



ZHEJIANG UNIU-NE Technology CO., LTD

浙江宇力微新能源科技有限公司



## U3115C-6C Data Sheet

V 1.2

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## Half-bridge of power MOSFET/IGBT Drive

### General Description

The U3115C/U3116C Fully operated to +350V 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 350 volts.

### Product Summary

V <sub>OFFSET</sub>	350V
I <sub>O+/-</sub>	1.0A / 1.2A
V <sub>CCon/off</sub> (typ.)	4.5V & 4.2V
V <sub>Bon/off</sub> (typ.)	5V & 4.9V
t <sub>on/off</sub> (typ.)	450 & 150ns
Deadtime (typ.)	300 ns
Work Tem	-40 ~150 °C

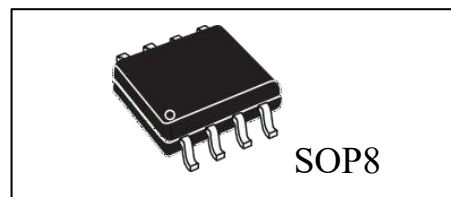
### Key Features

- Integrated bootstrap Diode<sup>(1)</sup>
- Floating channel designed for bootstrap operation
- Fully operational to +350V
- Tolerant to negative transient voltage dV/dt immune
- Gate drive supply range from 5 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 Converter, PMDC and PMAC motors
- Induction heating
- HVAC

### Packages

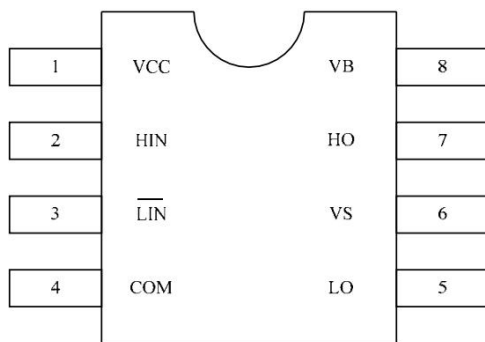


### Product information

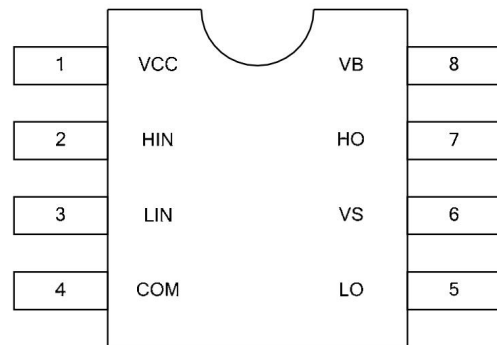
Base Part Number	Package Type	Standard OUT		V <sub>OFFSET</sub>	Logic Control
		IO+	IO-		
U3115C	SOP8	1.0A	1.2A	350V	HIN & $\overline{\text{LIN}}$
U3116C	SOP8	1.0A	1.2A	350V	HIN & LIN

Note: (1) When using internal diode bootstrap power supply, please match the capacitor and MOS, and fully test and verify

## Pin Assignments



U3115C

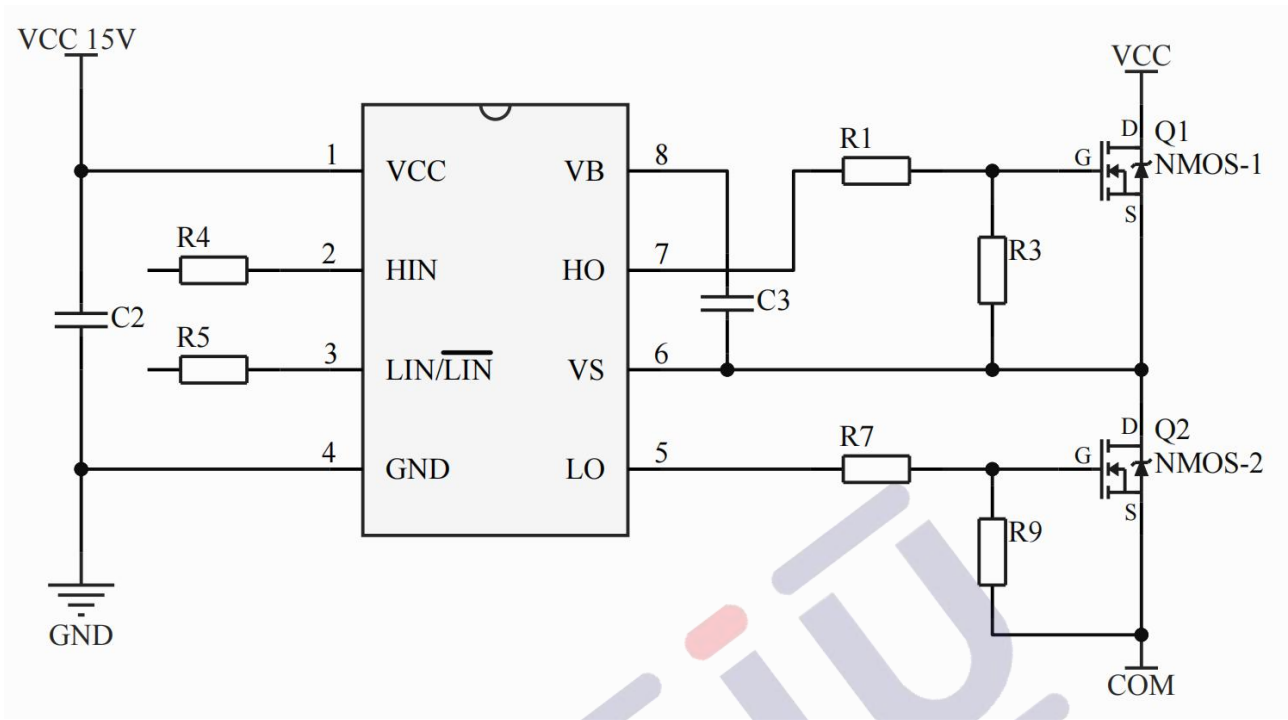


U3116C

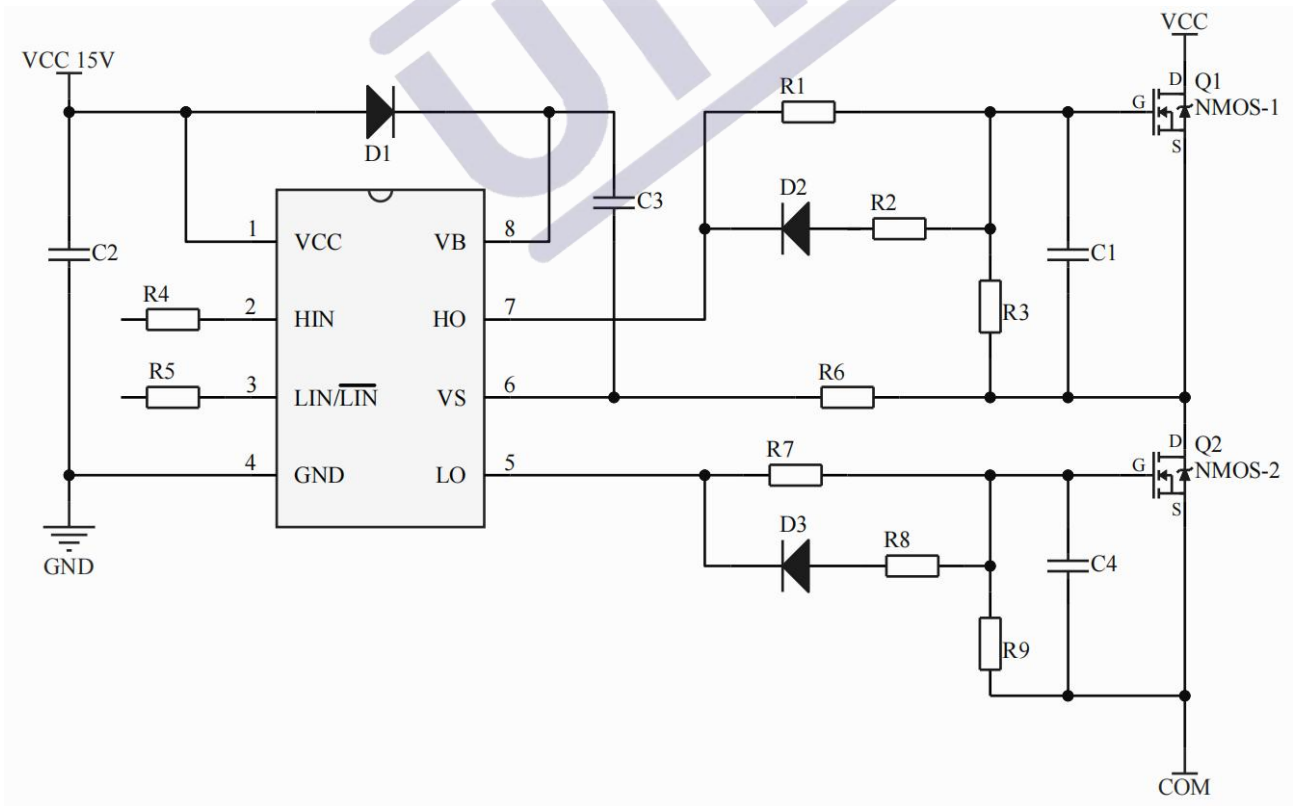
## Pin Function

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

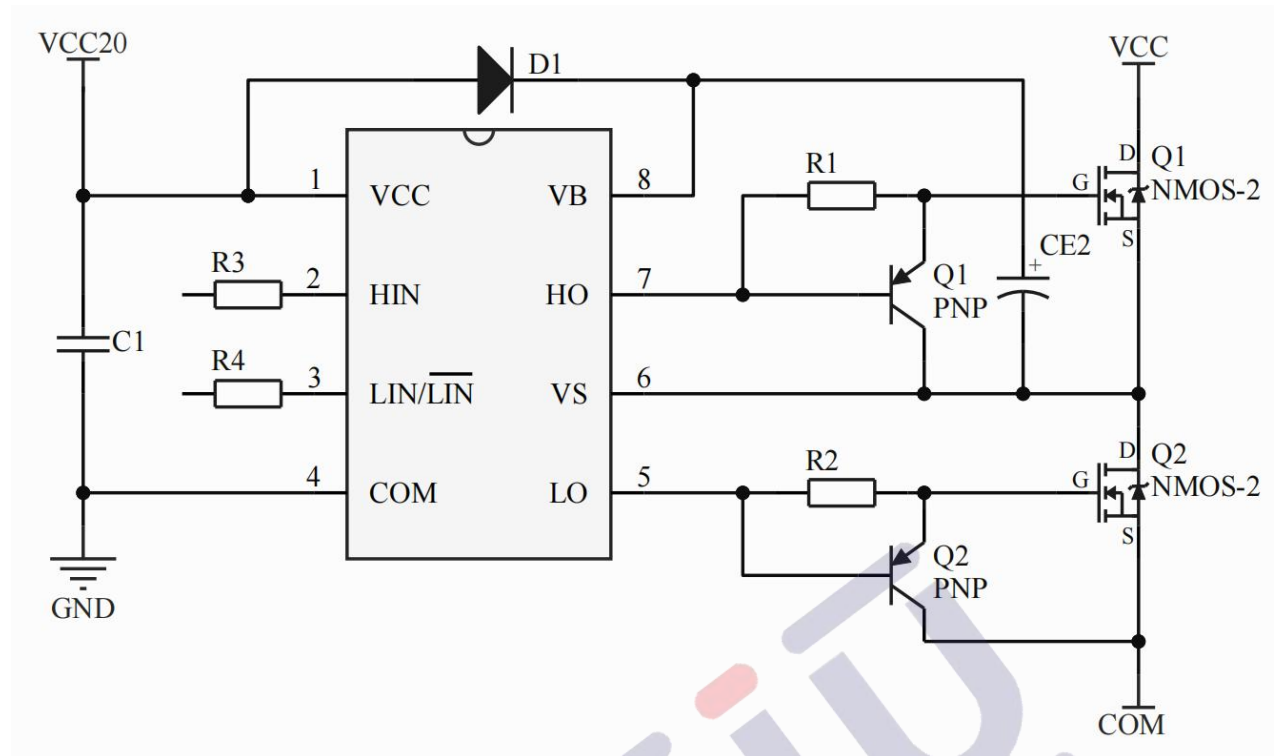
### Typical Connection



Small power application



Typical application



Much Big POWER application

**Note:** The above circuits and parameters are for reference only. The actual application circuit should be designed with the measured results in setting the parameters

## 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	365	V
VS	High side floating supply offset voltage	VB-15	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	20	
VIN	Logic input voltage (HIN & LIN )	-0.3	Vcc+0.3	
dVS/dt	Allowable offset supply voltage transient	-	55	
PD	Package power dissipation @ TA≤+25°C , SOIC-8	-	0.625	W
RthJA	Thermal resistance, junction to ambient , SOIC-8	-	200	°C/W
TJ	Junction temperature	-35	150	°C
TS	Storage temperature	-55	175	
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 + 5	VS + 20	V
VS	High side floating supply offset voltage	-5	350	
VHO	High side floating output voltage	VS	VB	
VLO	Low side output voltage	0	VCC	
VCC	Low side and logic fixed supply voltage	5	20	
VIN	Logic input voltage (HIN&LIN )	0	VCC	
TA	Ambient temperature	-40	150	

## Dynamic Electrical Characteristics

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

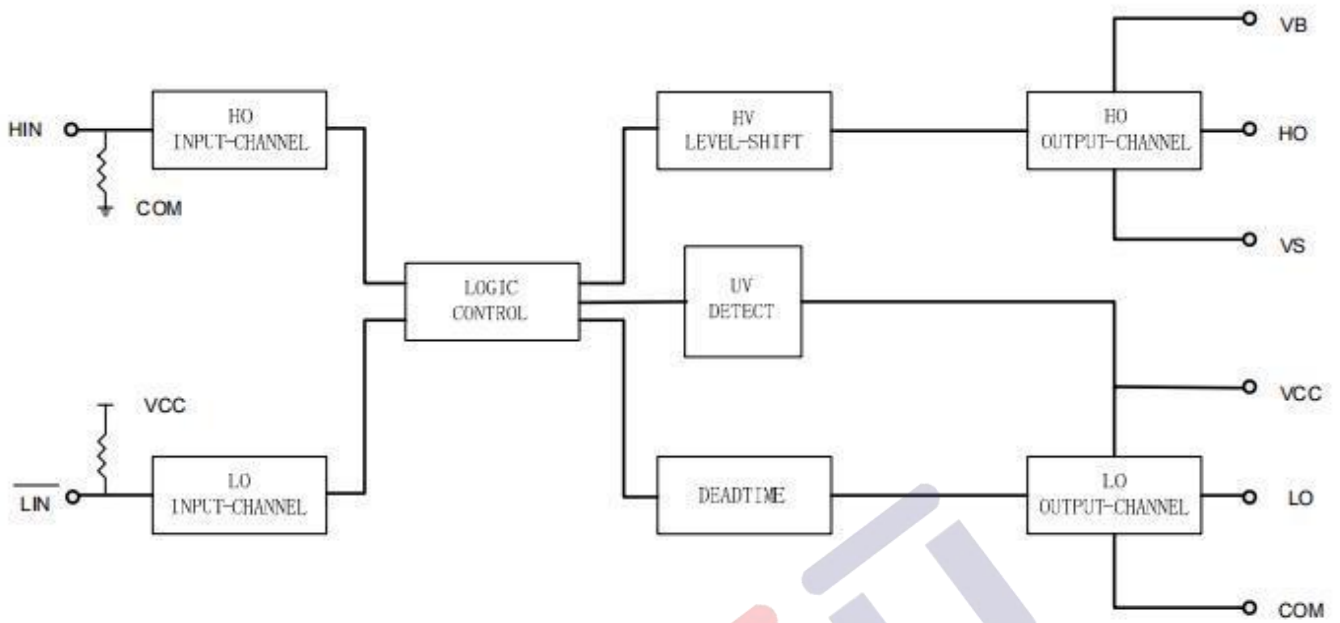
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
ton	Turn-on propagation delay	—	450	550	ns	VS = 0V
toff	Turn-off propagation delay	—	150	250		VS = 90V
tr	Turn-on rise time	—	50	75		
tf	Turn-off fall time	—	25	50		
DT	Deadtime, LS turn-off to HS turn-on & HS turn-on to LS turn-off	240	300	360		
MT	Delay matching, HS & LS turn-on/off	—	—	60		

## Electrical Characteristic

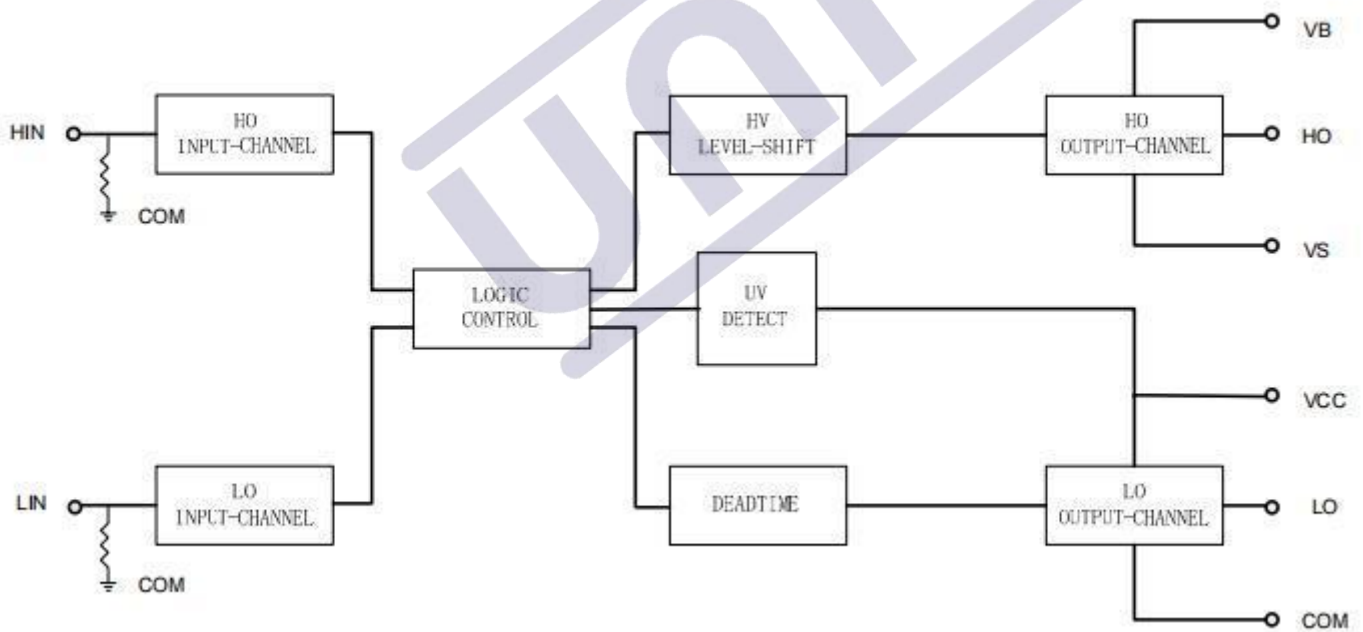
$V_{CC} = V_{BS} = V_{BIAS} = 15V$ ,  $T_A = 25^\circ C$ , unless otherwise specified.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
<b>Low Side Power Supply Characteristics</b>						
$V_{CCUV+}$	VCC supply under-voltage positive going threshold	—	4.5	5.4	V	
$V_{CCUV-}$	VCC supply under-voltage negative going threshold	—	4.2	5.1		
$V_{CCHYS}$	VCC supply under-voltage lockout hysteresis	-	0.3	—		
<b>High Side Floating Power Supply Characteristics</b>						
$V_{BSUV+}$	High side VBS supply under-voltage positive going threshold	—	5.0	5.6	V	
$V_{BSUV-}$	High side VBS supply under-voltage negative going threshold	—	4.9	5.5		
$V_{BSUVHS}$	High side VBS supply under-voltage lockout hysteresis	-	0.1	—		
IQCC	Quiescent VCC supply current	—	70	—	uA	$V_{IN} = 0V$ or $5V$
IQBS	Quiescent VBS supply current	—	20	—		$V_{IN} = 0V$ or $5V$
ILK	Offset supply leakage current	-	-	30		$V_B = V_S = 90V$
$V_{IH}$	Logic "1" (HO) & Logic "0" (LO) input voltage	2.5	-	-	V	$V_{CC} = 5V$ to $20V$
$V_{IL}$	Logic "0" (HO) & Logic "1" (LO) input voltage	-	1.6	-		$V_{CC} = 5V$ to $20V$
IIN+	Logic "1" input bias current	-	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	-	1000	-	mA	$V_O = 0V$ , $V_{IN} = V_{IH}$
IO-	Output low short circuit pulsed current	-	1200	-		$PW \leq 10 \mu s$

### Block Diagram



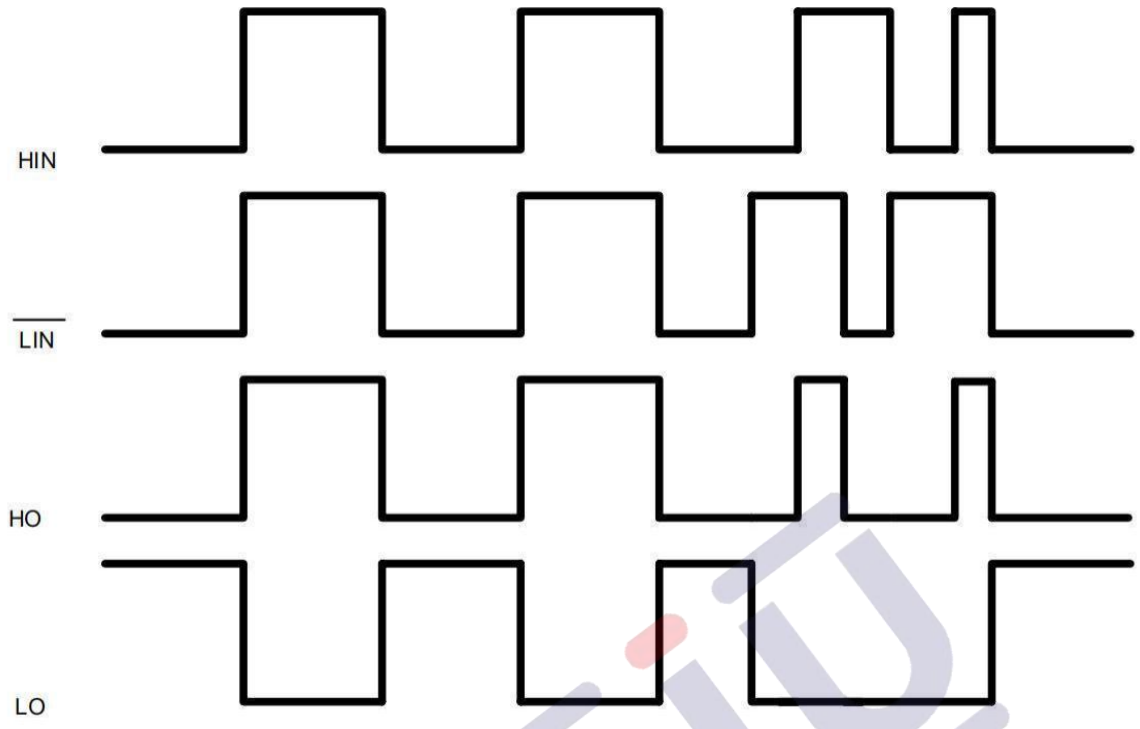
U3115C



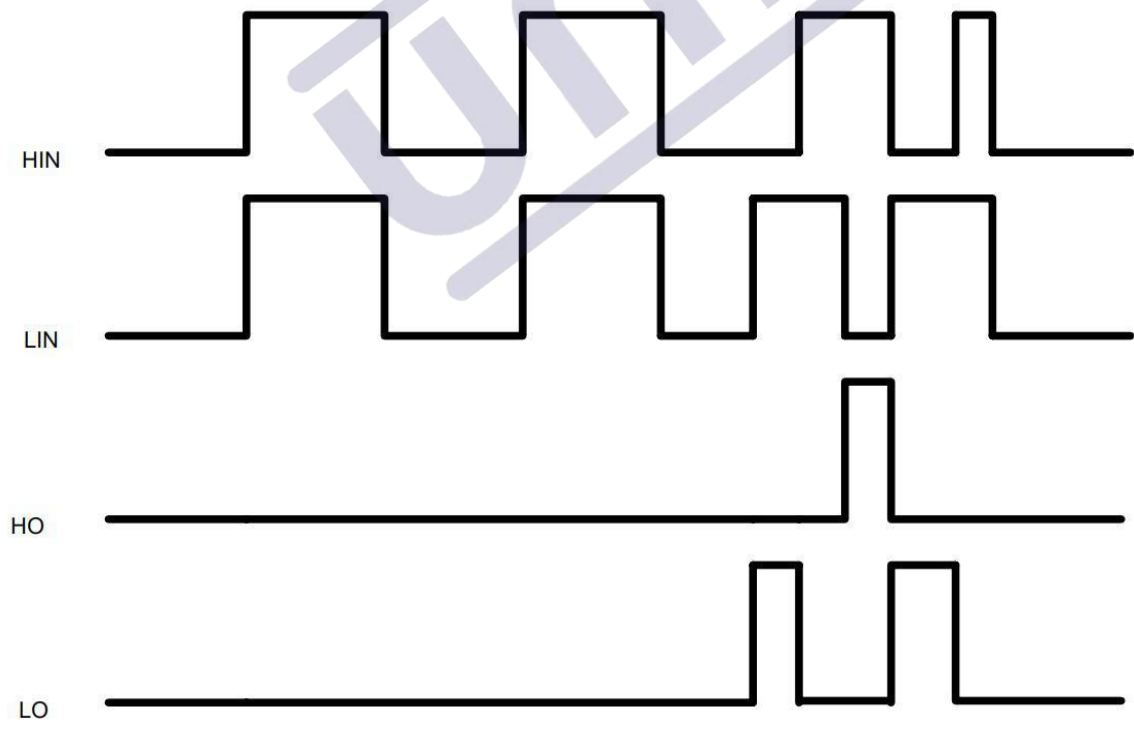
U3116C



### Time waveform

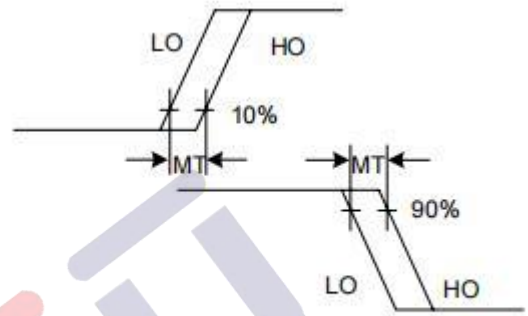
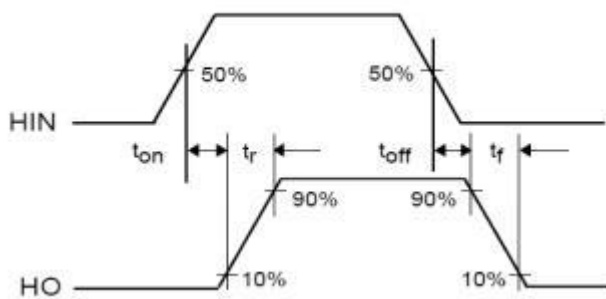
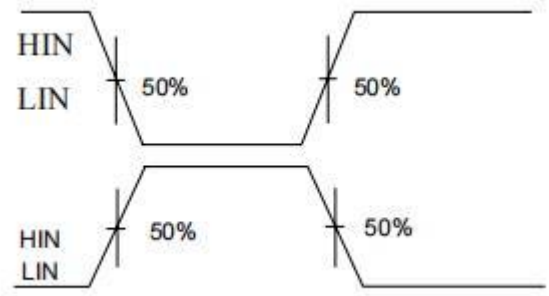
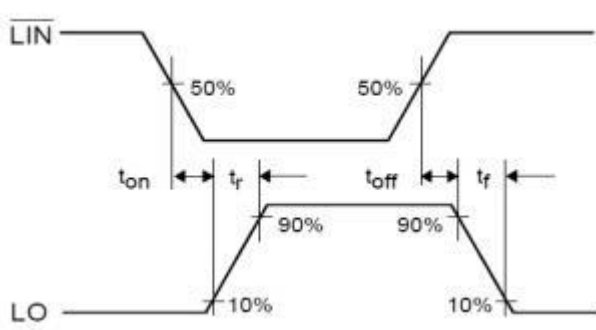


U3115C



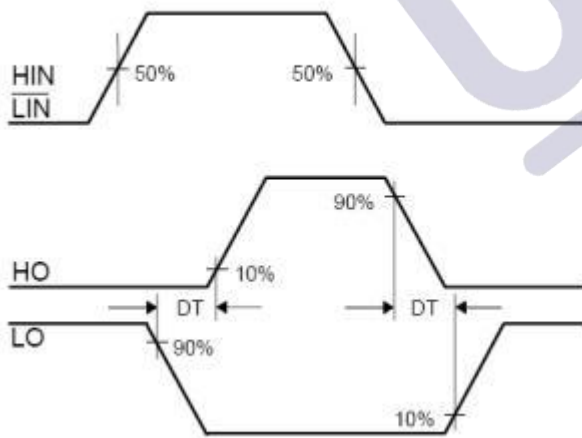
U3116C

**Time waveform**



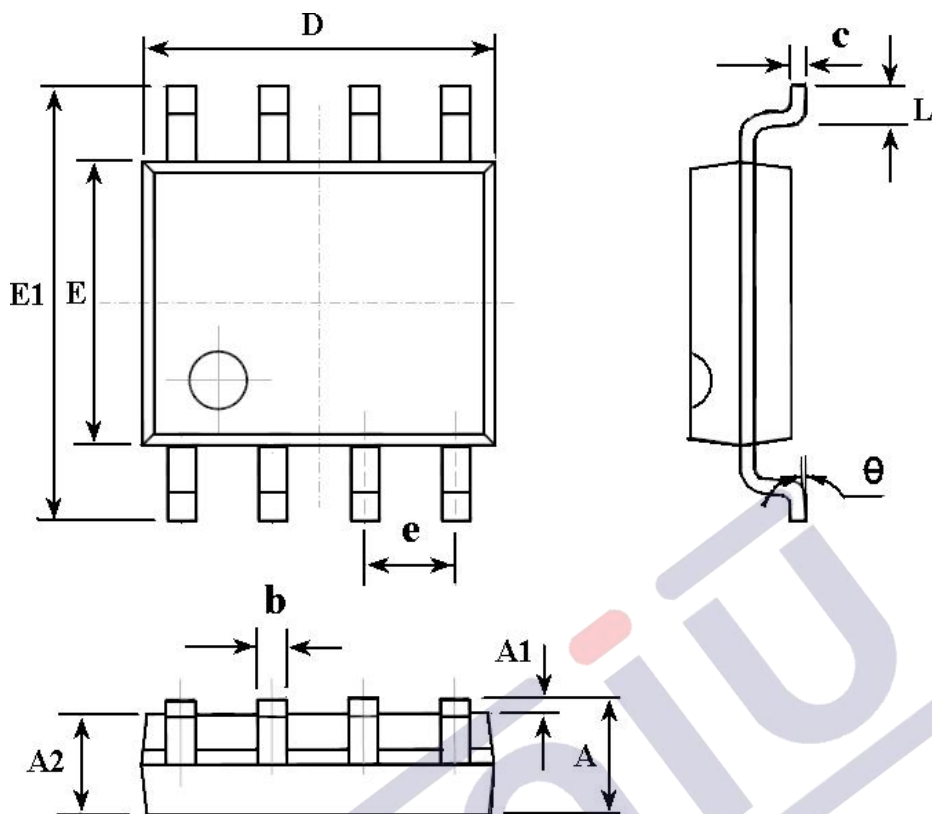
Switching Time Waveform Definitions

Delay matching time Definitions



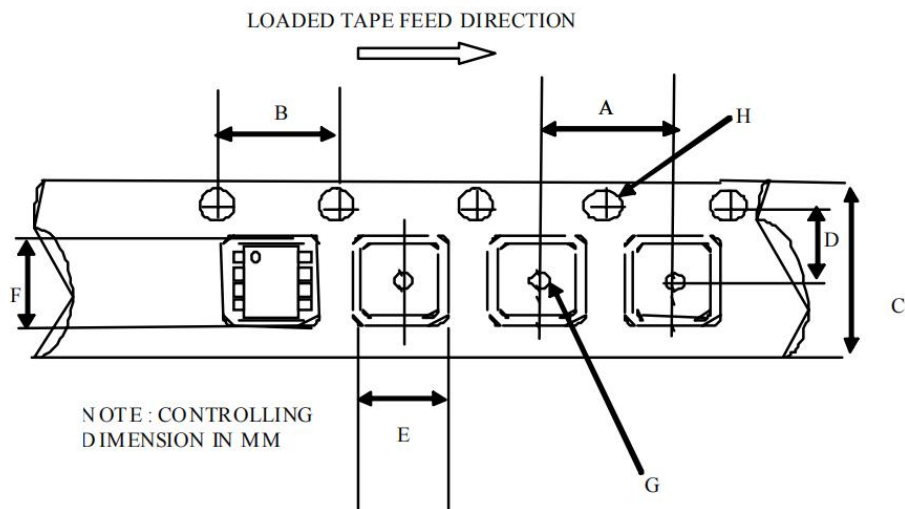
Deadtime Waveform Definitions

## Packaging information SOP8



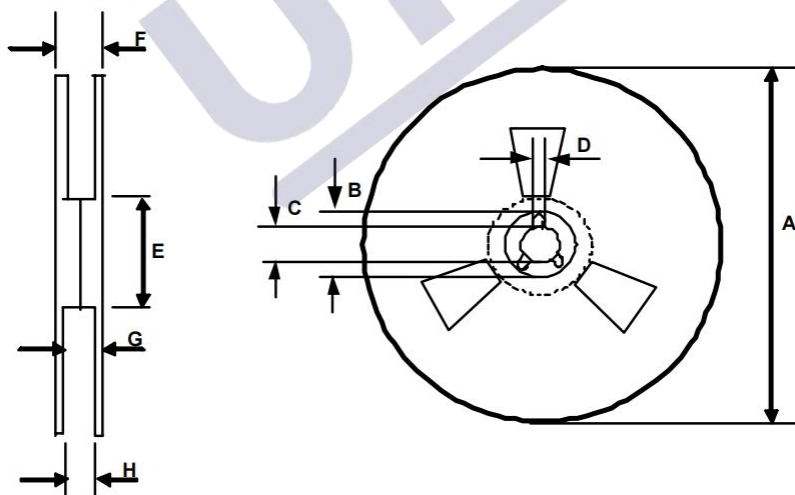
Symbol	Dimensions In Millimeters	
	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.330	0.510
c	0.170	0.250
D	4.700	5.100
E	3.800	4.000
E1	5.800	6.200
e	1.270(BSC)	
L	0.400	1.270
$\theta$	0°	8°

### Tape & Reel SOP8



CARRIER TAPE DIMENSION FOR 8SOP

Code	Metric		Imperial	
	Min	Max	Min	Max
A	7.90	8.10	0.311	0.318
B	3.90	4.10	0.153	0.161
C	11.70	12.30	0.46	0.484
D	5.45	5.55	0.214	0.218
E	6.30	6.50	0.248	0.255
F	5.10	5.30	0.200	0.208
G	1.50	n/a	0.059	n/a
H	1.50	1.60	0.059	0.062



REEL DIMENSIONS FOR 8SOP

Code	Metric		Imperial	
	Min	Max	Min	Max
A	329.60	330.25	12.976	13.001
B	20.95	21.45	0.824	0.844
C	12.80	13.20	0.503	0.519
D	1.95	2.45	0.767	0.096
E	98.00	102.00	3.858	4.015
F	n/a	18.40	n/a	0.724
G	14.50	17.10	0.570	0.673
H	12.40	14.40	0.488	0.566

## 1、版本记录

DATE	REV.	DESCRIPTION
2020/04/19	1.0	首次发布
2023/07/10	1.1	优化延时、边沿时间及欠压保护
2023/10/25	1.2	增加内置二极管应用

## 2、免责声明

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## 3、联系我们

浙江宇力微新能源科技有限公司

总部地址：绍兴市越城区斗门街道袍渚路25号中节能科创园45幢4/5楼

电话：0575-85087896（研发部）

传真：0575-88125157

E-mail:htw@uni-semic.com

无锡地址：无锡市新吴区纺城大道299号深港都会广场9-1401

电话:0510-85297939

E-mail:zh@uni-semic.com

深圳地址：深圳市宝安区航城街道三围社区南昌路上合工业园B2栋501

电话：0755-84510976

E-mail:htw@uni-semic.com