

**TOSHIBA**

**2SK2886**

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

# 2SK2886

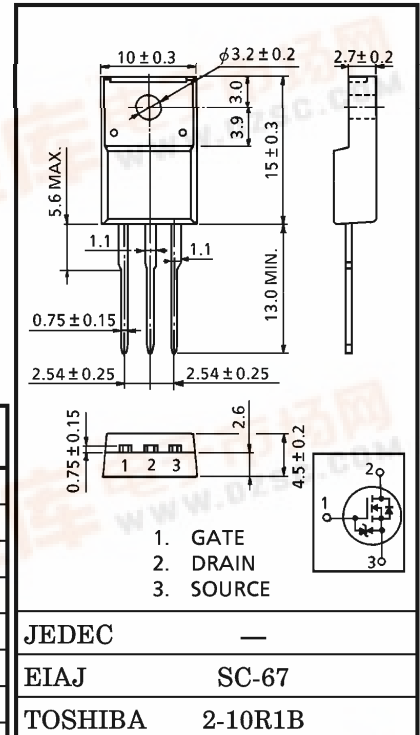
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATORS, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 14m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 31S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 50V$ )
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0V$  ( $V_{DS} = 10V, I_D = 1mA$ )



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

| CHARACTERISTIC                                 |       | SYMBOL    | RATING         | UNIT       |
|--|-------|-----------|----------------|------------|
| Drain-Source Voltage                           |       | $V_{DSS}$ | 50             | V          |
| Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )    |       | $V_{DGR}$ | 50             | V          |
| Gate-Source Voltage                            |       | $V_{GSS}$ | $\pm 20$       | V          |
| Drain Current                                  | DC    | $I_D$     | 45             | A          |
|  | Pulse | $I_{DP}$  | 135            | A          |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) |       | $P_D$     | 40             | W          |
| Single Pulse Avalanche Energy**                |       | $E_{AS}$  | 350            | mJ         |
| Avalanche Current                              |       | $I_{AR}$  | 45             | A          |
| Repetitive Avalanche Energy*                   |       | $E_{AR}$  | 4              | mJ         |
| Channel Temperature                            |       | $T_{ch}$  | 150            | $^\circ C$ |
| Storage Temperature Range                      |       | $T_{stg}$ | $-55 \sim 150$ | $^\circ C$ |

THERMAL CHARACTERISTICS

| CHARACTERISTIC                         | SYMBOL         | MAX.  | UNIT           |
|--|----------------|-------|----------------|
| Thermal Resistance, Channel to Case    | $R_{th(ch-c)}$ | 3.125 | $^\circ C / W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 62.5  | $^\circ C / W$ |

Note ;

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

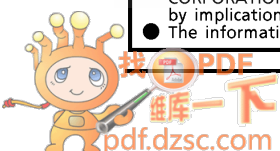
\*\*  $V_{DD} = 25V$ , Starting  $T_{ch} = 25^\circ C$ ,  $L = 213\mu H$ ,  $R_G = 25\Omega$ ,  $I_{AR} = 45A$

**This transistor is an electrostatic sensitive device.**

**Please handle with caution.**

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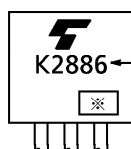
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  |               | SYMBOL           | TEST CONDITION                 | MIN. | TYP. | MAX. | UNIT |
|---|---------------|------------------|--------------------------------|------|------|------|------|
| Gate Leakage Current                            |               | IGSS             | VGS = ±16V, VDS = 0V           | —    | —    | ±10  | μA   |
| Drain Cut-off Current                           |               | IDSS             | VDS = 50V, VGS = 0V            | —    | —    | 100  | μA   |
| Drain-Source Breakdown Voltage                  |               | V(BR)DSS         | ID = 10mA, VGS = 0V            | 50   | —    | —    | V    |
| Gate Threshold Voltage                          |               | Vth              | VDS = 10V, ID = 1mA            | 0.8  | —    | 2.0  | V    |
| Drain-Source ON Resistance                      |               | RDS(ON)          | VGS = 4V, ID = 25A             | —    | 27   | 36   | mΩ   |
|   |               | RDS(ON)          | VGS = 10V, ID = 25A            | —    | 14   | 20   |      |
| Forward Transfer Admittance                     |               | Yfs              | VDS = 10V, ID = 25A            | 18   | 31   | —    | S    |
| Input Capacitance                               |               | Ciss             | VDS = 10V, VGS = 0V, f = 1MHz  | —    | 2200 | —    | pF   |
| Reverse Transfer Capacitance                    |               | Crss             |                                | —    | 390  | —    |      |
| Output Capacitance                              |               | Coss             |                                | —    | 1090 | —    |      |
| Switching Time                                  | Rise Time     | tr               |                                | —    | 40   | —    | ns   |
|   | Turn-on Time  | ton              |                                | —    | 70   | —    |      |
|   | Fall Time     | tf               |                                | —    | 130  | —    |      |
|   | Turn-off Time | t <sub>off</sub> |                                | —    | 360  | —    |      |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | Qg               | VDD = 40V, VGS = 10V, ID = 45A | —    | 66   | —    | nC   |
| Gate-Source Charge                              |               | Qgs              |                                | —    | 43   | —    |      |
| Gate-Drain ("Miller") Charge                    |               | Qgd              |                                | —    | 23   | —    |      |

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

| CHARACTERISTIC                   | SYMBOL          | TEST CONDITION       | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------------|----------------------|------|------|------|------|
| Continuous Drain Reverse Current | IDR             | —                    | —    | —    | 45   | A    |
| Pulse Drain Reverse Current      | IDRP            | —                    | —    | —    | 135  | A    |
| Diode Forward Voltage            | VDSF            | IDR = 45A, VGS = 0V  | —    | —    | -1.7 | V    |
| Reverse Recovery Time            | t <sub>rr</sub> | IDR = 45A, VGS = 0V  | —    | 78   | —    | ns   |
| Reverse Recovery Charge          | Q <sub>rr</sub> | dIDR / dt = 50A / μs | —    | 90   | —    | nC   |

MARKING

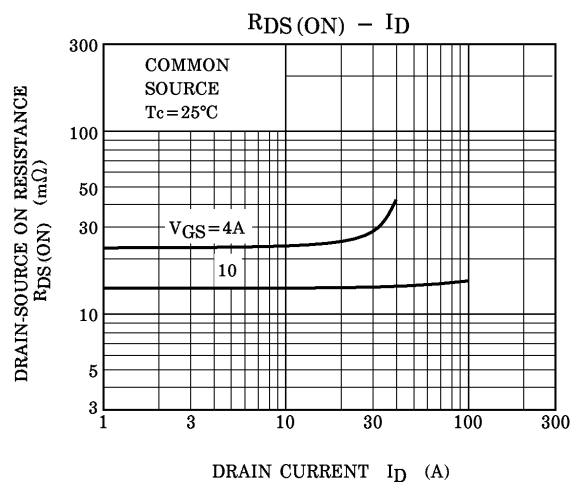
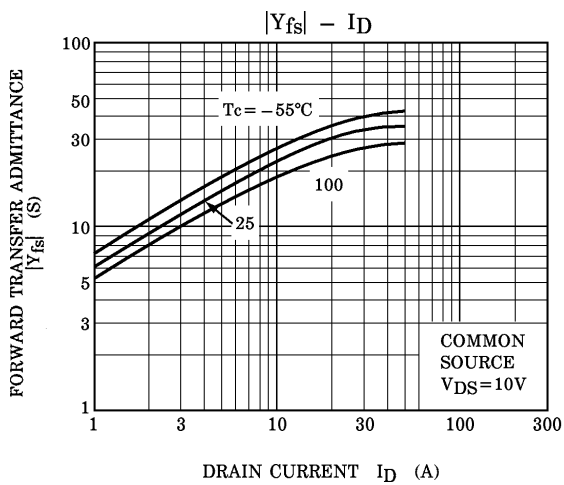
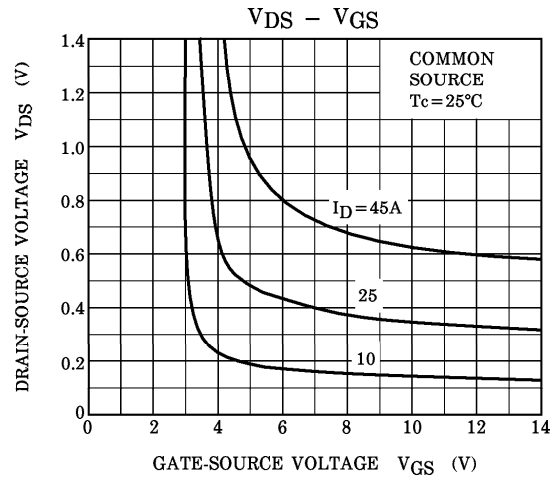
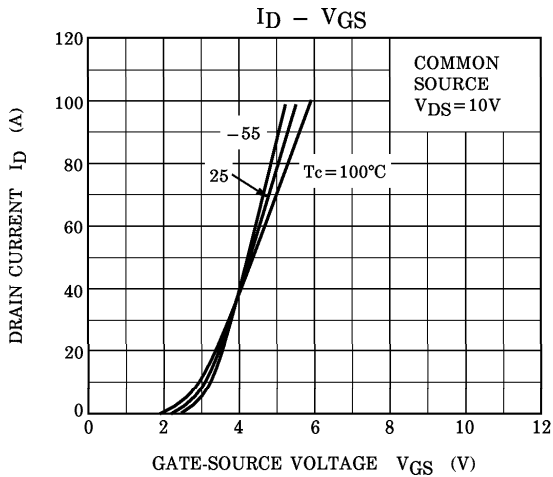
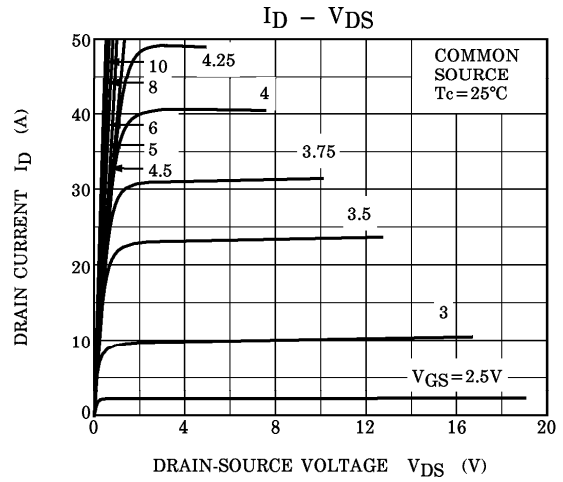
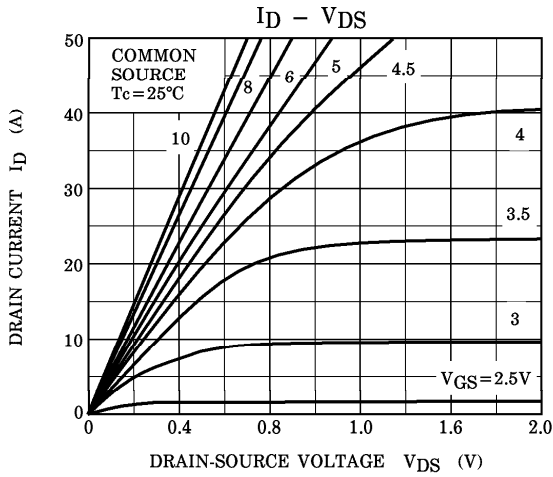


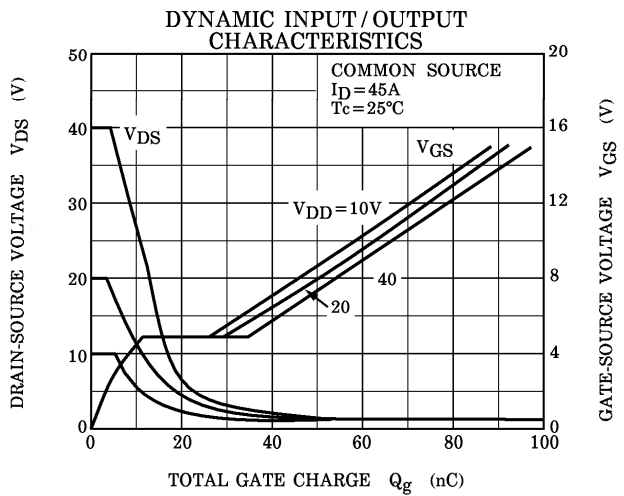
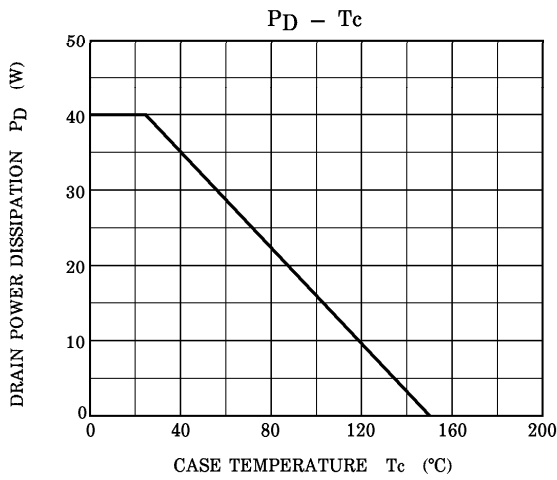
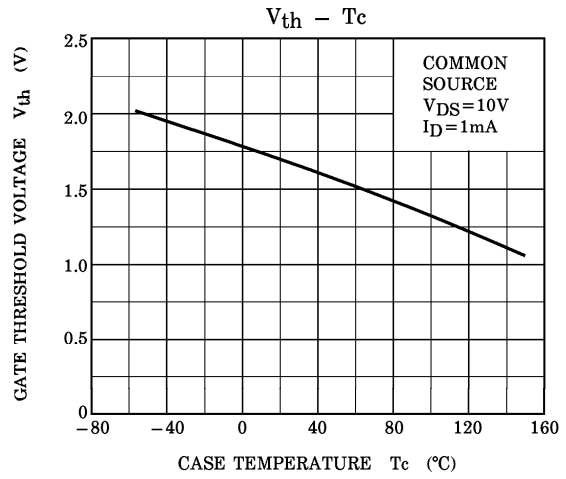
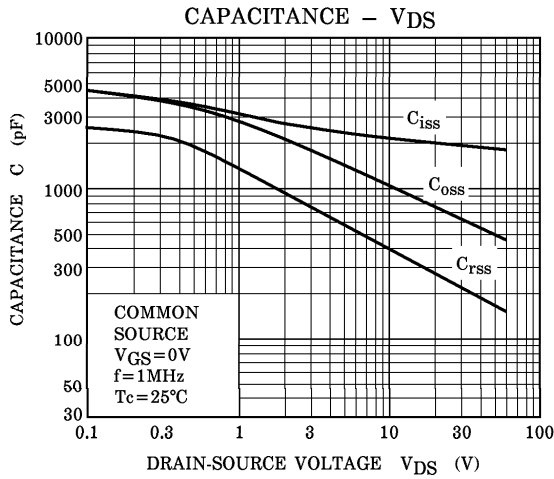
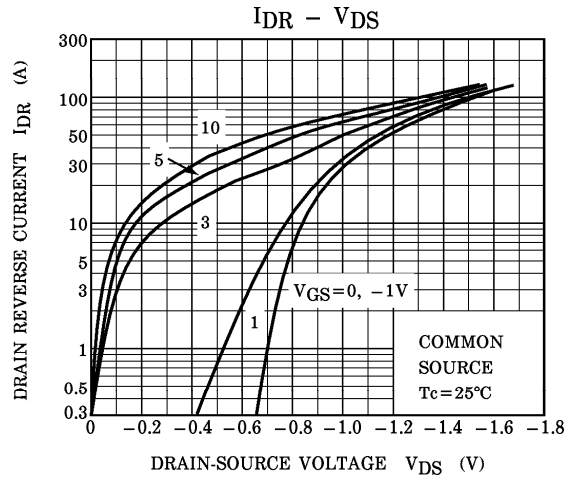
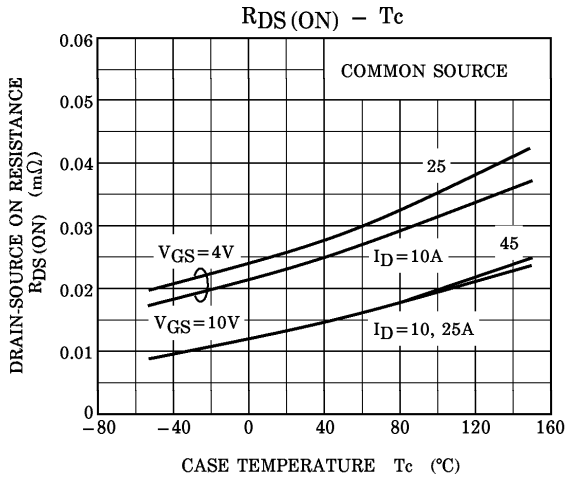
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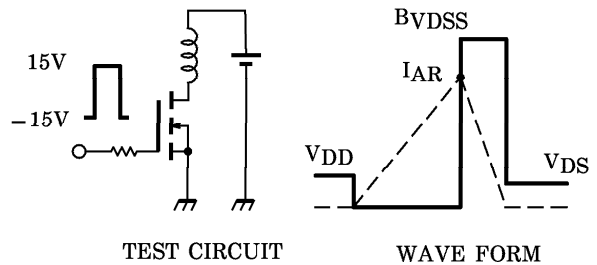
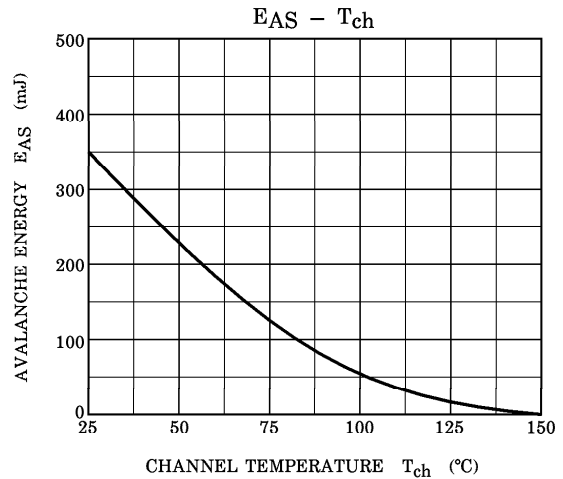
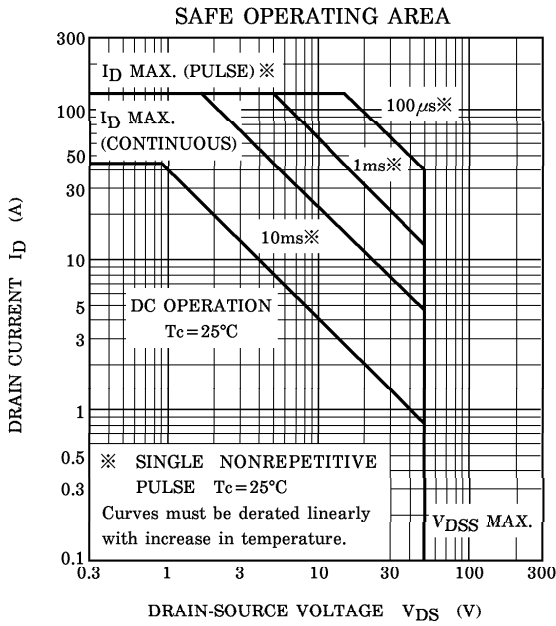
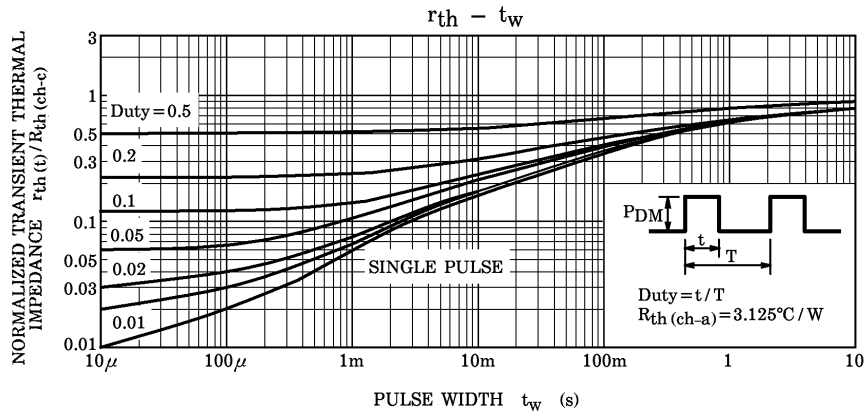
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 45A$ ,  $R_G = 25\Omega$ ,  $V_{DD} = 25V$ ,  $L = 213\mu H$

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