LEGM100BD170L5H

IGBT Power Module

Features:

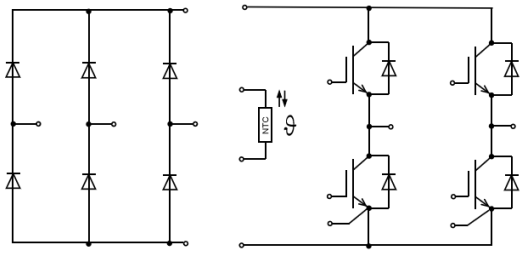
- V_{CE}=1700V I_C=100 A
- V_{CEsat} with positive temperature coefficient
- Low V_{CEsat}
- Unbeatable robustness
- T_{vjmax}=175℃

Applications

- Motor control and drives
- High power Converters
- UPS systems
- Wind turbines

Package Type & Internal Circuit

L5



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	T_{vj}=25 ℃	1700	V
I_C	Continuous Collector Current	T_C=150 ℃	100	A
I_{CRM}	Peak Collector Current	t_P=1ms	200	A
V_{GES}	Gate-Emitter Voltage	T_{vj}=25 ℃	±20	V
P_{tot}	Total Power Dissipation	T_C=25 ℃,T_{vjmax}=175 ℃	551	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=100A, V_{GE}=15 V, T_{vj}=25 ℃		1.69		V
		I_C=100A, V_{GE}=15 V, T_{vj}=150 ℃		2.08		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=6.0 mA,V_{CE}=V_{GE},T_{vj}= 25 ℃	5.5	6.3	7.0	V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1700 V, V_{GE}=0 V, T_{vj}=25 ℃			1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}=0 V, V_{GE}=20 V, T_{vj}=25 ℃			100	uA
R_{Gint}	Internal gate resistor	T_{vj}=25 ℃		8.4		Ω
C_{ies}	Input capacitance	f = 100 kHz, T_{vj}= 25°C, V_{CE} = 25 V, V_{GE}= 0 V		7.7		nF
C_{oes}	Output capacitance			0.45		nF
C_{res}	Reverse transfer capacitance			0.24		nF
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=100 A,V_{CE}=900 V V_{GE}=±15 V R_G=9 Ω T_{vj}=25 ℃		101		ns
t_r	Rise Time, Inductive Load			31		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			539		ns
t_f	Fall Time, Inductive Load			354		ns
E_{on}	Turn-on Energy Loss per Pulse			14.2		mJ
E_{off}	Energy Loss per Pulse			20.3		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=100 A,V_{CE}=900 V V_{GE}=±15 V R_G=9 Ω T_{vj}=150 ℃		124		ns
t_r	Rise Time, Inductive Load			33		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			671		ns
t_f	Fall Time, Inductive Load			586		ns
E_{on}	Turn-on Energy Loss per Pulse			19.4		mJ
E_{off}	Energy Loss per Pulse			31.0		mJ
$R_{th(j-c)}$	IGBT thermal resistance junction to case IGBT	per switch			0.272	K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		175	℃
Isc	SC	V_{GE}=15V, V_{CC}=1200V, t_p≤10μs, T_{vj}=175 ℃, V_{CEmax} = V_{CES} -L_{sCE} ·di/dt		395		A

Maximum Rated Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj}= 25 ℃		1700		V
I_F	Continuous DC Forward Current			100		A
I_{FRM}	Repetitive Peak Forward Current	t_P=1 ms		200		A

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=100 A, V_{CE}=0 V, T_{vj}=25 ℃		1.83		V
		I_F=100 A, V_{CE}=0 V, T_{vj}=150 ℃		1.98		V
I_{rr}	Peak reverse recovery current	I_F=100 A,V_R=900 V, di/dt=2690 A/us T_{vj}=25 ℃		160		A
Q_r	Recovered Charge			21.3		uC
E_{rec}	Reverse Recovery Energy			12.1		mJ
I_{rr}	Peak reverse recovery current	I_F=100 A,V_R=900 V, di/dt=2690 A/us T_{vj}=150 ℃		164		A
Q_r	Recovered Charge			35.9		uC
E_{rec}	Reverse Recovery Energy			22.1		mJ
$R_{th(j-c)}$	Thermal resistance, junction to case	per switch			0.479	K/W
$T_{vj\ op}$	Operating Junction Temperature		-40		175	℃

Maximum Rated Values (Diode Rectifier)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25 ℃		1600		V
I_{FRMSM}	Maximum RMS forward current per chip	T_c=80 ℃		110		A
I_{RMSM}	Maximum RMS current at rectifier chip	T_c=80 ℃		110		A
I_{FSM}	Surge forward current	t_p=10ms T_{vj}=25 ℃		1320		A

Characteristic Values (Diode Rectifier)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward voltage	I_F=110A,T_c=25 ℃		1.2		V
I_R	Reverse current	T_{vj}=25 ℃ V_R=V_{RRM}			10	uA
R_{thjc}	Thermal resistance junction to case	T_c=25 ℃		0.24		K/W
T_{vjop}	Temperature under switching conditions	per diode	-40		150	℃

NTC-Thermistor (Characteristic Values)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated resistance	T_c=25 ℃		5		KΩ
ΔR/R	Deviation of R100	T_c=100 ℃	-5		5	%
P_{25}	Power dissipation	T_c=25 ℃		20		mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$		3380		K
$B_{25/100}$	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298,15K))]$		3450		K

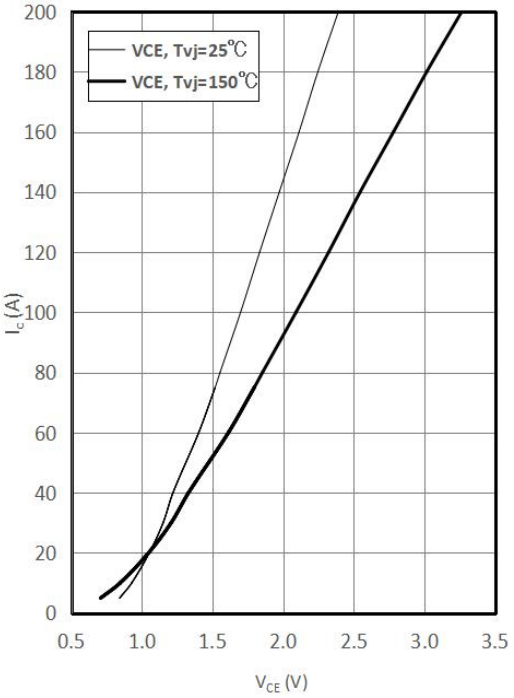
Module Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	t=1min,f=50Hz	2500			V
T_{stg}	Storage Temperature		-40		125	℃
M	Mounting Torque	Recommended(M5)	2.5		5.0	N·m
G	Weight of Module			310		g

output characteristic of IGBT,Inverter (typical)

$I_c = f(V_{CE})$

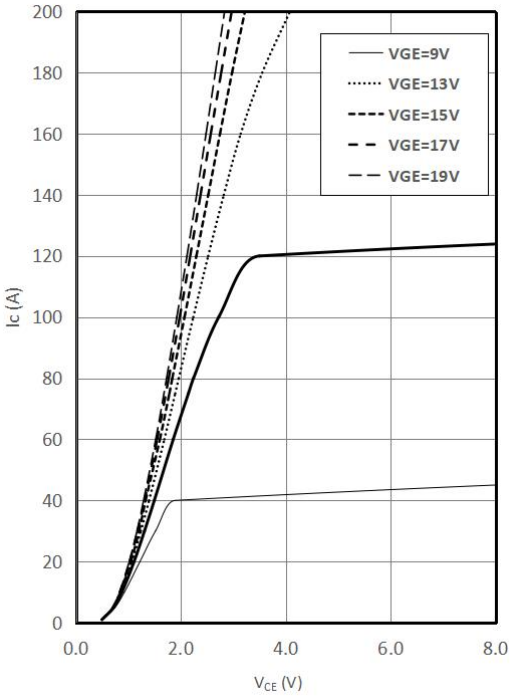
$V_{GE} = 15V$



Output characteristic IGBT , Inverter (typical)

$I_C = f(V_{CE})$

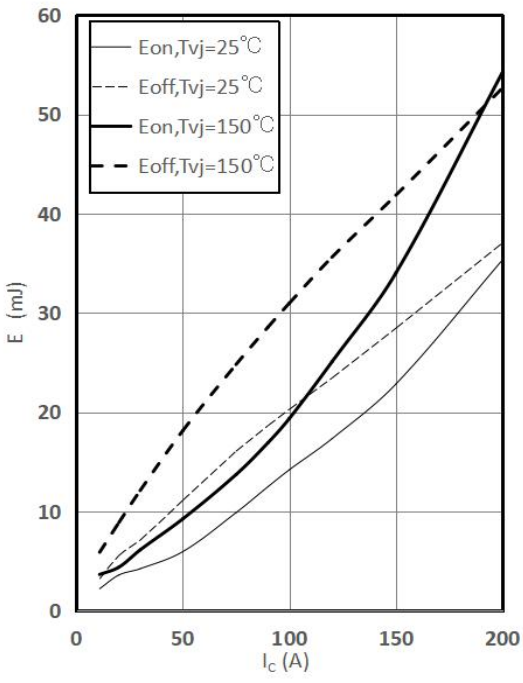
T_{vj}=150°C



switching time of IGBT,Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$

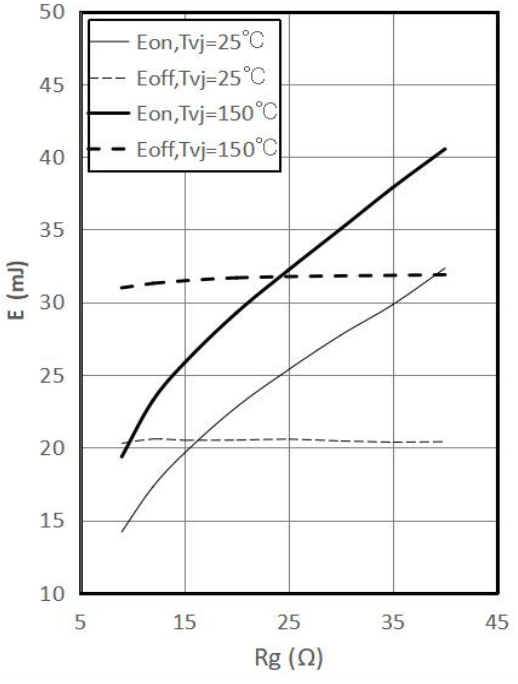
$V_{GE} = \pm 15V$, $R_G = 9\ \Omega$, $V_{CE} = 900V$



switching losses of IGBT,Inverter (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

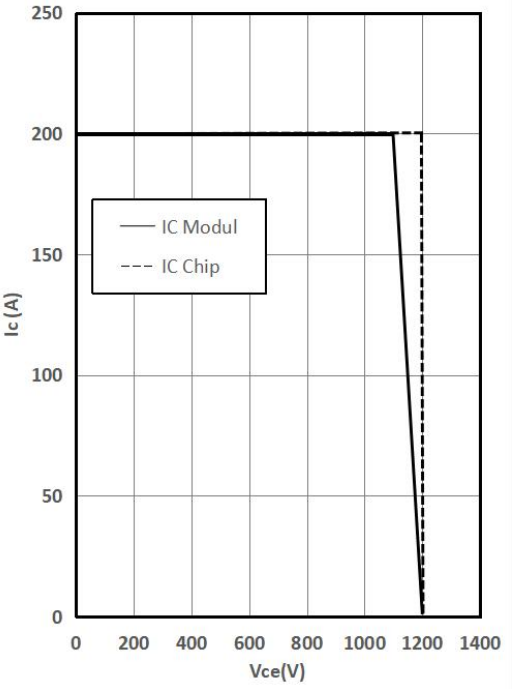
$V_{GE} = \pm 15V$, $I_C = 100\ A$, $V_{CE} = 900V$



RBSOA IGBT,Inverter (typical)

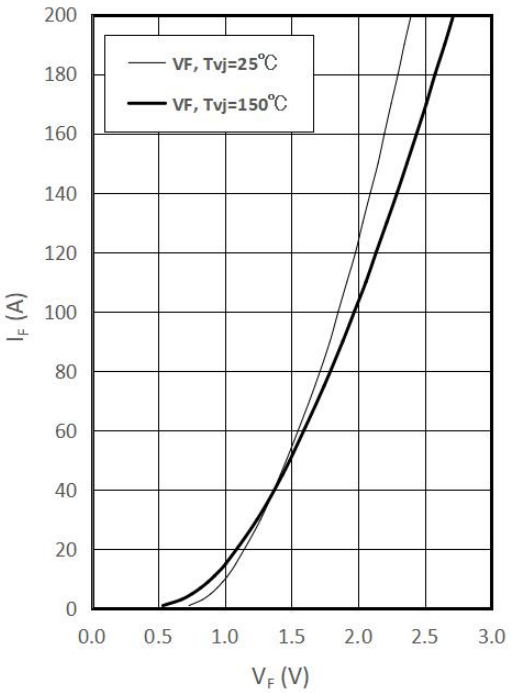
I_C= f (V_{CE})

V_{GE} = ±15V, R_G= 9Ω, T_{vj} =150 ℃



forward characteristic of Diodе,Inverter (typical)

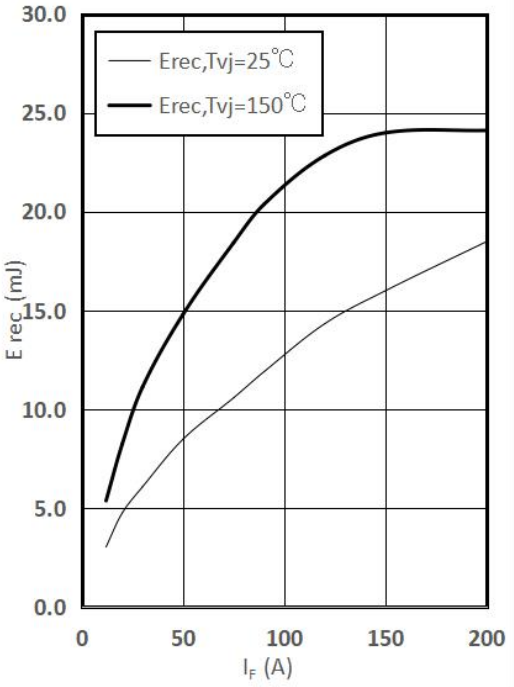
I_F = f(V_F)



switching losses of Diode, Inverter (typical)

E_{rec} = f(R_G),

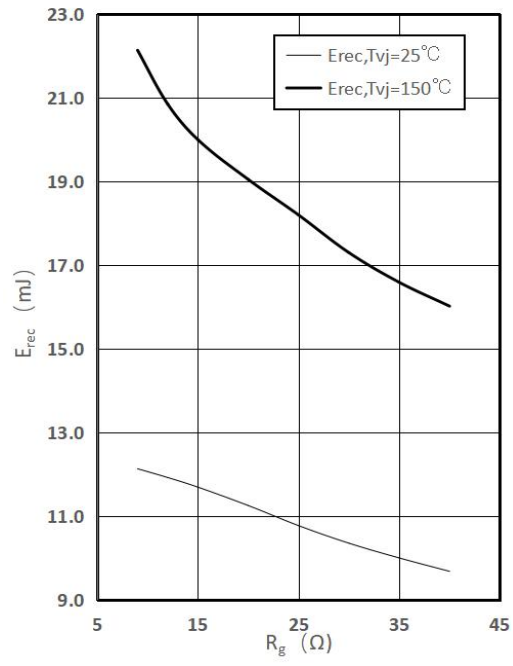
I_F = 100 A，V_{CE} = 900V



switching losses of Diode, Inverter (typical)

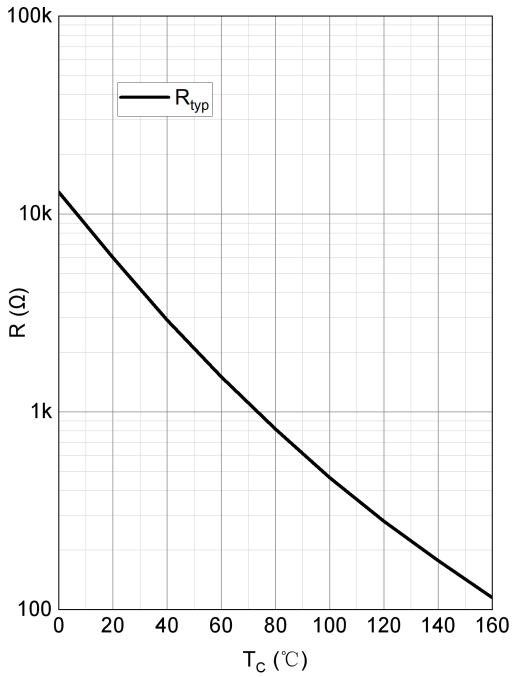
E_{rec} = f(I_F),

R_G = 9 Ω，V_{CE} = 900V

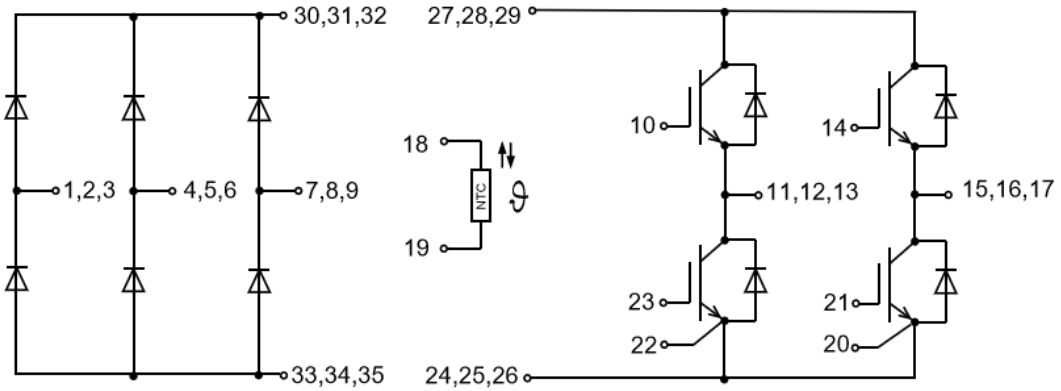


NTC-Thermistor-temperature characteristic (typical)

R = f (T)

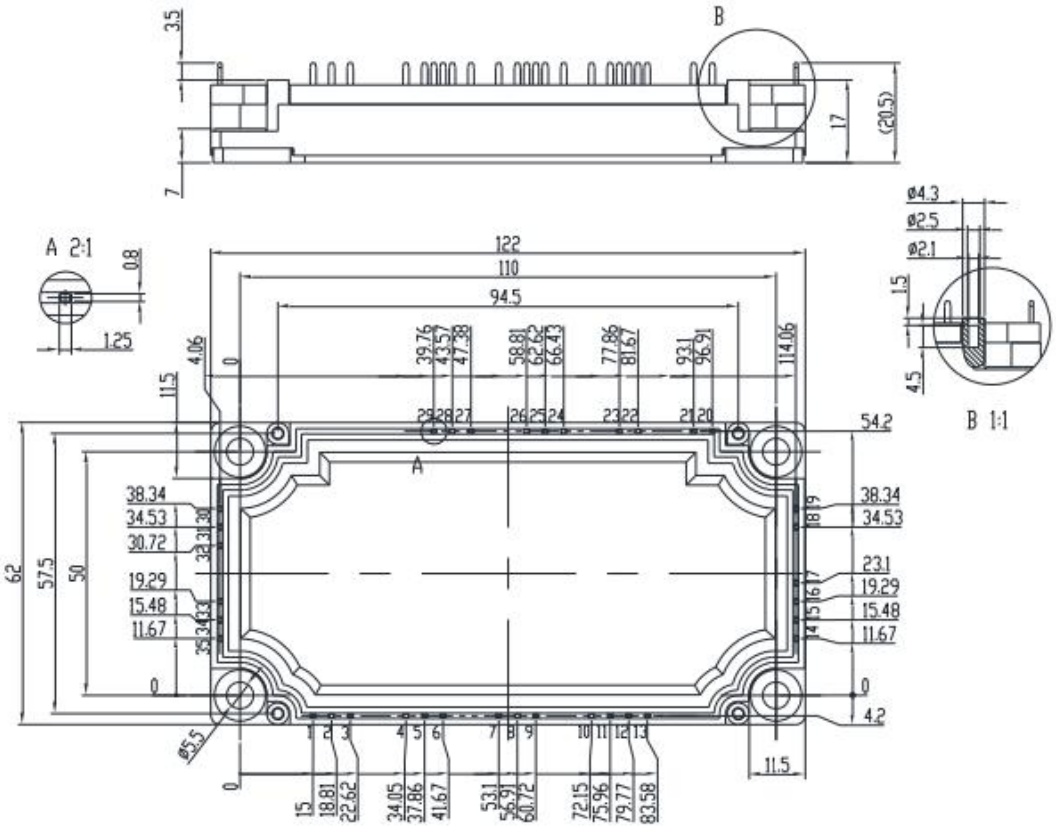


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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