ZHEJIANG UNIU-NE Technology CO.,LTD

浙 江 宇 力 微 新 能 源 科 技 有 限 公 司

U3115D-6D Data Sheet

V 1.1

Half-bridge of power MOSFET/IGBT Drive

General Description

The U3115D/U3116D 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 op-erates up to 350 volts.

Key Features

- Integrated bootstrap Diode(IF max 0.8A)
- 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

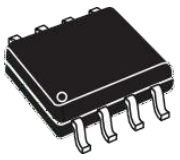
Applications

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

Product Summary

V_{OFFSET}	350V
I_O+/-	1.0A / 1.2A
$VCC_{on/off(typ.)}$	4.5V & 4.2V
$VB_{on/off\ (typ.)}$	5V & 4.9V
ton/off (typ.)	450 & 150ns
Deadtime (typ.)	300 ns
Work Tem	-40 ~150 °C

Pakeages

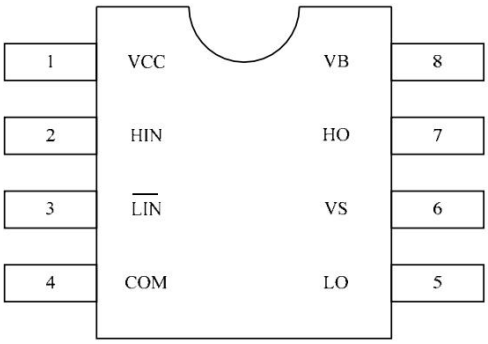


SOP8

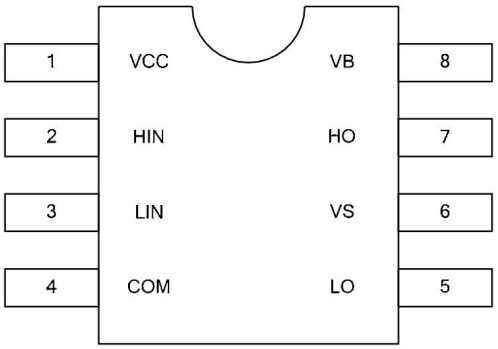
Product information

Base Part Number	Package Type	Standard OUT		VOFFSET	Logic Control
		IO+	IO-		
U3115D	SOP8	1.0A	1.2A	350V	HIN & $\overline{\text{LIN}}$
U3116D	SOP8	1.0A	1.2A	350V	HIN & LIN

Pin Assignments



U3115D

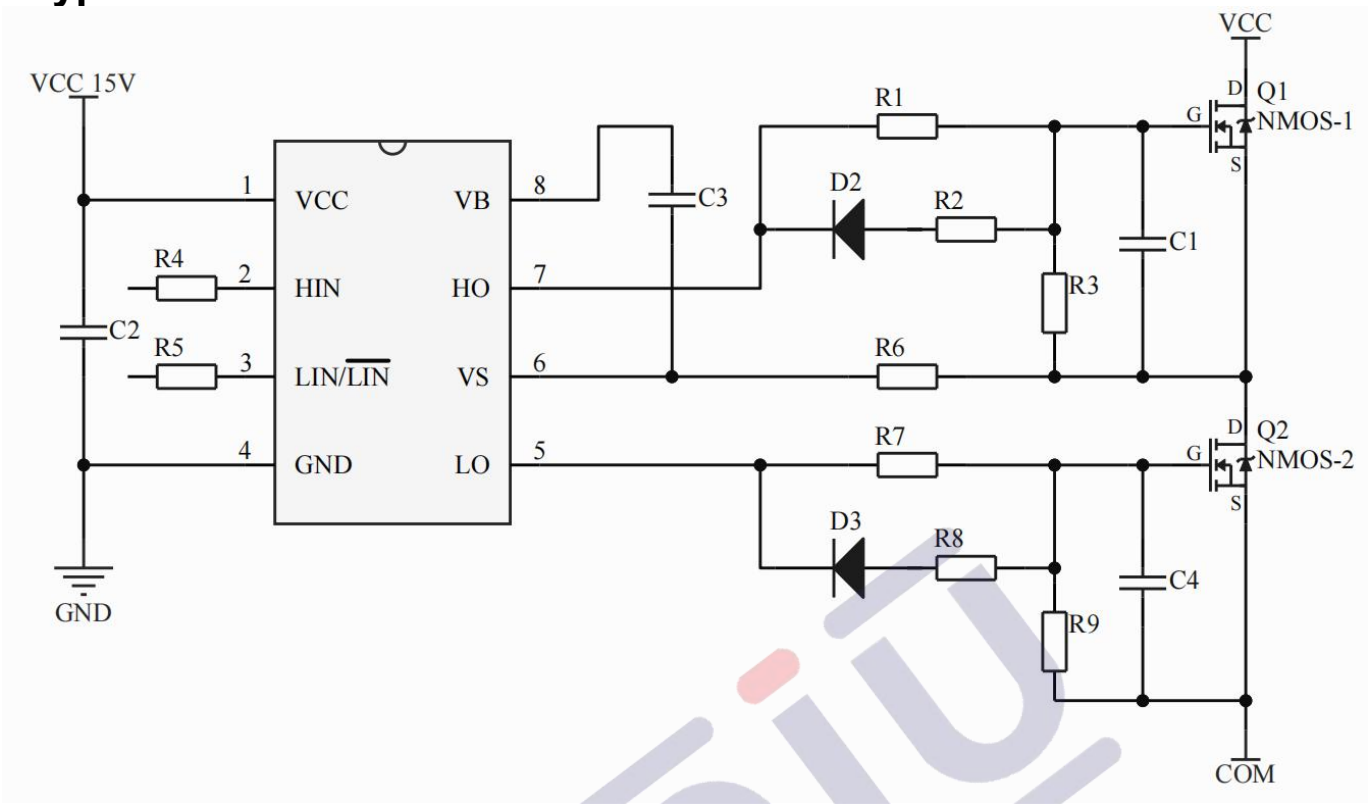


U3116D

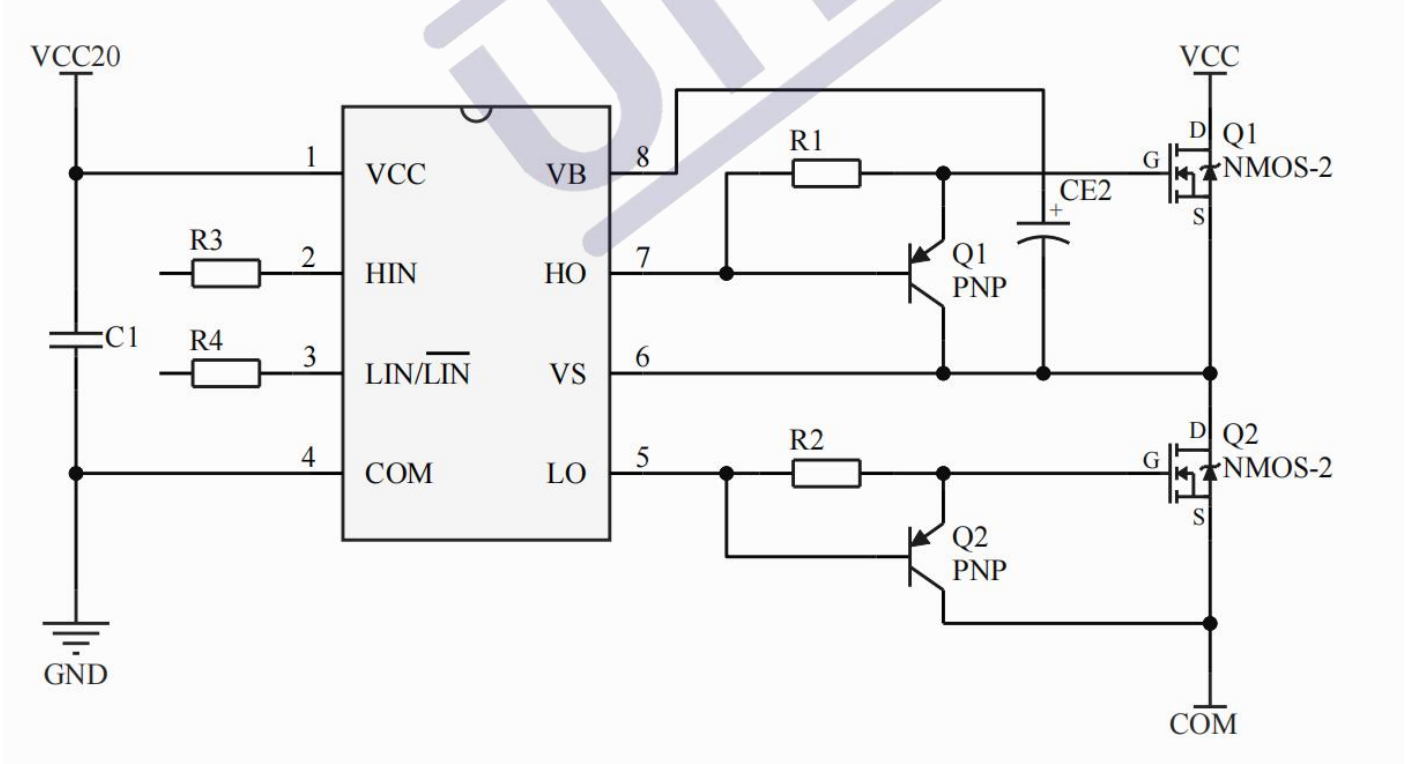
Pin Function

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



Typical application



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	375	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，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	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 + 5	VS + 20	V
VS	High side floating supply offset voltage	-6(Note1)	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	°C

Note1:Logic operational for VS of -6 to +350V.Logic state held for VS of -6V to -VBS.

Dynamic Electrical Characteristics

$V_{BIAS\ (VCC,\ VBS)}$ = 12V, Typical Connection Figure 1 and TA = 25°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		

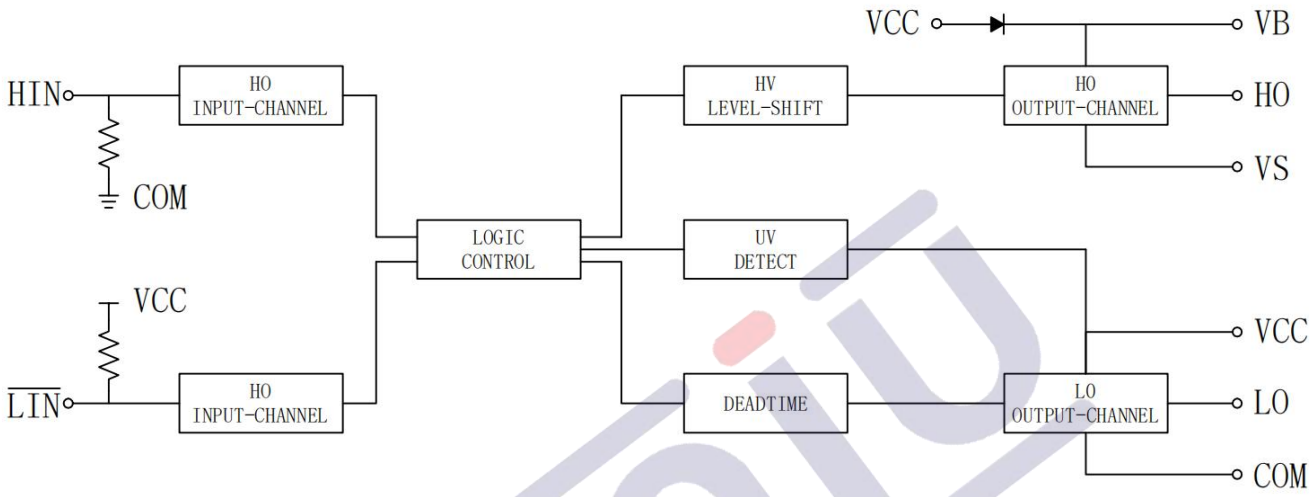
Electrical Characteristic

V_{CC} = V_{BS} = V_{BIAS} = 15V， T_A = 25°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	—	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	—		
High Side Floating Power Supply Characteristics						
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		VB =VS =90V
VIH	Logic “1” (HO) & Logic “0” (LO) input voltage	2.5	-	-	V	VCC=5V to 20V
VIL	Logic “0” (HO) & Logic “1” (LO) input voltage	-	1.6	-		VCC=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, VBIAS - VO	-	-	100	mV	Io = 0A
VOL	Low level output voltage, VO	-	-	100		Io =0A
IO+	I_F =0.5 A	-	1000	-	mA	VO= 0V, V_{IN} = V_{IH} PW ⩽10 us
IO-	I_F =0.5 A	-	1200	-		

Diode Characteristics						
IF(AV)	Average forward current	-	-	0.8	A	
V_{BR}	Reverse breakdown voltage	-	450	-	v	IR = 0.1mA
V_F	Maximum forward voltage drop	-	1.2V	-	v	IF =0.5 A

Block Diagram



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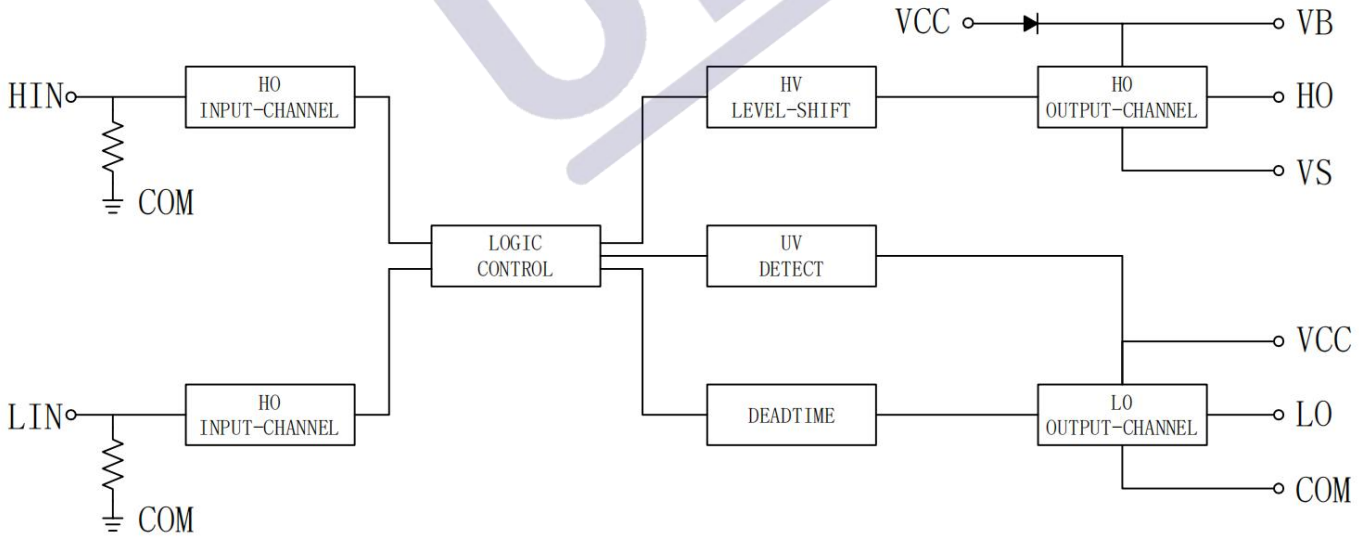

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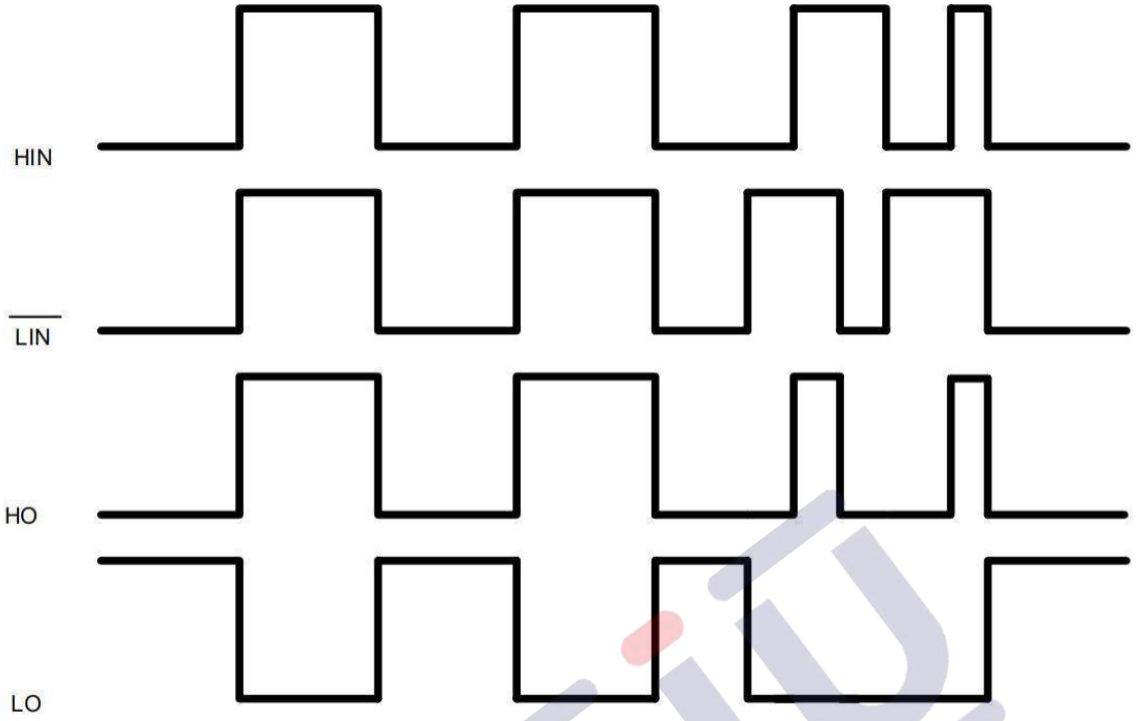
Time waveform



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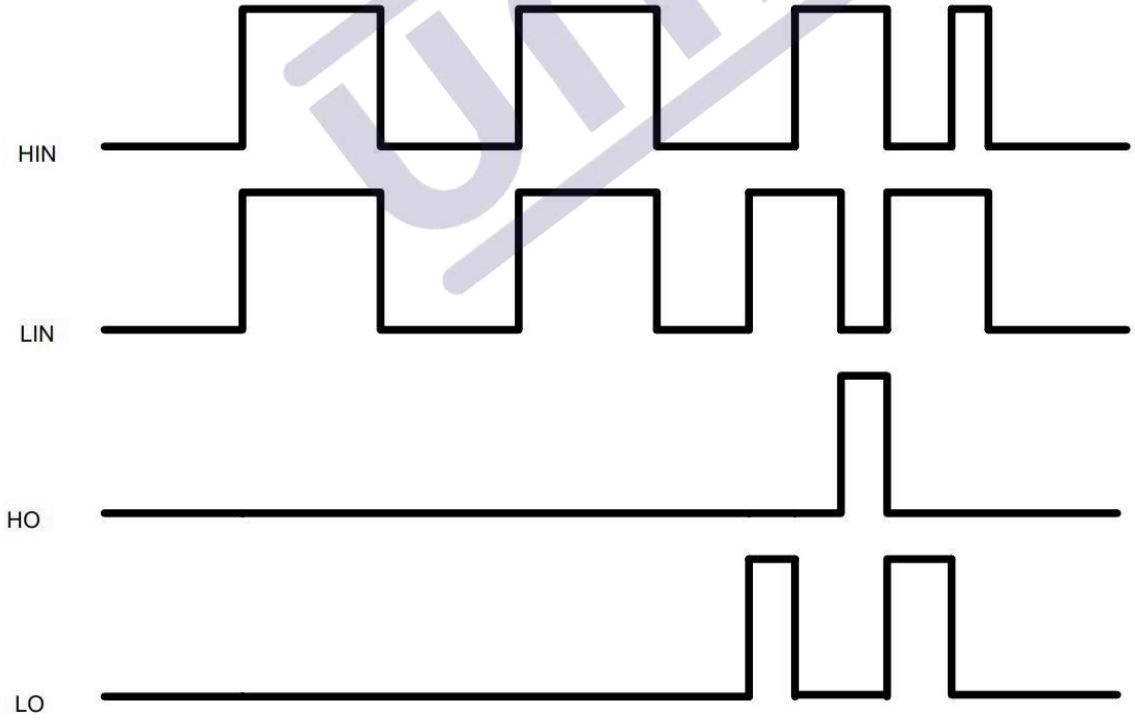

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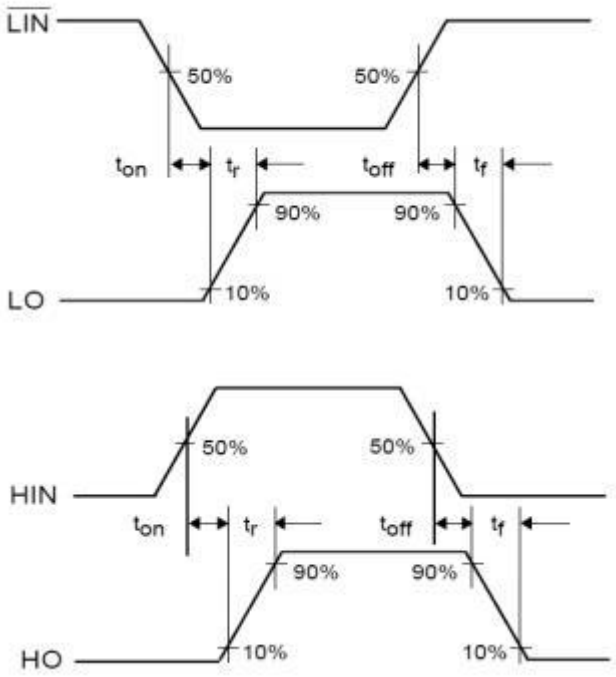
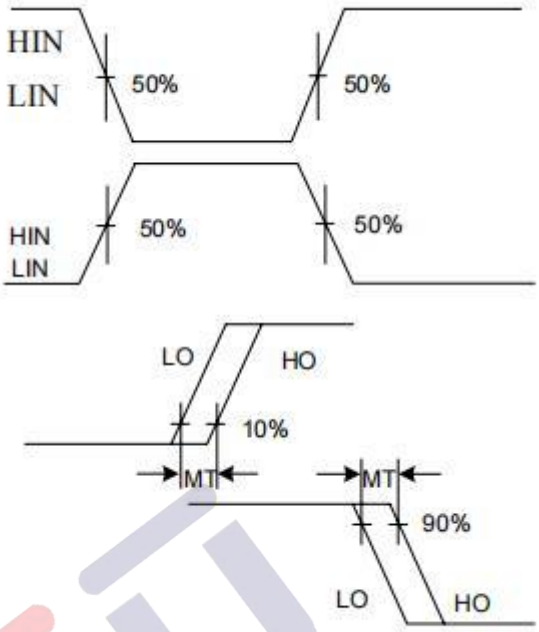
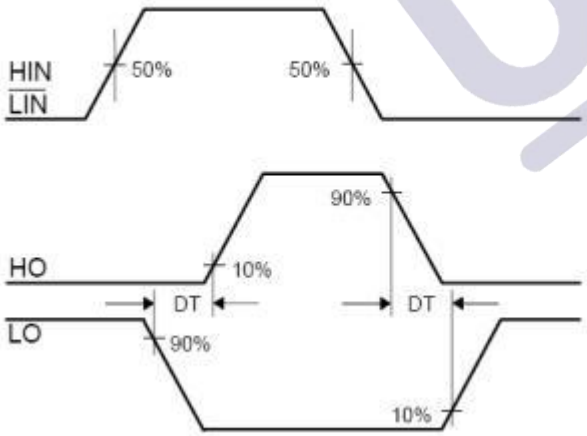
Time waveform



Switching Time Waveform Definitions

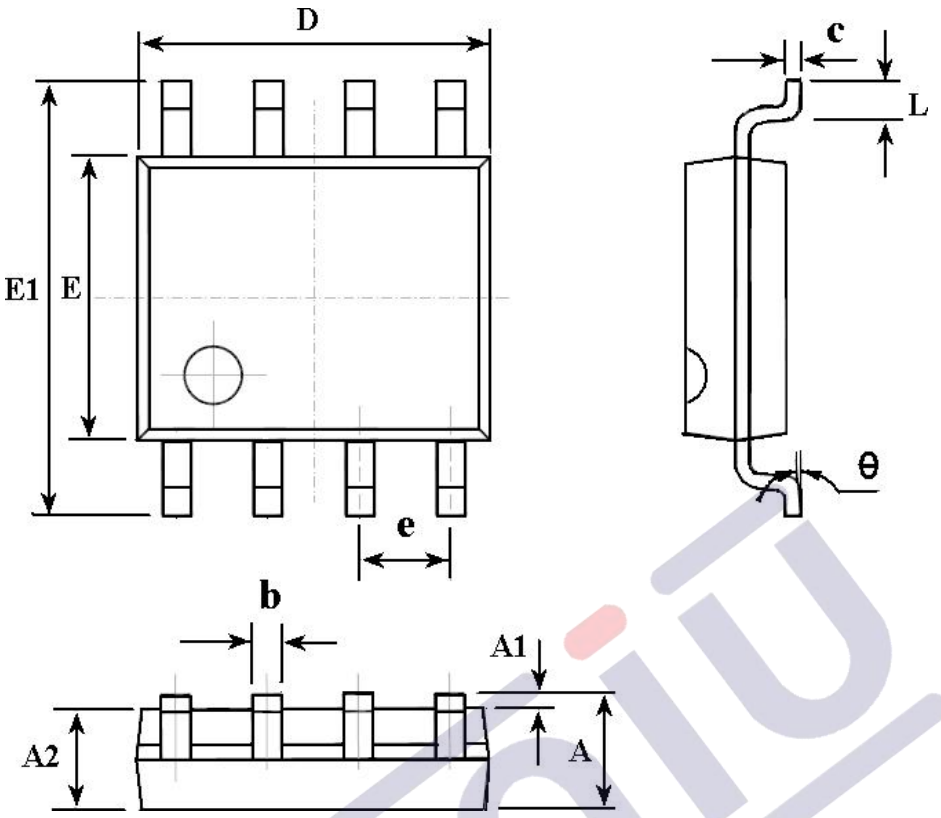


Delay matching time Definitions



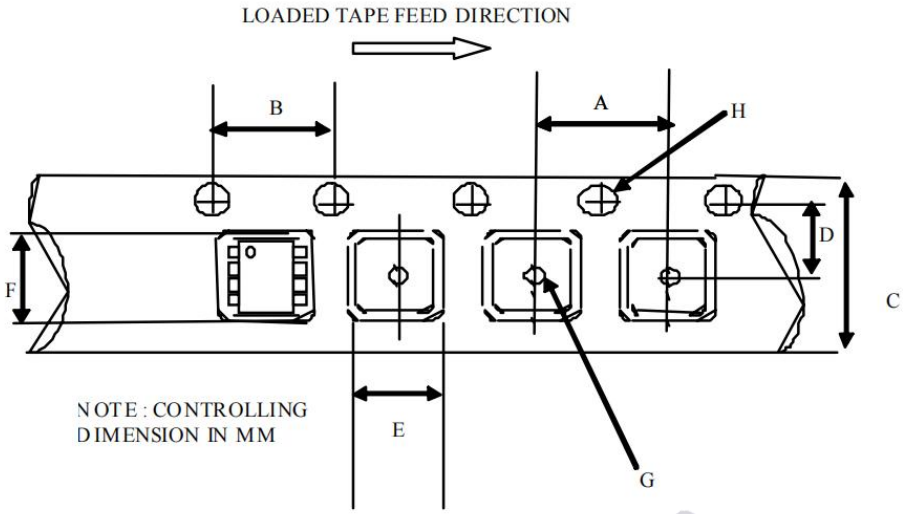
Deadtime Waveform Definitions

Packaging information SOP8



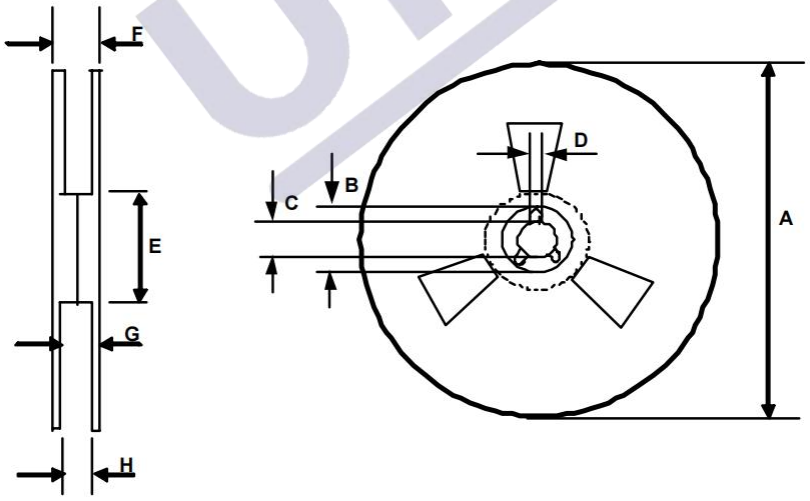
Symbol	Dimensions In Millimeters	
	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.330	0.510
c	0.170	0.250
D	4.700	5.100
E	3.800	4.000
E1	5.800	6.200
e	1.270(BSC)	
L	0.400	1.270
θ	0°	8°

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
2023/7/25	1.0	首次发布
2023/10/12	1.1	优化应用图

2、免责声明

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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渎路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：**江苏省无锡市锡山区先锋中路6号中国电子(无锡)数字芯城1#综合楼503室**

电话:0510-85297939

E-mail:zh@uni-semic.com

深圳地址：**深圳市宝安区西乡街道南昌社区宝源路泳辉国际商务大厦410**

电话：0755-84510976

E-mail:htw@uni-semic.com