

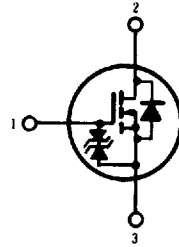
2SK559, 2SK560

SILICON N-CHANNEL MOS FET

HIGH SPEED POWER SWITCHING

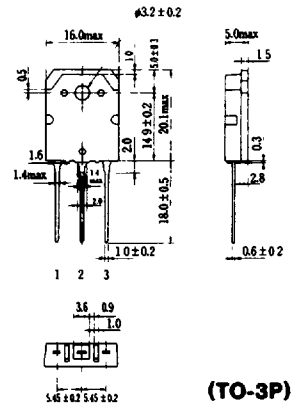
■ FEATURES

- Low On-Resistance.
- High Speed Switching.
- Low Drive Current.
- No Secondary Breakdown.
- Suitable for Switching Regulator, DC-DC Converter, Motor Controls, and Ultrasonic Power Oscillators.



1. Gate
2. Drain (Flange)
3. Source

(Dimensions in mm)



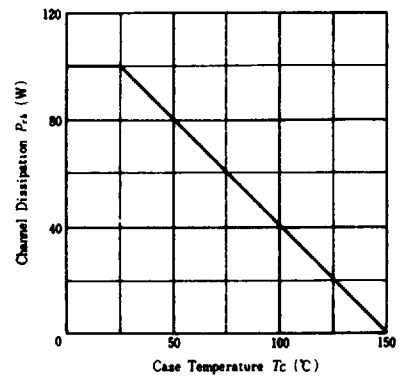
(TO-3P)

■ ABSOLUTE MAXIMUM RATINGS ($T_c=25^\circ\text{C}$)

| Item | Symbol | 2SK559 | 2SK560 | Unit |
|--|----------------|------------|--------|------|
| Drain-Source Voltage | V_{DS} | 450 | 500 | V |
| Gate-Source Voltage | V_{GS} | ±20 | | V |
| Drain Current | I_D | 15 | | A |
| Drain Peak Current | $I_{D(max)}$ * | 60 | | A |
| Body-Drain Diode Reverse Drain Current | I_{DR} | 15 | | A |
| Channel Dissipation | P_{ch} * | 100 | | W |
| Channel Temperature | T_{ch} | 150 | | °C |
| Storage Temperature | T_{stg} | -55 ~ +150 | | °C |

* $PW \leq 10\mu\text{s}$, duty cycle $\leq 1\%$
 **Value at $T_c = 25^\circ\text{C}$

POWER VS. TEMPERATURE DERATING

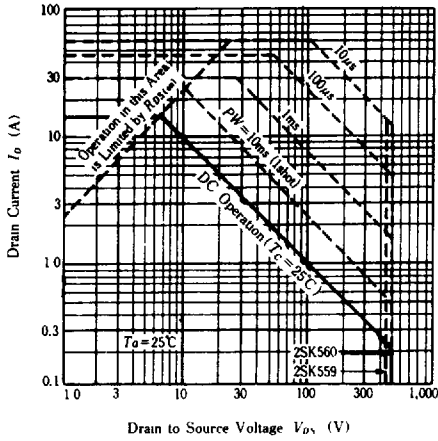


■ ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$)

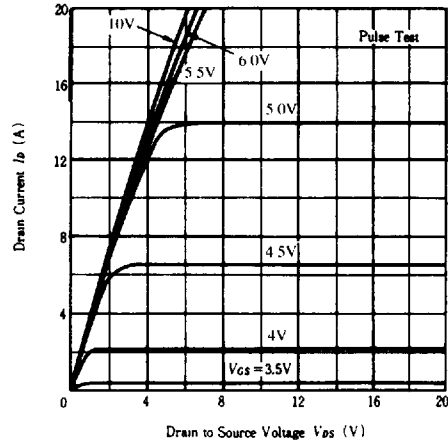
| Item | Symbol | Test Condition | min. | typ. | max. | Unit |
|---|---------------|---|-----------------------------------|------|------|------|
| Drain-Source Breakdown Voltage | 2SK559 | $I_D=10\text{mA}$, $V_{GS}=0$ | 450 | — | — | V |
| | 2SK560 | | 500 | — | — | |
| Gate-Source Breakdown Voltage | V_{GSOSS} | $I_G=\pm 100\mu\text{A}$, $V_{DS}=0$ | ±20 | — | — | V |
| Gate-Source Leak Current | I_{OSS} | $V_{GS}=\pm 16\text{V}$, $V_{DS}=0$ | — | — | ±10 | μA |
| Zero Gate Voltage Drain Current | 2SK559 | $V_{DS}=360\text{V}$, $V_{GS}=0$ | — | — | 250 | μA |
| | 2SK560 | | $V_{DS}=400\text{V}$, $V_{GS}=0$ | — | — | |
| Gate-Source Cutoff Voltage | $V_{GS(off)}$ | $I_D=1\text{mA}$, $V_{DS}=10\text{V}$ | 2.0 | — | 4.0 | V |
| Static Drain-Source On State Resistance | 2SK559 | $I_D=8\text{A}$, $V_{GS}=10\text{V}$ * | — | 0.25 | 0.36 | Ω |
| | 2SK560 | | — | 0.3 | 0.4 | |
| Forward Transfer Admittance | $ y_f $ | $I_D=8\text{A}$, $V_{DS}=10\text{V}$ * | 8 | 13 | — | S |
| Input Capacitance | C_{in} | $V_{DS}=10\text{V}$, $V_{GS}=0$, $f=1\text{MHz}$ | — | 2950 | — | pF |
| Output Capacitance | C_{out} | | — | 1100 | — | pF |
| Reverse Transfer Capacitance | C_{rc} | | — | 140 | — | pF |
| Turn-on Delay Time | t_{don} | | — | 30 | — | ns |
| Rise Tim | t_r | $I_D=8\text{A}$, $V_{GS}=10\text{V}$, $R_L=3.75\Omega$ | — | 115 | — | ns |
| Turn-off Delay Time | t_{doff} | | — | 200 | — | ns |
| Fall Time | t_f | | — | 120 | — | ns |
| Body-Drain Diode Forward Voltage | V_{DF} | $I_F=15\text{A}$, $V_{GS}=0$ | — | 1.2 | — | V |
| Body-Drain Diode Reverse Recovery Time | t_r | $I_F=15\text{A}$, $V_{GS}=0$, $di_F/dt=100\text{A}/\mu\text{s}$ | — | 500 | — | ns |

*Pulse Test

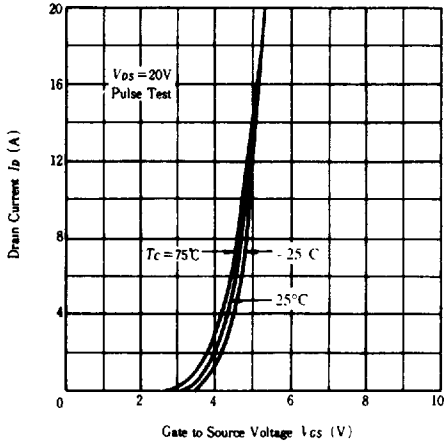
AREA OF SAFE OPERATION



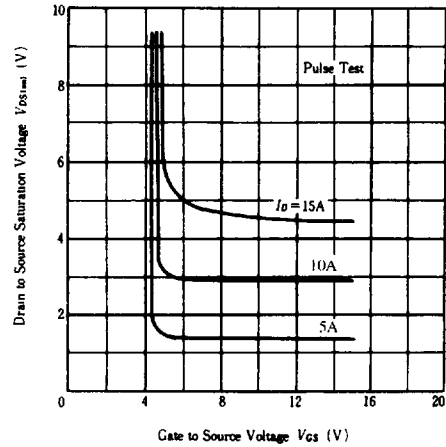
TYPICAL OUTPUT CHARACTERISTICS



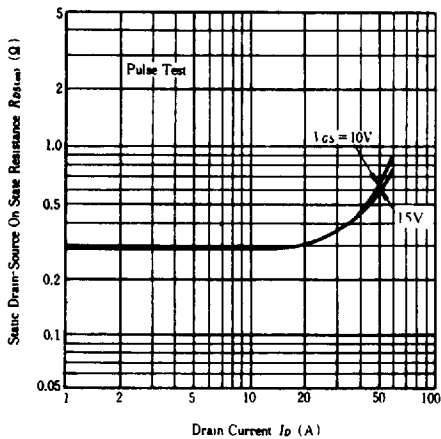
TYPICAL TRANSFER CHARACTERISTICS



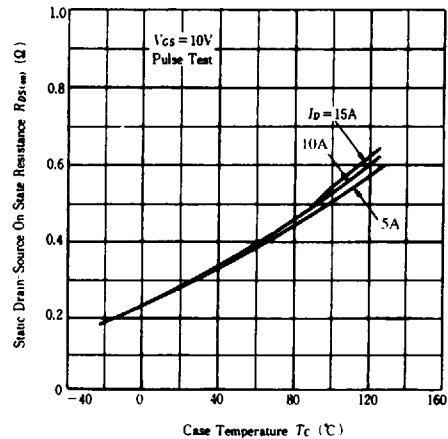
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT

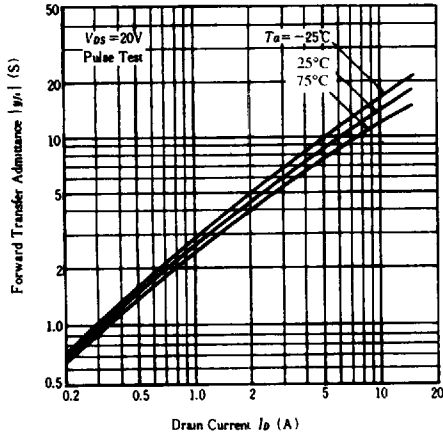


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE

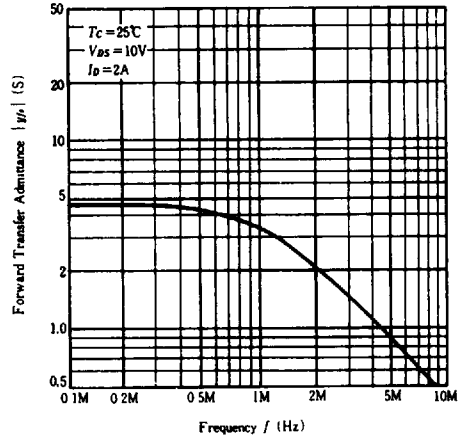


HITACHI/(OPTOELECTRONICS)

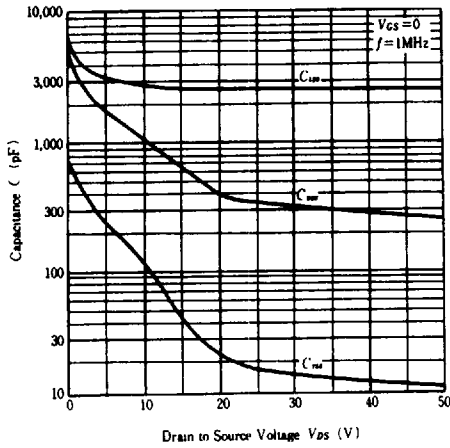
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



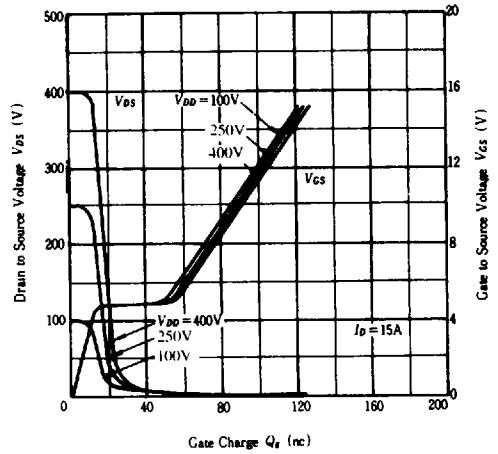
FORWARD TRANSFER ADMITTANCE VS. FREQUENCY



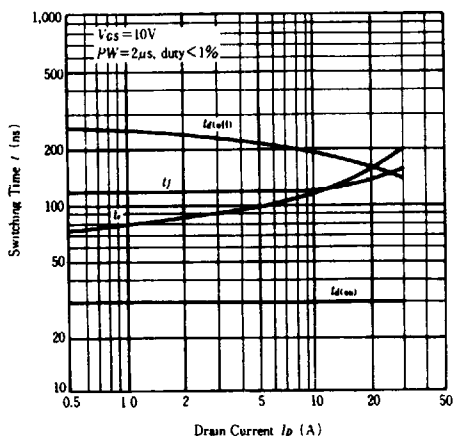
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



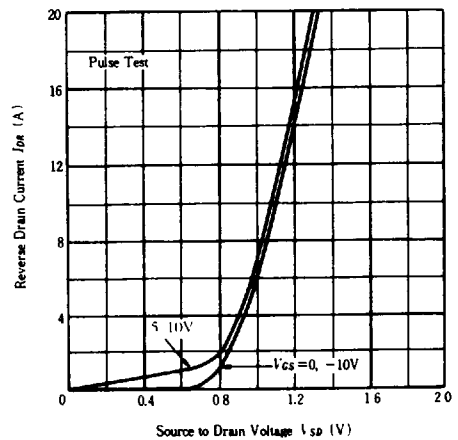
DYNAMIC INPUT CHARACTERISTICS



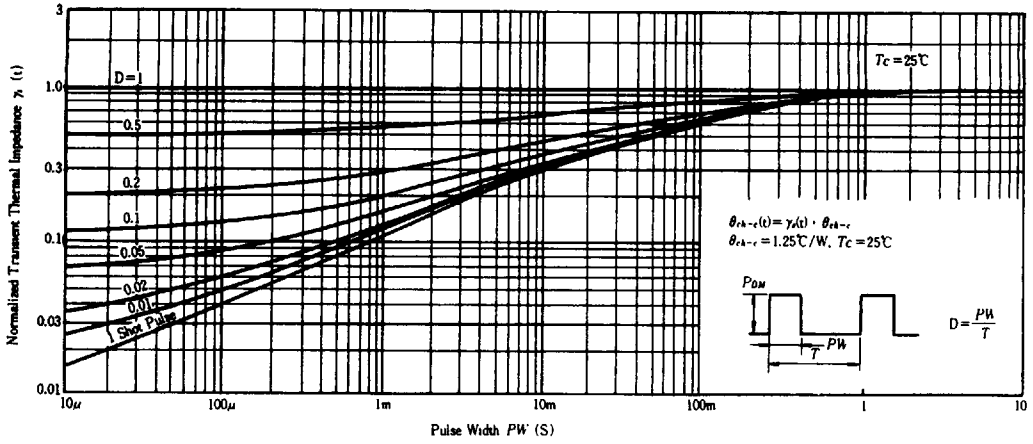
SWITCHING CHARACTERISTICS



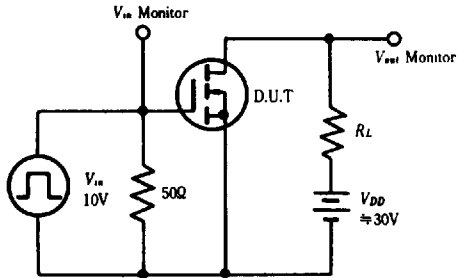
REVERSE DRAIN CURRENT VS. SOURCE - DRAIN VOLTAGE



NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT



WAVEFORMS

