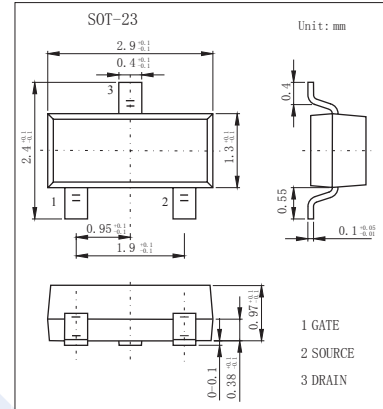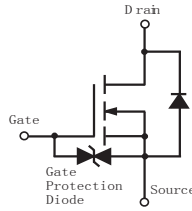# N-Channel Enhancement MOSFET

## BS870

### ■ Features

- Low On-Resistance: $R_{DS(ON)}$
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected 2KV HBM



SOT-23 Unit: mm

1 GATE
2 SOURCE
3 DRAIN

### ■ Absolute Maximum Ratings Ta=25℃

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage -Continuous | $V_{GS}$ | ±20 | |
| Drain Current        -Continuous ( Note:1) | $I_D$ | 300 | mA |
| -Pulsed | | 800 | |
| Power Dissipation    (Note 1) | $P_D$ | 350 | mW |
| Thermal Resistance.Junction- to-Ambient | $R_{thJA}$ | 357 | ℃/W |
| Junction  Temperature | $T_J$ | 150 | ℃ |
| Junction and Storage Temperature Range | $T_{stg}$ | -55 to 150 | |

Notes: 1. Device mounted on FR-4 PCB.

### ■ Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage   (Note.2) | $V_{DSS}$ | $I_D$=100 μ A, $V_{GS}$=0V | 60 | | | V |
| Zero Gate Voltage Drain Current    (Note.2) | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V | | | 1 | μ A |
| Gate-Body Leakage Current       (Note.2) | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±10 | uA |
| Gate Threshold Voltage       (Note.2) | $V_{GS(th)}$ | $V_{DS}$ = 10V, $I_D$ = 1mA | 1 | 1.6 | 2.5 | V |
| Static Drain-Source On-Resistance    (Note.2) | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=500mA | | | 2.5 | Ω |
| | | $V_{GS}$=10V, $I_D$=50mA | | | 3 | |
| Forward Transfer Admittance      (Note.2) | $|Y_{fs}|$ | $V_{GS}$=10V, $I_D$=200mA | 80 | | | ms |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=25V, f=1MHz | | | 50 | pF |
| Output Capacitance | $C_{oss}$ | | | | 25 | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | | 5 | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=4.5V, $V_{DS}$=15V, $I_D$=200mA | | | 0.8 | nC |
| Turn-On DelayTime | $t_{d(on)}$ | $I_D$=200mA, $V_{DS}$=30V, $R_G$=10Ω,$V_{GEN}$=10V,$R_L$=150Ω | | | 20 | ns |
| Turn-Off DelayTime | $t_{d(off)}$ | | | | 40 | |

Note: 2. Short duration test pulse used to minimize self-heating effect.

### ■ Marking

| Marking | K72光 |
|---|---|

# BS870
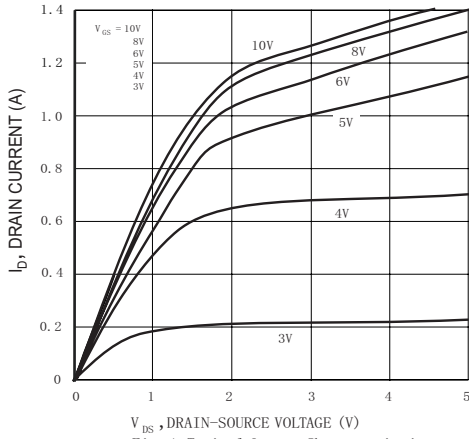
■ Typical Characteristics
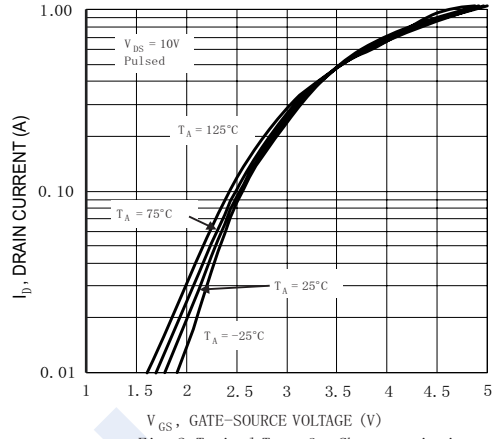

Fig. 1 Typical Output Characteristics
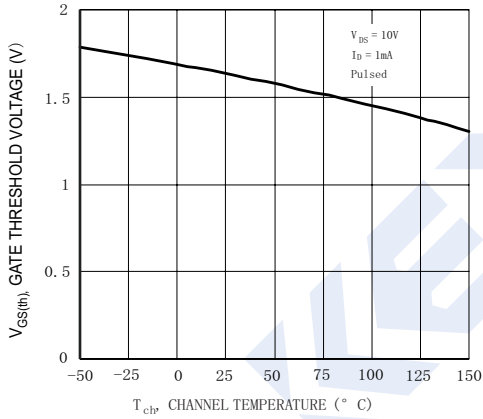

Fig. 2 Typical Transfer Characteristics


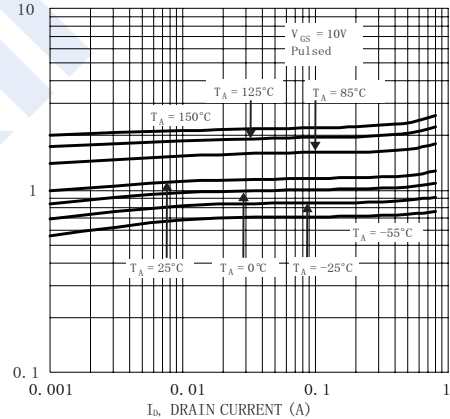Fig. 3 Gate Threshold Voltage
vs. Channel Temperature


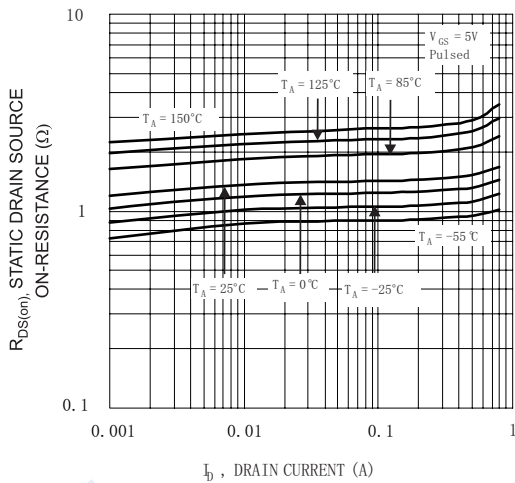Fig. 4 Static Drain-Source On-Resistance
Vs. Drain Current


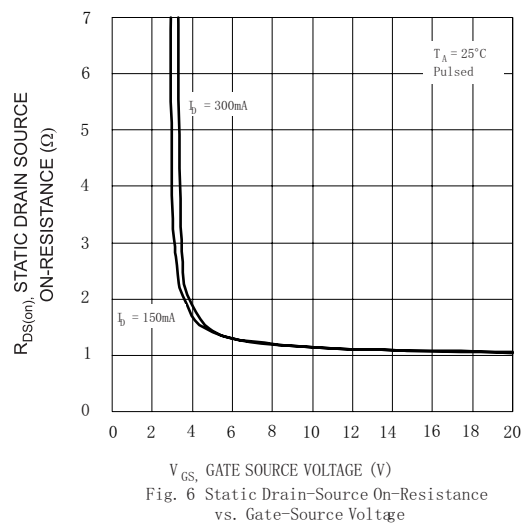Fig. 5 Static Drain-Source On-Resistance
vs. Drain Current


Fig. 6 Static Drain-Source On-Resistance
vs. Gate-Source Voltage
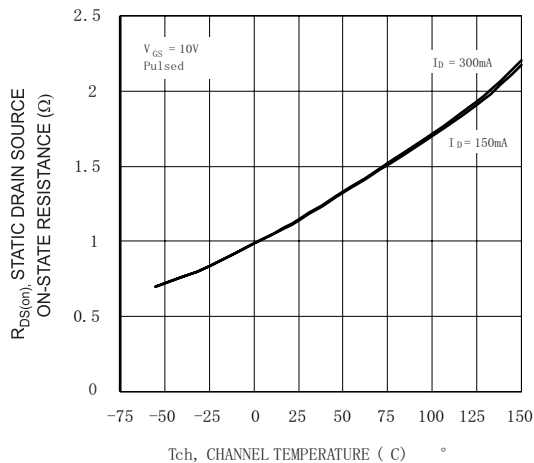
## BS870



Fig. 7 Static Drain-Source On-State Resistance
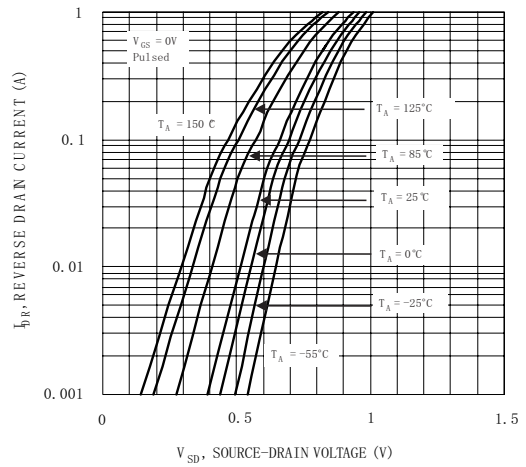vs. Channel Temperature



Fig. 8 Reverse Drain Current
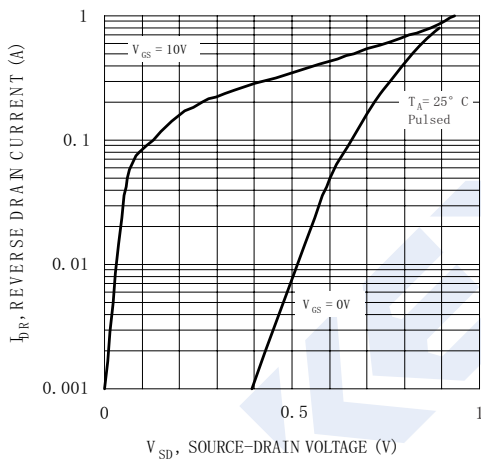vs. Source-Drain Voltage

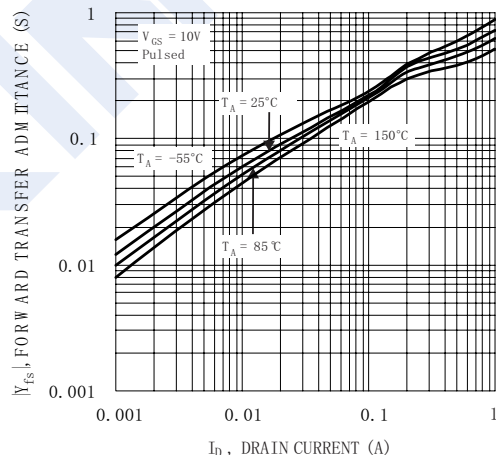

Fig. 9 Reverse Drain Current
vs. Source-Drain Voltage



Fig. 10 Forward Transfer Admittance
vs. Drain Current