Features

- Fully operational to +600 V
- Maximum Pulling Current: 0.45 A，
- Maximum Sinking Current: 1 A
- The High-Low Power Supply Has Independent UVLO Protection
- 10 V~20 V Gate Driver Voltage
- 3.3 V,5V and 15 V logic compatible
- Vs Pin Can Withstand Maximum -5V Continuously
- Built-In 120ns Dead Time
- High and Low Side Output Interlock Function
- SOP-8 Package

Applications

- Motor Driver
- Air Conditioners/Washing Machines
- General Purpose Inverters
- Industrial Control
- Micro/Mini Inverter Drivers

General Description

SP6030F is a high-voltage half-bridge gate driver chip, which is suitable for bridge circuit design composed of double N-MOS or IGBT. It can be widely used in DC brushless motor drive schemes.

The SP6030F controls the output of the high-low drive circuit through two independent input signals. The built-in 120ns dead time and direct drive protection logic of the chip can prevent the external two power tubes from being switched on at the same time. The floating channel can be used to drive an N-channel power MOSFET in the high-side configuration which operates up to 600 V.

Simplified Application

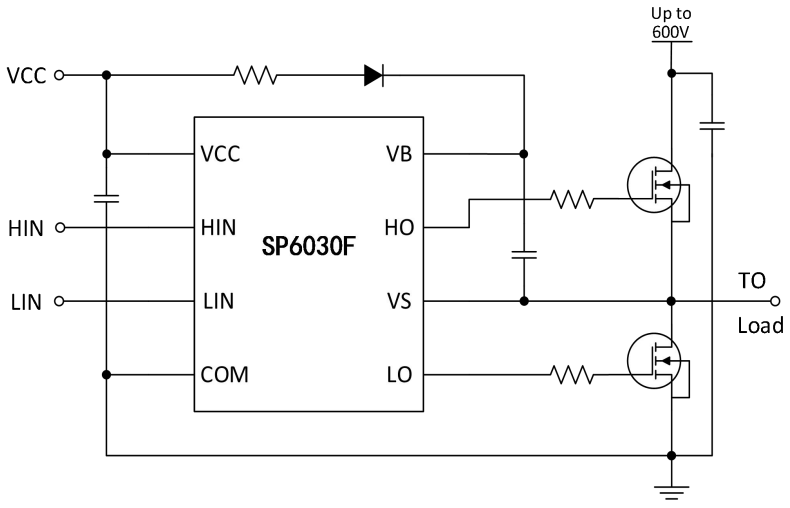


Figure 1 Typical Application of SP6030F

Pin Function Description

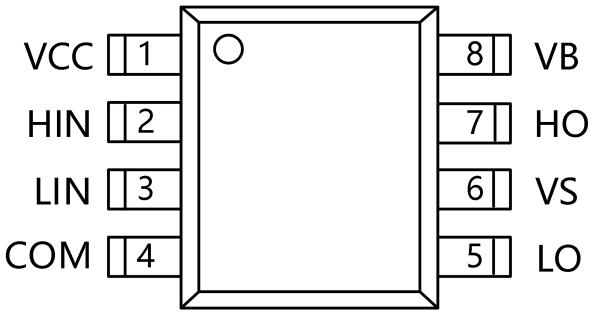
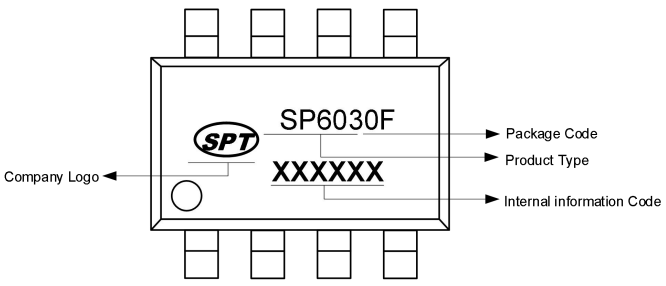


Figure 2 Pin Configuration

Pin No.	Pin Name	Function Description
1	VCC	Bias supply input. Power supply for the input logic side of the device and also low-side driver.
2	HIN	Logic input for high-side driver.
3	LIN	Low-side driver output.
4	COM	Logical ground
5	LO	Low side drive output signal
6	VS	Return for high-side floating supply
7	HO	High side drive output signal
8	VB	High side floating power port

Ordering and Marking Information

Part Number	Package Description	Top Marking	Package Form
SP6030F	SOP-8	SP6030F	4K/Reel



Absolute Maximum Ratings

Characteristics	Symbol	Rating	Units
High Side Floating Supply Voltage	V_B	-0.3~650	V
High Side Floating Offset Voltage	V_S	V_B-25~V_B+0.3	V
High Side Gate Drive Output Voltage	V_{HO}	V_S-0.3~V_B+0.3	V
Logic Power Supply Voltage	V_{CC}	-0.3~25	V
Logic Input Voltage of HIN/LIN	V_{IN}	-0.3~V_{CC}+0.3	V
Low Side Gate Drive Output Voltage	V_{LO}	-0.3~V_{CC}+0.3	V
Allowable Offset Supply Voltage Transient	dV_S/dt	50	V/ns
Package Power Dissipation @ T_A=25℃	P_{DMAX}	0.625	W
Power Dissipation, PD @ T_A=25℃	θ_{JA}	200	℃/W
Junction Temperature	T_J	-40~150	℃
Storage Temperature	T_{STG}	-55~150	℃

Note:

Note 1. Stresses listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

Note 2. Devices are ESD sensitive. Handling precaution recommended.

Recommended Operating Conditions

Symbol	Description	Value	Units
V_B	High Side Floating Supply Voltage	V_S+10~V_S+20	V
V_S	High Side Floating Offset Voltage	-5~600	V
V_{HO}	High Side Gate Drive Output Voltage	V_S~V_B	V
V_{CC}	Logic Power Supply Voltage	10~20	V
V_{IN}	Logic Input Voltage	0~15	V
V_{LO}	Low Side Gate Drive Output Voltage	0~V_{CC}	V
T_{OP}	Operating Temperature Range	-40~85	℃
T_{LEAD}	Lead Temperature Range(Soldering 10sec)	260	℃

Note 1.All the above voltage parameters are based on COM. Without special explanation, T_A=25℃.

Block Diagram

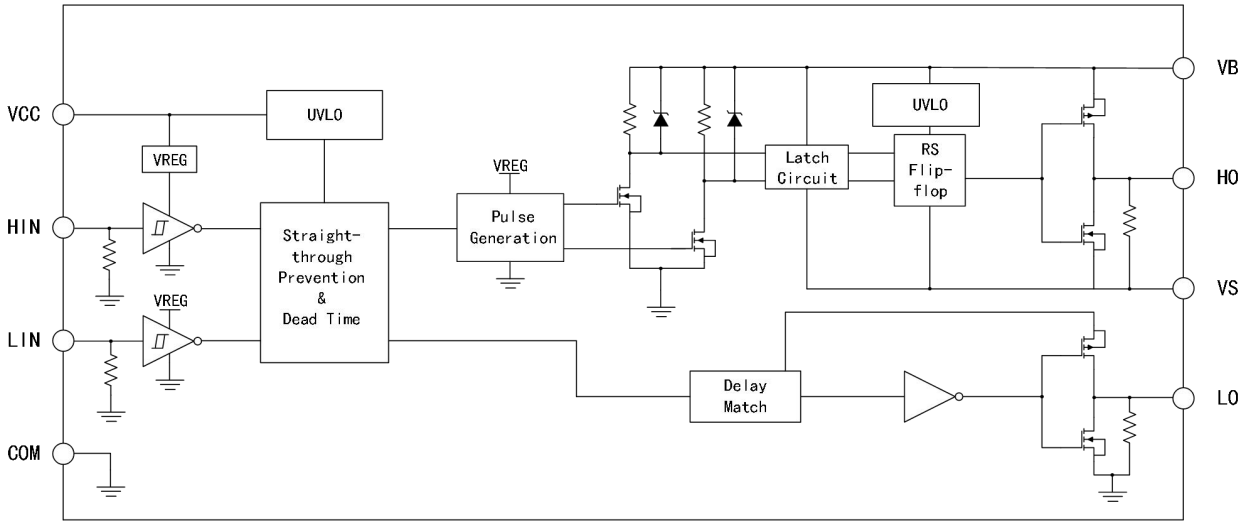
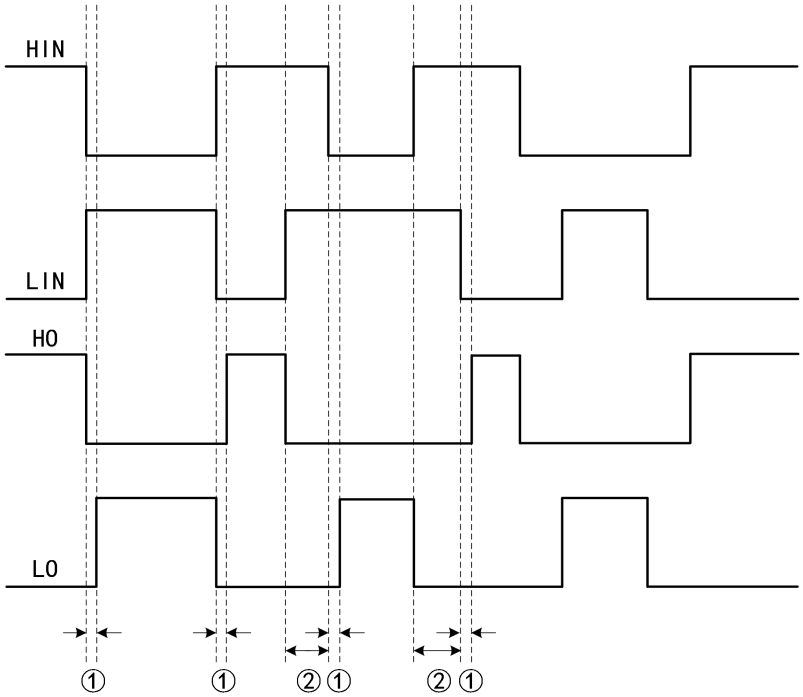


Figure 3 Block Diagram of SP6030F

Sequence Chart



①：Dead Time

②：Straight-through Prevention

Figure 4 Input/Output Logic Timing

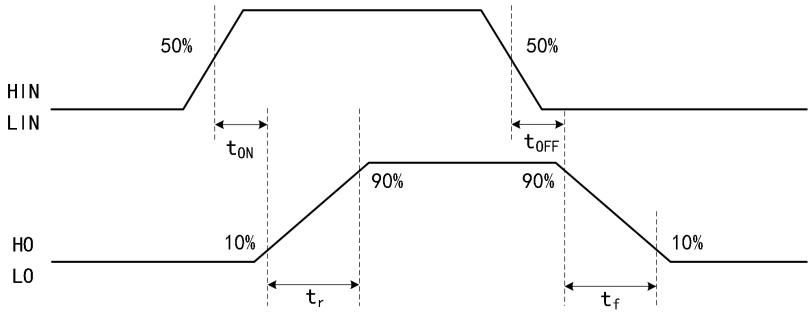


Figure 5 Time Parameter Definition

Electrical Characteristics

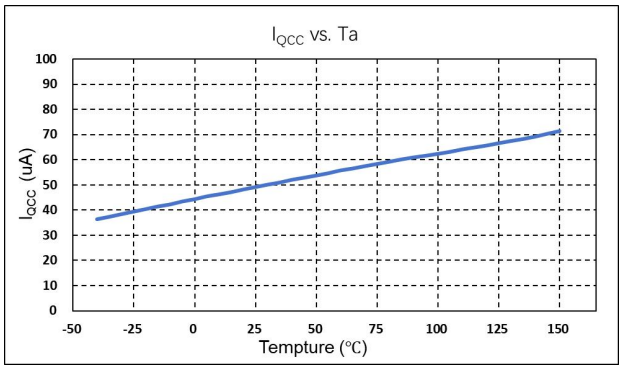
V_{CC}=V_{BS}=15V， VS=COM, unless otherwise specified

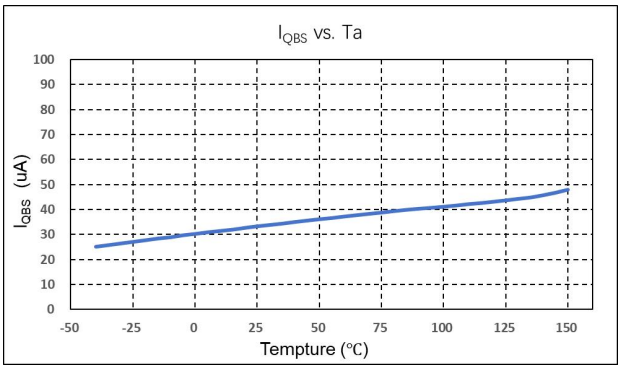
Characteristics	Symbol	Test Conditions	Min	Typ	Max	Units
Static Electrical Parameter						
V_{CC} Power Supply Threshold Voltage	V_{CC_ON}		7.5	8.4	9.2	V
V_{CC} Power Shutdown Threshold Voltage	V_{CC_OFF}		6.5	7.5	8.2	V
V_{CC} Undervoltage-Lockout	V_{CC_UVLO}		0.5	0.9	1.5	V
V_{BS} Power Supply Threshold Voltage	V_{BS_ON}		7.4	8.8	9.6	V
V_{BS} Power Shutdown Threshold Voltage	V_{BS_OFF}		6.4	7.8	8.6	V
V_{BS} Undervoltage-Lockout	V_{BS_UVLO}		0.5	1	1.5	V
V_S Maximum Static Negative Voltage	V_{SQN}	V_{BS}=15V			-5.0	V
Quiescent V_{CC} supply current	I_{QCC}	HIN=LIN=0V		52	75	μA
Quiescent V_{BS} supply current	I_{QBS}	HIN=LIN=0V		36	55	μA
Floating Power Leakage Current	I_{LK}	V_{BS}=V_S=620V			2	μA
Logic High Level Input Voltage	V_{IN+}			1.9		V
Logic Low Level Input Voltage	V_{IN-}			1.2		V
Logic High Level Input Current	I_{IN+}	HIN or LIN=5V		33	85	μA
Logic Low Level Input Current	I_{IN-}	HIN or LIN=0.2V			9.0	μA
High level output voltage (V_B-V_O)	V_{OUT+}	IO=20mA			0.5	V
Low level output voltage	V_{OUT-}	IO=20mA			0.5	V
High Level Output Short-Circuit Pulse Current	I_{OUT+}	VO=0V (VIN=5V,Short-circuit Pulse Width<10us)		450		mA
Low Level Output Short-Circuit Pulse Current	I_{OUT-}	VO=15V (VIN=0V,Short-circuit Pulse Width<10us)		1000		mA
Dynamic Electrical Parameter（CL=1nF）						
Turn On Transmission Delay	t_{ON}	V_S=0V		250		ns
Turn Off Transmission Delay	t_{OFF}	V_S=0V or 600V		150		ns
Turn On Rising Time	t_r			40		ns
Turn Off Falling Time	t_f			12		ns
Dead Time	DT			120		ns
High & Low Side Delay Matching Time	MT	t_{ON}(HO)-t_{ON}(LO) t_{OFF}(HO)-t_{OFF}(LO)			80	ns

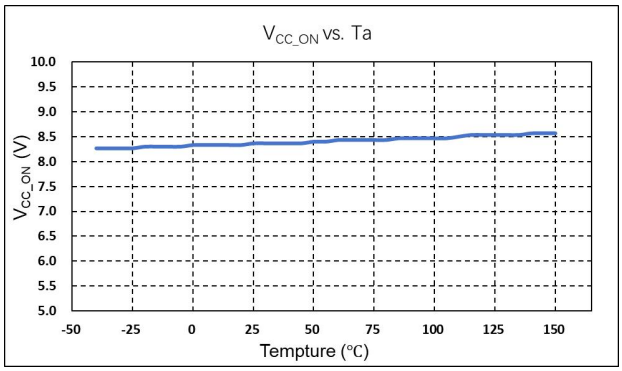
Note 1.The electrical parameter table defines the operating range of the device, whose maximum and minimum values are guaranteed by actual testing, and whose typical values are guaranteed by design values, performance and statistical analysis.

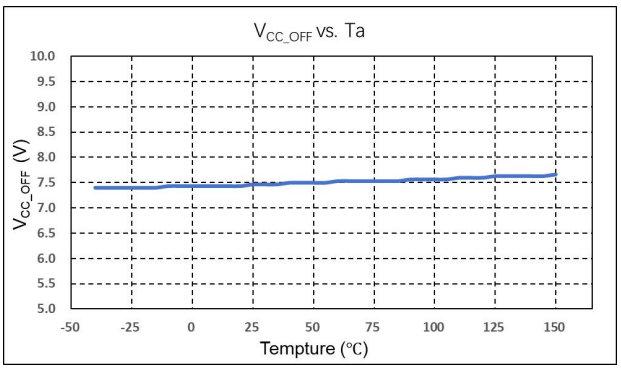
Note 2.The dynamic transmission time is greatly affected by the parasitic parameters of the peripheral track,and the actual test data shall prevail when used.

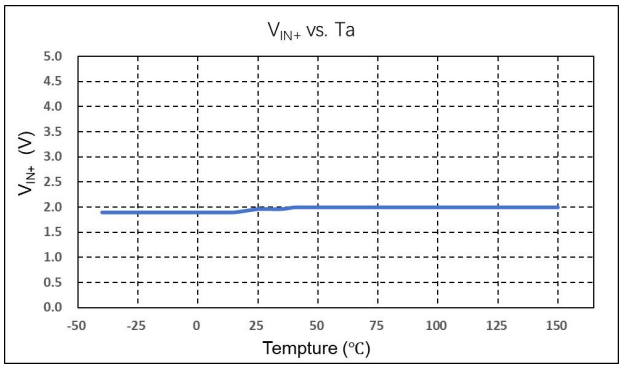
Typical Temperature Characteristic Curve

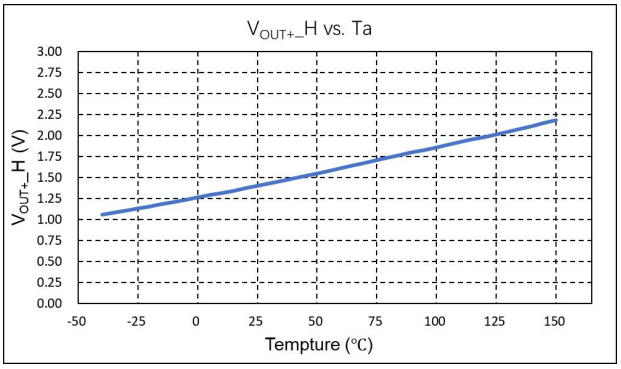


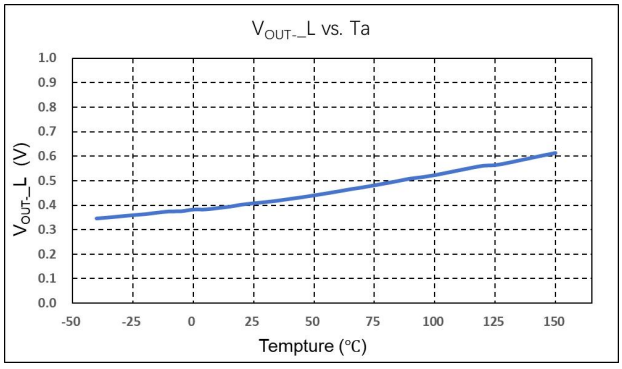


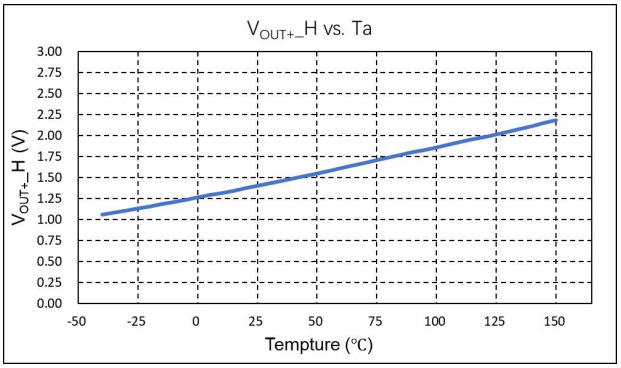




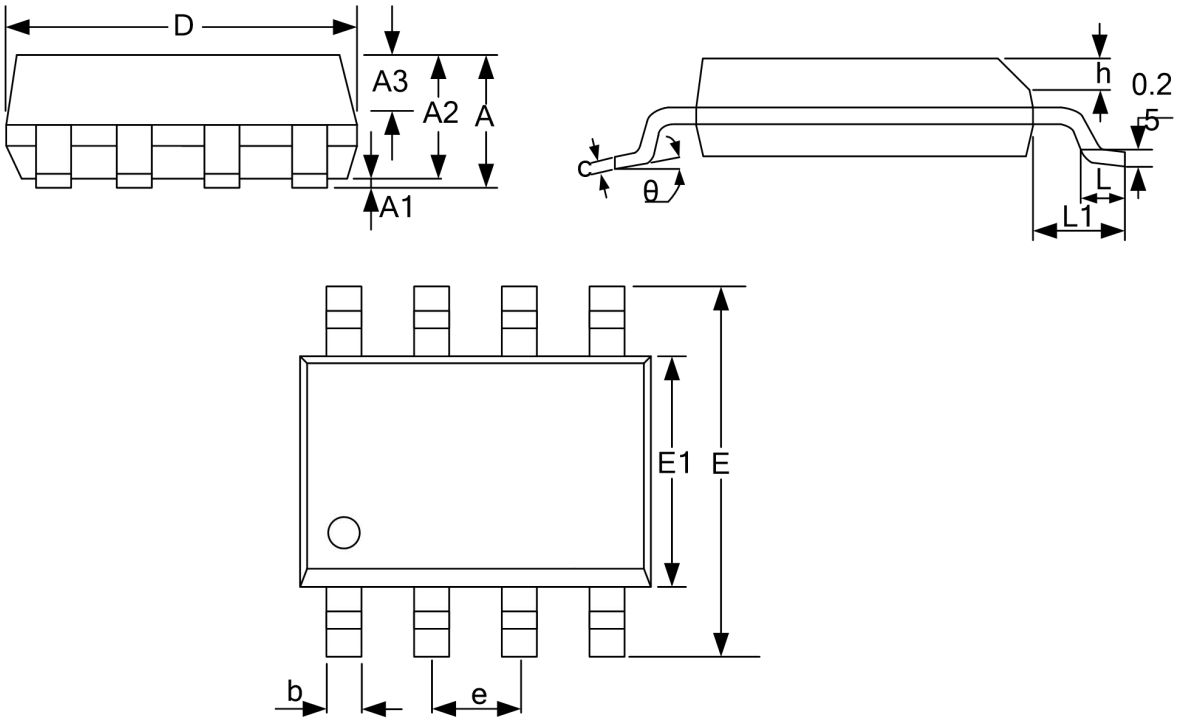








Package Information（Units: mm）



Symbol	Dimensions in Millimeters		
	Min.	Nom.	Max.
A	-	-	1.75
A1	0.10	-	0.25
A2	1.30	1.40	1.60
A3	0.60	0.65	0.70
D	4.70	4.90	5.10
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
b	0.39	-	0.48
c	0.20	-	0.24
e	1.27BSC		
h	0.25	-	0.50
L	0.50	-	0.80
L1	1.05BSC		
θ	0	-	8°

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