

LEGM50BJ120L8S

IGBT Power Module

Features:

- $V_{CE}=1200V$ $I_C=50A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature $150^{\circ}C$
- Isolation Type Package

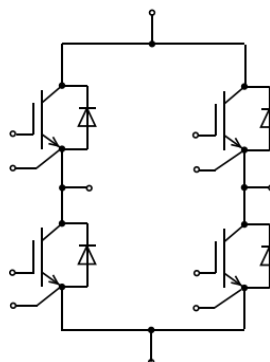
Applications:

- The inverter
- Motor control and drives

Package Type & Internal Circuit



L8



Internal Circuit

Maximum Rated Values (IGBT,Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
I_C	Continuous Collector Current	$T_C=80^{\circ}C$	50	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	100	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^{\circ}C$	± 30	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150^{\circ}C$	401	W

Characteristics Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=50\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.99		V
		$I_C=50\text{ A}, V_{GE}=15\text{ V}, T_{vj}=125\text{ }^{\circ}\text{C}$		2.46		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=6.0\text{ mA}, V_{CE}=V_{GE}, T_{vj}=25\text{ }^{\circ}\text{C}$	5.8	6.2	6.7	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			5	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=20\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			400	nA
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=50\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=15\text{ }\Omega$ $T_{vj}=25\text{ }^{\circ}\text{C}$		43		ns
t_r	Rise Time, Inductive Load			27		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			206		ns
t_f	Fall Time, Inductive Load			111		ns
E_{on}	Turn-on Energy Loss per Pulse			2.83		mJ
E_{off}	Turn-off Energy Loss per Pulse			2.06		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=50\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=15\text{ }\Omega$ $T_{vj}=125\text{ }^{\circ}\text{C}$		38		ns
t_r	Rise Time, Inductive Load			30		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			257		ns
t_f	Fall Time, Inductive Load			106		ns
E_{on}	Turn-on Energy Loss per Pulse			4.64		mJ
E_{off}	Turn-off Energy Loss per Pulse			2.37		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			0.312	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		125	$^{\circ}\text{C}$
I_{sc}	SC	$V_{GE}\leq 15\text{ V}, V_{CE}=600\text{ V},$ $t_p\leq 10\mu\text{ S}, T_{vj}=125^{\circ}\text{C},$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$		200		A

Maximum Rated Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj}=25\text{ }^{\circ}\text{C}$		1200		V
I_F	Continuous DC Forward Current			30		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		60		A
I^2t	I^2t Value	$V_R=0\text{ V}$, $t_p=10\text{ ms}$, $T_{vj}=150\text{ }^{\circ}\text{C}$		220		A ² s

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=30\text{ A}$, $V_{CE}=0\text{ V}$, $T_{vj}=25\text{ }^{\circ}\text{C}$		1.86		V
		$I_F=30\text{ A}$, $V_{CE}=0\text{ V}$, $T_{vj}=125\text{ }^{\circ}\text{C}$		1.61		V
I_{rr}	Peak Reverse Recovery Current	$I_F=30\text{ A}$, $V_R=600\text{ V}$ $-di/dt=1000\text{ A/us}$ $T_{vj}=25\text{ }^{\circ}\text{C}$, $V_{GE}=-15\text{ V}$		54		A
Q_r	Recovered Charge			3.26		uC
E_{rec}	Reverse Recovery Energy			1.09		mJ
I_{rr}	Peak Reverse Recovery Current	$I_F=30\text{ A}$, $V_R=600\text{ V}$ $-di/dt=1000\text{ A/us}$ $T_{vj}=125\text{ }^{\circ}\text{C}$ $V_{GE}=-15\text{ V}$		66		A
Q_r	Recovered Charge			6.44		uC
E_{rec}	Reverse Recovery Energy			2.38		mJ
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		125	$^{\circ}\text{C}$
R_{thJC}	Thermal resistance, junction to case	per Diode			0.942	K/W

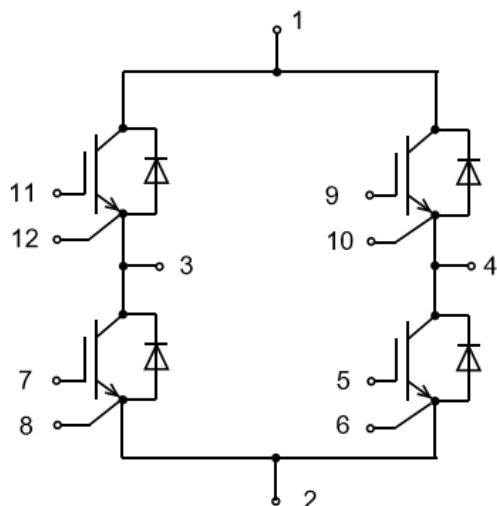
NTC-Thermistor (Characteristic Values)

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

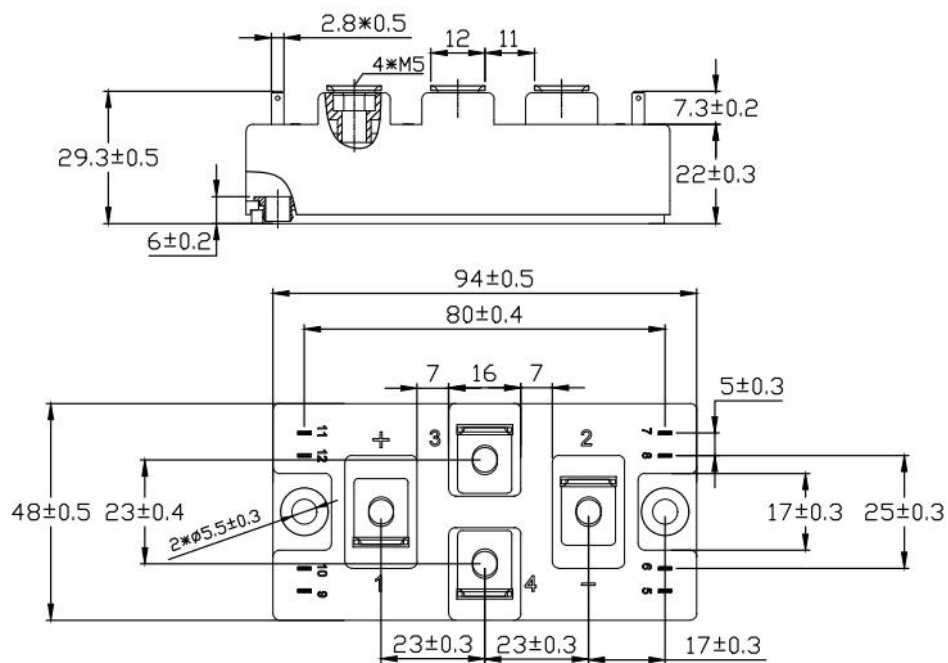
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{isol}	Isolation voltage	t=1min,f=50Hz	2500			V
T _{stg}	Storage Temperature		-40		125	°C
M	Mountig Force per Clamp	Power Terminal Screw:M5	2.5		5.0	N.m
		Mounting Screw:M5	3.0		5.0	N.m
G	Weight of Module			210		g

Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE