

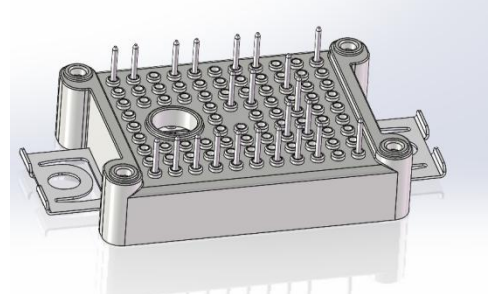
JLPI15B120RE1E6SN

LE1 PACK module with Trench/Fieldstop IGBT and Emitter Controlled diode and NTC



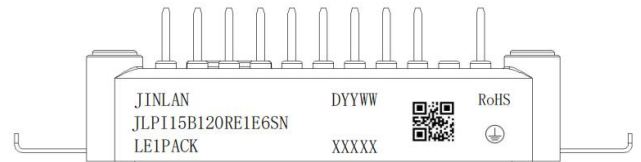
Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- 10 μ s short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175°C
- Low inductance case
- Al_2O_3 substrate with low thermal resistance
- Solder Contact Technology
- Rugged mounting due to integrated mounting clamps



LE1 Pack

MARKING DIAGRAM

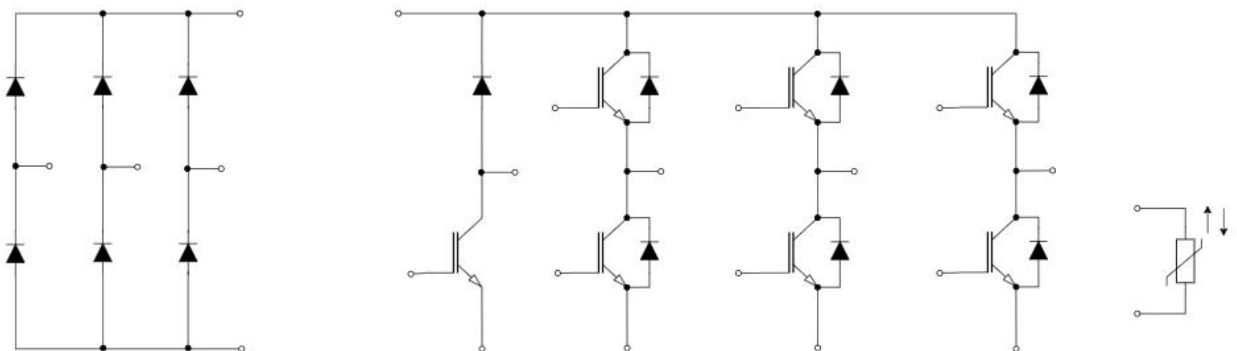


Typical Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

JINLAN	= Company Name
JLPI15B120RE1E6SN	= 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
Creepage distance	d_{creep}	terminal to terminal	6.3	mm
Clearance	d_{clear}	terminal to heatsink	10	mm
Clearance	d_{clear}	terminal to terminal	5	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		--	30	--	nH
Storage Temperature Range	T_{STG}		-40		125	°C
Mountig force per clamp	F		20	--	50	N
Weight	G		--	24	--	g

**IGBT, Inverter****Absolute Maximum Ratings** ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 25	V
I_C	Collector Current @ $T_C = 25^\circ\text{C}$	30	A
	Collector Current @ $T_C = 100^\circ\text{C}$	15	A
I_{CM}	Pulsed Collector Current, t_p limited by $T_{vj\max}$	30	A

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE} = 15\text{ V}, I_C = 15\text{ A}, T_{vj} = 25^\circ\text{C}$	--	1.55	1.90	V
		$V_{GE} = 15\text{ V}, I_C = 15\text{ A}, T_{vj} = 150^\circ\text{C}$	--	1.70	--	
$V_{GE(TH)}$	Gate-Emitter Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1\text{ mA}, T_{vj} = 25^\circ\text{C}$	5.0	6.0	7.0	V
I_{CES}	Collector-Emitter Cutoff Current	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}, T_{vj} = 25^\circ\text{C}$	--	--	100	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0\text{ V}, T_{vj} = 25^\circ\text{C}$	--	--	200	nA
R_{Gint}	Internal Gate Resistance	$f = 1\text{ MHz}$	--	0.5	--	Ω
C_{ies}	Input Capacitance	$V_{CE} = 30\text{ V}, f = 1\text{ MHz}, V_{GE} = 0\text{ V}$	--	1430	--	pF
C_{oes}	Output Capacitance		--	35	--	pF
C_{res}	Reverse Transfer Capacitance		--	25	--	pF
Q_G	Gate Charge	$V_{CC} = 960\text{ V}, V_{GE} = 15\text{ V}, I_C = 15\text{ A}$	--	90	--	nC
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 600\text{ V}, I_C = 15\text{ A}$ $R_{Gon} = 25\Omega, R_{Goff} = 25\Omega$ $V_{GE} = \pm 15\text{ V}$ Inductive Load $T_{vj} = 25^\circ\text{C}$	--	23	--	ns
t_r	Rise Time		--	21	--	
$t_{d(off)}$	Turn-off Delay Time		--	206	--	
t_f	Fall Time		--	22	--	
E_{on}	Turn-On Switching Loss per Pulse		--	0.9	--	mJ
E_{off}	Turn Off Switching Loss per Pulse		--	0.6	--	
E_{ts}	Total Switching Loss		--	1.5	--	
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 600\text{ V}, I_C = 15\text{ A}$ $R_{Gon} = 25\Omega, R_{Goff} = 25\Omega$ $V_{GE} = \pm 15\text{ V}$ Inductive Load $T_{vj} = 150^\circ\text{C}$	--	TBD	--	ns
t_r	Rise Time		--	TBD	--	
$t_{d(off)}$	Turn-off Delay Time		--	TBD	--	
t_f	Fall Time		--	TBD	--	
E_{on}	Turn-on Switching Loss per Pulse		--	TBD	--	mJ
E_{off}	Turn Off Switching Loss per Pulse		--	TBD	--	
E_{ts}	Total Switching Loss		--	TBD	--	
I_{sc}	SC Data	$t_p \leq 10\mu\text{s}, V_{GE} \leq 15\text{ V}, T_{vj} = 150^\circ\text{C}, V_{CC} = 600\text{ V}$	--	70	--	A
R_{thJC}	Thermal resistance	Junction-to-Case (per IGBT)		1.077		K/W
$T_{vj\text{ op}}$		Temperature under switching conditions	-40		175 ¹⁾	$^\circ\text{C}$

¹⁾ $T_{vj\text{ op}} > 150^\circ\text{C}$ is only allowed for operation at overload conditions.



Diode, Inverter

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

Symbol	Description	Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	15	A
I _{FM}	Diode Maximum Forward Current t _p =1ms	30	A

Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V _F	Diode Forward Voltage	I _F = 15A, V _{GE} = 0V, T _{vj} = 25°C	--	2.2	3.0	V
		I _F = 15A, V _{GE} = 0V, T _{vj} = 150°C	--	2.0	--	
Q _r	Recovered Charge	V _{CC} = 600 V, I _C = 15 A R _{Gon} = 25Ω, R _{Goff} = 25Ω V _{GE} = ±15V Inductive Load T _{vj} = 25°C	--	0.72	--	μC
I _{RM}	Peak Reverse Recovery Current		--	12	--	A
T _{rr}	Reverse Recovery Time		--	120	--	ns
Q _r	Recovered Charge	V _{CC} = 600 V, I _C = 15 A R _{Gon} = 25Ω, R _{Goff} = 25Ω V _{GE} = ±15V Inductive Load T _{vj} = 150°C	--	TBD	--	μC
I _{RM}	Peak Reverse Recovery Current		--	TBD	--	A
T _{rr}	Reverse Recovery Time		--	TBD	--	ns
R _{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	1.648	--	K/W
T _{vj op}		Temperature under switching conditions	-40		175 ²⁾	°C

²⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.

Diode, Rectifier

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

Symbol	Description	Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage	1600	V
I _F	Diode Continuous Forward Current	15	A
I _{FM}	Diode Maximum Forward Current t _p =1ms	30	A

Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V _F	Diode Forward Voltage	I _F = 15A, T _{vj} = 150 °C	--	1.2	--	V
I _R	Reverse Current	T _{vj} = 150 °C, V _R = 1600V	--	1.0	--	mA
R _{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	0.930	--	K/W
T _{vj op}		Temperature under switching conditions	-40		175 ³⁾	°C

³⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.

**IGBT, Chopper****Absolute Maximum Ratings** (T_c = 25°C unless otherwise noted)

Symbol	Description	Value	Unit
V _{CES}	Collector-Emitter Voltage	1200	V
V _{GES}	Gate-Emitter Voltage	±30	V
I _C	Collector Current @ T _c =25°C	30	A
	Collector Current @ T _c =80°C	15	A
I _{CM}	Pulsed Collector Current, t _p =1S	30	A

Characteristics (T_c = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} = 15 V, I _C = 15 A, T _{vj} = 25°C	--	1.55	1.90	V
		V _{GE} = 15 V, I _C = 15 A, T _{vj} = 150°C	--	1.70	--	
V _{GE(TH)}	Gate-Emitter Threshold Voltage	V _{GE} = V _{CE} , I _C = 1mA, T _{vj} = 25°C	5.0	6.0	7.0	V
I _{CES}	Collector-Emitter Cutoff Current	V _{GE} = 0 V, V _{CE} = V _{CES} , T _{vj} = 25°C	--	--	100	μA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = V _{GES} , V _{CE} = 0 V, T _{vj} = 25°C	--	--	200	nA
R _{Gint}	Internal Gate Resistance	f=1MHz	--	0.5	--	Ω
C _{ies}	Input Capacitance	V _{CE} =30V, f=1MHz, V _{GE} =0V	--	1430	--	pF
C _{oes}	Output Capacitance		--	35	--	pF
C _{res}	Reverse Transfer Capacitance		--	25	--	pF
Q _G	Gate Charge	V _{CC} =960V, V _{GE} =15V, I _C =15A	--	90	--	nC
t _{d(on)}	Turn-On Delay Time	V _{CC} = 600 V, I _C = 15 A R _{Gon} = 25Ω, R _{Goff} = 25Ω V _{GE} = ±15V Inductive Load T _{vj} = 25°C	--	23	--	ns
t _r	Rise Time		--	21	--	
t _{d(off)}	Turn-off Delay Time		--	206	--	
t _f	Fall Time		--	22	--	
E _{on}	Turn-On Switching Loss per Pulse		--	0.9	--	mJ
E _{off}	Turn Off Switching Loss per Pulse		--	0.6	--	
E _{ts}	Total Switching Loss		--	1.5	--	
t _{d(on)}	Turn-On Delay Time	V _{CC} = 600 V, I _C = 15 A R _{Gon} = 25Ω, R _{Goff} = 25Ω V _{GE} = ±15V Inductive Load T _{vj} = 150°C	--	TBD	--	ns
t _r	Rise Time		--	TBD	--	
t _{d(off)}	Turn-off Delay Time		--	TBD	--	
t _f	Fall Time		--	TBD	--	
E _{on}	Turn-on Switching Loss per Pulse		--	TBD	--	mJ
E _{off}	Turn Off Switching Loss per Pulse		--	TBD	--	
E _{ts}	Total Switching Loss		--	TBD	--	
I _{sc}	SC Data	t _p ≤10μs, V _{GE} ≤15V, T _{vj} =150°C, V _{CC} =600V	--	70	--	A
R _{thJC}	Thermal resistance	Junction-to-Case (per IGBT)		1.019		K/W
T _{vj op}		Temperature under switching conditions	-40		175 ¹⁾	°C

⁴⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.



Diode, Chopper

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

Symbol	Description	Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	10	A
I _{FM}	Diode Maximum Forward Current t _p =1ms	20	A

Characteristics (T_C=25°C unless otherwise noted)

V _F	Diode Forward Voltage	I _F = 10A, V _{GE} =0V, T _{vj} = 25°C	--	1.60		V
		I _F =10A, V _{GE} =0V, T _{vj} = 150°C	--	1.50	--	
Q _r	Recovered Charge	V _R =600V, I _F =10A, R _{Gon} = 10Ω, R _{Goff} = 25Ω V _{GE} =±15V, T _{vj} =25°C	--	0.214	--	μC
I _{RM}	Peak Reverse Recovery Current		--	5.22	--	A
T _{rr}	Reverse Recovery Time		--	27.5	--	ns
E _{rec}	Reverse Recovery Energy		--	0.090	--	mJ
Q _r	Recovered Charge	V _R =600V, I _F =10A, R _{Gon} = 10Ω, R _{Goff} = 25Ω V _{GE} =±15V, T _{vj} =150°C	--	0.495	--	μC
I _{RM}	Peak Reverse Recovery Current		--	7.97	--	A
T _{rr}	Reverse Recovery Time		--	42.9	--	ns
E _{rec}	Reverse Recovery Energy		--	0.291	--	mJ
R _{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	1.862	--	K/W
T _{vj op}		Temperature under switching conditions	-40		175 ²⁾	°C

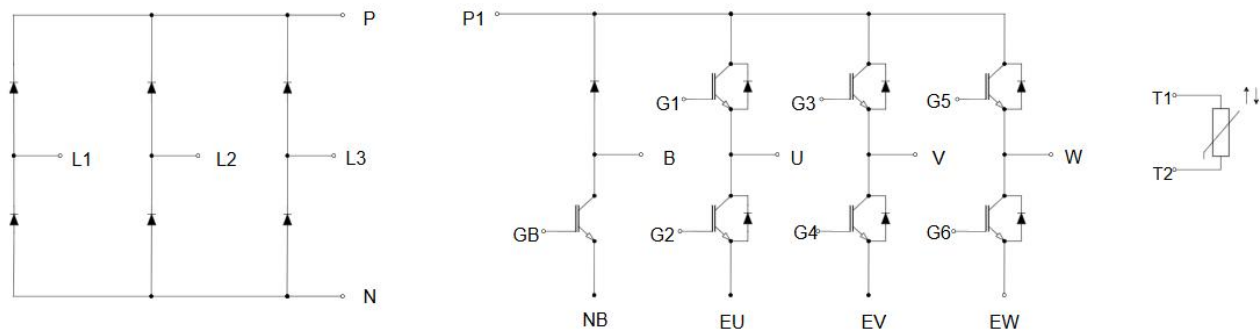
⁵⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.

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

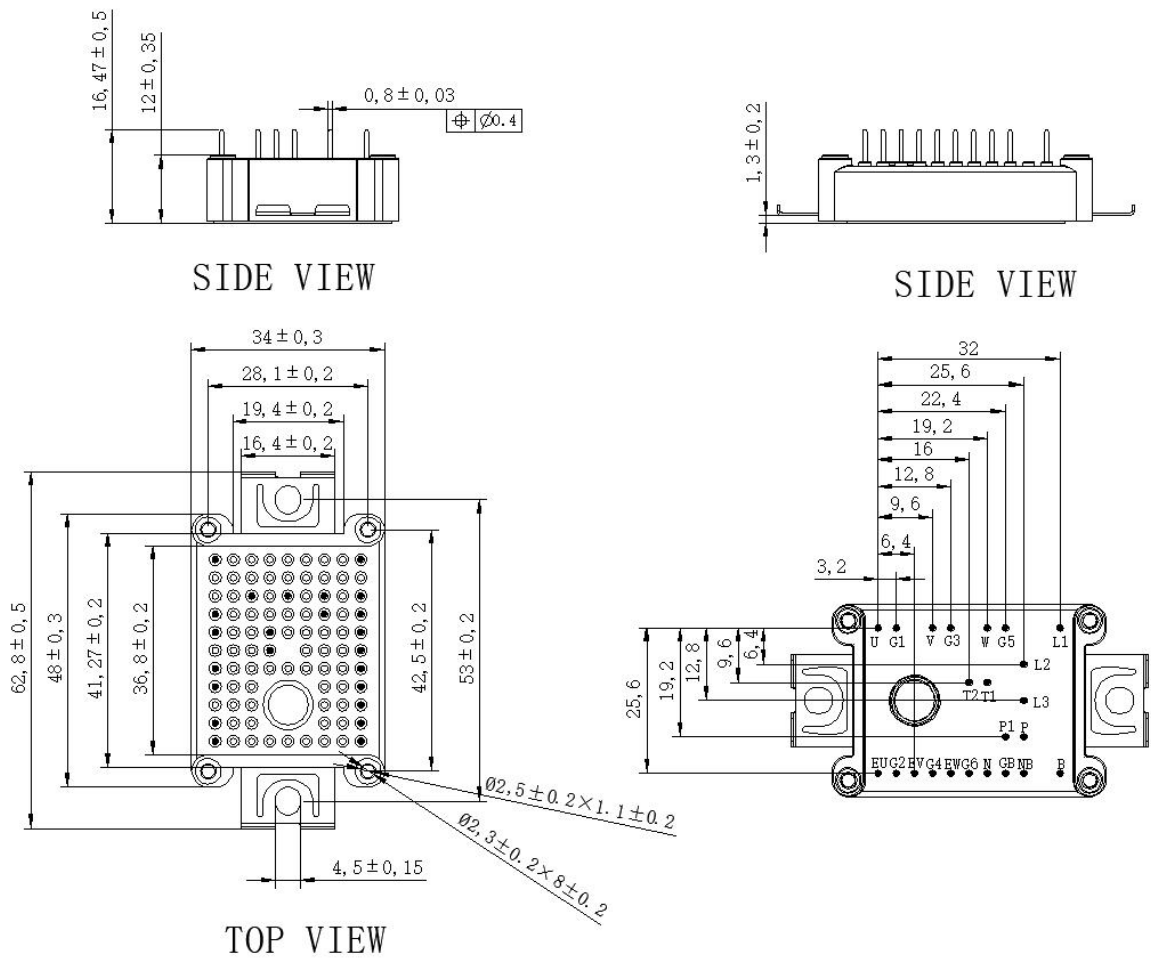
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
R ₂₅	Rated Resistance		--	5.0	--	kΩ
ΔR/R	Deviation of R ₁₀₀	T _C =100 °C, R ₁₀₀ =493.3 Ω	-5	--	5	%
P ₂₅	Power Dissipation		--	--	20.0	mW
B _{25/50}	B-value	R ₂ =R ₂₅ exp[B _{25/50} (1/T ₂ - 1/(298.15K))]	--	3375	--	K
B _{25/80}	B-value	R ₂ =R ₂₅ exp[B _{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





REVISION HISTORY

Document version	Date of release	Description of changes
Rev.00	2025-05-30	Preview



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