

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

2SK3314

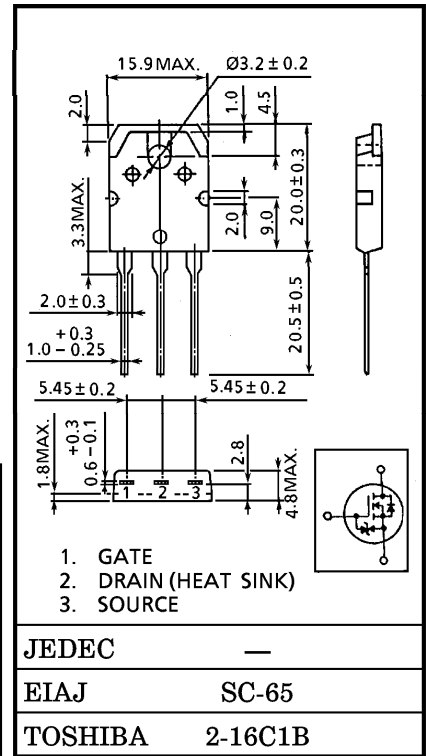
HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS
 SWITCHING REGULATOR, DC-DC CONVERTER APPLICATIONS
 MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS
 Unit in mm

- Fast Reverse Recovery Time : $t_{rr} = 105 \text{ ns (Typ.)}$
- Built-in High-Speed Free-Wheeling Diode
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.35 \Omega \text{ (Typ.)}$
- High Forward Transfer Admittance : $|Y_{fs}| = 9.9 \text{ S (Typ.)}$
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A (Max.) (}V_{DS} = 500 \text{ V)}$
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0 \text{ V}$
 $(V_{DS} = 10 \text{ V, } I_D = 1 \text{ mA})$

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

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|-------|-----------|----------------|------------------|
| Drain-Source Voltage | | V_{DSS} | 500 | V |
| Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$) | | V_{DGR} | 500 | V |
| Gate-Source Voltage | | V_{GSS} | ± 30 | V |
| Drain Current | DC | I_D | 15 | A |
| | Pulse | I_{DP} | 60 | A |
| Drain Power Dissipation ($T_c = 25^\circ\text{C}$) | | P_D | 150 | W |
| Single Pulse Avalanche Energy** | | E_{AS} | 630 | mJ |
| Avalanche Current | | I_{AR} | 15 | A |
| Repetitive Avalanche Energy* | | E_{AR} | 15 | mJ |
| Channel Temperature | | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{stg} | $-55 \sim 150$ | $^\circ\text{C}$ |



THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|--|----------------|-------|--------------------|
| Thermal Resistance, Channel to Case | $R_{th(ch-c)}$ | 0.833 | $^\circ\text{C/W}$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 50 | $^\circ\text{C/W}$ |

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = 90 \text{ V, } T_{ch} = 25^\circ\text{C (initial), } L = 4.76 \text{ mH, } R_G = 25 \Omega, I_{AR} = 15 \text{ A}$

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

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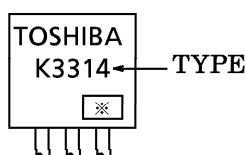
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|---|----------------------|---|---|--|------|------|----|
| Gate Leakage Current | I _{GSS} | V _{GS} = ±25 V, V _{DS} = 0 V | — | — | ±10 | μA | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = ±100 μA, V _{DS} = 0 V | ±30 | — | — | V | |
| Drain Cut-off Current | I _{DSS} | V _{DS} = 500 V, V _{GS} = 0 V | — | — | 100 | μA | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | I _D = 10 mA, V _{GS} = 0 V | 500 | — | — | V | |
| Gate Threshold Voltage | V _{th} | V _{DS} = 10 V, I _D = 1 mA | 2.0 | — | 4.0 | V | |
| Drain-Source ON Resistance | R _{DS(ON)} | V _{GS} = 10 V, I _D = 7 A | — | 0.35 | 0.49 | Ω | |
| Forward Transfer Admittance | Y _{fs} | V _{DS} = 10 V, I _D = 7 A | 5.0 | 9.9 | — | S | |
| Input Capacitance | C _{iss} | V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz | — | 2600 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | | — | 280 | — | | |
| Output Capacitance | C _{oss} | | — | 880 | — | | |
| Switching Time | Rise Time | t _r | <p>V_{GS} 10 V, 0 V, I_D = 7 A, V_{OUT}, R_L = 30 Ω, V_{DD} ≐ 210 V</p> | — | 50 | — | ns |
| | Turn-on Time | t _{on} | | — | 85 | — | |
| | Fall Time | t _f | | — | 65 | — | |
| | Turn-off Time | t _{off} | | V _{IN} : t _r , t _f < 5 ns, Duty ≤ 1%, t _w = 10 μs | — | 260 | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | Q _g | V _{DD} ≐ 400 V, V _{GS} = 10 V, I _D = 15 A | — | 58 | — | nC | |
| Gate-Source Charge | Q _{gs} | | — | 36 | — | | |
| Gate-Drain ("Miller") Charge | Q _{gd} | | — | 22 | — | | |

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

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|------------------|--|------|------|------|------|
| Continuous Drain Reverse Current | I _{DR} | — | — | — | 15 | A |
| Pulse Drain Reverse Current | I _{DRP} | — | — | — | 60 | A |
| Diode Forward Voltage | V _{DSF} | I _{DR} = 15 A, V _{GS} = 0 V | — | — | -1.7 | V |
| Reverse Recovery Time | t _{rr} | I _{DR} = 15 A, V _{GS} = 0 V dI _{DR} /dt = 100 A/μs | — | 105 | 180 | ns |
| Reverse Recovery Charge | Q _{rr} | | — | 0.24 | — | μC |

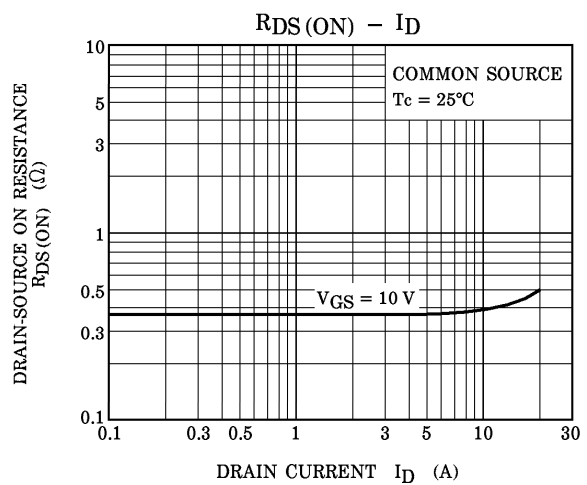
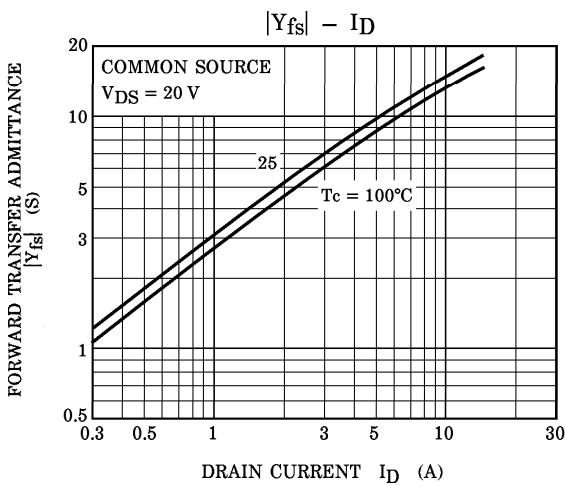
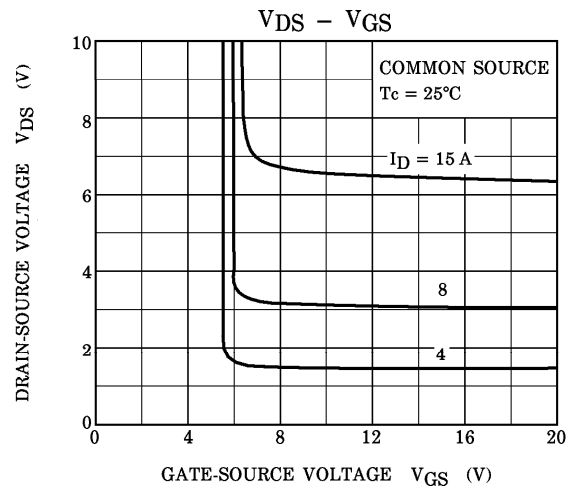
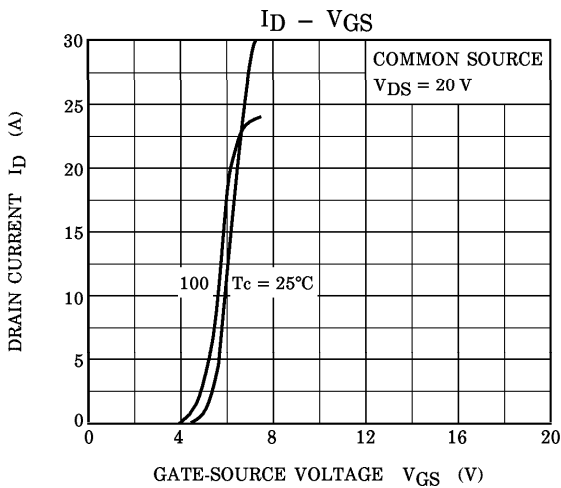
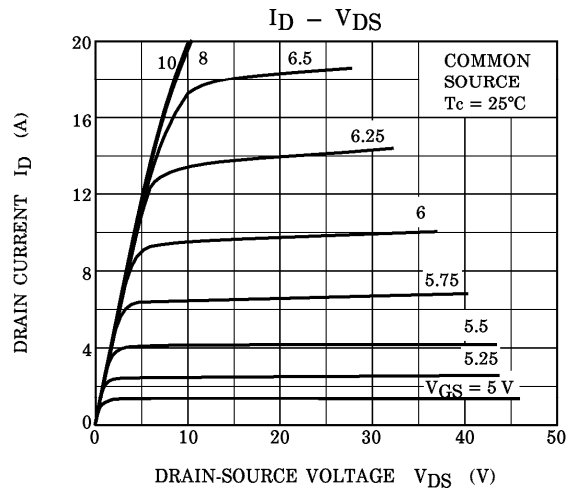
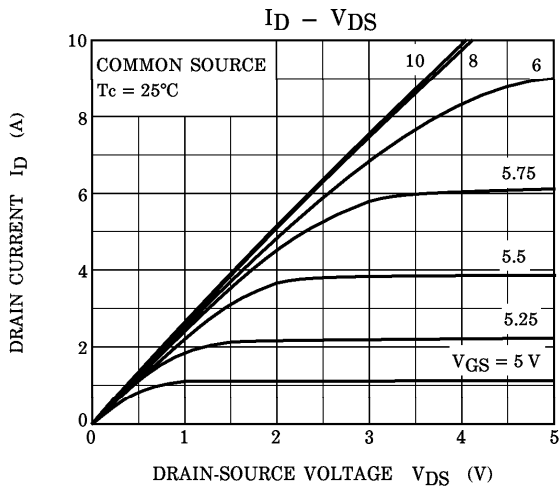
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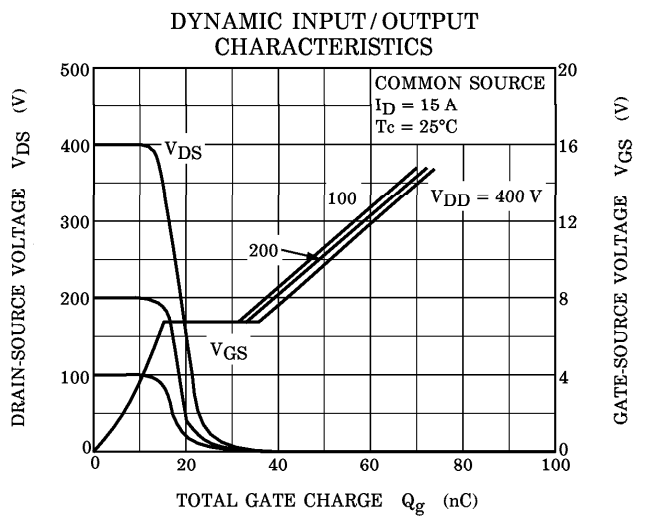
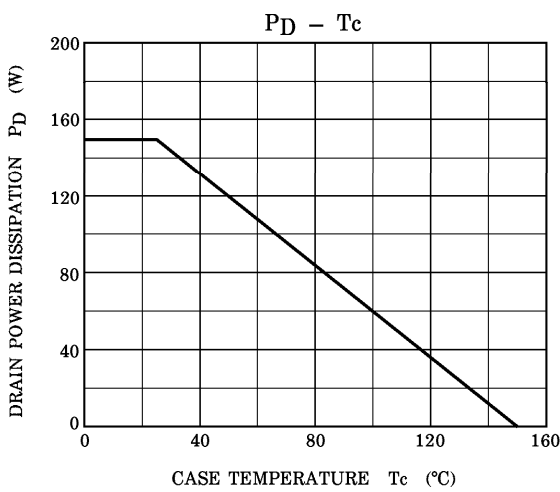
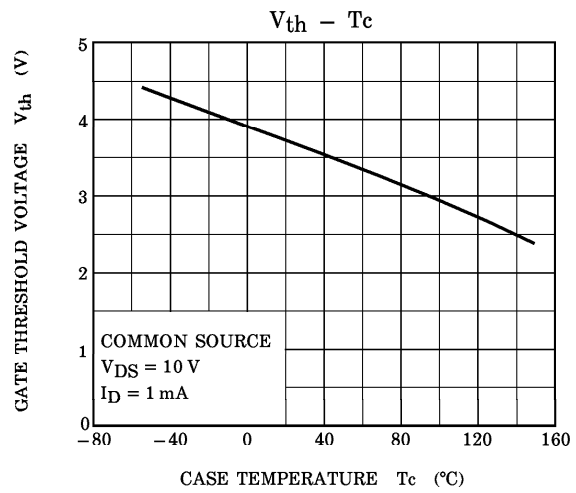
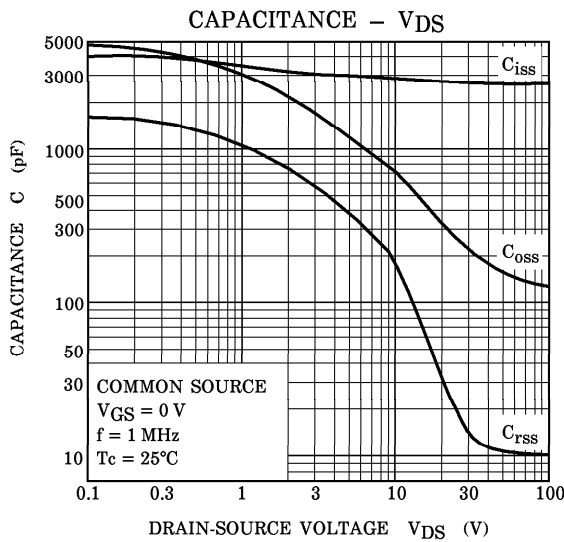
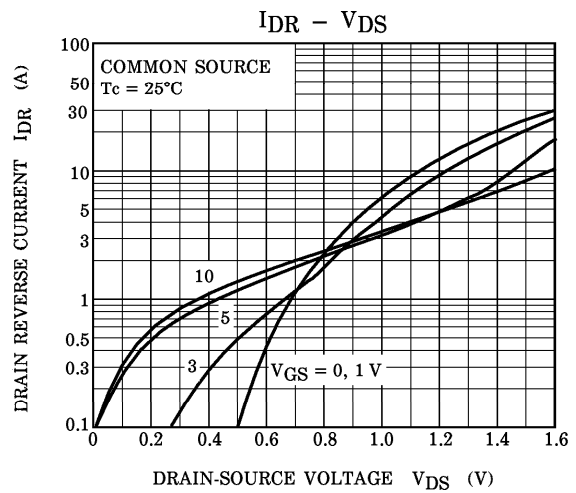
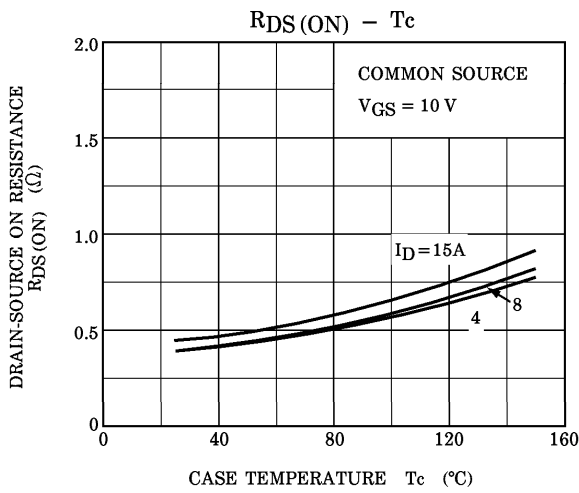


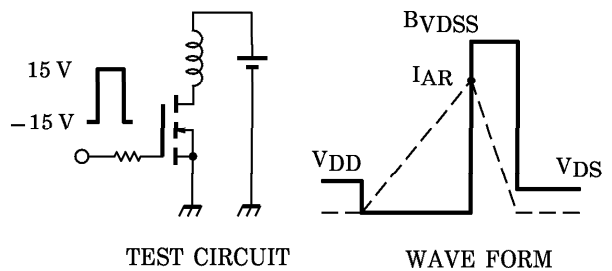
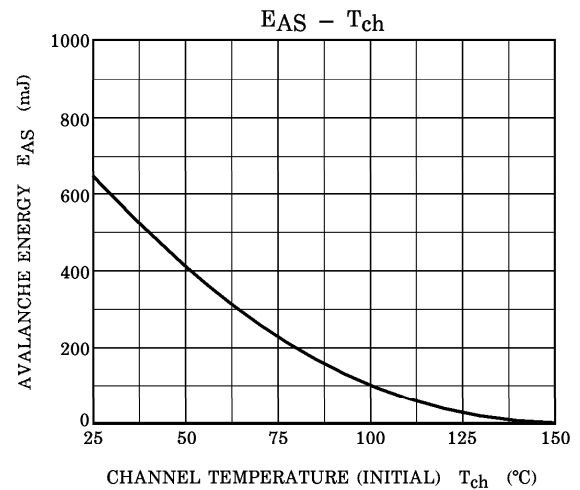
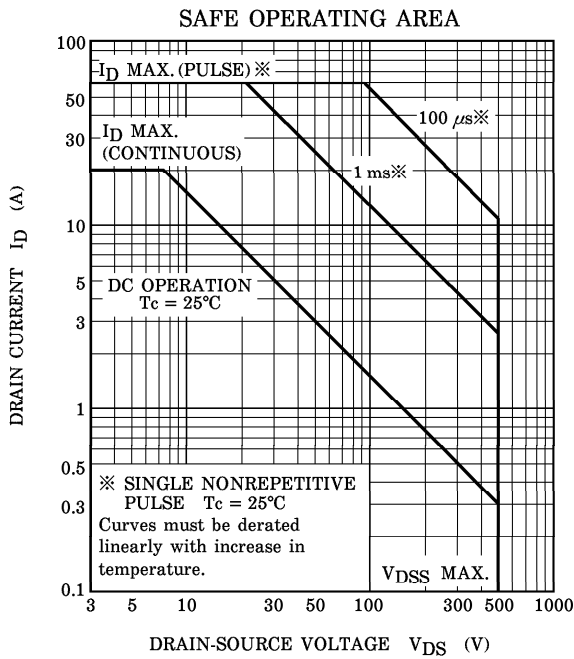
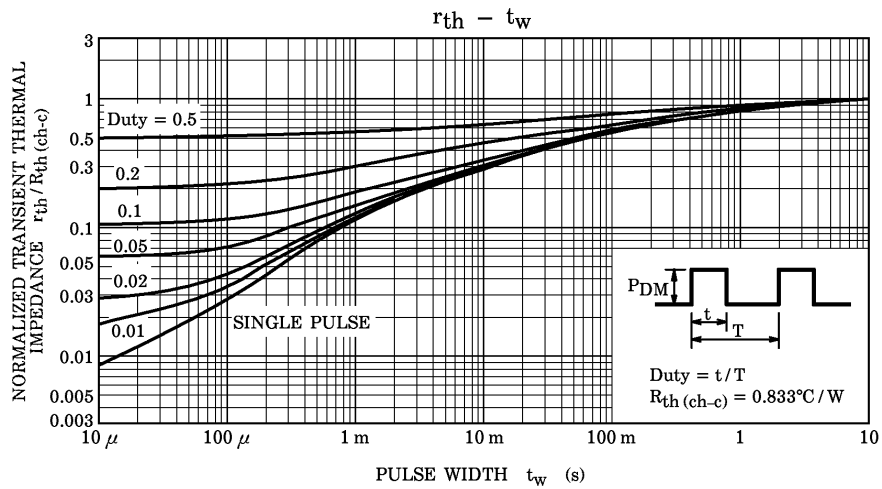
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = 15 A$, $R_G = 25 \Omega$, $V_{DD} = 90 V$, $L = 4.76 mH$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$$