

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L²-π-MOSIV)

2SK2228

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS.

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS.

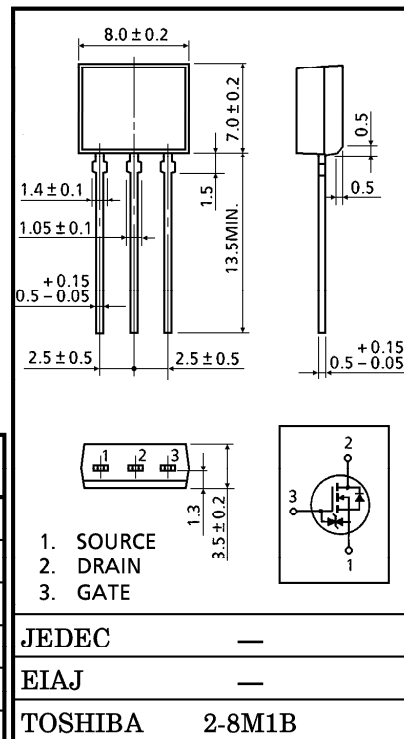
INDUSTRIAL APPLICATIONS

Unit in mm

- 4V GATE DRIVE
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.08\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 6.0S$ (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 (Ta = 25°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} | ± 20 | V |
| Drain Current | DC | I_D | 5 | A |
| | Pulse | I_{DP} | 20 | A |
| Drain Power Dissipation (Ta = 25°C) | | P_D | 1.2 | W |
| Channel Temperature | | T_{ch} | 150 | °C |
| Storage Temperature Range | | T_{stg} | -55~150 | °C |



Weight : 0.54g

THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|--|----------------|------|--------|
| Thermal Resistance, Channel To Ambient | $R_{th(ch-a)}$ | 104 | °C / W |

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} | $V_{GS} = \pm 16V, V_{DS} = 0V$ | — | — | ± 10 | μA |
| Drain Cut-off Current | | I_{DSS} | $V_{DS} = 60V, V_{GS} = 0V$ | — | — | 100 | μA |
| 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 | | $R_{DS(ON)}$ | $V_{GS} = 4V, I_D = 2.5A$ | — | 0.11 | 0.16 | Ω |
| | | | $V_{GS} = 10V, I_D = 2.5A$ | — | 0.08 | 0.11 | |
| Forward Transfer Admittance | | $ Y_{fs} $ | $V_{DS} = 10V, I_D = 2.5A$ | 3.5 | 6.0 | — | S |
| Input Capacitance | | C_{iss} | $V_{DS} = 10V, V_{GS} = 0V$ $f = 1MHz$ | — | 500 | — | pF |
| Reverse Transfer Capacitance | | C_{rss} | | — | 90 | — | |
| Output Capacitance | | C_{oss} | | — | 290 | — | |
| Switching Time | Rise Time | t_r | <p>$V_{GS} = 10V, 0V$ $I_D = 2.5A$ $R_L = 12\Omega$ $V_{DD} \approx 30V$</p> | — | 20 | — | ns |
| | Turn-on Time | t_{on} | | — | 60 | — | |
| | Fall Time | t_f | | — | 80 | — | |
| | Turn-off Time | t_{off} | | $V_{IN} : t_r, t_f < 5ns$ $Duty \leq 1\%, t_w = 10\mu s$ | — | 300 | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Q_g | $V_{DD} \approx 48V, V_{GS} = 10V$ $I_D = 5A$ | — | 20 | — | nC |
| Gate-Source Charge | | Q_{gs} | | — | 14 | — | |
| Gate-Drain ("Miller") Charge | | Q_{gd} | | — | 6 | — | |

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

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------|-------------------------------|------|------|------|---------|
| Continuous Drain Reverse Current | I_{DR} | — | — | — | 5 | A |
| Pulse Drain Reverse Current | I_{DRP} | — | — | — | 20 | A |
| Diode Forward Voltage | V_{DSF} | $I_{DR} = 5A, V_{GS} = 0V$ | — | — | -1.5 | V |
| Reverse Recovery Time | t_{rr} | $I_{DR} = 5A, V_{GS} = 0V$ | — | 140 | — | ns |
| Reverse Recovery Charge | Q_{rr} | $dI_{DR} / dt = 100A / \mu s$ | — | 0.4 | — | μC |

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