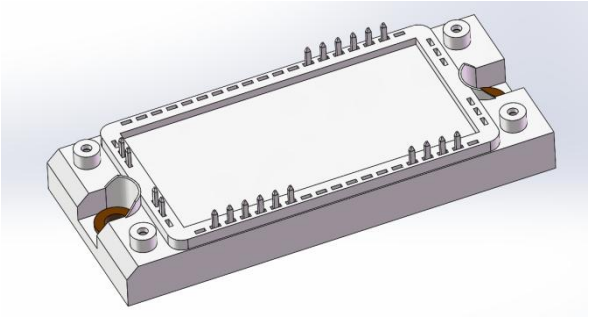
JLFD300V120RN2E7SN

LN2 PACK module with Trench/Fieldstop IGBT and Emitter Controlled diode and NTC

RoHS

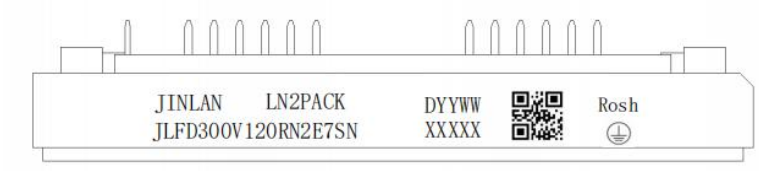
Features

- Low VCE(sat) Trench IGBT technology
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Low inductance case
- High power density
- Integrated temperature sensor available



LN2 Pack

MARKING DIAGRAM

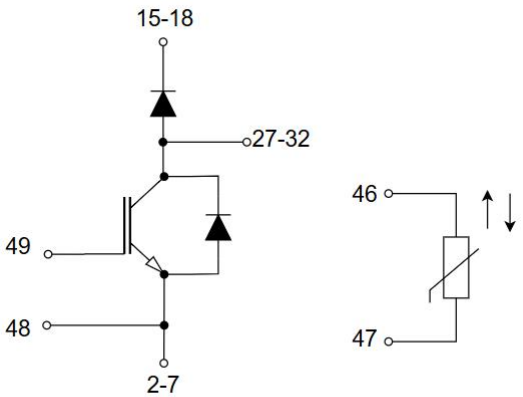


JINLAN	= Company Name
JLFD300V120RN2E7SN	= Specific Device Code
YYWW	= Year and Work Week Code
XXXXX	= Serial Number
QR code	= Custom Assembly Information

Typical Applications

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers
- Pumps, Fans

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 backside	12	mm
Creepage distance	d_{creep}	terminal to terminal	6	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
Module Lead Resistance, Terminal to Chip	$R_{CC'+EE'}$		--	2.2	--	mΩ
Storage Temperature Range	T_{STG}		-40		125	℃
Mounting Torque, Screw M5	M		3		6	N.m
Weight	G		--	176	--	g

Boost IGBT

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

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200V	V
V_{GES}	Gate-Emitter Voltage	±30	V
I_{CDC}	Continuous Collector Current @ T_C = 80°C (T_{JMAX} = 175°C)	300	A
I_{CM}	Pulsed Collector Current，t_p=1ms	600	A
Tjmax	Maximum Junction Temperature	175	℃

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} = 15V	T_{vj} = 25 °C	--	1.60	2.20	V
			T_{vj} = 175 °C	--	1.85	--	
$V_{GE(TH)}$	Gate−Emitter Threshold Voltage	I_C=8mA,V_{CE}=VGE		4.0	--	6.0	V
I_{CES}	Collector−Emitter Cutoff Current	V_{GE} = 0 V, V_{CE} = 1200 V		--	--	800	μA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±30 V, V_{CE} = 0 V, T_{vj} = 25°C		--	--	±100	nA
RGint	Internal Gate Resistance	Tvj = 25°C		--	0.2	--	Ω
Cies	Input Capacitance	VCE=30V,VGE=0V, f=1MHz,Tvj = 25°C		--	35475	--	pF
Coes	Output capacitance			--	840	--	pF
Cres	Reverse Transfer			--	201	--	pF
Q_G	Gate Charge	T_J = 25°C V_{CE} = 600 V, I_C = 300 A V_{GE} = −5 V to +15 V,		--	1.095	--	μC
td(on)	Turn−On Delay Time	V_{CE}=600V,IC=300A, V_{GE}= −5 V to +15 V, R_G=8Ω Inductive Load		--	180	--	ns
tr	Rise Time			--	91	--	
td(off)	Turn−off Delay Time			--	123	--	
tf	Fall Time			--	284	--	
Eon	Turn−On Switching Loss per Pulse			--	12.99	--	mJ
Eoff	Turn Off Switching Loss per Pulse			--	10.08	--	
td(on)	Turn−On Delay Time	VCE=600V,IC=300A, VGE= −5 V to +15 V, R_G=8Ω Tj=175°C		--	199	--	ns
tr	Rise Time			--	100	--	
td(off)	Turn−off Delay Time			--	135	--	
tf	Fall Time			--	313	--	
Eon	Turn−on Switching Loss per Pulse			--	18.81	--	mJ
Eoff	Turn Off Switching Loss per Pulse			--	13.88	--	
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	--	960	--	A
			t_P ≤ 10 μs, T_{vj}=175 °C	--	905	--	A
R_{thJC}	Thermal resistance	Junction-to-Case (per IGBT)		--	0.11	--	K/W
$T_{vj\ op}$		Temperature under switching conditions		-40		150[1)]	℃

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

Boost 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℃	300	A
I_{FRM}	Diode Maximum Forward Current t_p=1ms	600	A

Characteristics （Tc=25℃ unless otherwise noted）

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	I_F = 300 A, T_J = 25°C	--	1.90	2.80	V
		I_F = 300 A, T_J = 175°C	--	1.80	--	
Trr	Reverse Recovery Time	V_{CE} = 600 V, V_{GE} = −5 V to +15 V, I_F=300A,R_G=8Ω， T_j=25°C	--	150	--	ns
I_{RM}	Peak Reverse Recovery Current		--	210	--	A
Qrr	Recovered Charge		--	6.15	--	μC
Erec	Reverse Recovery Energy		--	5.13	--	mJ
Trr	Reverse Recovery Time	V_{CE} = 600 V, V_{GE} = −5 V to +15 V, I_F=300A,R_G=8Ω T_j=175°C	--	197	--	ns
IRM	Peak Reverse Recovery Current		--	277	--	A
Qrr	Recovered Charge		--	24.75	--	μC
Erec	Reverse Recovery Energy		--	6.93	--	mJ
RthJC	Thermal resistance	Junction-to-Case (per diode)	--	0.14	--	K/W
$T_{vj\ op}$		Temperature under switching conditions	-40		150[2)]	℃

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

Free Wheeling Diodes

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

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200V	V
I_F	Diode Continuous Forward Current	30	A
I_{FRM}	Diode Maximum Forward Current t_p=1ms	60	A

Characteristics （Tc=25℃ unless otherwise noted）

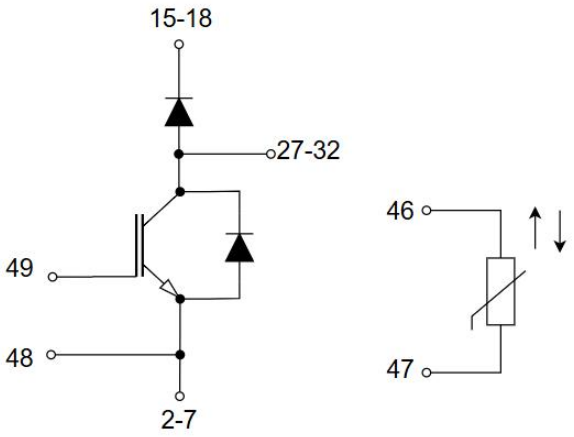
Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
V_F	Diode Forward Voltage	I_F=20A	T_{VJ}=25℃	--	1.9	2.5	V
		I_F=40A		--	2.4	3.2	
		I_F=20A	T_{VJ}=150℃	--	1.8	--	
		I_F=40A		--	2.2	--	
P_{tot}	total power dissipation	T_C=25℃			126		W
R_{thJC}	Thermal resistance	Junction-to-Case (per diode)			0.89		K/W
$T_{vj\ op}$		Temperature under switching conditions		-40		150[3)]	℃

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

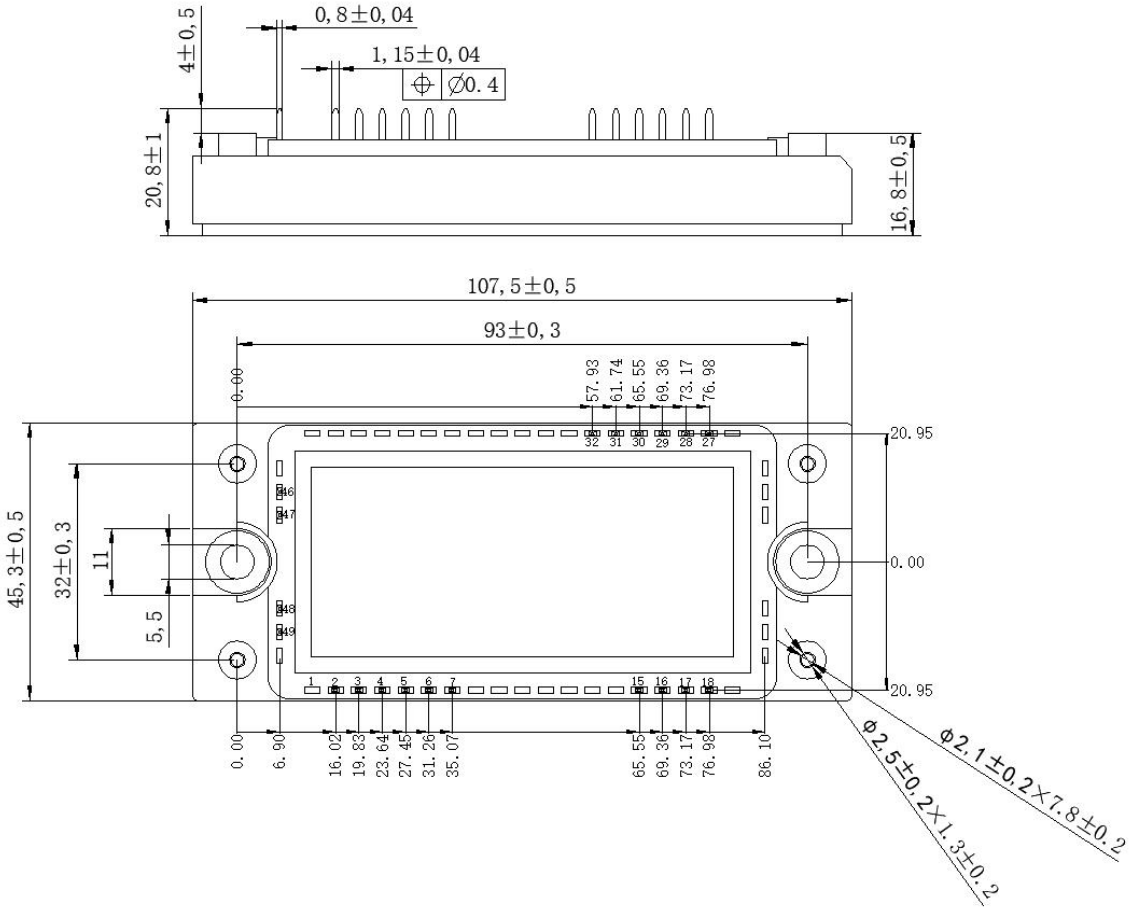
NTC Characteristics (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
R_{25}	Rated Resistance		--	5.0	--	kΩ
ΔR/R	Deviation of R100	Tc=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



REVISION HISTORY

Document version	Date of release	Description of changes
Rev.00	2024-06-25	Preview

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