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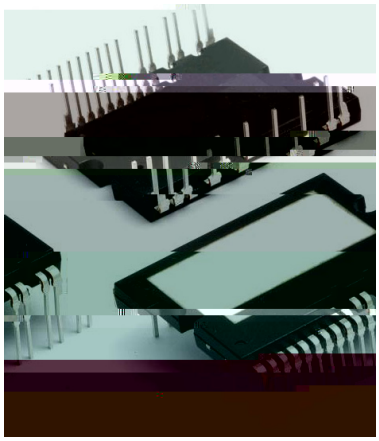


SPMAA−A26 / 26LD, PDD STD, CERAMIC TYPE,
STANDARD DUAL FORM
CASE MODFA

General Description

FNB41060 is a Motion SPM45 module providing a fully−featured, high−performance inverter output stage for AC Induction, BLDC, and PMSM motors. These modules integrate optimized gate drive of the built−in IGBTs to minimize EMI and losses, while also providing multiple on−module protection features including under−voltage lockouts, over−current shutdown, thermal monitoring, and fault reporting. The built−in, high−speed HVIC requires only a single supply voltage and translates the incoming logic−level gate inputs to the high−voltage, high−current drive signals required to properly drive the module's robust short−circuit−rated IGBTs. Separate negative IGBT terminals are available for each phase to support the widest variety of control algorithms.

Features

- UL Certified No. E209204 (UL1557)
- 600 V − 10 A 3−Phase IGBT Inverter with Integral Gate Drivers and Protection
- Low Thermal Resistance Using Ceramic Substrate
- Low−Loss, Short−Circuit Rated IGBTs
- Built−In Bootstrap Diodes and Dedicated Vs Pins Simplify PCB Layout
- Built−In NTC Thermistor for Temperature Monitoring
- Separate Open−Emitter Pins from Low−Side IGBTs for Three−Phase Current Sensing
- Single−Grounded Power Supply
- Isolation Rating: 2000 V_{rms} / Min.
- This Device is Pb−Free and Halide Free

Applications

- Motion Control − Home Appliance / Industrial Motor

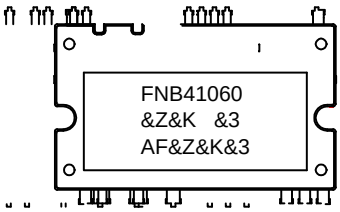
Integrated Power Functions

- 600 V − 10 A IGBT Inverter for Three−phase DC / AC Power Conversion (Please Refer to Figure 2)

Integrated Drive, Protection, and System Control Functions

- For Inverter High−side IGBTs: Gate Drive Circuit, High−voltage Isolated High−speed Level Shifting Control Circuit Under−Voltage Lock−Out (UVLO) Protection
- For Inverter Low−side IGBTs: Gate Drive Circuit, Short−Circuit Protection (SCP) Control Supply Circuit Under−Voltage Lock−Out (UVLO) Protection
- Fault Signaling: Corresponding to UVLO (Low−side Supply) and SC Faults
- Input Interface: Active−HIGH Interface, Works with 3.3 / 5 V Logic, Schmitt Trigger Input

MARKING DIAGRAM



FNB41060	= Specific Device Code
&Z	= Assembly Plant Code
&K	= 2−Digits Lot Run Traceability Code
&3	= 3−Digit Date Code
AF	= Specific Product Name

ORDERING INFORMATION

Device	Package	Shipping
FNB41060	SPMAA−A26 (Pb−Free, Halide Free)	12 Units / Rail

Related Resources

- AN−9070 − Motion SPM 45 Series Users Guide
- AN−9071 − Motion SPM 45 Series Thermal Performance Information
- AN−9072 − Motion SPM 45 Series Mounting Guidance
- RD−344 − Reference Design (Three Shunt Solution)
- RD−345 − Reference Design (One Shunt Solution)

PIN CONFIGURATION

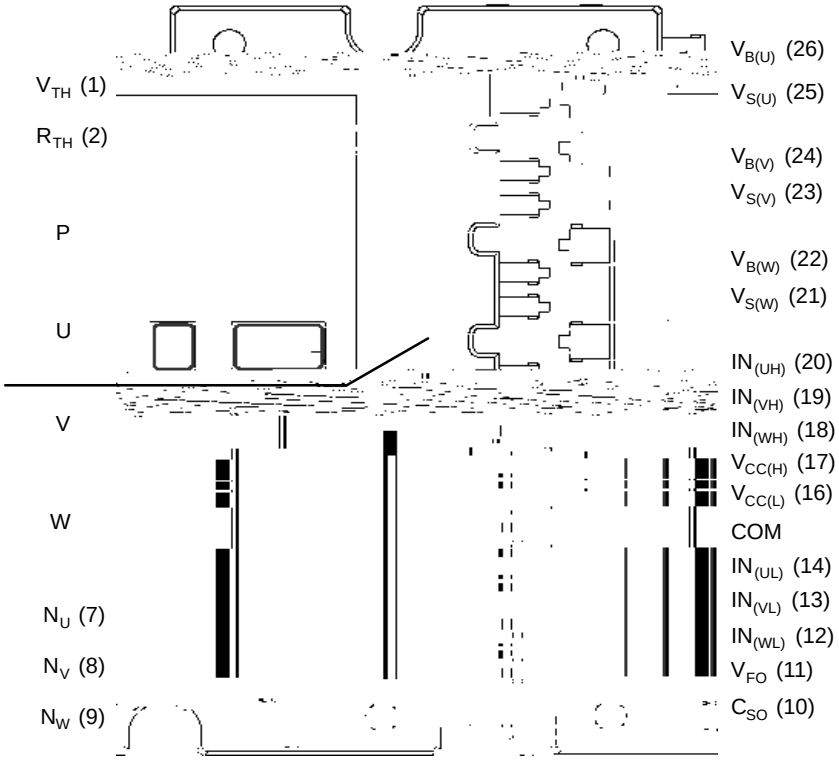
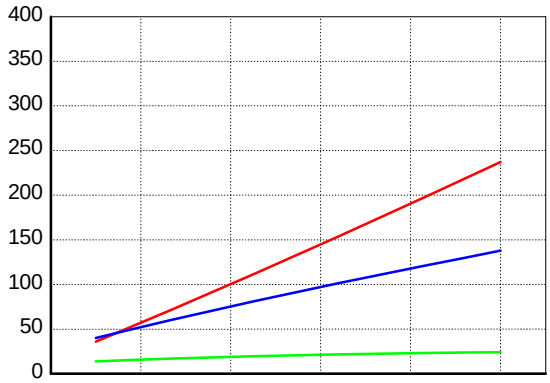


Figure 1. Top View

ABSOLUTE MAXIMUM RATINGS (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Rating	Unit
INVERTER PART				
V_{PN}	Supply Voltage	Applied between P − N_U, N_V, N_W	450	V
$V_{PN(Surge)}$	Supply Voltage (Surge)	Applied between P − N_U, N_V, N_W	500	V
V_{CES}	Collector−Emitter Voltage		600	V
$I_{O,25}$	Output Phase Current	T_C = 25°C, T_J < 150°C (Note 4)	10	A
$I_{O,100}$	Output Phase Current	T_C = 100°C, T_J < 150°C (Note 4)	5	A
I_{pk}	Output Peak Phase Current	T_C = 25°C, T_J < 150°C, Under 1 ms Pulse Width	15	A
P_C	Collector Dissipation	T_C = 25°C per Chip	32	W
T_J	Operating Junction Temperature	(Note 5)	− 40~150	°C
CONTROL PART				
V_{CC}	Control Supply Voltage	Applied between $V_{CC(H)}$, $V_{CC(L)}$ − COM	20	V
V_{BS}	High−Side Control Bias Voltage	Applied between $V_{B(U)}$ − $V_{S(U)}$, $V_{B(V)}$ − $V_{S(V)}$, $V_{B(W)}$ − $V_{S(W)}$	20	V
V_{IN}	Input Signal Voltage	Applied between $IN_{(UH)}$, $IN_{(VH)}$, $IN_{(WH)}$, $IN_{(UL)}$, $IN_{(VL)}$, $IN_{(WL)}$ − COM	−0.3~V_{CC} + 0.3	V
V_{FO}	Fault Output Supply Voltage	Applied between V_{FO} − COM	−0.3~V_{CC} + 0.3	V
I_{FO}	Fault Output Current	Sink Current at V_{FO} pin	1	mA
V_{SC}	Current−Sensing Input Voltage	Applied between C_{SC} − COM	−0.3~V_{CC} + 0.3	V
BOOTSTRAP DIODE PART				
V_{RRM}	Maximum Repetitive Reverse Voltage		600	V
I_F	Forward Current	T_C = 25°C, T_J < 150°C	0.50	A
I_{FP}	Forward Current (Peak)			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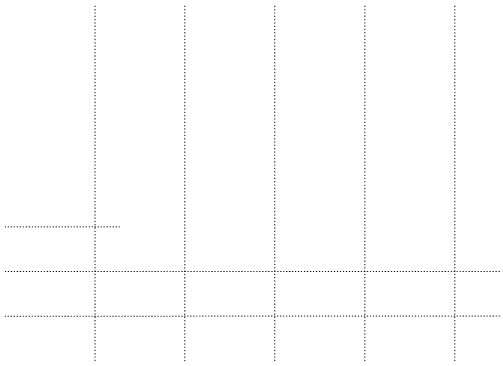

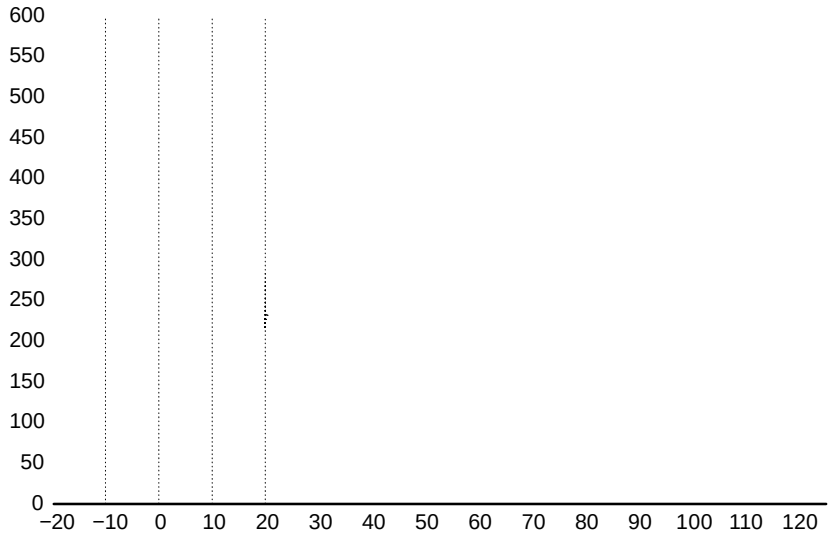
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MECHANICAL CHARACTERISTICS AND RATINGS

Parameter	Conditions		Min	Typ	Max	Unit
Device Flatness	See Figure 8		0	−	+120	μm
Mounting Torque	Mounting Screw: M3 See Figure 9	Recommended 0.7 N • m	0.6	0.7	0.8	N • m

FNB41060

NOTES:

16. To avoid malfunction, the wiring of each input should be as short as possible (less than 2−3 cm).
17. By virtue of integrating an application−specific type of HVIC inside the Motion SPM 45 product, direct coupling to MCU terminals without any optocoupler or transformer isolation is possible.
18. V_{FO} output is open−drain type. This signal line should be pulled up to the positive side of the MCU or control power supply with a resistor that makes I_{FO} up to 1 mA (please refer to Figure 13).
19. C_{SP15} of around seven times larger than bootstrap capacitor C_{BS} is recommended.
20. Input signal is active−HIGH type. There is a 5 kΩ resistor inside the IC to pull down each input signal line to GND. RC coupling circuits is recommended for the prevention of input signal oscillation. $R_S C_{PS}$ time constant should be selected in the range 50~ 50 ns (recommended R_S = 100 Ω, C_{PS} = 1 nF).

Figure 14. Typical Application Circuit

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