

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L<sup>2</sup>-π-MOS V)

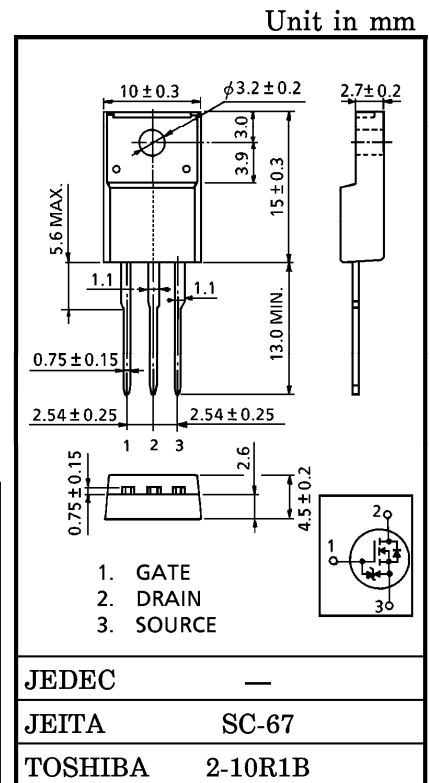
# 2SK2882

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- 4 V Gate Drive
- Low Drain-Source On Resistance :  $R_{DS(ON)} = 0.08 \Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 17 S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100 \mu A$  (Max.) ( $V_{DS} = 150 V$ )
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0 V$   
( $V_{DS} = 10 V, I_D = 1 mA$ )

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

| CHARACTERISTIC                                 | SYMBOL         | RATING         | UNIT       |
|--|----------------|----------------|------------|
| Drain-Source Voltage                           | $V_{DSS}$      | 150            | V          |
| Drain-Gate Voltage ( $R_{GS} = 20 k\Omega$ )   | $V_{DGR}$      | 150            | V          |
| Gate-Source Voltage                            | $V_{GSS}$      | $\pm 20$       | V          |
| Drain Current                                  | DC (Note 1)    | $I_D$          | 18 A       |
|  | Pulse (Note 1) | $I_{DP}$       | 54 A       |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) | $P_D$          | 45             | W          |
| Single Pulse Avalanche Energy (Note 2)         | $E_{AS}$       | 176            | mJ         |
| Avalanche Current                              | $I_{AR}$       | 18             | A          |
| Repetitive Avalanche Energy (Note 3)           | $E_{AR}$       | 4.5            | mJ         |
| Channel Temperature                            | $T_{ch}$       | 150            | $^\circ C$ |
| Storage Temperature Range                      | $T_{stg}$      | $-55 \sim 150$ | $^\circ C$ |



Weight : 1.9 g (Typ.)

THERMAL CHARACTERISTICS

| CHARACTERISTIC                         | SYMBOL         | MAX. | UNIT           |
|--|----------------|------|----------------|
| Thermal Resistance, Channel to Case    | $R_{th(ch-c)}$ | 2.78 | $^\circ C / W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 62.5 | $^\circ C / W$ |

- (Note 1) : Please use devices on condition that the channel temperature is below 150 $^\circ C$ .  
 (Note 2) :  $V_{DD} = 50 V, T_{ch} = 25^\circ C$  (initial),  $L = 0.8 mH, R_G = 25 \Omega, I_{AR} = 18 A$   
 (Note 3) : Repetitive rating ; Pulse Width Limited by maximum junction temperature.

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

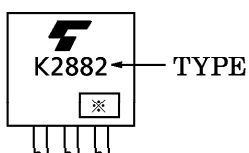
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  |               | SYMBOL        | TEST CONDITION  | MIN.                                      | TYP. | MAX.     | UNIT          |
|---|---------------|---------------|---|---|------|----------|---------------|
| Gate Leakage Current                            |               | $I_{GSS}$     | $V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$                       | —   | —    | $\pm 10$ | $\mu\text{A}$ |
| Drain Cut-off Current                           |               | $I_{DSS}$     | $V_{DS} = 150\text{ V}, V_{GS} = 0\text{ V}$                          | —   | —    | 100      | $\mu\text{A}$ |
| Drain-Source Breakdown Voltage                  |               | $V_{(BR)DSS}$ | $I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$                             | 150                                       | —    | —        | V             |
| Gate Threshold Voltage                          |               | $V_{th}$      | $V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$                             | 0.8                                       | —    | 2.0      | V             |
| Drain-Source ON Resistance                      |               | $R_{DS(ON)}$  | $V_{GS} = 4\text{ V}, I_D = 9\text{ A}$                               | —   | 0.09 | 0.18     | $\Omega$      |
|   |               |               | $V_{GS} = 10\text{ V}, I_D = 9\text{ A}$                              | —   | 0.08 | 0.12     |               |
| Forward Transfer Admittance                     |               | $ Y_{fs} $    | $V_{DS} = 10\text{ V}, I_D = 9\text{ A}$                              | 10  | 17   | —        | S             |
| Input Capacitance                               |               | $C_{iss}$     | $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$         | —   | 1380 | —        | pF            |
| Reverse Transfer Capacitance                    |               | $C_{rss}$     |   | —   | 200  | —        |               |
| Output Capacitance                              |               | $C_{oss}$     |   | —   | 610  | —        |               |
| Switching Time                                  | Rise Time     | $t_r$         |   | —   | 12   | —        | ns            |
|   | Turn-on Time  | $t_{on}$      |   | —   | 24   | —        |               |
|   | Fall Time     | $t_f$         |   | —   | 56   | —        |               |
|   | Turn-off Time | $t_{off}$     |   | Duty $\leq 1\%$ , $t_w = 10\ \mu\text{s}$ | —    | 130      |               |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | $Q_g$         | $V_{DD} \doteq 120\text{ V}, V_{GS} = 10\text{ V}, I_D = 18\text{ A}$ | —   | 57   | —        | nC            |
| Gate-Source Charge                              |               | $Q_{gs}$      |   | —   | 43   | —        |               |
| Gate-Drain ("Miller") Charge                    |               | $Q_{gd}$      |   | —   | 14   | —        |               |

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

| CHARACTERISTIC                            | SYMBOL    | TEST CONDITION                              | MIN. | TYP. | MAX. | UNIT          |
|---|-----------|---|------|------|------|---------------|
| Continuous Drain Reverse Current (Note 1) | $I_{DR}$  | —   | —    | —    | 18   | A             |
| Pulse Drain Reverse Current (Note 1)      | $I_{DRP}$ | —   | —    | —    | 54   | A             |
| Forward Voltage (Diode)                   | $V_{DSF}$ | $I_{DR} = 18\text{ A}, V_{GS} = 0\text{ V}$ | —    | —    | -1.7 | V             |
| Reverse Recovery Time                     | $t_{rr}$  | $I_{DR} = 18\text{ A}, V_{GS} = 0\text{ V}$ | —    | 185  | —    | ns            |
| Reverse Recovery Charge                   | $Q_{rr}$  | $dI_{DR}/dt = 100\text{ A}/\mu\text{s}$     | —    | 1.3  | —    | $\mu\text{C}$ |

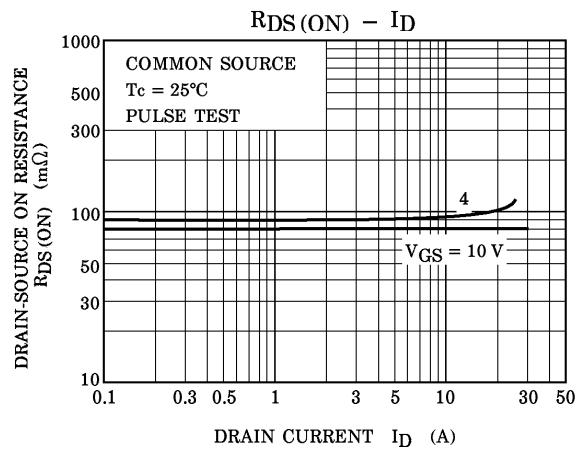
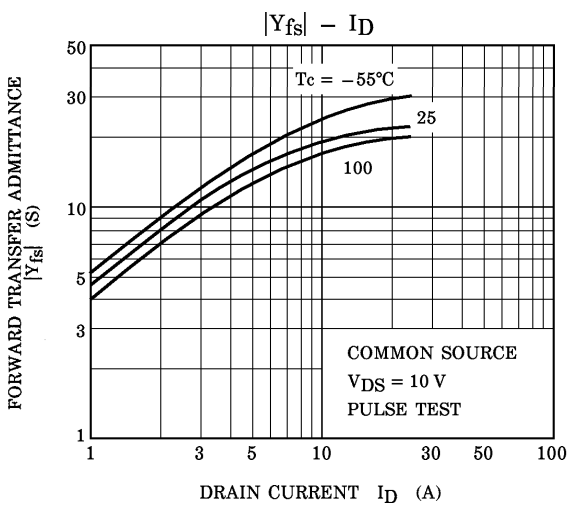
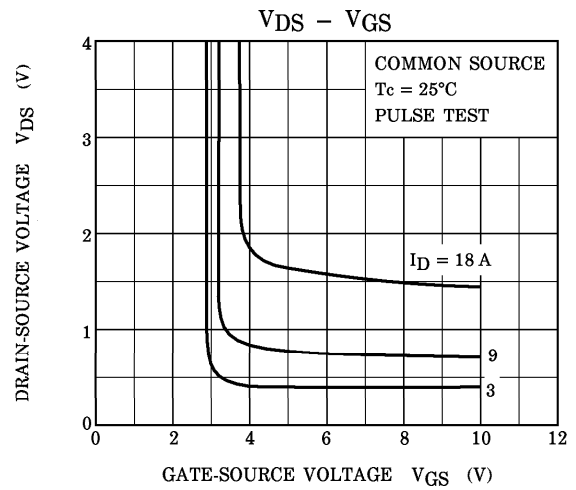
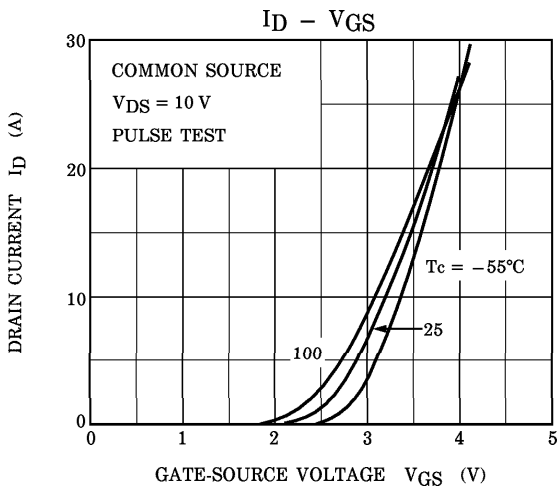
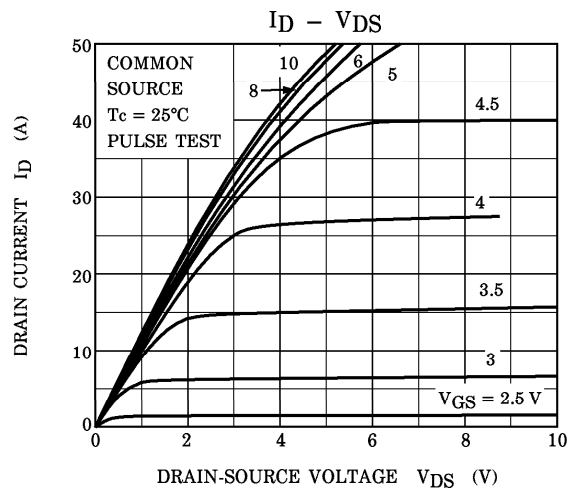
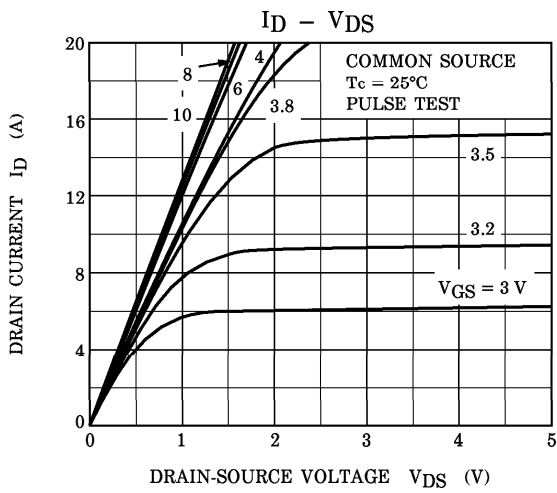
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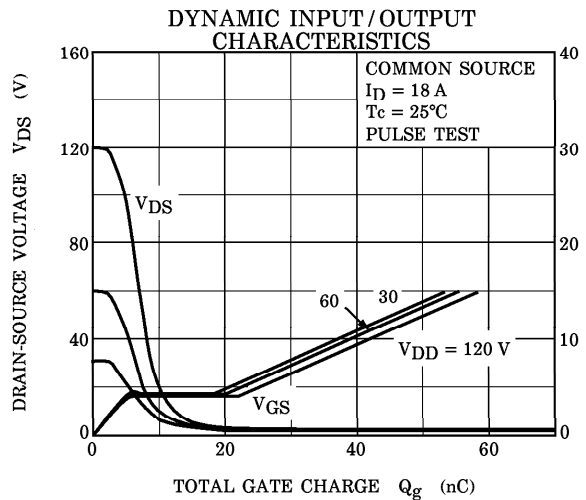
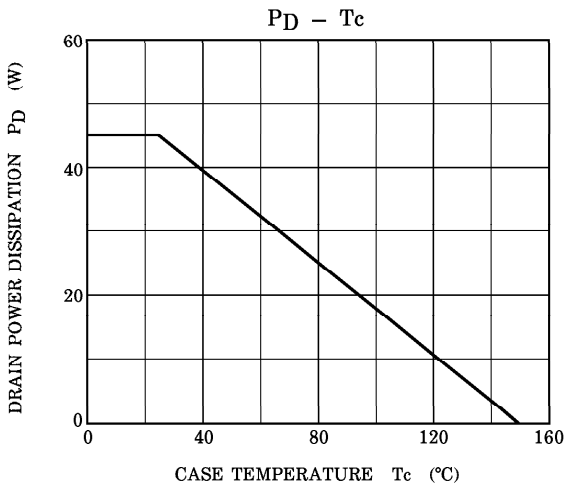
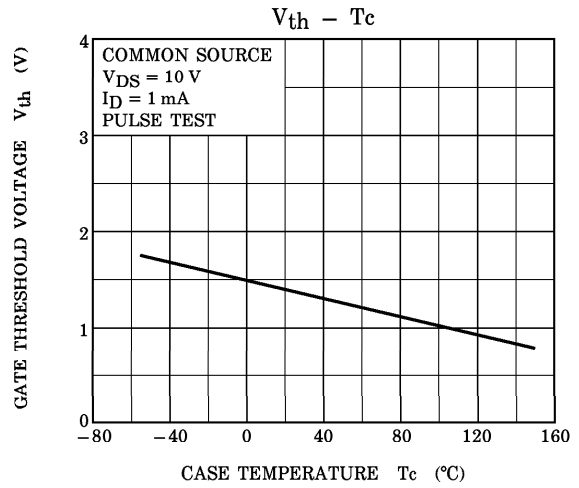
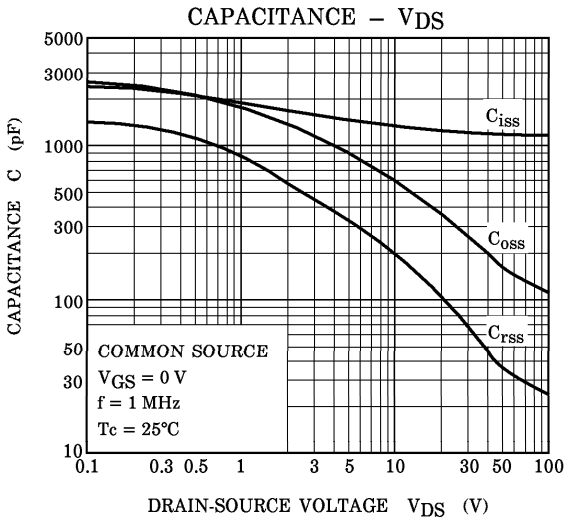
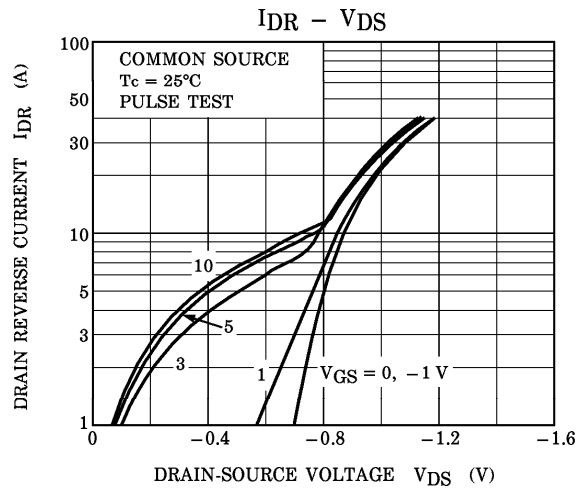
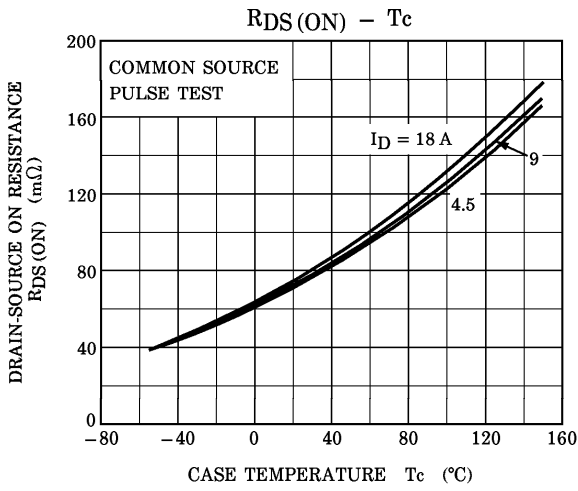


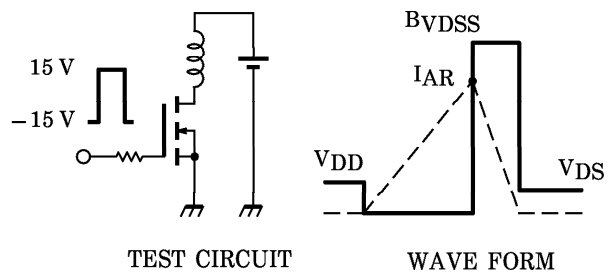
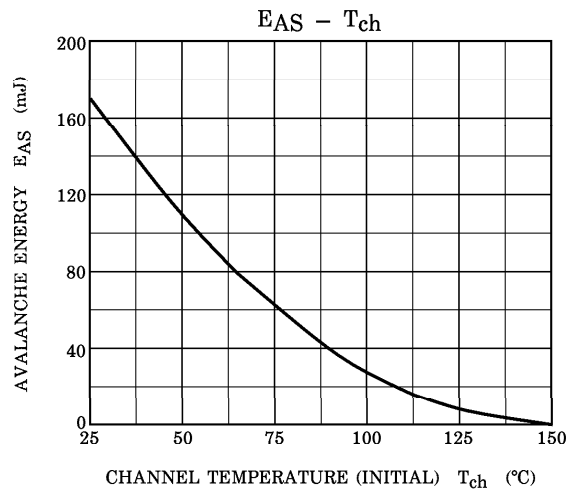
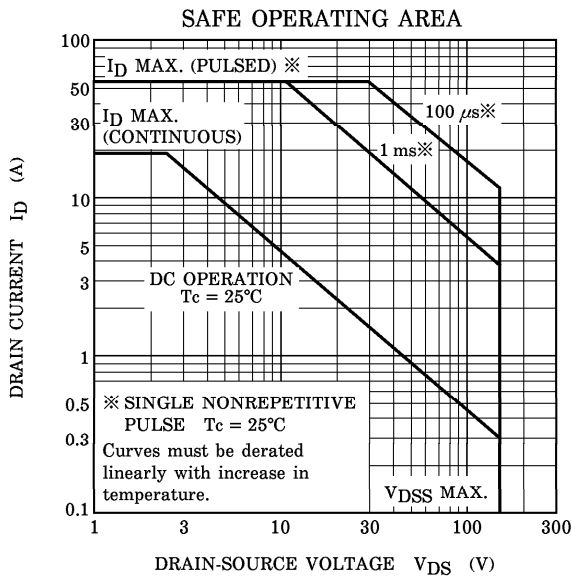
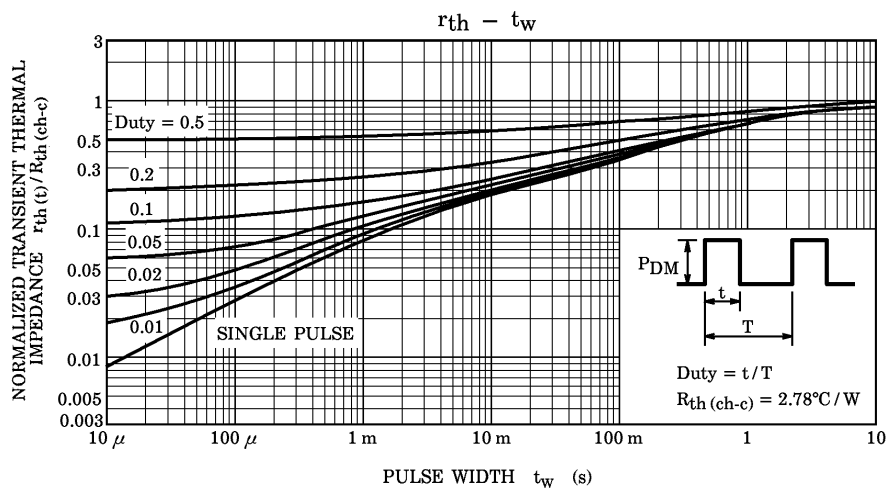
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$$R_G = 25 \Omega$$

$$V_{DD} = 50 \text{ V}, L = 0.8 \text{ mH} \quad E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left( \frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$

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