

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

2SK2837

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

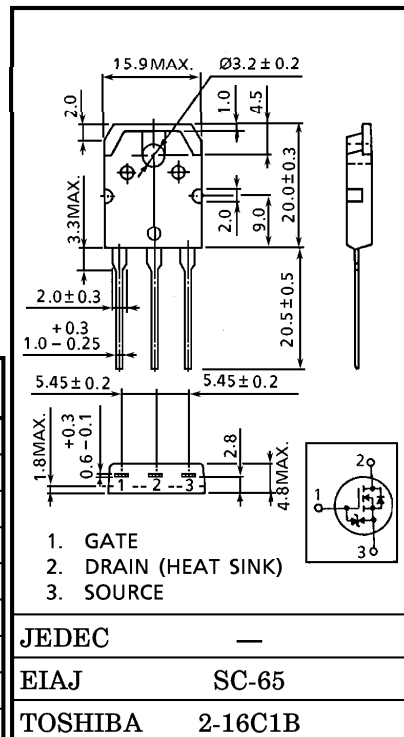
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.21\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 17S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DSS} = 500V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0V$ ($V_{DS} = 10V, I_D = 1mA$)

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

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|-------|-----------|----------------|------------|
| Drain-Source Voltage | | V_{DSS} | 500 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | | V_{DGR} | 500 | V |
| Gate-Source Voltage | | V_{GSS} | ± 30 | V |
| Drain Current | DC | I_D | 20 | A |
| | Pulse | I_{DP} | 80 | A |
| Drain Power Dissipation ($T_c = 25^\circ C$) | | P_D | 150 | W |
| Single Pulse Avalanche Energy** | | E_{AS} | 960 | mJ |
| Avalanche Current | | I_{AR} | 20 | A |
| Repetitive Avalanche Energy* | | E_{AR} | 15 | mJ |
| Channel Temperature | | T_{ch} | 150 | $^\circ C$ |
| Storage Temperature Range | | T_{stg} | $-55 \sim 150$ | $^\circ C$ |



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 | $^\circ C / W$ |

Note ;

* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** $V_{DD} = 90V$, Starting $T_{ch} = 25^\circ C$, $L = 4.08mH$
 $R_G = 25\Omega$, $I_{AR} = 20A$

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

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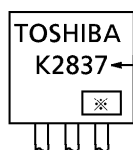
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|---|---------------|--|----------|------|----------|----------|----|
| Gate Leakage Current | I_{GSS} | $V_{GS} = \pm 25V, V_{DS} = 0V$ | — | — | ± 10 | μA | |
| Gate-Source Breakdown Voltage | $V_{(BR)GSS}$ | $I_G = \pm 10\mu A, V_{DS} = 0V$ | ± 30 | — | — | V | |
| Drain Cut-off Current | I_{DSS} | $V_{DS} = 500V, V_{GS} = 0V$ | — | — | 100 | μA | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D = 10mA, V_{GS} = 0V$ | 500 | — | — | V | |
| Gate Threshold Voltage | V_{th} | $V_{DS} = 10V, I_D = 1mA$ | 2.0 | — | 4.0 | V | |
| Drain-Source ON Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 10A$ | — | 0.21 | 0.27 | Ω | |
| Forward Transfer Admittance | $ Y_{fs} $ | $V_{DS} = 10V, I_D = 10A$ | 10 | 17 | — | S | |
| Input Capacitance | C_{iss} | $V_{DS} = 10V, V_{GS} = 0V,$ $f = 1MHz$ | — | 3720 | — | pF | |
| Reverse Transfer Capacitance | C_{rss} | | — | 340 | — | | |
| Output Capacitance | C_{oss} | | — | 1165 | — | | |
| Switching Time | Rise Time | t_r | | — | 30 | — | ns |
| | Turn-on Time | t_{on} | | — | 70 | — | |
| | Fall Time | t_f | | — | 50 | — | |
| | Turn-off Time | t_{off} | | — | 290 | — | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | Q_g | $V_{DD} = 400V, V_{GS} = 10V,$ $I_D = 6A$ | — | 80 | — | nC | |
| Gate-Source Charge | Q_{gs} | | — | 48 | — | | |
| Gate-Drain ("Miller") Charge | Q_{gd} | | — | 32 | — | | |

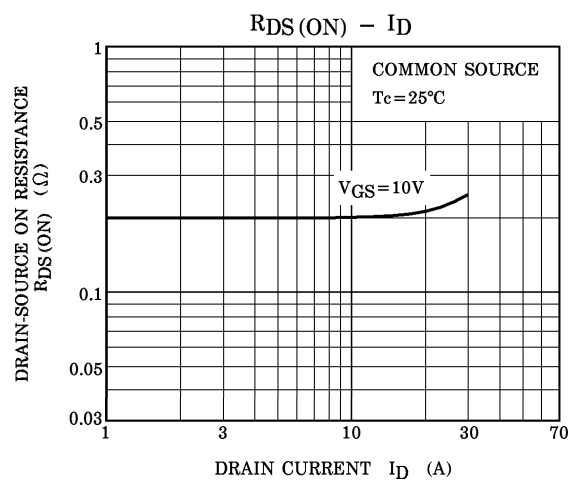
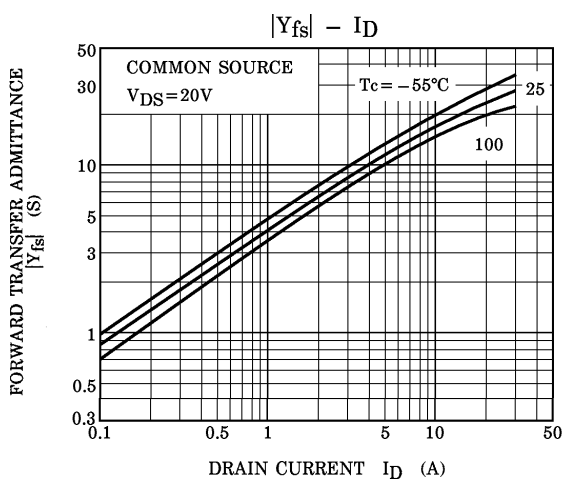
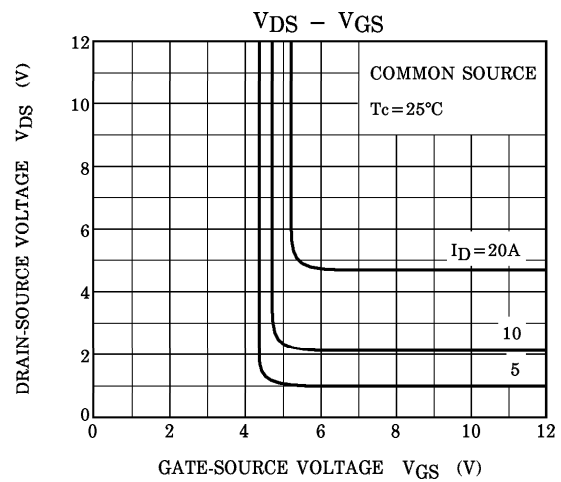
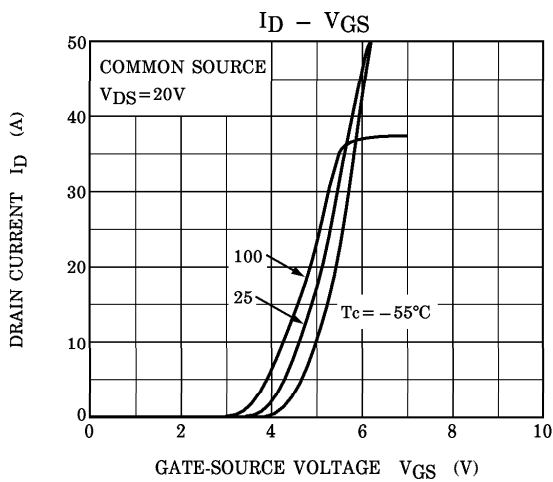
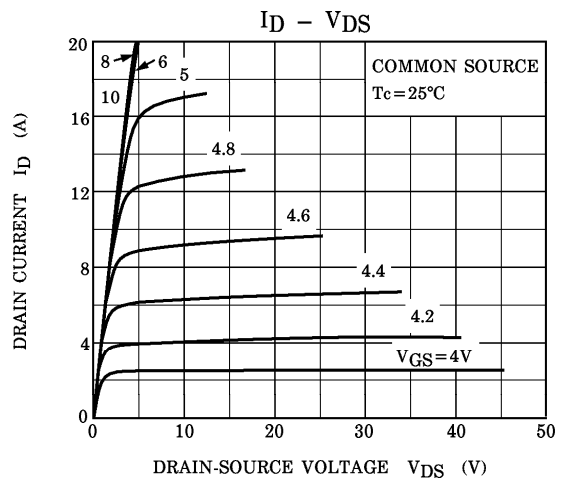
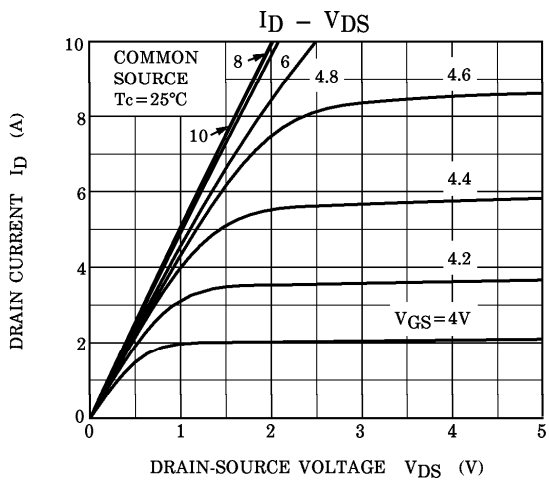
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

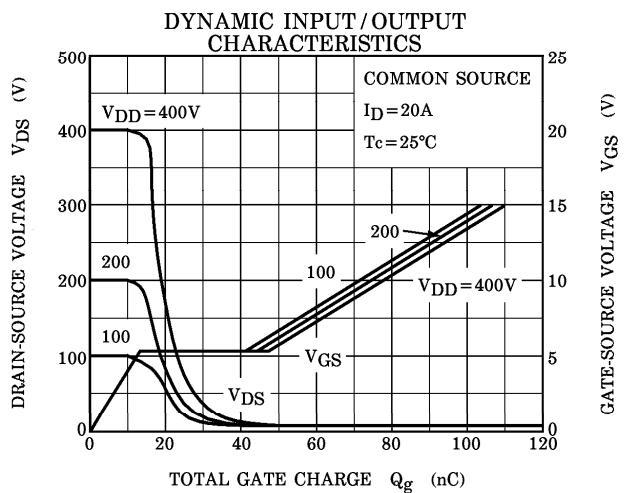
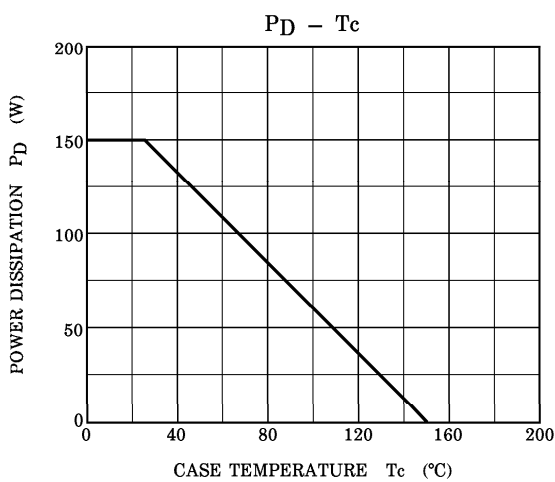
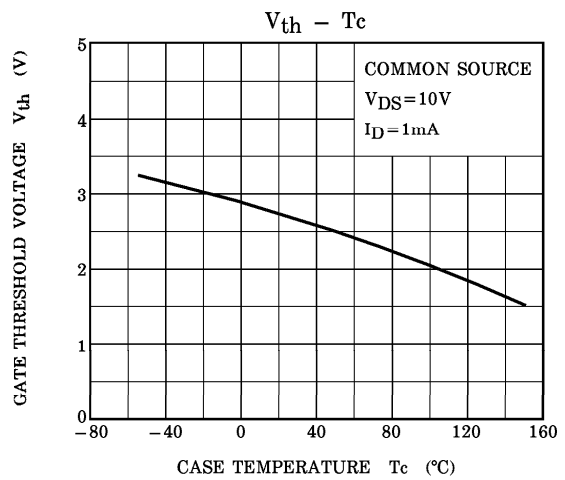
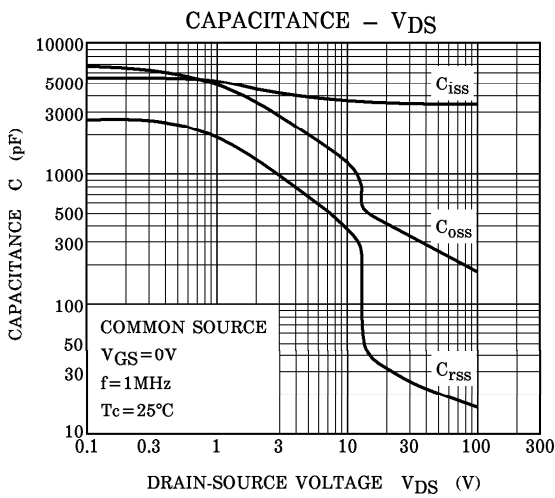
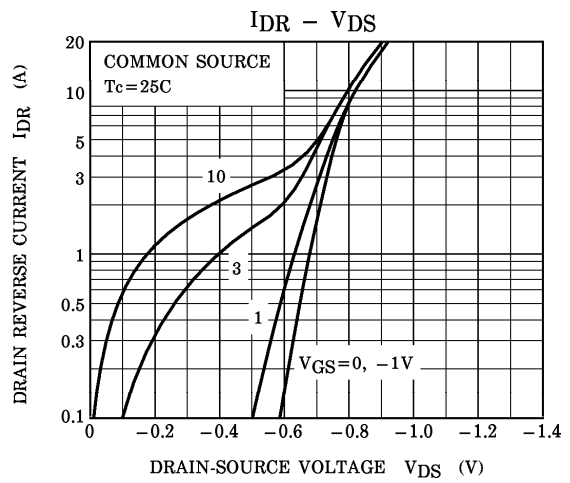
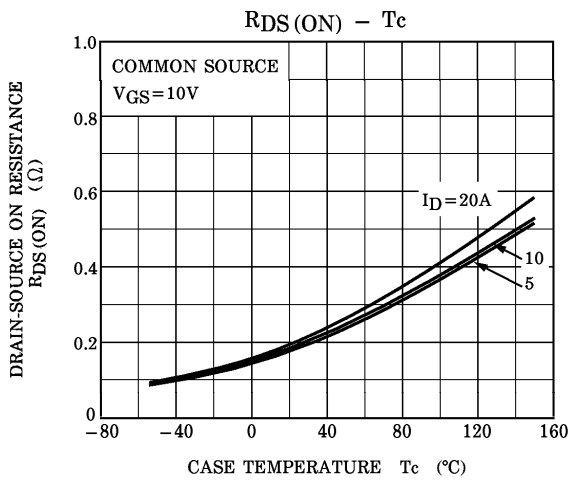
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------|--|------|------|------|---------|
| Continuous Drain Reverse Current | I_{DR} | — | — | — | 20 | A |
| Pulse Drain Reverse Current | I_{DRP} | — | — | — | 80 | A |
| Diode Forward Voltage | V_{DSF} | $I_{DR} = 20A, V_{GS} = 0V$ | — | — | -1.7 | V |
| Reverse Recovery Time | t_{rr} | $I_{DR} = 20A, V_{GS} = 0V$ $dI_{DR} / dt = 100A / \mu s$ | — | 540 | — | ns |
| Reverse Recovery Charge | Q_{rr} | | — | 5.4 | — | μC |

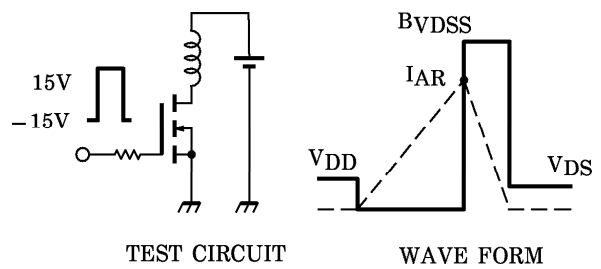
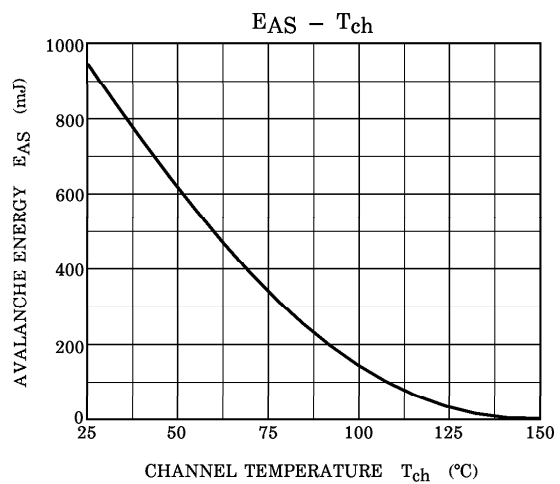
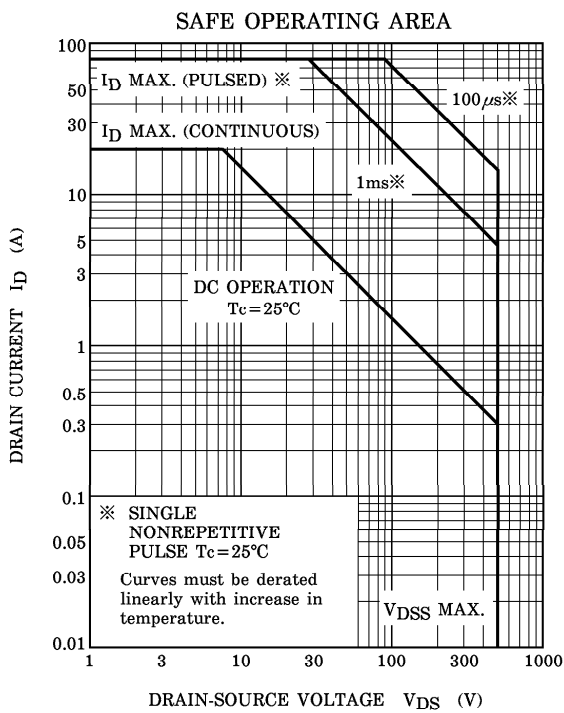
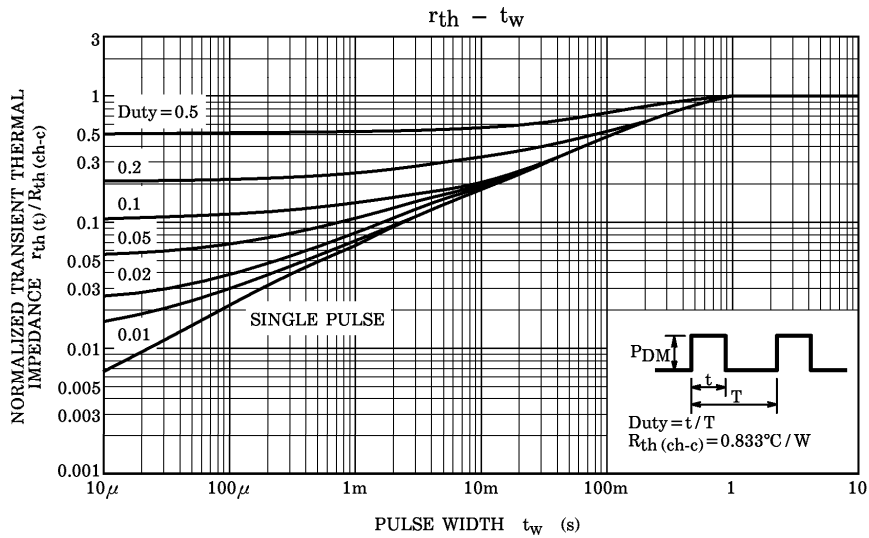
MARKING



TYPE →
 ※ Lot Number
 □ □ — Month (Starting from Alphabet A)
 — Year (Last Number of the Christian Era)







Peak $I_{AR} = 20A$, $R_G = 25\Omega$, $V_{DD} = 90V$, $L = 4.08mH$

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