ZHEJIANG UNIU-NE Technology CO.,LTD

浙 江 宇 力 微 新 能 源 科 技 有 限 公 司

U2104(S/M) Data Sheet

V 1.1

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High Current IO+/- 2A/2.5A HALF-BRIDGE DRIVER

General Description

The U2104(S/M) is high voltage, high speed power MOSFET and IGBT driver with dependent high and low side referenced output channels. Proprie- tary HVIC and latch immune CMOS technologies enable ruggedizedmonolithic construction. 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 600 volts.

Product Summary

|	
V_{OFFSET}	600V max
I_O+/-	2A / 2.5A
$VCC_{on/off}$ (typ.)	8.9V & 8.2V
Deadtime (typ.)	520 ns
Work Tem	-40 ~150 °C

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 8 to 20V
- Undervoltage lockout
- 3.3V, 5V and 15V input logic compatible
- Cross-conduction prevention logic
- internally set deadtime
- High side output in phase with input
- shut down input turns off both channels
- Matched propagation delay for both channels

Applications

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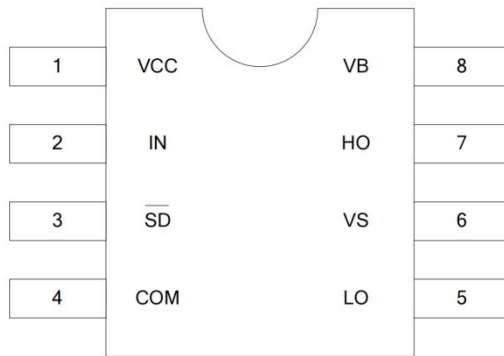- DC, AC, PMDC and PMAC motors
- Induction heating
- HVAC

Packages

8-Lead SOP
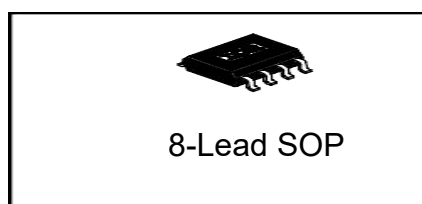
Products Information

Base Part Number	Package Type	Standard OUT		V_{OFFSET}	Logic Control
		IO+	IO-		
U2104	SOP8	2A	2.5A	600V	IN & $\overline{SD}$
U2104S	SOP8	1.2A	1.5A	600V	IN & $\overline{SD}$
U2104M	SOP8	0.4A	0.6A	600V	IN & $\overline{SD}$

Pin Assignments

1	VCC	VB	8
2	IN	HO	7
3	$\overline{SD}$	VS	6
4	COM	LO	5

Pin Function

Number	Symbol	Description
1	VCC	Low side and logic fixed supply
2	IN	Logic input for high and low side gate driver outputs (HO and LO)
3	$\overline{SD}$	Logic input for shutdown
4	COM	Low side return
5	LO	Low side gate drive output
6	VS	High side floating supply return
7	HO	High side gate drive output
8	VB	High side floating supply

Typical Application
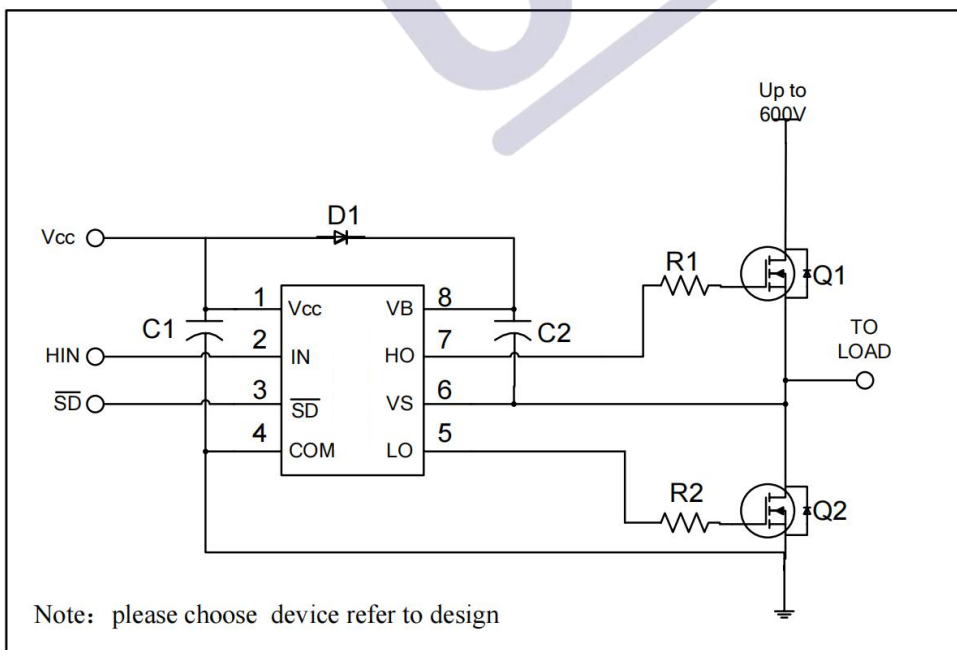
Part	Typical value
D1	BYV26B
C1	10uF/25V
C2	0.1uF/63V
R1	20R
R2	20R
Q1	IRF830
Q2	IRF830

Note：please choose device refer to design

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.
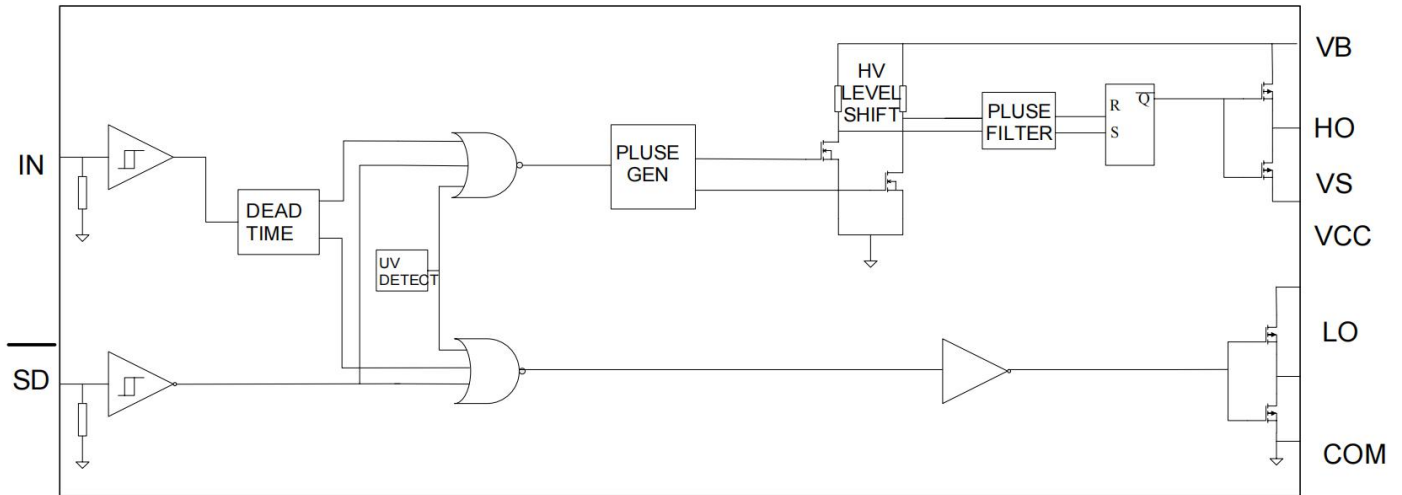
Symbol	Definition	Min.	Max.	Units
VB	High side floating absolute voltage	-0.3	625	V
VS	High side floating supply offset voltage	VB - 25	VB + 0.3	
VHO	High side floating output voltage	VS - 0.3	VB + 0.3	
VCC	Low side and logic fixed supply voltage	-0.3	25	
VLO	Low side output voltage	-0.3	VCC + 0.3	
VIN	Logic input voltage (IN & SD)	-0.3	VCC + 0.3	
dVs/dt	Allowable offset supply voltage transient	—	50	V/ns
PD	Package power dissipation @ TA ≤ +25°C (8 lead SOIC)	—	0.625	W
RthJA	Thermal resistance, junction to ambient (8 lead SOIC)	—	200	°C/W
TJ	Junction temperature	—	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 + 10	VS + 20	V
VS	High side floating supply offset voltage	-0.3	600	
VHO	High side floating output voltage	VS	VB	
VCC	Low side and logic fixed supply voltage	8	20	V
VLO	Low side output voltage	0	VCC	V
VIN	Logic input voltage (HIN&LIN)	0	VCC	V
TA	Ambient temperature	-40	125	°C

Block Diagram

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
ton	Turn-on propagation delay	—	680	820		VS = 0V
toff	Turn-off propagation delay	—	150	220		VS = 600V
tsd	Shutdown propagation delay	—	160	220		
tr	Turn-on rise time	—	100	170	ns	
tf	Turn-off fall time	—	50	90		
DT1	Deadtime, LS turn-off to HS turn-on & HS turn-on to LS turn-off	400	520	650		
MT	Delay matching, HS & LS turn-on/off	—	—	60		

Electrical Characteristic

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

| Symbol	Definition		Min.	Typ.	Max.	Units	Test Conditions
VIH	Logic "1" (HO) & Logic "0" (LO) input voltage		3	—	—	V	VCC=10V to 20V
VIL	Logic "0" (HO) & Logic "1" (LO) input voltage		—	—	0.8		VCC=10V to 20V
VSD,TH+	SD input positive going threshold		3	—	—		VCC=10V to 20V
VSD,TH-	SD input negative going threshold		—	—	0.8		VCC=10V to 20V
VOH	High level output voltage, VBIAS - VO		—	—	100	mV	IO = 0A
VOL	Low level output voltage, VO		—	—	100		IO = 0A
ILK	Offset supply leakage current		—	—	50		VB = VS = 600V
IQBS	Quiescent VBS supply current		—	30	55		VIN = 0V or 5V
IQCC	Quiescent VCC supply current		—	150	270	µA	VIN = 0V or 5V
IIN+	Logic "1" input bias current		—	3	10		VIN = 5V
IIN-	Logic "0" input bias current		—	—	1		VIN = 0V
VCCUV+	VCC supply undervoltage positive going threshold		8	8.9	9.8	V	
VCCUV-	VCC supply undervoltage negative going threshold		7.4	8.2	9		
VBUV+	VBS supply undervoltage positive going threshold		6.8	7.8	8.8	V	
VBUV-	VBS supply undervoltage negative going threshold		6.6	7.6	8.6		
IO+	Output high short circuit pulsed current	U2104	—	2000	—	mA	VO = 0V PW ≤10 µs
		U2104S	—	1200	—		
		U2104M	—	400	—		
IO-	Output low short circuit pulsed current	U2104	—	2500	—		VO = 15V PW ≤10 µs
		U2104S	—	1500	—		
		U2104M	—	600	—		
DT2	Output low short circuit DT time		500	600	800	ns	

Time waveform
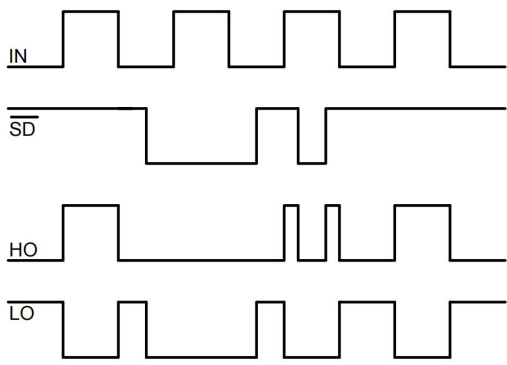
Figure 1. Input/Output Timing Diagram

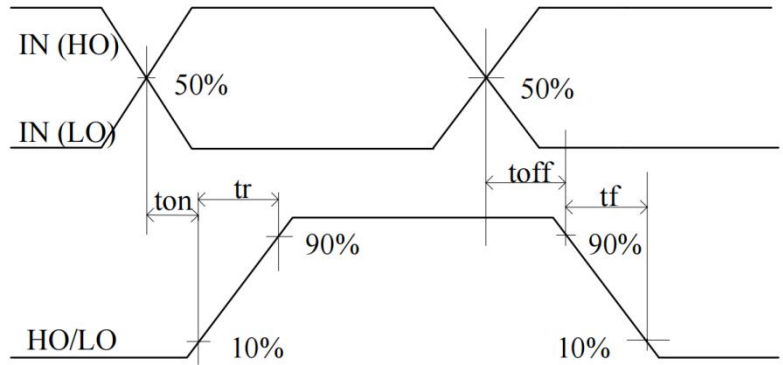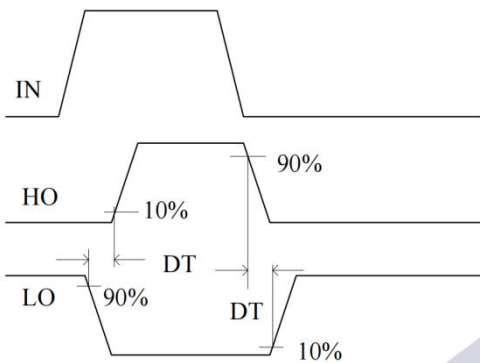
Figure 2. Switching Time Waveform Definitions
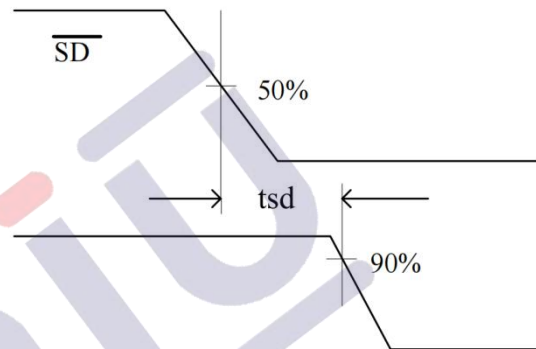

Figure 3.Deadtime Waveform Definitions
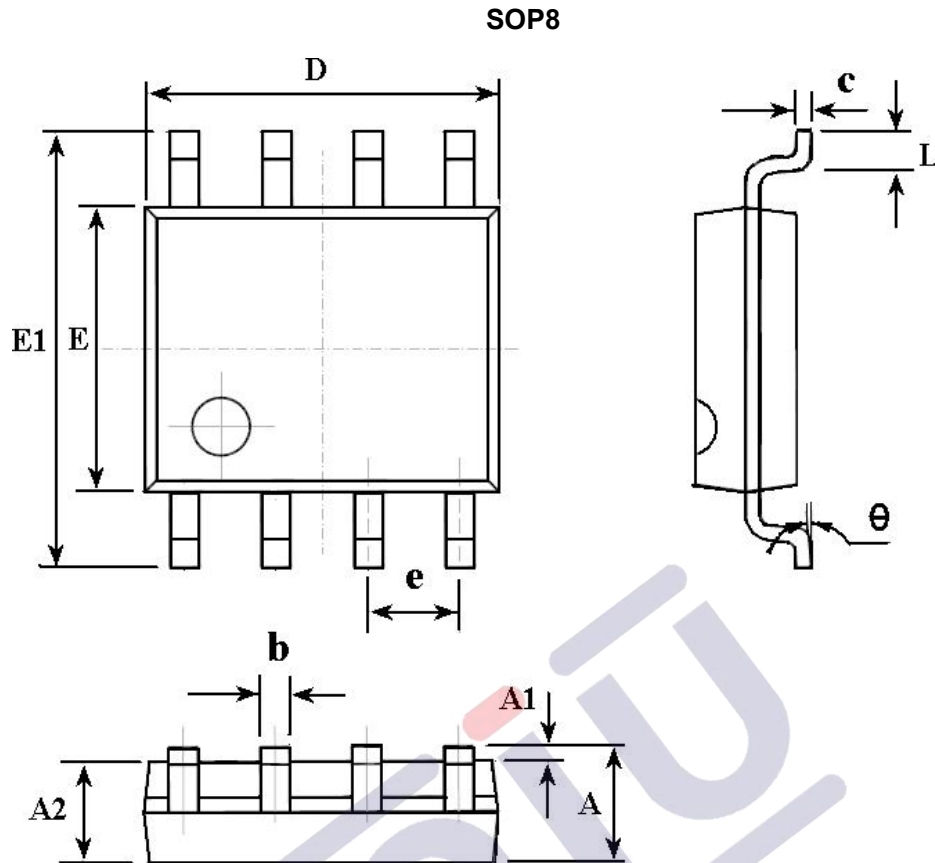

Figure 4.Shutdown Waveform Definitions
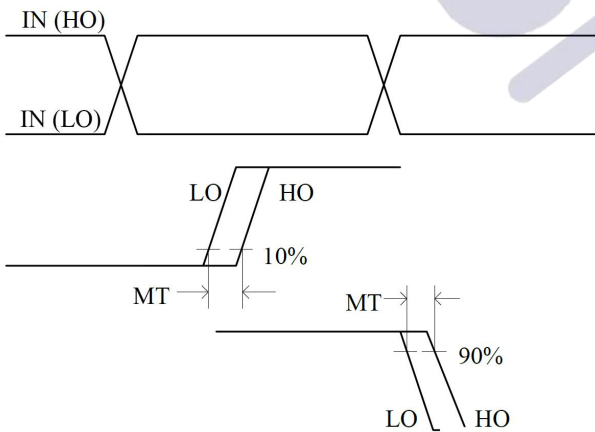
Packaging information

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°

1.

DATE	REV.	DESCRIPTION
2018/04/19	1.0	First Release
2010/05/21	1.1	Change the package

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