# S1P10R120HBA Preliminary

**1200V / 100A All-Silicon Carbide MOSFET Half-Bridge Module**

## Features

Electrical features
$V_{DSS}$ = 1200V
$I_D$ nom = 100A
High-speed Switching Possible
High Power Density
High Frequency Operation
Ultra-low Losses

## Applications

Servo drives
UPS system
Motor drives

# 1 Maximum ratings

**Table 1 Maximum rating** (Tc = 25°C unless otherwise specified)

| Symbol | Parameter | Value | Unit | Test Conditions | Note |
|---|---|---|---|---|---|
| $V_{DS,max}$ | Drain source voltage | 1200 | V | $V_{GS}$ = 0V, $I_D$ = 100 μA | |
| $V_{GS,max}$ | Gate source voltage | -8 /+19 | V | Absolute maximum values | |
| $V_{GSop}$ | | | | | |

# 3 Electrical characteristics

**Table 4 SiC MOSFET characteristics** (Tc = 25°C unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-source breakdown voltage | 1200 | - | - | V | $V_{GS}$ = 0V, $I_D$ = 200μA | |
| $V_{GS(th)}$ | Gate threshold voltage | 2.3 | 2.8 | 4.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 35.4mA | |
| | | - | 2.0 | - | V | $V_{DS}$ = $V_{GS}$, $I_D$ = | |

**Table 5 Body diode characteristics** (Tc = 25°C unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode forward voltage | - | 4.0 | - | V | $V_{GS}$ = -4V, $I_{SD}$ = 100A | |
| | | - | 3.5 | - | V | $V_{GS}$ = -4V, $I_{SD}$ = 100A<br>$T_J$ = 175°C | |
| $I_S$ | Continuous diode | | | | | | |

# 4 Electrical characteristic diagram



Figure 1. Output Characteristic, $T_{vj}$=25



Figure 2. Output Characteristic, $T_{vj}$=175



Figure 3. Transfer Characteristic



Figure 4. On-resistance VS. Junction Temperature



Figure 5. On-resistance VS. Drain to Source Current



Figure 6. Capacitance VS. $V_{DS}$



Figure 7. 3rd Quadrant Characteristic

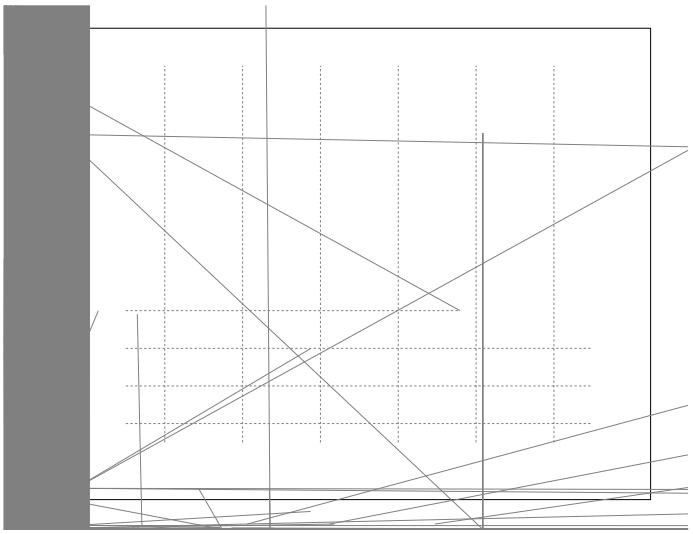


Figure 8. MOSFET Switching Energy vs. External Gate Resistance

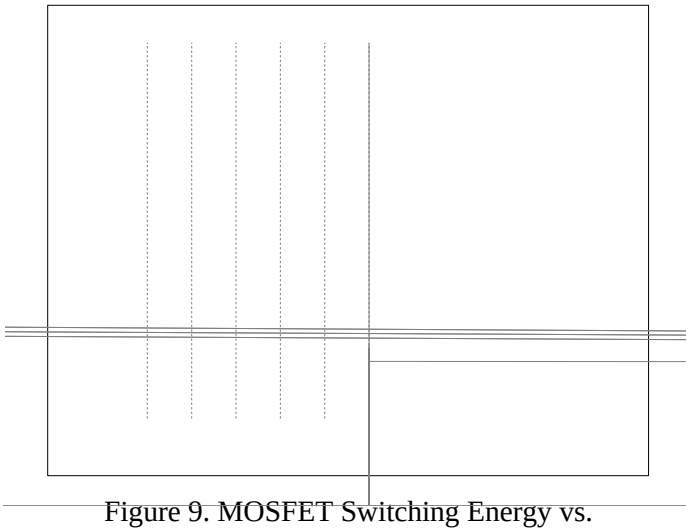


Figure 9. MOSFET Switching Energy vs. Drain to Source Current

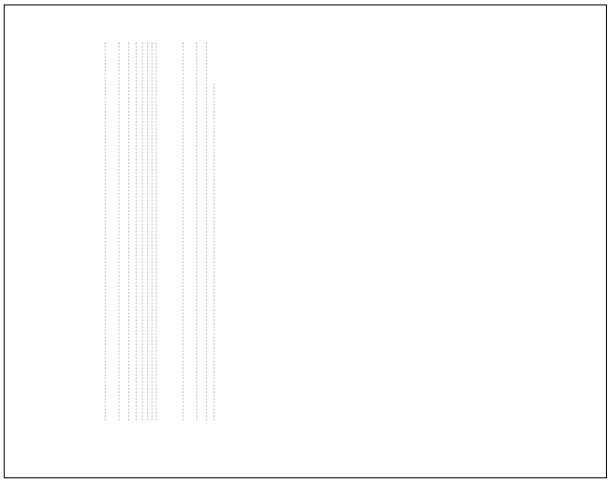
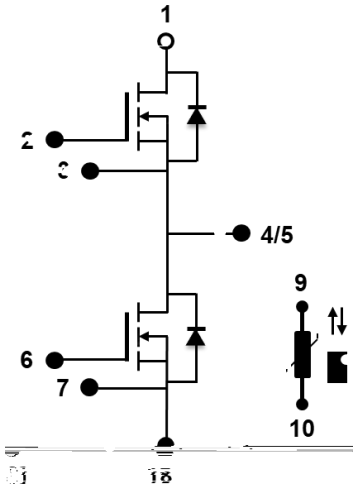
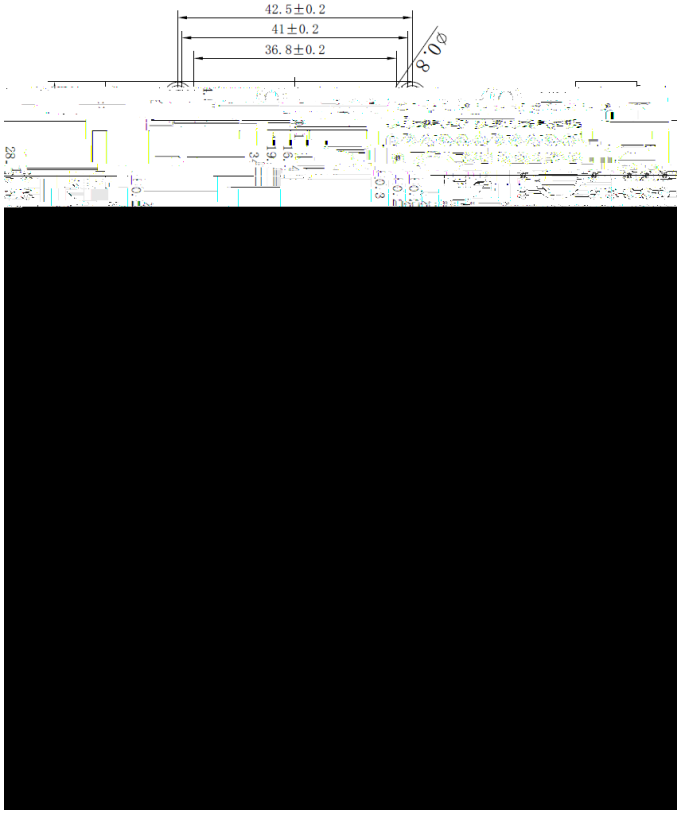


Figure 10. Transient Thermal Impedance (junction to case)

# 5 Package drawing



# 6 Test conditions

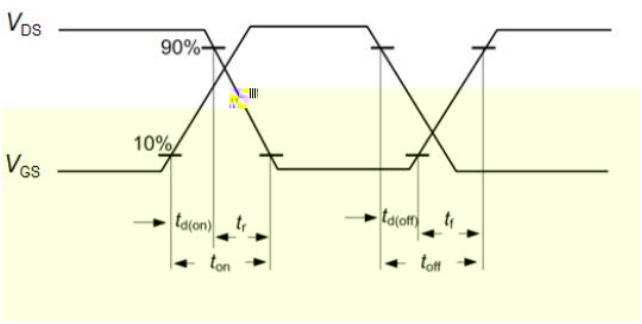



Figure A. Definition of switching times

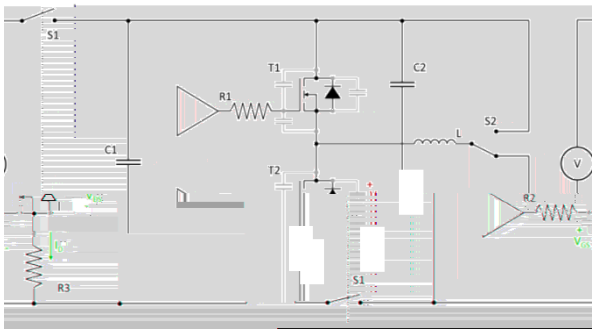



Figure B. Dynamic test circuit

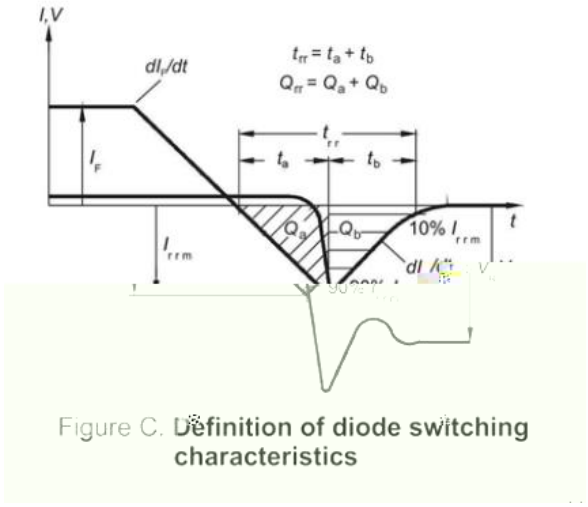



Figure C. Definition of body diode switching characteristics

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