

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSIII)

# 2SK2719

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

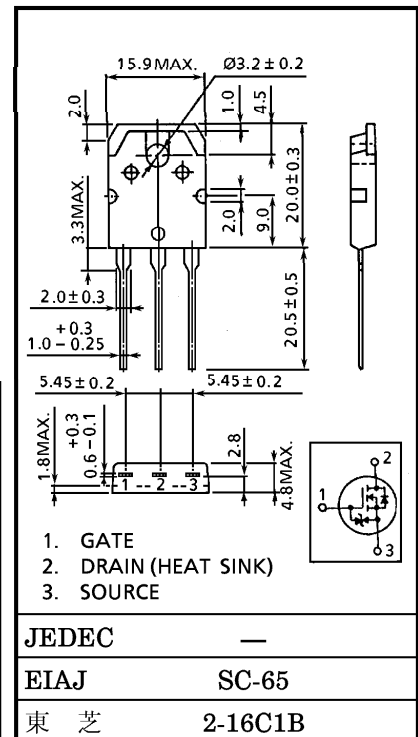
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 3.7\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 2.6S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 720V$ )
- 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                           |       | $V_{DSS}$ | 900            | V          |
| Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )    |       | $V_{DGR}$ | 900            | V          |
| Gate-Source Voltage                            |       | $V_{GSS}$ | $\pm 30$       | V          |
| Drain Current                                  | DC    | $I_D$     | 3              | A          |
|  | Pulse | $I_{DP}$  | 9              |            |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) |       | $P_D$     | 125            | W          |
| Single Pulse Avalanche Energy**                |       | $E_{AS}$  | 295            | mJ         |
| Avalanche Current                              |       | $I_{AR}$  | 3              | A          |
| Repetitive Avalanche Energy*                   |       | $E_{AR}$  | 12.5           | 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    | $R_{th(ch-c)}$ | 1.0  | $^\circ C / W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 50.0 | $^\circ C / W$ |

Note ;

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

\*\*  $V_{DD} = 90V$ , Starting  $T_{ch} = 25^\circ C$ ,  $L = 60mH$ ,  $R_G = 25\Omega$ ,  $I_{AR} = 3A$

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

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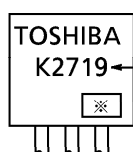
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  |               | SYMBOL           | TEST CONDITION  | MIN.   | TYP. | MAX. | UNIT |
|---|---------------|------------------|---|--|------|------|------|
| Gate Leakage Current                            |               | IGSS             | VGS = ±30V, VDS = 0V  | —  | —    | ±10  | μA   |
| Gate-Source Breakdown Voltage                   |               | V(BR)GSS         | IG = ±10μA, VDS = 0V  | ±30  | —    | —    | V    |
| Drain Cut-off Current                           |               | IDSS             | VDS = 720V, VGS = 0V  | —  | —    | 100  | μA   |
| Drain-Source Breakdown Voltage                  |               | V(BR)DSS         | ID = 10mA, VGS = 0V   | 900  | —    | —    | V    |
| Gate Threshold Voltage                          |               | Vth              | VDS = 10V, ID = 1mA   | 2.0  | —    | 4.0  | V    |
| Drain-Source ON Resistance                      |               | RDS(ON)          | VGS = 10V, ID = 1.5A  | —  | 3.7  | 4.3  | Ω    |
| Forward Transfer Admittance                     |               | Yfs              | VDS = 20V, ID = 1.5A  | 0.65   | 2.6  | —    | S    |
| Input Capacitance                               |               | Ciss             | VDS = 25V, VGS = 0V, f = 1MHz   | —  | 750  | —    | pF   |
| Reverse Transfer Capacitance                    |               | Crss             |   | —  | 10   | —    |      |
| Output Capacitance                              |               | Coss             |   | —  | 70   | —    |      |
| Switching Time                                  | Rise Time     | tr               | <p> <math>I_D = 15A</math><br/> <math>V_{GS} = 10V</math><br/> <math>V_{GS} = 0V</math><br/> <math>R_L = 133\Omega</math><br/> <math>V_{DD} \doteq 200V</math> </p> | —  | 15   | —    | ns   |
|   | Turn-on Time  | ton              |   | —  | 55   | —    |      |
|   | Fall Time     | tf               |   | —  | 30   | —    |      |
|   | Turn-off Time | t <sub>off</sub> |   | $V_{IN} : t_r, t_f < 5ns,$<br>$Duty \leq 1\%, t_w = 10\mu s$ | —    | 110  |      |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | Qg               | VDD ≐ 400V, VGS = 10V, ID = 3A  | —  | 25   | —    | nC   |
| Gate-Source Charge                              |               | Qgs              |   | —  | 13   | —    |      |
| Gate-Drain ("Miller") Charge                    |               | Qgd              |   | —  | 12   | —    |      |

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

| CHARACTERISTIC                   | SYMBOL          | TEST CONDITION        | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------------|-----------------------|------|------|------|------|
| Continuous Drain Reverse Current | IDR             | —                     | —    | —    | 3    | A    |
| Pulse Drain Reverse Current      | IDRP            | —                     | —    | —    | 9    | A    |
| Diode Forward Voltage            | VDSF            | IDR = 3A, VGS = 0V    | —    | —    | -1.9 | V    |
| Reverse Recovery Time            | t <sub>rr</sub> | IDR = 3A, VGS = 0V    | —    | 1100 | —    | ns   |
| Reverse Recovery Charge          | Q <sub>rr</sub> | dIDR / dt = 100A / μs | —    | 7.5  | —    | μC   |

MARKING

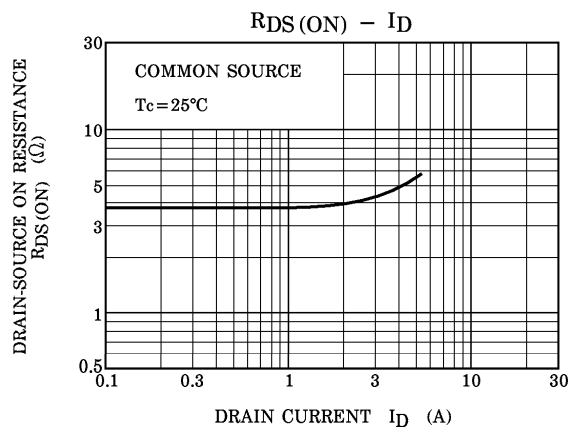
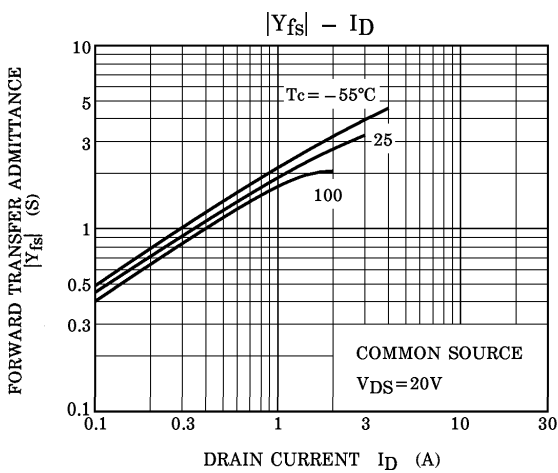
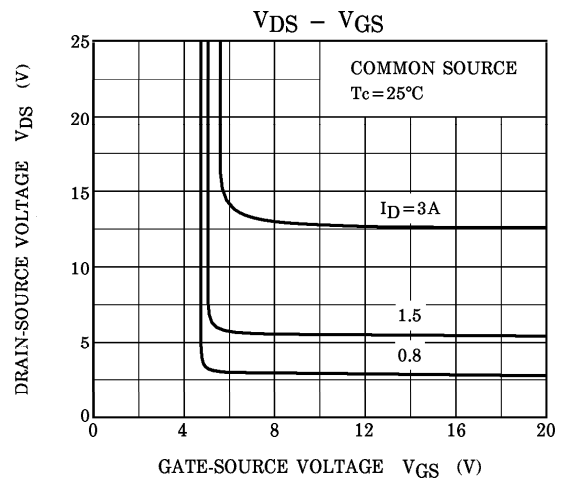
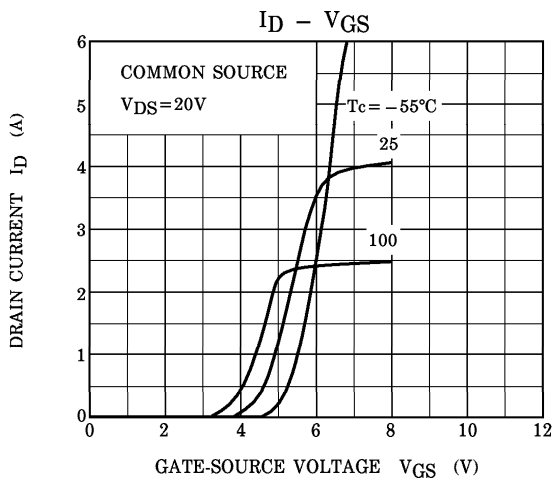
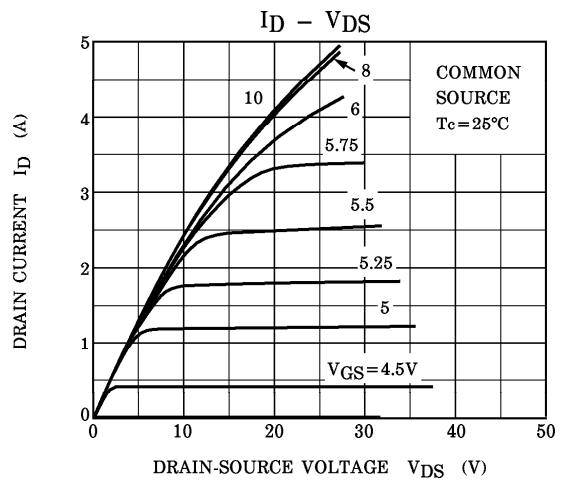
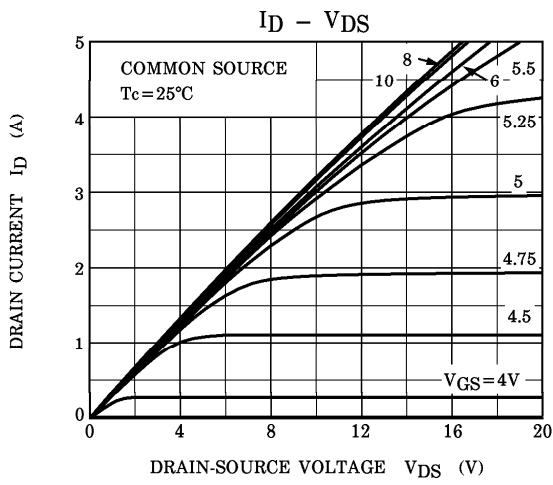


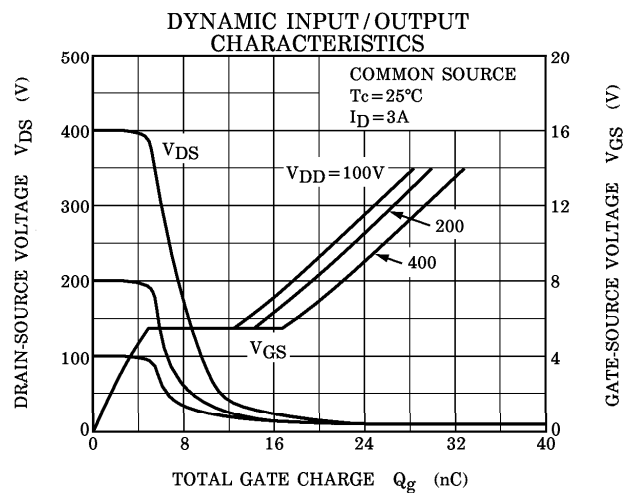
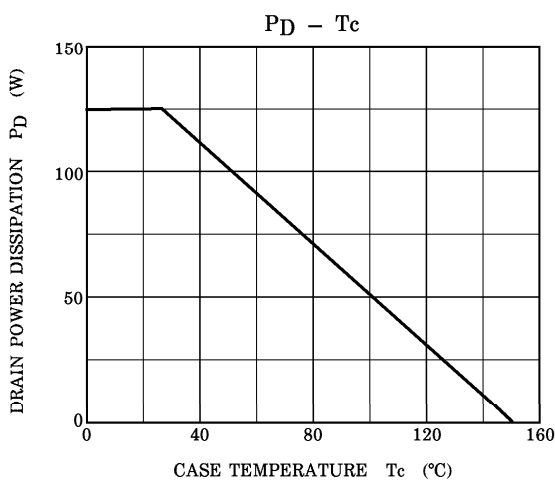
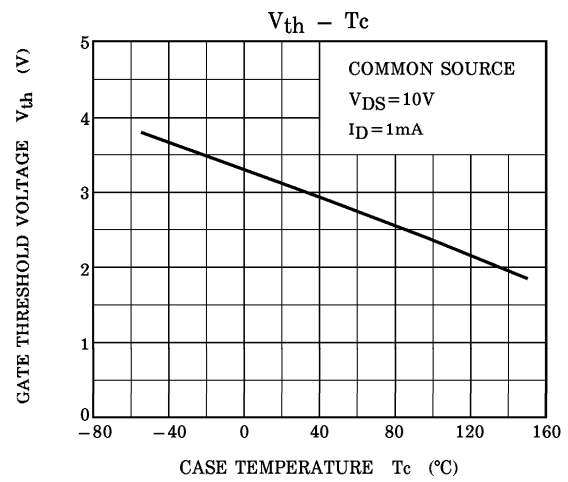
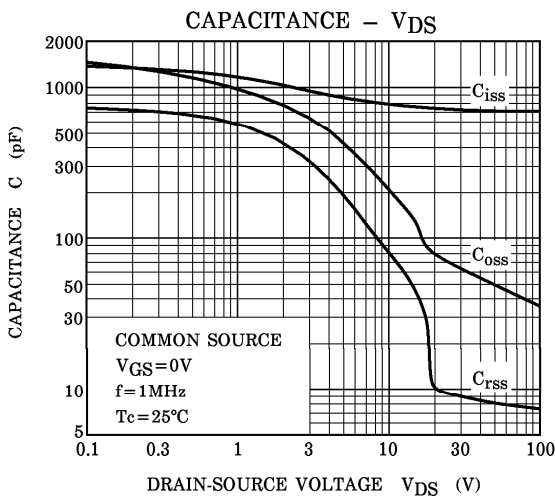
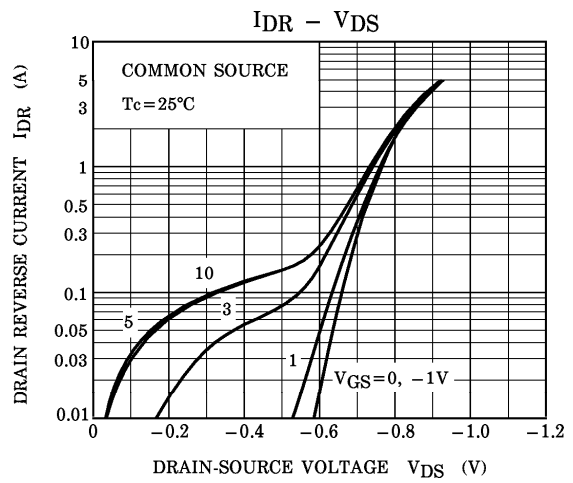
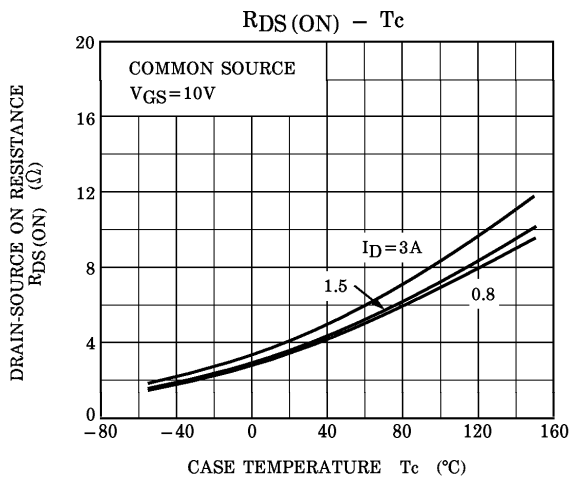
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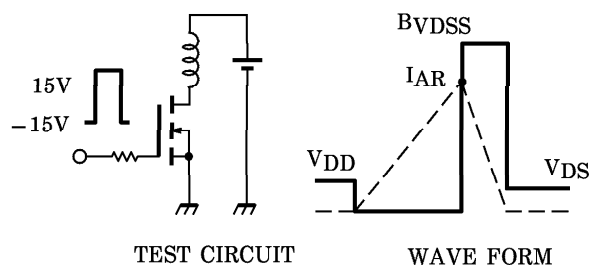
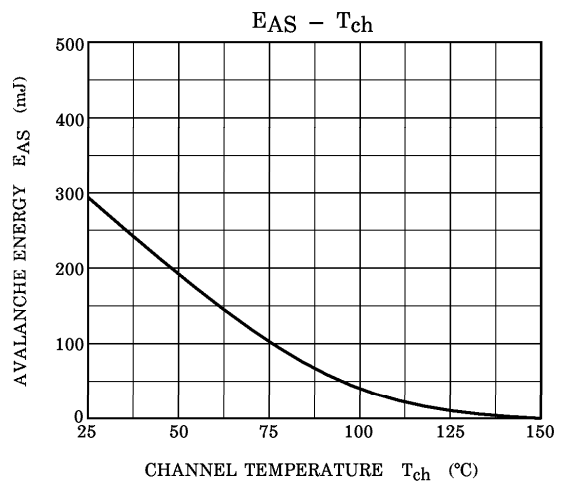
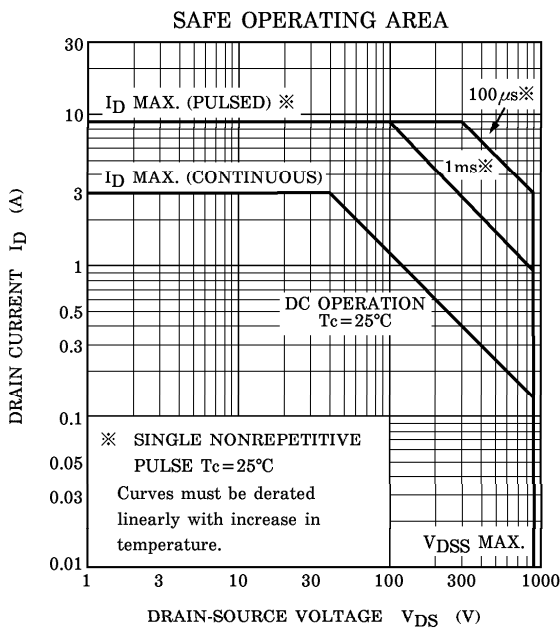
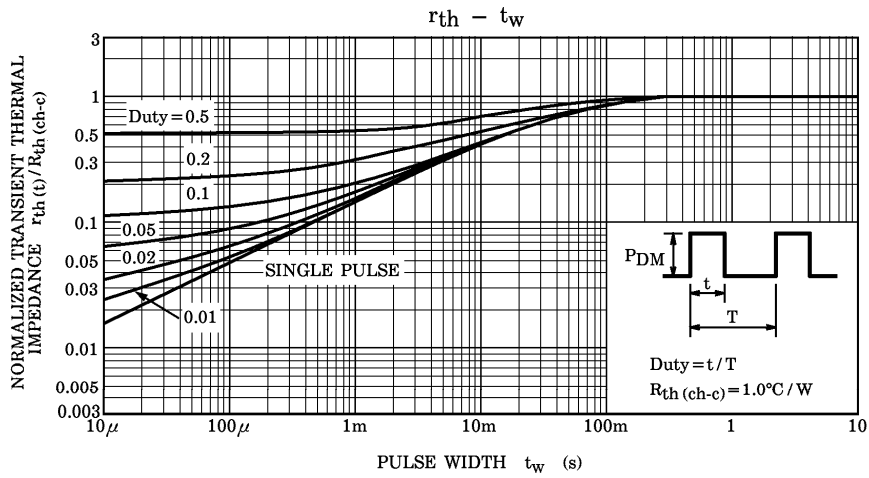
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 3A$ ,  $R_G = 25\Omega$   
 $V_{DD} = 90V$ ,  $L = 60mH$

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