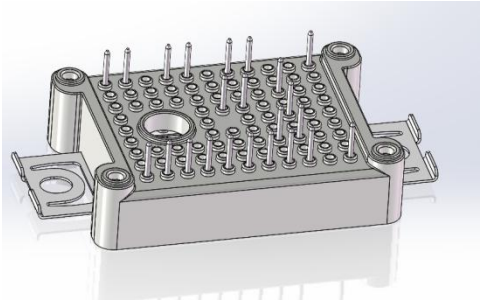
JLPI10B120RE1E7SN

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

RoHS

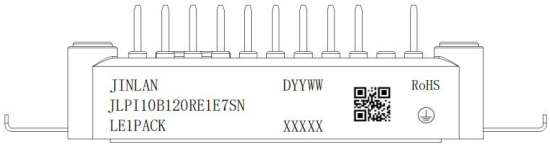
Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175℃
- 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

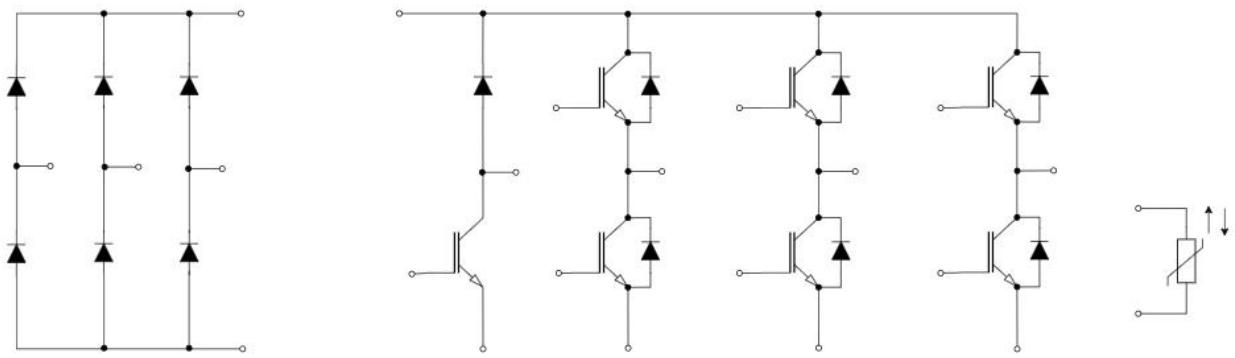


Typical Applications

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

JINLAN	= Company Name
JLPI10B120RE1E7SN	= 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	℃

Package Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray Inductance	L_{CE}		--	30	--	nH
Storage Temperature Range	T_{STG}		-40		125	℃
Mountig force per clamp	F		20	--	50	N
Weight	G		--	24	--	g

IGBT, Inverter

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	±25	V
I_C	Collector Current @ T_C=25℃	20	A
	Collector Current @ T_C=100℃	10	A
I_{CM}	Pulsed Collector Current，t_p limited by $T_{vj\,max}$	20	A

Characteristics (Tc = 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 = 10 A, T_{vj} = 25°C	--	1.50	2.20	V
		V_{GE} = 15 V, I_C = 10 A, T_{vj} = 125°C	--	1.70	--	
		V_{GE} = 15 V, I_C = 10 A, T_{vj} = 150°C	--	1.75	--	
$V_{GE(TH)}$	Gate−Emitter Threshold Voltage	V_{GE} = V_{CE} , I_C = 250μA,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	--	--	200	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		--	0.8	--	Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V	--	1610	--	pF
C_{oes}	Output capacitance		--	88.7	--	pF
C_{res}	Reverse Transfer		--	14.8	--	pF
Q_G	Gate Charge	V_{GE}=15V, I_C=10A	--	60.7	--	nC
$t_{d(on)}$	Turn−On Delay Time	V_{CC} = 600 V, I_C = 10 A R_{Gon} = 10Ω,R_{Goff} = 25Ω V_{GE} =±15V Inductive Load T_{vj} = 25°C	--	60	--	ns
t_r	Rise Time		--	20	--	
$t_{d(off)}$	Turn−off Delay Time		--	110	--	
t_f	Fall Time		--	47	--	
E_{on}	Turn−On Switching Loss per Pulse		--	0.495	--	mJ
E_{off}	Turn Off Switching Loss per Pulse		--	0.305	--	
E_{ts}	Total Switching Loss		--	0.800	--	
$t_{d(on)}$	Turn−On Delay Time	V_{CC} = 600 V, I_C = 10 A R_{Gon} = 10Ω,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		--	0.770	--	mJ
E_{off}	Turn Off Switching Loss per Pulse		--	0.425	--	
E_{ts}	Total Switching Loss		--	1.195	--	
I_{SC}	SC Data	t_P≤10μs,V_{GE} ≤15V, T_{vj} =150℃,V_{CC}=800V	--	35	--	A
R_{thJC}	Thermal resistance	Junction-to-Case (per IGBT)	--	TBD	--	K/W
$T_{vj\,op}$		Temperature under switching conditions	-40		175[1)]	°C

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

Diode, Inverter

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	10	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	20	A

Characteristics (Tc=25℃ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
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} = 125°C	--	1.50	--	
		I_F = 10A, V_{GE}=0V, T_{vj} = 150°C	--	1.70	--	
Qr	Recovered Charge	V_{CC} = 600 V, I_C = 10 A R_{Gon} = 47Ω,R_{Goff} = 47Ω V_{GE} =±15V Inductive Load Tvj = 25°C	--	0.214	--	μC
IRM	Peak Reverse Recovery Current		--	5.22	--	A
Trr	Reverse Recovery Time		--	27.5	--	ns
E_{rec}	Reverse Recovery Energy		--	0.090	--	mJ
Qr	Recovered Charge	V_{CC} = 600 V, I_C = 10 A R_{Gon} = 47Ω,R_{Goff} = 47Ω V_{GE} =±15V Inductive Load Tvj = 150°C	--	0.495	--	μC
IRM	Peak Reverse Recovery Current		--	7.97	--	A
Trr	Reverse Recovery Time		--	42.9	--	ns
E_{rec}	Reverse Recovery Energy		--	0.291	--	mJ
R_{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	TBD	--	K/W
$T_{vj\ op}$		Temperature under switching conditions	-40		175[2)]	°C

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

Diode, Rectifier

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

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1600	V
I_F	Diode Continuous Forward Current	10	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	20	A

Characteristics (Tc=25℃ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	I_F =10A, T_j = 150 °C	--	1.2	--	V
I_R	Reverse Current	T_j=150 °C, V_R=1600V	--	1	--	mA
R_{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	TBD	--	K/W
$T_{vj\ op}$		Temperature under switching conditions	-40		175[3)]	°C

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

IGBT, Chopper

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_C	Collector Current @ T_C=25℃	20	A
	Collector Current @ T_C=80℃	10	A
I_{CM}	Pulsed Collector Current，t_p=1S	20	A

Characteristics (Tc = 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 = 10 A, T_{vj} = 25°C	--	1.50	2.20	V
		V_{GE} = 15 V, I_C = 10 A, T_{vj} = 125°C	--	1.70	--	
		V_{GE} = 15 V, I_C = 10 A, T_{vj} = 150°C	--	1.75	--	
$V_{GE(TH)}$	Gate−Emitter Threshold Voltage	V_{GE} = V_{CE} , I_C = 250μA,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	--	--	200	μA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = V_{GES} , V_{CE} = 0 V， T_{vj} = 25°C	--	--	200	nA
RGint	Internal Gate Resistance		--	0.8	--	Ω
Cies	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V	--	1610	--	pF
Coes	Output capacitance		--	88.7	--	pF
Cres	Reverse Transfer		--	14.8	--	pF
Q_G	Gate Charge	V_{GE}=15V, I_C=10A	--	60.7	--	nC
td(on)	Turn−On Delay Time	V_{CC} = 600 V, I_C = 10 A R_{Gon} = 10Ω,R_{Goff} = 25Ω V_{GE} =±15V Inductive Load T_{vj} = 25°C	--	60	--	ns
tr	Rise Time		--	20	--	
td(off)	Turn−off Delay Time		--	110	--	
tf	Fall Time		--	47	--	
Eon	Turn−On Switching Loss per Pulse		--	0.495	--	mJ
Eoff	Turn Off Switching Loss per Pulse		--	0.305	--	
E_{ts}	Total Switching Loss		--	0.800	--	
td(on)	Turn−On Delay Time	V_{CC} = 600 V, I_C = 10 A R_{Gon} = 10Ω,R_{Goff} = 25Ω V_{GE} =±15V Inductive Load T_{vj} = 150°C	--	TBD	--	ns
tr	Rise Time		--	TBD	--	
td(off)	Turn−off Delay Time		--	TBD	--	
tf	Fall Time		--	TBD	--	
Eon	Turn−on Switching Loss per Pulse		--	0.770	--	mJ
Eoff	Turn Off Switching Loss per Pulse		--	0.425	--	
E_{ts}	Total Switching Loss		--	1.195	--	
I_{SC}	SC Data	t_P≤10μs,V_{GE} ≤15V, T_{vj} =150℃,V_{CC}=800V	--	35	--	A
R_{thJC}	Thermal resistance	Junction-to-Case (per IGBT)	--	TBD	--	K/W
$T_{vj\,op}$		Temperature under switching conditions	-40		175[1)]	°C

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

Diode, Chopper

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	10	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	20	A

Characteristics (Tc=25℃ unless otherwise noted)

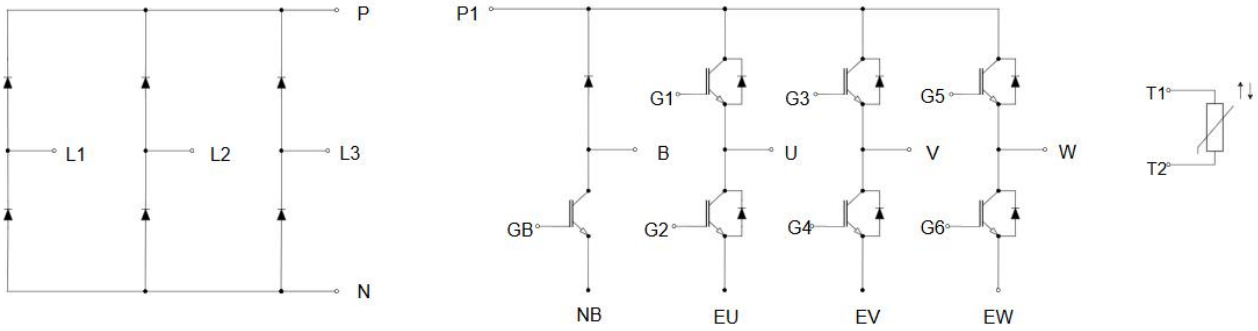
V_F	Diode Forward Voltage	I_F = 10A, V_{GE}=0V， T_{vj} = 25°C	--	1.60	--	V
		I_F =10A, V_{GE}=0V， T_{vj} = 150°C	--	1.50	--	
Q_r	Recovered Charge	V_R=600V,I_F=10A, R_{Gon} = 10Ω,R_{Goff} = 25Ω V_{GE} =±15V T_{vj} =25℃	--	0.214	--	μC
I_{RM}	Peak Reverse Recovery Current		--	5.22	--	A
T_{rr}	Reverse Recovery 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℃	--	0.495	--	μC
I_{RM}	Peak Reverse Recovery Current		--	7.97	--	A
Trr	Reverse Recovery Time		--	42.9	--	ns
E_{rec}	Reverse Recovery Energy		--	0.291	--	mJ
R_{thJC}	Thermal resistance	Junction-to-Case (per diode)	--	TBD	--	K/W
$T_{vj\ op}$		Temperature under switching conditions	-40		175[2)]	°C

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

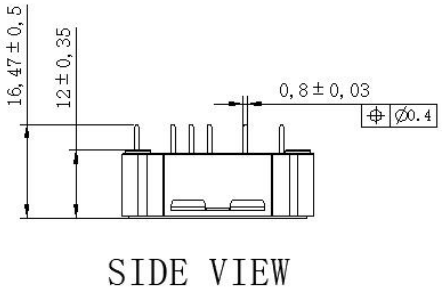
NTC Characteristics (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
R_{25}	Rated Resistance		--	5.0	--	kΩ
ΔR/R	Deviation of R_{100}	T_C=100 ℃,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

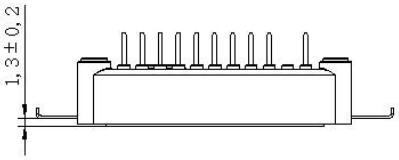
CIRCUIT DIAGRAM



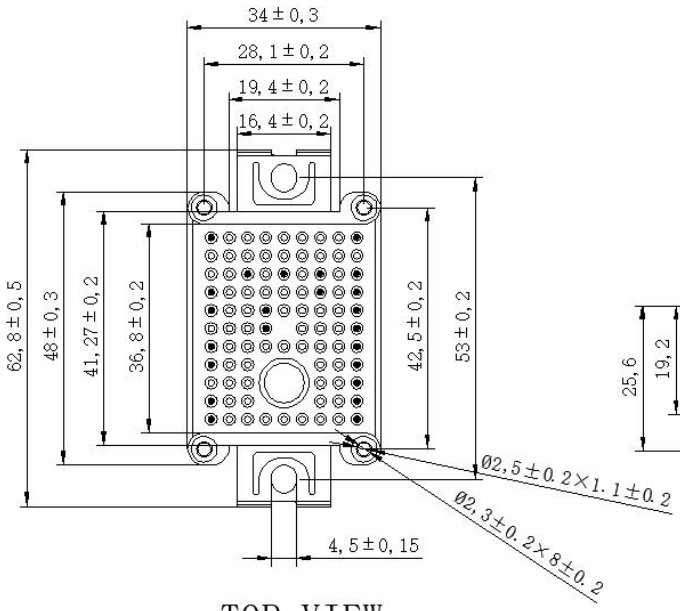
PACKAGE DIMENSION



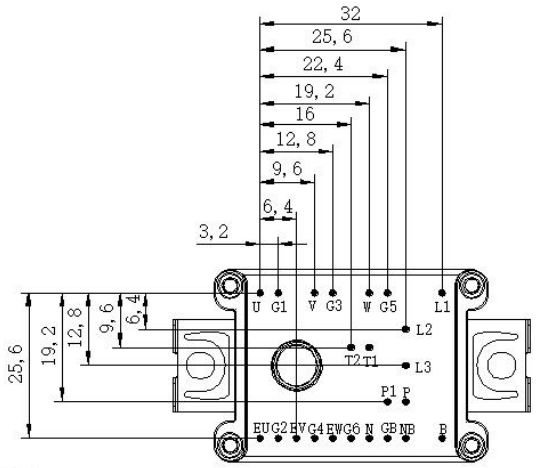
SIDE VIEW



SIDE VIEW



TOP VIEW



REVISION HISTORY

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

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