

LEGM150BD170L5H

IGBT Power Module

Features:

- $V_{CE}=1700V$ $I_C=150$ A
- V_{CEsat} with positive temperature coefficient
- Low V_{CEsat}
- Unbeatable robustness
- $T_{vjmax}=175^{\circ}C$

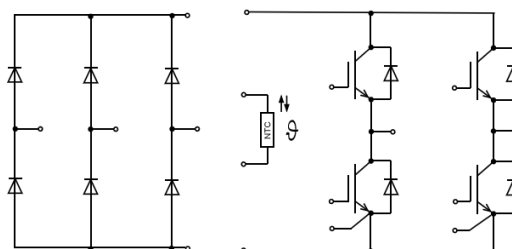
Applications

- 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	$T_{vj}=25^{\circ}C$	1700	V
I_C	Continuous Collector Current	$T_C=150^{\circ}C$	150	A
I_{CRM}	Peak Collector Current	$t_p=1ms$	300	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^{\circ}C$	± 20	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=175^{\circ}C$	1042	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=150A, V_{GE}=15V, T_{vj}=25^\circ C$		1.65		V
		$I_C=150A, V_{GE}=15V, T_{vj}=175^\circ C$		2.05		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=9mA, V_{CE}=V_{GE}, T_{vj}=25^\circ C$	5.00	6.15	7.50	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1700V, V_{GE}=0V, T_{vj}=25^\circ C$			1.0	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^\circ C$			0.5	μA
R_{Gint}	Internal gate resistor	$T_{vj}=25^\circ C$		5.6		Ω
C_{ies}	Input capacitance	$f = 100\text{ kHz}, T_{vj}=25^\circ C,$ $V_{CE}=25V, V_{GE}=0V$		11.5		nF
C_{res}	Reverse transfer capacitance			0.35		nF
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=150A, V_{CE}=900V$ $V_{GE}=\pm 15V$ $R_G=6\Omega$ $T_{vj}=25^\circ C$		105		ns
t_r	Rise Time, Inductive Load			52		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			590		ns
t_f	Fall Time, Inductive Load			360		ns
E_{on}	Turn-on Energy Loss per Pulse			41		mJ
E_{off}	Energy Loss per Pulse			33		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=150A, V_{CE}=900V$ $V_{GE}=\pm 15V$ $R_G=6\Omega$ $T_{vj}=175^\circ C$		150		ns
t_r	Rise Time, Inductive Load			62		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			775		ns
t_f	Fall Time, Inductive Load			660		ns
E_{on}	Turn-on Energy Loss per Pulse			65		mJ
E_{off}	Energy Loss per Pulse			65		mJ
$R_{th(j-c)}$	IGBT thermal resistance junction to case IGBT	per switch			0.144	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		175	$^\circ C$
I_{sc}	SC	$V_{GE}=15V, V_{CC}=1200V, tp\leq 10\mu s,$ $T_{vj}=175^\circ C, V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$		593		A

Maximum Rated Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$		1700		V
I_F	Continuous DC Forward Current			150		A
I_{FRM}	Repetitive Peak Forward Current	$t_p = 1\text{ ms}$		300		A

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F = 150\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 25\text{ }^{\circ}\text{C}$		1.70		V
		$I_F = 150\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 175\text{ }^{\circ}\text{C}$		1.95		V
I_{rr}	Peak reverse recovery current	$I_F = 150\text{ A}, V_R = 900\text{ V},$ $di/dt = 2600\text{ A/us}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$		160		A
Q_r	Recovered Charge			27		uC
E_{rec}	Reverse Recovery Energy			19		mJ
I_{rr}	Peak reverse recovery current	$I_F = 150\text{ A}, V_R = 900\text{ V},$ $di/dt = 2600\text{ A/us}$ $T_{vj} = 175\text{ }^{\circ}\text{C}$		153		A
Q_r	Recovered Charge			68		uC
E_{rec}	Reverse Recovery Energy			38		mJ
$R_{th(j-c)}$	Thermal resistance, junction to case	per switch			0.240	K/W
$T_{vj\text{ op}}$	Operating Junction Temperature		-40		175	$^{\circ}\text{C}$

Maximum Rated Values (Diode Rectifier)

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

Characteristic Values (Diode Rectifier)

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

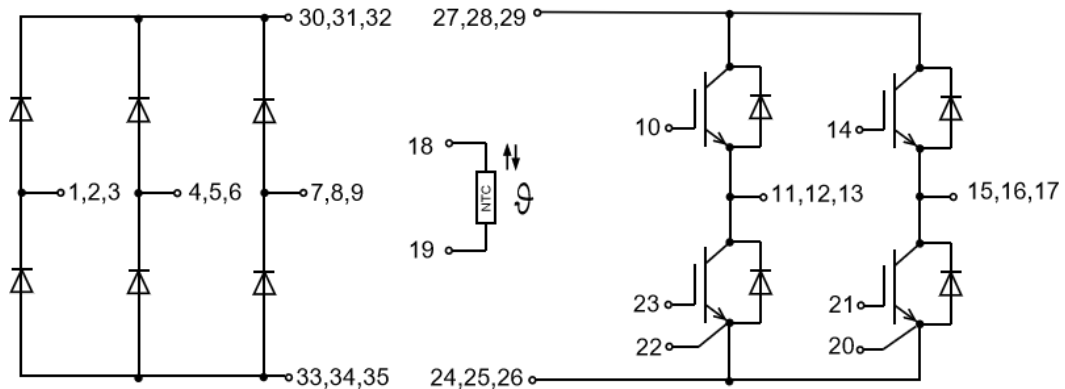
NTC-Thermistor (Characteristic Values)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated resistance	$T_c=25\text{ }^{\circ}\text{C}$		5		K Ω
$\Delta R/R$	Deviation of R100	$T_c=100\text{ }^{\circ}\text{C}$	-5		5	%
P_{25}	Power dissipation	$T_c=25\text{ }^{\circ}\text{C}$		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

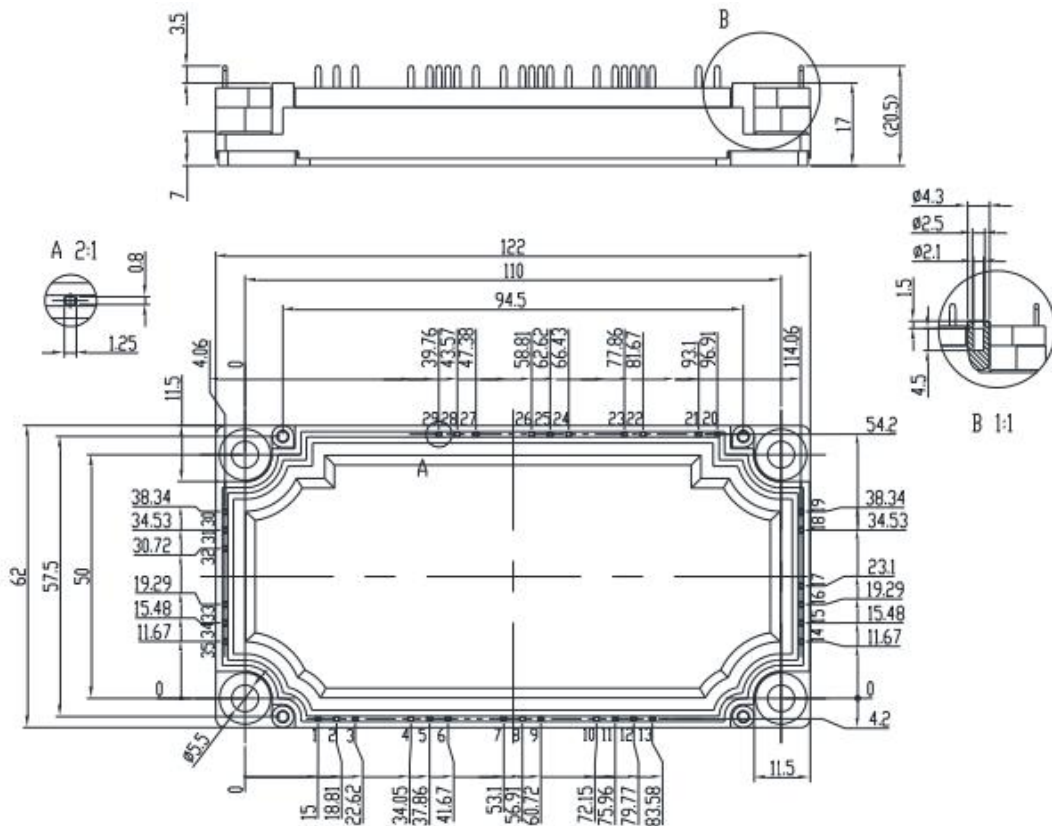
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	$t=1\text{min}, f=50\text{Hz}$	2500			V
T_{stg}	Storage Temperature		-40		125	$^{\circ}\text{C}$
M	Mounting Torque	Recommended(M5)	2.5		5.0	N·m
G	Weight of Module			310		g

Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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