

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

2SK2847

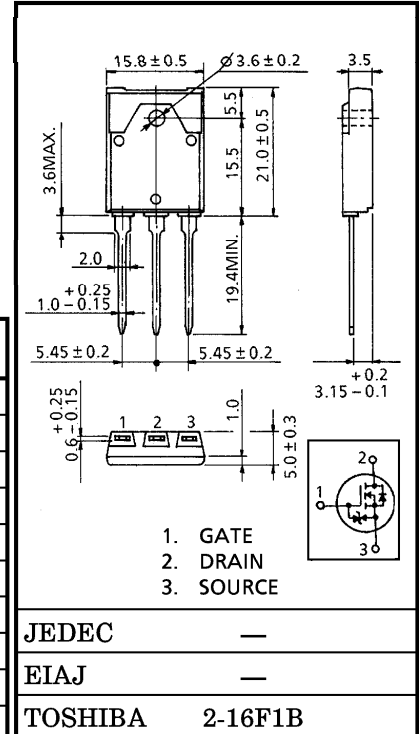
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS
Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 1.1\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 7.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 720V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0V$ ($V_{DS} = 10V, I_D = 1mA$)

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

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|-------|-----------|----------------|------------|
| Drain-Source Voltage | | V_{DSS} | 900 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | | V_{DGR} | 900 | V |
| Gate-Source Voltage | | V_{GSS} | ± 30 | V |
| Drain Current | DC | I_D | 8 | A |
| | Pulse | I_{DP} | 24 | A |
| Drain Power Dissipation ($T_c = 25^\circ C$) | | P_D | 85 | W |
| Single Pulse Avalanche Energy** | | E_{AS} | 799 | mJ |
| Avalanche Current | | I_{AR} | 8 | A |
| Repetitive Avalanche Energy* | | E_{AR} | 8.5 | mJ |
| Channel Temperature | | T_{ch} | 150 | $^\circ C$ |
| Storage Temperature Range | | T_{stg} | $-55 \sim 150$ | $^\circ C$ |



Weight : 5.8g (Typ.)

THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|--|----------------|------|----------------|
| Thermal Resistance, Channel to Case | $R_{th(ch-c)}$ | 1.47 | $^\circ C / W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 41.6 | $^\circ C / W$ |

Note ;

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

** $V_{DD} = 90V$, Starting $T_{ch} = 25^\circ C$, $L = 22.9mH$, $R_G = 25\Omega$, $I_{AR} = 8A$

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

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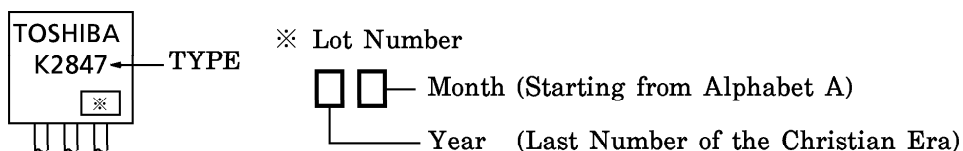
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

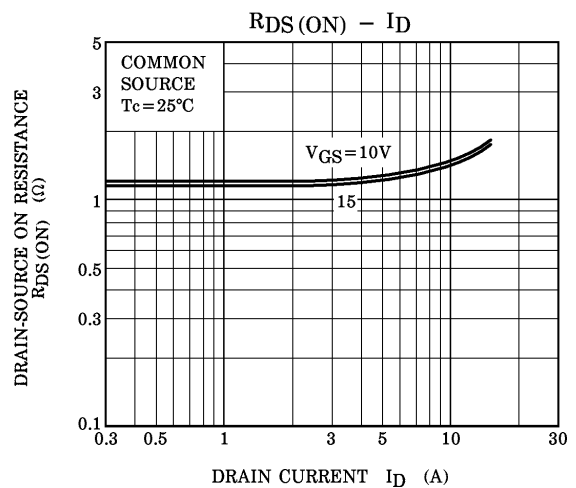
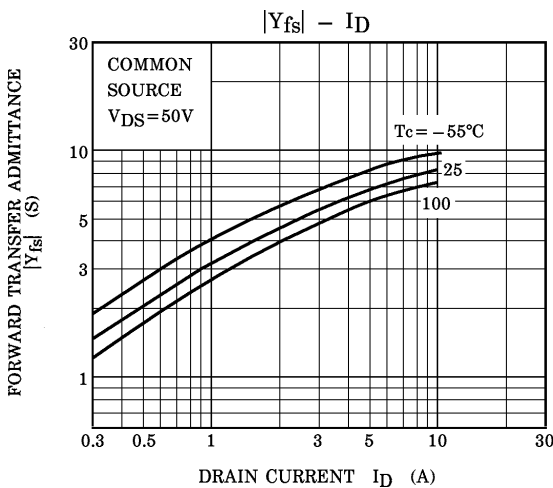
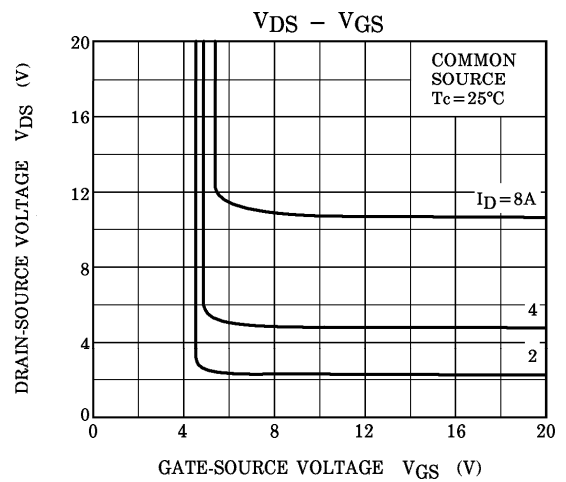
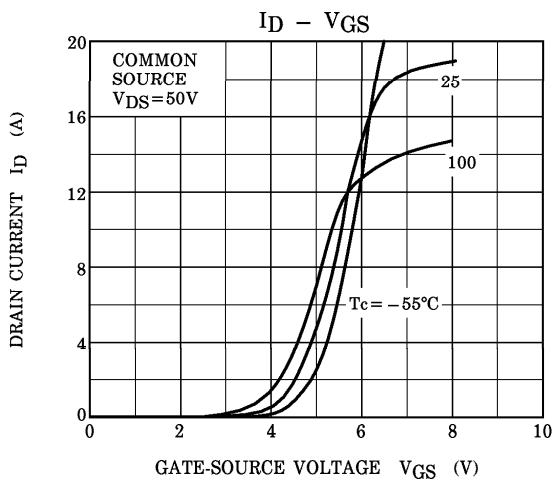
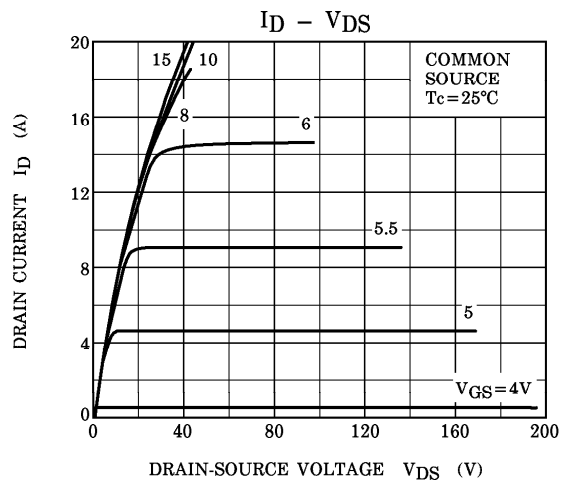
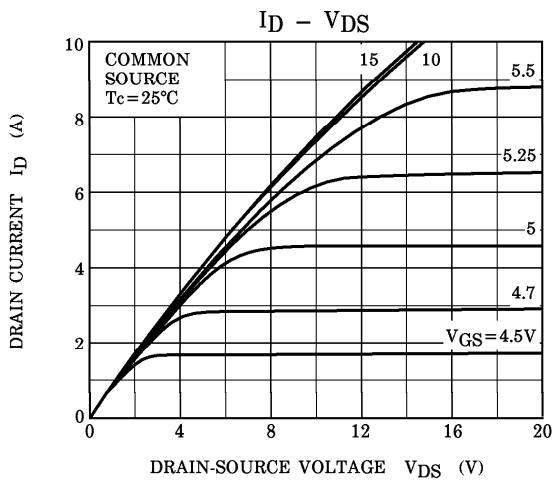
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---------------|---------------|--|--|------|----------|----------|
| Gate Leakage Current | | I_{GSS} | $V_{GS} = \pm 30V, V_{DS} = 0V$ | — | — | ± 10 | μA |
| Gate-Source Breakdown Voltage | | $V_{(BR)GSS}$ | $I_G = \pm 10\mu A, V_{DS} = 0V$ | ± 30 | — | — | V |
| Drain Cut-off Current | | I_{DSS} | $V_{DS} = 720V, V_{GS} = 0V$ | — | — | 100 | μA |
| Drain-Source Breakdown Voltage | | $V_{(BR)DSS}$ | $I_D = 10mA, V_{GS} = 0V$ | 900 | — | — | V |
| Gate Threshold Voltage | | V_{th} | $V_{DS} = 10V, I_D = 1mA$ | 2.0 | — | 4.0 | V |
| Drain-Source ON Resistance | | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 4A$ | — | 1.1 | 1.4 | Ω |
| Forward Transfer Admittance | | $ Y_{fs} $ | $V_{DS} = 15V, I_D = 4A$ | 3.0 | 7.0 | — | S |
| Input Capacitance | | C_{iss} | $V_{DS} = 25V, V_{GS} = 0V,$ $f = 1MHz$ | — | 2040 | — | pF |
| Reverse Transfer Capacitance | | C_{rss} | | — | 45 | — | |
| Output Capacitance | | C_{oss} | | — | 190 | — | |
| Switching Time | Rise Time | t_r | | — | 25 | — | ns |
| | Turn-on Time | t_{on} | | — | 60 | — | |
| | Fall Time | t_f | | — | 20 | — | |
| | Turn-off Time | t_{off} | | $V_{IN} : t_r, t_f < 5ns,$ $Duty \leq 1\%, t_w = 10\mu s$ | — | 95 | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Q_g | $V_{DD} \approx 400V, V_{GS} = 10V,$ $I_D = 8A$ | — | 58 | — | nC |
| Gate-Source Charge | | Q_{gs} | | — | 32 | — | |
| Gate-Drain ("Miller") Charge | | Q_{gd} | | — | 26 | — | |

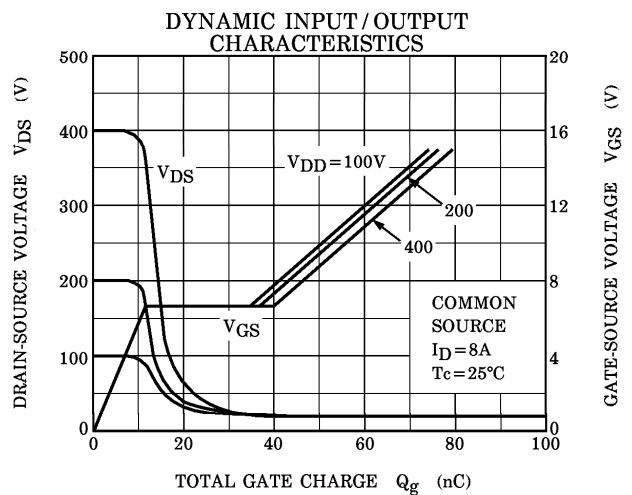
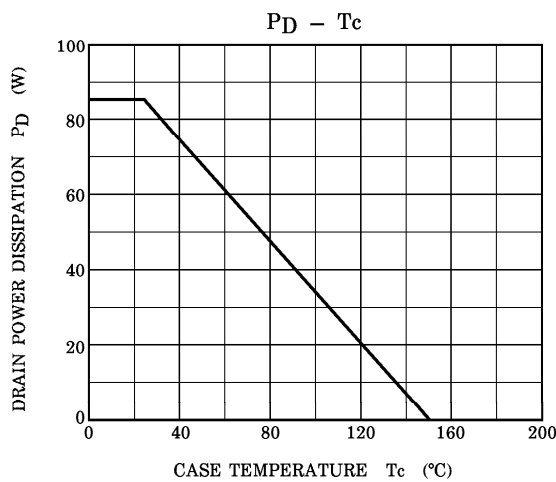
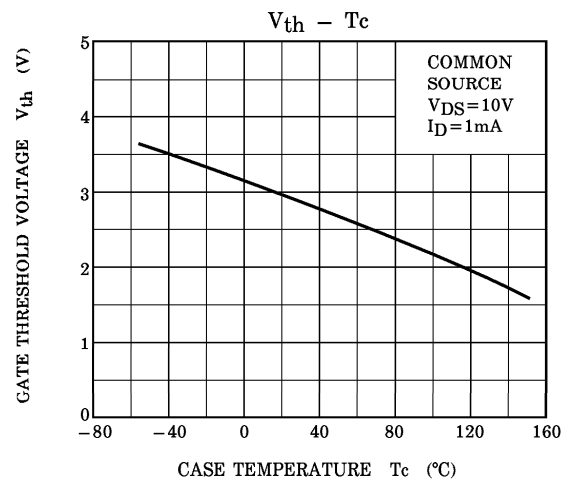
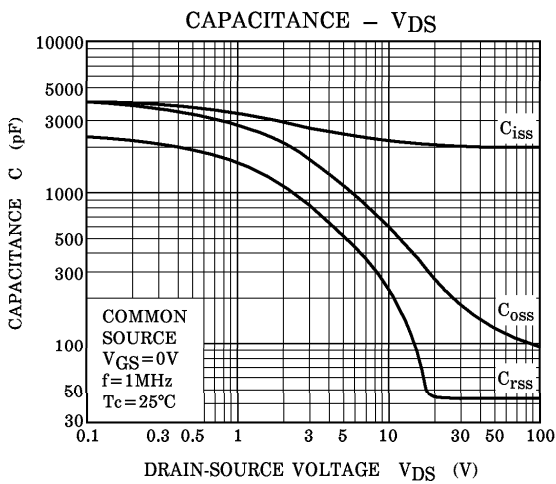
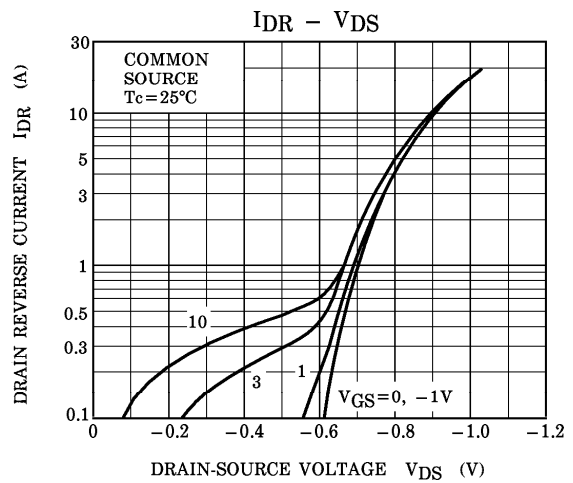
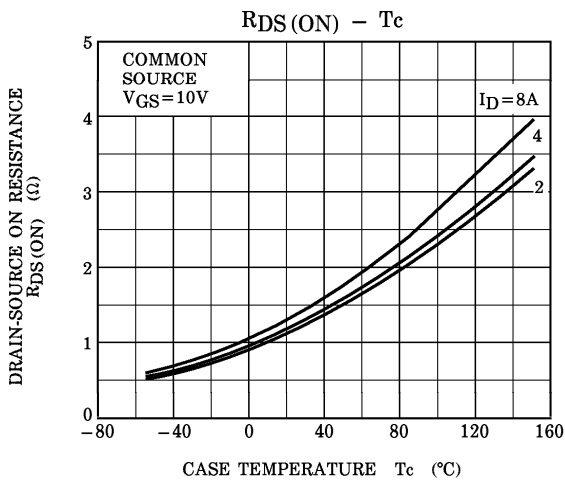
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

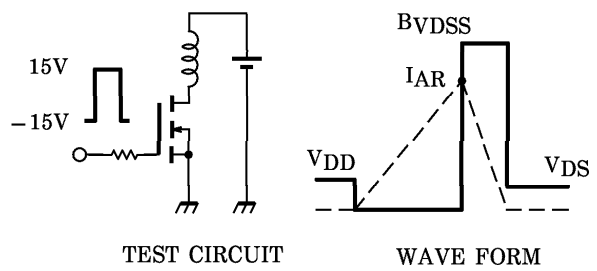
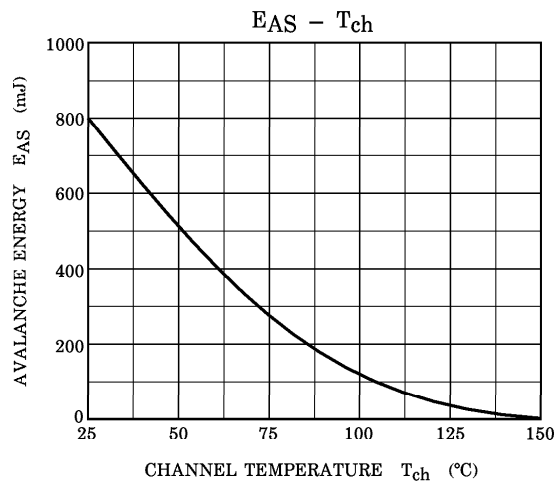
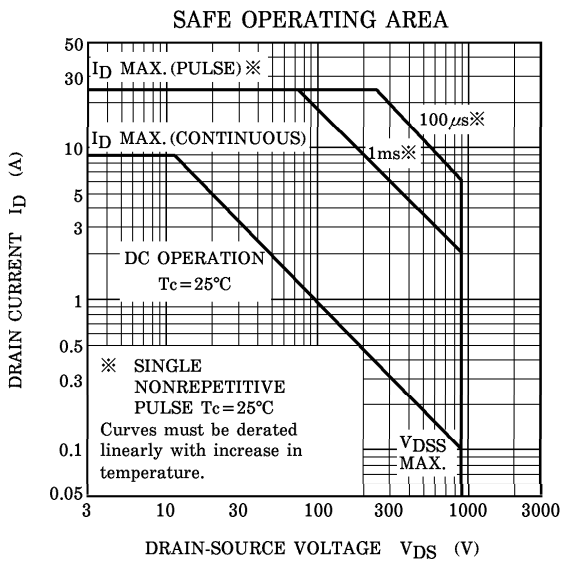
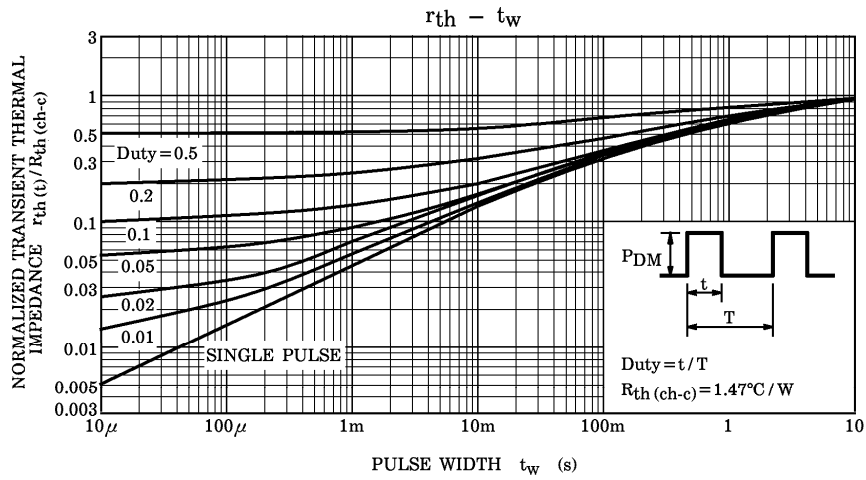
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------|-------------------------------|------|------|------|---------|
| Continuous Drain Reverse Current | I_{DR} | — | — | — | 8 | A |
| Pulse Drain Reverse Current | I_{DRP} | — | — | — | 24 | A |
| Diode Forward Voltage | V_{DSF} | $I_{DR} = 8A, V_{GS} = 0V$ | — | — | -1.9 | V |
| Reverse Recovery Time | t_{rr} | $I_{DR} = 8A, V_{GS} = 0V$ | — | 1650 | — | ns |
| Reverse Recovery Charge | Q_{rr} | $dI_{DR} / dt = 100A / \mu s$ | — | 21 | — | μC |

MARKING









Peak $I_{AR} = 8A$, $R_G = 25\Omega$
 $V_{DD} = 90V$, $L = 22.9mH$

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