JLFF200B120RN3E7SN

N3 PACK module with Gen7 IGBT and Emitter Controlled 7 diode

RoHS

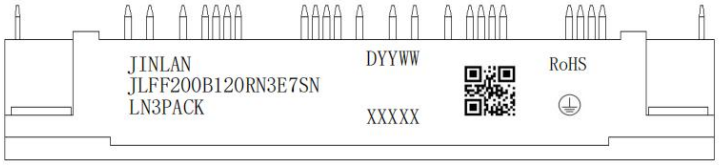
Features

- V_{CES} = 1200 V
- $I_{C\ nom}$ = 200 A / I_{CRM} = 400 A
- Low $V_{CE,sat}$
- $V_{CE(sat)}$ with positive temperature coefficient
- High power and thermal cycling capability
- Integrated temperature sensor available
- Copper base plate

LN3 Pack

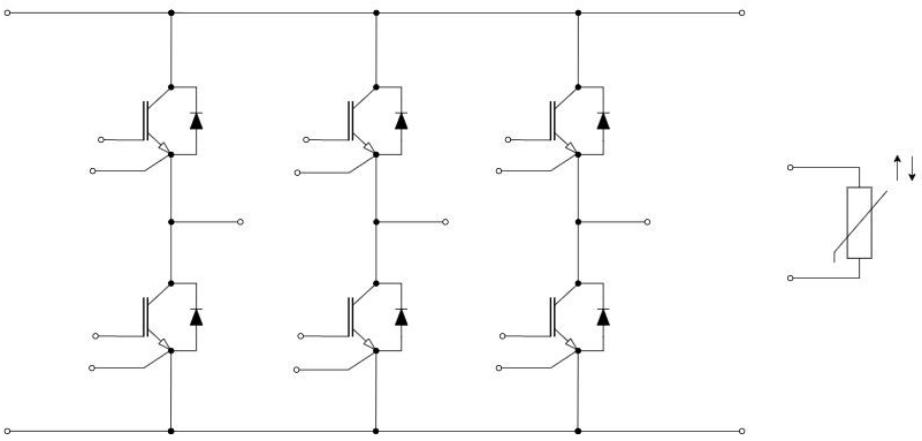
Typical Applications

- Motor drives
- Auxiliary inverters
- Servo drives



JINLAN	= Company Name
JLFF200B120RN3E7SN	= 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)	Improved Al_2O_3	
Creepage distance	d_{creep}	terminal to heatsink	10	mm
Creepage distance	d_{creep}	terminal to terminal	7.5	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
Module Lead Resistance, Terminal to Chip	$R_{CC'+EE'}$	T_C=25°C, per switch		--	1.5	--	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
Weight	G			--	300	--	g

IGBT

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

Symbol	Description	Note or test condition		Value	Unit
V_{CES}	Collector-Emitter Voltage	T_{vj} = 25 °C		1200	V
I_{CDC}	Continuous DC collector current	$T_{vj\,max}$ = 175 °C	T_C = 90 °C	200	A
I_{CRM}	Repetitive peak collector current	t_p limited by $T_{vj\,op}$		400	A
V_{GES}	Gate-emitter peak voltage			±30	V

Characteristics (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
$V_{CE(sat)}$	Collector−Emitter Saturation Voltage	I_C =200A, V_{GE} = 15 V	T_{vj} = 25 °C	--	1.40	1.90	V
			T_{vj} = 150 °C	--	1.60	--	
$V_{GE(TH)}$	Gate−Emitter Threshold Voltage	V_{GE} = V_{CE}, I_C =5 mA, T_{vj} = 25°C		5.0	5.8	6.5	V
I_{CES}	Collector−Emitter Cutoff Current	V_{GE} = 0 V, V_{CE} =1200V, T_{vj}= 25°C		--	--	100	uA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = 20 V, V_{CE} = 0 V, T_{vj} = 25°C		--	--	100	nA
R_{Gint}	Internal Gate Resistance	T_{vj} = 25 °C		--	3.38	--	Ω
C_{ies}	Input Capacitance	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V		--	32.7	--	nF
C_{oes}	Out Capacitance			--	2.19	--	nF
C_{res}	Reverse Transfer Capacitance			--	0.12	--	nF
Q_G	Gate Charge	V_{GE} = ±15 V, V_{CE} = 600 V		--	1.0	--	μC
$t_{d(on)}$	Turn−On Delay Time	I_C = 200A, V_{CC} = 600 V, V_{GE} = ±15V, R_G = 3.0 Ω	T_{vj} = 25 °C	--	0.203	--	μS
			T_{vj} = 150 °C	--	0.230	--	
			T_{vj} = 175 °C	--	0.233	--	
t_r	Rise Time	I_C =200A, V_{CC} = 600 V, V_{GE} = ±15V, R_G = 3.0 Ω	T_{vj} = 25 °C	--	0.037	--	μS
			T_{vj} = 150 °C	--	0.044	--	
			T_{vj} = 175 °C	--	0.045	--	
$t_{d(off)}$	Turn−off Delay Time	I_C = 200A, V_{CC} = 600 V, V_{GE} = ±15V, R_{Goff} = 3.0 Ω	T_{vj} = 25 °C	--	0.412	--	μS
			T_{vj} = 150 °C	--	0.470	--	
			T_{vj} = 175 °C	--	0.480	--	
t_f	Fall Time	I_C = 200A, V_{CC} = 600 V, V_{GE} =±15V, R_G =3.0 Ω	T_{vj} = 25 °C	--	0.050	--	μS
			T_{vj} = 150 °C	--	0.112	--	
			T_{vj} = 175 °C	--	0.114	--	
E_{on}	Turn−On Switching Loss per Pulse	I_C =200A, V_{CE}= 600 V, V_{GE} = ±15V, R_G = 3.0 Ω (Tvj max= 175 °C)	T_{vj} = 25 °C	--	6.22	--	mJ
			T_{vj} = 150 °C	--	12.40	--	
			T_{vj} = 175 °C	--	13.80	--	
E_{off}	Turn Off Switching Loss per Pulse	I_C = 200A, V_{CE} = 600 V, V_{GE} =±15V, R_G =3.0 Ω ($T_{vj\,max}$= 175 °C)	T_{vj} = 25 °C	--	27.03	--	mJ
			T_{vj} = 150 °C	--	36.00	--	
			T_{vj} = 175 °C	--	37.20	--	
I_{SC}	SC Data	V_{GE} ≤ 15 V, V_{CC} = 800 V, V_{CEmax}=V_{CES}-L_{sCE}.di/dt	t_P ≤ 8 μs, T_{vj}=150 °C	--	1000	--	A
			t_P ≤ 7 μs, T_{vj}=175 °C	--	941	--	

R_{thJC}	Thermal resistance	Junction-to-Case (per IGBT)	--	0.153		K/W
$T_{vj\ op}$		Temperature under switching conditions	-40		175	℃

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

Diode

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

Symbol	Description	Note or test condition	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj} = 25 °C	1200	V
I_F	Continuous DC forward current		200	A
I_{FRM}	Repetitive peak forward current	t_P = 1 ms	400	A

Characteristics （Tc=25℃ unless otherwise noted）

Symbol	Parameter	Test Condition		Value			Unit
				Min	Typ	Max	
V_F	Diode Forward Voltage	I_F = 200A, V_{GE} = 0 V	T_{vj} = 25 °C	--	1.65	2.35	V
			T_{vj} = 150 °C	--	1.60	--	
Q_{rr}	Recovered Charge	I_C = 200A, V_{CC} = 600 V, V_{GE} = 15 /-5V，R_G = 1.0 Ω ($T_{vj\ max}$= 175 °C)	T_{vj} = 25 °C	--	6.75	--	μC
			T_{vj} = 150 °C	--	12.75	--	
			T_{vj} = 175 °C	--	14.25	--	
I_{RRM}	Peak Reverse Recovery Current	I_C = 200A, V_{CC} = 600 V, V_{GE} =15 /-5V,R_G = 1.0 Ω ($T_{vj\ max}$= 175 °C)	T_{vj} = 25 °C	--	140	--	A
			T_{vj} = 150 °C	--	176	--	
			T_{vj} = 175 °C	--	185	--	
E_{rec}	Reverse recovery energy	I_C = 200A, V_{CC} = 600 V, V_{GE} =15 /-5V，R_G = 1.0 Ω ($T_{vj\ max}$= 175 °C)	T_{vj} = 25 °C	--	4.4	--	mJ
			T_{vj} = 150 °C	--	12.0	--	
			T_{vj} = 175 °C	--	14	--	
R_{thJC}	Thermal resistance, junction to case	per diode		--	0.234		K/W
$T_{vj\ op}$	Temperature under switching conditions			-40	--	175	℃

[2)] $T_{vj\ op}$ > 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 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

Figure1.output characteristic IGBT(typical)
T_{vj}=25°C

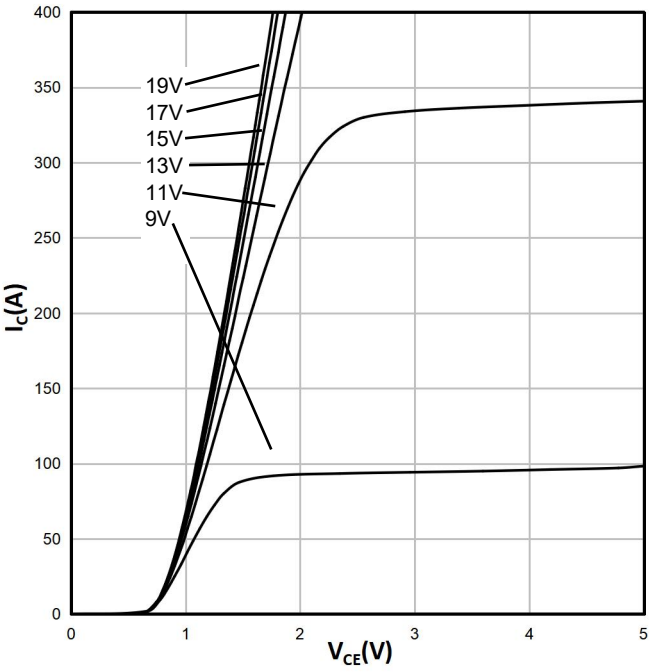


Figure2.output characteristic IGBT(typical)
T_{vj}=150°C

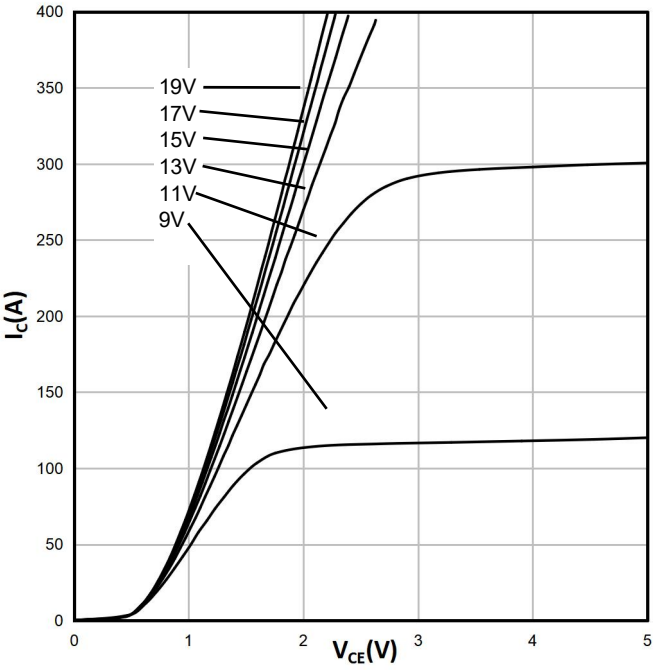


Figure3. $V_{CE(sat)}$ vs. Temperature

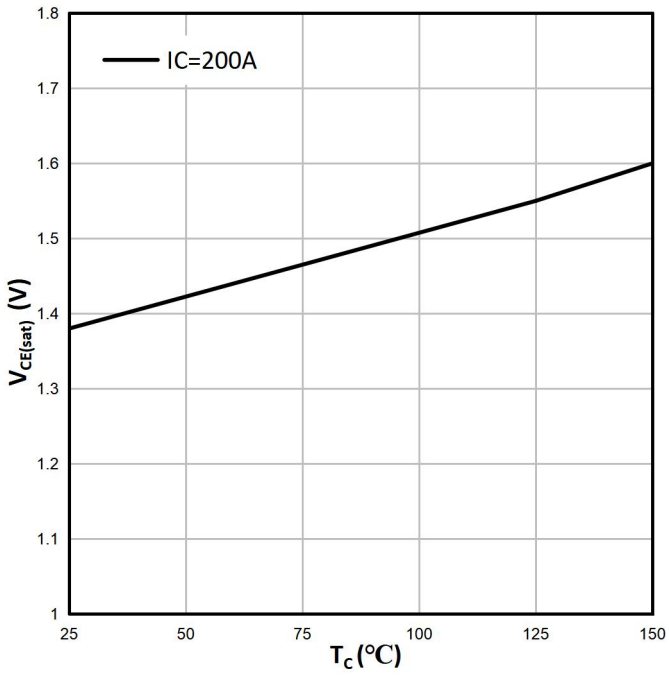


Figure4.transfer characteristic IGBT(typical)
V_{CE}=20V

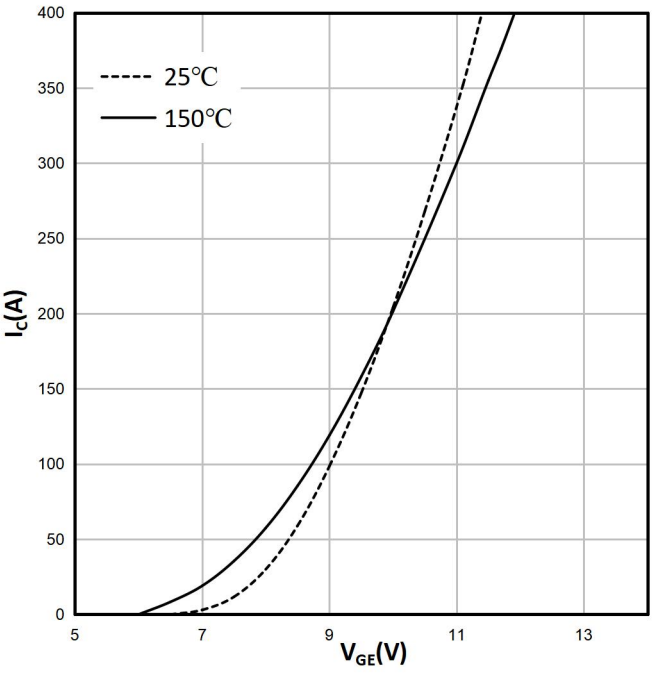


Figure5. FBSOA IGBT(typical)
D=0, Tc=25℃,Tj<=175℃,Vge=15V

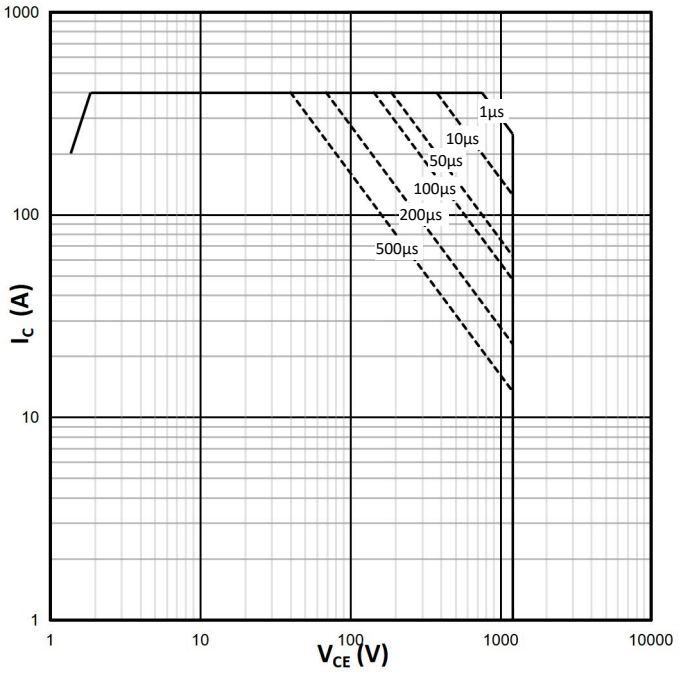


Figure6. Gate Charge Waveform
Vcc=600V,IC=200A,VGE=15V

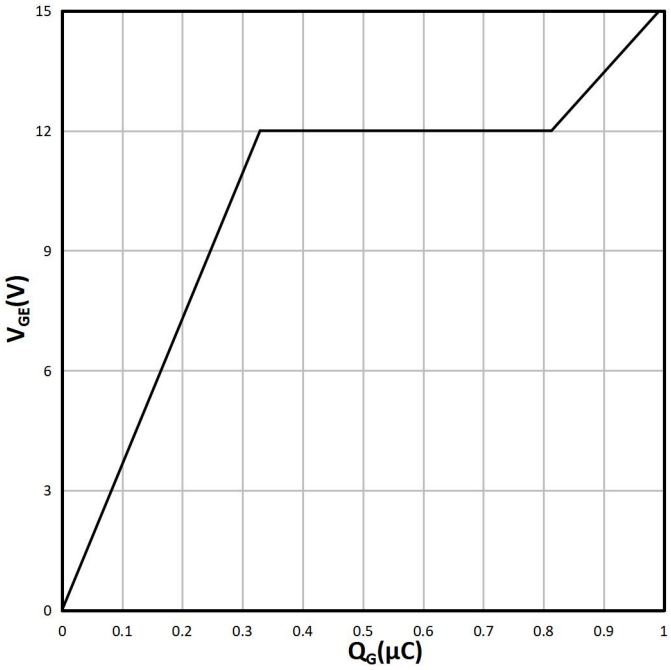


Figure7. transient thermal impedance

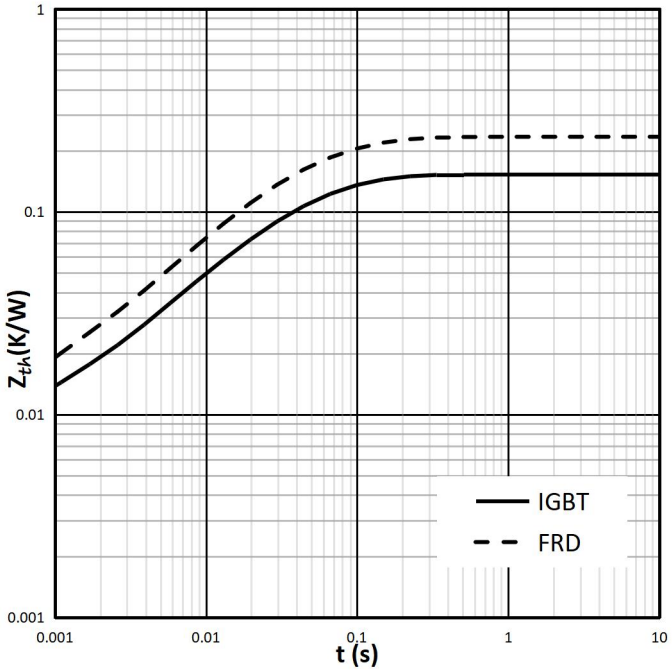
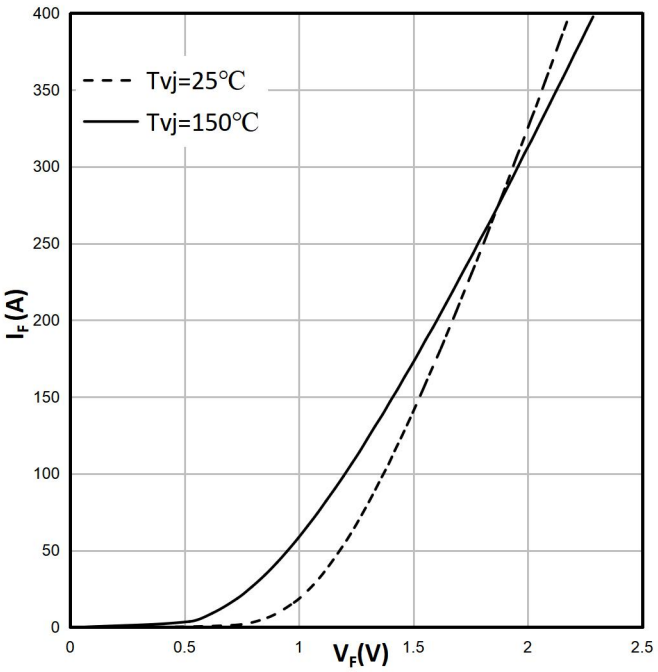
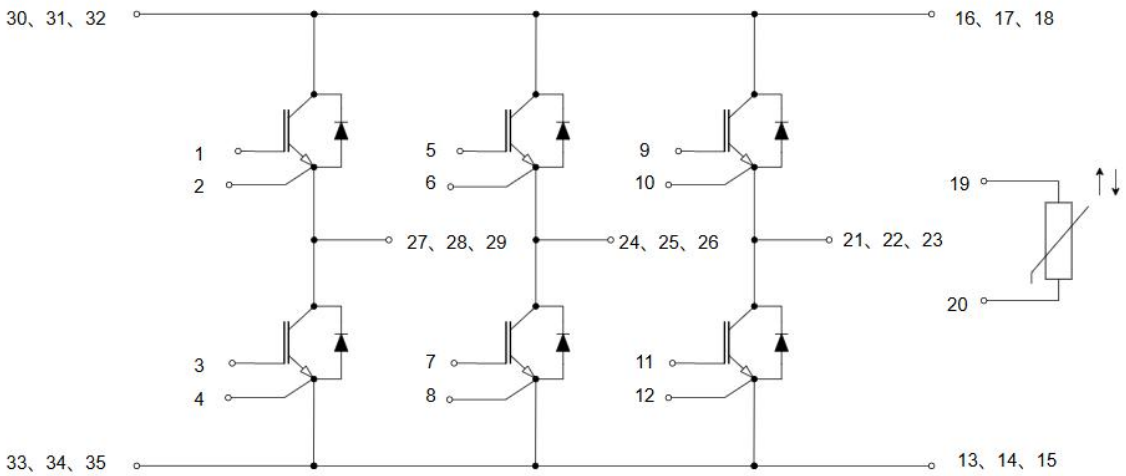


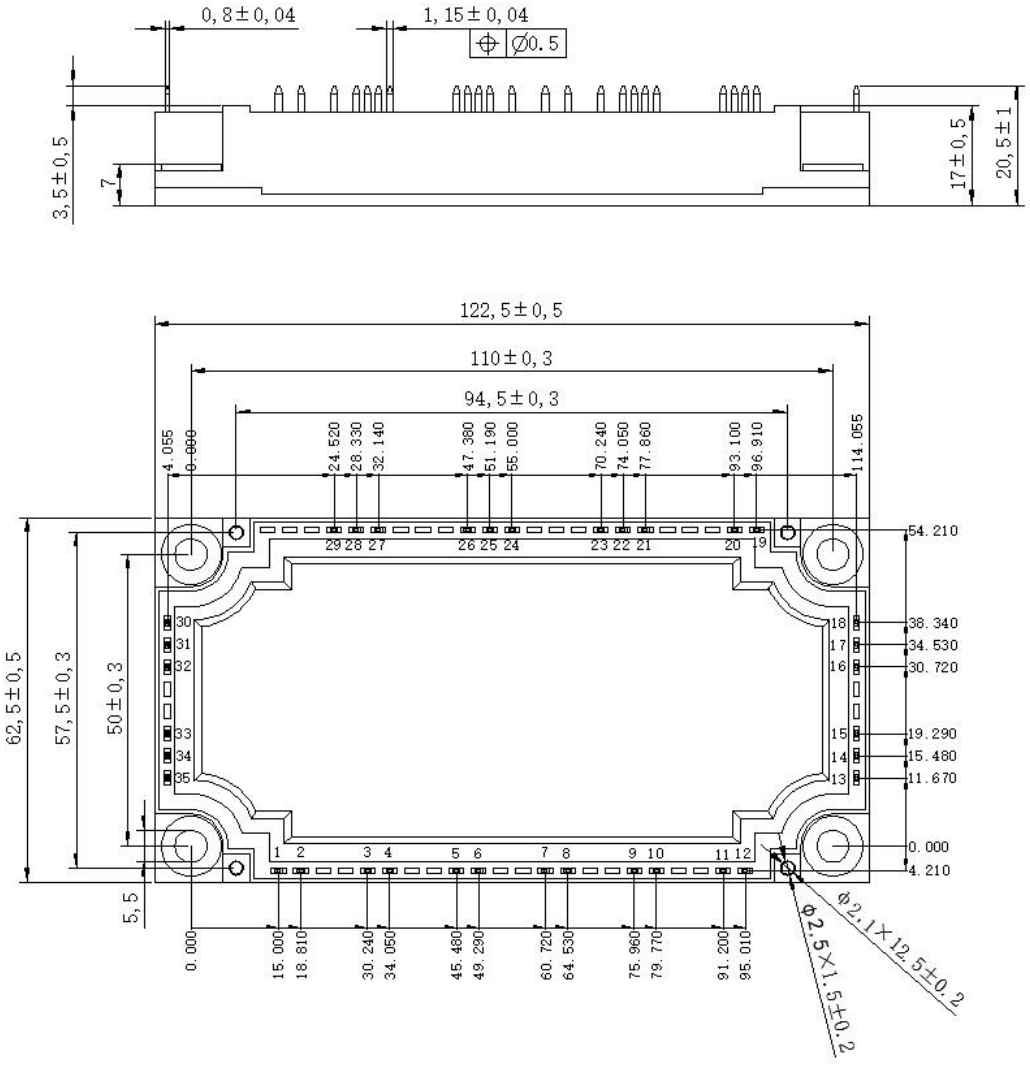
Figure10. forward characteristic of Diode(typical)
VGE=0V



CIRCUIT DIAGRAM



PACKAGE DIMENSION



REVISION HISTORY

Document version	Date of release	Description of changes
Rev.00	2024-08-01	Preview
Rev.01	2025-06-02	Add Charts

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