# LEGM75BH120L1S

## IGBT Power Module

### Features:

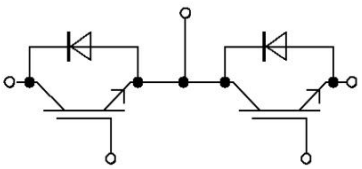
- $V_{CE}$=1200V $I_C$=75A
- Low $V_{CE(sat)}$
- $V_{CEsat}$ with positive temperature coefficient
- Maximum junction temperature 150℃
- Isolation Type Package

### 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 | $V_{EC}$=0 V,$I_C$=1mA,$T_{vj}$=25℃ | 1200 | V |
| $I_C$ | Continuous Collector Current | $T_C$=100℃ | 75 | A |
| $I_{CRM}$ | Peak Collector Current | $I_{CRM}$=2$I_C$ | 150 | A |
| $V_{GES}$ | Gate-Emitter Voltage | $T_{vj}$=25℃ | ±30 | V |
| $P_{tot}$ | Total Power Dissipation | $T_C$=25℃,$T_{vjmax}$=150℃ | 350 | W |

## Characteristics Values (IGBT Inverter)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C$=75 A, $V_{GE}$=15 V, $T_{vj}$=25 ℃ | | 1.65 | | V |
| | | $I_C$=75 A, $V_{GE}$=15 V, $T_{vj}$=125 ℃ | | 1.80 | | V |
| $V_{GE(th)}$ | Gate Threshold Voltage | $I_C$=5.0 mA,$V_{CE}$=$V_{GE}$,$T_{vj}$= 25 ℃ | | 5.8 | | V |
| $I_{CES}$ | Collector-Emitter Cut-off Current | $V_{CE}$=1200 V, $V_{GE}$=0 V, $T_{vj}$=25 ℃ | | | 1.2 | mA |
| $I_{GES}$ | Gate-Emitter Leakage Current | $V_{CE}$=0 V, $V_{GE}$=15 V, $T_{vj}$=25 ℃ | | | 410 | nA |
| $t_{d(on)}$ | Turn-on Delay Time, Inductive Load | $I_C$= 75 A,$V_{CE}$= 600 V<br>$V_{GE}$ =±15 V<br>$R_{Gon}$ = 2 Ω<br>$T_{vj}$ = 25 ℃ | | 110 | | ns |
| $t_r$ | Rise Time, Inductive Load | | | 35 | | ns |
| $t_{d(off)}$ | Turn-off Delay Time, Inductive Load | | | 270 | | ns |
| $t_f$ | Fall Time, Inductive Load | | | 170 | | ns |
| $E_{on}$ | Turn-on Energy Loss per Pulse | | | 1.9 | | mJ |
| $E_{off}$ | Energy Loss per Pulse | | | 4.8 | | mJ |
| $t_{d(on)}$ | Turn-on Delay Time, Inductive Load | $I_C$ = 75 A,$V_{CE}$ = 600 V<br>$V_{GE}$ = ±15 V<br>$R_{Gon}$ = 2 Ω<br>$T_{vj}$= 125 ℃ | | 110 | | ns |
| $t_r$ | Rise Time, Inductive Load | | | 40 | | ns |
| $t_{d(off)}$ | Turn-off Delay Time, Inductive Load | | | 320 | | ns |
| $t_f$ | Fall Time, Inductive Load | | | 280 | | ns |
| $E_{on}$ | Turn-on Energy Loss per Pulse | | | 2.4 | | mJ |
| $E_{off}$ | Energy Loss per Pulse | | | 7.5 | | mJ |
| $R_{thJC}$ | Thermal resistance, junction to case | per IGBT | | | 0.35 | K/W |
| $T_{vj\ op}$ | Temperature under switching conditions | | -40 | | 125 | ℃ |
| $I_{SC}$ | SC data | $V_{GE}$ ≤15 V, $V_{CC}$ = 600 V<br>$V_{CEmax}$ = $V_{CES}$ -$L_{sCE}$ ·di/dt<br>$t_P$ ≤ 10 μs, $T_{vj}$ = 125 ℃ | | 400 | | A |

## Maximum Rated Values (Diode Inverter)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive Peak Reverse Voltage | $T_{vj}$= 25 ℃ | | 1200 | | V |
| $I_F$ | Continuous DC Forward Current | $T_C$=100 ℃ | | 75 | | A |
| $I_{FRM}$ | Repetitive Peak Forward Current | $t_P$=1 ms | | 150 | | A |
| $I^2t$ | $I^2t$ Value | $V_R$=0 V, $t_P$=10 ms, $T_{vj}$=125 ℃ | | 1200 | | $A^2s$ |

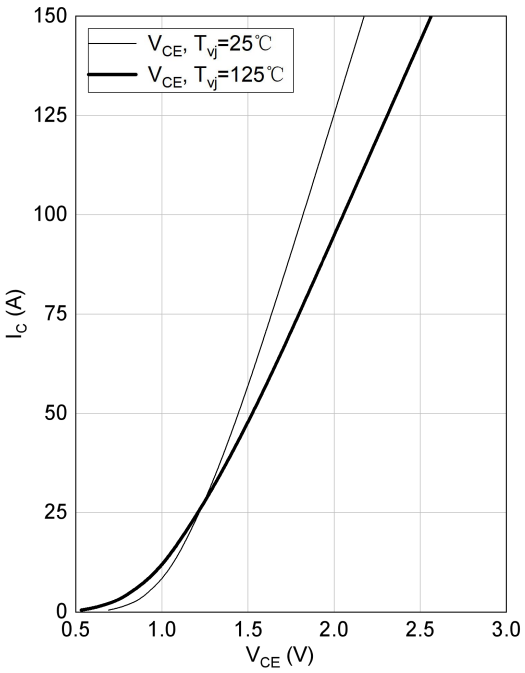
## Characteristic Values (Diode Inverter)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | $I_F$=75 A, $V_{CE}$=0 V, $T_{vj}$=25 ℃ | | 1.65 | | V |
| | | $I_F$=75 A, $V_{CE}$=0 V, $T_{vj}$=125 ℃ | | 1.75 | | V |
| $t_{rr}$ | Reverse Recovery time | $I_F$= 75 A,$V_R$= 600 V<br>-di/dt = 2000A/us<br>$T_{vj}$ = 25 ℃ | | 100 | | ns |
| $Q_r$ | Recovered Charge | | | 15.6 | | uC |
| $E_{rec}$ | Reverse Recovery Energy | | | 0.5 | | mJ |
| $t_{rr}$ | Reverse Recovery time | $I_F$= 75A,$V_R$= 600 V<br>-di/dt = 2000A/us<br>$T_{vj}$ = 125 ℃ | | 120 | | ns |
| $Q_r$ | Recovered Charge | | | 23.4 | | uC |
| $E_{rec}$ | Reverse Recovery Energy | | | 1.3 | | mJ |
| $R_{thJC}$ | Thermal resistance, junction to case | per Diode | | | 0.65 | K/W |
| $T_{vj\ op}$ | Temperature under switching conditions | | -40 | | 125 | ℃ |

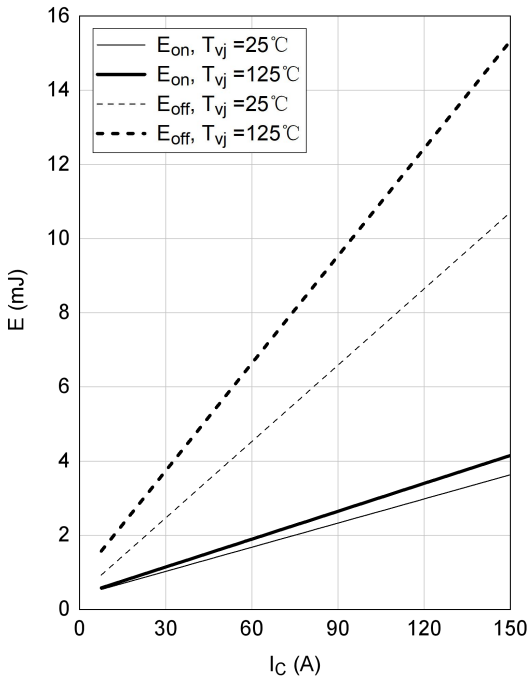
## Module Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{isol}$ | Isolation voltage | t=1min,f=50Hz | 2500 | | | V |
| $T_{stg}$ | Storage Temperature | | -40 | | 125 | ℃ |
| $M_t$ | 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 |

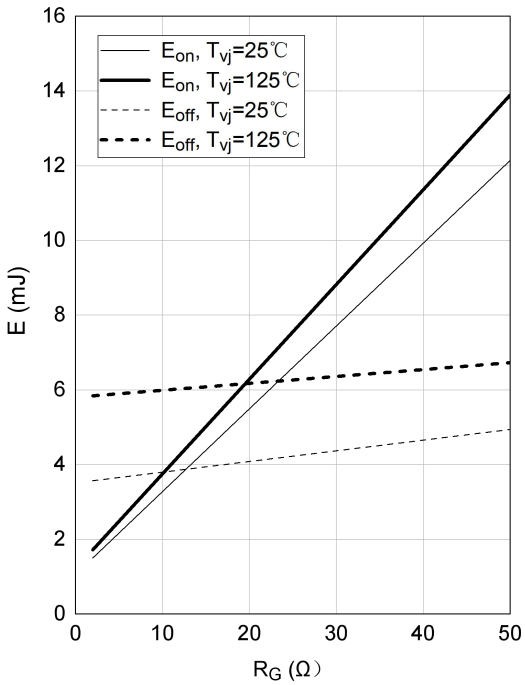
Output characteristic of IGBT,Inverter(typical)
$I_C = f(V_{CE})$
$V_{GE}$ = 15V



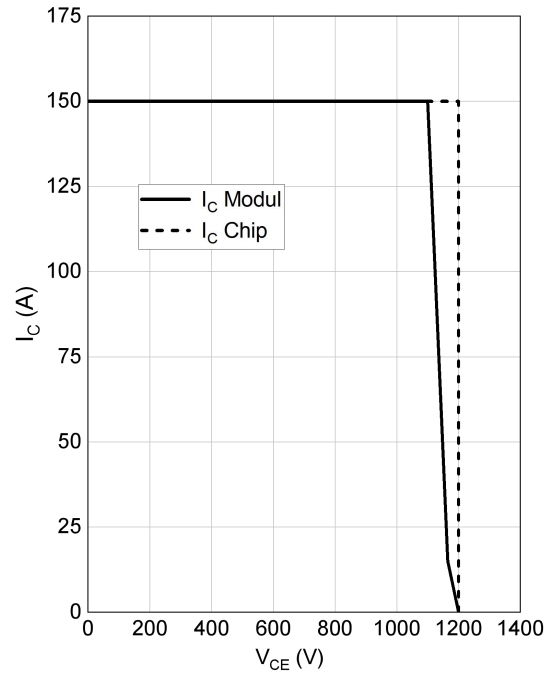

Switching losses IGBT,Inverter(typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE}$= ±15V, $R_{Gon}$ = 2Ω, $R_{Goff}$ = 2Ω, $V_{CE}$ = 600V




Switching losses IGBT,Inverter(typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE}$ = ±15V, $I_C$ = 75A , $V_{CE}$ = 600V

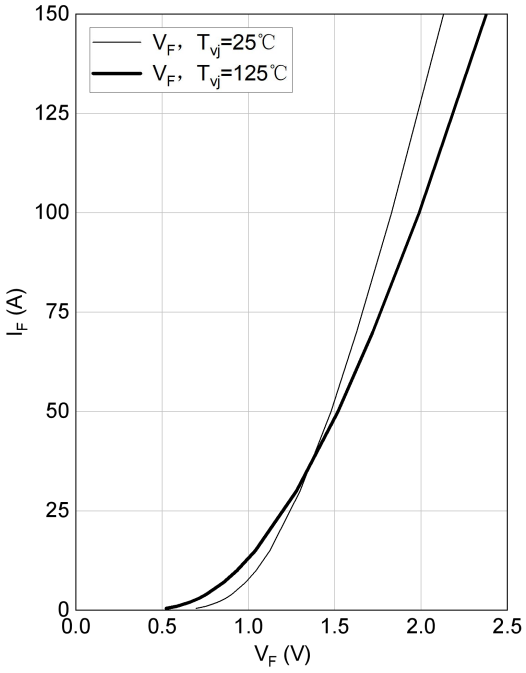



RBSOA IGBT,Inverter (typical)
$I_C = f(V_{CE})$
$V_{GE}$ = ±15V, $R_{Goff}$ = 50Ω, $T_{vj}$ =125 ℃



Forward characteristic of Diode, Inverter (typical)

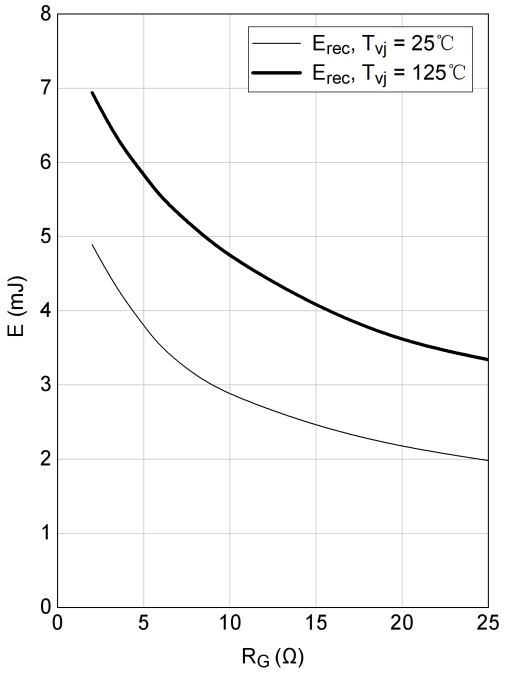
$I_F = f(V_F)$




Switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$

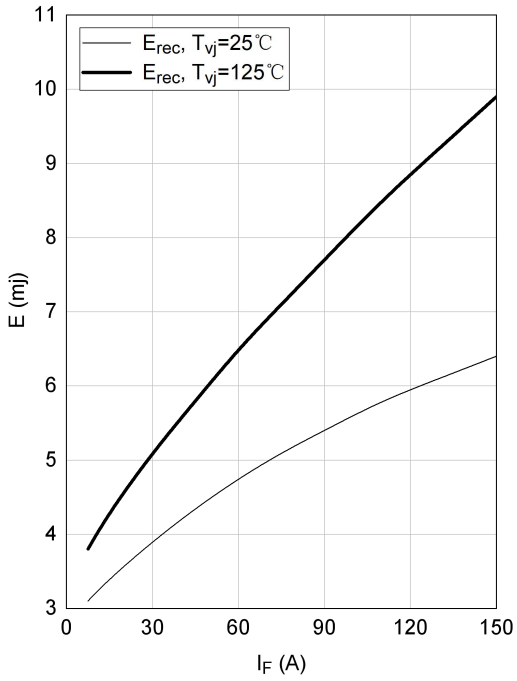
$I_F$ = 75 A, $V_{CE}$ = 600 V



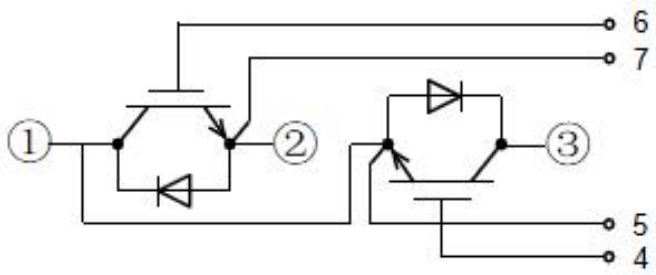

Switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

$R_{Gon}$ = 2Ω, $V_{CE}$ = 600 V

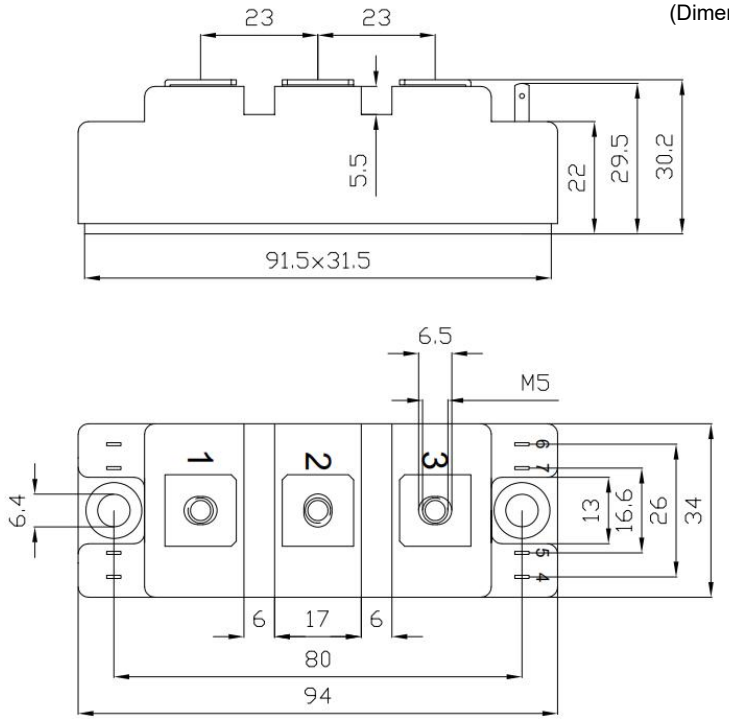


## Circuit Diagram




## Package Dimensions

(Dimensions in Millimeters)



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