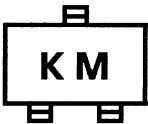


2SK2009

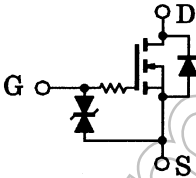
High Speed Switching Applications  
Analog Switch Applications

- High input impedance.
- Low gate threshold voltage:  $V_{th} = 0.5$  to  $1.5$  V
- Excellent switching times:  $t_{on} = 0.06 \mu s$  (typ.)  
 $t_{off} = 0.12 \mu s$  (typ.)
- Low drain-source ON resistance:  $R_{DS(ON)} = 1.2 \Omega$  (typ.)
- Small package
- Enhancement-mode

Marking



Equivalent Circuit



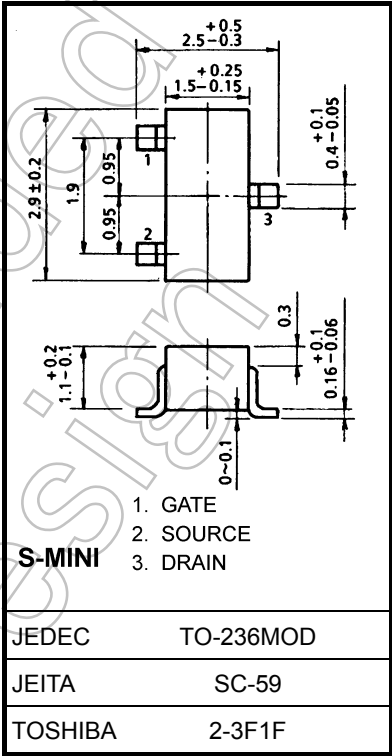
Absolute Maximum Ratings ( $T_a = 25^{\circ}C$ )

| Characteristics           | Symbol    | Rating     | Unit        |
|---------------------------|-----------|------------|-------------|
| Drain-source voltage      | $V_{DS}$  | 30         | V           |
| Gate-source voltage       | $V_{GSS}$ | $\pm 20$   | V           |
| DC drain current          | $I_D$     | 200        | mA          |
| Drain power dissipation   | $P_D$     | 200        | mW          |
| Channel temperature       | $T_{ch}$  | 150        | $^{\circ}C$ |
| Storage temperature range | $T_{stg}$ | -55 to 150 | $^{\circ}C$ |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.  
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Note: This transistor is electrostatic sensitive device. Please handle with caution.

Unit: mm



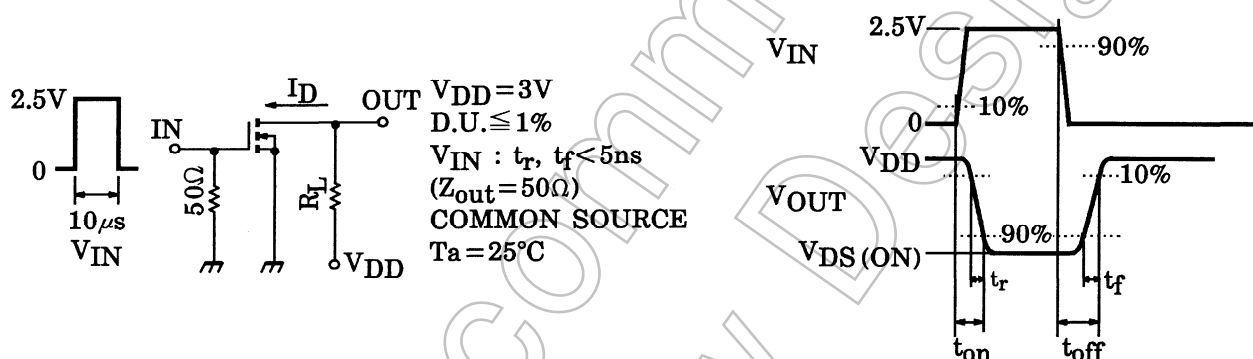
Weight: 0.012 g (typ.)

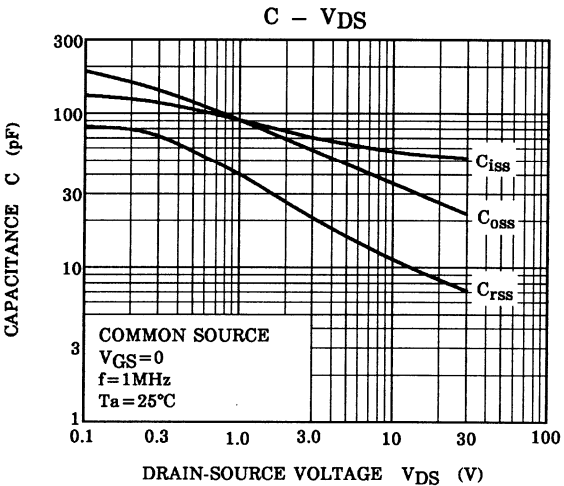
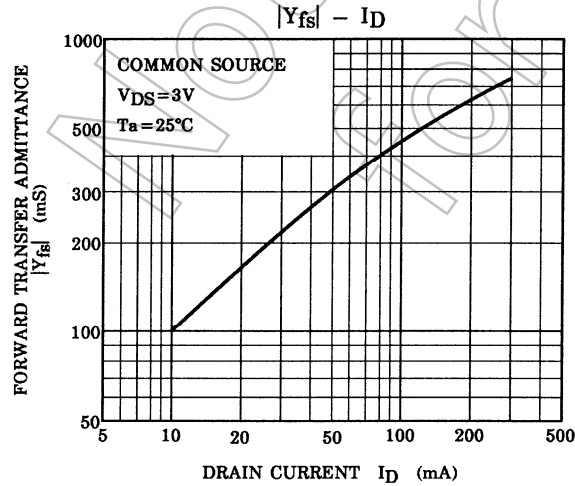
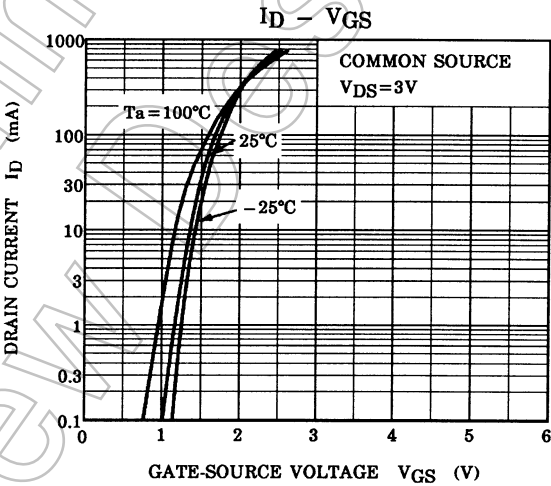
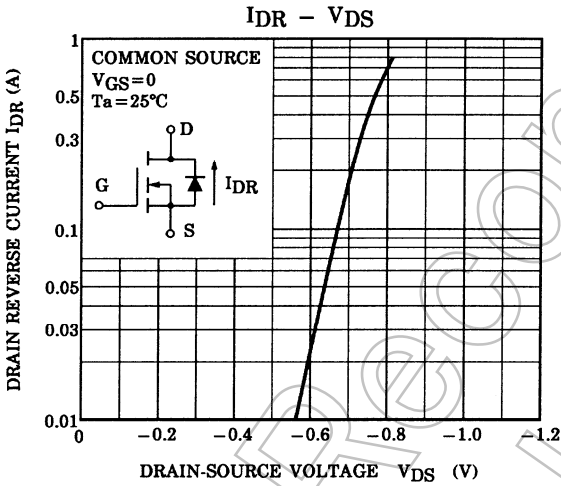
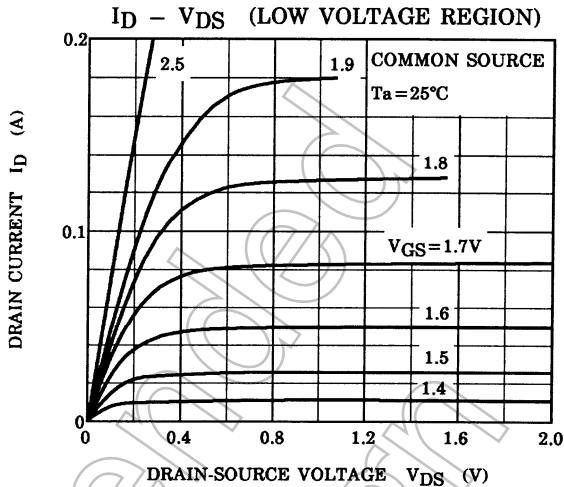
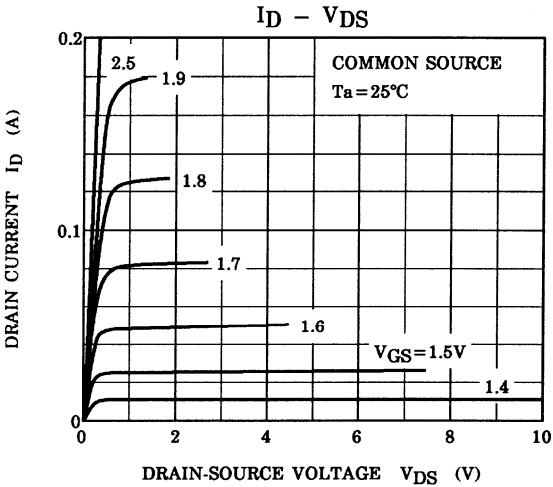
Start of commercial production  
1992-04

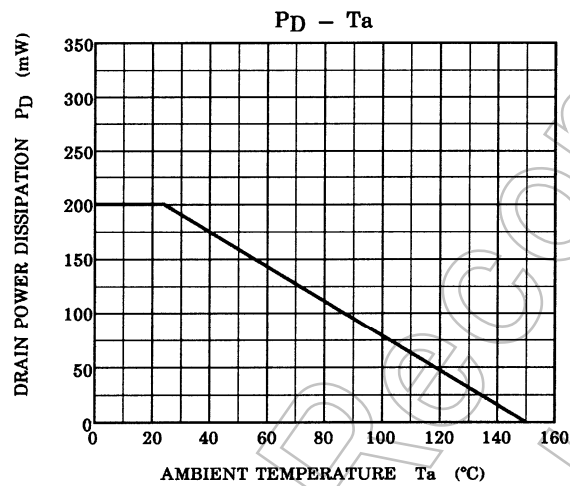
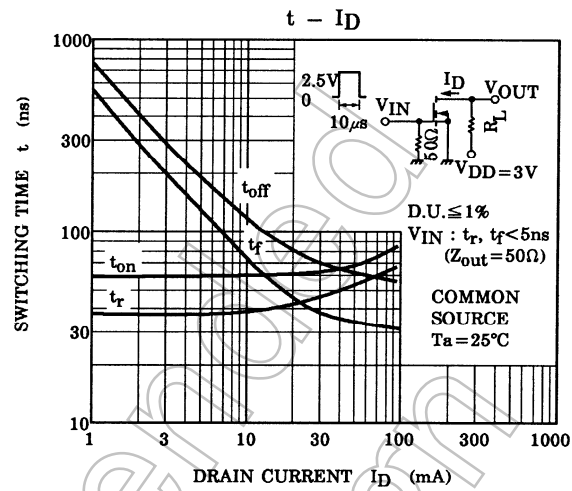
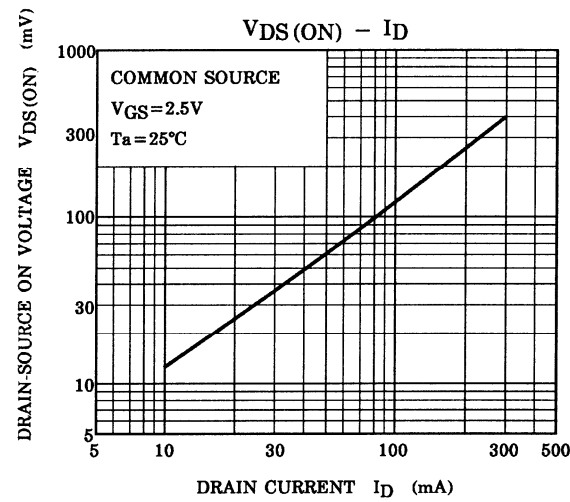
## Electrical Characteristics (Ta = 25°C)

| Characteristics                | Symbol        | Test Condition                                                                    | Min | Typ. | Max       | Unit          |
|--------------------------------|---------------|-----------------------------------------------------------------------------------|-----|------|-----------|---------------|
| Gate leakage current           | $I_{GSS}$     | $V_{GS} = \pm 10 \text{ V}, V_{DS} = 0$                                           | —   | —    | $\pm 0.1$ | $\mu\text{A}$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $I_D = 1 \text{ mA}, V_{GS} = 0$                                                  | 30  | —    | —         | V             |
| Drain cut-off current          | $I_{DSS}$     | $V_{DS} = 30 \text{ V}, V_{GS} = 0$                                               | —   | —    | 10        | $\mu\text{A}$ |
| Gate threshold voltage         | $V_{th}$      | $V_{DS} = 3 \text{ V}, I_D = 0.1 \text{ mA}$                                      | 0.5 | —    | 1.5       | V             |
| Forward transfer admittance    | $ Y_{fs} $    | $V_{DS} = 3 \text{ V}, I_D = 50 \text{ mA}$                                       | 100 | —    | —         | mS            |
| Drain-source ON resistance     | $R_{DS(ON)}$  | $I_D = 50 \text{ mA}, V_{GS} = 2.5 \text{ V}$                                     | —   | 1.2  | 2         | $\Omega$      |
| Input capacitance              | $C_{iss}$     | $V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$                             | —   | 70   | —         | pF            |
| Reverse transfer capacitance   | $C_{rss}$     | $V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$                             | —   | 23   | —         | pF            |
| Output capacitance             | $C_{oss}$     | $V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$                             | —   | 58   | —         | pF            |
| Switching time                 | Turn-on time  | $V_{DD} = 3 \text{ V}, I_D = 10 \text{ mA}, V_{GS} = 0 \text{ to } 2.5 \text{ V}$ | —   | 0.06 | —         | $\mu\text{s}$ |
|                                | Turn-off time | $V_{DD} = 3 \text{ V}, I_D = 10 \text{ mA}, V_{GS} = 0 \text{ to } 2.5 \text{ V}$ | —   | 0.12 | —         |               |

## Switching Time Test Circuit







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