JLHF4MR120RD3E7DN

LD3 Half-Bridge Module with SiC Trench MOSFET

RoHS

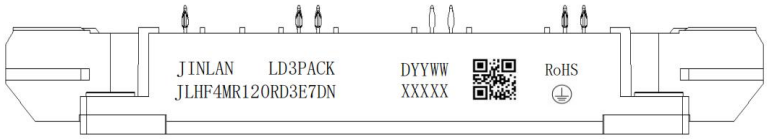
Features

• Electrical features
- Silicon Carbide MOSFET
- Maximum junction temperature 175℃
- Low Inductive Layout
- High current density
- Low switching losses

• Mechanical features
- Package with CTI >200
- Solderable Pins
- Isolated copper baseplate using AMB technology

LD3 Pack

MARKING DIAGRAM

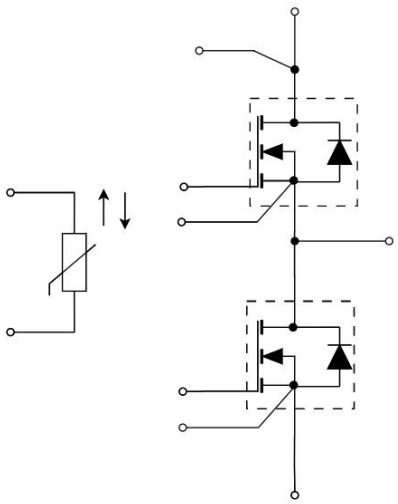


JINLAN	= Company Name
JLHF4MR120RD3E7DN	= Specific Device Code
YYWW	= Year and Work Week Code
XXXXX	= Serial Number
QR code	= Custom Assembly Information

Typical Applications

• EV Chargers
• Industrial Automation & Testing
• Solar

Description



Package Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS,f=50Hz,t=60s	4.0	kV
Internal isolation		basic insulation(class 1,IEC 61140)	Si_3N_4	
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}			--	20	--	nH
Module Lead Resistance, Terminal to Chip	$R_{CC'+EE'}$	T_C=25°C, per switch		--	0.80	--	mΩ
Storage Temperature Range	T_{STG}			-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	2.5	--	5.0	Nm
Weight	G			--	340	--	g

SIC MOSFET

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

Symbol	Parameter	Conditions	Value	Unit
V_{DSS}	Drain-source voltage	T_{vj}=25℃	1200	V
I_{DN}	Implemented drain current	V_{GS} =18V T_c = 25℃	450	A
I_{DDC}	Continuous DC drain current	Collector Current @T_{vj}=175℃,V_{GS}=18V,T_c=65℃	400	A
I_{DRM}	Repetitive peak drain current	verified by design, t_p limited by $T_{vj\ max}$	900	A
$V_{GS\ max}$	Gate-source voltage, max. transient voltage	AC (f >1Hz)	-8 / +21	V
$V_{GS\ OP}$	Gate-source voltage, max.static voltage (Recommended)		-3 / +18	V

Characteristics (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
$R_{DS(on)}$	Drain-source on-resistance	V_{GS} = 18 V, I_{DN}=400A, T_{vj} = 25°C	--	2.65	--	mΩ
		V_{GS} = 18 V, I_{DN}= 400 A, T_{vj} =150°C	--	3.45	--	
$V_{GS(TH)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D =100 mA,T_{vj} = 25°C	2.0	--	3.0	V
I_{DSS}	Drain-Source Leakage Current	V_{GS} = -3V, V_{DS} =1200V	--	30	100	μA
~~I_{GSS}~~	~~Gate-Source Leakage Current~~	~~V_{GS} = -4V, V_{DS} = 0V~~	~~--~~	~~1~~	~~100~~	~~nA~~
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ＋18V, V_{DS} = 0V	--	1	100	nA
R_{Gint}	Internal Gate Resistance	f = 1 MHz	--	1.1	--	Ω
C_{iss}	Input Capacitance	V_{GS} = 0 V, f = 100kHz, V_{DS} = 800V	--	27.2	--	pF
C_{oss}	Output capacitance		--	1.76	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	95.2	--	pF
Q_G	Total Gate Charge	V_{GS} = −3/18 V, V_{DS} = 800 V, I_{DS} = 400 A	--	304.8	--	nC
$t_{d(on)}$	Turn−On Delay Time	T_J = 25°C V_{GS} = −5/15V, V_{DS} = 600 V, I_{DS} = 400 A, R_{Gon} =4.7Ω, R_{Goff} = 4.7Ω Inductive load	--	102.4	--	ns
t_r	Rise Time		--	180	--	
$t_{d(off)}$	Turn−off Delay Time		--	223.2	--	
t_f	Fall Time		--	77.6	--	
E_{on}	Turn−On Switching Loss per Pulse		--	12.8	--	mJ
E_{off}	Turn Off Switching Loss per Pulse		--	20	--	
$t_{d(on)}$	Turn−On Delay Time	T_J = 150°C V_{GS} =−5/15V, V_{DS} = 600 V, I_{DS} = 400 A, R_{Gon} =4.7Ω, R_{Goff} = 4.7Ω Inductive load	--	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	--	
R_{thJC}	Thermal resistance	Junction-to-Case (per MOS)	--	0.104	--	K/W
$T_{vj\ op}$		Temperature under switching conditions	-40		175[1)]	℃

1) $T_{vj\ op}$ > 175℃ is only allowed for operation at overload conditions.

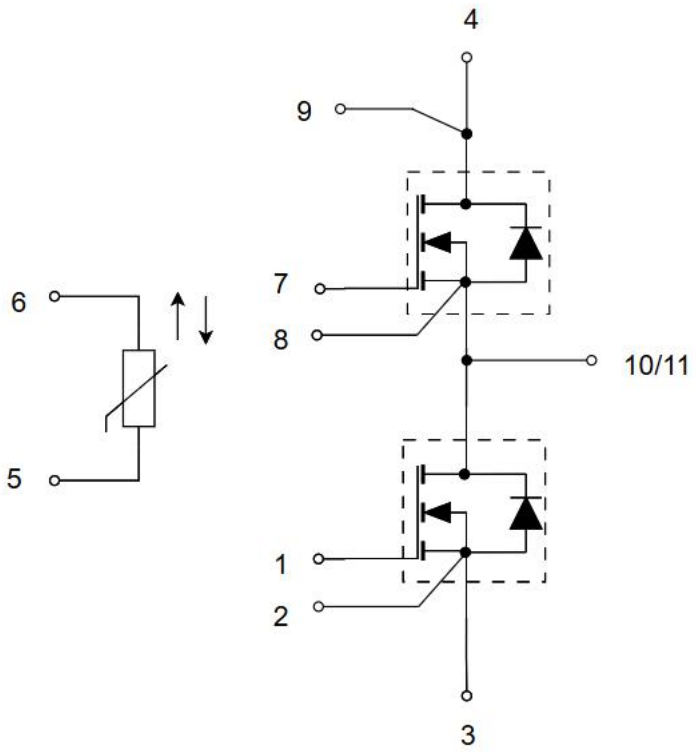
Reverse Diode Characteristics （Tc=25℃ unless otherwise noted）

Symbol	Parameter	Test Condition		Value			Unit
				Min	Typ	Max	
V_{SD}	Diode Forward Voltage	VGS= -3V，I_{SD}= 200A	T_{vj} = 25 °C	--	4.7	--	V
			T_{vj} = 150 °C	--	4.3	--	V

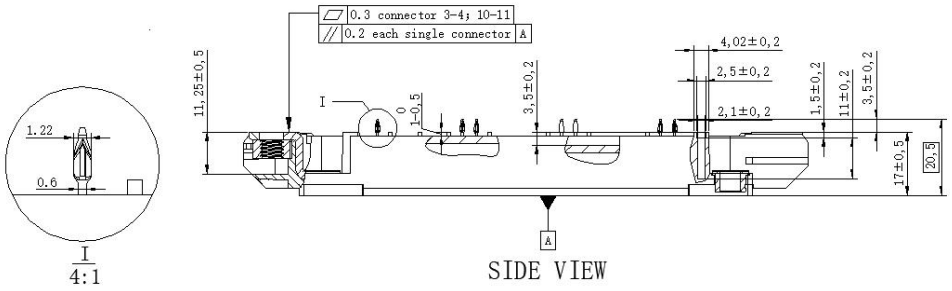
NTC Characteristics

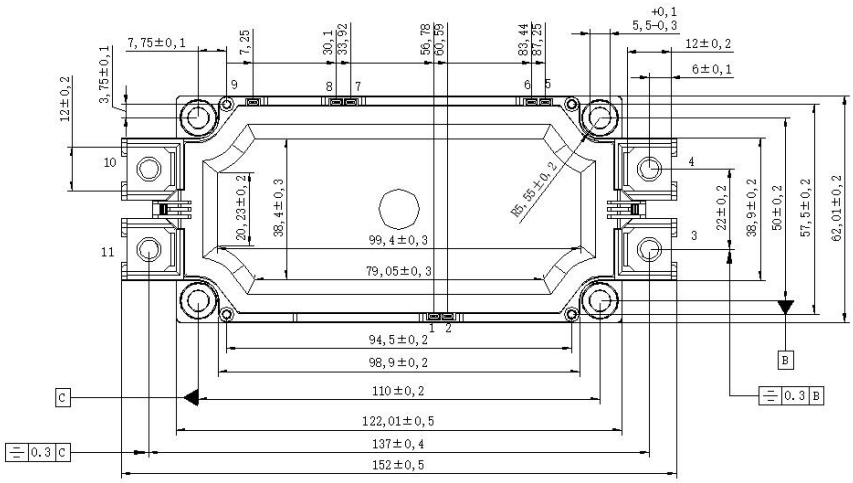
Symbol	Parameter	Note or Test Condition	Value			Unit
			Min	Typ	Max	
R_{25}	Rated Resistance	T_C = 25°C	--	5	--	kΩ
ΔR/R	Deviation of R100	T_C=100 ℃,R_{100}=493Ω	-5	--	5	%
P_{25}	Power Dissipation	T_C = 25°C	--	--	20	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2- 1/(298.15K))]$	--	3375	--	K
$B_{25/80}$	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

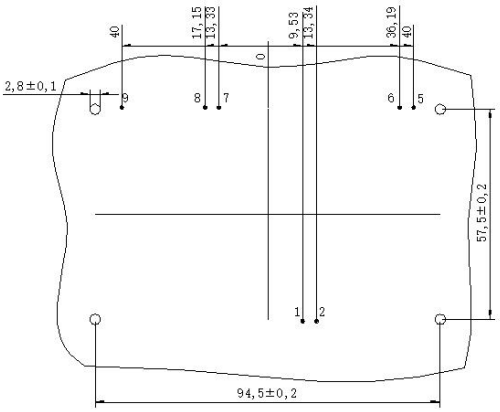
CIRCUIT DIAGRAM



PACKAGE DIMENSION







REVISION HISTORY

Document version	Date of release	Description of changes
Rev.00	2025-05-27	Preliminary Data

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