JJMICROELECTRONICS

HPD Module with 750V 820A Trench FS IGBT

JF820Z8BL1

Key performance:

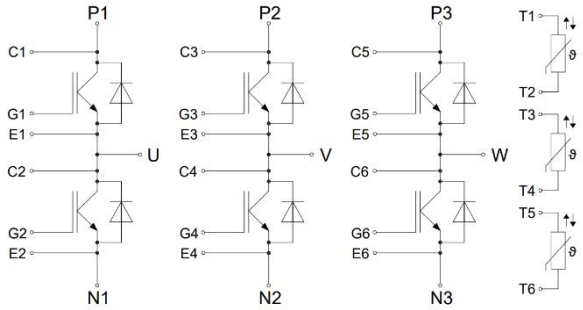
- V_{CE}=750V
- I_C=820A@T_C=100℃
- $V_{CE(sat)}$=1.6V

Features:

- Low V_{CEsat}.
- Low switching losses.
- Low stray inductance design.
- Positive V_{CEsat} temperature coefficient.

Benefits:

- High efficiency for application.
- Integrated NTC temperature sensor.
- RoHS compliant.



Applications:

- Motor drives
- Automotive applications

Maximum rated values , IGBT

Parameter	Conditions	Symbol	Values	Unit
Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	750	V
Implemented collector current		I_{CN}	820	A
Continuous DC collector current	T_F=80℃, $T_{vj\ max}$ = 175°C	$I_{C.nom}$	450	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	1500	A
Gate-emitter peak voltage		V_{GES}	±20	V

Characteristic values , IGBT

Parameter	Conditions	Symbol	Values			Unit
			Min.	Typ.	Max.	
Collector-emitter saturation voltage	I_C = 820A, V_{GE} = 15 V T_{vj} = 25°C	V_{CEsat}	-	1.6	-	V
Gate threshold voltage	I_C = 1 mA, V_{CE} = V_{GE} T_{vj} = 25°C	V_{GEth}	-	5.1	-	V
Collector-emitter cut-off current	V_{CE} = 750 V, V_{GE} = 0 V, T_{vj} = 25°C	I_{CES}	-	-	1.0	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C	I_{GES}	-	-	500	nA
Input capacitance	V_{CE}=25V, V_{GE}=0V, f=100kHz	C_{ies}	-	31	-	nF
Reverse transfer capacitance		C_{res}	-	0.26	-	nF
Gate charge	V_{GE}=±15V	Q_G	-	4.6	-	uC
Short circuit current	V_{CC}=400V, V_{GE} ≤ 15V, t_p ≤ 6us, T_{vj}=150℃	I_{SC}	-	3800	-	A
Turn-on delay time, inductive load	I_C = 450A, V_{CE} = 400 V V_{GE} =±15 V R_G = 5.1Ω T_{vj} = 25°C	$t_{d(on)}$	-	0.31	-	us
Rise time, inductive load		t_r	-	0.77	-	us
Turn-off delay time, inductive load		$t_{d(off)}$	-	1.0	-	us
Fall time, inductive load		t_f	-	0.05	-	us
Turn-on energy loss per pulse		E_{on}	-	14.8	-	mJ
Turn-off energy loss per pulse		E_{off}	-	25.9	-	mJ

Parameter	Conditions	Symbol	Values			Unit
			Min.	Typ.	Max.	
Module inductance		L_M	-	8	-	nH
Temperature under switching conditions		$T_{vj\ op}$	-40	-	150	°C

Maximum rated values , Diode

Parameter	Conditions	Symbol	Values	Unit
Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	750	V
Implemented forward current		I_{FN}	820	A
Continuous DC forward current		I_F	450	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	1500	A
I^2t - value	V_R=0V, t_p=10ms, T_{vj}=150℃	I^2t	14.4	kA^2S

Characteristic values , Diode

Parameter	Conditions	Symbol	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	I_F = 450A, V_{GE} = 0 V T_{vj} = 25°C	V_F	-	1.7	-	V
Peak reverse recovery current	I_F=450A, V_R=400V, -di_F/dt=2300 A/us	I_{RM}	-	51	-	A
Recovered charge		Q_{rr}	-	6.1	-	uC
Reverse recovery energy		E_{rec}	-	1.7	-	mJ
Temperature under switching conditions		$T_{vj\ op}$	-40	-	150	°C

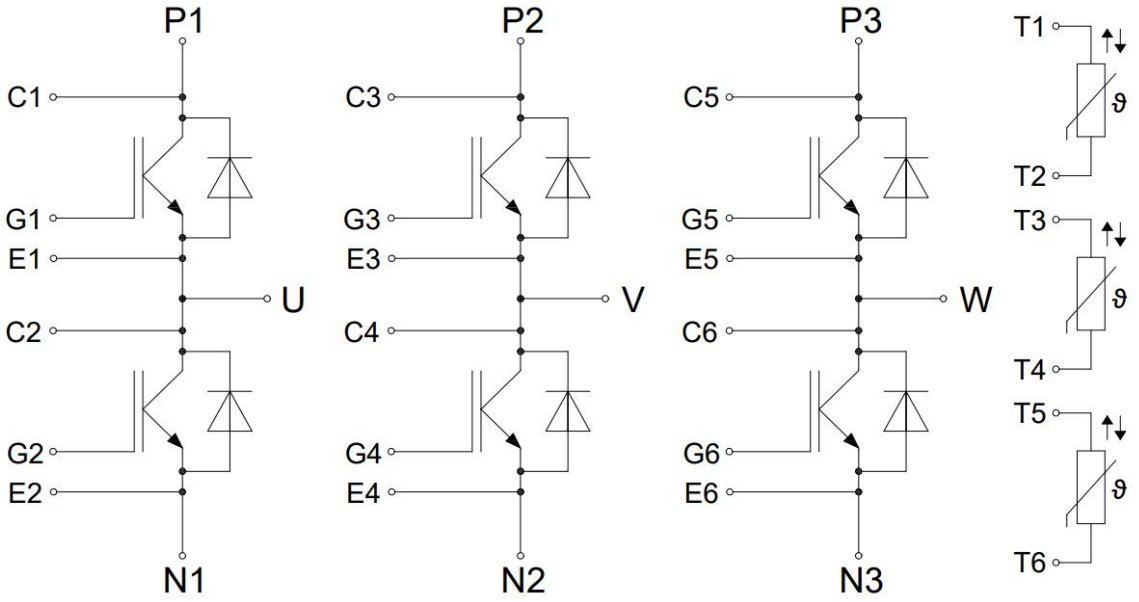
NTC - thermistor

Parameter	Conditions	Symbol	Values			Unit
			Min.	Typ.	Max.	
Rated resistance	T_C=25℃	R_{25}	-	5	-	kΩ
Deviation of R100	T_C=100℃, R_{100}=493Ω	ΔR/R	-5	-	5	%
Power dissipation	T_C=25℃	P_{25}	-	-	20.0	mW
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2 - 1/(298,15K))]$	$B_{25/50}$	-	3375	-	K
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2 - 1/(298,15K))]$	$B_{25/50}$	-	3411	-	K
B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2 - 1/(298,15K))]$	$B_{25/50}$	-	3433	-	K

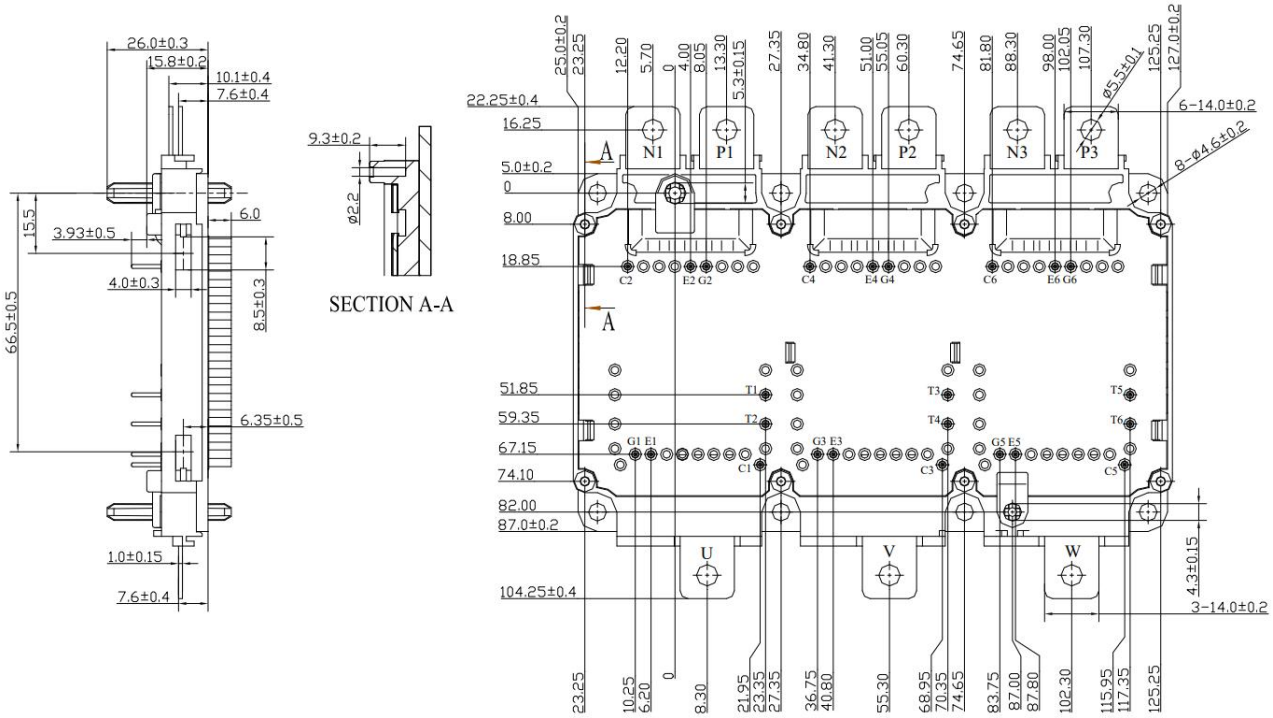
Module

Parameter	Conditions	Symbol	Values	Unit
Isolation test voltage	AC RMS, 1 min, 50Hz, T_C=25℃	V_{ISOL}	2.5	kV
Material of module baseplate			Cu	
Material of internal isolation			Si3N4	
Creepage distance	Thermal to heatsink Thermal to terminal		9.0 9.0	mm mm
Clearance	Terminal to heatsink Terminal to terminal		4.5 4.5	mm mm
Storage temperature		T_{stg}	-40 ~ +125	℃
Mounting torque for module mounting	Mounting – M4	M	1.8 ~ 2.2	Nm
Weight		G	730	g

Circuit diagram



Package outlines (mm)



Revision history

Date	Revision	Changes
Jan 11, 2025	Rev 1.0	Release of the preliminary datasheet.

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