

描述/Description

- XNS24S72F6基于Trench FS-IGBT技术，是一款先进的DIP25 IPM，为交流感应、直流无刷电机和PMSM电机提供非常全面的高性能逆变器输出平台。
XNS24S72F6 is an Advanced DIP25 IPM Based on Trench FS-IGBT Technology, Providing a Fully-featured, High-performance Inverter Output Stage for AC Induction, BLDC, and PMSM Motors.
- XNS24S72F6综合优化了IGBT的栅极驱动以最小化电磁干扰和能量损耗，同时也提供多重保护特性，包括集成欠压闭锁、过流保护、温度检测和故障报告。
XNS24S72F6 Optimized Gate Drive of the Built-in IGBTs to Minimize EMI and Losses, while also Providing Multiple Protection Features Including Under-voltage Lockouts, Over-current Shutdown, Thermal Monitoring, Fault Reporting.
- XNS24S72F6内置高速HVIC，提供无光耦单电源IGBT栅极驱动能力，进一步减小了逆变器系统设计的总体尺寸。
XNS24S72F6 Combines High Speed HVIC Provides Opto-Coupler-Less Single-Supply IGBT Gate Driving Capability that Further Reduce the Overall Size of the Inverter System Design.
- 独立的IGBT负端在每个相位均有效，可支持大量不同种类的控制算法。
Separate Negative IGBT Terminals are Available for Each Phase to Support the Widest Variety of Control Algorithms.

主要特点

- 600V-24 A三相IGBT逆变器，包含栅极驱动和保护的控制IC
- 低损耗、短路额定的IGBT
- 内置带限流电阻的自举二极管
- 低端IGBT的独立发射极开路引脚用于三相电流感测
- 内置负温度系数的电阻用于温度检测
- 全隔离DIP25封装
- 绝缘级别2500V_{rms}/1min
- 单接地电源供电
- 无铅工艺；符合ROHS

Features

- 600V-24A 3-Phase IGBT Inverter Bridge Including Control ICs for Gate Driving and Protection
- Low-Loss, Short-Circuit Rated IGBTs
- Built-In Bootstrap Diodes with Current Limiting Resistor
- Separate Open-Emitter Pins from Low-Side IGBTs for Three-Phase Current Sensing
- Built-In NTC Thermistor for Temperature Monitoring
- Fully Isolated DIP25 Package
- Isolation Rating: 2500 V_{rms}/min
- Single-Grounded Power Supply
- Lead-free Terminal Plating; RoHS Compliant

应用

- 运动控制 – 家用设备 / 工业电机

Applications

- Motion Control – Home Appliance / Industrial Motor

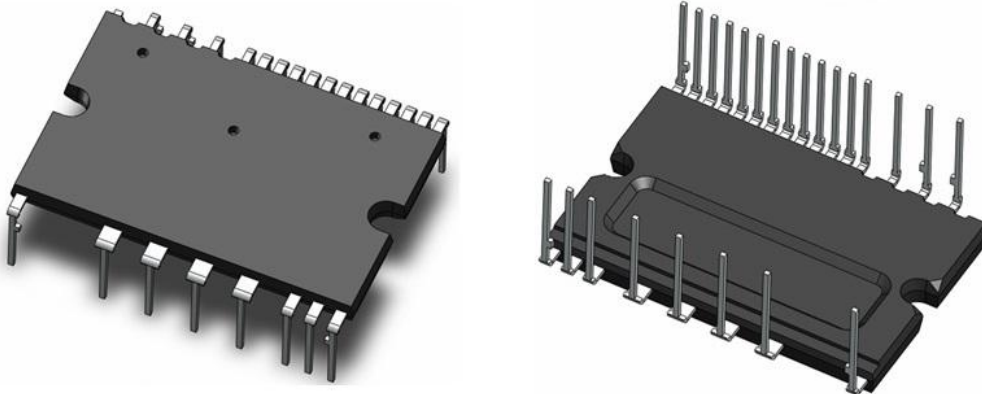
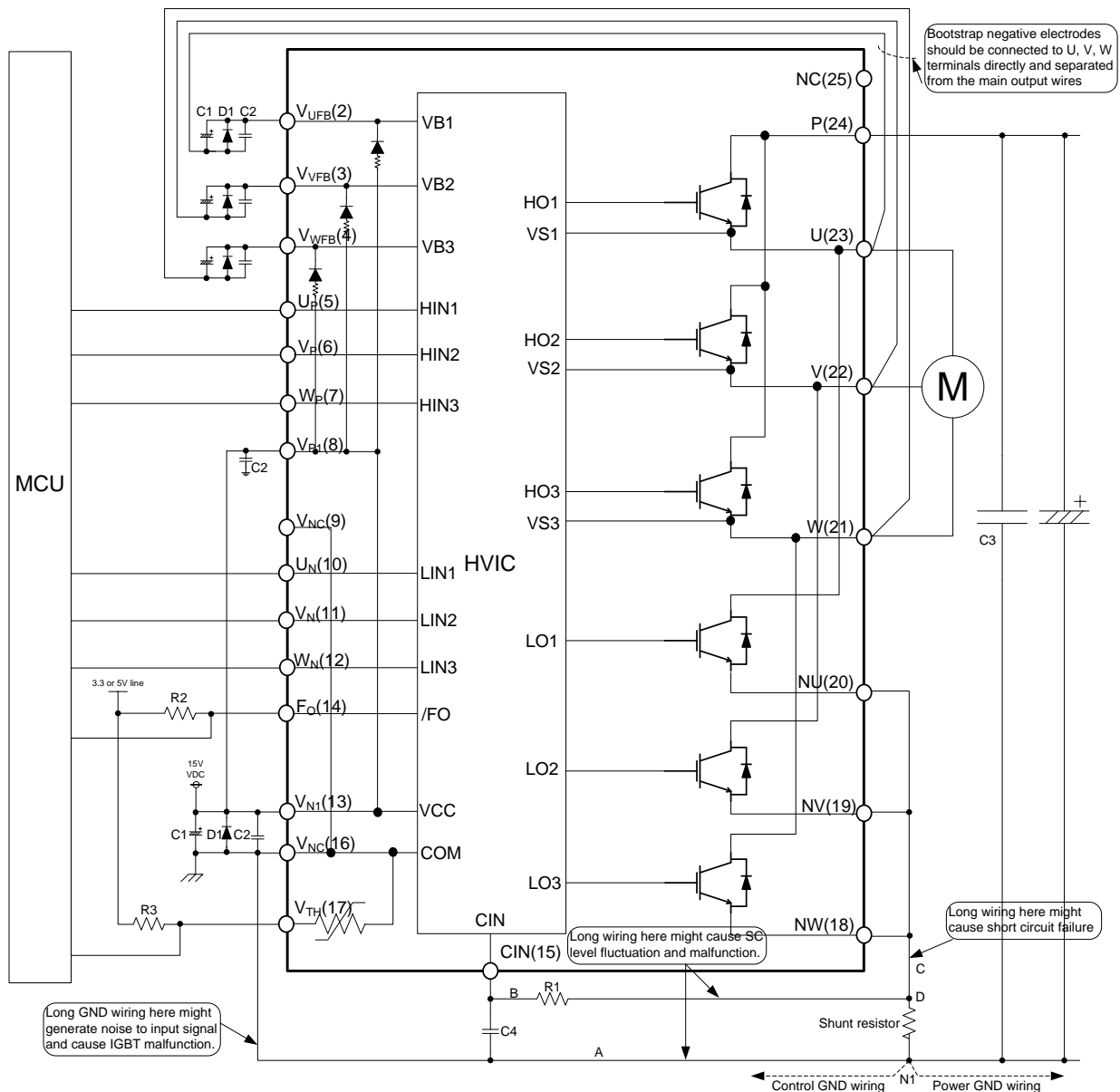


图1. 封装概览

Figure1. Package Overview

| 引脚号/Pin Number | 引脚名/Pin Name | 引脚描述/Pin Description |
|----------------|--------------|-------------------------------------------------------------------|
| 1 | NC | No connection 空引脚 |
| 2 | VUFB | High-Side Bias Voltage for U-Phase IGBT Driving 上桥臂U相驱动正端 |
| 3 | VVFB | High-Side Bias Voltage for V-Phase IGBT Driving 上桥臂V相驱动正端 |
| 4 | VWFB | High-Side Bias Voltage for W-Phase IGBT Driving 上桥臂W相驱动正端 |
| 5 | UP | Signal Input for High-Side U Phase 上半桥U相逻辑输入端 |
| 6 | VP | Signal Input for High-Side V Phase 上半桥V相逻辑输入端 |
| 7 | WP | Signal Input for High-Side W Phase 上半桥W相逻辑输入端 |
| 8 | VP1 | Common Bias Voltage for IC and IGBTs Driver 控制电源正端 |
| 9 | VNC | Common Supply Ground 下桥臂参考地端 |
| 10 | UN | Signal Input for Low-Side U Phase 下桥臂U相逻辑输入端 |
| 11 | VN | Signal Input for Low-Side V Phase 下桥臂V相逻辑输入端 |
| 12 | WN | Signal Input for Low-Side W Phase 下桥臂W相逻辑输入端 |
| 13 | VN1 | Common Bias Voltage for IC and IGBTs Driver 控制电源正端 |
| 14 | FO | Fault Output 故障信号输出端 |
| 15 | CIN | Capacitor for Short-Circuit Current Detector Input 过流电流保护电压检测端 |
| 16 | VNC | Common Supply Ground 下桥臂参考地端 |
| 17 | VTH | 热敏电阻电压 NTC Voltage |
| 18 | NW | Negative DC-Link Input for W-Phase 逆变器直流电源负端 (W相) |
| 19 | NV | Negative DC-Link Input for V-Phase 逆变器直流电源负端 (V相) |
| 20 | NU | Negative DC-Link Input for U-Phase 逆变器直流电源负端 (U相) |
| 21 | W | Output for W-Phase 逆变器W相输出端 |
| 22 | V | Output for V-Phase 逆变器V相输出端 |
| 23 | U | Output for U-Phase 逆变器U相输出端 |
| 24 | P | Positive DC-Link Input 逆变器直流电压正端 |
| 25 | NC | N.C 空引脚 |

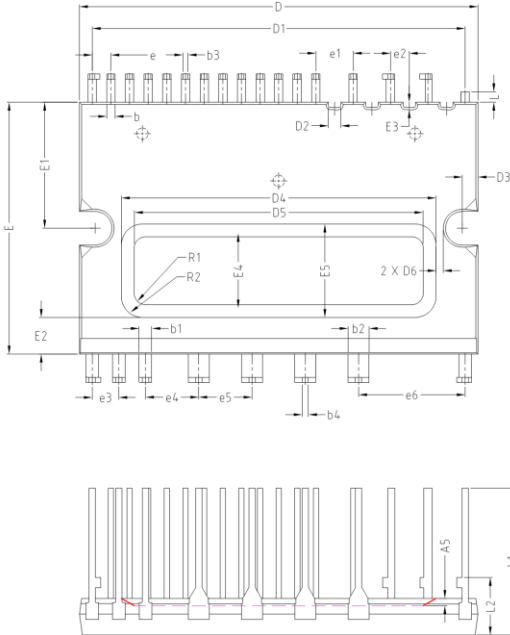


Typical Application Circuit

注/Note:

1. 推荐在电源上加稳压二极管D1 (24V/1W)，防止浪涌电压损坏IPM。
It is recommended to insert a Zener diode D1 (24V/1W) between each pair of control supply terminals to prevent surge destruction.
2. 输入正逻辑，下拉电阻5.4KΩ。为了避免故障，应尽可能缩短每个输入端的连线（小于2-3 cm）。
Input logic is High-active. There is a 5.4KΩ pull down resistor. To avoid malfunction, the wiring of each input should be as short as possible (less than 2-3cm).
3. 为避免保护功能出错，应尽可能缩短R1和C4 周围的连线。
To prevent errors of the protection function, the wiring of B, C and D point should be as short as possible.
4. 在短路保护电路中，R1C4 的时间常数应在1.5 ~ 2.0 μs 的范围内进行选择。
In the short-circuit protection circuit, please select the R1C4 time constant in the range 1.5 ~ 2.0 μs.
5. 每个电容都应尽可能地靠近产品的引脚安装。（C1: 温度特性好，频率特性好；C2: 0.22u-2uF, 温度特性好，频率特性好）
Each capacitor should be mounted as close to the pins of the product as possible. (C1: good temperature, frequency characteristic electrolytic type and C2: 0.22u-2uF, good temperature, frequency and DC bias characteristic ceramic type are recommended.)
6. 为防止浪涌的破坏，应尽可能缩短滤波电容和P & GND 引脚间的连线。推荐在P & GND 引脚间使用0.1 ~ 0.22 μ F 的高频无感电容C3。
To prevent surge destruction, the wiring between the smoothing capacitor and the P & GND pins should be as short as possible. The use of a high-frequency non-inductive C3 capacitor of around 0.1 ~ 0.22 μF between the P & GND pins is recommended.

轮廓封装详图 / Detailed Package Outline Drawings



| S Y M B O L | COMMON | | | S Y M B O L | COMMON | | |
|----------------------------|-----------------------|-------|-------|----------------------------|-----------------------|-------|-------|
| | Dimensions millimeter | | | | Dimensions millimeter | | |
| | Min | Nom | Max | | Min | Nom | Max |
| A | 3.35 | 3.50 | 3.65 | E2 | 3.35 | 3.50 | 3.65 |
| A1 | 0.85 | 1.00 | 1.15 | E3 | 0.35 | 0.50 | 0.65 |
| A2 | 1.35 | 1.50 | 1.65 | E4 | 6.33 | 6.48 | 6.63 |
| A3 | 0.55 | 0.70 | 0.85 | E5 | 8.75 | 8.90 | 9.05 |
| A4 | 0.35 | 0.50 | 0.65 | E6 | 29.00 | 29.40 | 29.80 |
| A5 | 0.55 | 0.70 | 0.85 | E7 | 0.85 | 1.00 | 1.15 |
| b | 0.74 | 0.83 | 0.92 | E8 | 1.35 | 1.50 | 1.65 |
| b1 | 1.14 | 1.23 | 1.32 | e | 1.728 | 1.778 | 1.828 |
| b2 | 1.94 | 2.03 | 2.12 | e1 | 3.506 | 3.556 | 3.606 |
| b3 | 0.44 | 0.53 | 0.62 | e2 | 1.728 | 1.778 | 1.828 |
| b4 | 0.54 | 0.63 | 0.72 | e3 | 2.490 | 2.540 | 2.590 |
| C | 0.426 | 0.516 | 0.606 | e4 | 5.030 | 5.080 | 5.130 |
| D | 37.85 | 38.00 | 38.15 | e5 | 5.030 | 5.080 | 5.130 |
| D1 | 35.41 | 35.56 | 35.71 | e6 | 10.11 | 10.16 | 10.21 |
| D2 | 1.05 | 1.20 | 1.35 | L | 0.91 | 1.00 | 1.09 |
| D3 | 1.35 | 1.50 | 1.65 | L1 | 13.80 | 14.00 | 14.20 |
| D4 | 29.85 | 30.00 | 30.15 | L2 | 5.40 | 5.50 | 5.60 |
| D5 | 27.43 | 27.58 | 27.73 | Q | 90° | 90° | 95° |
| D6 | 0.64 | 0.69 | 0.74 | Q1 | 7° | 8° | 9° |
| E | 23.85 | 24.00 | 24.15 | Q2 | 7° | 8° | 9° |
| E1 | 11.85 | 12.00 | 12.15 | | | | |

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