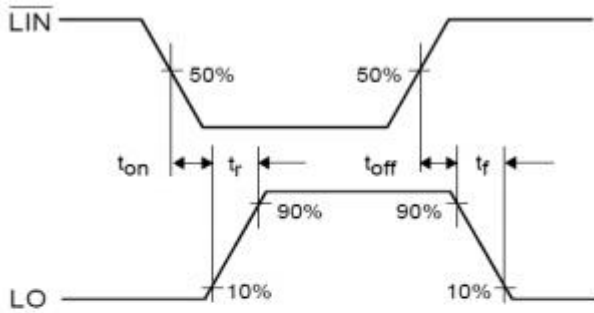


U3115S



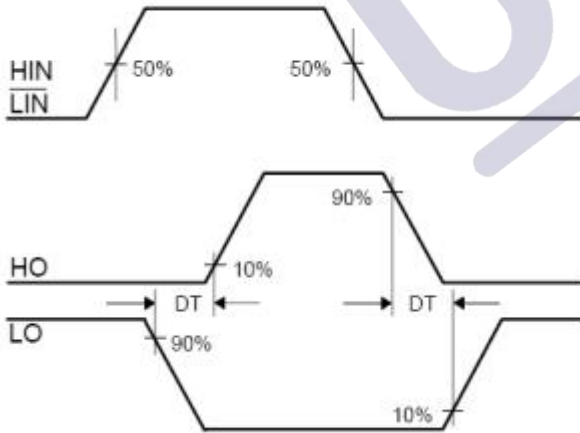
U3116S

Time waveform



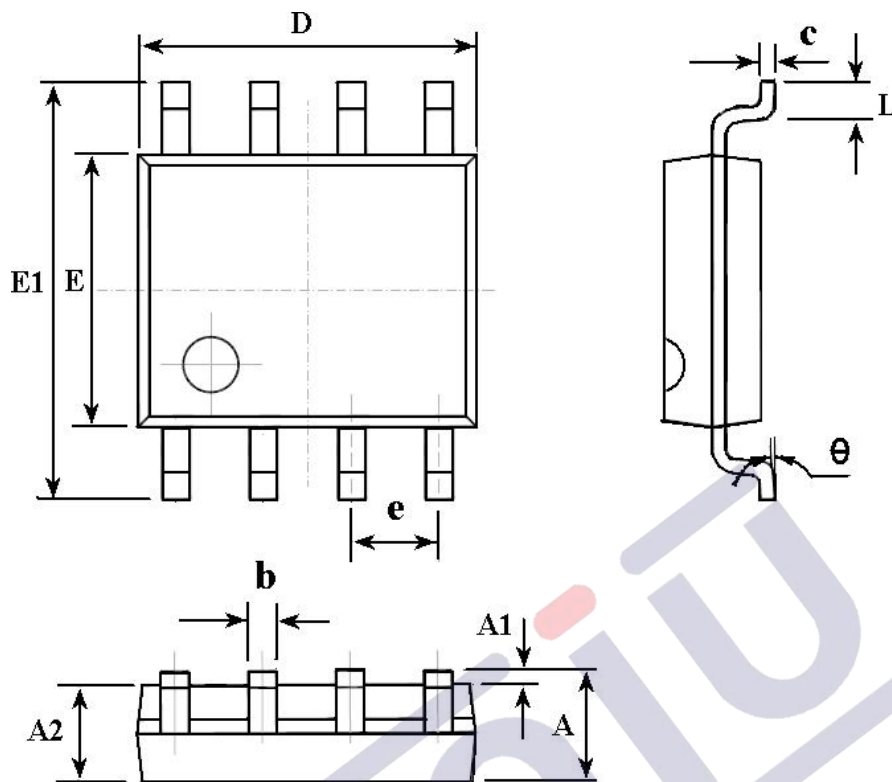
Switching Time Waveform Definitions

Deadtime Waveform Definitions



Delay matching time Definitions

Packaging information SOP8



Symbol	Dimensions In Millimeters	
	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.330	0.510
c	0.170	0.250
D	4.700	5.100
E	3.800	4.000
E1	5.800	6.200
e	1.270(BSC)	
L	0.400	1.270
θ	0°	8°

1.版本记录

DATE	REV.	DESCRIPTION
2018/04/19	1.0	First Release
2019/05/21	2.0	Change the package
2021/10/18	3.0	Layout adjustment
2022/11/07	3.1	Change the Logo

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