

TENTATIVE TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOS ν)

2SK2992

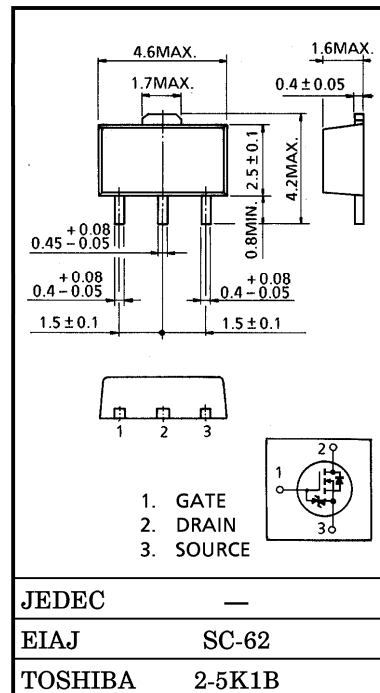
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

INDUSTRIAL APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 2.2\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 0.9S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 200V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 3.5V$ ($V_{DS} = 10V, I_D = 1mA$)

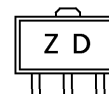


MAXIMUM RATINGS ($T_a = 25^\circ C$)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|-----------|----------------|------------|
| Drain-Source Voltage | V_{DSS} | 200 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | V_{DGR} | 200 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Drain Current | DC | I_D | 1 A |
| | Pulse | I_{DP} | 3 A |
| Drain Power Dissipation*** | P_D | 1.5 | W |
| Single Pulse Avalanche Energy** | E_{AS} | 36 | mJ |
| Avalanche Current | I_{AR} | 1 | A |
| Repetitive Avalanche Energy* | E_{AR} | 0.15 | mJ |
| Channel Temperature | T_{ch} | 150 | $^\circ C$ |
| Storage Temperature Range | T_{stg} | $-55 \sim 150$ | $^\circ C$ |

JEDEC —
 EIAJ SC-62
 TOSHIBA 2-5K1B
 Weight : 0.05g (Typ.)

MARKING



THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|--|----------------|------|----------------|
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 250 | $^\circ C / W$ |

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = 50V$, Starting $T_{ch} = 25^\circ C$, $L = 56.7mH$, $R_G = 25\Omega$, $I_{AR} = 1A$
- *** Mounted on ceramic substrate ($1inch^2 \times 0.8t$)

**This transistor is an electrostatic sensitive device.
 Please handle with caution.**

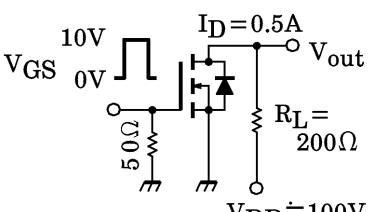
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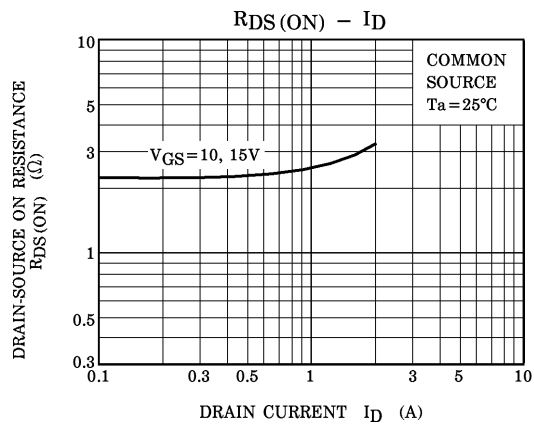
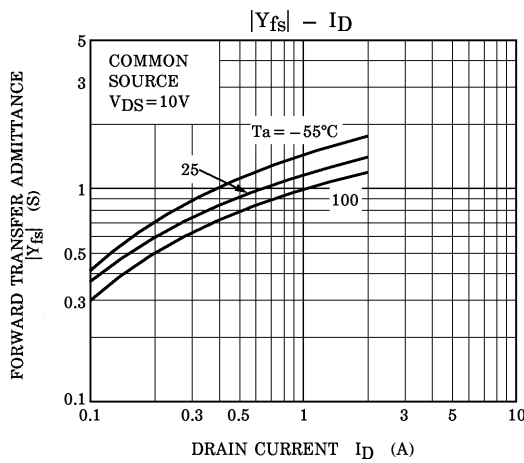
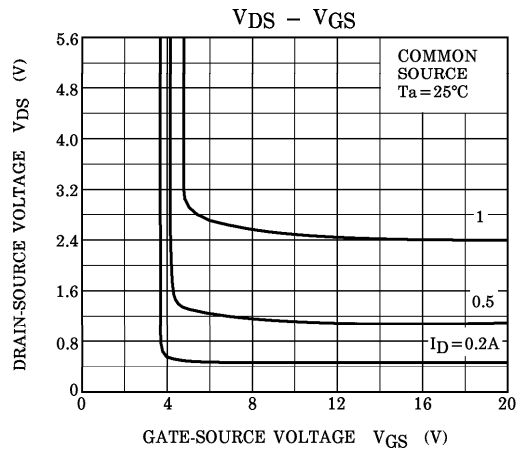
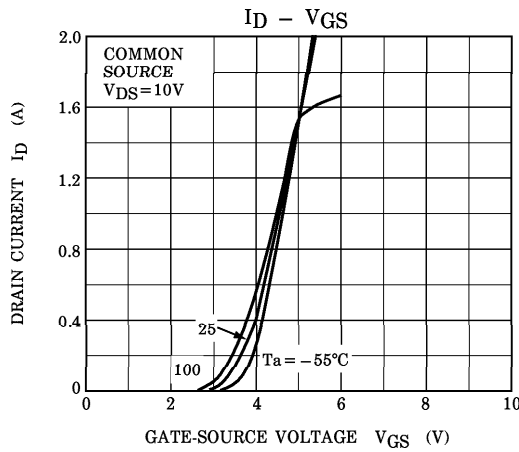
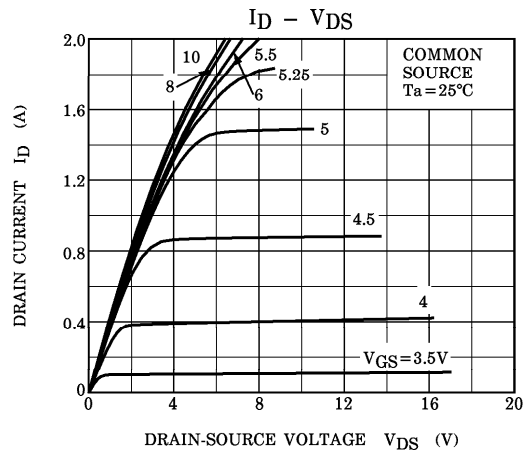
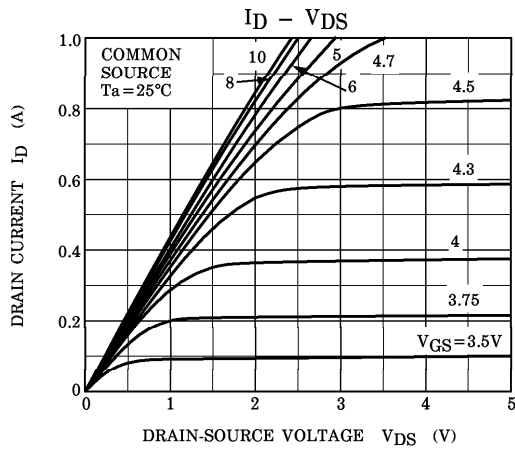
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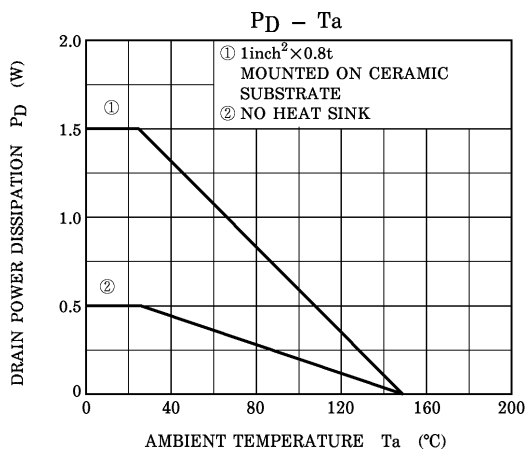
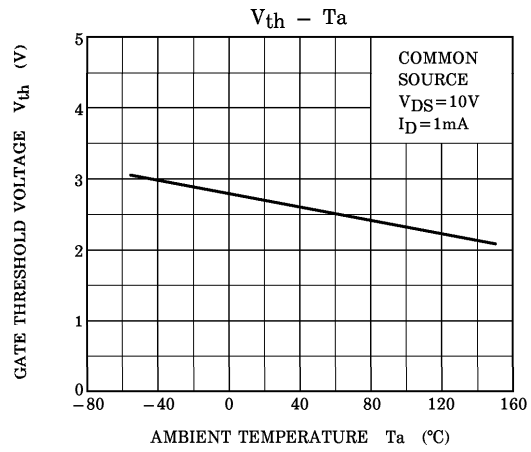
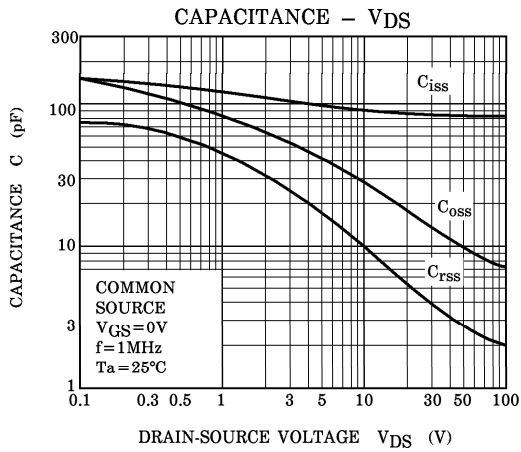
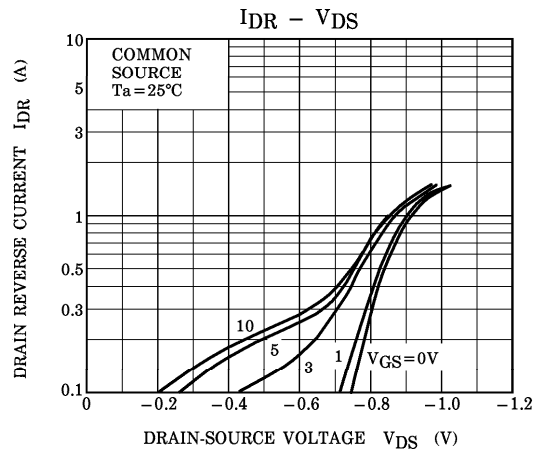
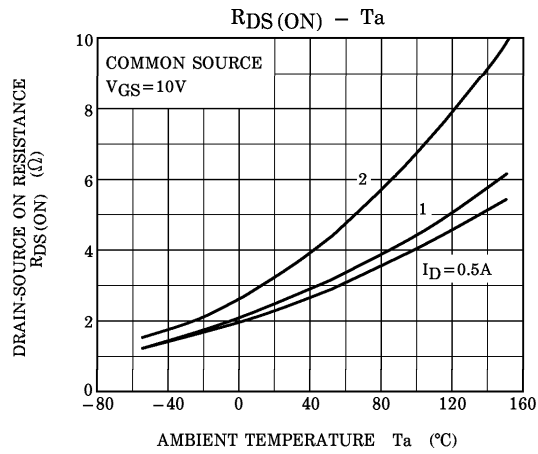
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

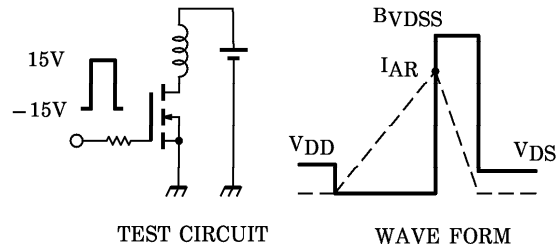
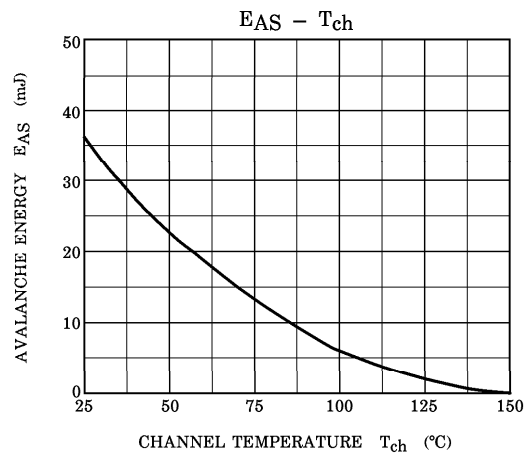
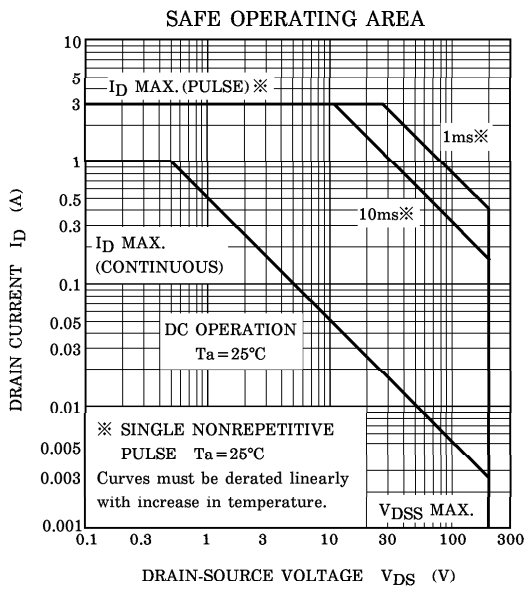
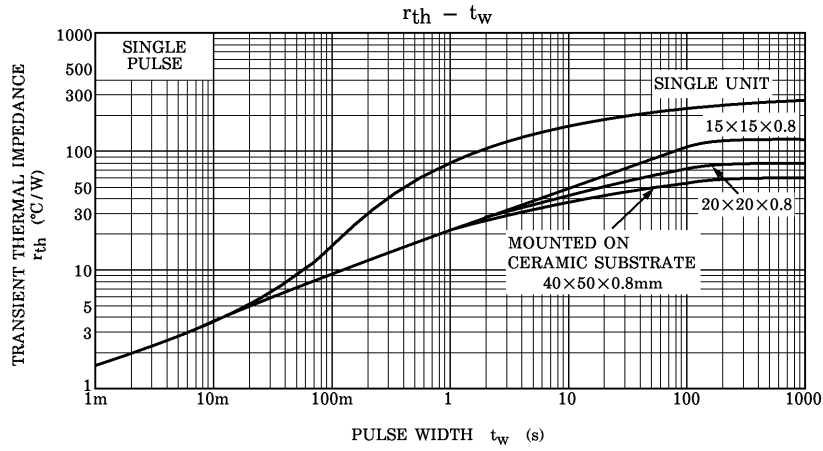
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---------------|----------|--|------|------|------|------|
| Gate Leakage Current | | IGSS | VGS = ±16V, VDS = 0V | — | — | ±10 | μA |
| Drain Cut-off Current | | IDSS | VDS = 200V, VGS = 0V | — | — | 100 | μA |
| Drain-Source Breakdown Voltage | | V(BR)DSS | ID = 10mA, VGS = 0V | 200 | — | — | V |
| Gate Threshold Voltage | | Vth | VDS = 10V, ID = 1mA | 2.0 | — | 3.5 | V |
| Drain-Source ON Resistance | | RDS(ON) | VGS = 10V, ID = 0.5A | — | 2.2 | 3.5 | Ω |
| Forward Transfer Admittance | | Yfs | VDS = 10V, ID = 0.5A | 0.5 | 0.9 | — | S |
| Input Capacitance | | Ciss | VDS = 10V, VGS = 0V f = 1MHz | — | 90 | — | pF |
| Reverse Transfer Capacitance | | Crss | | — | 10 | — | |
| Output Capacitance | | Coss | | — | 30 | — | |
| Switching Time | Rise Time | tr |  <p>VIN : tr, tf < 5ns, Duty ≤ 1%, tw = 10μs</p> | — | 9 | — | ns |
| | Turn-on Time | ton | | — | 17 | — | |
| | Fall Time | tf | | — | 16 | — | |
| | Turn-off Time | toff | | — | 45 | — | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Qg | VDD ≐ 160V, VGS = 10V | — | 3.0 | — | nC |
| Gate-Source Charge | | Qgs | ID = 1A | — | 1.8 | — | |
| Gate-Drain (“Miller”) Charge | | Qgd | | — | 1.2 | — | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|--------|-----------------------|------|------|------|------|
| Continuous Drain Reverse Current | IDR | — | — | — | 1 | A |
| Pulse Drain Reverse Current | IDRP | — | — | — | 3 | A |
| Diode Forward Voltage | VDSF | IDR = 1A, VGS = 0V | — | — | -1.5 | V |
| Reverse Recovery Time | trr | IDR = 1A, VGS = 0V | — | 85 | — | ns |
| Reverse Recovery Charge | Qrr | dIDR / dt = 100A / μs | — | 190 | — | nC |







Peak $I_{AR} = 1A$, $R_G = 25\Omega$
 $V_{DD} = 50V$, $L = 56.7mH$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BV_{DSS}}{BV_{DSS} - V_{DD}} \right)$$