

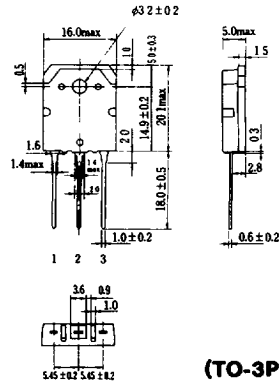
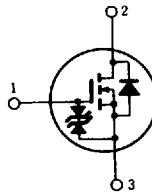
2SK682, 2SK683

SILICON N-CANNEL MOS FET

HIGH SPEED POWER SWITCHING

■ FEATURES

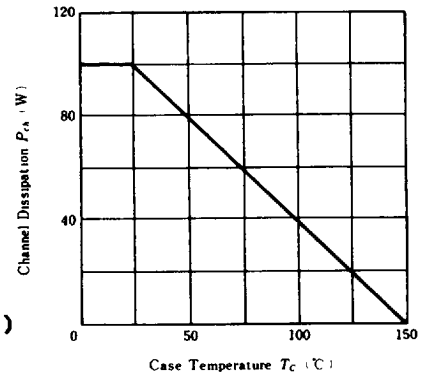
- Low On-Resistance
- High Speed Switching
- Low Drive Current
- No Secondary Breakdown
- Suitable for Switching Regulator, DC-DC Converter and Motor Driver



1. Gate
2. Drain (Flange)
3. Source (Dimensions in mm)

(TO-3P)

POWER VS. TEMPERATURE DERATING



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

| Item | Symbol | 2SK682 | 2SK683 | Unit |
|--|------------------|----------|--------|------|
| Drain-Source Voltage | V_{DSS} | 450 | 500 | V |
| Gate-Source Voltage | V_{GSS} | ±20 | | V |
| Drain Current | I_D | 12 | | A |
| Drain Peak Current | $I_{D(pulse)}$ * | 48 | | A |
| Body-Drain Diode Reverse Drain Current | I_{DR} | 12 | | A |
| Channel Dissipation | P_{ch} ** | 100 | | W |
| Channel Temperature | T_{ch} | 150 | | °C |
| Storage Temperature | T_{stg} | -55~+150 | | °C |

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

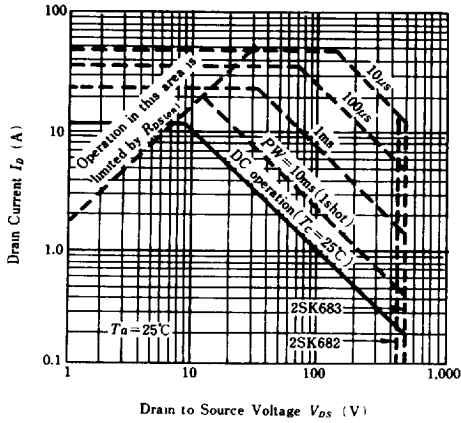
HITACHI/(OPTOELECTRONICS)

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

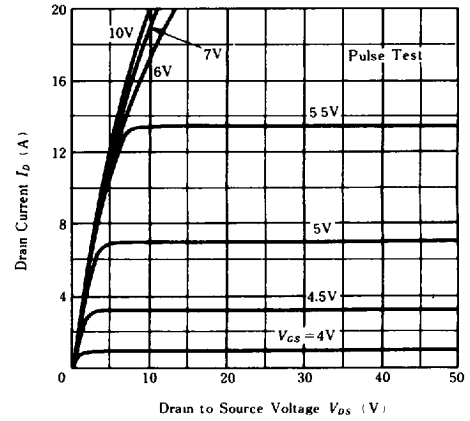
| Item | Symbol | Test Condition | min. | typ. | max. | Unit |
|---|---------------|---|--------------------------------|------|------|------|
| Drain-Source Breakdown Voltage | 2SK682 | $I_D=10\text{mA}, V_{GS}=0$ | 450 | — | — | V |
| | 2SK683 | | 500 | — | — | |
| Gate-Source Breakdown Voltage | $V_{(BR)GSS}$ | $I_C=\pm 100\mu\text{A}, V_{DS}=0$ | ±20 | — | — | V |
| Gate-Source Leak Current | I_{GSS} | $V_{GS}=\pm 16\text{V}, V_{DS}=0$ | — | — | ±10 | μA |
| Zero Gate Voltage Drain Current | 2SK682 | $V_{DS}=360\text{V}, V_{GS}=0$ | — | — | 250 | μA |
| | 2SK683 | | $V_{DS}=400\text{V}, V_{GS}=0$ | — | — | |
| 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 | 2SK682 | $I_D=6\text{A}, V_{GS}=10\text{V}$ * | — | 0.4 | 0.55 | Ω |
| | 2SK683 | | — | 0.45 | 0.60 | |
| Forward Transfer Admittance | $ y_{fs} $ | $I_D=6\text{A}, V_{DS}=10\text{V}$ * | 6 | 10 | — | S |
| Input Capacitance | C_{iss} | $V_{DS}=10\text{V}, V_{GS}=0, f=1\text{MHz}$ | — | 2050 | — | pF |
| Output Capacitance | C_{oss} | | — | 720 | — | pF |
| Reverse Transfer Capacitance | C_{rss} | | — | 80 | — | pF |
| Turn-on Delay Time | $t_{d(on)}$ | | — | 25 | — | ns |
| Rise Time | t_r | $I_D=6\text{A}, V_{GS}=10\text{V}, R_L=5\Omega$ | — | 85 | — | ns |
| Turn-off Delay Time | $t_{d(off)}$ | | — | 145 | — | ns |
| Fall Time | t_f | | — | 85 | — | ns |
| Body-Drain Diode Forward Voltage | V_{DF} | $I_F=12\text{A}, V_{GS}=0$ | — | 1.0 | — | V |
| Body-Drain Diode Reverse Recovery Time | t_{rr} | $I_F=12\text{A}, V_{GS}=0, dI_F/dt=100\text{A}/\mu\text{s}$ | — | 120 | — | ns |

*Pulse Test

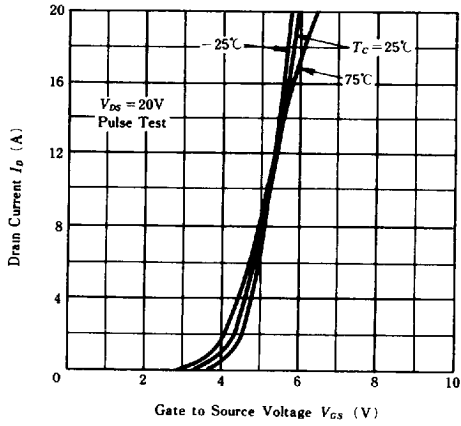
MAXIMUM SAFE OPERATION AREA



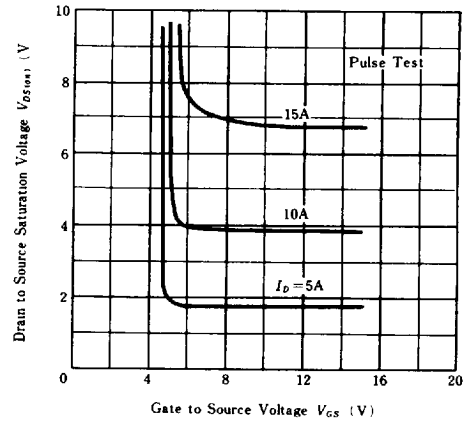
TYPICAL OUTPUT CHARACTERISTICS



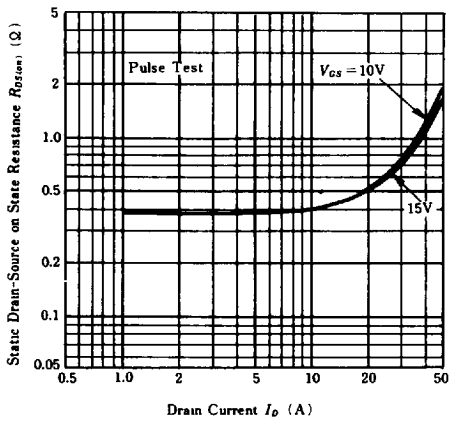
TYPICAL TRANSFER CHARACTERISTICS



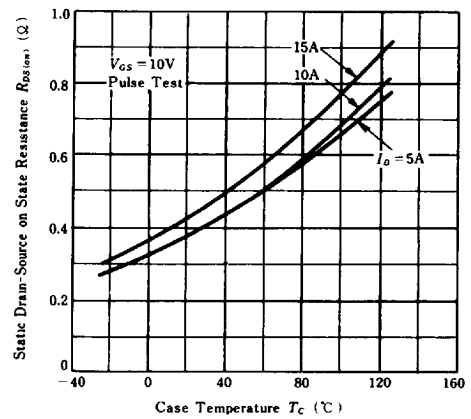
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



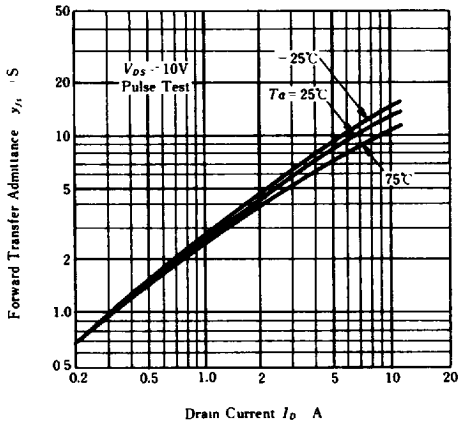
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT



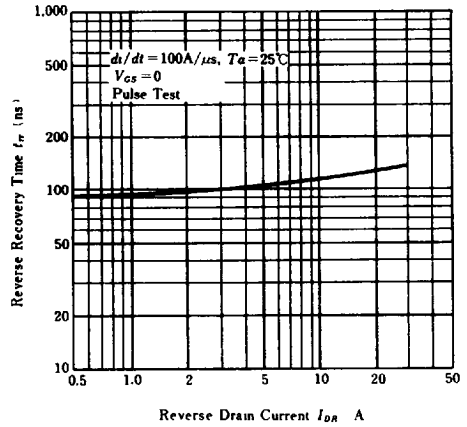
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE



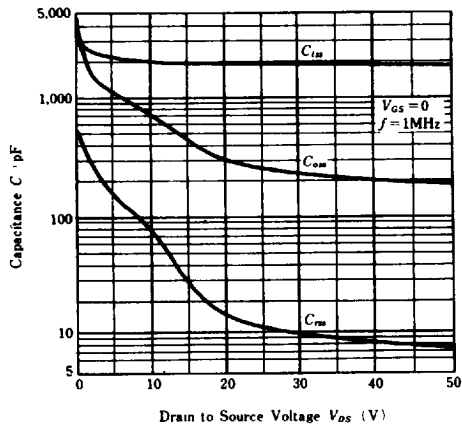
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



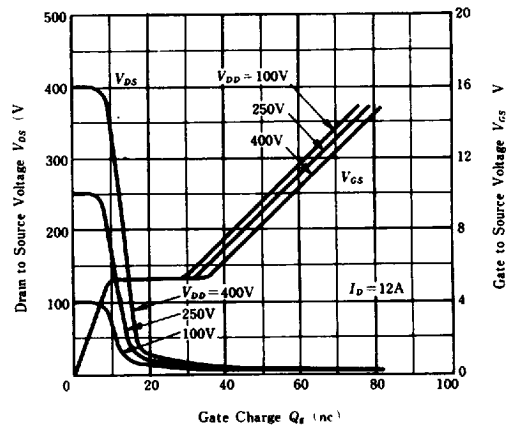
BODY DRAIN DIODE REVERSE RECOVERY TIME



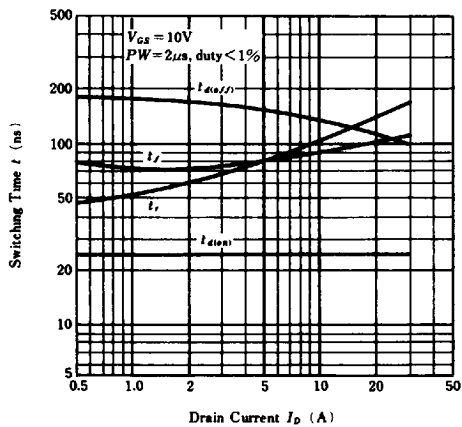
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



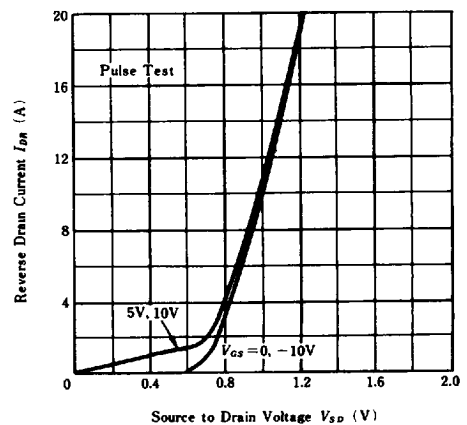
DYNAMIC INPUT CHARACTERISTICS



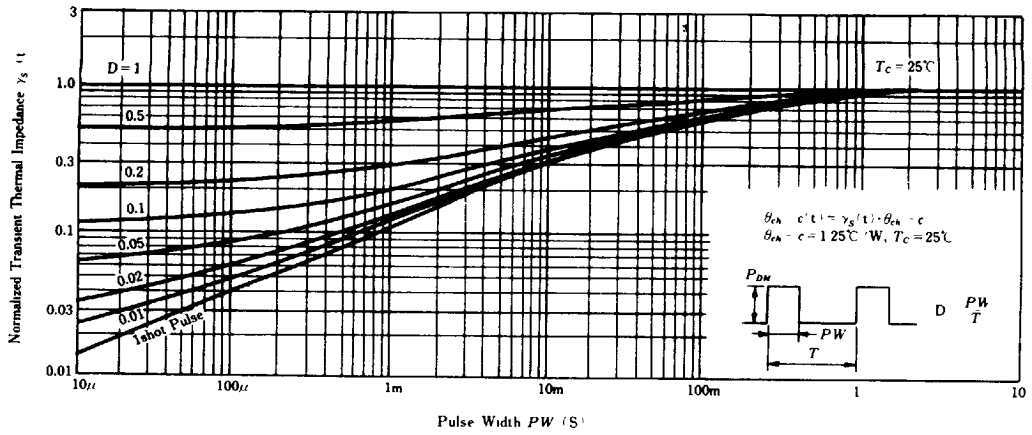
SWITCHING CHARACTERISTICS



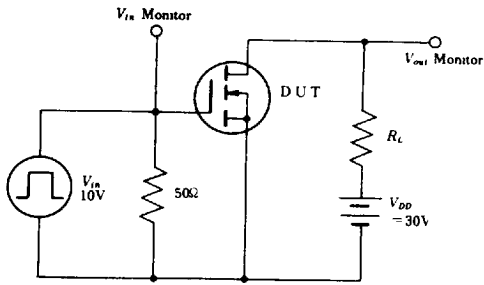
REVERSE DRAIN CURRENT VS. SOURCE TO DRAIN VOLTAGE



NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT



WAVEFORMS

