

### 描述/Description

- XNS21765基于Trench FS-IGBT技术, 提供紧凑且高性能的变频伺服解决方案, 适合较高功率的消费和工业应用领域。  
XNS21765 is an Advanced IPM Based on Trench FS-IGBT Technology as a Compact and High Performance Inverter or Server Solution for Higher Power Consumption and Industrial Applications.
- XNS21765通过优化开关速度和减小寄生电感实现低电磁干扰(EMI)特性。  
XNS21765 Features Low Electromagnetic Interference (EMI) Characteristics Through Optimizing Switching Speed and Reducing Parasitic Inductance.
- XNS21765内置优化的保护和驱动电路并与低损耗IGBT匹配, 欠压锁定和短路保护进一步提高了系统可靠性。  
XNS21765 Combines Optimized Circuit Protection and Drive Matched to Low-Loss IGBTs. System Reliability is Further Enhanced by the Integrated Under-Voltage Lock-Out and Short-Circuit Protection.
- XNS21765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。  
XNS21765 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.
- 分开的负直流端子使得变频器的每相电流可以单独监视到。  
Each Phase Current of Inverter can be Monitored Separately Due to the Divided Negative DC Terminals.

### 主要特点

- 600V-20 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
- 采用DBC (Al2O3) 基板实现非常低的热阻
- 内置自举二极管和专用的Vs 引脚以简化印刷电路板布局
- 低端IGBT的独立发射极开路引脚用于三相电流感测
- 绝缘级别2500V<sub>rms</sub>/1min
- 单接地电源供电

### 应用

- 运动控制 – 家用设备 / 工业电机

### Features

- 600V-20A 3-Phase IGBT Inverter Bridge Including Control ICs for Gate Driving and Protection
- Low-Loss, Short-Circuit Rated IGBTs
- Very Low Thermal Resistance Due to Using Al2O3 DBC
- Built-In Bootstrap Diodes and Dedicated Vs Pins Simplify PCB Layout
- Separate Open-Emitter Pins from Low-Side IGBTs for Three-Phase Current Sensing
- Isolation Voltage Rating of 2500 V<sub>rms</sub> for 1 min.
- Single-Grounded Power Supply Due to Built-In HVIC

### Applications

- Motion Control – Home Appliance / Industrial Motor

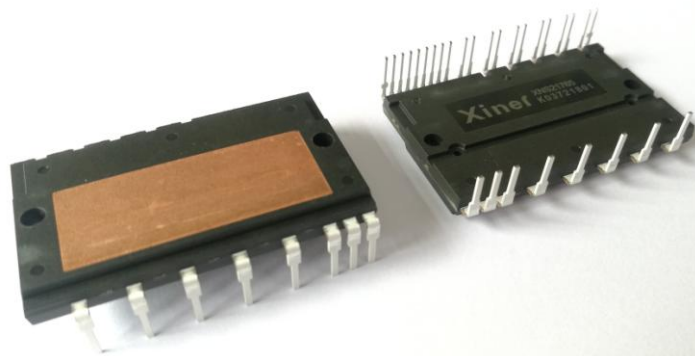
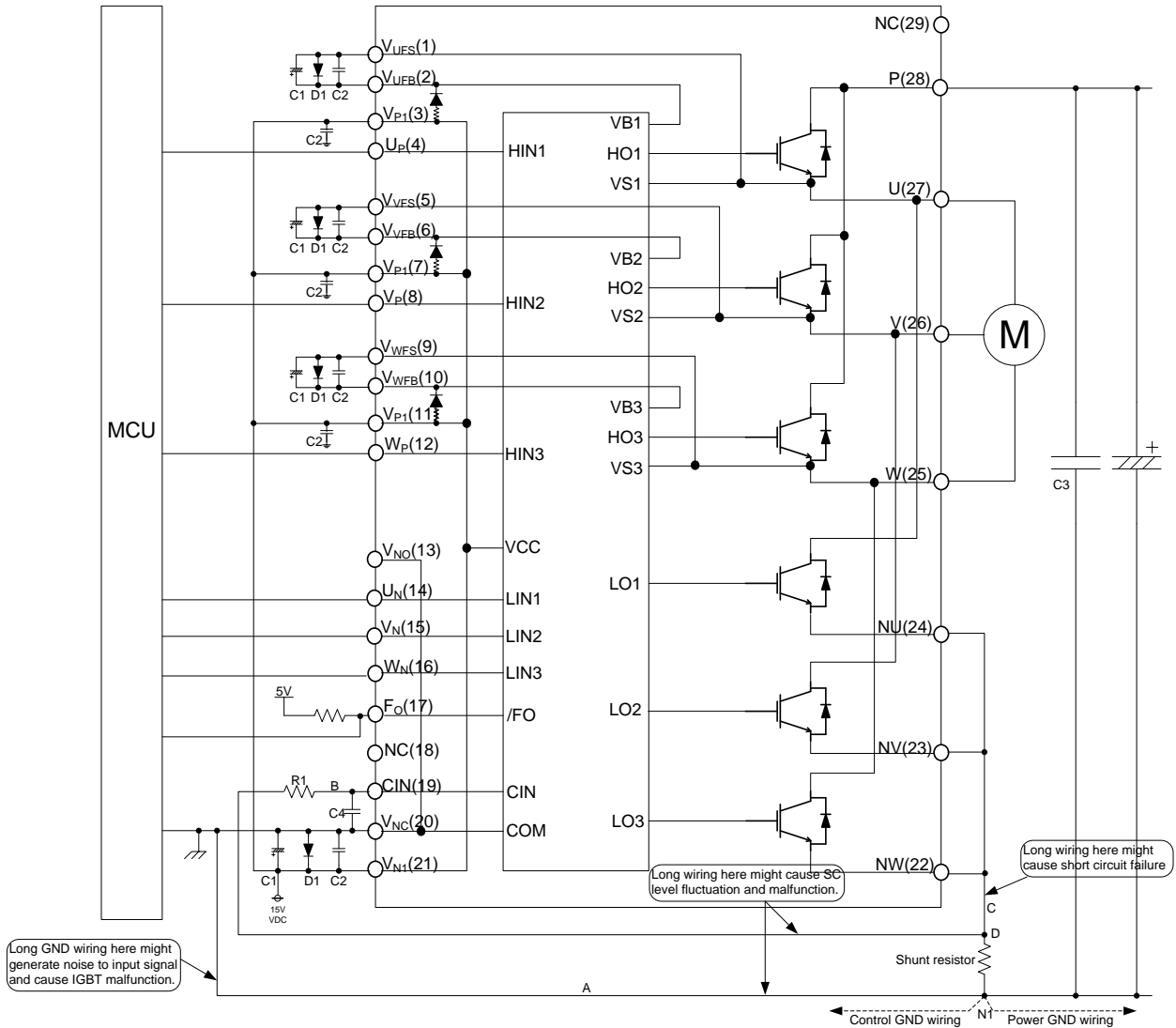


图1. 封装概览

Figure1. Package Overview

## 引脚描述 / Pin descriptions

引脚号/Pin Number	引脚名/Pin Name	引脚描述/Pin Description
1	VUFS	High-Side Bias Voltage Ground for U-Phase IGBT Driving 上桥臂U相驱动地端
2	VUFB	High-Side Bias Voltage for U-Phase IGBT Driving 上桥臂U相驱动正端
3	VP1	Common Bias Voltage for IC and IGBTs Driver 控制电源正端
4	UP	Signal Input for High-Side U Phase 上半桥U相逻辑输入端
5	VVFS	High-Side Bias Voltage Ground for V-Phase IGBT Driving 上桥臂V相驱动地端
6	VVFB	High-Side Bias Voltage for V-Phase IGBT Driving 上桥臂V相驱动正端
7	VP1	Common Bias Voltage for IC and IGBTs Driver 控制电源正端
8	VP	Signal Input for High-Side V Phase 上半桥V相逻辑输入端
9	VWFS	High-Side Bias Voltage Ground for W-Phase IGBT Driving 上桥臂W相驱动地端
10	VWFB	High-Side Bias Voltage for W-Phase IGBT Driving 上桥臂W相驱动正端
11	VP1	Common Bias Voltage for IC and IGBTs Driver 控制电源正端
12	WP	Signal Input for High-Side W Phase 上半桥W相逻辑输入端
13	VNO	Common Supply Ground 门极控制参考地端
14	UN	Signal Input for Low-Side U Phase 下桥臂U相逻辑输入端
15	VN	Signal Input for Low-Side V Phase 下桥臂V相逻辑输入端
16	WN	Signal Input for Low-Side W Phase 下桥臂W相逻辑输入端
17	FO	Fault Output 故障信号输出端
18	NC	N.C 空引脚
19	CIN	Capacitor for Short-Circuit Current Detector Input 过流电流跳闸电压检测端
20	VNC	Common Supply Ground 下桥臂参考地端
21	VN1	Common Bias Voltage for IC and IGBTs Driver 控制电源正端
22	NW	Negative DC-Link Input for W-Phase 逆变器直流电源负端（W相）
23	NV	Negative DC-Link Input for V-Phase 逆变器直流电源负端（V相）
24	NU	Negative DC-Link Input for U-Phase 逆变器直流电源负端（U相）
25	W	Output for W-Phase 逆变器W相输出端
26	V	Output for V-Phase 逆变器V相输出端
27	U	Output for U-Phase 逆变器U相输出端
28	P	Positive DC-Link Input 逆变器直流电压正端
29	NC	N.C 空引脚



### Typical Application Circuit

#### 注/Note:

- 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.
- 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).
- 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.
- 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.
- 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: 0.22uF, good temperature, frequency and DC bias characteristic ceramic type are recommended.)
- 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 μF 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.
- 在各种家用电器设备中，几乎都用到了继电器。在这些情况下，MCU 和继电器之间应留有足够的距离。  
Relays are used at almost every systems of electrical equipments at industrial application. In these cases, there should be sufficient distance between the CPU and the relays.
- 控制地和功率地应该分开不限，相交于一点N1。

