## Descriptions

This is 1200V 100A IGBT Power Module in a Isolation Type Package

## Features

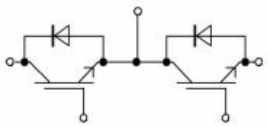
- $V_{CE}$=1200V $I_C$=100A
- Low $V_{CE(sat)}$
- $V_{CEsat}$ with positive temperature coefficient
- Maximum junction temperature 150℃
- Isolation Type Packagee

## Application

- Welder
- Inductive heating

## 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℃ | 1200 | V |
| $I_C$ | Continuous Collector Current | $T_C$=100℃ | 100 | A |
| $I_{CRM}$ | Peak Collector Current | $I_{CRM}$=2$I_C$ | 200 | A |
| $V_{GES}$ | Gate-Emitter Voltage | $T_{vj}$=25℃ | ±30 | V |
| $P_{tot}$ | Total Power Dissipation | $T_C$=25℃,$T_{vjmax}$=150℃ | 550 | W |

## Characteristics Values (IGBT Inverter)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C$=100 A, $V_{GE}$=15 V, $T_{vj}$=25 ℃ | | 1.80 | 2.25 | V |
| | | $I_C$=100 A, $V_{GE}$=15 V, $T_{vj}$=125 ℃ | | 2.6 | 3 | V |
| $V_{GE(th)}$ | Gate Threshold Voltage | $I_C$=2 mA,$V_{CE}$=$V_{GE}$,$T_{vj}$= 25 ℃ | 5 | 6 | 6.5 | V |
| $I_{CES}$ | Collector-Emitter Cut-off Current | $V_{CE}$=1200 V, $V_{GE}$=0 V, $T_{vj}$=25 ℃ | | | 5.0 | mA |
| $I_{GES}$ | Gate-Emitter Leakage Current | $V_{CE}$=0 V, $V_{GE}$=15 V, $T_{vj}$=25 ℃ | | | 400 | nA |
| $t_{d(on)}$ | Turn-on Delay Time, Inductive Load | $I_C$=100 A,$V_{CE}$=600 V<br>$V_{GE}$=±15 V<br>$R_{Gon}$=5 Ω<br>$T_{vj}$=25 ℃ | | 36 | | ns |
| $t_r$ | Rise Time, Inductive Load | | | 42 | | ns |
| $t_{d(off)}$ | Turn-off Delay Time, Inductive Load | | | 282 | | ns |
| $t_f$ | Fall Time, Inductive Load | | | 76 | | ns |
| $E_{on}$ | Turn-on Energy Loss per Pulse | | | 2.39 | | mJ |
| $E_{off}$ | Energy Loss per Pulse | | | 6.22 | | mJ |
| $t_{d(on)}$ | Turn-on Delay Time, Inductive Load | $I_C$=100 A,$V_{CE}$=600 V<br>$V_{GE}$=±15 V<br>$R_{Gon}$=5Ω<br>$T_{vj}$=125 ℃ | | 40 | | ns |
| $t_r$ | Rise Time, Inductive Load | | | 46 | | ns |
| $t_{d(off)}$ | Turn-off Delay Time, Inductive Load | | | 322 | | ns |
| $t_f$ | Fall Time, Inductive Load | | | 134 | | ns |
| $E_{on}$ | Turn-on Energy Loss per Pulse | | | 3.01 | | mJ |
| $E_{off}$ | Energy Loss per Pulse | | | 8.98 | | mJ |
| $R_{thJC}$ | Thermal resistance, junction to case | per IGBT | | | 0.22 | 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 ℃ | | 450 | | A |

## Maximum Rated Values (Diode Rectifier)

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive Peak Reverse Voltage | | 1200 | | V |
| $I_F$ | Continuous DC Forward Current | | 50 | | A |
| $I_{FRM}$ | Repetitive Peak Forward Current | | 100 | | A |
| $I^2t$ | $I^2t$ Value | | 550 | | $A^2s$ |

## Characteristic Values (Diode Inverter)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | $I_F$=50 A, $V_{CE}$=0 V, $T_{vj}$=25 ℃ | | 1.9 | 2.2 | V |
| | | $I_F$=50 A, $V_{CE}$=0 V, $T_{vj}$=125 ℃ | | 1.8 | 2.2 | V |
| $t_{rr}$ | Reverse Recovery time | $I_F$=50 A,$V_R$=600 V - di/dt=3000 A/us $T_{vj}$=25 ℃ | | 43 | | ns |
| $Q_r$ | Recovered Charge | | | 2.10 | | uC |
| $E_{rec}$ | Reverse Recovery Energy | | | 0.43 | | mJ |
| $t_{rr}$ | Reverse Recovery time | $I_F$=50A,$V_R$=600 V - di/dt=3000 A/us $T_{vj}$=125 ℃ | | 45 | | ns |
| $Q_r$ | Recovered Charge | | | 1.86 | | uC |
| $E_{rec}$ | Reverse Recovery Energy | | | 0.47 | | mJ |
| $R_{thJC}$ | Thermal resistance, junction to case | per Diode | | | 0.85 | K/W |
| $T_{vj\ op}$ | Operating Junction Temperature | | -40 | | 125 | ℃ |

## Module Characteristics

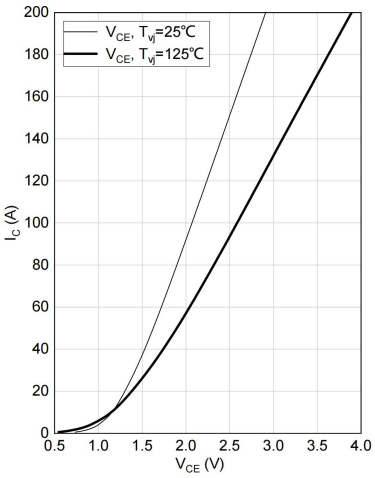
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{isol}$ | Isolation voltage | t=1min,f=50Hz | 2500 | | | V |
| $T_{stg}$ | Storage Temperature | | -40 | | 125 | ℃ |
| $M_t$ | Module Electrodes Torque | Recommended(M5) | 2.5 | | 5.0 | N·m |
| $M_s$ | Module-to-Sink Torque | Recommended(M6) | 3.0 | | 6.0 | N·m |
| G | Weight of Module | | | 160 | | g |

## Typical Characteristics

Output characteristic of IGBT,Inverter (typical)

$I_c = f(V_{CE})$

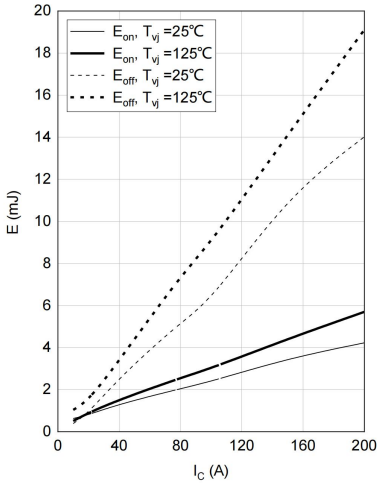
$V_{GE} = 15V$




Switching losses of IGBT,Inverter (typical)

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

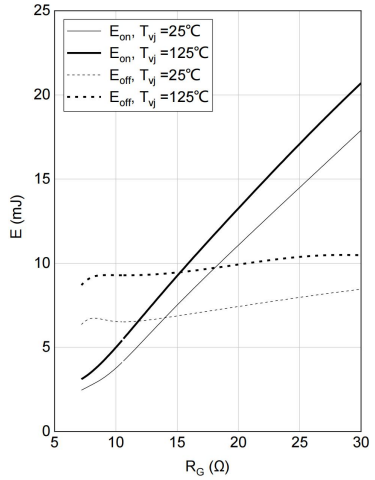
$V_{GE} = \pm 15V$, $R_{Gon} = 7\Omega$, $V_{CE} = 600V$




Switching losses of IGBT,Inverter (typical)

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

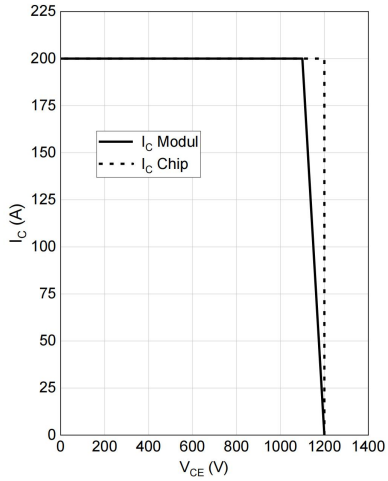
$V_{GE} = \pm 15V$, $I_C = 100A$, $V_{CE} = 600V$




RBSOA IGBT,Inverter (typical)

$I_C = f(V_{CE})$

$V_{GE} = \pm 15V$, $R_{Goff} = 7\Omega$, $T_{vj} = 125$ ℃

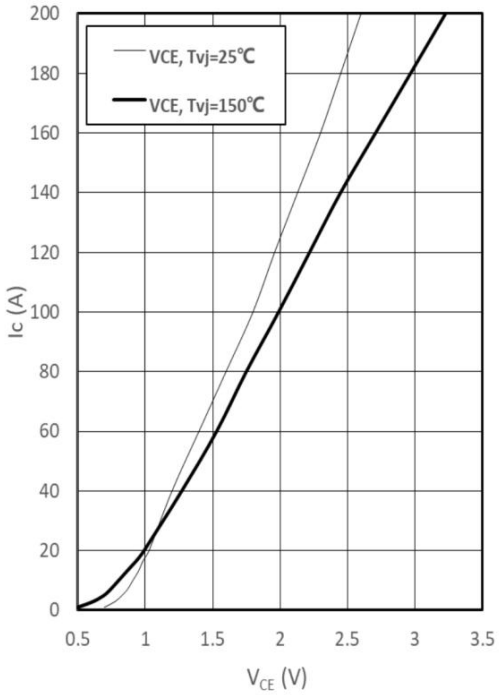


## Typical Characteristics

Output characteristic of IGBT,Inverter (typical)

$I_c = f(V_{CE})$

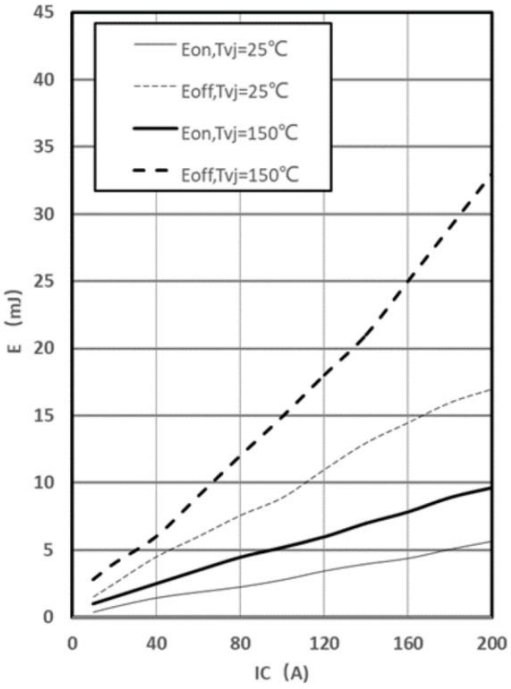
$V_{GE} = 15V$




Switching losses of IGBT,Inverter (typical)

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

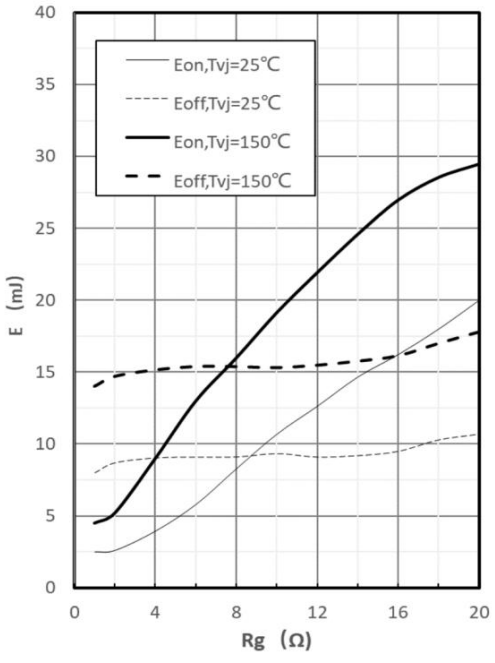
$V_{GE} = 15V$, $R_G = 2\Omega$, $V_{CE} = 600V$




Switching losses of IGBT,Inverter (typical)

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

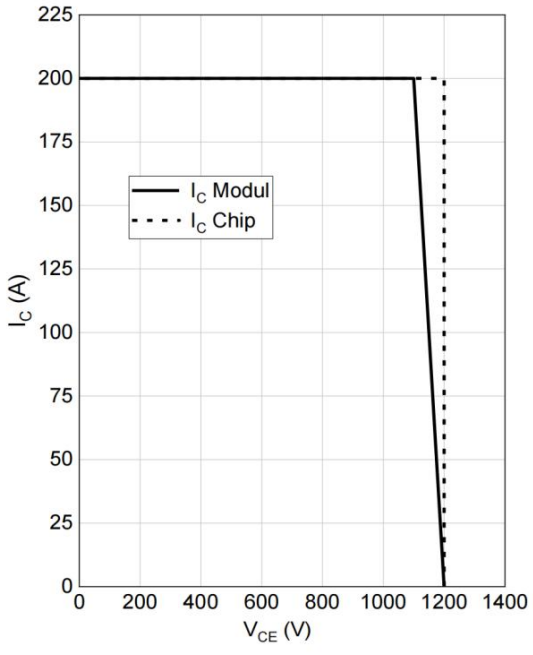
$V_{GE} = \pm 15V$, $I_C = 100A$, $V_{CE} = 600V$




RBSOA IGBT,Inverter (typical)

$I_C = f(V_{CE})$

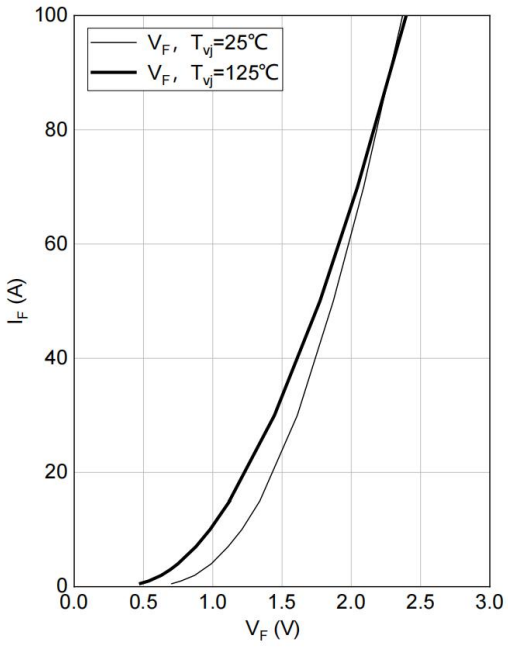
$V_{GE} = 15V$, $R_{Goff} = 2\Omega$, $T_{vj} = 150$ ℃



## Typical Characteristics

forward characteristic of Diode,Inverter (typical)

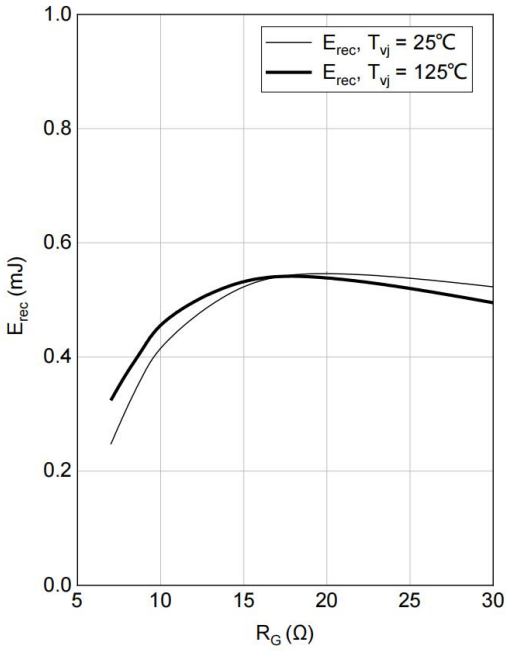
$I_F = f(V_F)$




switching losses of Diode, Inverter (typical)

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

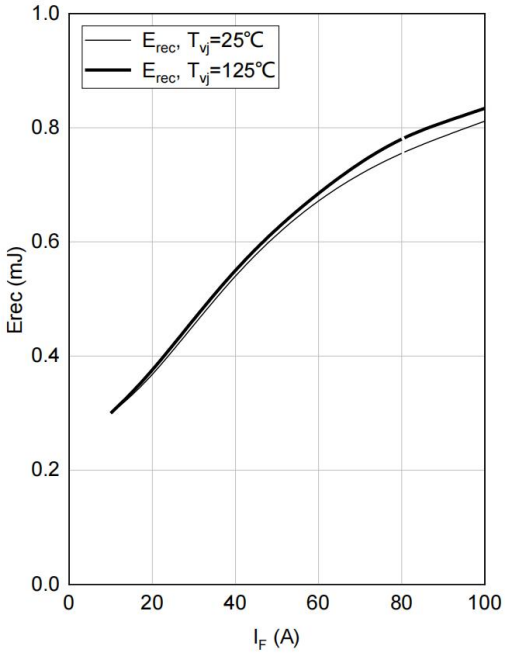
$I_F$ = 50A, $V_{CE}$ = 600V



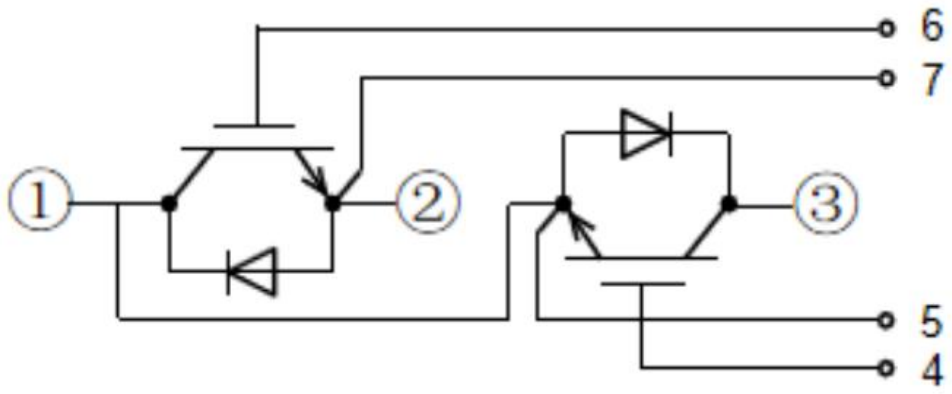

switching losses of Diode, Inverter (typical)

Erec = $f(I_F)$,

$R_{Gon}$ = 15 Ω, $V_{CE}$ = 600V



## Circuit Diagram




## Package Dimensions

(Dimensions in Millimeters)