ShiLing® 浙江世菱电力电子有限公司
ZHEJIANG SHILING POWER ELECTRON CO.,LTD.

# 产品规格书

## Specification of Products

产品名称：MOSFET模块

产品型号：100A650V

浙江世菱电力电子有限公司
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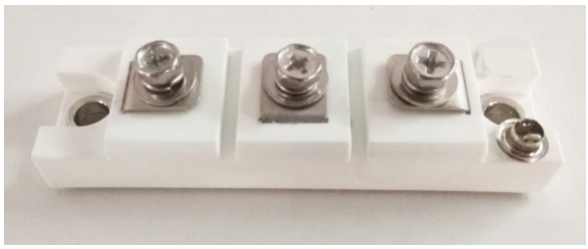
SEMICONDUCTOR

# MOSFET

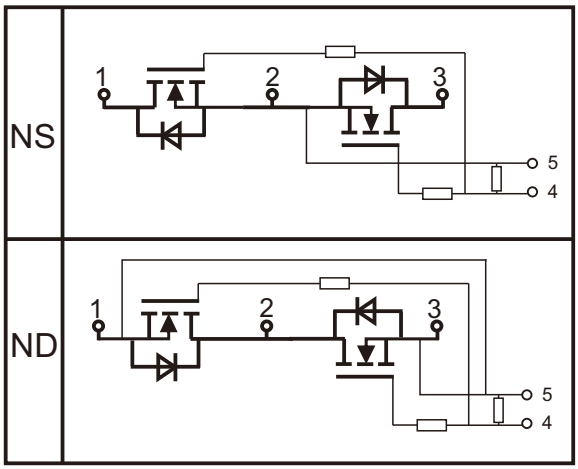
**Molding Type Module**

**650V/100A 2 in one-package**



## General Description

SHILINGPOWER MOSFET Power Module provides very low $R_{DS(on)}$ as well as optimized intrinsic diode. It s designed for the applications such SMPS and DC drives.




Equivalent Circuit Schematic

## Features

- Low $R_{DS(on)}$
- Optimized intrinsic reverse diode
- Low inductance case avoid oscillations
- Kelvin source terminals for easy drive
- Isolated copper baseplate using DBC technology

## Typical Applications

- Main and auxiliary AC drives of electric vehicles
- DC servo and robot drives
- Battery vehicles
- UPS equipment
- Plasma cutting

## Absolute Maximum Ratings $T_C$=25℃ unless otherwise noted

| Symbol | Description | | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | 650 | V |
| $V_{GSS}$ | Gate-Source Voltage | ±30 | V |
| $I_D$ | Drain Current @ $T_C$=25℃<br>@ $T_C$=80℃ | 100<br>80 | A |
| $I_F$ | Diode Forward Current | 100 | A |
| $P_D$ | Maximum Power Dissipation @ $T_j$=175℃ | 720 | W |
| $T_{jmax}$ | Maximum Junction Temperature | 150 | ℃ |
| $T_{jop}$ | Operating Junction Temperature | - 40 to +150 | ℃ |
| $T_{STG}$ | Storage Temperature Range | - 40 to +125 | ℃ |
| $V_{ISO}$ | Isolation Voltage RMS,f=50Hz,t=1min | 3000 | V |
| Mounting Torque | Power Terminal Screw:M5<br>Mounting Screw:M6 | 3.5to 4.0<br>3.0 to 5.0 | N.m |

## Electrical Characteristics of MOSFET $T_C$=25℃ unless otherwise noted

### Off Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $T_j$=25℃ | 650 | | | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=$V_{DSS}$,$V_{GS}$=0V, $T_j$=25℃ | | | 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=$V_{GSS}$,$V_{DS}$=0V, $T_j$=25℃ | | | ±100 | nA |

### On Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $I_D$=1.0mA,$V_{DS}$=$V_{GS}$, $T_j$=25℃ | 3.2 | | 4.2 | V |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance | $I_D$=20 A,$V_{GS}$=10V, $T_j$=25℃ | | 63 | 80 | mΩ |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$=50V,$I_D$=100A | 208 | | | S |

## Switching Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $R_{Gint}$ | Internal Gate Resistance | | | 0.68 | | Ω |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=600V,$I_D$=100A, $R_G$=0.26Ω,$V_{GS}$=10V, $T_j$=25℃ | | 25 | | ns |
| $t_r$ | Rise Time | | | 27 | | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 70 | | ns |
| $t_f$ | Fall Time | | | 16 | | ns |
| $Q_g$ | Total Gate Charge | $I_D$=50 A,$V_{DS}$=600V, $V_{GS}$=10V | | 197 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 70 | | nC |
| $Q_{gd}$ | Gate-Drain ("Miller") Charge | | | 64 | | nC |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V,$V_{DS}$=25V, f=1.0MHz | | 12.7 | | nF |
| $C_{oss}$ | Output Capacitance | | | 1.28 | | nF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 0.12 | | nF |
| $L_{CE}$ | Stray Inductance | | | | 20 | nH |
| $R_{CC+EE}$ | Module Lead Resistance,Terminal to Chip | $T_C$=25℃ | | 0.35 | | mΩ |

## Electrical Characteristics of Inverse Diode $T_C$=25℃ unless otherwise noted

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode Forward Voltage | $I_F$= 100A,$V_{GS}$=0V,$T_j$=25℃ | 0.5 | | 1.0 | V |
| $t_{rr}$ | Diode Reverse Recovery Time | $V_R$=300V,$I_F$=100A, di/dt=100A/μs, $T_j$=25℃ | | 200 | | ns |
| $Q_{rr}$ | Diode Reverse Recovery Charge | | | 0.6 | | μC |

## Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Units |
|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case (per MOSFET) | | 0.189 | K/W |
| $R_{\theta CS}$ | Case-to-Sink (Conductive grease applied) | 0.035 | | K/W |
| Weight | Weight of Module | 110 | | g |

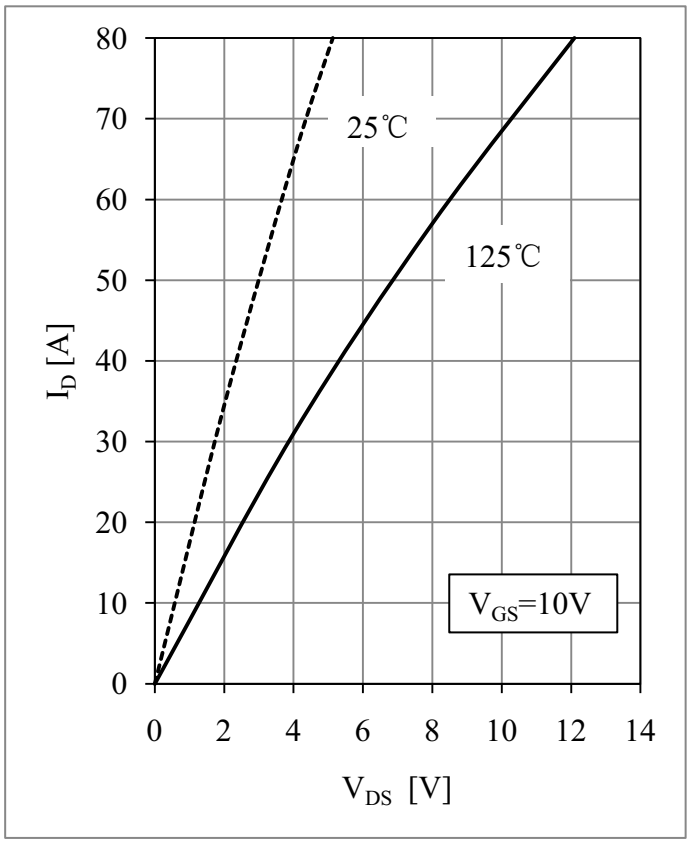



Fig 1. Mosfet Output Characteristics

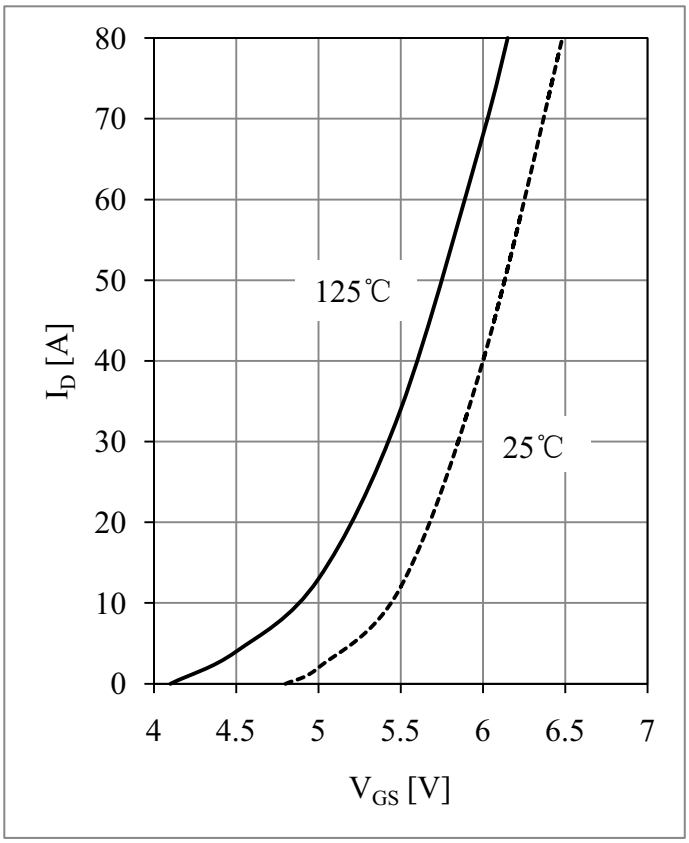



Fig 2. Mosfet Transfer Characteristics

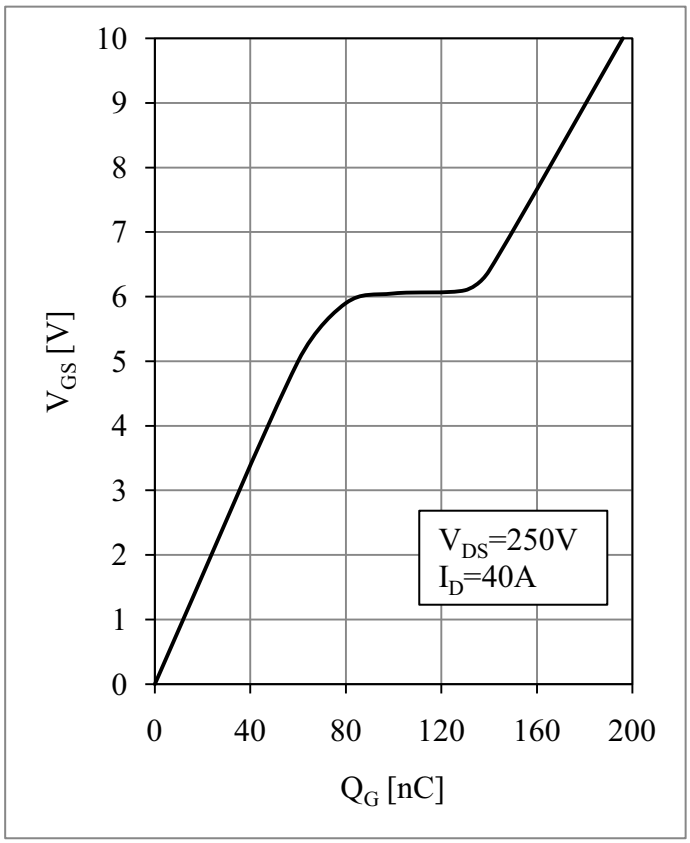



Fig 3. Gate Charge Characteristic

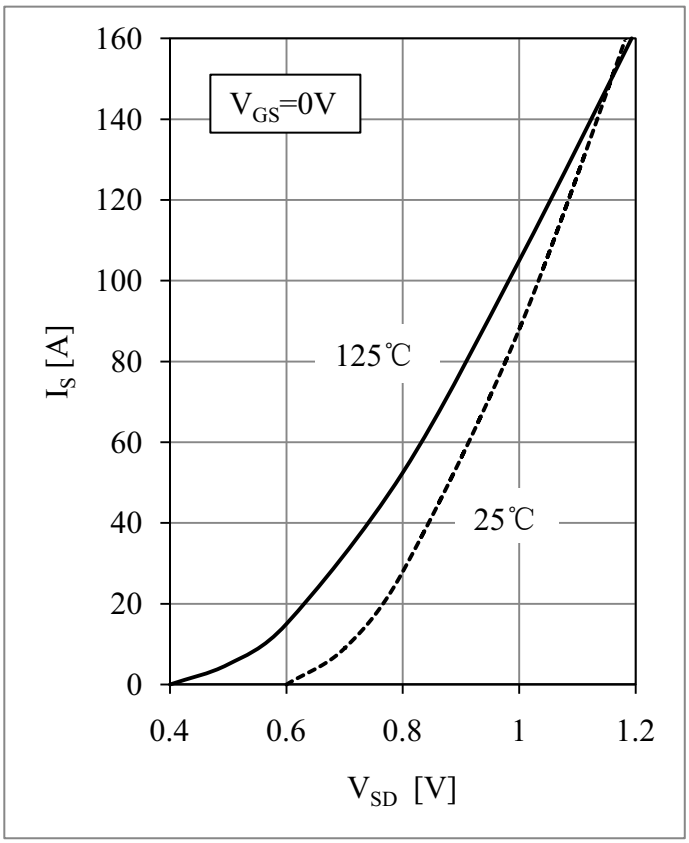



Fig 4. Inverse Diode Output Characteristics

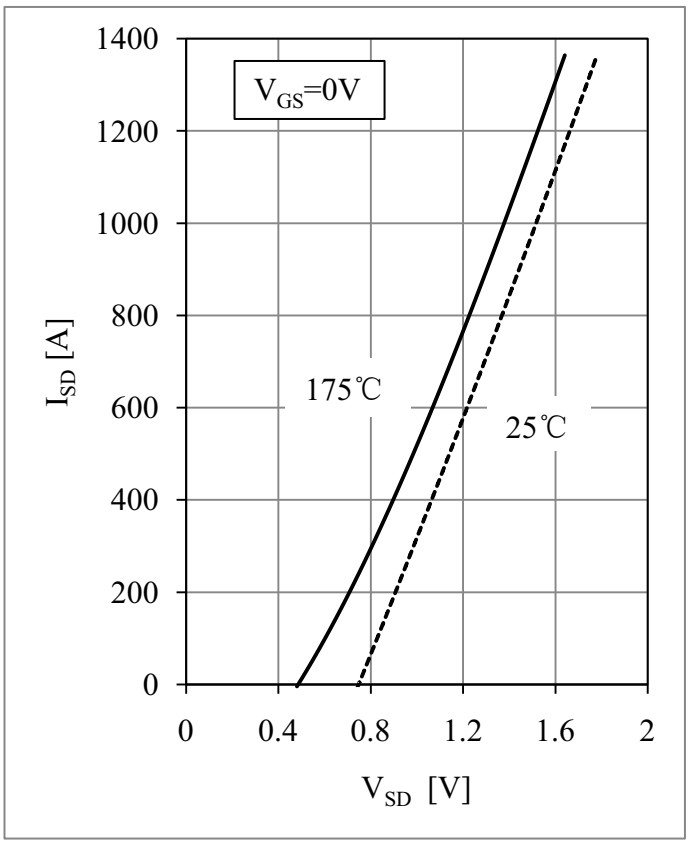



Fig 5. Inverse Diode Output Characteristic

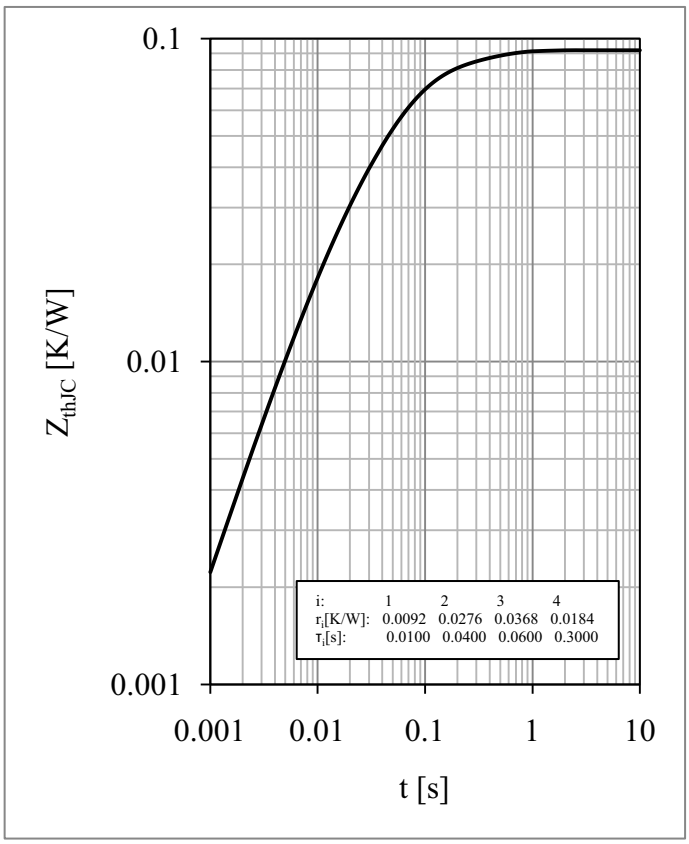
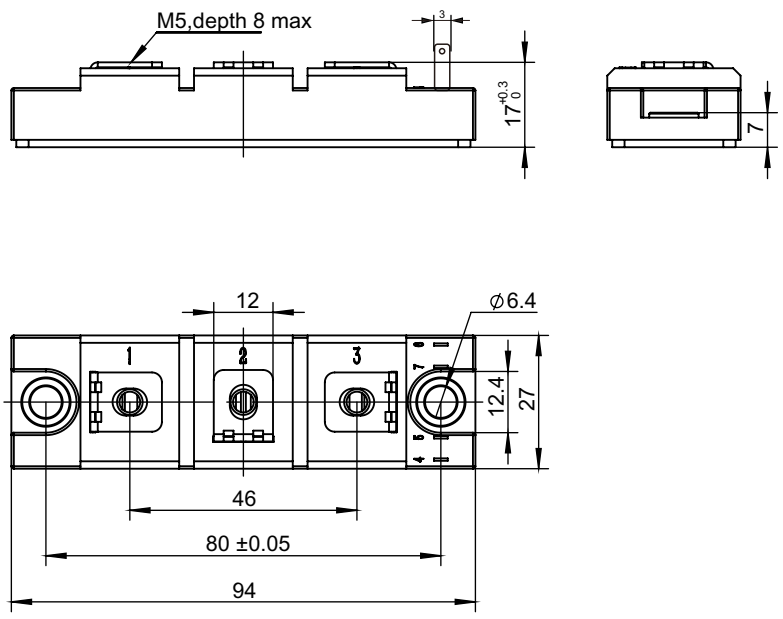



Fig 6. Transient Thermal Impedance

## Package Dimension




Dimensions (mm)