



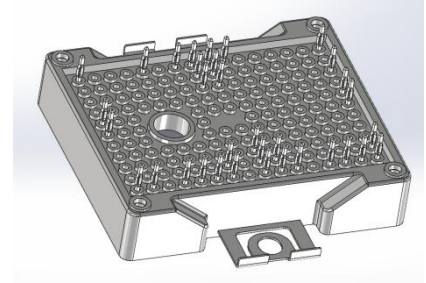
JL3I150V65SE2E7PN

3-Level NPC Inverter Module with 650V Trench Stop IGBTs



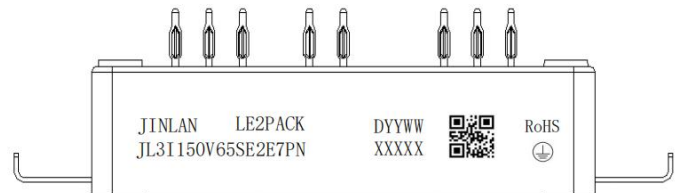
Features

- Electrical features
 - 650V Trench Stop IGBTs
 - Low Inductive Design
 - Low Switching Losses
 - Low Inductive Layout
 - Thermistor



- Mechanical features
 - Compact Design
 - Pressfit contact technology
 - Al₂O₃ Substrate with Low Thermal Resistance

LE2 Pack



Typical Applications

- 3-Level-Applications
- Solar Applications
- UPS Systems

JINLAN

= Company Name

JL3I150V65SE2E7PN

= Specific Device Code

YYWW

= Year and Work Week Code

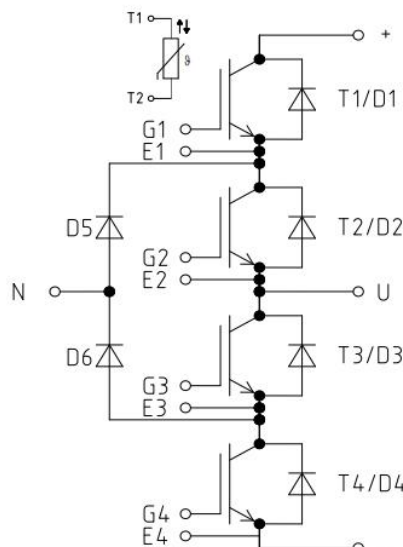
XXXXX

= Serial Number

QR code

= Custom Assembly Information

Description





Package Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=60s	2.5	kV
Internal isolation		basic insulation(class 1, IEC 61140)	Al_2O_3	
Creepage distance	d_{creep}	terminal to heatsink	11.5	mm
Clearance	d_{clear}	terminal to heatsink	10	mm
Comparative tracking index (electrical)	CTI		>200	
RTI Elec.	RTI	housing	140	°C

Package Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray Inductance	LCE		--	15	--	nH
Module Lead Resistance, Terminal to Chip	$R_{CC'+EE'}$		--	2	--	mΩ
Storage Temperature Range	T_{STG}		-40		125	°C
Mounting torque for module mounting	M	-Mounting according to valid application note	40	--	80	N
Weight	G		--	39	--	g

**IGBT (T1、T2、T3、T4)****Absolute Maximum Ratings** (T_C = 25°C unless otherwise noted)

Symbol	Description	Value	Unit
V _{CES}	Collector-Emitter Voltage	650	V
V _{GES}	Gate-Emitter Voltage	± 30	V
I _{CDC}	Continuous Collector Current @ T _C = 80°C (T _{JMAX} = 175°C)	150	A
I _{CM}	Pulsed Collector Current, t _p limited by T _{vj max}	300	A
T _{Jmax}	Maximum Junction Temperature	175	°C
P _D	Power Dissipation @ T _C = 25°C	379	W
	Power Dissipation @T _C = 100 °C	151	W

Characteristics (T_C=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 150A, V _{GE} = 15V				V
		T _{vj} = 25 °C	--	1.35	1.90	
		T _{vj} = 175 °C	--	1.60	--	
V _{GE(TH)}	Gate-Emitter Threshold Voltage	I _C =3mA, V _{CE} =V _{GE}	4.0	--	5.5	V
I _{CES}	Collector-Emitter Cutoff Current	V _{GE} = 0 V, V _{CE} = 650 V	--	--	200	μA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = ± 30 V, V _{CE} = 0 V, T _{vj} = 25°C	--	--	± 100	nA
R _{Gint}	Internal Gate Resistance	T _{vj} = 25 °C	--	0.8	--	Ω
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=1MHz	--	12080	--	pF
C _{oes}	Output capacitance		--	424	--	pF
C _{res}	Reverse Transfer		--	52	--	pF
Q _G	Gate Charge	T _J = 25°C V _{CE} = 400 V, I _C = 150 A V _{GE} = -5 V to +15 V	--	0.381	--	μC
t _{d(on)}	Turn-On Delay Time	V _{CE} =400V, I _C =150A, V _{GE} = -5 V to +15 V, R _G =5Ω Inductive Load T _{vj} =25°C	--	81	--	ns
t _r	Rise Time		--	52	--	
t _{d(off)}	Turn-off Delay Time		--	224	--	
t _f	Fall Time		--	40	--	
E _{on}	Turn-On Switching Loss per Pulse		--	6.6	--	mJ
E _{off}	Turn Off Switching Loss per Pulse		--	3.5	--	
t _{d(on)}	Turn-On Delay Time	V _{CE} =400V, I _C =150A, V _{GE} = -5 V to +15 V, R _G =5Ω T _J =175°C	--	90	--	ns
t _r	Rise Time		--	63	--	
t _{d(off)}	Turn-off Delay Time		--	244	--	
t _f	Fall Time		--	47	--	
E _{on}	Turn-on Switching Loss per Pulse		--	8.3	--	mJ
E _{off}	Turn Off Switching Loss per Pulse		--	5.0	--	
R _{thJC}	Thermal resistance	Junction-to-Case (per IGBT)	--	0.294	--	K/W
T _{vj op}		Temperature under switching conditions	-40		150 ¹⁾	°C

¹⁾T_{vj op} > 150°C is only allowed for operation at overload conditions. For detailed specifications please refer to AN 2018-14.

**Diode (D1、D2、D3、D4)****Absolute Maximum Ratings** ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	650	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	300	A

Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 150\text{ A}, T_J = 25^\circ\text{C}$	--	1.70	2.4	V
		$I_F = 150\text{ A}, T_J = 175^\circ\text{C}$	--	1.60	--	
T_{rr}	Reverse Recovery Time	$V_{CE}=400\text{V},$ $V_{GE} = -5\text{ V to } +15\text{ V},$ $I_F=150\text{A}, R_G=5\Omega$ $T_{vj}=25^\circ\text{C}$	--	202	--	ns
I_{RM}	Peak Reverse Recovery Current		--	23.9	--	A
Q_{rr}	Recovered Charge		--	3.3	--	μC
E_{rec}	Reverse Recovery Energy		--	0.5	--	mJ
T_{rr}	Reverse Recovery Time	$V_{CE}=400\text{V},$ $V_{GE} = -5\text{ V to } +15\text{ V}$ $I_F=150\text{A}, R_G=5\Omega, T_J=175^\circ\text{C}$	--	273	--	ns
I_{RM}	Peak Reverse Recovery Current		--	45.3	--	A
Q_{rr}	Recovered Charge		--	8.1	--	μC
E_{rec}	Reverse Recovery Energy		--	0.8	--	mJ
R_{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	0.319	--	K/W
$T_{vj\text{ op}}$		Temperature under switching conditions	-40		150 ²⁾	$^\circ\text{C}$

²⁾ $T_{vj\text{ op}} > 150^\circ\text{C}$ is only allowed for operation at overload conditions. For detailed specifications please refer to AN 2018-14.

Diode (D5、D6)**Absolute Maximum Ratings** ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	650	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	300	A

Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 150\text{ A}, T_J = 25^\circ\text{C}$	--	1.70	2.4	V
		$I_F = 150\text{ A}, T_J = 175^\circ\text{C}$	--	1.60	--	
T_{rr}	Reverse Recovery Time	$V_{CE}=400\text{V},$ $V_{GE} = -5\text{ V to } +15\text{ V}$ $I_F=150\text{A}, R_G=5\Omega$ $T_{vj}=25^\circ\text{C}$	--	202	--	ns
I_{RM}	Peak Reverse Recovery Current		--	23.9	--	A
Q_{rr}	Recovered Charge		--	3.3	--	μC
E_{rec}	Reverse Recovery Energy		--	0.5	--	mJ
T_{rr}	Reverse Recovery Time	$V_{CE}=400\text{V},$ $V_{GE} = -5\text{ V to } +15\text{ V}$ $I_F=150\text{A}, R_G=5\Omega, T_J=175^\circ\text{C}$	--	273	--	ns
I_{RM}	Peak Reverse Recovery Current		--	45.3	--	A
Q_{rr}	Recovered Charge		--	8.1	--	μC
E_{rec}	Reverse Recovery Energy		--	0.8	--	mJ
R_{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	0.31	--	K/W
$T_{vj\text{ op}}$		Temperature under switching conditions	-40		150 ³⁾	$^\circ\text{C}$

³⁾ $T_{vj\text{ op}} > 150^\circ\text{C}$ is only allowed for operation at overload conditions. For detailed specifications please refer to AN 2018-14.

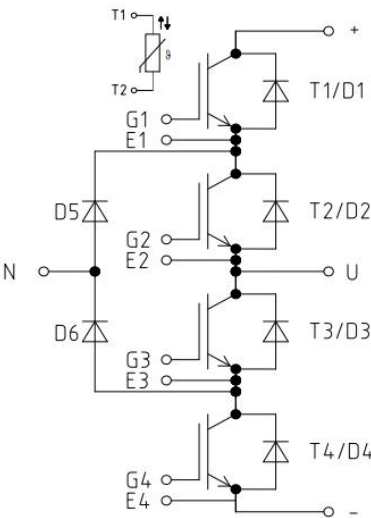


NTC Characteristics (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
R ₂₅	Rated Resistance		--	5.0	--	kΩ
ΔR/R	Deviation of R100	T _C =100 °C, 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

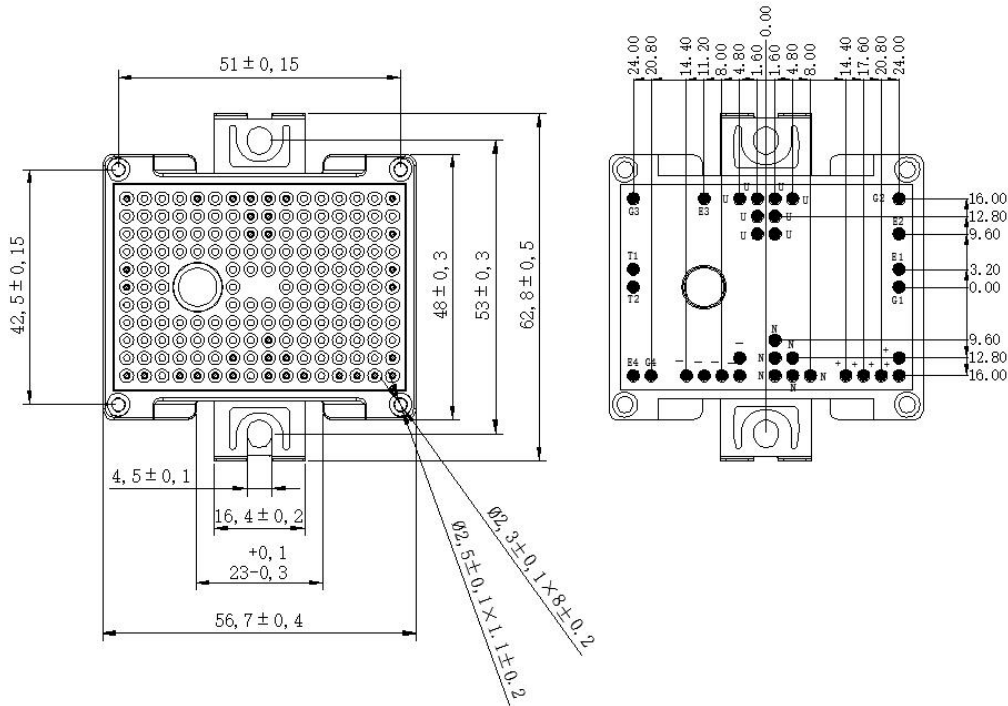
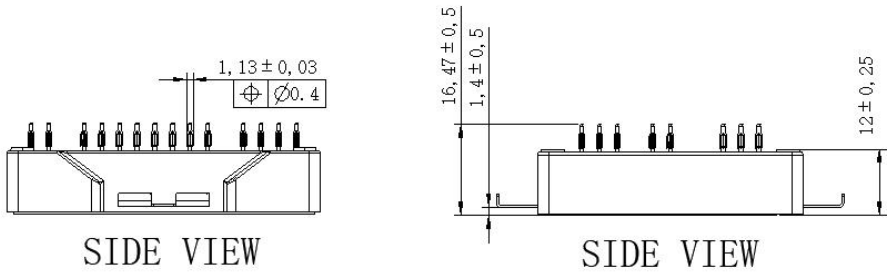


CIRCUIT DIAGRAM



PACKAGE DIMENSION

Dimensions in Millimeters





REVISION HISTORY

Document version	Date of release	Description of changes
Rev.00	2024-10-30	Preview
Rev.01	2025-1-14	PIN location degree modification



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