

FNA41560, FNA41560B2

Integrated Power Function

- 600 V – 15 A IGBT Inverter for three-phase DC / AC power conversion (please refer to Figure 2)

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PIN DESCRIPTIONS

Pin No.	Pin Name	Pin Description
1	V _{TH}	Thermistor Bias Voltage
2	R _{TH}	

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

Symbol	Parameter	Conditions	Rating	Unit
INVERTER PART				
V _{PN}	Output Voltage	Applied between P – N _U , N _V , N _W	450	V
V _{PN(Surge)}	Output Voltage (Surge)	Applied between P – N _U , N _V , N _W	500	V
V _{CES}	Collector – Emitter Voltage		600	V
±I _C	Each IGBT Collector Current	T _C = 25°C, T _J < 150°C	15	A
±I _{CP}	Each IGBT Collector Current (Peak)	T _C = 25°C, T _J < 150°C, Under 1 ms Pulse Width	30	A
P _C				

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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INVERTER PART

V _{CE(SAT)}	Collector – Emitter Saturation Voltage	V _{CC} = V _{BS} = 15 V V _{IN} = 5 V	I _C = 50 A, T _J = 25°C	–	1.8	2.3	V
V _F	FWDi Forward Voltage	V _{IN} = 0 V	I _F = 50 A, T _J = 25°C	–	1.8	2.3	V
HS	t _{ON}	Switching TimesV					

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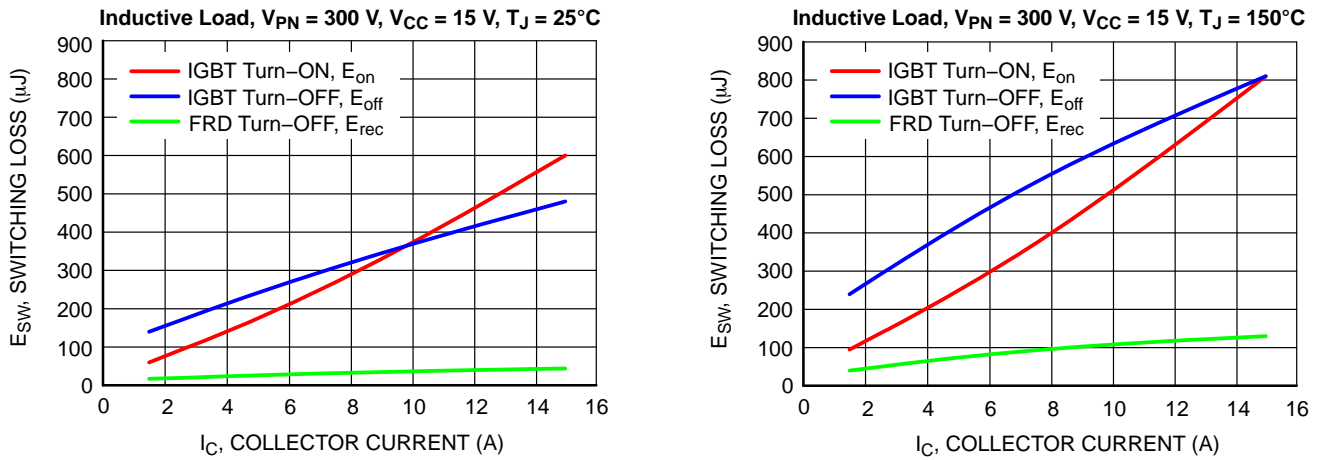


Figure 4. Switching Loss Characteristics (Typical)

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified.) (continued)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
CONTROL PART							
I _{QCCH}	Quiescent V _{CC} Supply Current	V _{CC(H)} = 15 V, I _{N(UH, VH, WH)} = 0 V	V _{CC(H)} - COM	-	-	0.10	mA
I _{QCCL}		V _{CC(L)} = 15 V, I _{N(UL, VL, WL)} = 0 V	V _{CC(L)} - COM	-	-	2.65	mA
I _{PCCH}	Operating V _{CC} Supply Current	V _{CC(L)} = 15 V, f _{PWM} = 20 kHz, duty = 50%, Applied to One PWM Signal Input for High-Side	V _{CC(H)} - COM	-	-	0.15	mA
I _{PCCL}		V _{CC(L)} = 15 V, f _{PWM} = 20 kHz, duty = 50%, Applied to One PWM Signal Input for Low-Side	V _{CC(L)} - COM	-	-	3.65	mA
I _{QBS}	Quiescent V _{BS} Supply Current	V _{BS} = 15 V, I _{N(UH, VH, WH)} = 0 V	V _{B(U)} - V _{S(U)} , V _{B(V)} - V _{S(V)} , V _{B(W)} - V _{S(W)}	-	-	0.30	mA
I _{PBS}	Operating V _{BS} Supply Current	V _{CC} = V _{BS} = 15 V, f _{PWM} = 20 kHz, duty = 50%, Applied to One PWM Signal Input for High-Side	V _{B(U)} - V _{S(U)} , V _{B(V)} - V _{S(V)} , V _{B(W)} - V _{S(W)}	-	-	2.00	mA
V _{FOH}	Fault Output Voltage	V _{SC} = 0 V, V _{FO} Circuit: 10 kΩ to 5 V Pull-up	4.5	-	-	V	
V _{FOL}		V _{SC} = 1 V, V _{FO} Circuit: 10 kΩ to 5 V Pull-up	-	-	0.5	V	
V _{SC(ref)}	Short-Circuit Current Trip Level	V _{CC} = 15 V (Note 7)	0.45	0.50	0.55	V	
UV _{CCD}	Supply Circuit Under-Voltage Protection	Detection level	10.5	-	13.0	V	
UV _{CCR}		Reset level	11.0	-	13.5	V	
UV _{BSD}		Detection level	10.0	-	12.5	V	
UV _{BSR}		Reset level	10.5	-	13.0	V	
t _{FOD}	Fault-Out Pulse Width		30	-	-	μs	
V _{IN(ON)}	ON Threshold Voltage	Applied between I _{N(UH)} , I _{N(VH)} , I _{N(WH)} , I _{N(UL)} , I _{N(VL)} , I _{N(WL)} - COM	-	-	2.6	V	
V _{IN(OFF)}	OFF Threshold Voltage		0.8	-	-	V	
R _{TH}	Resistance of Thermistor	@ T _{TH} = 25°C (Note 8)	-	47	-	kΩ	
		@ T _{TH} = 100°C	-	2.9	-	kΩ	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

7. Short-

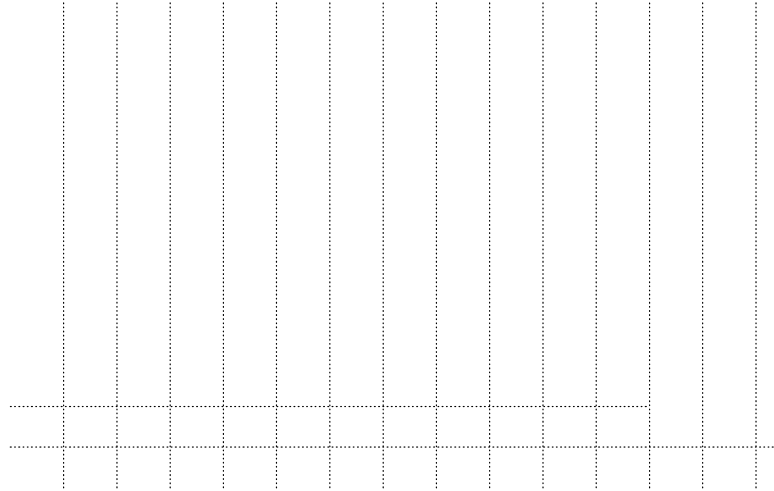


Figure 5. R T Curve of The Built In Thermistor

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RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{PN}	Supply Voltage					

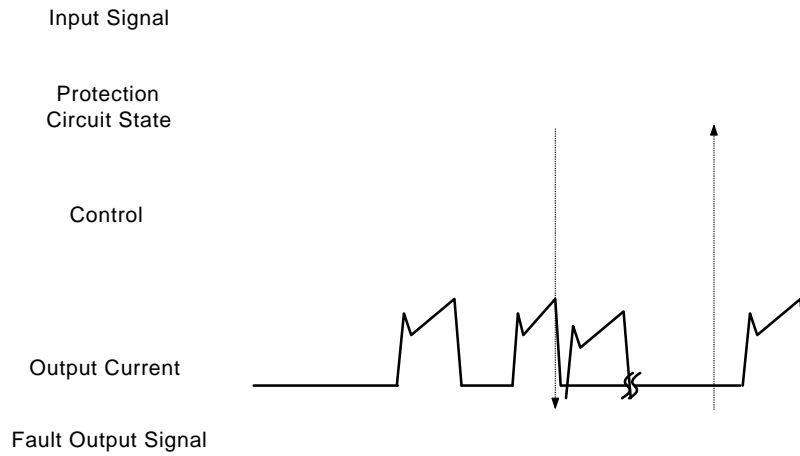
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MECHANICAL CHARACTERISTICS AND RATINGS

Parameter	Conditions	Min	Typ	Max	Unit
Device Flatness	See Fg792.Avice Flatnes15348 63.72709 15.364 reT180 706.844 220.365 .90704 refBT8 0 0 8 6.919785 697.7764 Tm0				

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TIME CHARTS OF PROTECTIVE FUNCTION



- a1: Control supply voltage rises: after the voltage rises UV_{CCR} , the circuits start to operate when next input is applied.
- a2: Normal operation: IGBT ON and carrying current.
- a3: Under-voltage detection (UV_{CCD}).
- a4: IGBT OFF in spite of control input condition.
- a5: Fault output operation starts.
- a6: Under-voltage reset (UV_{CCR}).
- a7: Normal operation: IGBT ON and carrying current.

Figure 10. Under Voltage Protection (Low Side)

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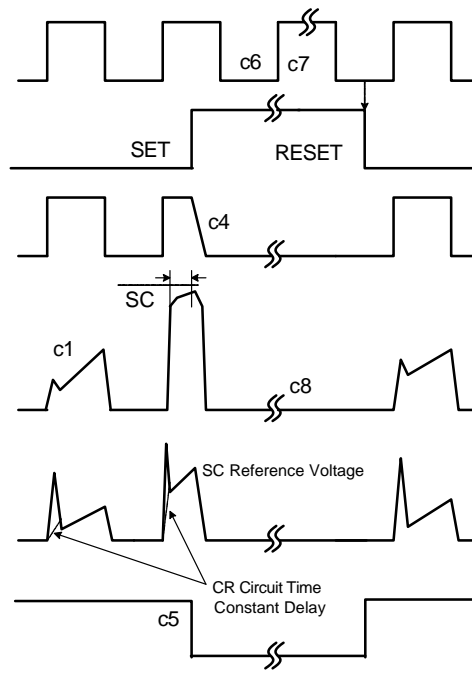
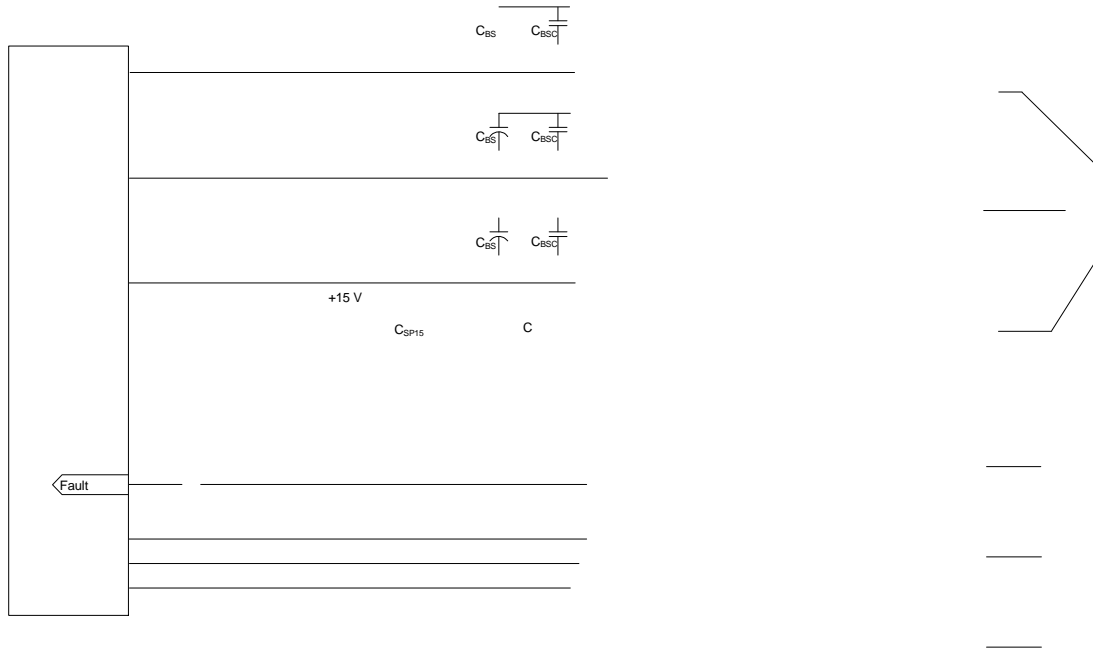


Figure 12. Short Circuit Protection (Low Side Operation Only)

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NOTES:

Figure 14. Typical Applications Circuit

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