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

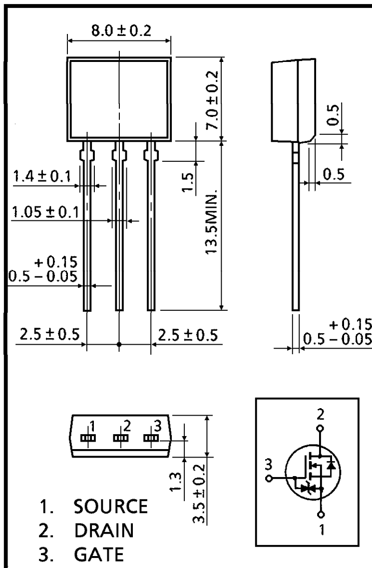
# 2SK2835

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

Unit in mm




| | |
|---|---|
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | 2-8M1B |

Weight : 0.54g

- Low Drain-Source ON Resistance : $R_{DS\,(ON)} = 0.56\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 4.5S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 200V$)
- Enhancement-Mode : $V_{th} = 1.5\sim3.5V$ ($V_{DS} = 10V$, $I_D = 1mA$)

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 200 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | | $V_{DGR}$ | 200 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Drain Current | DC | $I_D$ | 5 | A |
| | Pulse | $I_{DP}$ | 20 | |
| Drain Power Dissipation (Ta = 25°C) | | $P_D$ | 1.3 | W |
| Single Pulse Avalanche Energy** | | $E_{AS}$ | 65 | mJ |
| Avalanche Current | | $I_{AR}$ | 5 | A |
| Repetitive Avalanche Energy* | | $E_{AR}$ | 0.13 | mJ |
| Channel Temperature | | $T_{ch}$ | 150 | °C |
| Storage Temperature Range | | $T_{stg}$ | −55~150 | °C |

THERMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|---|---|---|---|
| Thermal Resistance, Channel to Ambient | $R_{th\,(ch-a)}$ | 96.1 | °C / W |

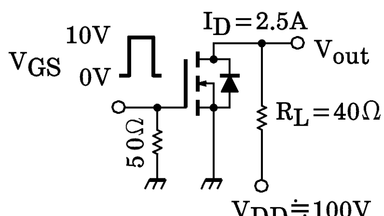
Note ;

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

** $V_{DD} = 50V$, Starting $T_{ch} = 25°C$, $L = 4.2mH$, $R_G = 25\Omega$, $I_{AR} = 5A$

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

ELECTRICAL CHARACTERISTICS ($Ta = 25°C$)

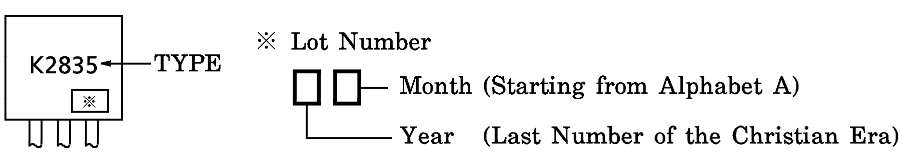
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Gate Leakage Current | | $I_{GSS}$ | $V_{GS} = \pm 16V$, $V_{DS} = 0V$ | — | — | ±10 | μA |
| Drain Cut-off Current | | $I_{DSS}$ | $V_{DS} = 200V$, $V_{GS} = 0V$ | — | — | 100 | μA |
| Drain-Source Breakdown Voltage | | $V_{(BR)DSS}$ | $I_D = 10mA$, $V_{GS} = 0V$ | 200 | — | — | V |
| Gate Threshold Voltage | | $V_{th}$ | $V_{DS} = 10V$, $I_D = 1mA$ | 1.5 | — | 3.5 | V |
| Drain-Source ON Resistance | | $R_{DS(ON)}$ | $V_{GS} = 10V$, $I_D = 2.5A$ | — | 0.56 | 0.8 | Ω |
| Forward Transfer Admittance | | $\|Y_{fs}\|$ | $V_{DS} = 10V$, $I_D = 2.5A$ | 2.0 | 4.5 | — | S |
| Input Capacitance | | $C_{iss}$ | $V_{DS} = 10V$, $V_{GS} = 0V$ f = 1MHz | — | 440 | — | pF |
| Reverse Transfer Capacitance | | $C_{rss}$ | | — | 35 | — | |
| Output Capacitance | | $C_{oss}$ | | — | 120 | — | |
| Switching Time | Rise Time | $t_r$ |  $V_{IN}$ : $t_r$, $t_f < 5ns$, Duty ≦ 1%, $t_w = 10\mu s$ | — | 15 | — | ns |
| | Turn-on Time | $t_{on}$ | | — | 20 | — | |
| | Fall Time | $t_f$ | | — | 15 | — | |
| | Turn-off Time | $t_{off}$ | | — | 60 | — | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | $Q_g$ | $V_{DD} ≒ 100V$, $V_{GS} = 10V$ $I_D = 5A$ | — | 10 | — | nC |
| Gate-Source Charge | | $Q_{gs}$ | | — | 6 | — | |
| Gate-Drain ("Miller") Charge | | $Q_{gd}$ | | — | 4 | — | |



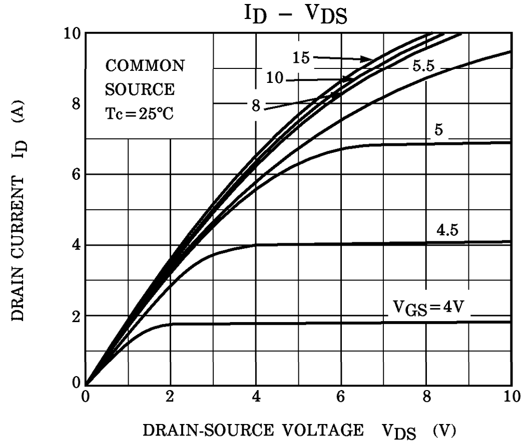
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($Ta = 25°C$)

| 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 | $V_{DSF}$ | $I_{DR} = 5A$, $V_{GS} = 0V$ | — | — | −2.0 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_{DR} = 5A$, $V_{GS} = 0V$ $dI_{DR} / dt = 100A / \mu s$ | — | 150 | — | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | — | 0.45 | — | μC |

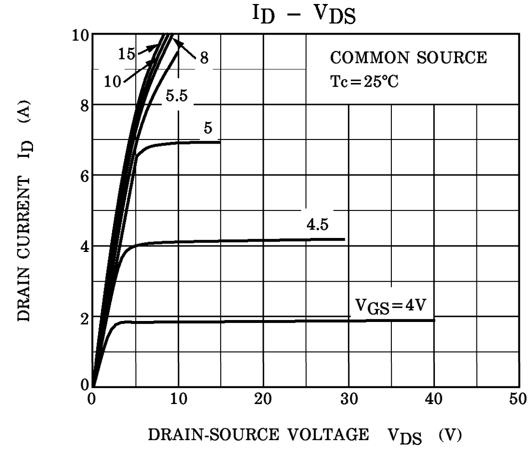
MARKING



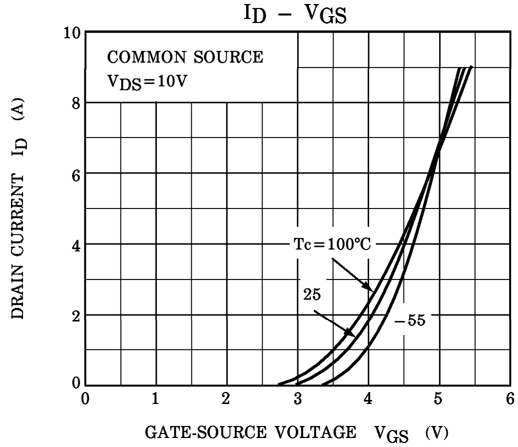
$I_D - V_{DS}$



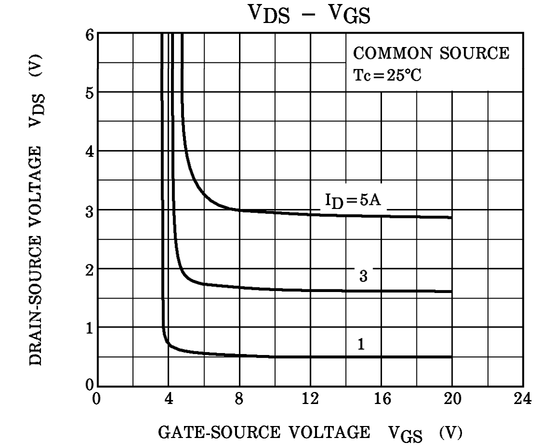

$I_D - V_{DS}$



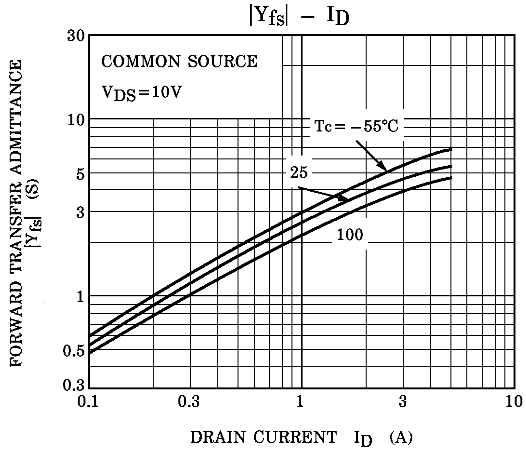

$I_D - V_{GS}$



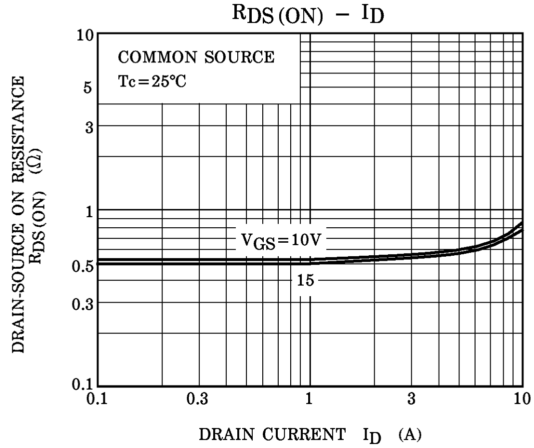

$V_{DS} - V_{GS}$



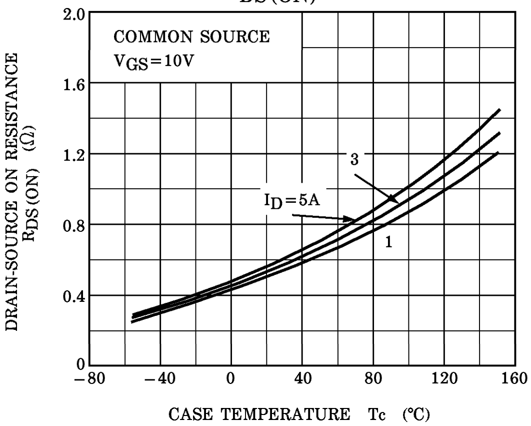

$|Y_{fs}| - I_D$



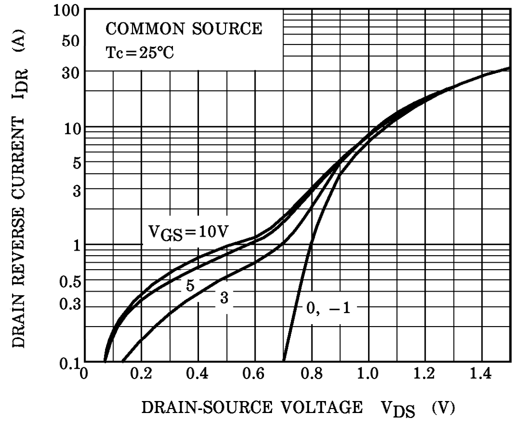

$R_{DS(ON)} - I_D$



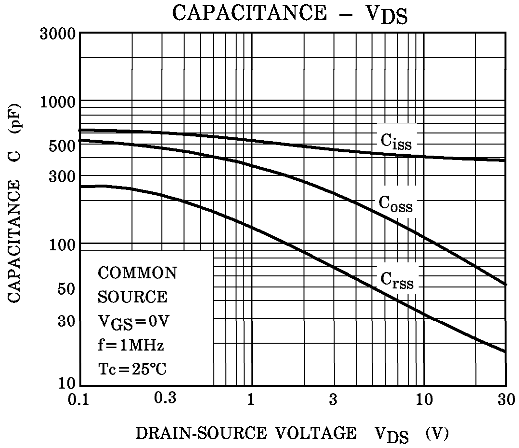
$R_{DS(ON)}$ – Tc



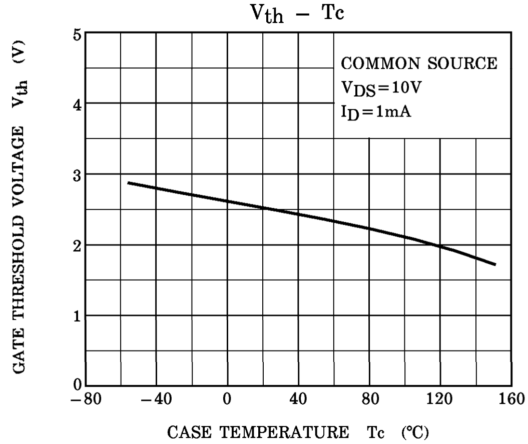

$I_{DR}$ – $V_{DS}$



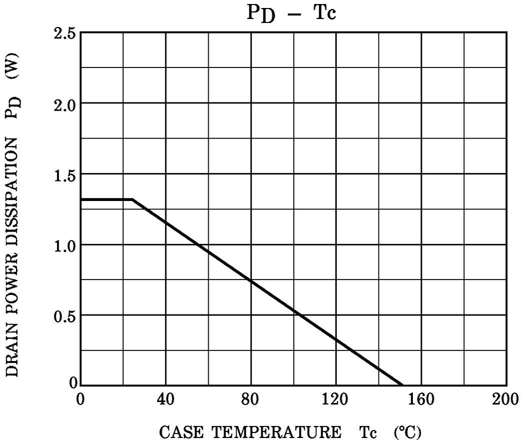

CAPACITANCE – $V_{DS}$

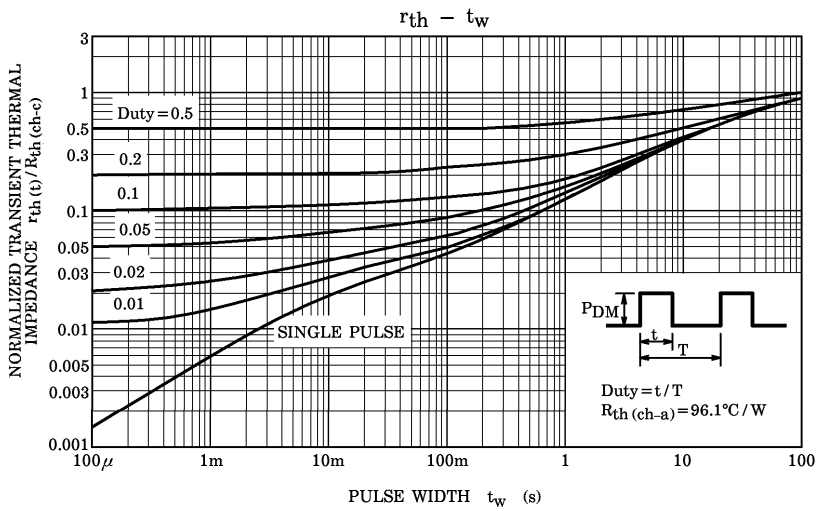


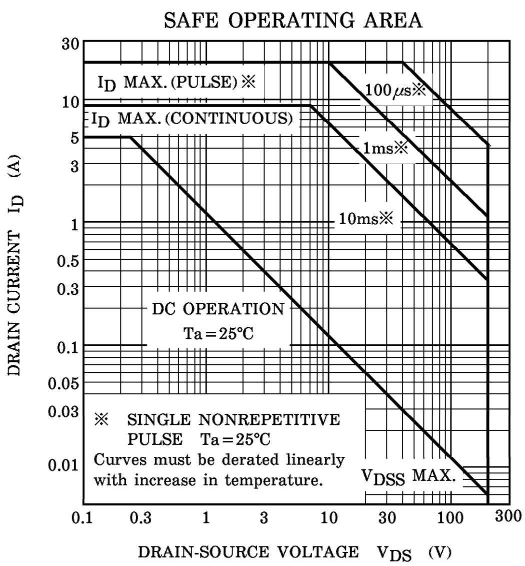

$V_{th}$ – Tc

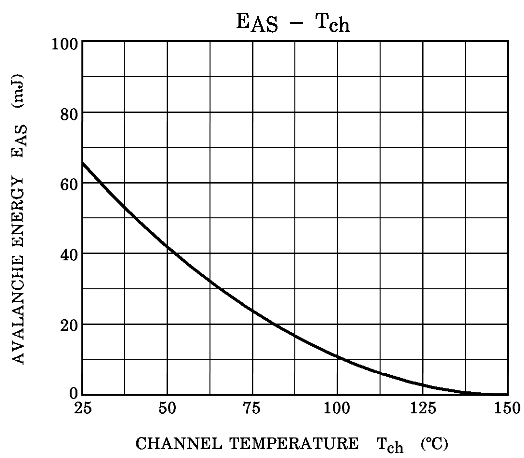


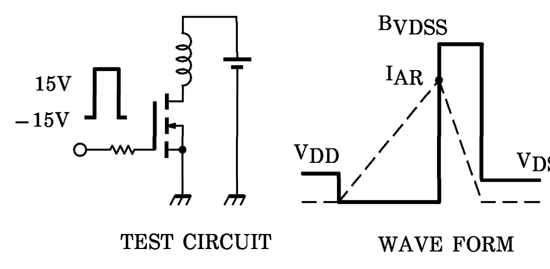

$P_D$ – Tc






Peak $I_{AR}$=5A, $R_G$=25Ω
$V_{DD}$=25V, L=4.2mH

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