

# LEGM100BH120L1H

## IGBT Power Module

### Features:

- $V_{CE}=1200V$   $I_C=100A$
- Low  $V_{CE(sat)}$
- $V_{CEsat}$  with positive temperature coefficient
- Maximum junction temperature 175°C
- Isolation Type Package

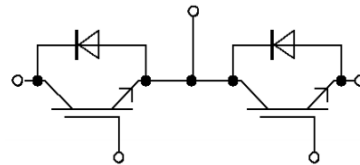
### Applications:

- The inverter
- Motor control and drives

### Package Type & Internal Circuit



L1



Internal Circuit

### Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CES}$	Collector-emitter voltage	$V_{EC}=0V, I_C=1mA, T_{vj}=25^\circ C$	1200	V
$I_C$	Continuous Collector Current	$T_C=100^\circ C$	100	A
$I_{CRM}$	Peak Collector Current	$I_{CRM}=2I_C$	200	A
$V_{GES}$	Gate-Emitter Voltage	$T_{vj}=25^\circ C$	$\pm 30$	V
$P_{tot}$	Total Power Dissipation	$T_C=25^\circ C, T_{vjmax}=150^\circ C$	500	W

**Characteristics Values (IGBT Inverter)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=100A, V_{GE}=15V, T_{vj}=25^\circ C$		1.8	2.3	V		
		$I_C=100A, V_{GE}=15V, T_{vj}=150^\circ C$		2.0	2.7	V		
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=5.0mA, V_{CE}=V_{GE}, T_{vj}=25^\circ C$	5.2	6	6.5	V		
$I_{CES}$	Collector-Emitter Cut-off Current	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^\circ C$			20	$\mu A$		
$I_{GES}$	Gate-Emitter Leakage Current	$V_{CE}=0V, V_{GE}=15V, T_{vj}=25^\circ C$			200	nA		
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=25^\circ C$		106		ns		
$t_r$	Rise Time, Inductive Load			40		ns		
$t_{d(off)}$	Turn-off Delay Time, Inductive Load				330		ns	
$t_f$	Fall Time, Inductive Load				240		ns	
$E_{on}$	Turn-on Energy Loss per Pulse				2.6		mJ	
$E_{off}$	Energy Loss per Pulse				8.3		mJ	
$t_{d(on)}$	Turn-on Delay Time, Inductive Load		$I_C=100A, V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=150^\circ C$		120		ns	
$t_r$	Rise Time, Inductive Load					43		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load					421		ns
$t_f$	Fall Time, Inductive Load					327		ns
$E_{on}$	Turn-on Energy Loss per Pulse				5.1		mJ	
$E_{off}$	Energy Loss per Pulse				14.9		mJ	
$R_{thJC}$	Thermal resistance, junction to case	per IGBT			0.29	K/W		
$T_{vj op}$	Temperature under switching conditions		-40		150	$^\circ C$		
$I_{SC}$	SC data	$V_{GE} \leq 15V, V_{CC} = 600V$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_p \leq 10\mu s, T_{vj} = 150^\circ C$		427		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	$T_C=100\text{ }^{\circ}\text{C}$		100		A
$I_{FRM}$	Repetitive Peak Forward Current	$t_p=1\text{ ms}$		400		A
$I^2t$	$I^2t$ Value	$V_R=0\text{ V}$ , $t_p=10\text{ ms}$ , $T_{vj}=125\text{ }^{\circ}\text{C}$		2000		$\text{A}^2\text{s}$

**Characteristic Values (Diode Inverter)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_F$	Forward Voltage	$I_F=100\text{ A}$ , $V_{CE}=0\text{ V}$ , $T_{vj}=25\text{ }^{\circ}\text{C}$		2.3	2.7	V
		$I_F=100\text{ A}$ , $V_{CE}=0\text{ V}$ , $T_{vj}=150\text{ }^{\circ}\text{C}$		2.2	2.5	V
$t_{rr}$	Reverse Recovery time	$I_F=100\text{ A}$ , $V_R=600\text{ V}$		210		ns
$Q_r$	Recovered Charge	$-di/dt=1600\text{ A/us}$		7		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy	$T_{vj}=25\text{ }^{\circ}\text{C}$		2.2		mJ
$t_{rr}$	Reverse Recovery time	$I_F=100\text{ A}$ , $V_R=600\text{ V}$		360		ns
		$-di/dt=1600\text{ A/us}$		16.9		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy	$T_{vj}=150\text{ }^{\circ}\text{C}$		6		mJ
$R_{thJC}$	Thermal resistance, junction to case	per Diode			0.52	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$

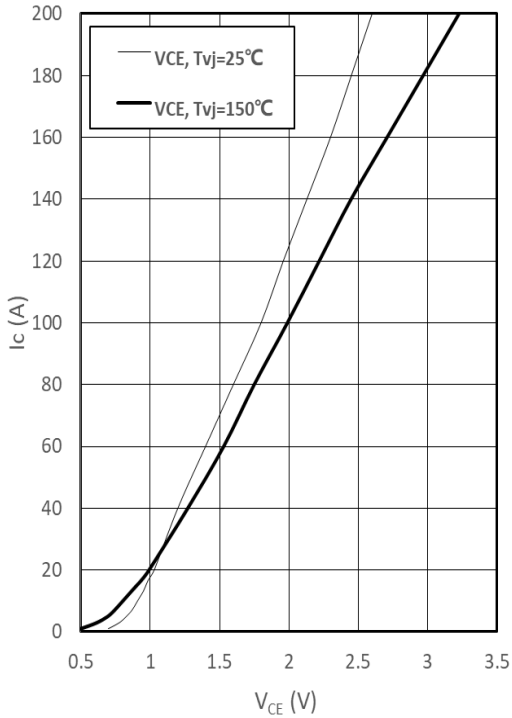
**Module Characteristics**

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		150	$^{\circ}\text{C}$
$M_t$	Module Electrodes Torque	Recommended(M5)	2.5		5.0	N·m
$M_s$	Module-to-Sink Torque	Recommended(M6)	3.0		6.0	N·m
G	Weight of Module			160		g

**Output characteristic of IGBT, Inverter (typical)**

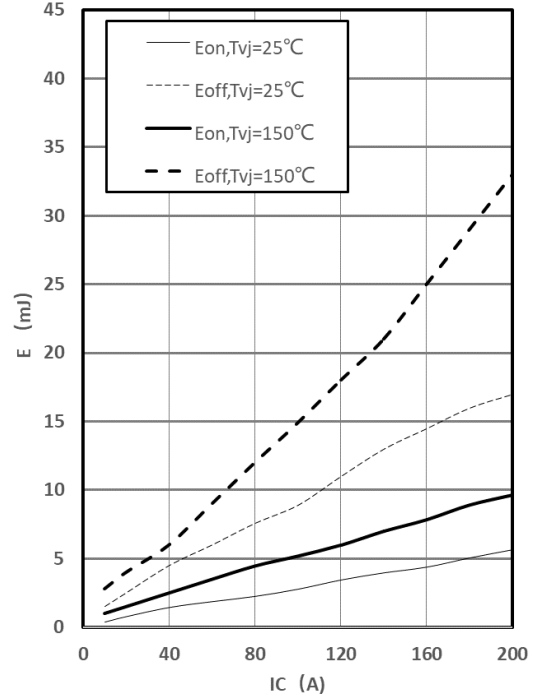
$$I_c = f(V_{CE})$$

$$V_{GE} = 15V$$


**Switching losses of IGBT, Inverter (typical)**

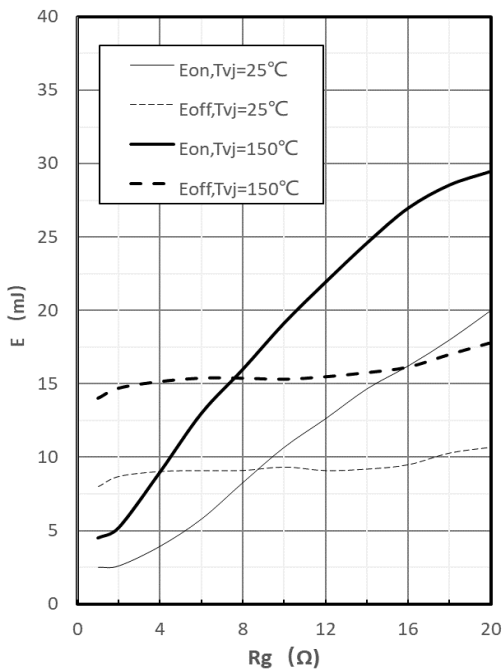
$$E_{on} = f(I_c), E_{off} = f(I_c)$$

$$V_{GE} = \pm 15V, R_G = 2\Omega, V_{CE} = 600V$$


**Switching losses of IGBT, Inverter (typical)**

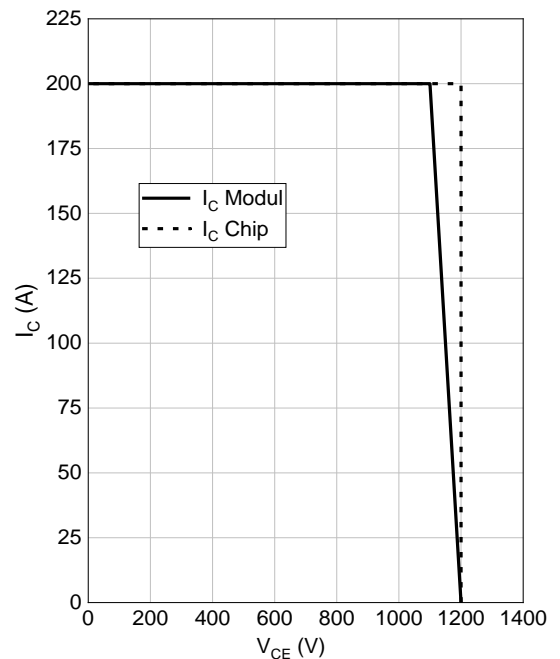
$$E_{on} = f(R_G), E_{off} = f(R_G)$$

$$V_{GE} = \pm 15V, I_c = 100A, V_{CE} = 600V$$


**RBSOA IGBT, Inverter (typical)**

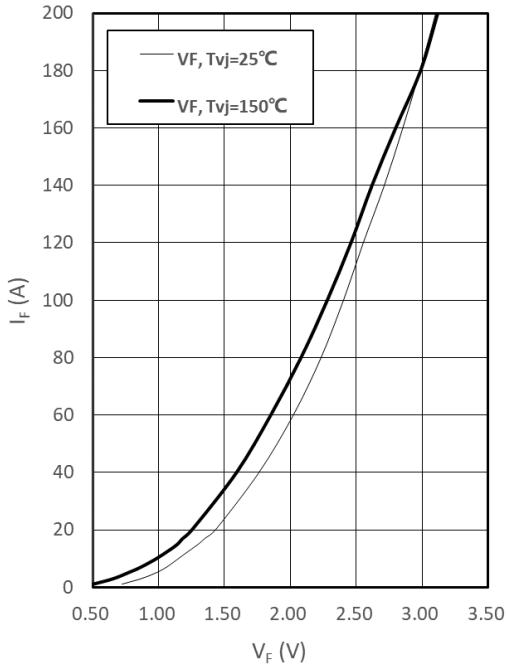
$$I_c = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_G = 1\Omega, T_{vj} = 150^\circ C$$



forward characteristic of Diode, Inverter (typical)

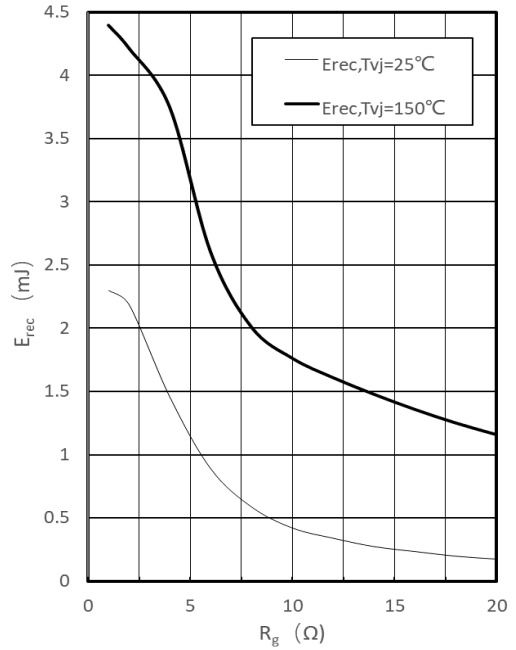
$$I_F = f(V_F)$$



switching losses of Diode, Inverter (typical)

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

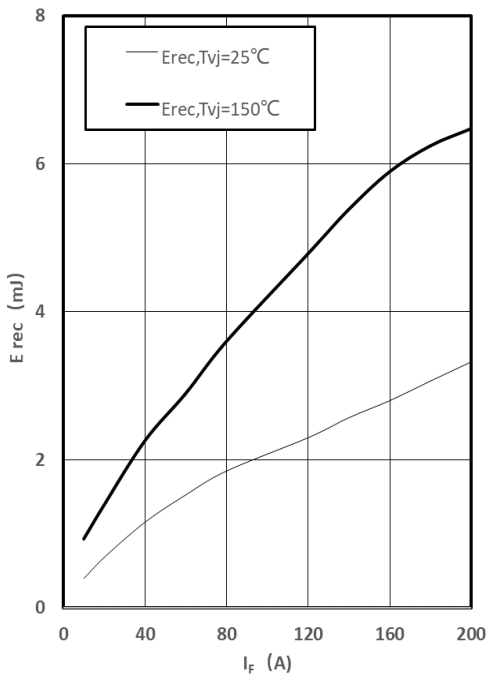
$$I_F = 100\text{A}, V_{CE} = 600\text{V}$$



switching loss of Diode, Inverter (typical)

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

$$R_G = 2\Omega, V_{CE} = 600\text{V}$$





**DISCLAIMER**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.