

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

# 2SK2493

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS  
CHOPPER REGULATOR, AND DC-DC CONVERTER APPLICATIONS

INDUSTRIAL APPLICATIONS  
Unit in mm

- 2.5V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.08m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 8.0S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 16V$ )
- Enhancement-Mode :  $V_{th} = 0.5 \sim 1.1V$  ( $V_{DS} = 10V, I_D = 1mA$ )

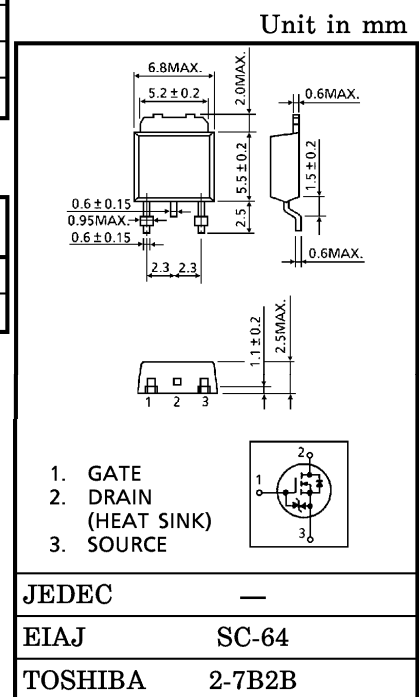
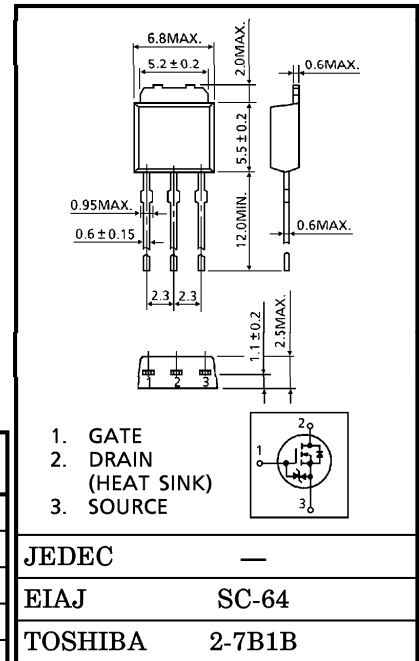
MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

| CHARACTERISTIC                                 | SYMBOL    | RATING         | UNIT       |
|--|-----------|----------------|------------|
| Drain-Source Voltage                           | $V_{DSS}$ | 16             | V          |
| Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )    | $V_{DGR}$ | 16             | V          |
| Gate-Source Voltage                            | $V_{GSS}$ | $\pm 8$        | V          |
| Drain Current                                  | DC        | $I_D$          | 5 A        |
|  | Pulse     | $I_{DP}$       | 20 A       |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) | $P_D$     | 20             | W          |
| 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    | $R_{th(ch-c)}$ | 6.25 | $^\circ C / W$ |
| Thermal Resistance, Channel To Ambient | $R_{th(ch-a)}$ | 125  | $^\circ C / W$ |

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



Weight : 0.36g

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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  | SYMBOL        | TEST CONDITION                                  | MIN.  | TYP.   | MAX.     | UNIT     |    |
|---|---------------|---|---|--|----------|----------|----|
| Gate Leakage Current                            | $I_{GSS}$     | $V_{GS} = \pm 6.5V, V_{DS} = 0V$                | —   | —  | $\pm 10$ | $\mu A$  |    |
| Drain Cut-off Current                           | $I_{DSS}$     | $V_{DS} = 16V, V_{GS} = 0V$                     | —   | —  | 100      | $\mu A$  |    |
| Drain-Source Breakdown Voltage                  | $V(BR)_{DSS}$ | $I_D = 10mA, V_{GS} = 0V$                       | 16  | —  | —        | V        |    |
| Gate Threshold Voltage                          | $V_{th}$      | $V_{DS} = 10V, I_D = 1mA$                       | 0.5   | —  | 1.1      | V        |    |
| Drain-Source ON Resistance                      | $R_{DS(ON)}$  | $V_{GS} = 2.5V, I_D = 2.5A$                     | —   | 0.08   | 0.12     | $\Omega$ |    |
|   |               | $V_{GS} = 4V, I_D = 2.5A$                       | —   | 0.07   | 0.1      |          |    |
| Forward Transfer Admittance                     | $ Y_{fs} $    | $V_{DS} = 10V, I_D = 2.5A$                      | 4.0   | 8.0  | —        | S        |    |
| Input Capacitance                               | $C_{iss}$     | $V_{DS} = 10V, V_{GS} = 0V$<br>$f = 1MHz$       | —   | 1200   | —        | pF       |    |
| Reverse Transfer Capacitance                    | $C_{rss}$     |   | —   | 110  | —        |          |    |
| Output Capacitance                              | $C_{oss}$     |   | —   | 380  | —        |          |    |
| Switching Time                                  | Rise Time     | $t_r$   | <p><math>I_D = 2.5A</math><br/><math>V_{GS} = 5V</math><br/><math>0V</math><br/><math>50\Omega</math><br/><math>R_L = 3.2\Omega</math><br/><math>V_{DD} \approx 8V</math></p> | —  | 30       | —        | ns |
|   | Turn-on Time  | $t_{on}$  |   | —  | 50       | —        |    |
|   | Fall Time     | $t_f$   |   | —  | 200      | —        |    |
|   | Turn-off Time | $t_{off}$                                       |   | $V_{IN} : t_r, t_f < 5ns,$<br>$Duty \leq 1\%, t_w = 10\mu s$ | —        | 650      |    |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | $Q_g$         | $V_{DD} \approx 16V, V_{GS} = 5V$<br>$I_D = 5A$ | —   | 23   | —        | nC       |    |
| Gate-Source Charge                              | $Q_{gs}$      |   | —   | 17   | —        |          |    |
| 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            | $V_{DSF}$ | $I_{DR} = 5A, V_{GS} = 0V$                                 | —    | —    | -1.7 | V       |
| Reverse Recovery Time            | $t_{rr}$  | $I_{DR} = 5A, V_{GS} = 0V$<br>$dI_{DR} / dt = 50A / \mu s$ | —    | 120  | —    | ns      |
| Reverse Recovery Charge          | $Q_{rr}$  |  | —    | 0.12 | —    | $\mu C$ |

MARKING

