

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $L^2$ - $\pi$ -MOS V)**2SK2385**

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

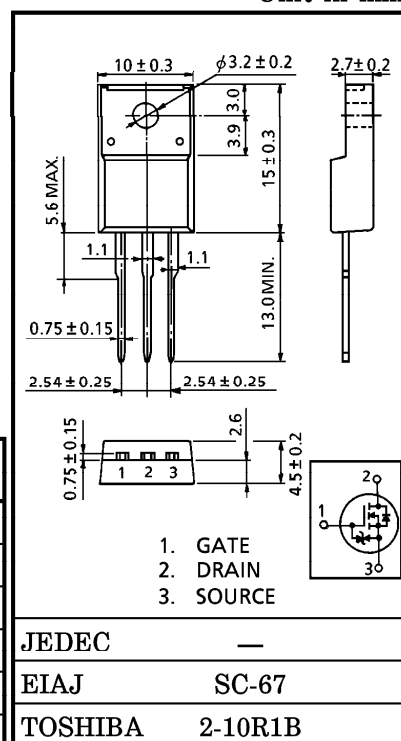
- 4V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 22m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 27S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 60V$ )
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0V$  ( $V_{DS} = 10V$ ,  $I_D = 1mA$ )

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

| CHARACTERISTIC                                 |       | SYMBOL    | RATING         | UNIT       |
|------------------------------------------------|-------|-----------|----------------|------------|
| Drain-Source Voltage                           |       | $V_{DSS}$ | 60             | V          |
| Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )    |       | $V_{DGR}$ | 60             | V          |
| Gate-Source Voltage                            |       | $V_{GSS}$ | $\pm 20$       | V          |
| Drain Current                                  | DC    | $I_D$     | 36             | A          |
|                                                | Pulse | $I_{DP}$  | 144            | A          |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) |       | $P_D$     | 40             | W          |
| Single Pulse Avalanche Energy**                |       | $E_{AS}$  | 365            | mJ         |
| Avalanche Current                              |       | $I_{AR}$  | 36             | A          |
| Repetitive Avalanche Energy*                   |       | $E_{AR}$  | 4              | mJ         |
| Channel Temperature                            |       | $T_{ch}$  | 150            | $^\circ C$ |
| Storage Temperature Range                      |       | $T_{stg}$ | $-55 \sim 150$ | $^\circ C$ |

INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 1.9g

## 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.

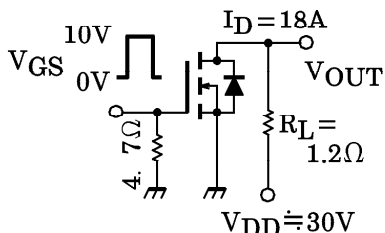
\*\*  $V_{DD} = 25V$ ,  $T_{ch} = 25^\circ C$ ,  $L = 383\mu H$ ,  $R_G = 25\Omega$ ,  $I_{AR} = 36A$ 

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

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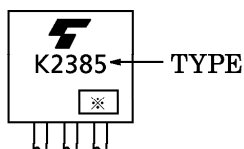
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  |               | SYMBOL         | TEST CONDITION                                                                                                                                                                     | MIN. | TYP. | MAX.     | UNIT      |
|-------------------------------------------------|---------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|----------|-----------|
| Gate Leakage Current                            |               | $I_{GSS}$      | $V_{GS} = \pm 16V, V_{DS} = 0V$                                                                                                                                                    | —    | —    | $\pm 10$ | $\mu A$   |
| Drain Cut-off Current                           |               | $I_{DSS}$      | $V_{DS} = 60V, V_{GS} = 0V$                                                                                                                                                        | —    | —    | 100      | $\mu A$   |
| Drain-Source Breakdown Voltage                  |               | $V_{(BR) DSS}$ | $I_D = 10mA, V_{GS} = 0V$                                                                                                                                                          | 60   | —    | —        | V         |
| Gate Threshold Voltage                          |               | $V_{th}$       | $V_{DS} = 10V, I_D = 1mA$                                                                                                                                                          | 0.8  | —    | 2.0      | V         |
| Drain-Source ON Resistance                      |               | $R_{DS(ON)}$   | $V_{GS} = 4V, I_D = 15A$                                                                                                                                                           | —    | 40   | 55       | $m\Omega$ |
|                                                 |               |                | $V_{DS} = 10V, I_D = 18A$                                                                                                                                                          | —    | 22   | 30       |           |
| Forward Transfer Admittance                     |               | $ Y_{fs} $     | $V_{DS} = 10V, I_D = 18A$                                                                                                                                                          | 15   | 27   | —        | S         |
| Input Capacitance                               |               | $C_{iss}$      | $V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$                                                                                                                                              | —    | 1800 | —        | pF        |
| Reverse Transfer Capacitance                    |               | $C_{rss}$      |                                                                                                                                                                                    | —    | 350  | —        |           |
| Output Capacitance                              |               | $C_{oss}$      |                                                                                                                                                                                    | —    | 900  | —        |           |
| Switching Time                                  | Rise Time     | $t_r$          |  <p><math>V_{IN} : t_r, t_f &lt; 5ns,</math><br/> <math>Duty \leq 1\%, t_w = 10\mu s</math></p> | —    | 20   | —        | ns        |
|                                                 | Turn-on Time  | $t_{on}$       |                                                                                                                                                                                    | —    | 30   | —        |           |
|                                                 | Fall Time     | $t_f$          |                                                                                                                                                                                    | —    | 40   | —        |           |
|                                                 | Turn-off Time | $t_{off}$      |                                                                                                                                                                                    | —    | 130  | —        |           |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | $Q_g$          | $V_{DD} \doteq 48V, V_{GS} = 10V$<br>$I_D = 36A$                                                                                                                                   | —    | 60   | —        | nC        |
| Gate-Source Charge                              |               | $Q_{gs}$       |                                                                                                                                                                                    | —    | 40   | —        |           |
| Gate-Drain ("Miller") Charge                    |               | $Q_{gd}$       |                                                                                                                                                                                    | —    | 20   | —        |           |

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

| CHARACTERISTIC                   | SYMBOL    | TEST CONDITION                                              | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------|-------------------------------------------------------------|------|------|------|------|
| Continuous Drain Reverse Current | $I_{DR}$  | —                                                           | —    | —    | 36   | A    |
| Pulse Drain Reverse Current      | $I_{DRP}$ | —                                                           | —    | —    | 144  | A    |
| Diode Forward Voltage            | $V_{DSF}$ | $I_{DR} = 36A, V_{GS} = 0V$                                 | —    | —    | —1.8 | V    |
| Reverse Recovery Time            | $t_{rr}$  | $I_{DR} = 36A, V_{GS} = 0V$<br>$dI_{DR} / dt = 50A / \mu s$ | —    | 60   | —    | ns   |
| Reverse Recovery Charge          | $Q_{rr}$  |                                                             | —    | 51   | —    | nC   |

## MARKING

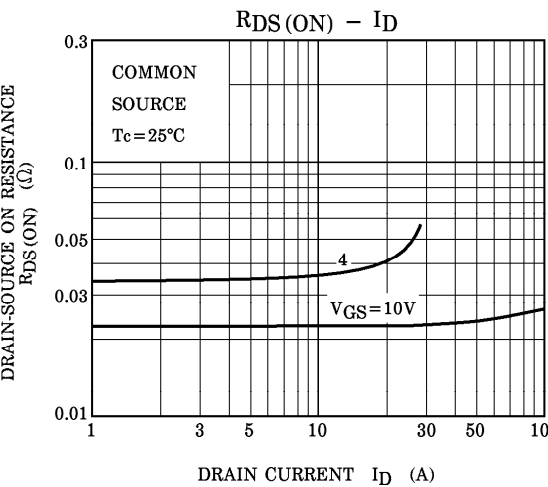
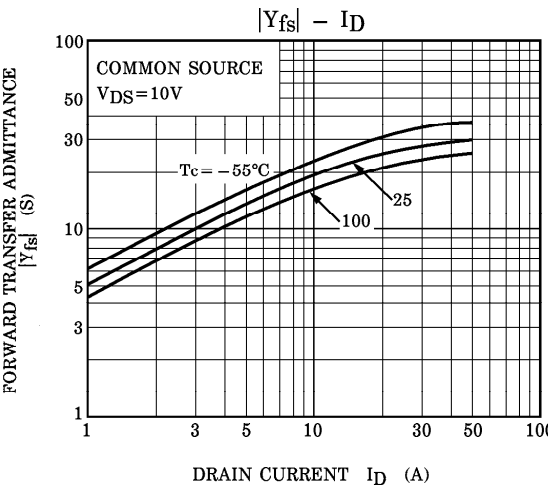
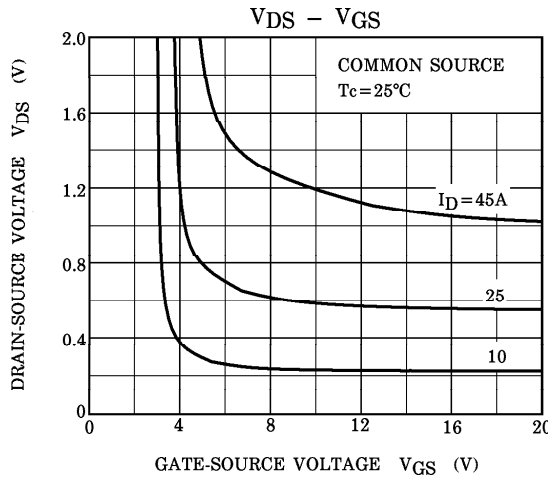
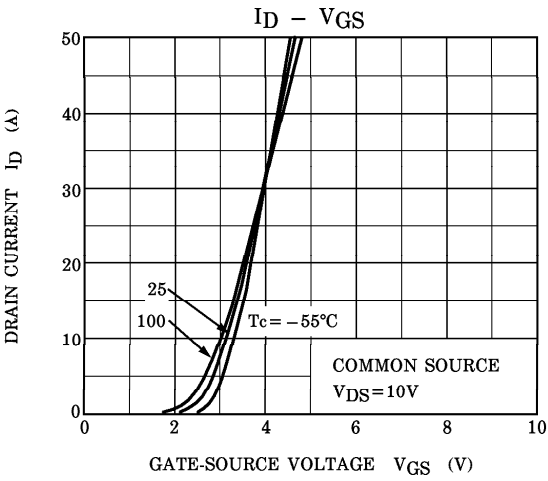
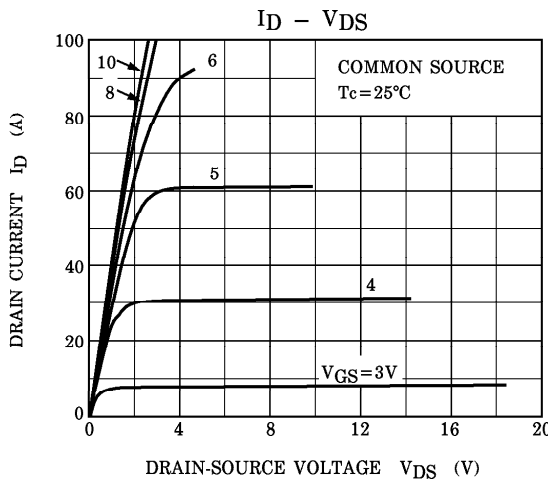
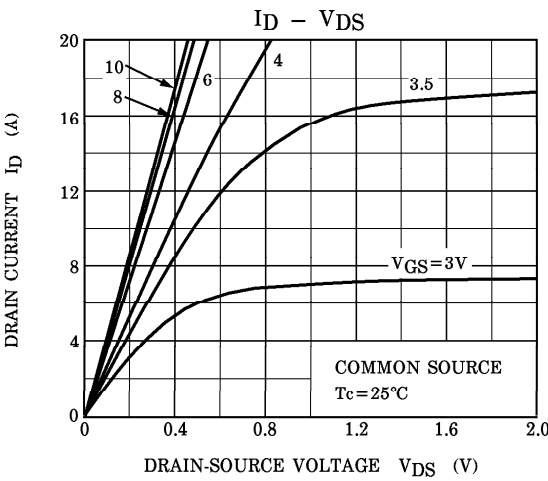


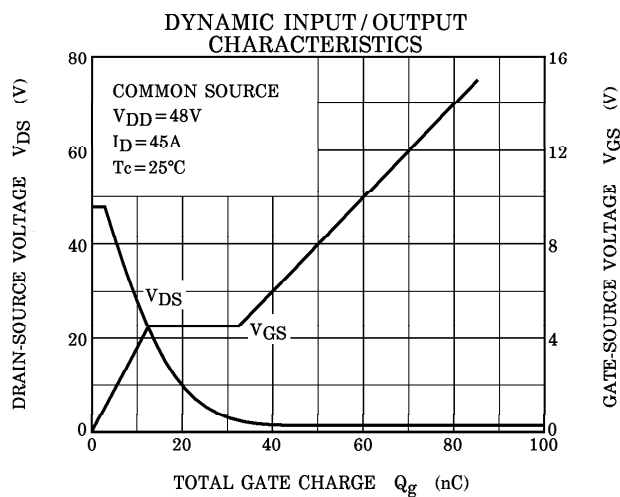
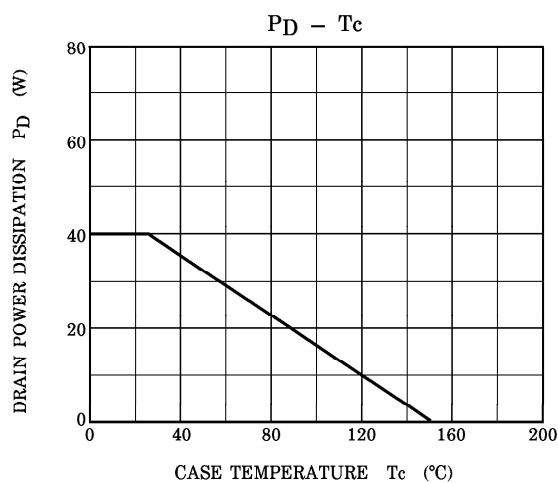
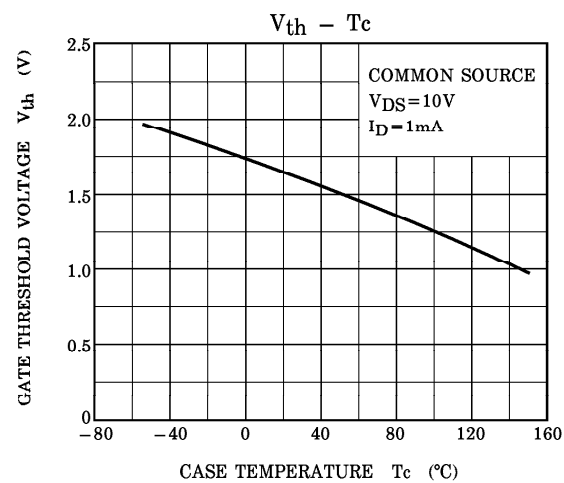
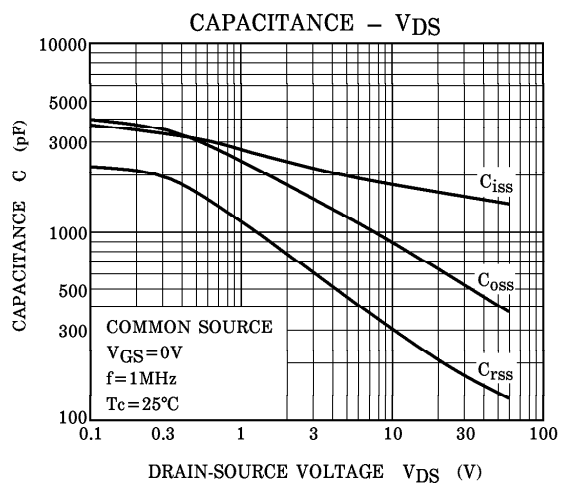
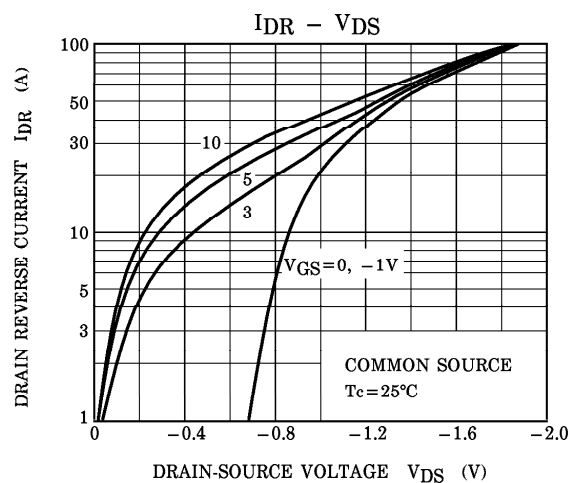
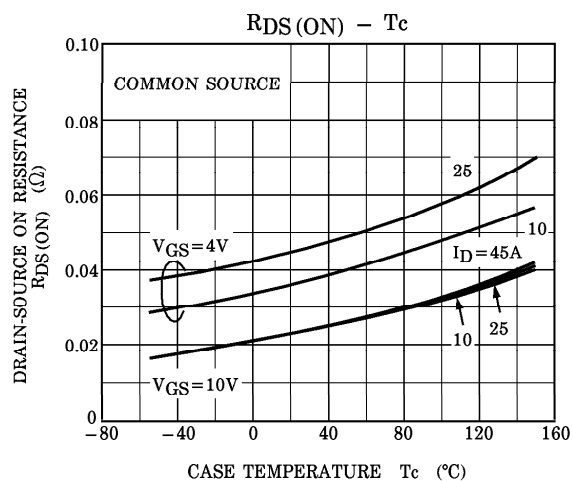
※ Lot Number

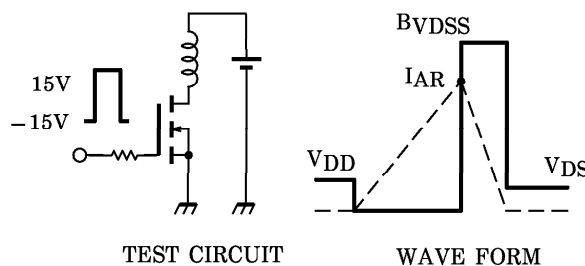
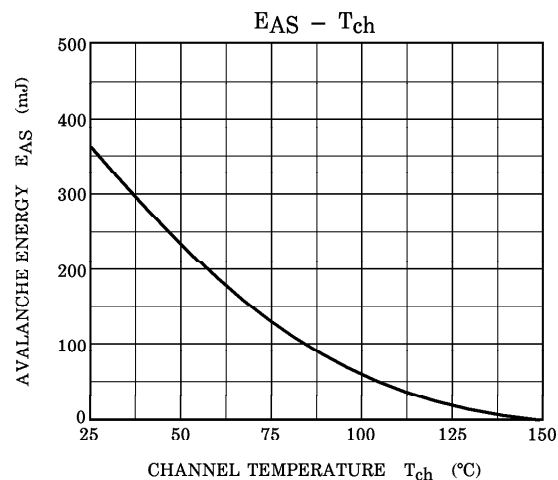
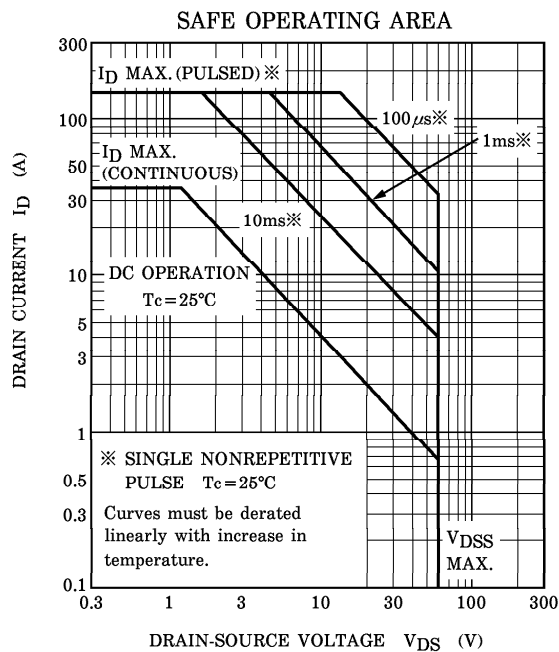
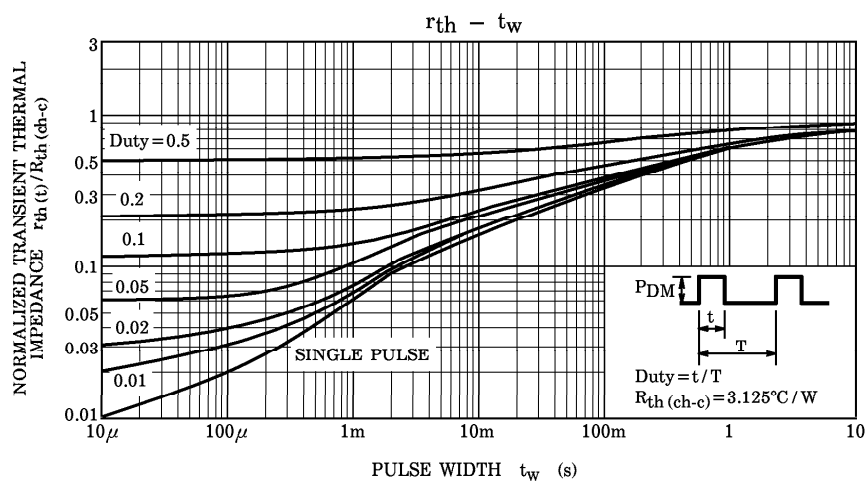


Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)







Peak  $I_{AR} = 36A$ ,  $R_G = 25\Omega$   $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left( \frac{BVDSS}{BVDSS - V_{DD}} \right)$   
 $V_{DD} = 25V$ ,  $L = 383\mu H$