ZHEJIANG UNIU-NE Technology CO.,LTD

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U3215C-6C Data Sheet

V 4.0

High Current IO+/- 2.0/2.5A HALF-BRIDGE DRIVER

General Description

The U3215C/U3216C Fully operated to +600V 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 600 volts.

Key Features

- Floating channel designed for bootstrap operation
- Fully operational to +600V
- 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

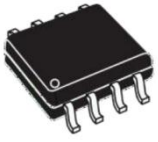
Applications

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

Product Summary

V_{OFFSET}	600V max
I_O+/-	2.0 A / 2.5A
VCC	5V - 20V
$t_{on/off}$ (typ.)	320 & 200ns
Deadtime (typ.)	120 ns
Work Tem	-40 ~150 ℃

Packages

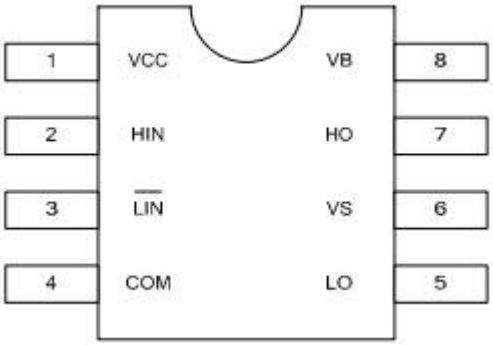


SOP8

Products Information

Base Part Number	Package Type	Standard OUT		V_{OFFSET}	Logic Control
		IO+	IO-		
U3215C	SOP8	2.0A	2.5A	600V	HIN & $\overline{LIN}$
U3216C	SOP8	2.0A	2.5A	600V	HIN & LIN

Pin Assignments



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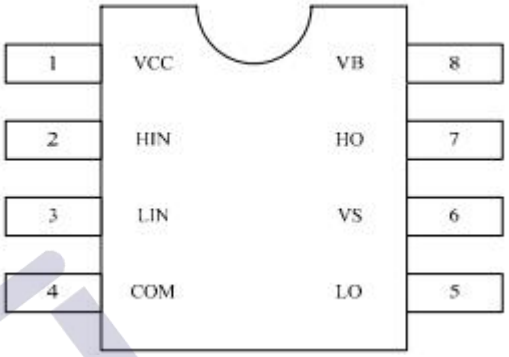
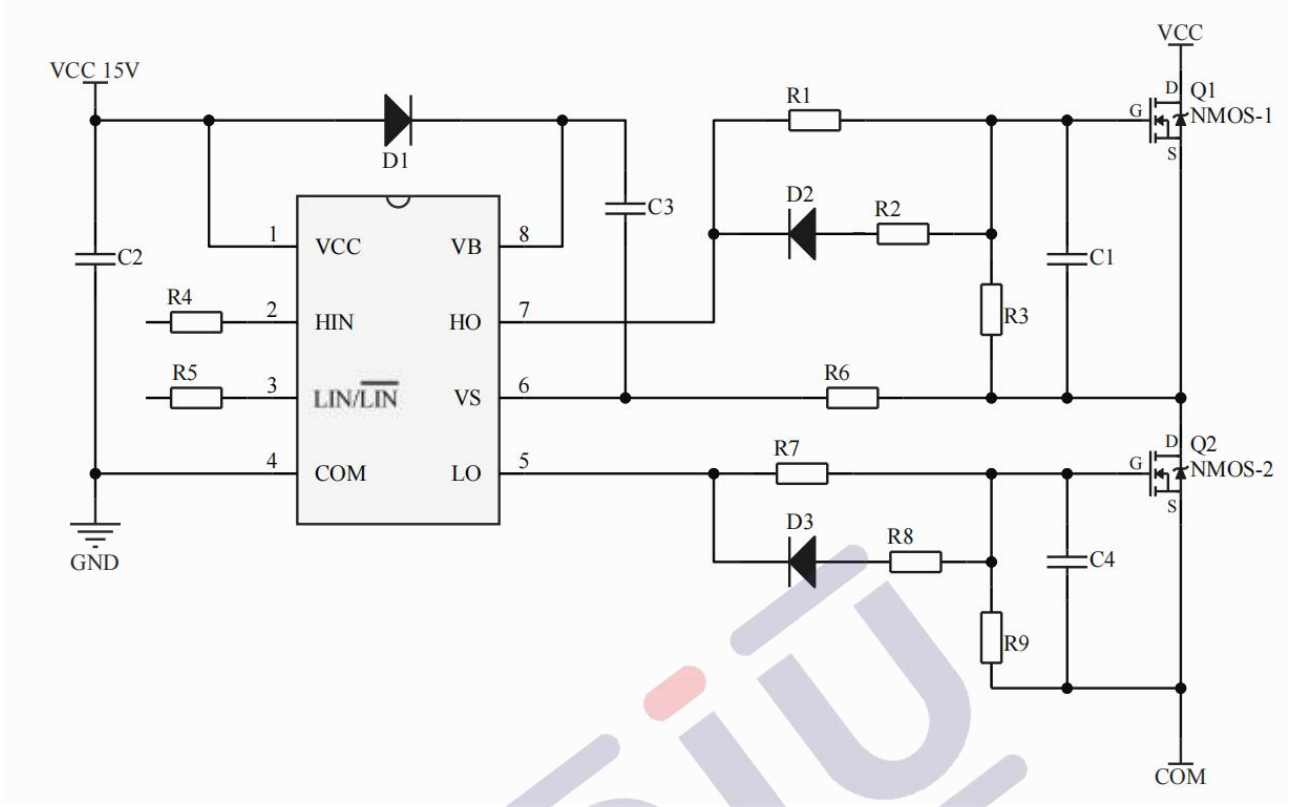


U3216C

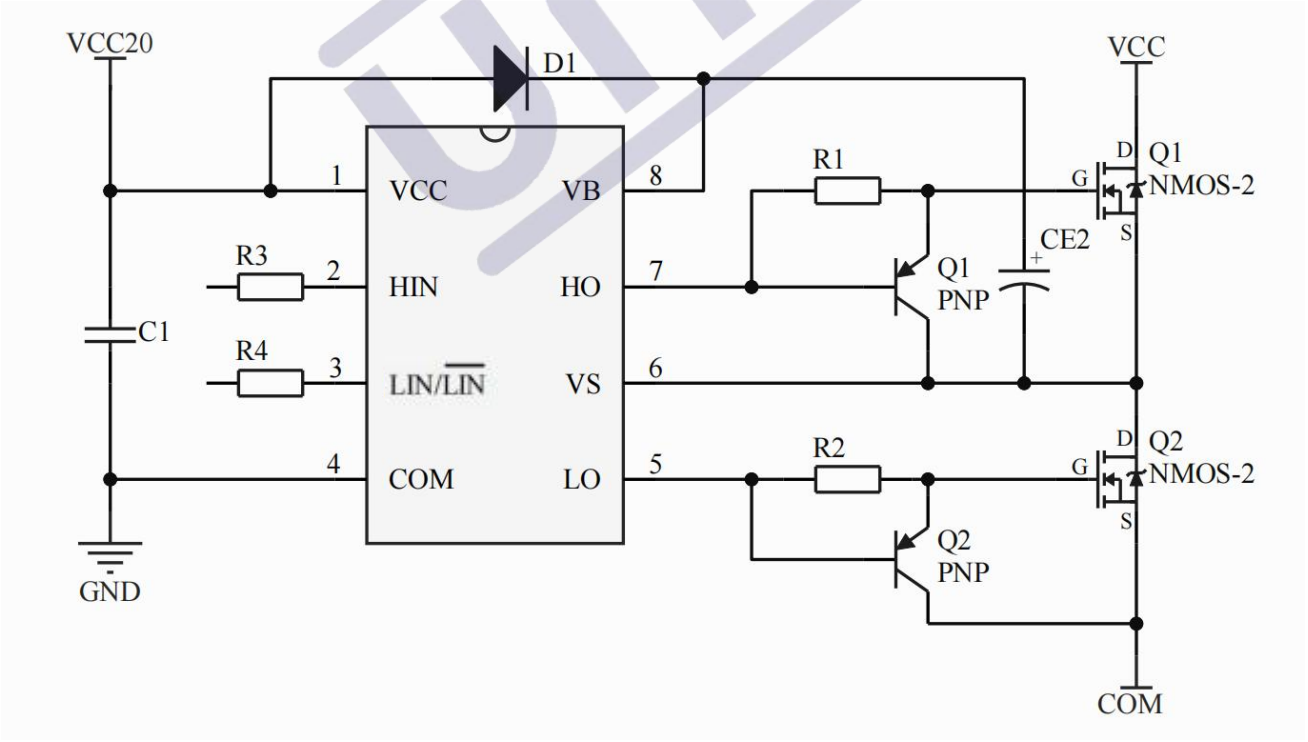
Pin Function

Number	Symbol	Type	Description
1	VCC	P	Low side and logic fixed supply
2	HIN	I	Logic input for high side gate driver outputs (HO), in phase
3	LIN	I	Logic input for low side gate driver outputs (LO), in phase
	$\overline{\text{LIN}}$	I	Logic input for low side gate driver outputs (LO), out of phase
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

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

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	600	V
VS	High side floating supply offset voltage	VB-20	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	V/ns
P_D	Package power dissipation @ TA ≤ +25°C	—	0.625	W
Rth_{JA}	Thermal resistance, junction to ambient	—	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	-20	600	
VHO	High side floating output voltage	VS	VB	
VLO	Low side output voltage	0	VCC	
VCC	Low side and logic fixed supply voltage	5.0	20	
VIN	Logic input voltage (HIN&LIN)	0	VCC	
TA	Ambient temperature	-40	125	°C

Electrical Characteristic

V_{CC} = V_{BS} = V_{BIAS} = 15V，CL=1000pF, TA = 25°C， unless otherwise specified.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
tr	Turn-on rise time	—	20	50	ns	
tf	Turn-off fall time	—	18	48		
ton	Turn-on propagation delay	—	320	400		VS = 0V
toff	Turn-off propagation delay	—	200	260		VS =400V
DT	Deadtime, LS turn-off to HS turn-on & HS turn-on to LS turn-off	—	120	—		
MT	Delay matching, HS & LS turn-on/off	—	—	70		

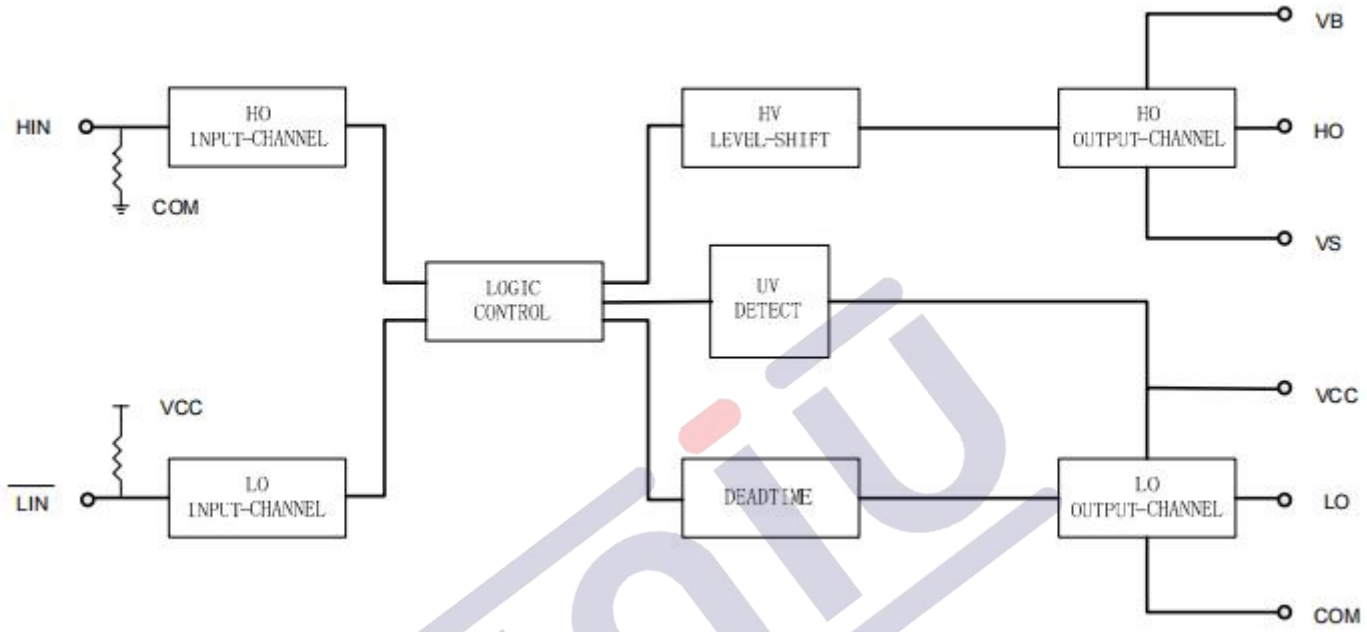
Electrical Characteristic

V_{CC} = V_{BS} = V_{BIAS} = 15V，TA = 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	—	4.8	5.6	V	
V_{CCUV-}	VCC supply under-voltage negative going threshold	—	4.5	5.3		
V_{CCHYS}	VCC supply under-voltage lockout hysteresis	0.1	0.3	—		
High Side Floating Power Supply Characteristics						
V_{BSUV+}	High side VBS supply under-voltage positive going threshold	—	4.9	5.7	V	
V_{BSUV-}	High side VBS supply under-voltage negative going threshold	—	4.6	5.4		
V_{BSUVHS}	High side VBS supply under-voltage lockout hysteresis	0.1	0.3	—		
IQCC	Quiescent VCC supply current	—	100	—	uA	Vin =0V or 5V
IQBS	Quiescent VBS supply current	—	32	—		Vin =0V or 5V
ILK	Offset supply leakage current	—	—	3		VB = VS = 400V
VIH	Logic “1” (HO) & Logic “0” (LO) input voltage	3	—	—	V	VCC =5V to 20V
VIL	Logic “0” (HO) & Logic “1” (LO) input voltage	—	—	0.8		VCC =5V to 20V
IIN+	Logic “1” input bias current	—	20	50	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+	Output high short circuit pulsed current	—	2000	—	mA	VO = 0V $V_{IN} = V_{IH}$ PW ≤ 10 us
IO-	Output low short circuit pulsed current	—	2500	—		VO = 15V $V_{IN} = V_{IL}$ PW ≤ 10 us

Block Diagram



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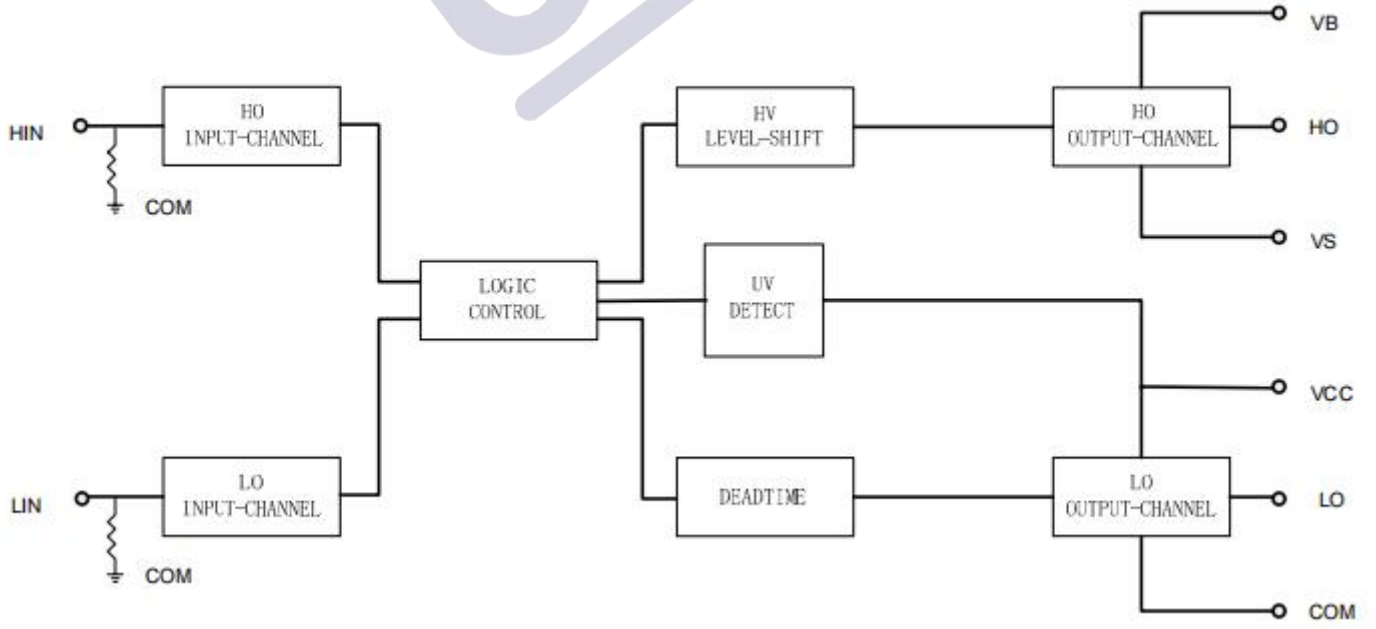

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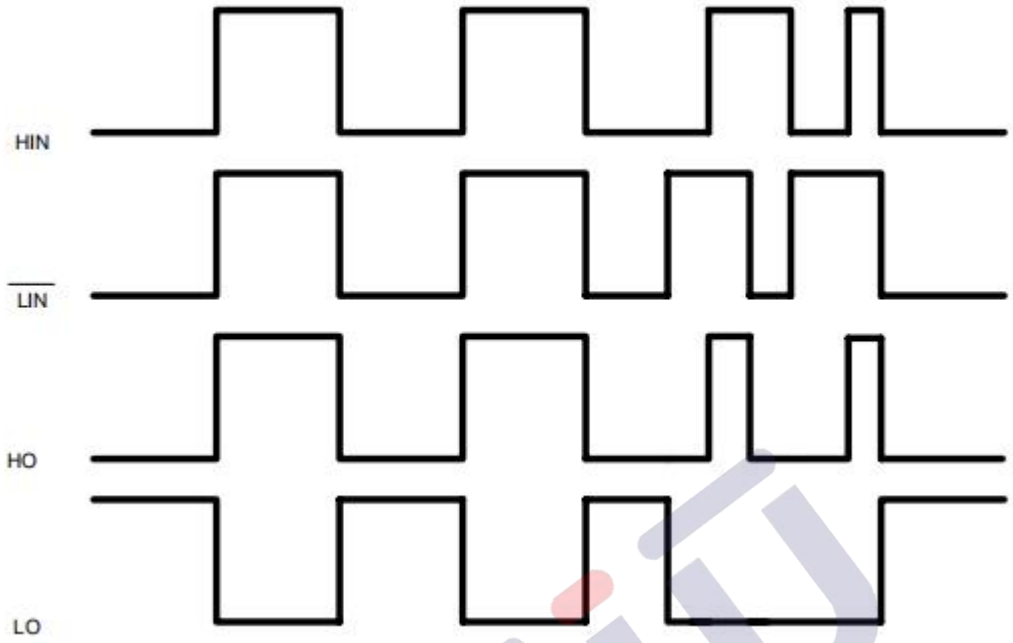
Time waveform



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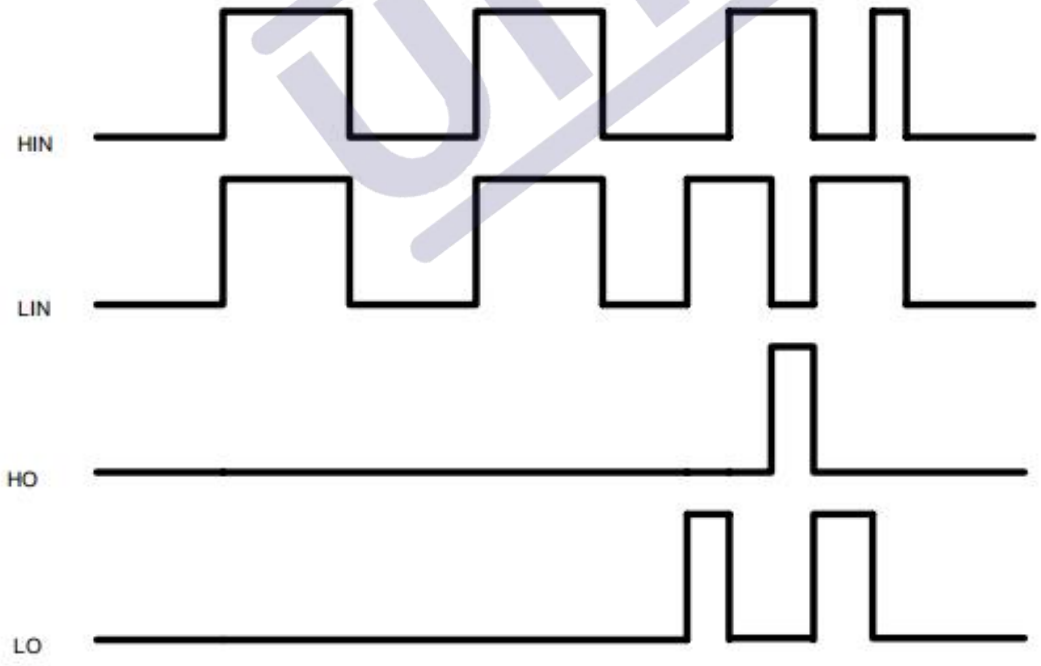

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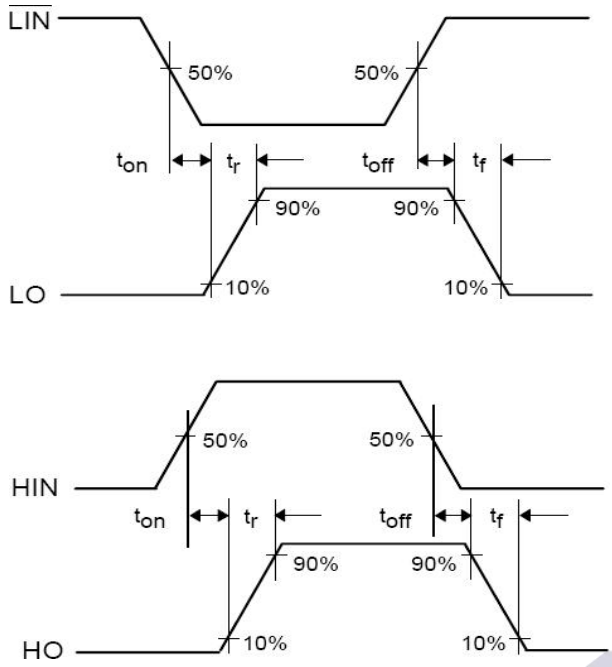
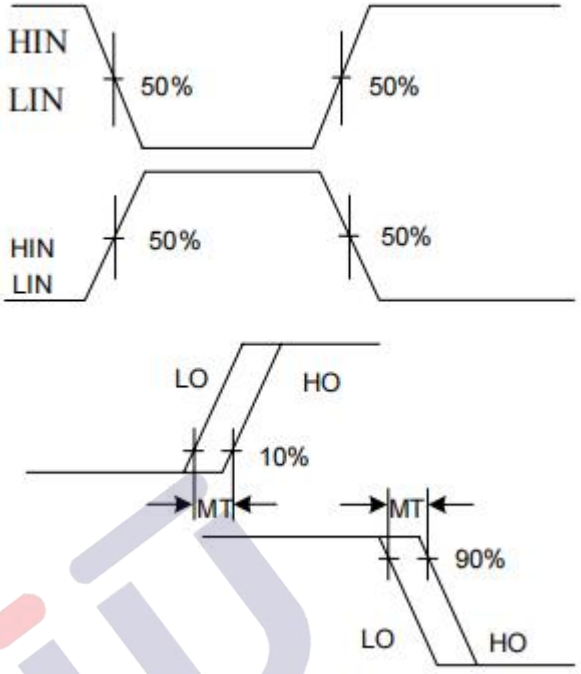
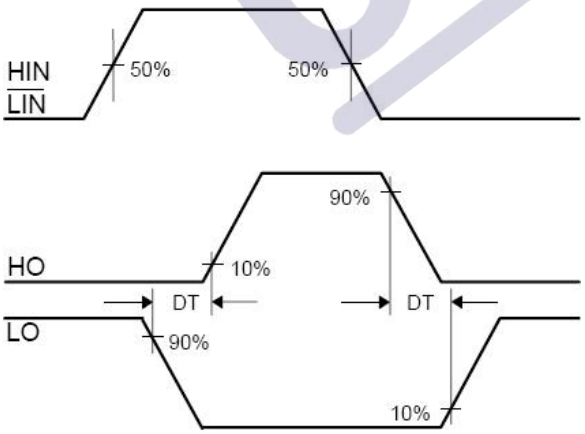
Time waveform



Switching Time Waveform Definitions



Delay matching time Definitions



Deadtime Waveform Definitions

Packaging information

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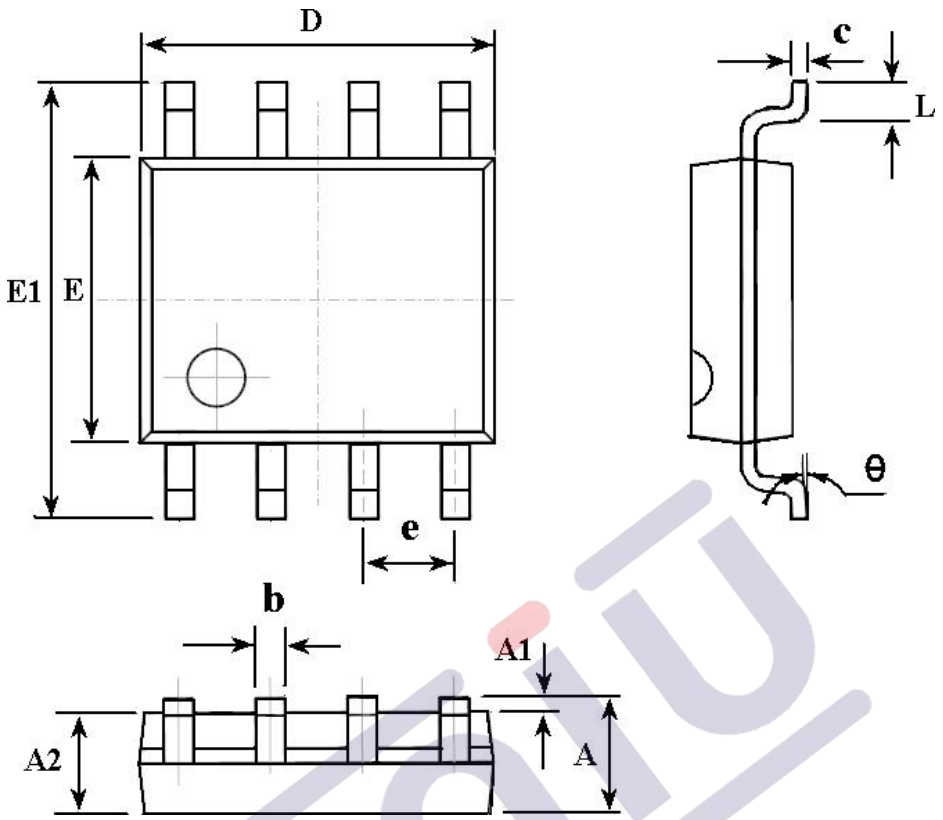

Symbol	Dimensions In Millimeters	
	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.330	0.510
c	0.170	0.250
D	4.700	5.100
E	3.800	4.000
E1	5.800	6.200
e	1.270(BSC)	
L	0.400	1.270
θ	0°	8°

1、版本记录

DATE	REV.	DESCRIPTION
2018/04/19	1.0	首次发布
2019/05/21	2.0	变更封装
2021/10/18	3.0	布局调整
2023/8/26	4.0	优化电路

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