

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

2SK2996

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

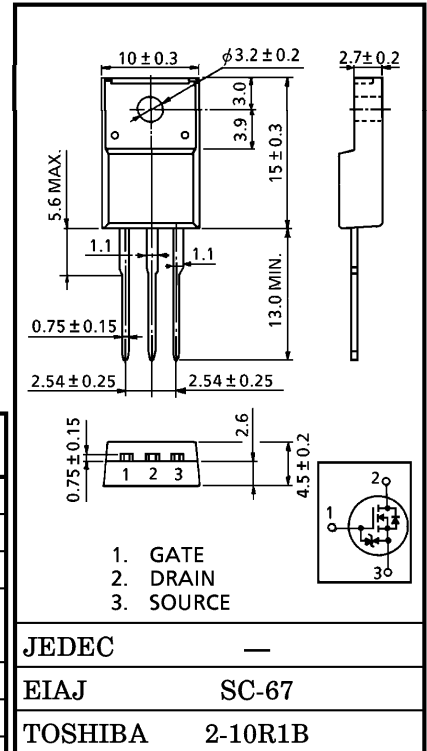
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.74 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 6.8 S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu A$ (Max.) ($V_{DS} = 600 V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0 V$
($V_{DS} = 10 V, I_D = 1 mA$)

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

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|--|-----------|----------------|------------|
| Drain-Source Voltage | V_{DSS} | 600 | V |
| Drain-Gate Voltage ($R_{GS} = 20 k\Omega$) | V_{DGR} | 600 | V |
| Gate-Source Voltage | V_{GSS} | ± 30 | V |
| Drain Current | DC | I_D | 10 |
| | Pulse | I_{DP} | 30 |
| Drain Power Dissipation ($T_c = 25^\circ C$) | P_D | 45 | W |
| Single Pulse Avalanche Energy** | E_{AS} | 252 | mJ |
| Avalanche Current | I_{AR} | 10 | A |
| Repetitive Avalanche Energy* | E_{AR} | 4.5 | mJ |
| Channel Temperature | T_{ch} | 150 | $^\circ C$ |
| Storage Temperature Range | T_{stg} | $-55 \sim 150$ | $^\circ C$ |



Weight : 1.9 g

THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|--|----------------|------|--------------|
| Thermal Resistance, Channel to Case | $R_{th(ch-c)}$ | 2.78 | $^\circ C/W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 62.5 | $^\circ C/W$ |

Note ;

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

** $V_{DD} = 90 V, T_{ch} = 25^\circ C$ (initial), $L = 4.41 mH, R_G = 25 \Omega, I_{AR} = 10 A$

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

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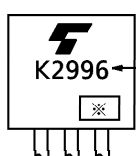
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| 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 = ±10 μA, V _{DS} = 0 V | ±30 | — | — | V | |
| Drain Cut-off Current | I _{DSS} | V _{DS} = 600 V, V _{GS} = 0 V | — | — | 100 | μA | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | I _D = 10 mA, V _{GS} = 0 V | 600 | — | — | 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 = 5 A | — | 0.74 | 1.0 | Ω | |
| Forward Transfer Admittance | Y _{fs} | V _{DS} = 10 V, I _D = 5 A | 3.4 | 6.8 | — | S | |
| Input Capacitance | C _{iss} | V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz | — | 1500 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | | — | 13 | — | | |
| Output Capacitance | C _{oss} | | — | 140 | — | | |
| Switching Time | Rise Time | t _r | | — | 15 | — | ns |
| | Turn-on Time | t _{on} | | — | 55 | — | |
| | Fall Time | t _f | | — | 27 | — | |
| | Turn-off Time | t _{off} | | V _{IN} : t _r , t _f < 5 ns, Duty ≤ 1%, t _w = 10 μs | — | 145 | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | Q _g | V _{DD} ≐ 400 V, V _{GS} = 10 V, I _D = 10 A | — | 38 | — | nC | |
| Gate-Source Charge | Q _{gs} | | — | 21 | — | | |
| Gate-Drain (“Miller”) Charge | Q _{gd} | | — | 17 | — | | |

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

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-------------------|---|------|------|------|------|
| Continuous Drain Reverse Current | I _{DR} | — | — | — | 10 | A |
| Pulse Drain Reverse Current | I _{DRP} | — | — | — | 30 | A |
| Diode Forward Voltage | V _{DSSF} | I _{DR} = 10 A, V _{GS} = 0 V | — | — | -1.7 | V |
| Reverse Recovery Time | t _{rr} | I _{DR} = 10 A, V _{GS} = 0 V | — | 1600 | — | ns |
| Reverse Recovery Charge | Q _{rr} | dI _{DR} / dt = 100 A / μs | — | 17 | — | μC |

MARKING

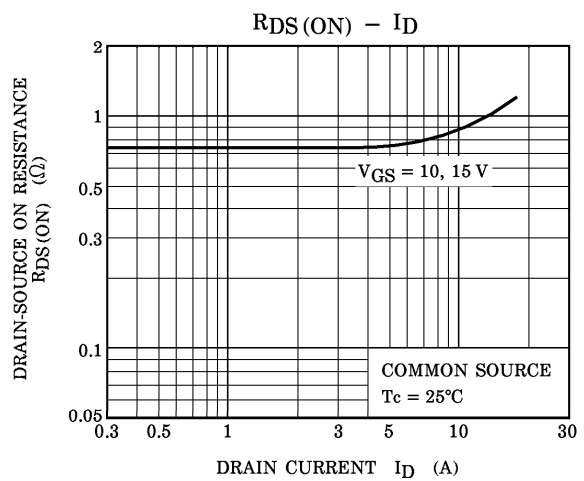
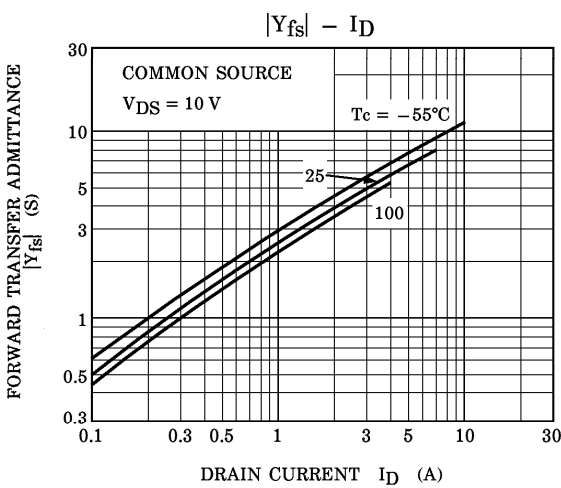
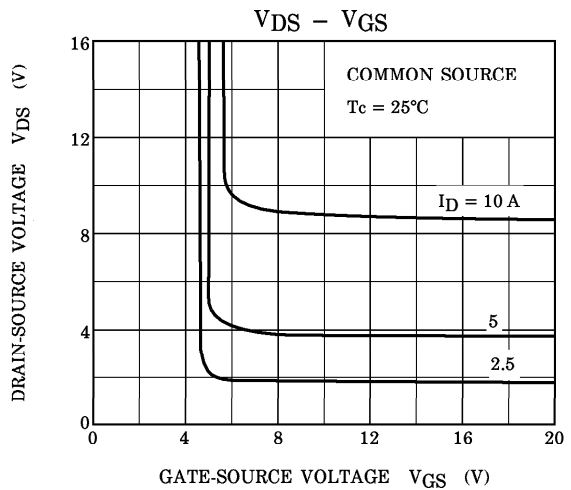
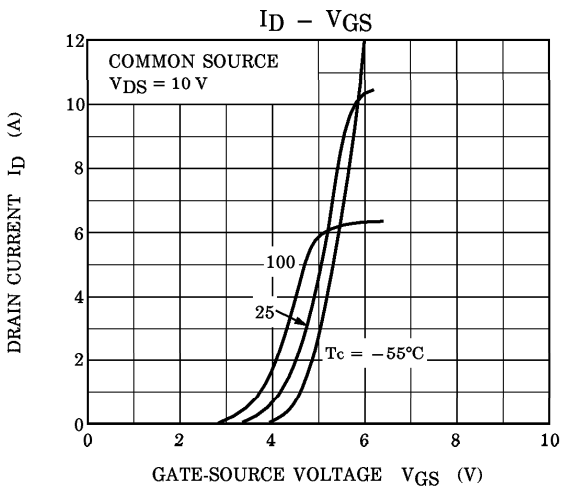
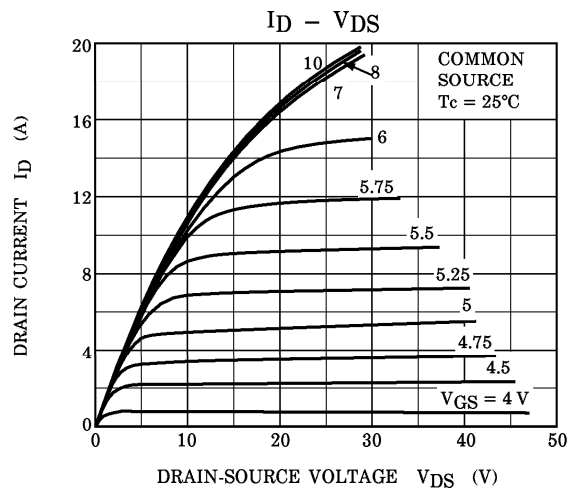
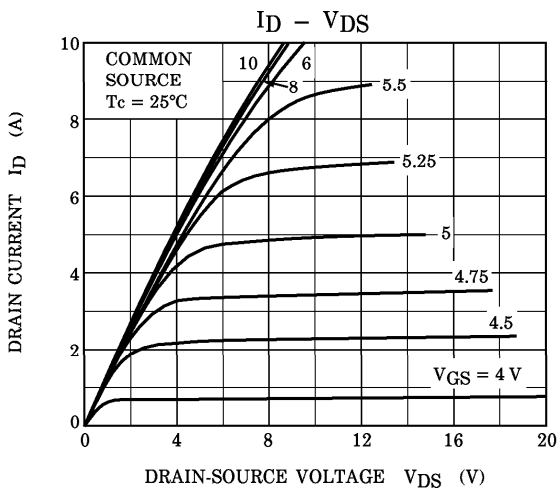


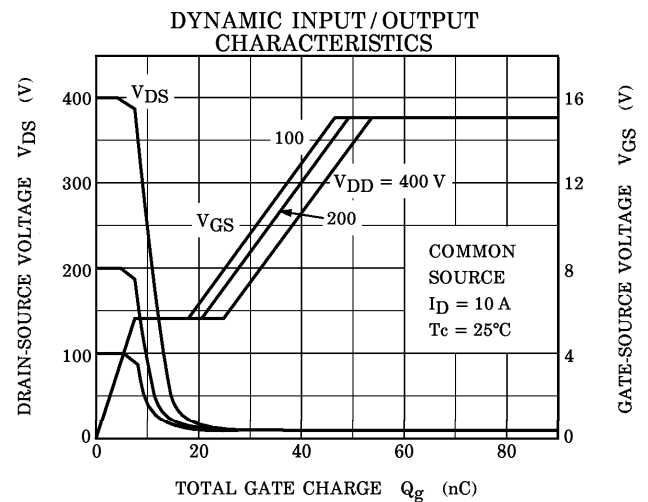
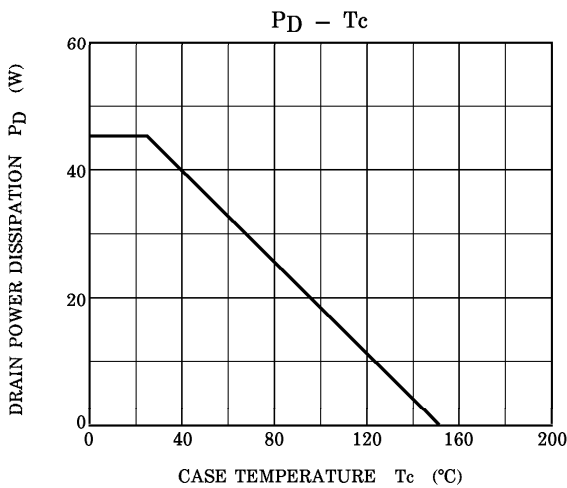
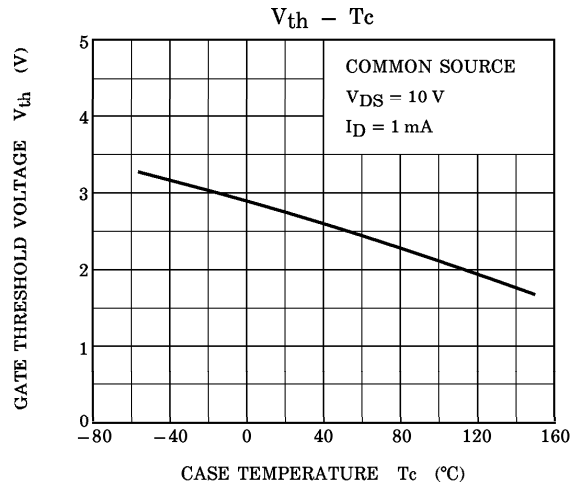
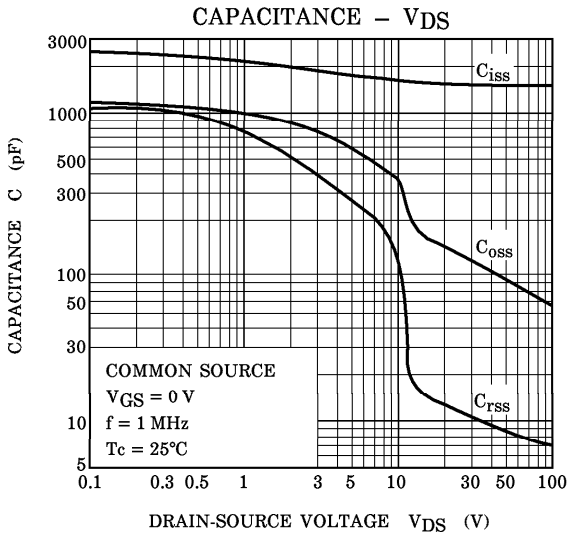
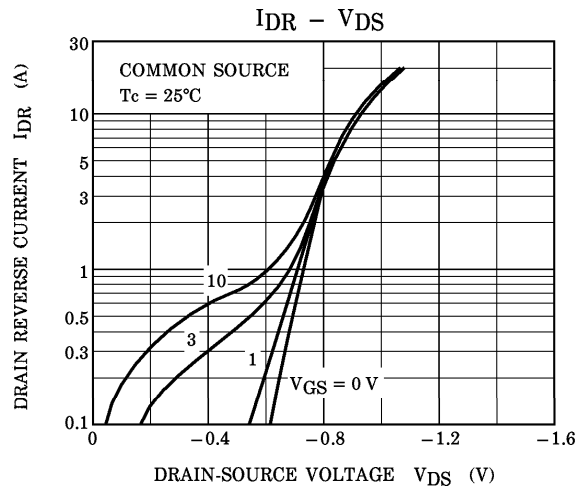
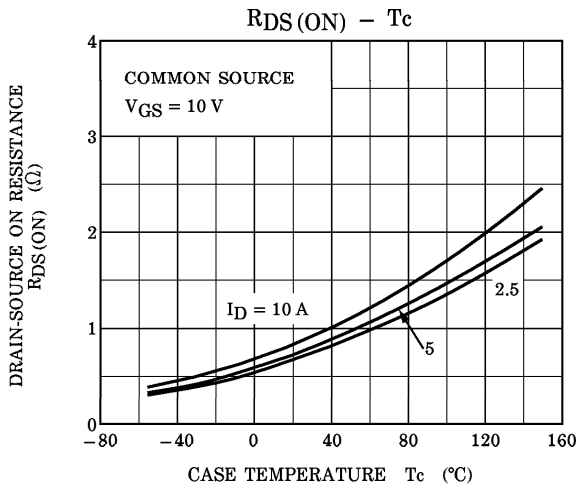
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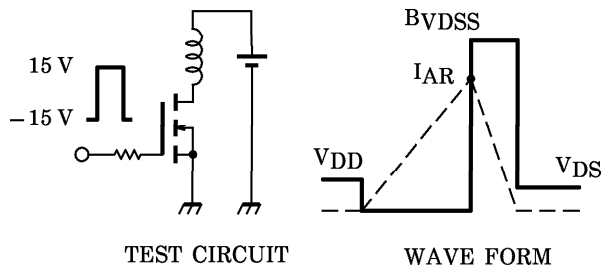
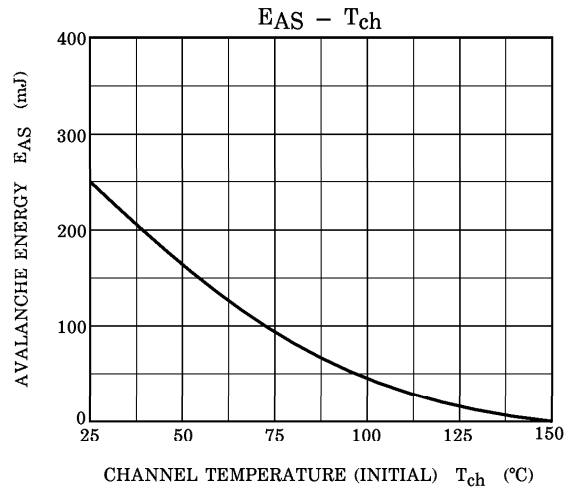
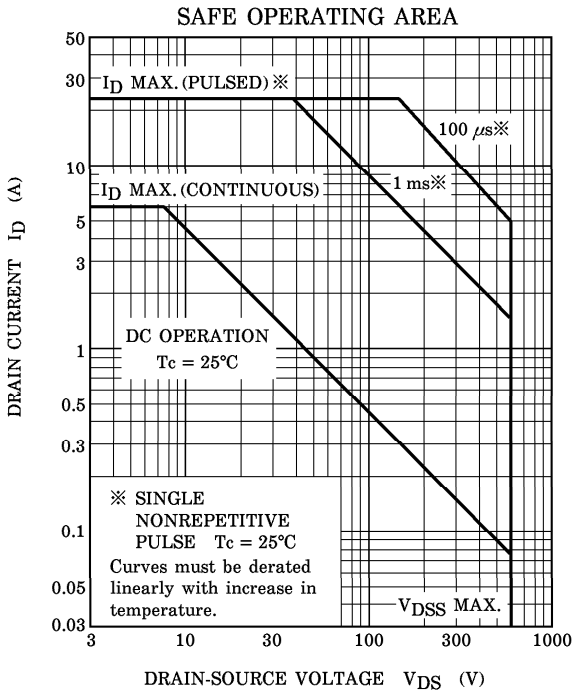
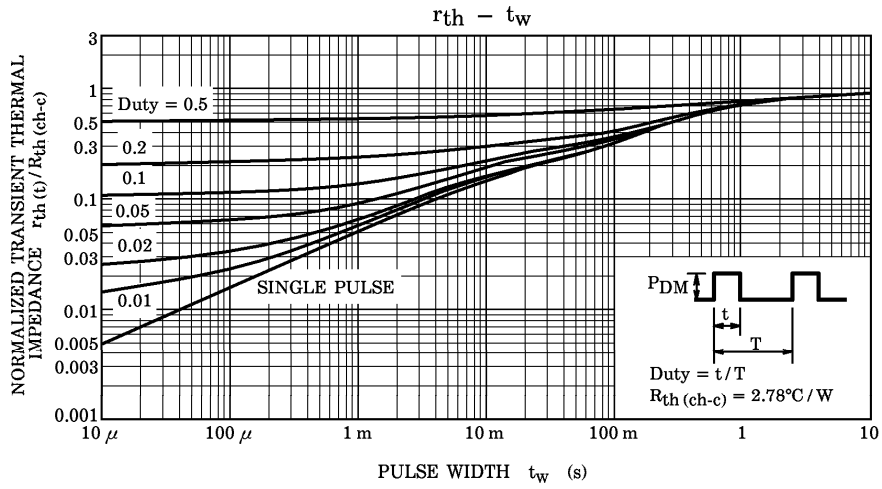
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$Peak\ I_{AR} = 10\text{ A}, R_G = 25\ \Omega$
 $V_{DD} = 90\text{ V}, L = 4.41\text{ mH}$
 $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$