

### DESCRIPTION

The devices are full bridge drivers to control power devices like MOS-transistors or IGBTs in 3-phase systems with a maximum blocking voltage of +600 V. The six independent drivers are controlled at the low-side using CMOS and LSTTL compatible signals, down to 3.3V logic. The device includes an under-voltage detection unit with hysteresis characteristic and over-current detection. The over-current level is adjusted by choosing the resistor value and the threshold level at pin ITRIP. Both error conditions (under-voltage and over-current) lead to a definite shut down of all six switches. An error signal is provided at the FAULT open drain output pin. The

blocking time after over-current can be adjusted with an RC-network at pin RCIN. The input RCIN owns an internal current source of  $2\mu$ A. Therefore, the resistor RRCIN is optional. The typical output current can be given with 200mA for pull-up and 400mA for pull down. Because of system safety reasons a 0.5us dead time has been realized. The function of inputs EN and ITRIP can optionally be extended with over-temperature detection, using an external NTC resistor, diodes and resistor network.

## **FEATURES**

- Drives up to six IGBT/MOSFET power devices
- All high side channels fully operate up to +600V
- Gate drive supplies up to 18 V per channel
- Under-voltage lockout for all channels
- Over-current protection
- Flexible over-temperature shutdown input
- Advanced input filter
- Built-in dead-time protection
- Shoot-through (cross-conduction) protection
- Independent Enable/disable input and fault reporting
- Shut down all switches during error conditions
- Adjustable fault clear timing
- Separate logic and power grounds
- 3.3 V/5V input logic compatible (positive logic)
- Designed for use with bootstrap power supplies
- Matched propagation delays for all channels
- Matched dead time
- -40°C to 125°C operating range
- SOP28/SOP32 Package available
- Lead-free

## **APPLICATIONS**

- Appliance motor drives-air conditioners, washing machines, refrigerator, dish washer, Fans
- Servo drives
- Industrial inverters. General purpose three phase inverters



## **BLOCK DIAGRAM**





# **TYPICAL APPLICATION**



Typical connection of 3-phase HV motor driver



#### **ORDER INFORMATION**

Valid Part Number	Package Type	Top Code
PT5616-S	SOP28, 300MIL	PT5616-S
PT5616-S1	SOP32, 300MIL	PT5616-S1

### **PIN CONFIGURATION**







PT5616

## **PIN DESCRIPTION**

Pin	Description		Pin No.	
Name			SOP32	
VCC	Logic and low-side gate drivers power supply voltage	1	1	
V5V	5V LDO output	-	2	
NC.	Not Connected	-	3	
HINU	Logic inputs for high-side gate driver outputs (phase U); input is in-phase with output	2	4	
HINV	Logic inputs for high-side gate driver outputs (phase V); input is in-phase with output	3	5	
HINW	Logic inputs for high-side gate driver outputs (phase W); input is in-phase with output	4	6	
LINU	Logic inputs for low-side gate driver outputs (phase U); input is in-phase with output	5	7	
LINV	Logic inputs for low-side gate driver outputs (phase V); input is in-phase with output	6	8	
LINW	Logic inputs for low-side gate driver outputs (phase W); input is in-phase with output	7	9	
VSS	Logic ground	-	10	
FAULT	Indicates over-current, over-temperature (ITRIP), or low-side under-voltage lockout has occurred. This pin has negative logic and an open-drain output. The use of over-current and over-temperature protection requires the use of external components.	8	11	
ITRIP	Analog input for over-current shutdown. When active, ITRIP shuts down outputs and activates FAULT and RCIN low. When ITRIP becomes inactive, FAULT stays active low for an externally set time t <sub>FLTCLR</sub> , then automatically becomes inactive (open-drain high	9	12	
	impedance). Logic input to shutdown functionality. Logic functions when EN is high (i.e., positive logic).		 	
EN	No effect on FAULT and not latched. EN can also be extended as input of	10	13	
	over-temperature protection when equipped with an external NTC resistor.			
	An external RC network input used to define the FAULT CLEAR delay (tFLTCLR)			
RCIN	approximately equal to $R^*C$ . When $RCIN > 8 V$ , the FAULT pin goes back into an		14	
	open-drain high-impedance state.			
VSS	Logic ground	12	15	
COM	Low-side gate drive return	13	16	
LOW	Low-side gate driver W-phase output	14	17	
LOV	Low-side gate driver V-phase output	15	18	
LOU	Low-side gate driver U-phase output	16	19	
NC.	Not Connected	-	20	
NC.	Not Connected	17	21	
VSW	High-side driver W-phase floating supply offset voltage	18	22	
HOW	High-side driver W-phase gate driver output	19	23	
VBW	High-side driver W-phase floating supply	20	24	
NC.	Not Connected	21	25	
VSV	High-side driver V-phase floating supply offset voltage	22	26	
HOV	High-side driver V-phase gate driver output	23	27	
VBV	High-side driver V-phase floating supply	24	28	
NC.	Not Connected	25	29	
VSU	High-side driver U-phase floating supply offset voltage	26	30	
HOU	High-side driver U-phase gate driver output	27	31	
VBU	High-side driver U-phase floating supply	28	32	



# **IMPORTANT NOTICE**

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