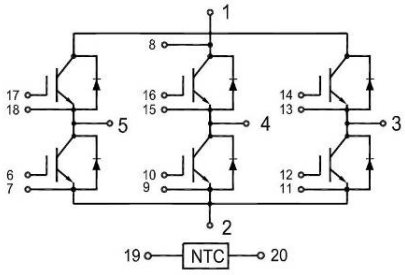
SILVERMICRO

# GT200FF120A8H

## IGBT Module

**Features：**

- Short Circuit Rated 10μs
- Low Saturation Voltage: VCE (sat) = 1.90V @ IC = 200A , TC=25℃
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement




**Applications：**

- High Power Converters
- Motor Drives
- UPS Systems

### IGBT, Inverter

**Maximum Rated Values**($T_C$=25℃Unless otherwise specified)

| | | | | |
|---|---|---|---|---|
| $V_{CES}$ | Collector-Emitter Blocking Voltage | | 1200 | V |
| $V_{GES}$ | Gate-Emitter Voltage | | ±20 | V |
| $I_C$ | Continuous Collector Current | $T_C$ = 80℃, | 200 | A |
| | | $T_C$ = 25℃ | 335 | A |
| $I_{CM}$ | Peak Collector Current Repetitive | $T_J$ = 175℃ | 400 | A |
| $t_{SC}$ | Short Circuit Withstand Time | | >10 | μs |
| $P_D$ | Maximum Power Dissipation (IGBT) | $T_C$ = 25℃<br>$T_{Jmax}$=175℃ | 1271 | W |

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## Electrical Characteristics of IGBT ($T_C$=25℃Unless otherwise specified)

Static characteristics

| Symbol | Description | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{GE(th)}$ | Gate-Emitter Threshold Voltage | $I_C$ = 1 mA, $V_{CE}$ = $V_{GE}$ | | 5.0 | 5.5 | 6.0 | V |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C$ = 200 A, $V_{GE}$ = 15V | $T_J$ = 25℃ | | 1.90 | 2.10 | V |
| | | | $T_J$ = 125℃ | | 2.20 | | V |
| | | | $T_J$ = 150℃ | | 2.30 | | V |
| $I_{CES}$ | Collector-Emitter Leakage Current | $V_{GE}$ = 0V, $V_{CE}$ = $V_{CES}$, $T_J$ = 25℃ | | | | 1 | mA |
| $I_{GES}$ | Gate-Emitter Leakage Current | $V_{GE}$ = ±20V, $V_{CE}$ = $V_{CES}$, $T_J$ = 25℃ | | | | 400 | nA |
| $C_{ies}$ | Input Capacitance | $V_{CE}$ = 25V, $V_{GE}$ = 0V , f =1MHz | | | 22.4 | | nF |
| $C_{oes}$ | Output Capacitance | | | | 1.55 | | nF |

Switching Characteristics

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $t_{d(on)}$ | Turn-on Delay Time | $V_{CC}$ = 600V,$I_C$ = 200A, $R_G$ = 10Ω,$V_{GE}$ = ±15V, Inductive Load | $T_J$ = 25℃ | | 355 | | ns |
| | | | $T_J$ = 125℃ | | 320 | | |
| | | | $T_J$ = 150℃ | | 320 | | |
| $t_r$ | Rise Time | | $T_J$ = 25℃ | | 200 | | ns |
| | | | $T_J$ = 125℃ | | 210 | | |
| | | | $T_J$ = 150℃ | | 215 | | |
| $t_{d(off)}$ | Turn-off Delay Time | | $T_J$ = 25℃ | | 525 | | ns |
| | | | $T_J$ = 125℃ | | 560 | | |
| | | | $T_J$ = 150℃ | | 580 | | |
| $t_f$ | Fall Time | | $T_J$ = 25℃ | | 170 | | ns |
| | | | $T_J$ = 125℃ | | 190 | | |
| | | | $T_J$ = 150℃ | | 210 | | |
| $E_{on}$ | Turn-on Switching Loss | | $T_J$ = 25℃ | | 24.6 | | mJ |
| | | | $T_J$ = 125℃ | | 33.0 | | |
| | | | $T_J$ = 150℃ | | 34.5 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $E_{off}$ | Turn-off Switching Loss | $V_{CC}$ = 600V,$I_C$ = 200A, $R_G$ = 10Ω,$V_{GE}$ = ±15V, Inductive Load | $T_J$ = 25℃ | | 12.7 | | mJ |
| | | | $T_J$ = 125℃ | | 17.2 | | |
| | | | $T_J$ = 150℃ | | 19.2 | | |
| $Q_g$ | Total Gate Charge | | $T_J$ = 25℃ | | 1800 | | nC |
| | | | $T_J$ = 125℃ | | 1815 | | |
| | | | $T_J$ = 150℃ | | 1822 | | |
| RBSOA | RBSOA | $I_C$=400A,$V_{CC}$=1050V,Vp=1200V, Rg = 10Ω, $V_{GE}$=+15V to 0V, $T_J$ =150°C | | Trapezoid | | | |
| SCSOA | SCSOA | $V_{CC}$ = 600V, $V_{GE}$ = 15V, $T_J$ = 150℃ | | 10 | | | μs |
| $R_{\theta JC}$ | IGBT Thermal Resistance: Junction-To-Case | | | | 0.118 | | ℃/W |

## Diode, Inverter

**Maximum Rated Values** ($T_C$=25℃Unless otherwise specified)

| | | | |
|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | 1200 | V |
| $I_F$ | Diode Continuous Forward Current | 200 | A |
| $I_{FM}$ | Peak FWD Current Repetitive | 400 | A |

**Electrical Characteristics of FWD** ($T_C$=25℃Unless otherwise specified)

| Symbol | Description | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{FM}$ | Forward Voltage | $I_F$ = 200A , $V_{GE}$ = 0V | $T_J$ = 25℃ | | 2.00 | | V |
| | | | $T_J$ = 125℃ | | 2.20 | | |
| | | | $T_J$ = 150℃ | | 2.20 | | |
| $I_{rr}$ | Peak Reverse Recovery Current | $I_F$＝200A, di/dt =1100A/μs, $V_{rr}$ = 600V, $V_{GE}$ = -15V | $T_J$ = 25℃ | | 70 | | A |
| | | | $T_J$ = 125℃ | | 110 | | |
| | | | $T_J$ = 150℃ | | 120 | | |
| $Q_{rr}$ | Reverse Recovery Charge | | $T_J$ = 25℃ | | 10.6 | | μC |
| | | | $T_J$ = 125℃ | | 22.3 | | |
| | | | $T_J$ = 150℃ | | 27.3 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $E_{rec}$ | Reverse Recovery Energy | $I_F$＝200A, di/dt =1100A/μs, $V_{rr}$ = 600V, $V_{GE}$ = -15V | $T_J$ = 25℃ | | 3.7 | | mJ |
| | | | $T_J$ = 125℃ | | 8.1 | | |
| | | | $T_J$ = 150℃ | | 9.6 | | |
| $R_{\theta JC}$ | Diode Thermal Resistance: Junction-To-Case | | | | 0.193 | | ℃/W |

## NTC-Thermistor Characteristic values

| | | | | |
|---|---|---|---|---|
| $R_{25}$ | $T_C$ =25℃ | 5 | | kΩ |
| △R/R | $T_C$ =100℃，$R_{100}$ =481Ω | | ±5 | % |
| $P_{25}$ | $T_C$ =25℃ | 50 | | mW |
| $B_{25/50}$ | $R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$ | 3380 | | K |
| $B_{25/80}$ | $R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$ | 3440 | | K |

### Module

| Symbol | Description | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{iso}$ | Isolation Voltage(All Terminals Shorted) | f = 50Hz, 1minute | 2500 | | | V |
| $T_J$ | Maximum Junction Temperature | | | | 175 | ℃ |
| $T_{JOP}$ | Maximum Operating Junction Temperature Range | | -40 +150 | | | ℃ |
| $T_{stg}$ | Storage Temperature | | -40 +125 | | | ℃ |
| $R_{\theta CS}$ | Case-To-Sink (Conductive Grease Applied) | | | 0.1 | | ℃/W |
| M | Power Terminals Screw:M6 | | 3.0 | | 6.0 | N·m |
| M | Mounting Screw:M5 | | 3.0 | | 6.0 | N·m |
| G | Weight | | | 390 | | g |

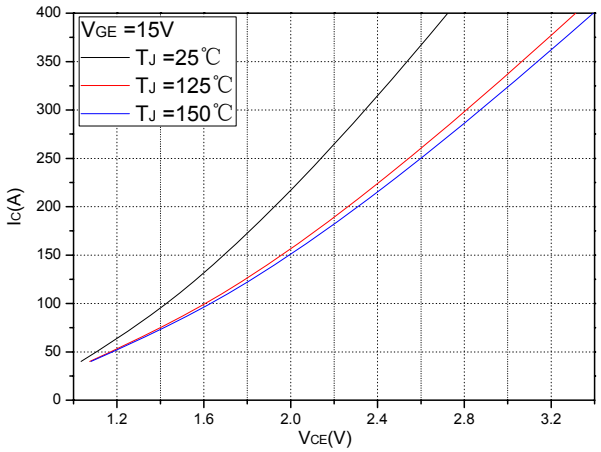



**Fig.1 Typical Saturation Voltage Characteristics**

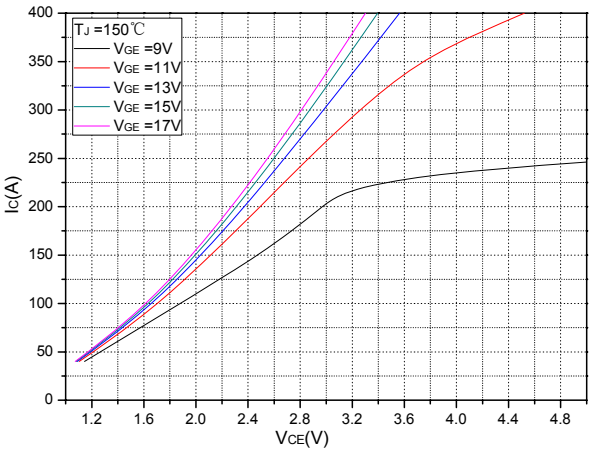



**Fig.2 Typical Output Characteristics**

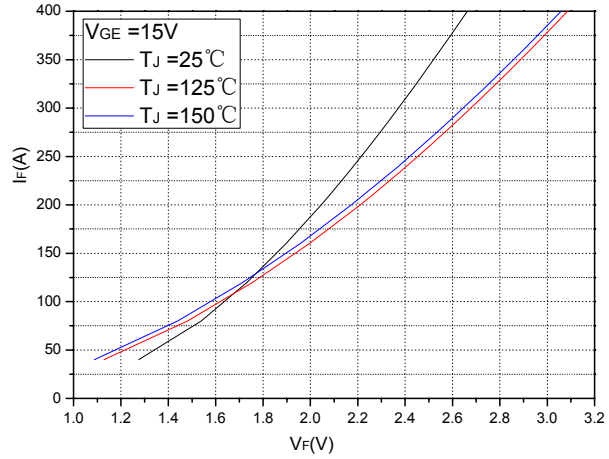



**Fig.3 Forward Characteristics of FWD**

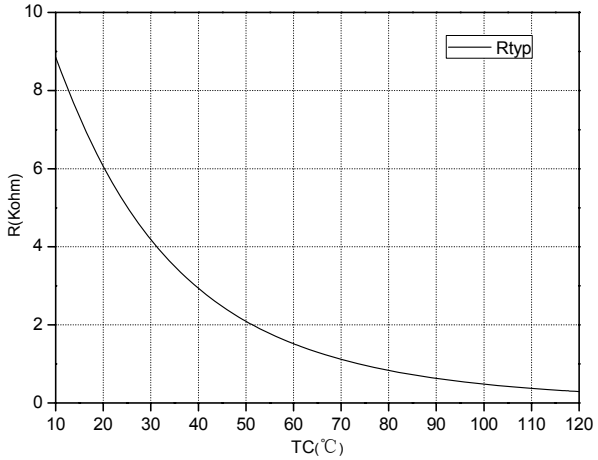



**Fig.4 NTC Temperature characteristics**

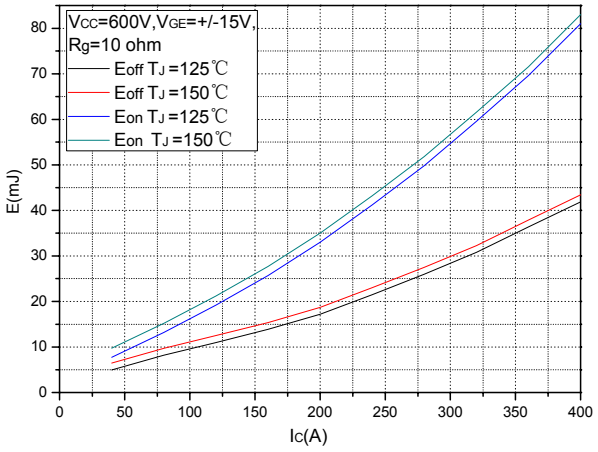



**Fig.5 Typical Switching Loss vs. Collector Current**

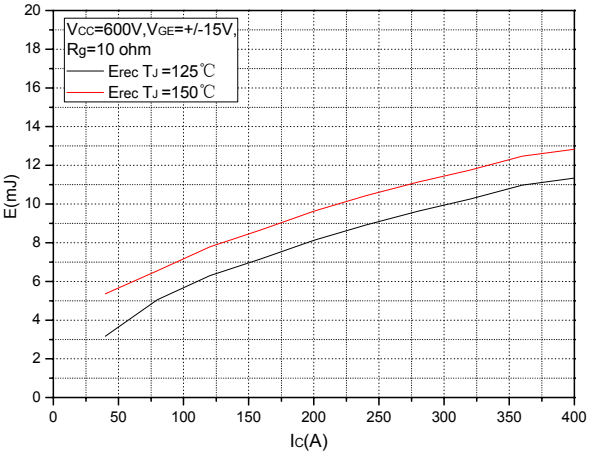



**Fig.6 Typical Switching Loss vs. Collector Current**

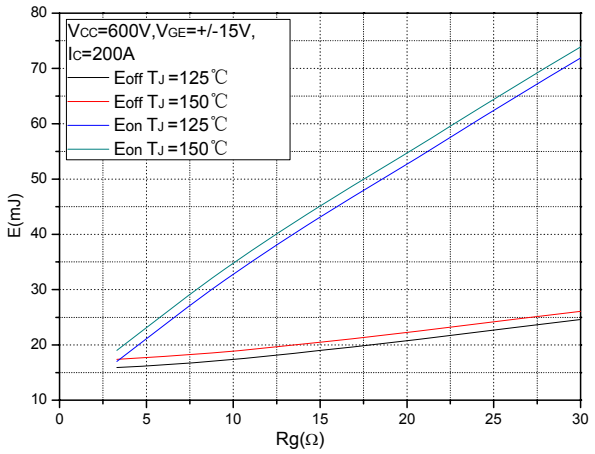



**Fig.7 Typical Switching Loss vs. Gate Resistance**

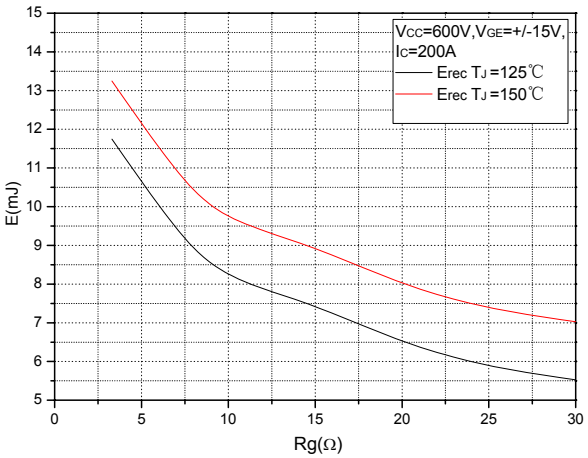



**Fig.8 Typical Switching Loss vs. Gate Resistance**

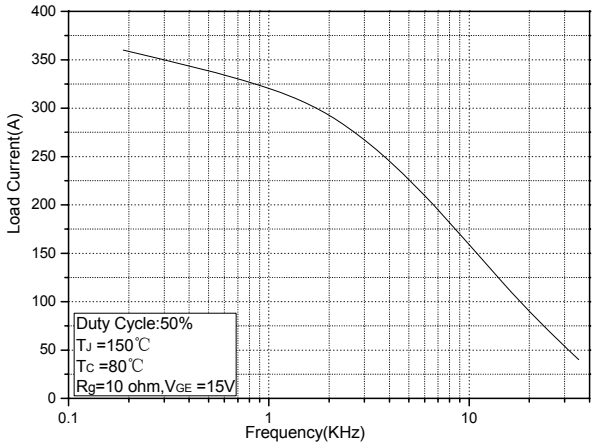



**Fig.9 Typical Load Current vs. Frequency**

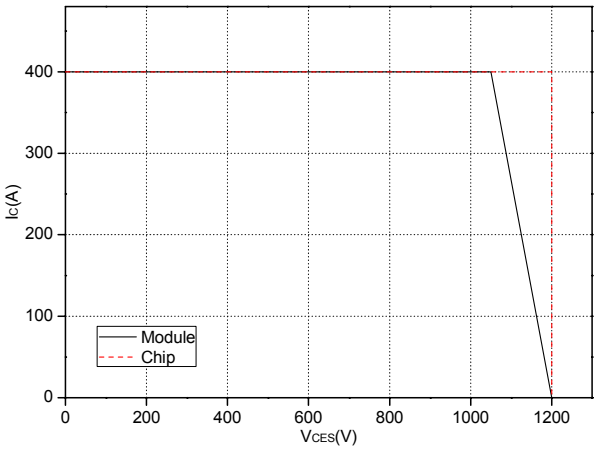



**Fig.10 Reverse Bias Safe Operation Area (RBSOA)**

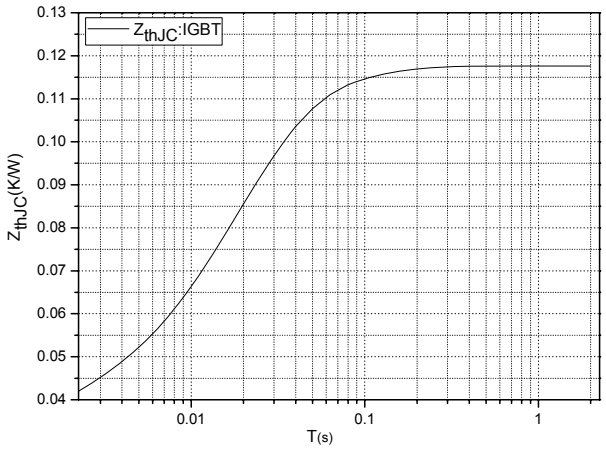



**Fig.11 Transient thermal impedance (IGBT)**

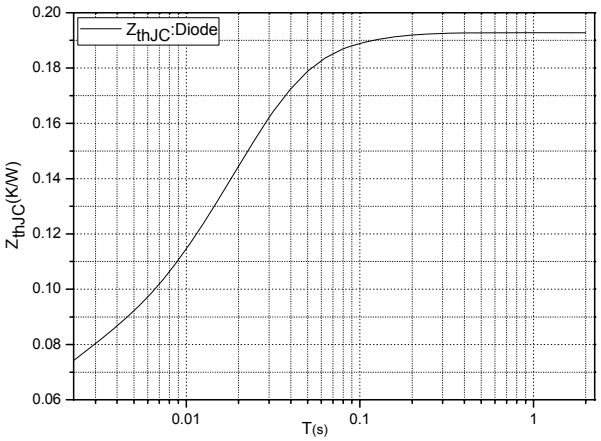



**Fig.12 Transient thermal impedance (Diode)**

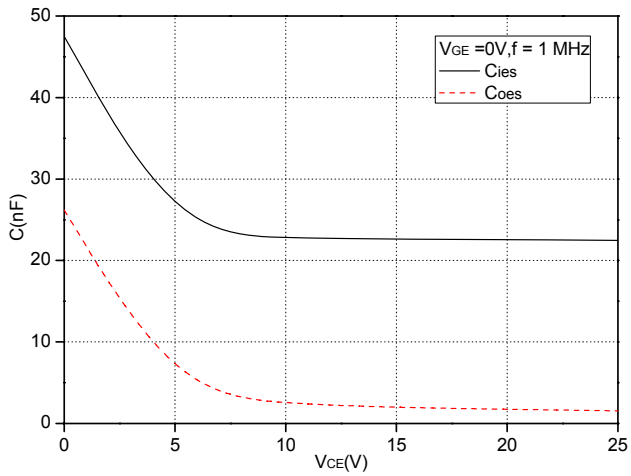
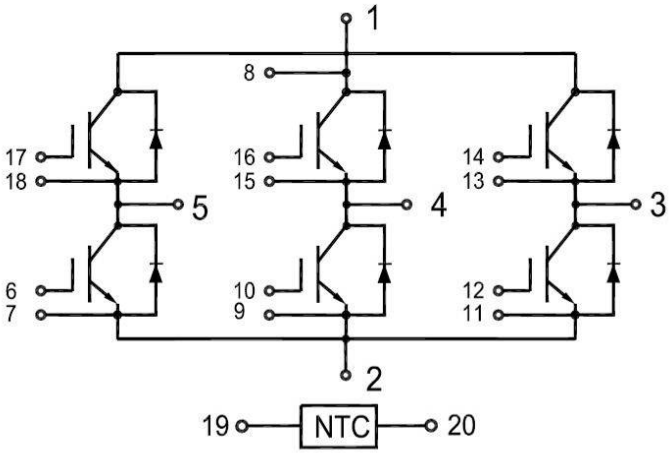
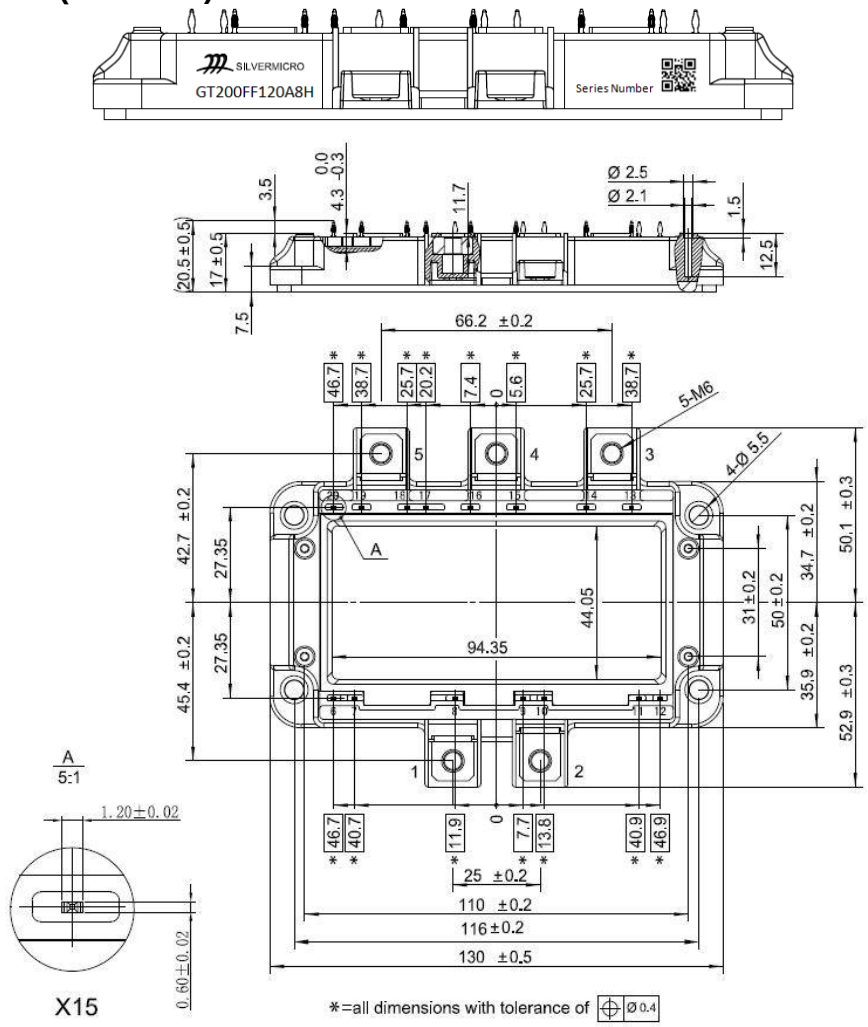



**Fig.13 Capacitance Characteristics**

## Internal Circuit




## Package Outline (Unit: mm):



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