

LEGM150BH120L1H

IGBT Power Module

Features

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

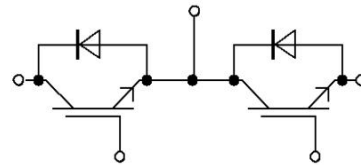
Applications

- The inverter
- Motor control and drives

Package Type & Internal Circuit



L1



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Maximum Power Dissipation	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
I_C	Continuous Collector Current	$T_C=100^{\circ}C$	150	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	300	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^{\circ}C$	± 20	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=150^{\circ}C$	700	W

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =150 A, V _{GE} =15 V, T _{vj} =25 °C		1.65		V
		I _C =150 A, V _{GE} =15 V, T _{vj} =125 °C		1.80		V
V _{GE(th)}	Gate Threshold Voltage	I _C =5.0 mA, V _{CE} =V _{GE} , T _{vj} =25 °C		5.8		V
I _{CES}	Collector-Emitter Cut-off Current	V _{CE} =1200 V, V _{GE} =0 V, T _{vj} =25 °C			1.0	mA
I _{GES}	Gate-Emitter Leakage Current	V _{CE} =0 V, V _{GE} =15 V, T _{vj} =25 °C			400	nA
t _{d(on)}	Turn-on Delay Time, Inductive Load	I _C =150 A, V _{CE} =600 V V _{GE} =±15 V R _{Gon} =1 Ω T _{vj} =25 °C		120		ns
t _r	Rise Time, Inductive Load			55		ns
t _{d(off)}	Turn-off Delay Time, Inductive Load			370		ns
t _f	Fall Time, Inductive Load			105		ns
E _{on}	Turn-on Energy Loss per Pulse			3.1		mJ
E _{off}	Energy Loss per Pulse			12.4		mJ
t _{d(on)}	Turn-on Delay Time, Inductive Load	I _C =150 A, V _{CE} =600 V V _{GE} =±15 V R _{Gon} =1 Ω T _{vj} =125 °C		140		ns
t _r	Rise Time, Inductive Load			60		ns
t _{d(off)}	Turn-off Delay Time, Inductive Load			400		ns
t _f	Fall Time, Inductive Load			115		ns
E _{on}	Turn-on Energy Loss per Pulse			3.8		mJ
E _{off}	Energy Loss per Pulse			15		mJ
R _{thJC}	Thermal resistance, junction to case	per IGBT			0.79	K/W
T _{vj op}	Temperature under switching conditions		-40		125	°C
I _{SC}	SC data	V _{GE} ≤ 15 V, V _{CC} = 600 V V _{CEmax} = V _{CES} - L _{sCE} · di/dt t _P ≤ 10 μs, T _{vj} = 125 °C		900		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	$T_C=100\text{ }^{\circ}\text{C}$		150		A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		300		A
I^2t	I^2t Value	$V_R=0\text{ V}, t_p=10\text{ ms}, T_{vj}=125\text{ }^{\circ}\text{C}$		4500		A^2s

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=150\text{ A}, V_{CE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.75		V
		$I_F=150\text{ A}, V_{CE}=0\text{ V}, T_{vj}=125\text{ }^{\circ}\text{C}$		1.85		V
t_{rr}	Reverse Recovery time	$I_F=150\text{ A}, V_R=600\text{ V}$ $-di/dt=3500\text{ A/us}$		160		ns
Q_r	Recovered Charge			14.7		μC
E_{rec}	Reverse Recovery Energy		$T_{vj}=25\text{ }^{\circ}\text{C}$		7.4	
t_{rr}	Reverse Recovery time	$I_F=150\text{ A}, V_R=600\text{ V}$ $-di/dt=3500\text{ A/us}$		190		ns
			Q_r	Recovered Charge		21.8
E_{rec}	Reverse Recovery Energy		$T_{vj}=125\text{ }^{\circ}\text{C}$		11.3	
R_{thJC}	Thermal resistance, junction to case	per Diode			0.28	K/W
$T_{vj\text{ op}}$	Operating Junction Temperature		-40		125	$^{\circ}\text{C}$

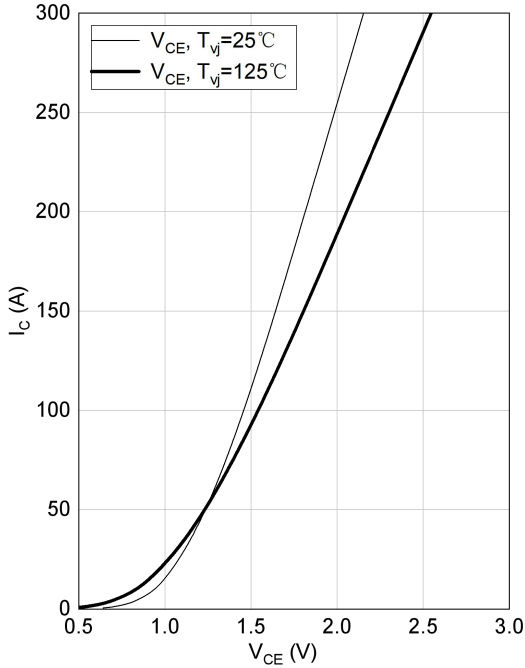
Module Characteristics

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_t	Module Electrodes Torque	Recommended(M6)	2.5		5.0	$\text{N}\cdot\text{m}$
M_s	Module-to-Sink Torque	Recommended(M6)	3.0		6.0	$\text{N}\cdot\text{m}$
G	Weight of Module			160		g

Output characteristic of IGBT, Inverter (typical)

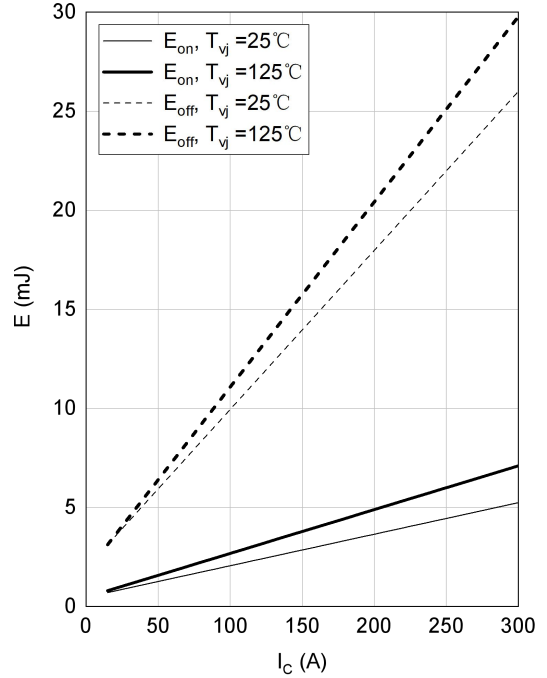
$$I_c = f(V_{CE})$$

$$V_{GE} = 15V$$


Switching losses of IGBT, Inverter (typical)

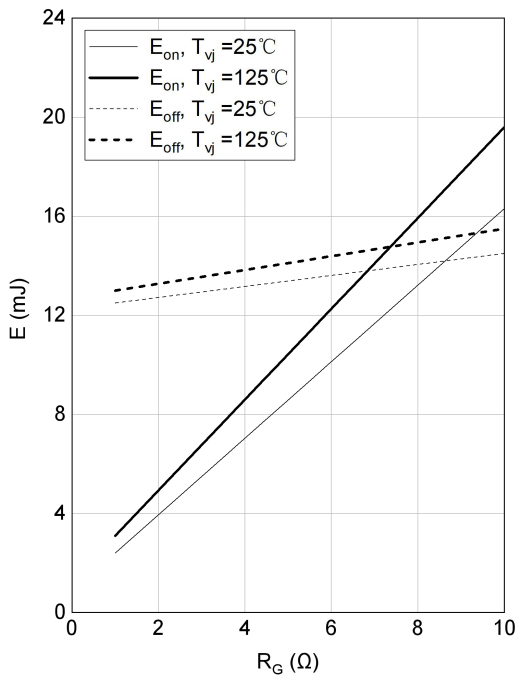
$$E_{on} = f(I_c), E_{off} = f(I_c)$$

$$V_{GE} = \pm 15V, R_G = 1\Omega, V_{CE} = 600V$$


Switching losses of IGBT, Inverter (typical)

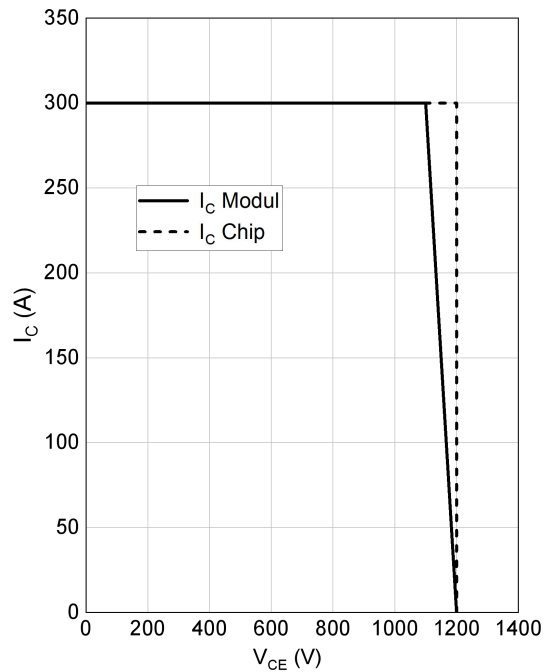
$$E_{on} = f(R_G), E_{off} = f(R_G)$$

$$V_{GE} = \pm 15V, I_c = 150A, V_{CE} = 600V$$


RBSOA IGBT, Inverter (typical)

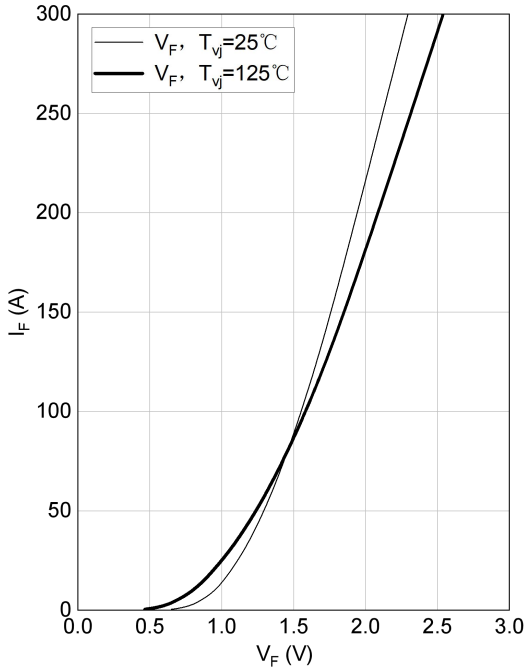
$$I_c = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_{Goff} = 1\Omega, T_{vj} = 125^\circ C$$



Forward characteristic of Diode, Inverter (typical)

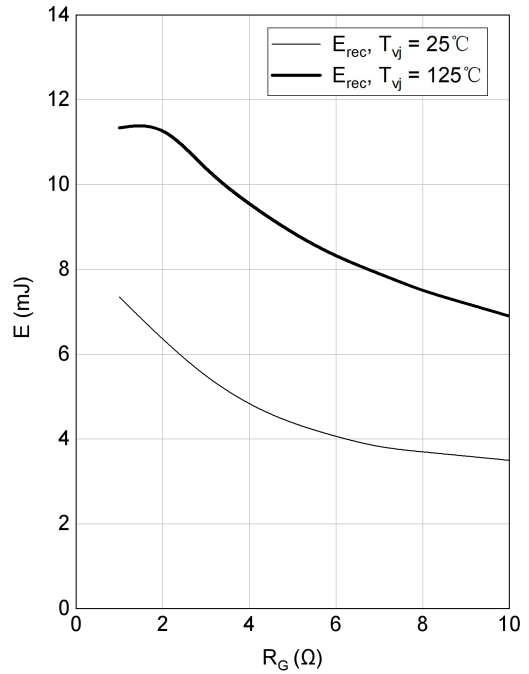
$$I_F = f(V_F)$$



Switching losses of Diode, Inverter (typical)

$$E_{rec} = f(R_G)$$

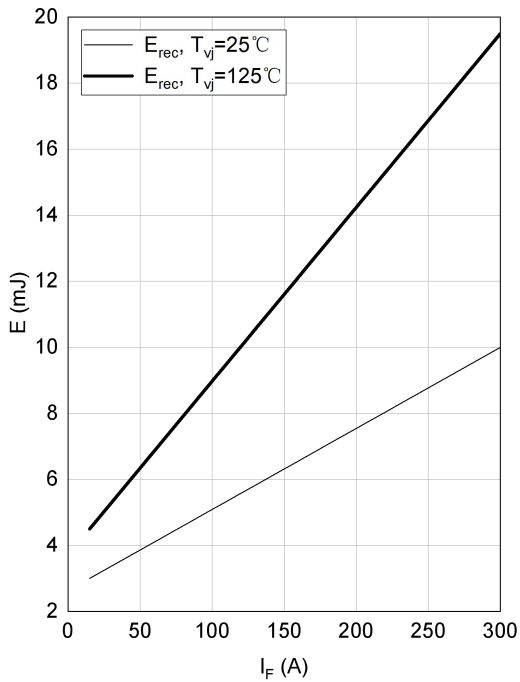
$$I_F = 150\text{A}, V_{CE} = 600\text{V}$$



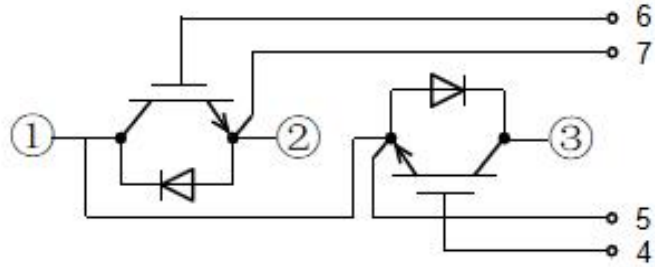
Switching loss of Diode, Inverter (typical)

$$E_{rec} = f(I_F)$$

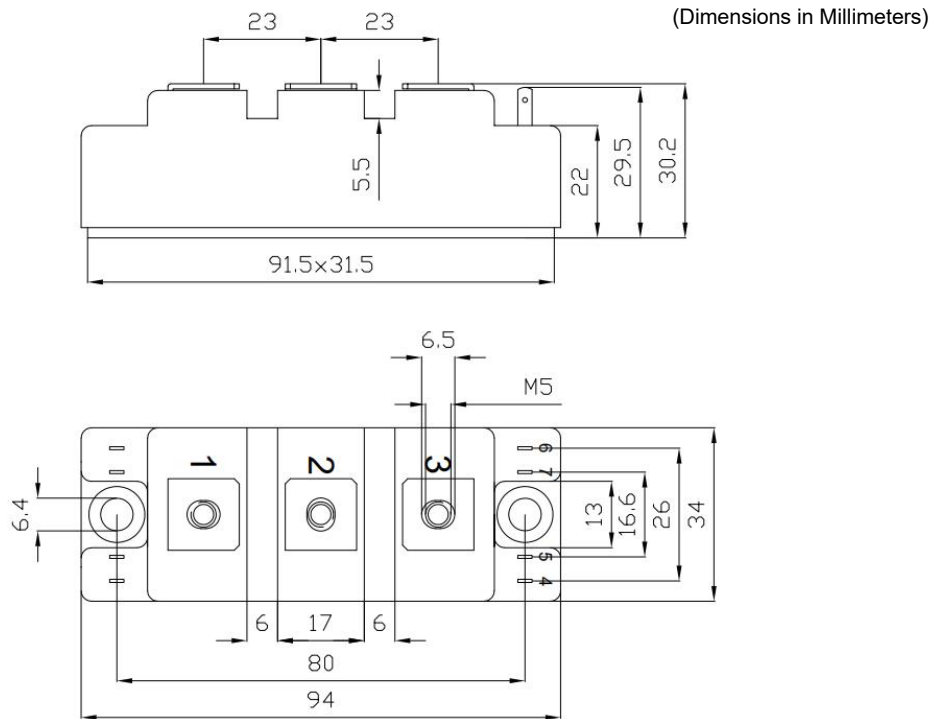
$$R_G = 1\Omega, V_{CE} = 600\text{V}$$



Circuit Diagram



Package Dimensions



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