

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (L²-π-MOSV)

2SJ511

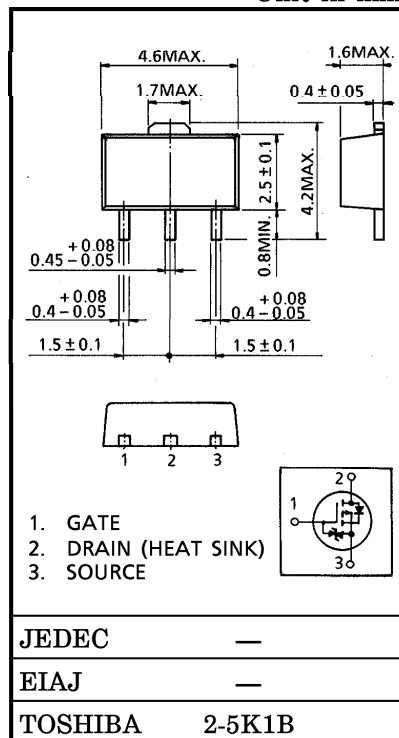
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
 CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS
 Unit in mm

- 4V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.32\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 1.4S$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100\mu A$ (Max.) ($V_{DS} = -30V$)
- Enhancement-Mode : $V_{th} = -0.8 \sim -2.0V$
 ($V_{DS} = -10V, I_D = -1mA$)

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|-------|-----------|----------|------|
| Drain-Source Voltage | | V_{DSS} | -30 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | | V_{DGR} | -30 | V |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V |
| Drain Current | DC | I_D | -2 | A |
| | Pulse | I_{DP} | -6 | A |
| Drain Power Dissipation*** | | P_D | 1.5 | W |
| Single Pulse Avalanche Energy** | | E_{AS} | 55 | mJ |
| Avalanche Current | | I_{AR} | -2 | A |
| Repetitive Avalanche Energy* | | E_{AR} | 0.15 | mJ |
| Channel Temperature | | T_{ch} | 150 | °C |
| Storage Temperature Range | | T_{stg} | -55~150 | °C |



Weight : 0.05g (Typ.)

MARKING



THERMAL CHARACTERISTICS

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

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = -25V$, Starting $T_{ch} = 25°C$, $L = 10mH$, $R_G = 25\Omega$, $I_{AR} = -2A$
- *** Mounted on ceramic substrate (1inch² × 0.8t)

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

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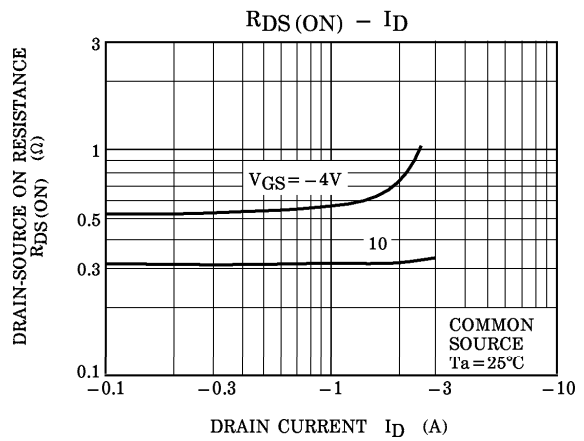
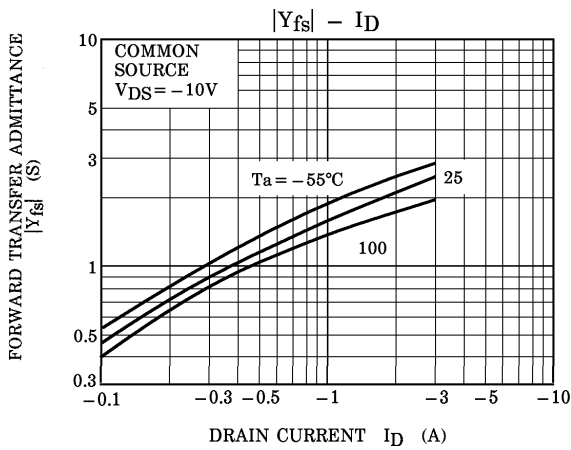
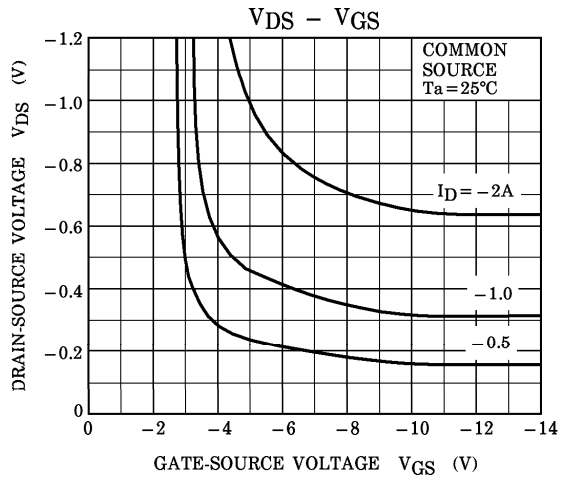
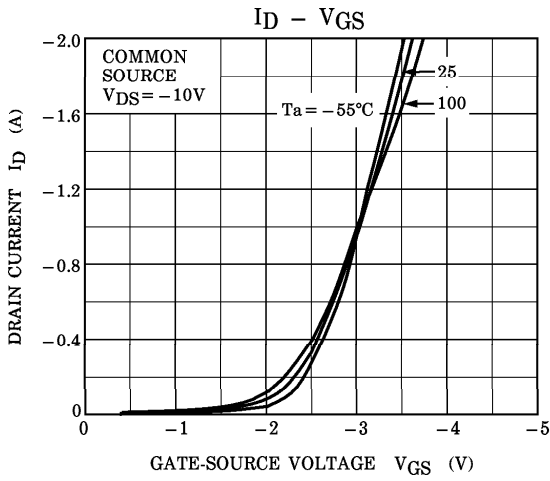
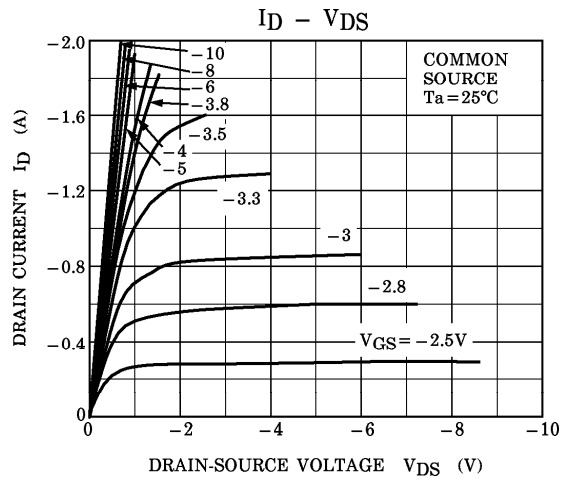
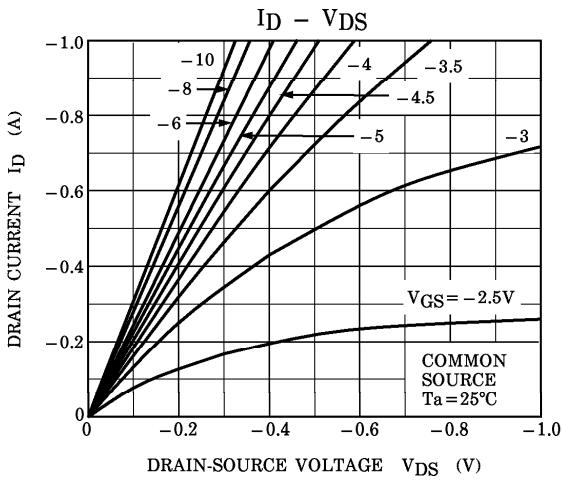
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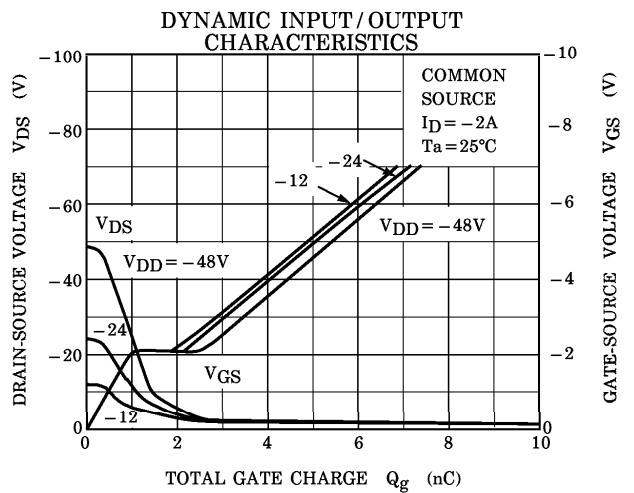
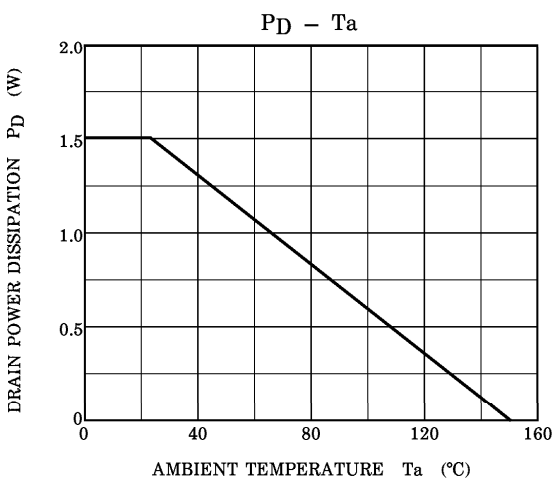
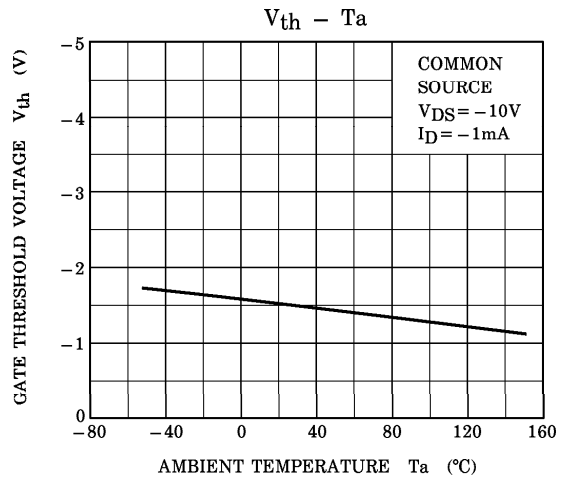
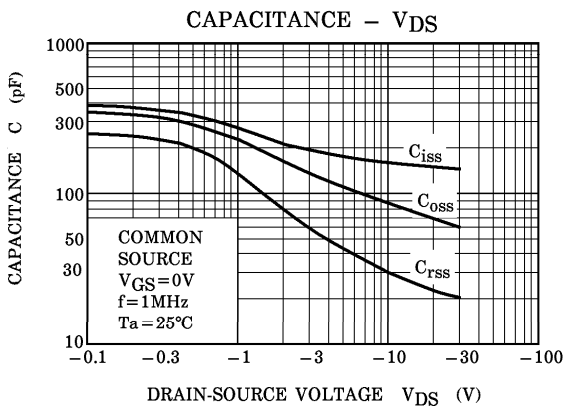
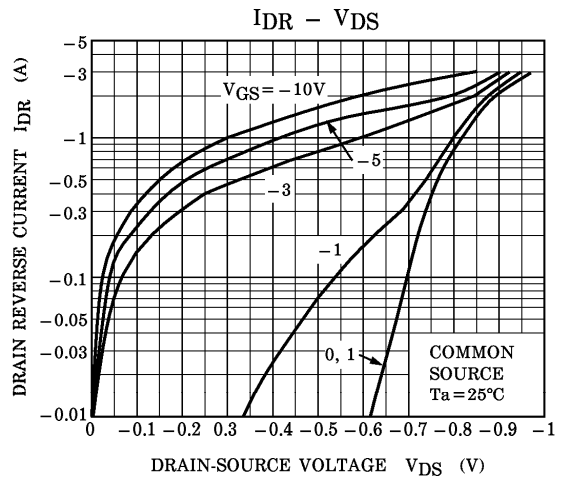
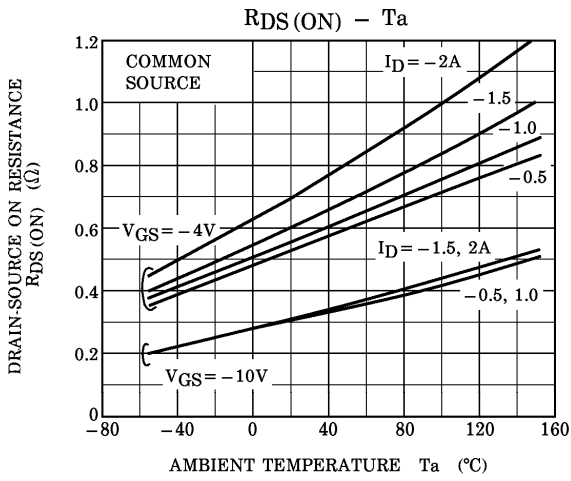
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

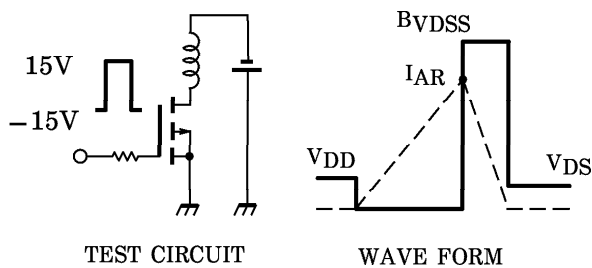
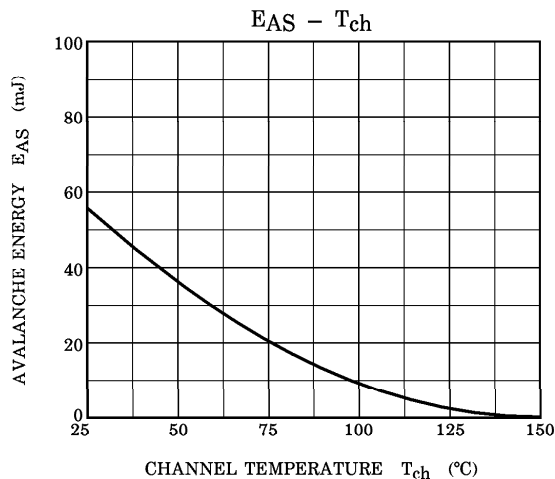
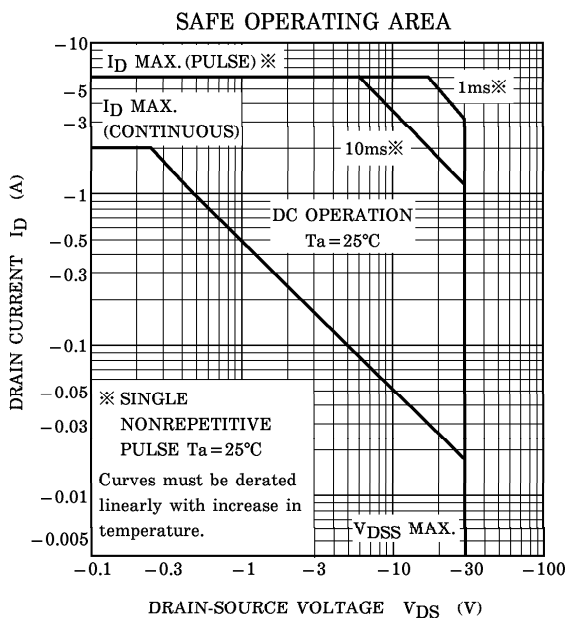
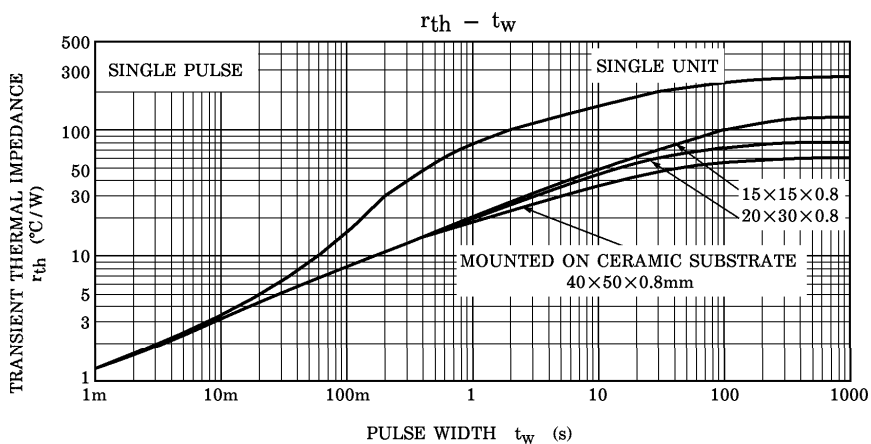
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---------------|---------------|---|------|------|----------|----------|
| Gate Leakage Current | | I_{GSS} | $V_{GS} = \pm 16V, V_{DS} = 0V$ | — | — | ± 10 | μA |
| Drain Cut-off Current | | I_{DSS} | $V_{DS} = -30V, V_{GS} = 0V$ | — | — | -100 | μA |
| Drain-Source Breakdown Voltage | | $V_{(BR)DSS}$ | $I_D = -10mA, V_{GS} = 0V$ | -30 | — | — | V |
| Gate Threshold Voltage | | V_{th} | $V_{DS} = -10V, I_D = -1mA$ | -0.8 | — | -2.0 | V |
| Drain-Source ON Resistance | | $R_{DS(ON)}$ | $V_{GS} = -4V, I_D = -1A$ | — | 0.55 | 0.76 | Ω |
| | | | $V_{GS} = -10V, I_D = -1A$ | — | 0.32 | 0.45 | |
| Forward Transfer Admittance | | $ Y_{fs} $ | $V_{DS} = -10V, I_D = -1A$ | 0.7 | 1.4 | — | S |
| Input Capacitance | | C_{iss} | $V_{DS} = -10V, V_{GS} = 0V,$ $f = 1MHz$ | — | 160 | — | pF |
| Reverse Transfer Capacitance | | C_{rss} | | — | 30 | — | |
| Output Capacitance | | C_{oss} | | — | 85 | — | |
| Switching Time | Rise Time | t_r | | — | 30 | — | ns |
| | Turn-on Time | t_{on} | | — | 45 | — | |
| | Fall Time | t_f | | — | 30 | — | |
| | Turn-off Time | t_{off} | | — | 120 | — | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Q_g | $V_{DD} \doteq -24V, V_{GS} = -10V,$ $I_D = -2A$ | — | 5.5 | — | nC |
| Gate-Source Charge | | Q_{gs} | | — | 4.3 | — | |
| Gate-Drain (“Miller”) Charge | | Q_{gd} | | — | 1.2 | — | |

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

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------|------------------------------|------|------|------|------|
| Continuous Drain Reverse Current | I_{DR} | — | — | — | -2 | A |
| Pulse Drain Reverse Current | I_{DRP} | — | — | — | -6 | A |
| Diode Forward Voltage | V_{DSF} | $I_{DR} = -2A, V_{GS} = 0V$ | — | — | 1.5 | V |
| Reverse Recovery Time | t_{rr} | $I_{DR} = -2A, V_{GS} = 0V$ | — | 40 | — | ns |
| Reverse Recovery Charge | Q_{rr} | $dI_{DR} / dt = 50A / \mu s$ | — | 18 | — | nC |







Peak $I_{AR} = -2A$, $R_G = 25\Omega$, $V_{DD} = -25V$, $L = 10mH$ $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$