Integrated Power Function

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

PIN DESCRIPTIONS

Pin No.	Pin Name	Pin Description
1	V_{TH}	Thermistor Bias Voltage
2	R_{TH}	

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
$\pm I_C$	Each IGBT Collector Current	T_C = 25°C, T_J < 150°C	15	A
$\pm I_{CP}$	Each IGBT Collector Current (Peak)	T_C = 25°C, T_J < 150°C, Under 1 ms Pulse Width	30	A
P_C				

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
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						

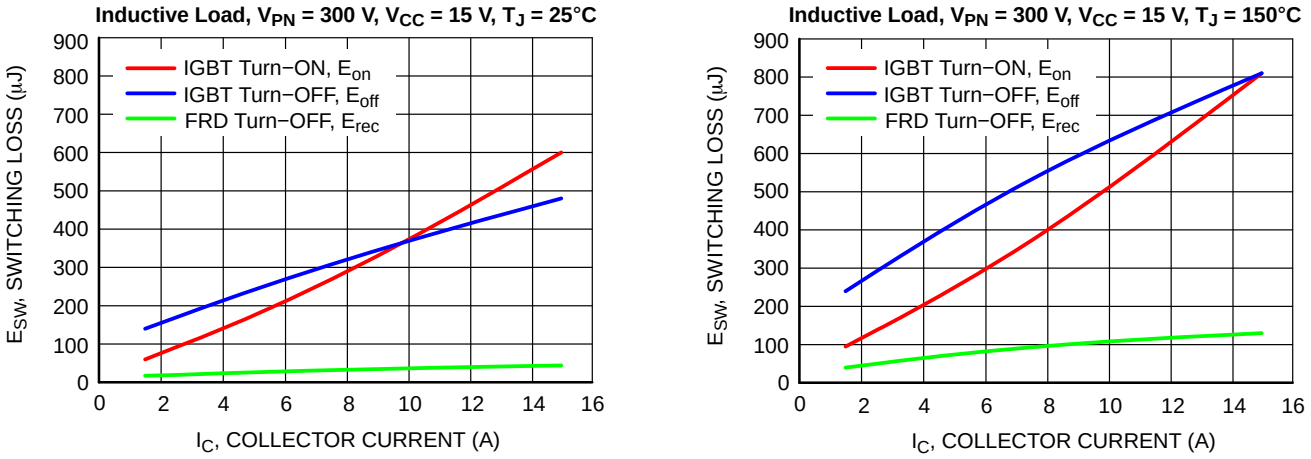


Figure 4. Switching Loss Characteristics (Typical)

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, $IN_{(UH, VH, WH)}$ = 0 V	$V_{CC(H)}$ − COM	−	−	0.10	mA
I_{QCCL}		$V_{CC(L)}$ = 15 V, $IN_{(UL, VL, WL)}$ = 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, $IN_{(UH, VH, WH)}$ = 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 $IN_{(UH)}$, $IN_{(VH)}$, $IN_{(WH)}$, $IN_{(UL)}$, $IN_{(VL)}$, $IN_{(WL)}$ − 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−

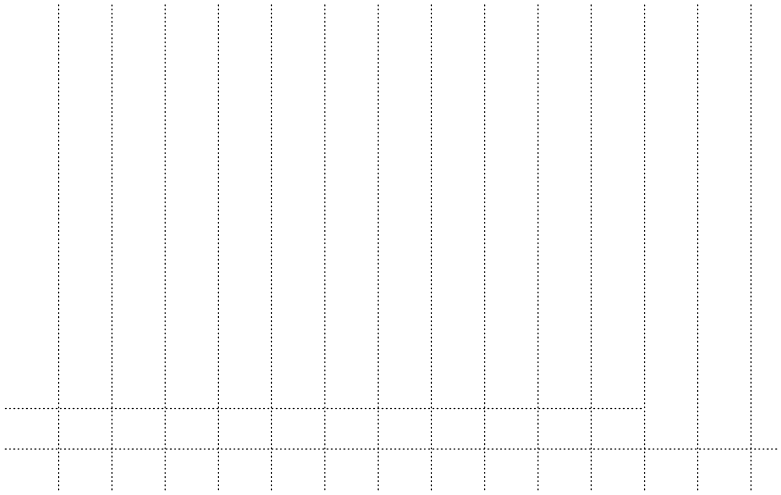


Figure 5. R T Curve of The Built In Thermistor

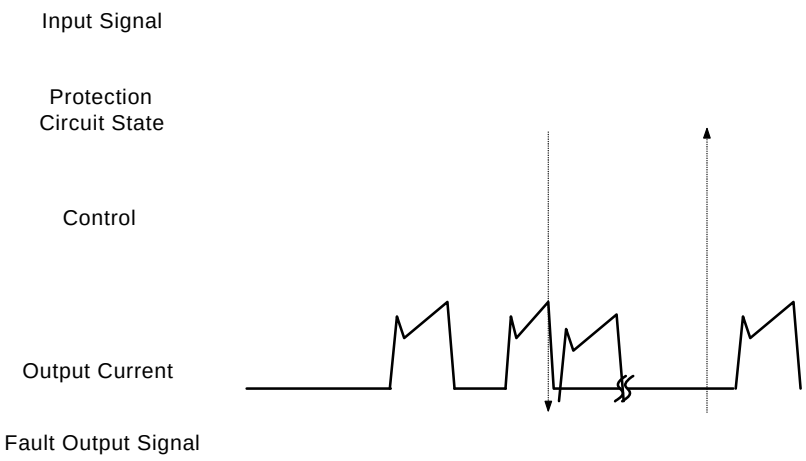
RECOMMENDED OPERATING CONDITIONS

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

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 T				

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)

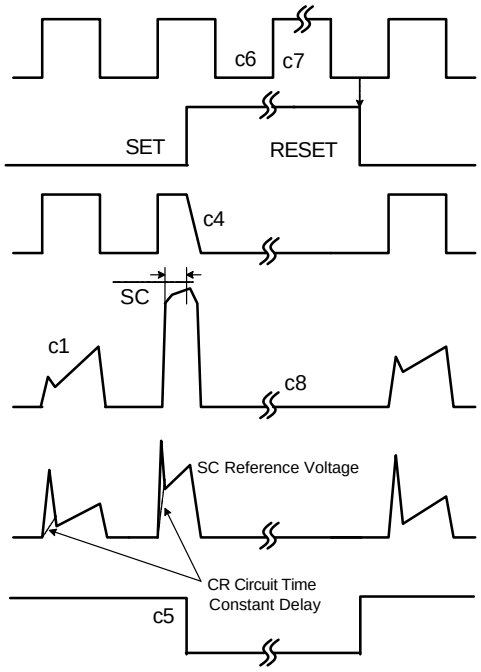
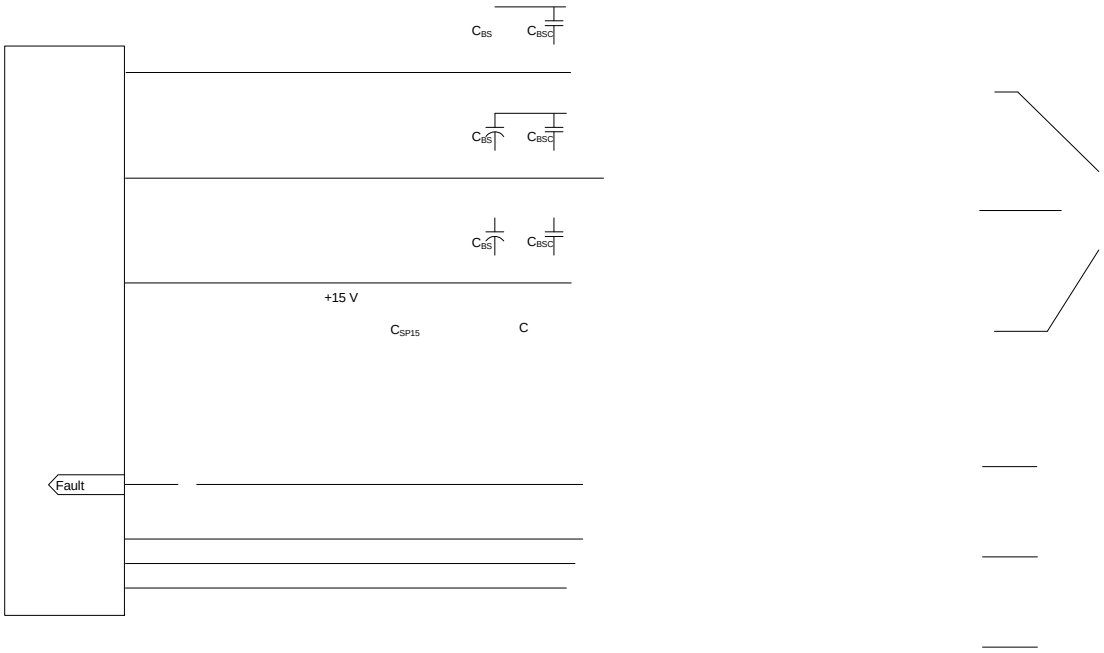


Figure 12. Short Circuit Protection (Low Side Operation Only)



NOTES:

Figure 14. Typical Applications Circuit

D

B)

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