

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOS \bar{V})

2SK2914

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.42\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 7.5S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.)
($V_{DS} = 250V$)
- Enhancement-Mode : $V_{th} = 1.5 \sim 3.5V$
($V_{DS} = 10V$, $I_D = 1mA$)

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

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|-------|-----------|----------------|------------|
| Drain-Source Voltage | | V_{DSS} | 250 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | | V_{DGR} | 250 | V |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V |
| Drain Current | DC | I_D | 7.5 | A |
| | Pulse | I_{DP} | 30 | |
| Drain Power Dissipation ($T_c = 25^\circ C$) | | P_D | 20 | W |
| Single Pulse Avalanche Energy** | | E_{AS} | 110 | mJ |
| Avalanche Current | | I_{AR} | 7.5 | A |
| Repetitive Avalanche Energy* | | E_{AR} | 2 | mJ |
| 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 | $R_{th(ch-a)}$ | 83.3 | $^\circ C/W$ |

Note ;

* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

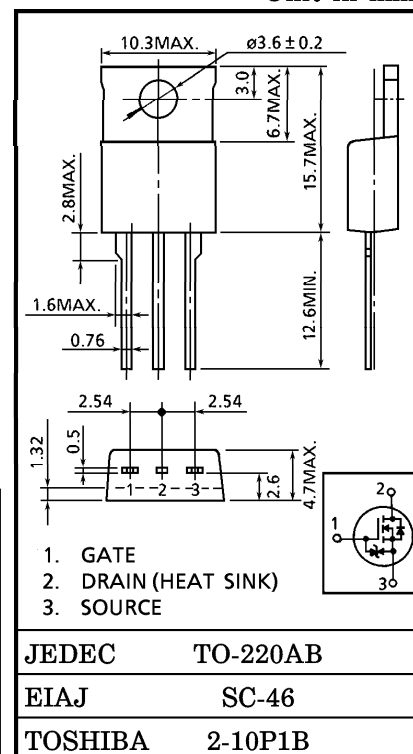
** $V_{DD} = 50V$, $T_{ch} = 25^\circ C$ (initial), $L = 3.3mH$, $R_G = 25\Omega$, $I_{AR} = 7.5A$

This transistor is an electrostatic sensitive device.

Please handle with caution.

INDUSTRIAL APPLICATIONS

Unit in mm

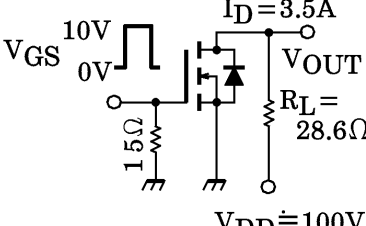


Weight : 2.0g (Typ.)

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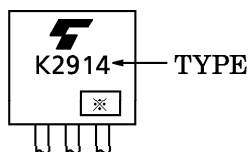
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| 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} | $V_{DS} = 250V, V_{GS} = 0V$ | — | — | 100 | μA |
| Drain-Source Breakdown Voltage | | $V_{(BR) DSS}$ | $I_D = 10mA, V_{GS} = 0V$ | 250 | — | — | V |
| Gate Threshold Voltage | | V_{th} | $V_{DS} = 10V, I_D = 1mA$ | 1.5 | — | 3.5 | V |
| Drain-Source ON Resistance | | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 3.5A$ | — | 0.42 | 0.5 | Ω |
| Forward Transfer Admittance | | $ Y_{fs} $ | $V_{DS} = 10V, I_D = 3.5A$ | 4 | 7.5 | — | S |
| Input Capacitance | | C_{iss} | $V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$ | — | 700 | — | pF |
| Reverse Transfer Capacitance | | C_{rss} | | — | 80 | — | |
| Output Capacitance | | C_{oss} | | — | 270 | — | |
| Switching Time | Rise Time | t_r |  <p>$V_{IN} : t_r, t_f < 5ns,$ Duty $\leq 1\%, t_w = 10\mu s$</p> | — | 10 | — | ns |
| | Turn-On Time | t_{on} | | — | 20 | — | |
| | Fall Time | t_f | | — | 10 | — | |
| | Turn-Off Time | t_{off} | | — | 70 | — | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Q_g | $V_{DD} \doteq 200V, V_{GS} = 10V,$ $I_D = 7.5A$ | — | 20 | — | nC |
| Gate-Source Charge | | Q_{gs} | | — | 13 | — | |
| Gate-Drain ("Miller") Charge | | Q_{gd} | | — | 7 | — | |

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

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------|-------------------------------|------|------|------|---------|
| Continuous Drain Reverse Current | I_{DR} | — | — | — | 7.5 | A |
| Pulse Drain Reverse Current | I_{DRP} | — | — | — | 30 | A |
| Diode Forward Voltage | V_{DSF} | $I_{DR} = 7.5A, V_{GS} = 0V$ | — | — | -2.0 | V |
| Reverse Recovery Time | t_{rr} | $I_{DR} = 7.5A, V_{GS} = 0V$ | — | 180 | — | ns |
| Reverse Recovery Charge | Q_{rr} | $dI_{DR} / dt = 100A / \mu s$ | — | 1.1 | — | μC |

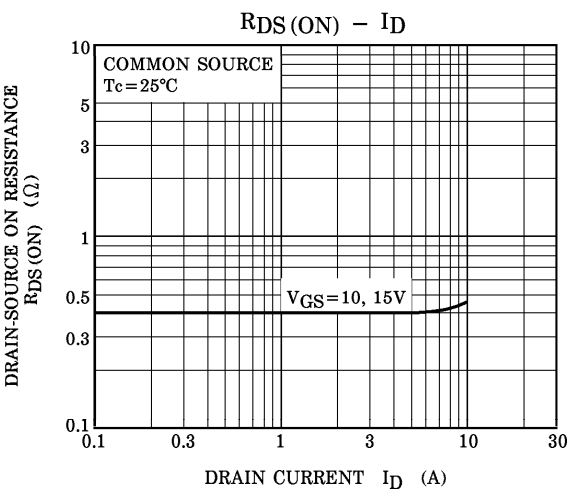
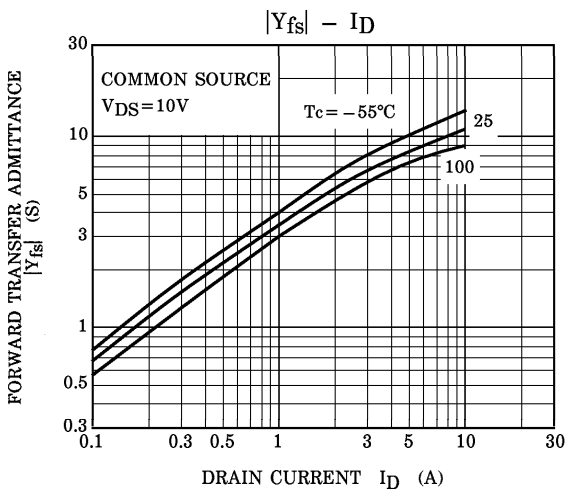
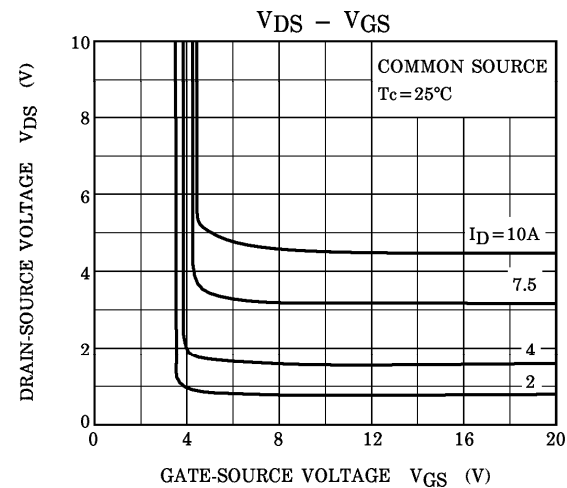
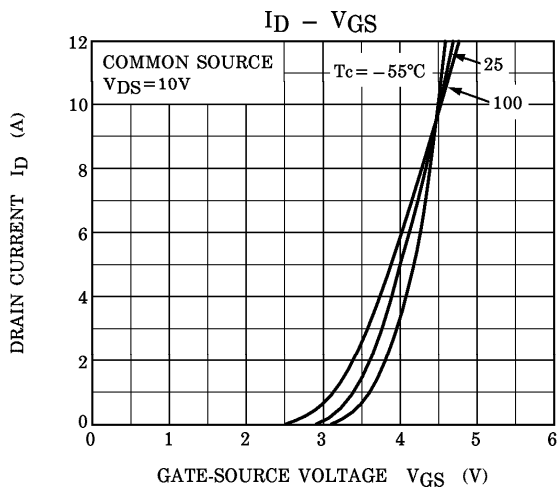
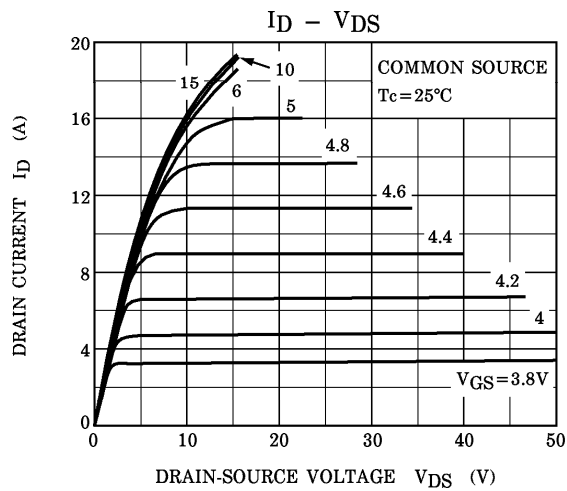
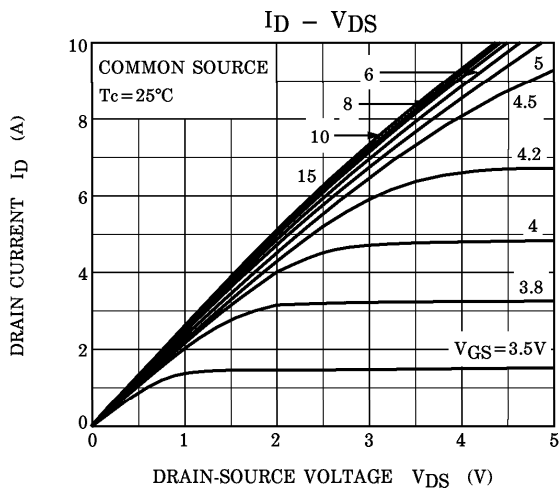
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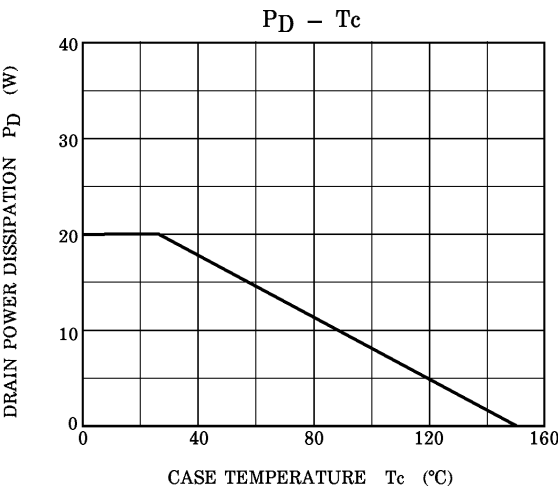
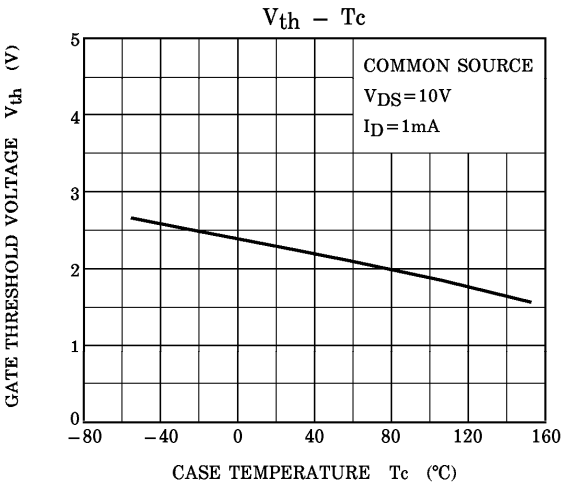
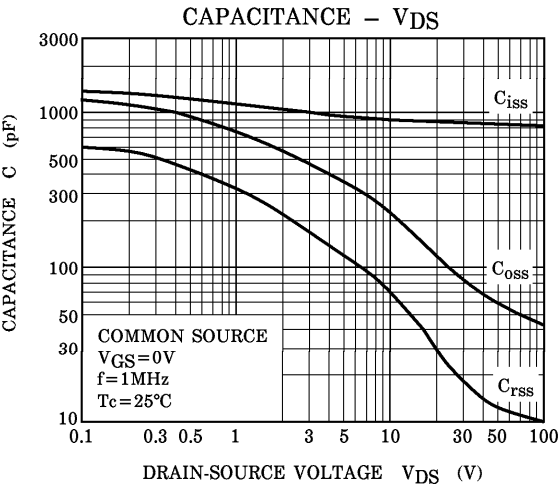
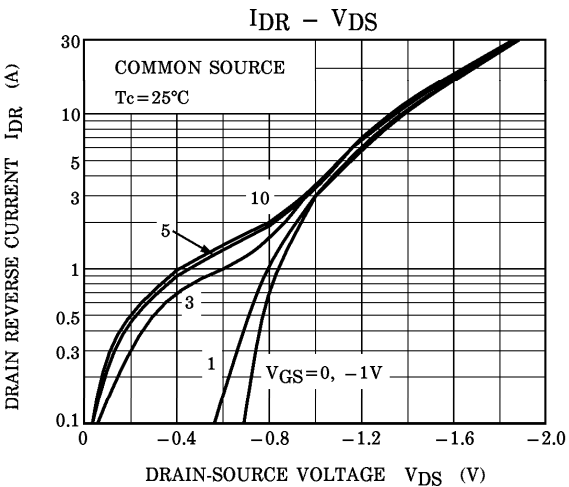
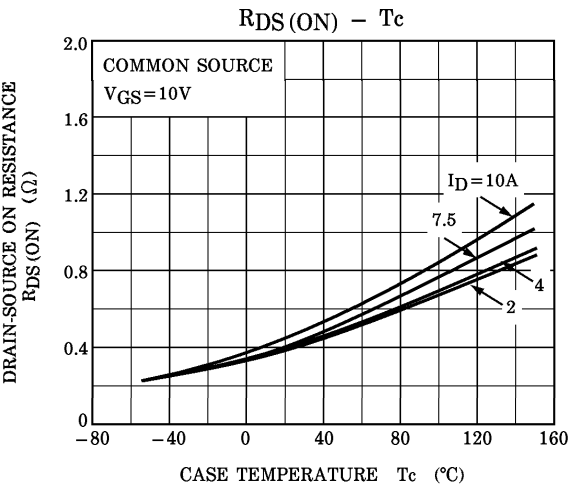


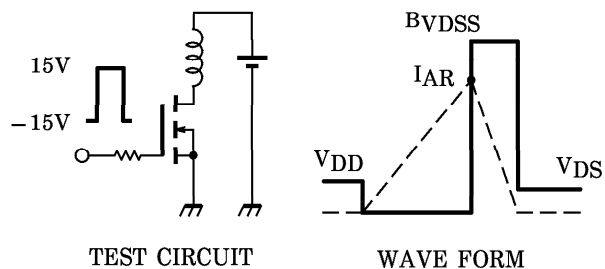
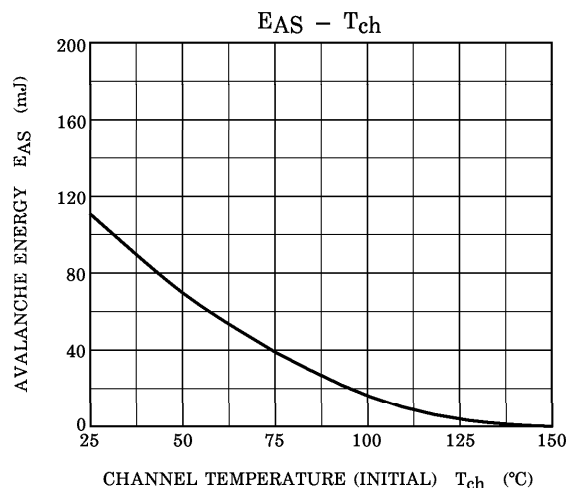
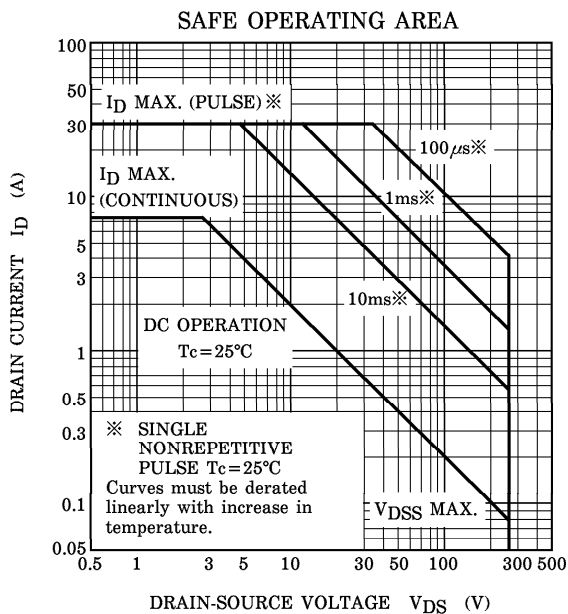
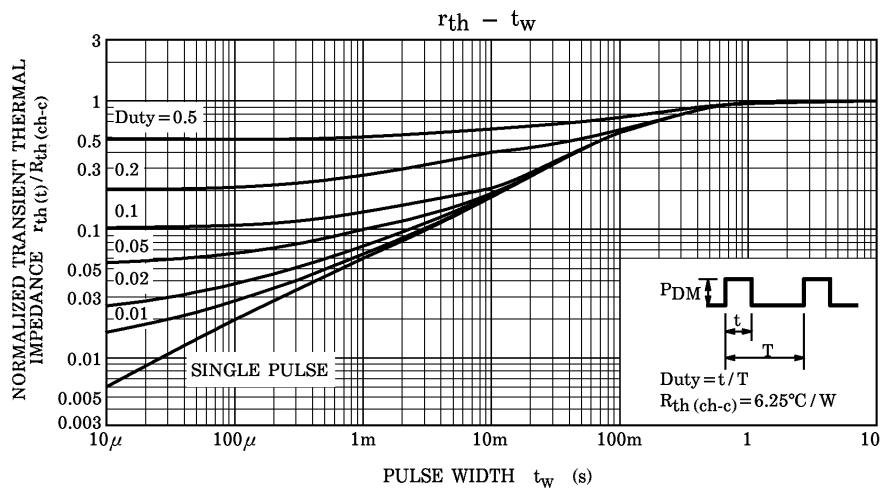
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR}=7.5\text{A}$, $R_G=25\Omega$ $E_{AS}=\frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS-V_{DD}}\right)$
 $V_{DD}=50\text{V}$, $L=3.3\text{mH}$