

SEMICONDUCTOR
TOSHIBA
TECHNICAL DATA

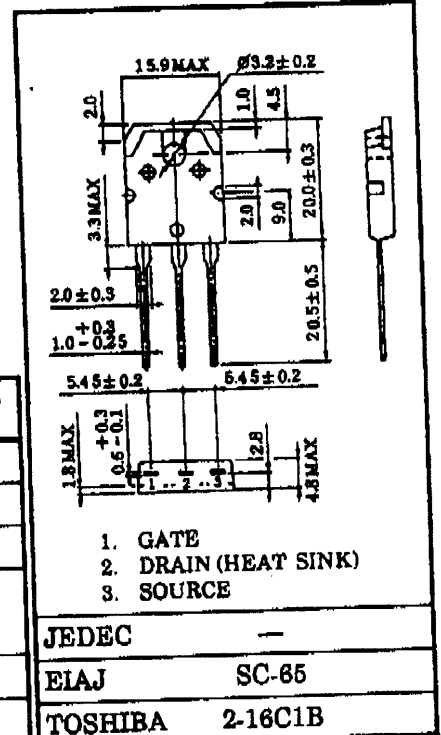
TOSHIBA FIELD EFFECT TRANSISTOR
2SK2039
SILICON N CHANNEL MOS TYPE
(π -MOS II.5)

317-5431

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

INDUSTRIAL APPLICATIONS
Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 1.9\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 1.7S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 300\mu A$ (Max.) @ $V_{DS} = 720V$
- Enhancement-Mode : $V_{th} = 1.5 - 3.5V$ @ $V_{DS} = 10V, I_D = 1mA$



MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|-------|-----------|----------|------------|
| Drain-Source Voltage | | V_{DSS} | 900 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | | V_{DGR} | 900 | V |
| Gate-Source Voltage | | V_{GSS} | ± 30 | V |
| Drain Current | DC | I_D | 5 | A |
| | Pulse | I_{DP} | 15 | |
| Drain Power Dissipation ($T_c = 25^\circ C$) | | P_D | 150 | W |
| Channel Temperature | | T_{ch} | 150 | $^\circ C$ |
| Storage Temperature Range | | T_{stg} | -55~150 | $^\circ C$ |

| | |
|---------------|---------|
| JEDEC | - |
| ELAJ | SC-65 |
| TOSHIBA | 2-16C1B |
| Weight : 4.6g | |

THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|--|----------------|-------|--------------|
| Thermal Resistance, Channel to Case | $R_{th(ch-c)}$ | 0.833 | $^\circ C/W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 50 | $^\circ C/W$ |

THIS TRANSISTOR IS AN ELECTROSTATIC SENSITIVE DEVICE. PLEASE HANDLE WITH CAUTION.

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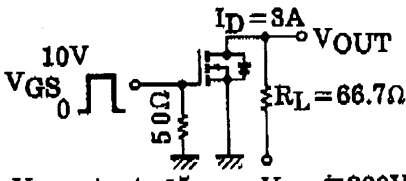
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---------------|----------|---|------|------|------|------|
| Gate Leakage Current | | IGSS | VGS = ±30V, VDS = 0V | — | — | ±100 | nA |
| Drain Cut-off Current | | IDSS | VDS = 720V, VGS = 0V | — | — | 300 | μA |
| Drain-Source Breakdown Voltage | | V(BR)DSS | ID = 10mA, VGS = 0V | 900 | — | — | V |
| Gate Threshold Voltage | | Vth | VDS = 10V, ID = 1mA | 1.5 | — | 3.5 | V |
| Drain-Source ON Resistance | | RDS(ON) | VGS = 10V, ID = 3A | — | 1.9 | 2.5 | Ω |
| Forward Transfer Admittance | | Yfs | VDS = 20V, ID = 3A | 1.0 | 3.0 | — | S |
| Input Capacitance | | Ciss | VDS = 25V, VGS = 0V, f = 1MHz | — | 690 | 980 | pF |
| Reverse Transfer Capacitance | | Crss | | — | 65 | 110 | |
| Output Capacitance | | Coss | | — | 120 | 180 | |
| Switching Time | Rise Time | tr |  | — | 30 | 60 | ns |
| | Turn-on Time | ton | | — | 70 | 140 | |
| | Fall Time | tf | | — | 40 | 80 | |
| | Turn-off Time | toff | | — | 210 | 420 | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Qg | VDD = 400V, VGS = 10V, ID = 5A | — | 55 | 110 | nC |
| Gate-Source Charge | | Qgs | | — | 25 | — | |
| Gate-Drain ("Miller") Charge | | Qgd | | — | 30 | — | |

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

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|--------|-----------------------|------|------|------|------|
| Continuous Drain Reverse Current | IDR | — | — | — | 5 | A |
| Pulse Drain Reverse Current | IDRP | — | — | — | 15 | A |
| Diode Forward Voltage | VDSF | IDR = 5A, VGS = 0V | — | — | -1.9 | V |
| Reverse Recovery Time | trr | IDR = 5A, VGS = 0V | — | 1450 | — | ns |
| Reverse Recovered Charge | Qrr | dIDR / dt = 100A / μs | — | 20 | — | μC |

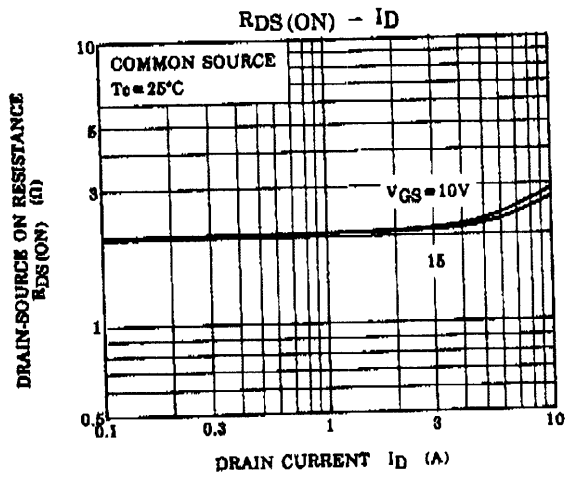
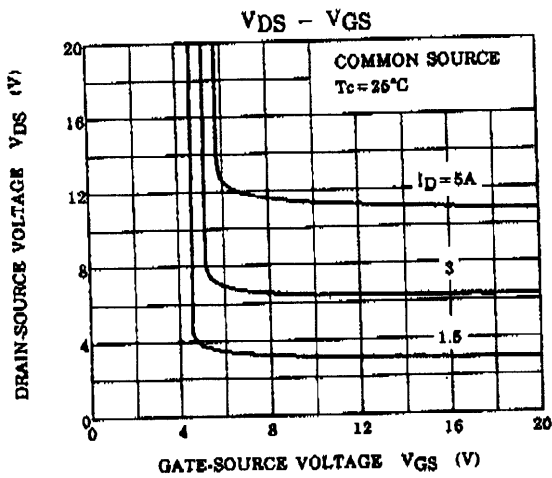
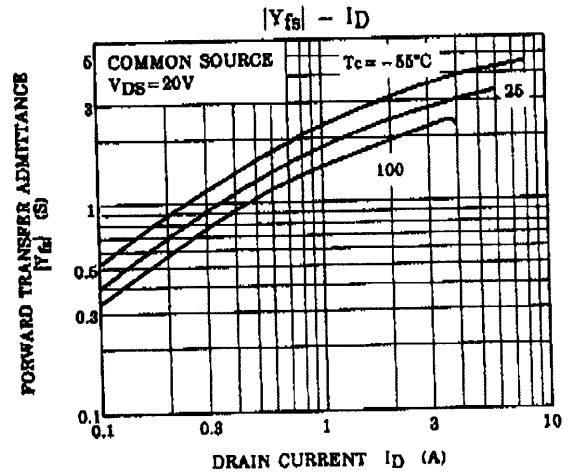
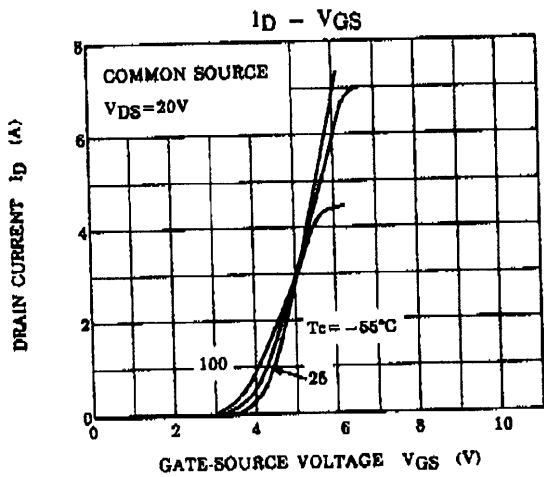
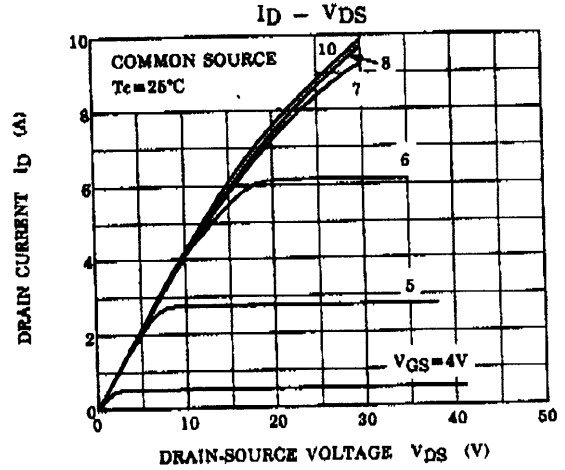
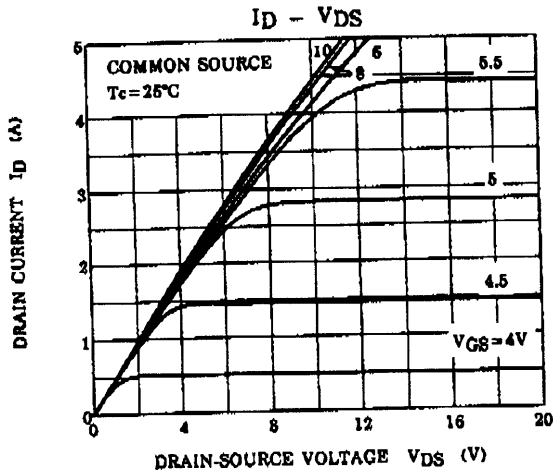
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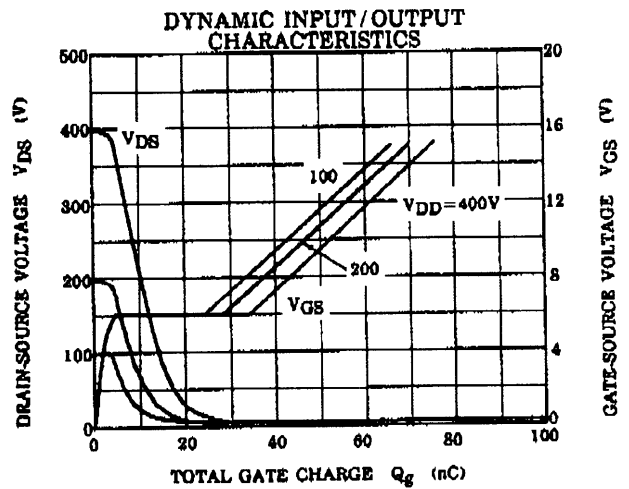
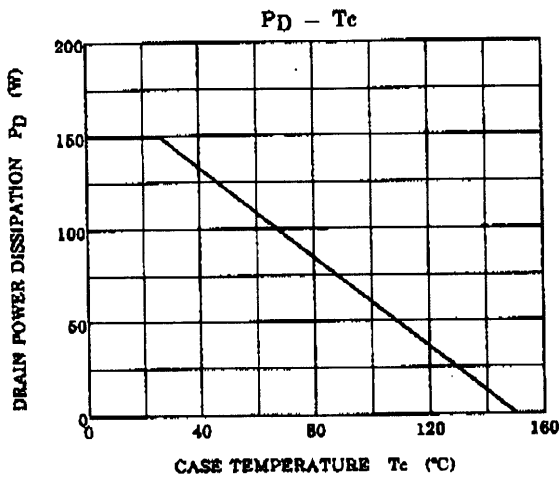
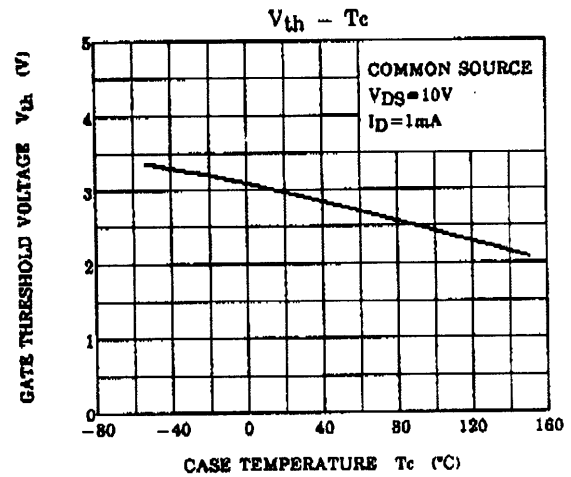
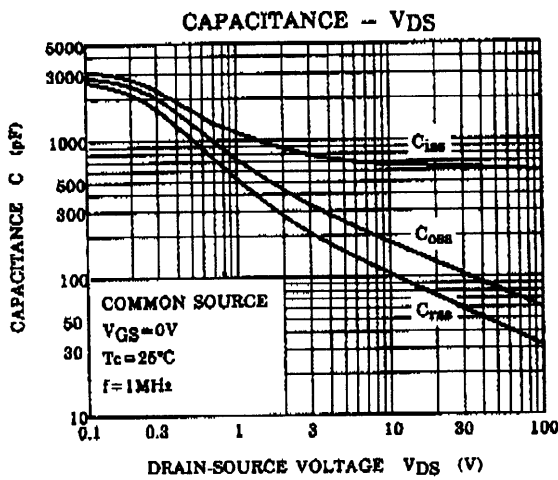
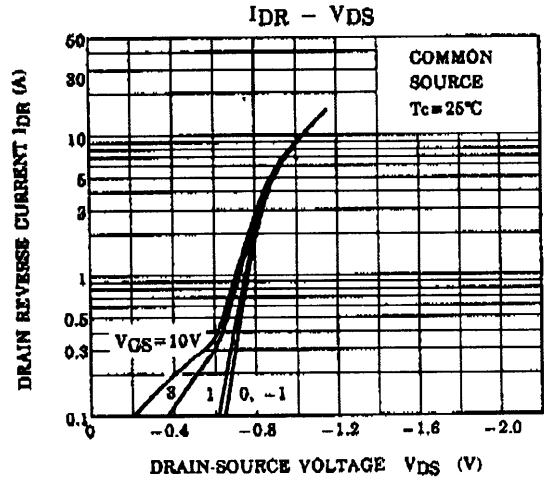
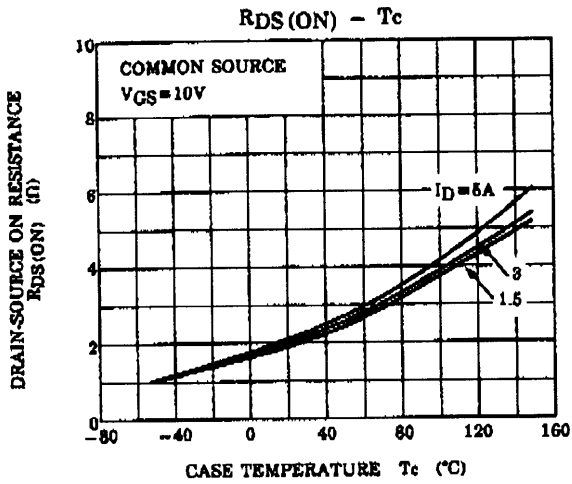
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