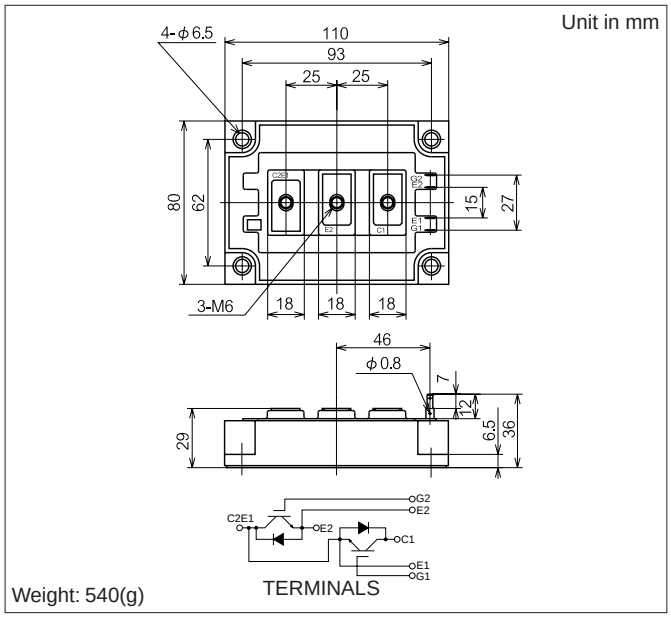
# MBM300GS12AW

Silicon N-channel IGBT

## FEATURES

* High speed and low saturation voltage.
* low noise due to built-in free-wheeling diode - ultra soft fast recovery diode(USFD).
* Isolated head sink (terminal to base).

OUTLINE DRAWING




## ABSOLUTE MAXIMUM RATINGS (Tc=25°C )

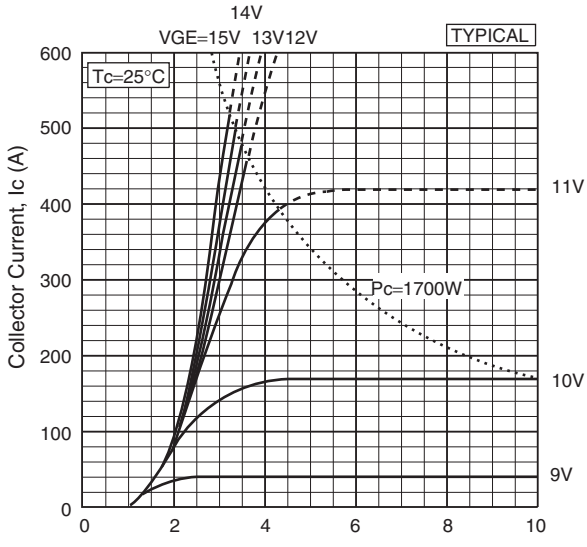
| Item | | Symbol | Unit | MBM300GS12AW | |
|---|---|---|---|---|---|
| Collector Emitter Voltage | | $V_{CES}$ | V | 1,200 | |
| Gate Emitter Voltage | | $V_{GES}$ | V | ±20 | |
| Collector Current | DC | $I_C$ | A | 300 | |
| | 1ms | $I_{Cp}$ | | 600 | |
| Forward Current | DC | $I_F$ | A | 300 | (1) |
| | 1ms | $I_{FM}$ | | 600 | |
| Collector Power Dissipation | | Pc | W | 1,700 | |
| Junction Temperature | | $T_j$ | °C | -40 ~ +150 | |
| Storage Temperature | | $T_{stg}$ | °C | -40 ~ +125 | |
| Isolation Voltage | | $V_{ISO}$ | $V_{RMS}$ | 2,500(AC 1 minute) | |
| Screw Torque | Terminals | - | N.m (kgf.cm) | 2.94(30) | (2) |
| | Mounting | - | | 2.94(30) | (3) |

Notes:(1)RMS Current of Diode 90Arms max.
(2)(3)Recommended Value 2.45N.m(25kgf.cm)

## CHARACTERISTICS (Tc=25°C )

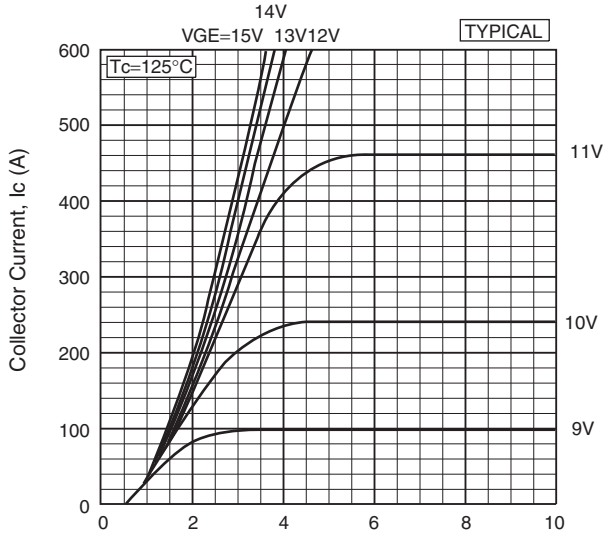
| Item | | Symbol | Unit | Min. | Typ. | Max. | Test Conditions |
|---|---|---|---|---|---|---|---|
| Collector Emitter Cut-Off Current | | $I_{CES}$ | mA | - | - | 1.0 | $V_{CE}$=1,200V,$V_{GE}$=0V |
| Gate Emitter Leakage Current | | $I_{GES}$ | nA | - | - | ±500 | $V_{GE}$=±20V,$V_{CE}$=0V |
| Collector Emitter Saturation Voltage | | $V_{CE(sat)}$ | V | - | 2.7 | 3.4 | $I_C$=300A,$V_{GE}$=15V |
| Gate Emitter Threshold Voltage | | $V_{GE(TO)}$ | V | - | - | 10 | $V_{CE}$=5V, $I_C$ =300mA |
| Input Capacitance | | $C_{ies}$ | pF | - | 28,000 | - | $V_{CE}$=10V,$V_{GE}$=0V,f=1MHz |
| Switching Times | Rise Time | $t_r$ | μs | - | 0.25 | 0.5 | $V_{CC}$=600V |
| | Turn On Time | $t_{on}$ | | - | 0.4 | 0.7 | $R_L$=2.0Ω |
| | Fall Time | $t_f$ | | - | 0.25 | 0.35 | $R_G$=4.3Ω (4) |
| | Turn Off Time | $t_{off}$ | | - | 0.75 | 1.1 | $V_{GE}$=±15V |
| Peak Forward Voltage Drop | | $V_{FM}$ | V | - | 2.5 | 3.5 | $I_F$=300A,$V_{GE}$=0V |
| Reverse Recovery Time | | $t_{rr}$ | μs | - | - | 0.35 | $I_F$=300A,$V_{GE}$=-10V, di/dt=400A/μs |
| Thermal Impedance | IGBT | Rth(j-c) | °C/W | - | - | 0.073 | Junction to case |
| | FWD | Rth(j-c) | | - | - | 0.2 | |

Notes:(4) $R_G$ value is the test condition's value for decision of the switching times, not recommended value.
Determine the suitable $R_G$ value after the measurement of switching waveforms (overshoot voltage,etc.)with appliance mounted.



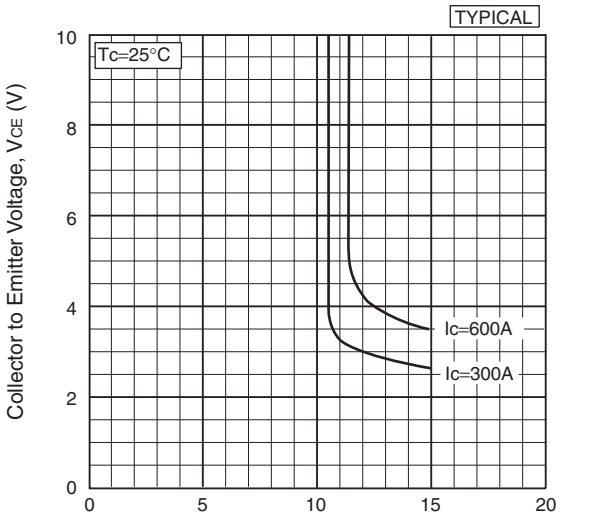

Collector to Emitter Voltage, $V_{CE}$ (V)

**Collector current vs. Collector to Emitter voltage**



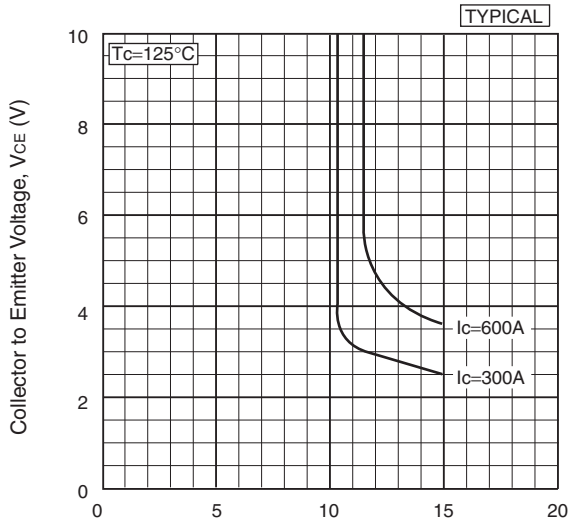

Collector to Emitter Voltage, $V_{CE}$ (V)

**Collector current vs. Collector to Emitter voltage**



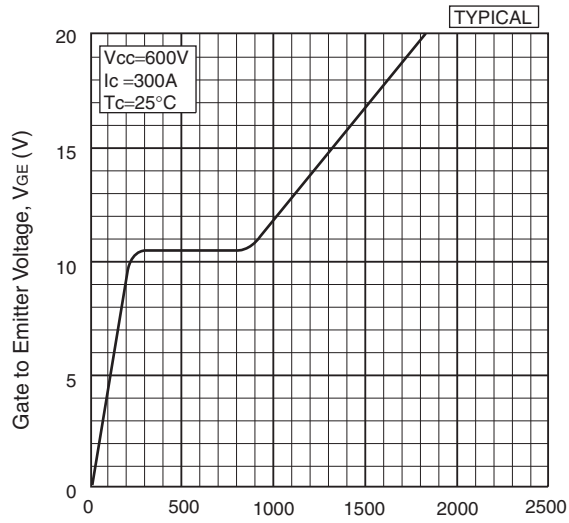

Gate to Emitter Voltage, $V_{GE}$ (V)

**Collector to Emitter voltage vs. Gate to Emitter voltage**



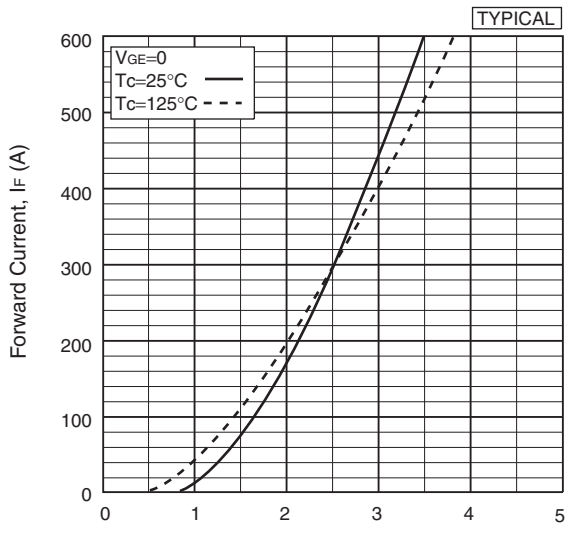

Gate to Emitter Voltage, $V_{GE}$ (V)

**Collector to Emitter voltage vs. Gate to Emitter voltage**




Gate Charge, $Q_G$ (nc)

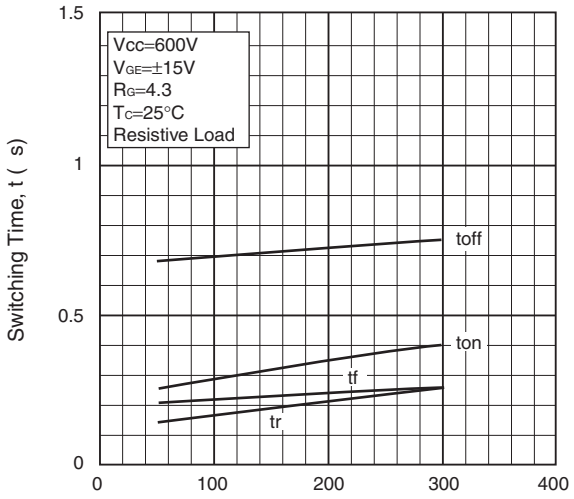
**Gate charge characteristics**




Forward Voltage, $V_F$ (V)

**Forward voltage of free-wheeling diode**

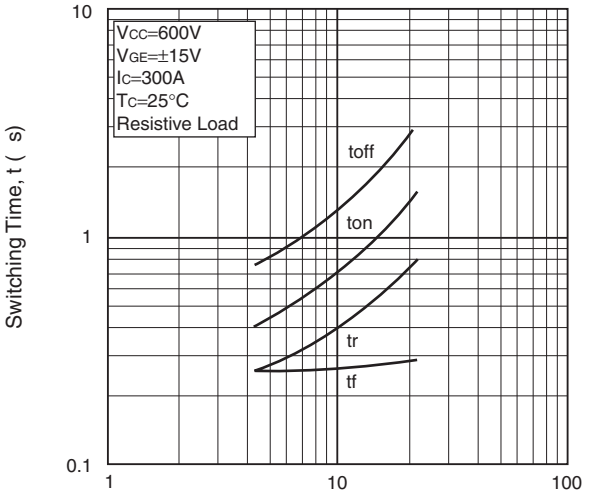
TYPICAL




Collector Current, Ic (A)

**Switching time vs. Collector current**

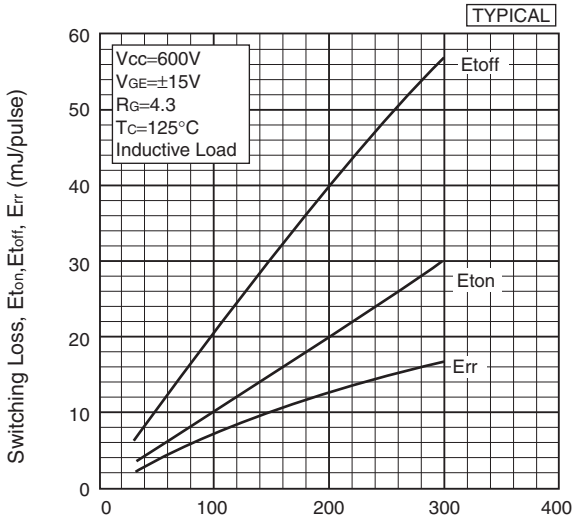
TYPICAL




Gate Resistance, RG ( )

**Switching time vs. Gate resistance**

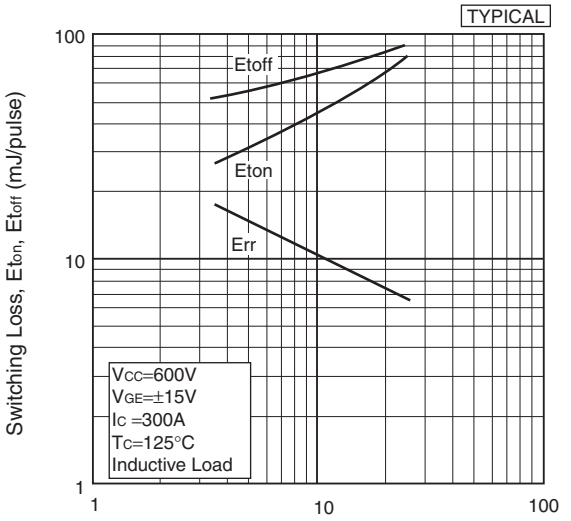
TYPICAL




Collector Current, Ic (A)

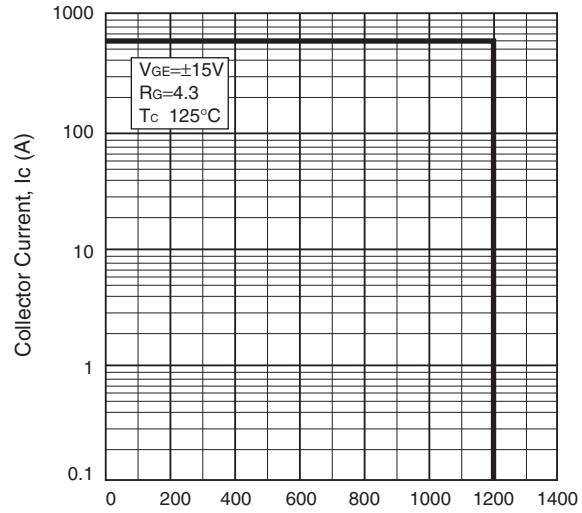
**Switching loss vs. Collector current**

TYPICAL



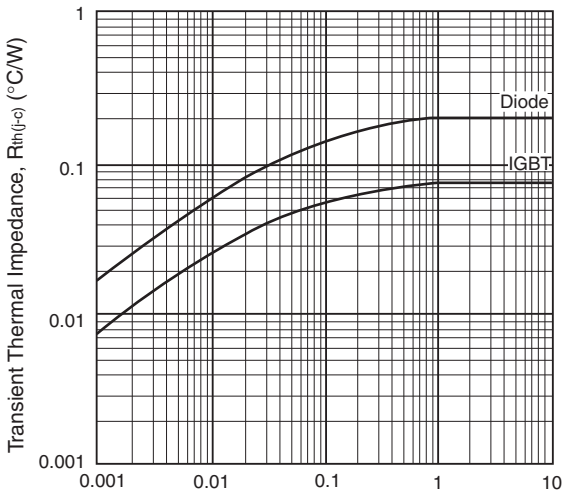

Gate Resistance, RG ( )

**Switching loss vs. Gate resistance**




Collector to Emitter Voltage, VCE (V)

**Reverse biased safe operating area**




Time, t (s)

**Transient thermal impedance**

# HITACHI POWER SEMICONDUCTORS

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