To our customers,

## Old Company Name in Catalogs and Other Documents

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April 1st, 2010
Renesas Electronics Corporation

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RENESAS

# MOS FIELD EFFECT TRANSISTOR
# 2SK3663

## N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

### DESCRIPTION

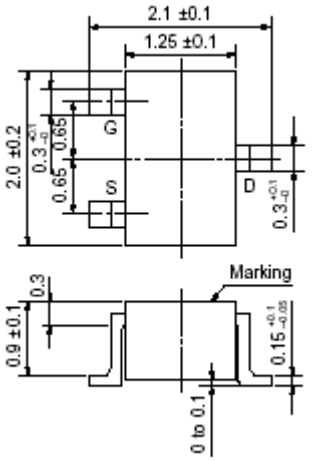
The 2SK3663 is a switching device which can be driven directly by a 2.5 V power source.

The 2SK3663 features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

### FEATURES

- 2.5 V drive available
- Low on-state resistance
  $R_{DS(on)1}$ = 0.57 Ω MAX. ($V_{GS}$ = 4.5 V, $I_D$ = 0.30 A)
  $R_{DS(on)2}$ = 0.60 Ω MAX. ($V_{GS}$ = 4.0 V, $I_D$ = 0.30 A)
  $R_{DS(on)3}$ = 0.88 Ω MAX. ($V_{GS}$ = 2.5 V, $I_D$ = 0.15 A)

### PACKAGE DRAWING (Unit: mm)




### ORDERING INFORMATION

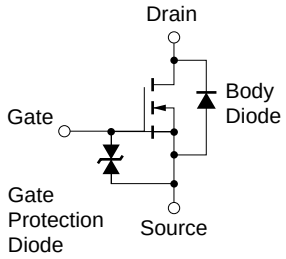
| PART NUMBER | PACKAGE |
|---|---|
| 2SK3663 | SC-70 (SSP) |

**Remark** Marking : G26

### ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C)

| | | | |
|---|---|---|---|
| Drain to Source Voltage ($V_{GS}$ = 0 V) | $V_{DSS}$ | 20 | V |
| Gate to Source Voltage ($V_{DS}$ = 0 V) | $V_{GSS}$ | ±12 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ±0.5 | A |
| Drain Current (pulse) **Note1** | $I_{D(pulse)}$ | ±2.0 | A |
| Total Power Dissipation **Note2** | $P_T$ | 0.2 | W |
| Channel Temperature | $T_{ch}$ | 150 | °C |
| Storage Temperature | $T_{stg}$ | –55 to +150 | °C |

### EQUIVALENT CIRCUIT




**Notes 1.** PW ≤ 10 μs, Duty Cycle ≤ 1%

**2.** Mounted on FR-4 board of 2500 $mm^2$ x 1.1 mm

**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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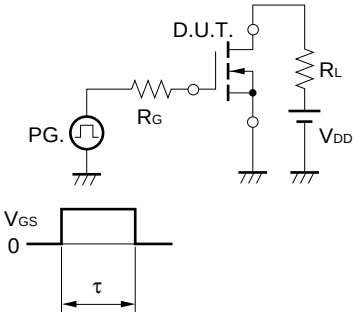
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## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C)

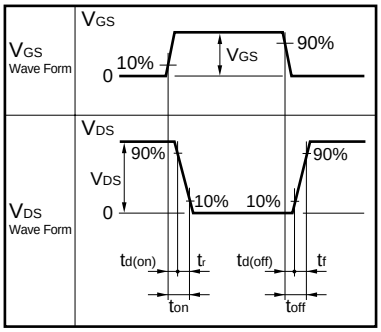
| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20 V, $V_{GS}$ = 0 V | | | 1.0 | μA |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±12 V, $V_{DS}$ = 0 V | | | ±10 | μA |
| Gate Cut-off Voltage[Note] | $V_{GS(off)}$ | $V_{DS}$ = 10 V, $I_D$ = 1.0 mA | 0.5 | 1.0 | 1.5 | V |
| Forward Transfer Admittance[Note] | $\|y_{fs}\|$ | $V_{DS}$ = 10 V, $I_D$ = 0.30 A | 0.25 | 0.75 | | S |
| Drain to Source On-state Resistance[Note] | $R_{DS(on)1}$ | $V_{GS}$ = 4.5 V, $I_D$ = 0.30 A | | 0.38 | 0.57 | Ω |
| | $R_{DS(on)2}$ | $V_{GS}$ = 4.0 V, $I_D$ = 0.30 A | | 0.41 | 0.60 | Ω |
| | $R_{DS(on)3}$ | $V_{GS}$ = 2.5 V, $I_D$ = 0.15 A | | 0.60 | 0.88 | Ω |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 10 V | | 28 | | pF |
| Output Capacitance | $C_{oss}$ | $V_{GS}$ = 0 V | | 11 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | f = 1.0 MHz | | 7 | | pF |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$ = 10 V, $I_D$ = 0.30 A | | 20 | | ns |
| Rise Time | $t_r$ | $V_{GS}$ = 4.0 V | | 51 | | ns |
| Turn-off Delay Time | $t_{d\ off)}$ | $R_G$ = 10 Ω | | 94 | | ns |
| Fall Time | $t_f$ | | | 87 | | ns |
| Body Diode Forward Voltage | $V_{F(S-D)}$ | $I_F$ = 0.5 A, $V_{GS}$ = 0 V | | 0.87 | | V |

**Note** Pulsed : PW≤350 μs, Duty Cycle≤2%

### TEST CIRCUIT SWITCHING TIME



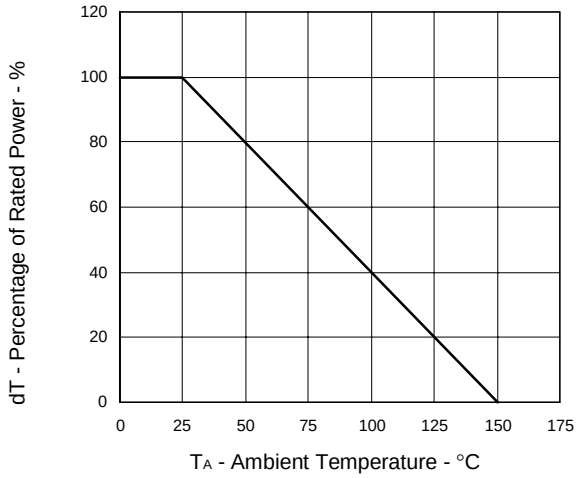

τ = 1 μs
Duty Cycle ≤ 1%



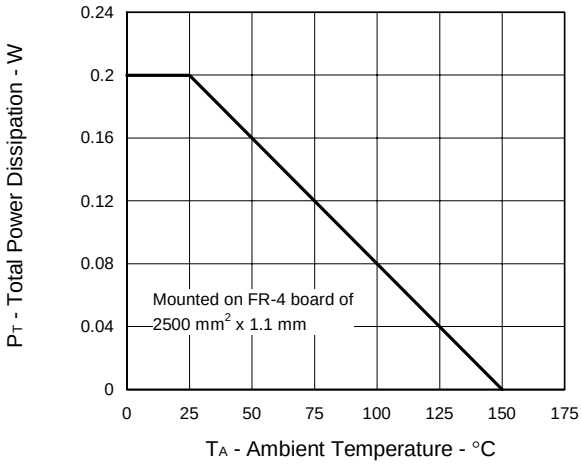



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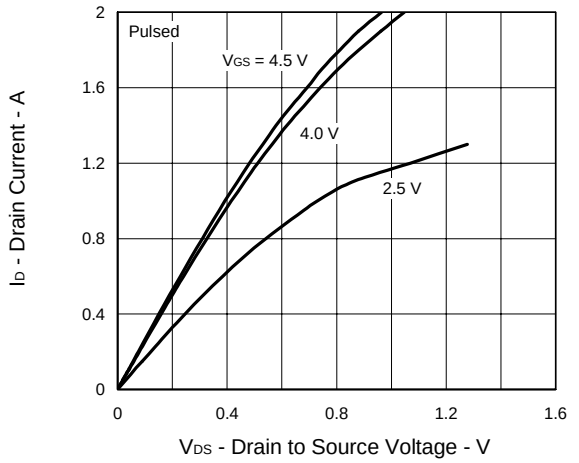
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



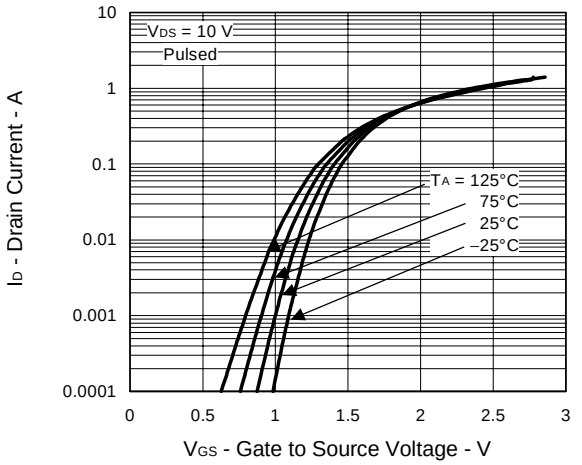

TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



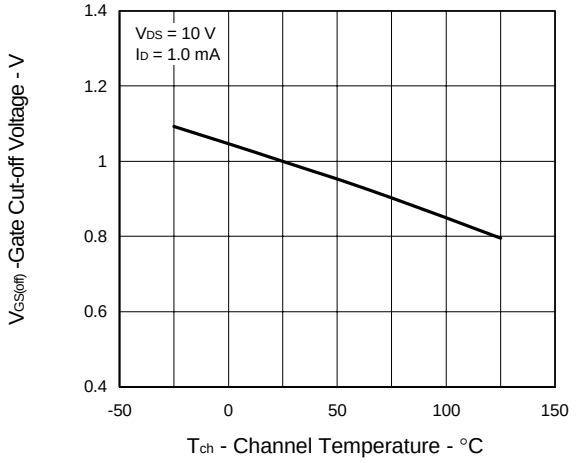

DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



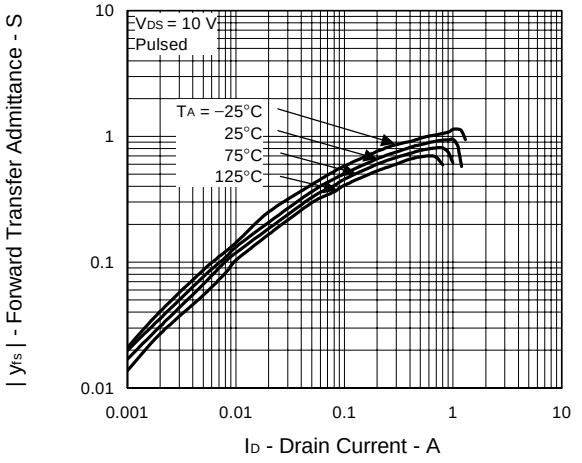

FORWARD TRANSFER CHARACTERISTICS




GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



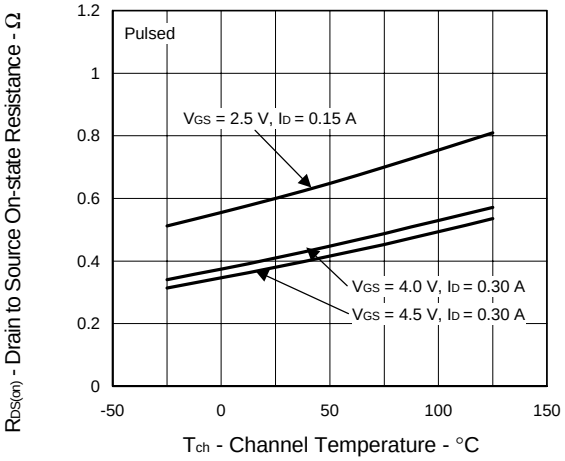

FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



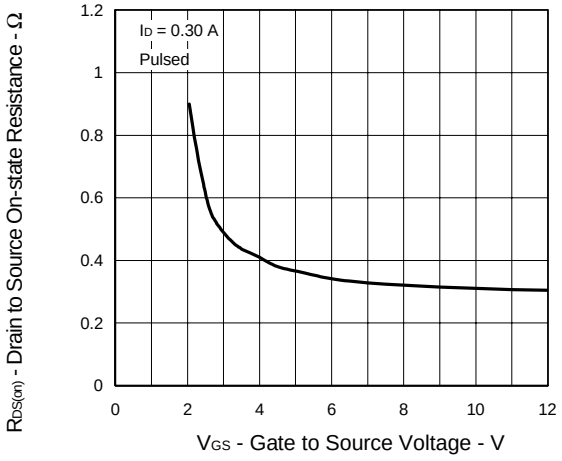



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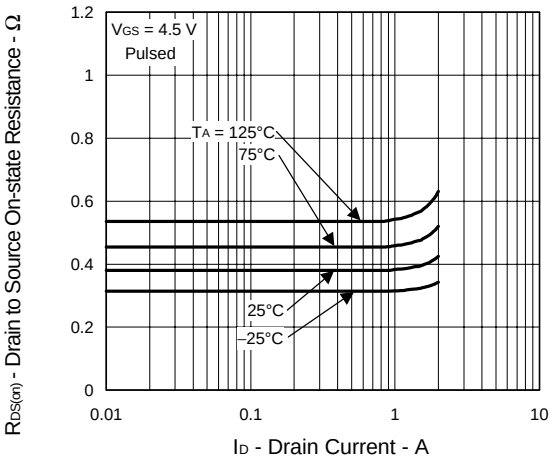
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



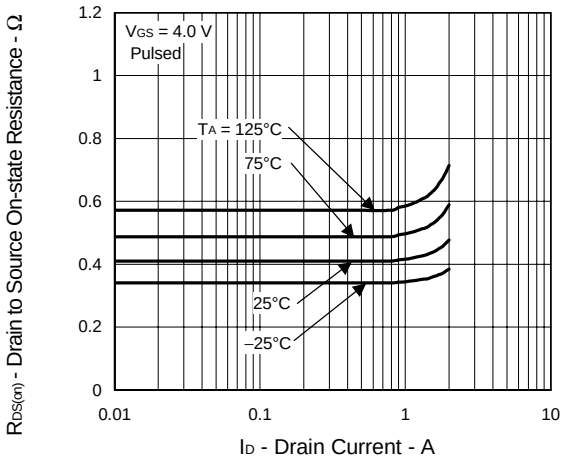

DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



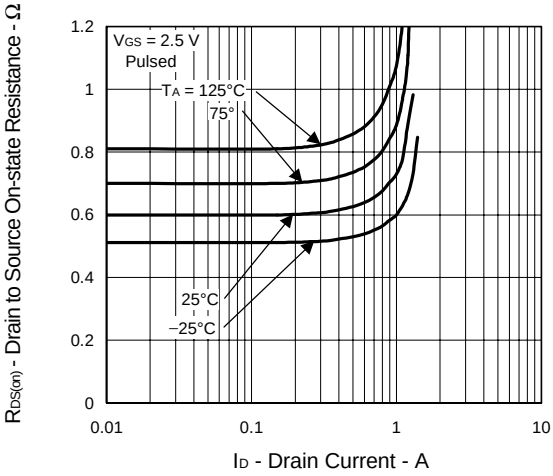

DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



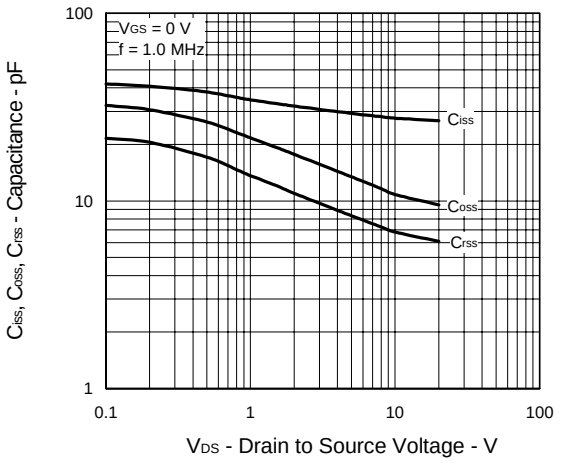

DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT




DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



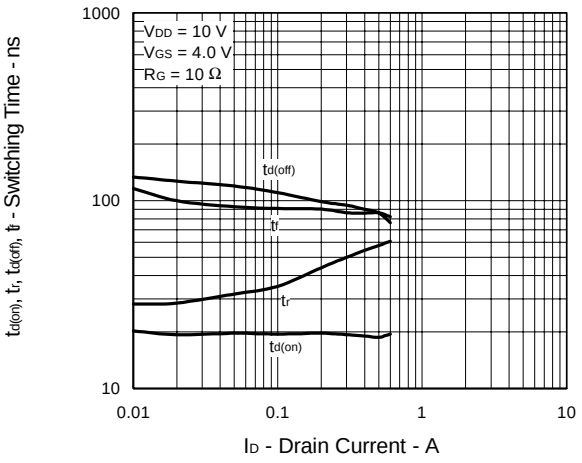

CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



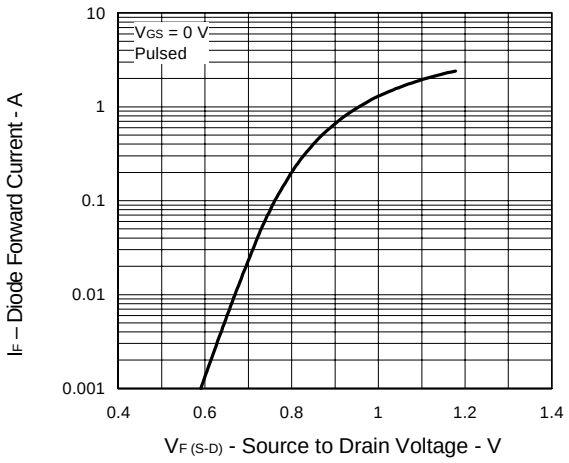



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SWITCHING CHARACTERISTICS




SOURCE TO DRAIN DIODE FORWARD VOLTAGE






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