JLHF450B120SD3E7DN

LD3 module with NCE Gen.7 Trench/Fieldstop IGBT and Emitter Controlled diode and Pressfit/NTC

Features

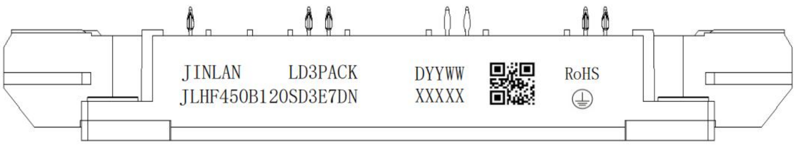
RoHS

- Electrical features
  - Low V_{CEsat}
  - $V_{CE(sat)}$ with positive temperature coefficient
  - 10µs short circuit capability
  - Maximum junction temperature 175℃
  - Low inductance case
  - Fast & soft reverse recovery anti-parallel FWD

LD3

- Mechanical features
  - Isolated Base Plate
  - Pressfit Contact Technology

MARKING DIAGRAM

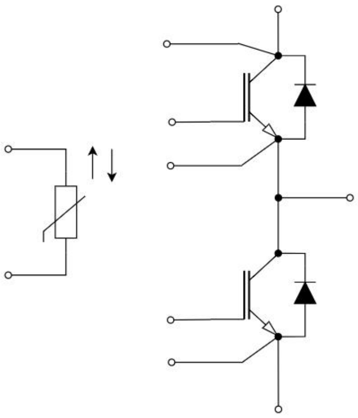


JINLAN = Company Name
JLHF450B120SD3E7DN = Specific Device Code
YYWW = Year and Work Week Code
XXXXX = Serial Number
QR code = Custom Assembly Information

Typical Applications

- Inverter and power supplies
- Motor Drives
- Servo Drives
- Photovoltaic/Fuel cell

Description



Package Insulation coordination

Symbol	Description	Note or test condition	Values	Unit
V_{ISOL}	Isolation test voltage	RMS,f=50Hz,t=60s	3	kV
	Material of module baseplate		Cu	
	Internal isolation	basic insulation(class 1,IEC 61140)	Al_2O_3	
d_{creep}	Creepage distance	terminal to heatsink	14.5	mm
d_{creep}	Creepage distance	terminal to terminal	13.0	mm
d_{clear}	Clearance	terminal to heatsink	12.5	mm
d_{clear}	Clearance	terminal to terminal	10.0	mm
CTI	Comparative tracking index (electrical)		>500	

Package Characteristic values

Symbol	Description	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
L_{sCE}	Stray inductance module				20		nH
$R_{CC'+EE'}$	Module lead resistance, terminals - chip	TC = 25 °C, per switch			1.1		mΩ
T_{STG}	Storage Temperature Range			-40		125	℃
M	Mounting torque for module mounting	-Mounting according to valid application note	M5, Screw	3.0	--	6.0	Nm
M	Terminal connection torque	-Mounting according to valid application note	M6, Screw	3.0	--	6.0	Nm
G	Weight			--	345	--	g

IGBT

Absolute Maximum Ratings (Tc = 25°C unless otherwise noted)

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±30	V
I_{CDC}	Continuous Collector Current @ T_C = 80°C (T_{JMAX} = 175°C)	450	A
I_{CM}	Pulsed Collector Current，t_p limited by $T_{vj\,max}$	900	A

Characteristics (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
$V_{CE(sat)}$	Collector−Emitter Saturation Voltage	I_C =300A, V_{GE} = 15 V	T_{vj} = 25 °C	--	1.50	2.30	V
			T_{vj} = 150 °C	--	1.70	--	
$V_{CE(sat)}$	Collector−Emitter Saturation Voltage	I_C =450A, V_{GE} = 15 V	T_{vj} = 25 °C	--	1.65	2.45	V
			T_{vj} = 150 °C	--	1.85	--	
$V_{GE(TH)}$	Gate−Emitter Threshold Voltage	V_{GE} = V_{CE}, I_C = 5 mA, T_{vj} = 25°C		5.0	6.0	7.0	V
I_{CES}	Collector−Emitter Cutoff Current	V_{GE} = 0 V, V_{CE} =1200V, T_{vj}= 25°C		--	--	1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±30 V, V_{CE} = 0 V, T_{vj} = 25°C		--	--	±200	nA
R_{Gint}	Internal Gate Resistance	T_{vj} = 25 °C		--	0.8	--	Ω
C_{ies}	Input Capacitance	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V		--	64.2	--	nF
C_{res}	Reverse Transfer			--	0.32	--	nF
Q_G	Gate Charge	V_{GE} = ±15 V, V_{CC} = 960 V		--	2.2	--	μC
$t_{d(on)}$	Turn−On Delay Time	I_C = 450A, V_{CC} = 600 V, V_{GE} = 15 /-5V, R_G = 5.0 Ω	T_{vj} = 25 °C	--	260	--	ns
			T_{vj} = 150 °C	--	286	--	
t_r	Rise Time	I_C =450A, V_{CC} = 600 V, V_{GE} = 15 /-5V, R_G = 5.0 Ω	T_{vj} = 25 °C	--	60	--	ns
			T_{vj} = 150 °C	--	93	--	
$t_{d(off)}$	Turn−off Delay Time	I_C = 450A, V_{CC} = 600 V, V_{GE} = 15 /-5V, R_{Goff} = 5.0 Ω	T_{vj} = 25 °C	--	360	--	ns
			T_{vj} = 150 °C	--	440	--	
t_f	Fall Time	I_C = 450A, V_{CC} = 600 V, V_{GE} = 15 /-5V, R_G = 5.0 Ω	T_{vj} = 25 °C	--	53	--	ns
			T_{vj} = 150 °C	--	126	--	
E_{on}	Turn−On Switching Loss per Pulse	I_C =450A, V_{CC} = 600 V, V_{GE} = 15 /-5V, R_G = 5.0 Ω ($T_{vj\,max}$= 175 °C)	T_{vj} = 25 °C	--	26.04	--	mJ
			T_{vj} = 150 °C	--	52.25	--	
E_{off}	Turn Off Switching Loss per Pulse	I_C = 450A, V_{CC} = 600 V, V_{GE} = 15 /-5V, R_G = 5.0 Ω ($T_{vj\,max}$= 175 °C)	T_{vj} = 25 °C	--	35.14	--	mJ
			T_{vj} = 150 °C	--	56.80	--	
I_{SC}	SC Data	V_{GE} ≤ 15 V, V_{CC} = 800 V, V_{CEmax}=V_{CES}-L_{sCE}.di/dt	t_P ≤ 10 μs, T_{vj}=150 °C	--	2000	--	A
R_{thJC}	Thermal resistance	Junction-to-Case (per IGBT)		--	0.079		K/W
$T_{vj\,op}$		Temperature under switching conditions		-40		175[1]	℃

[1] $T_{vj\,op}$ > 150℃ is only allowed for operation at overload conditions.

Diodes

Absolute Maximum Ratings (Tc = 25°C unless otherwise noted)

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current @ T_C=80℃	450	A
I_{FRM}	Diode Maximum Forward Current t_p=1ms	900	A

Characteristics （Tc=25℃ unless otherwise noted）

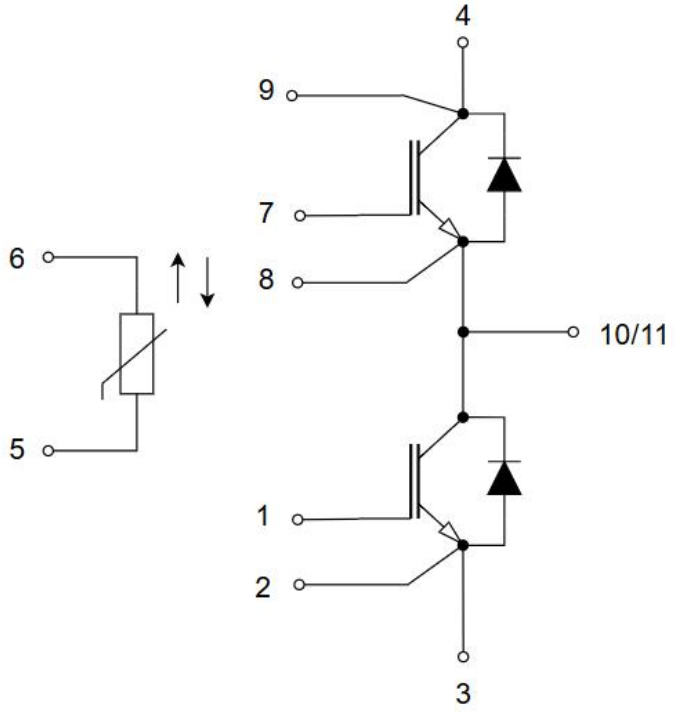
Symbol	Parameter	Note or Test Condition		Min	Typ	Max	Unit
V_F	Diode Forward Voltage	I_F = 300 A	T_{vj} = 25 °C	--	1.65	2.65	V
			T_{vj} = 150 °C	--	1.55	--	
V_F	Diode Forward Voltage	I_F = 450 A	T_{vj} = 25 °C	--	1.80	2.80	
			T_{vj} = 150 °C	--	1.70	--	
Q_r	Recovered Charge	I_F = 450 A, V_R = 600 V, R_G = 5.0 Ω ($T_{vj\,max}$= 175 °C)	T_{vj} = 25 °C	--	10.66	--	μC
			T_{vj} = 150 °C	--	33.15	--	
I_{RM}	Peak Reverse Recovery Current	I_F = 450 A, V_R = 600 V, R_G = 5.0 Ω ($T_{vj\,max}$= 175 °C)	T_{vj} = 25 °C	--	139	--	A
			T_{vj} = 150 °C	--	199	--	
E_{rec}	Reverse recovery energy	I_F = 450 A, V_R = 600 V, R_G = 5.0 Ω ($T_{vj\,max}$= 175 °C)	T_{vj} = 25 °C	--	9.85	--	mJ
			T_{vj} = 150 °C	--	24.38	--	
R_{thJC}	Thermal resistance, junction to case	per diode		--	0.098	--	K/W
$T_{vj\,op}$		Temperature under switching conditions		-40		175[2]	℃

[2] $T_{vj\,op}$ >150℃ is only allowed for operation at overload conditions.

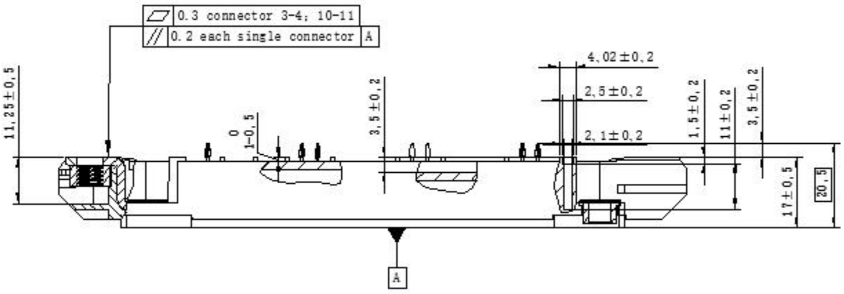
NTC Characteristics (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
R_{25}	Rated Resistance		--	5.0	--	kΩ
ΔR/R	Deviation of R100	T_C=100 ℃,R_{100}=493.3Ω	-5	--	5	%
P_{25}	Power Dissipation		--	--	20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2- 1/(298.15K))]$	--	3375	--	K
$B_{25/80}$	B-value	$R_2=R_{25}\exp[B_{25/80}(1/T_2- 1/(298.15K))]$	--	3411	--	K
$B_{25/100}$	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2- 1/(298.15K))]$	--	3433	--	K

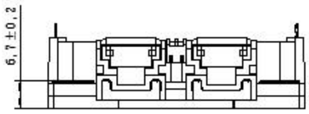
CIRCUIT DIAGRAM



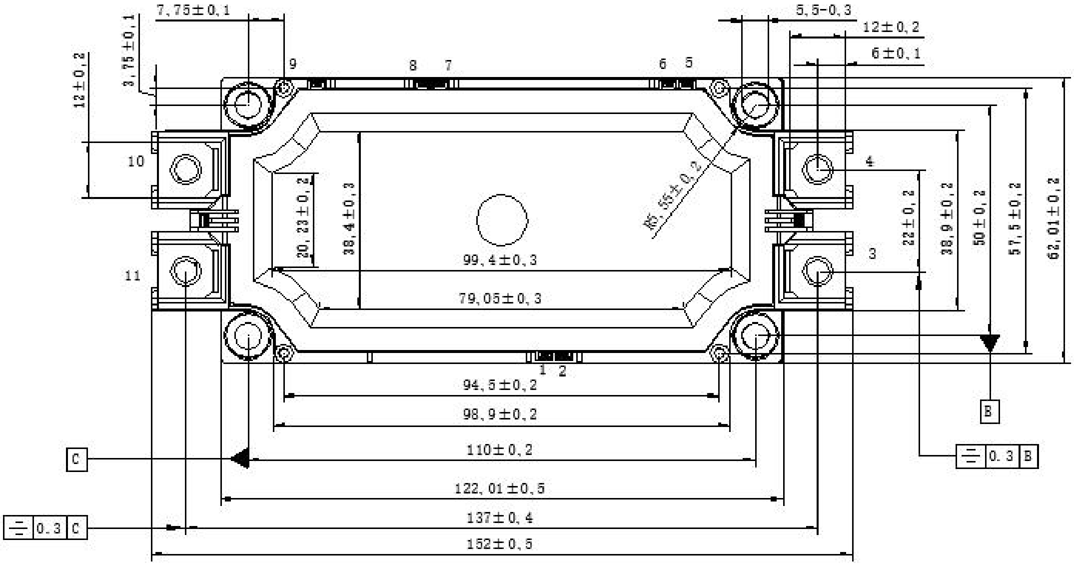
PACKAGE DIMENSION



SIDE VIEW



SIDE VIEW



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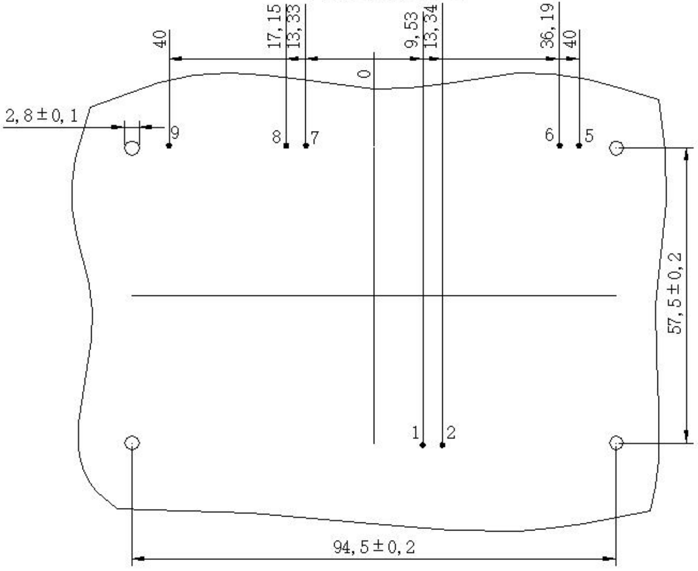

REVISION HISTORY

Document version	Date of release	Description of changes
Rev.00	2024-12-19	Preview

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