

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L²-π-MOSV)

2SK2782

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- 4V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.039\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 11S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 60V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0V$ ($V_{DS} = 10V, I_D = 1mA$)

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|-----------|----------|------|
| Drain-Source Voltage | V_{DSS} | 60 | V |
| Drain-Gate Voltage ($R_{GS} = 20k\Omega$) | V_{DGR} | 60 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Drain Current | DC | I_D | 20 A |
| | Pulse | I_{DP} | 50 A |
| Drain Power Dissipation (Tc = 25°C) | P_D | 40 | W |
| Single Pulse Avalanche Energy** | E_{AS} | 156 | mJ |
| Avalanche Current | I_{AR} | 20 | A |
| Repetitive Avalanche Energy* | E_{AR} | 4 | mJ |
| Channel Temperature | T_{ch} | 150 | °C |
| Storage Temperature Range | T_{stg} | -55~150 | °C |

THEMAL CHARACTERISTICS

| CHARACTERISTIC | SYMBOL | MAX. | UNIT |
|--|----------------|-------|------|
| Thermal Resistance, Channel to Case | $R_{th(ch-c)}$ | 3.125 | °C/W |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 125 | °C/W |

Note ;

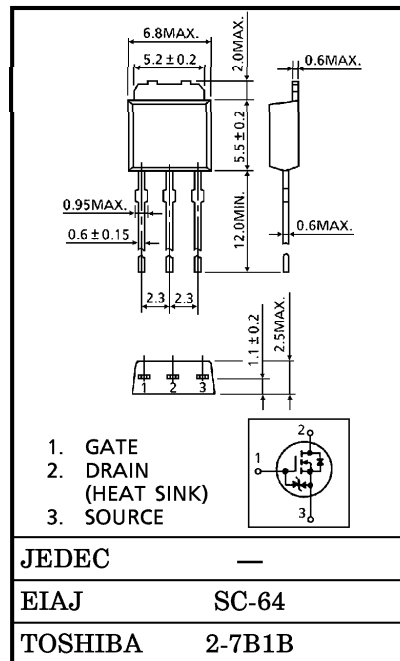
* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** $V_{DD} = 25V$, Starting $T_{ch} = 25^\circ C$, $L = 530\mu H$, $R_G = 25\Omega$, $I_D = 20A$

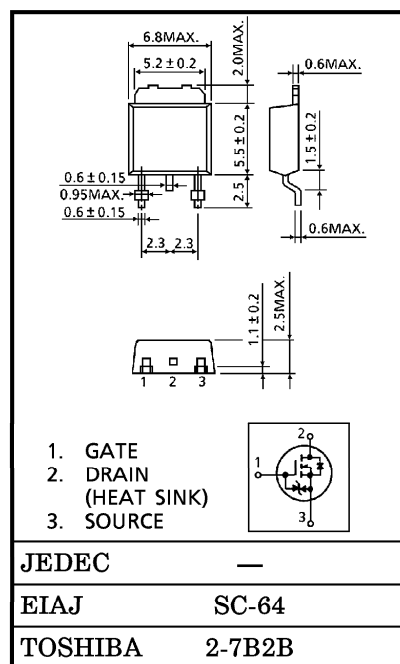
This transistor is an electrostatic sensitive device. Please handle with caution.

INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 0.36g

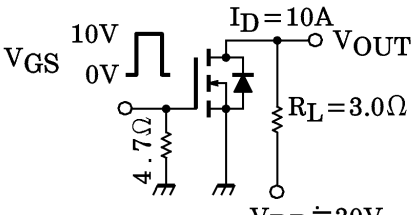


Weight : 0.36g

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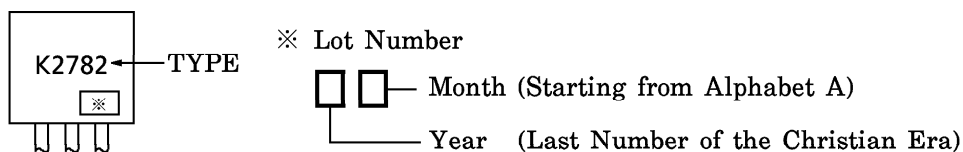
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

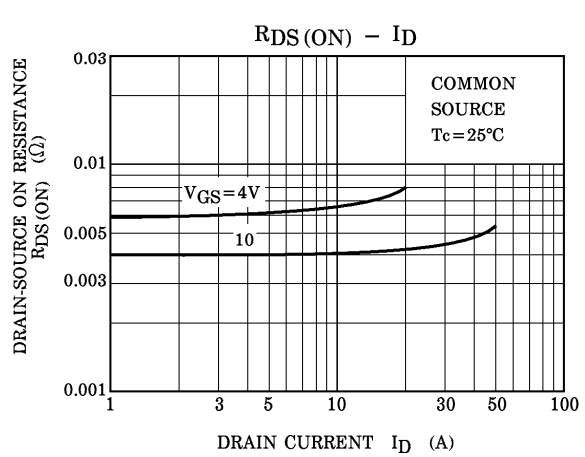
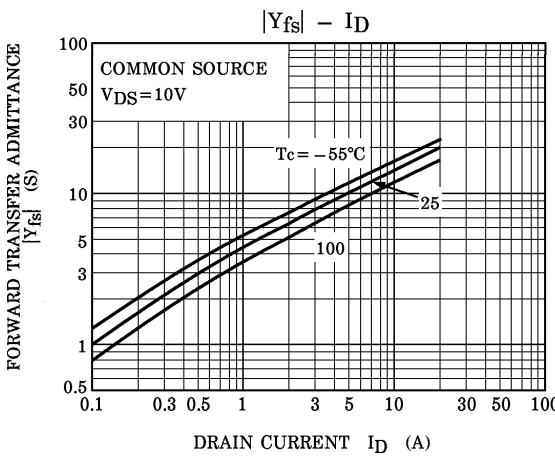
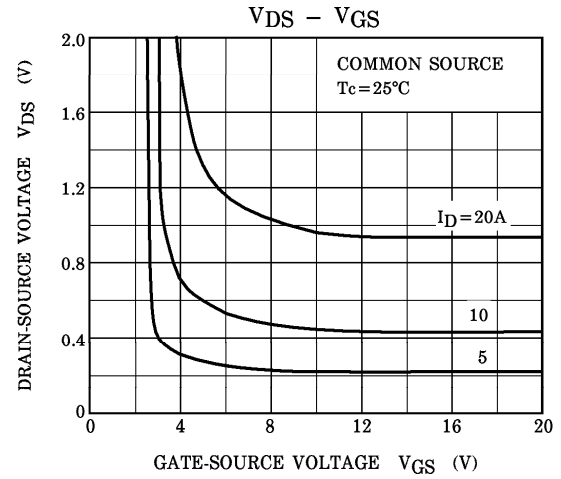
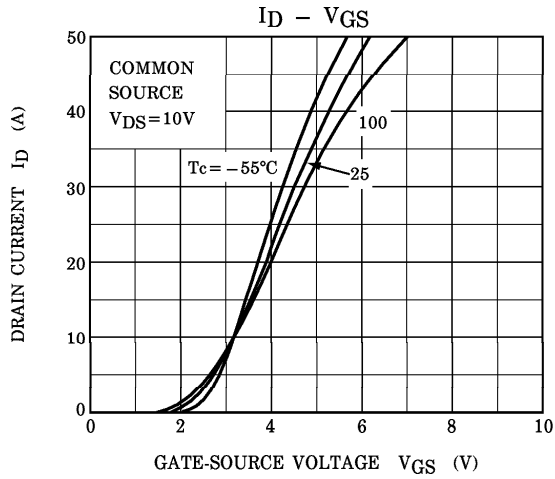
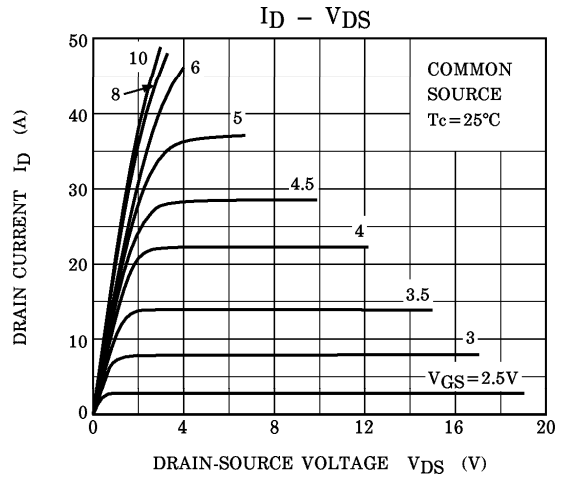
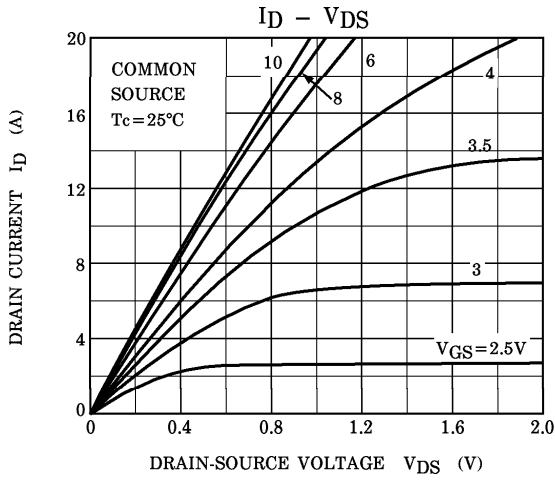
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---------------|----------|---|---|-------|-------|------|
| Gate Leakage Current | | IGSS | VGS = ±16V, VDS = 0V | — | — | ±10 | μA |
| Drain Cut-off Current | | IDSS | VDS = 60V, VGS = 0V | — | — | 100 | μA |
| Drain-Source Breakdown Voltage | | V(BR)DSS | ID = 10mA, VGS = 0V | 60 | — | — | V |
| Gate Threshold Voltage | | Vth | VDS = 10V, ID = 1mA | 0.8 | — | 2.0 | V |
| Drain-Source ON Resistance | | RDS(ON) | VGS = 4V, ID = 5A | — | 0.06 | 0.09 | Ω |
| | | | VGS = 10V, ID = 10A | — | 0.039 | 0.055 | |
| Forward Transfer Admittance | | Yfs | VDS = 10V, ID = 10A | 7 | 11 | — | S |
| Input Capacitance | | Ciss | VDS = 10V, VGS = 0V f = 1MHz | — | 880 | — | pF |
| Reverse Transfer Capacitance | | Crss | | — | 90 | — | |
| Output Capacitance | | Coss | | — | 330 | — | |
| Switching Time | Rise Time | tr |  | — | 15 | — | ns |
| | Turn-on Time | ton | | — | 25 | — | |
| | Fall Time | tf | | — | 30 | — | |
| | Turn-off Time | toff | | VIN : tr, tf < 5ns, Duty ≤ 1%, tw = 10μs | — | 100 | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Qg | VDD ≐ 48V, VGS = 10V ID = 20A | — | 25 | — | nC |
| Gate-Source Charge | | Qgs | | — | 19 | — | |
| Gate-Drain ("Miller") Charge | | Qgd | | — | 6 | — | |

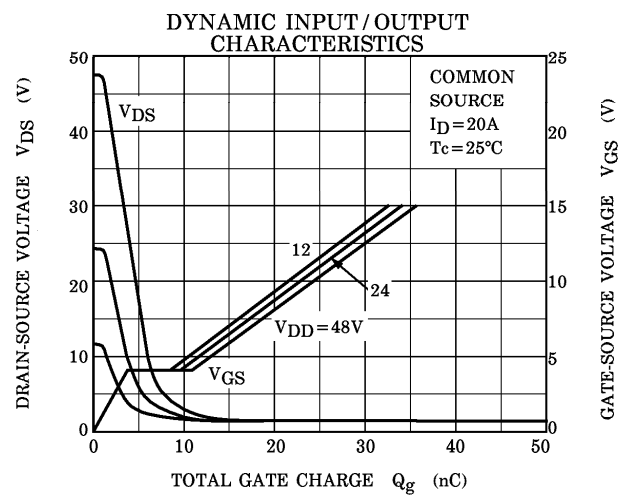
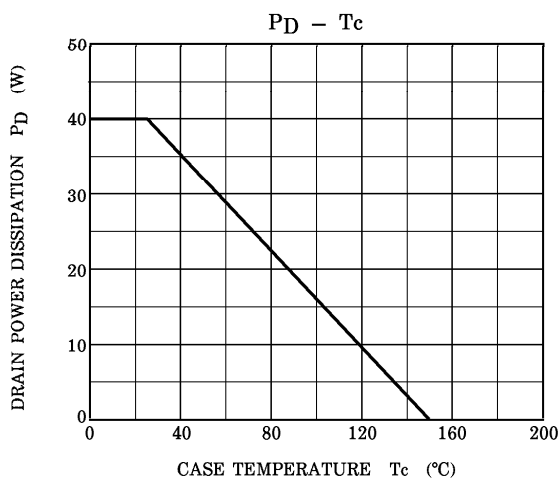
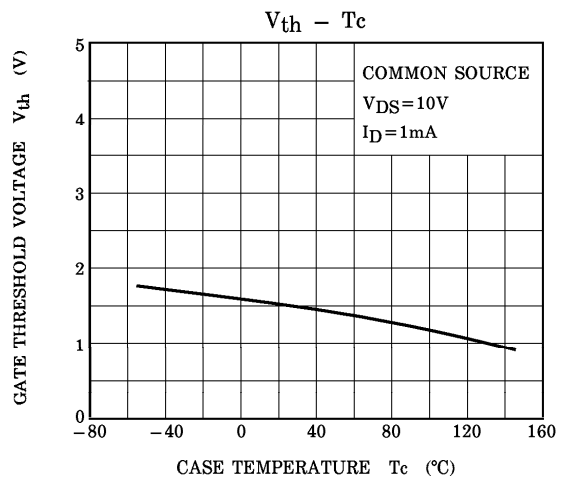
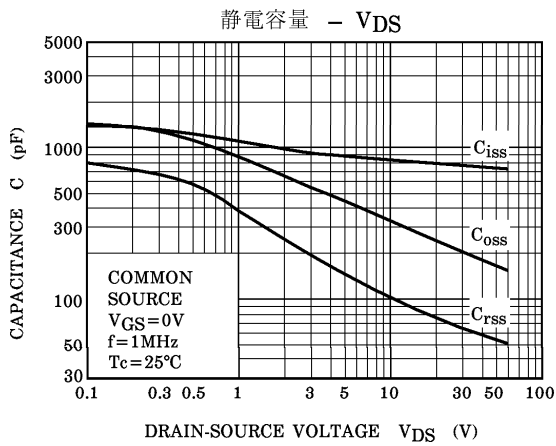
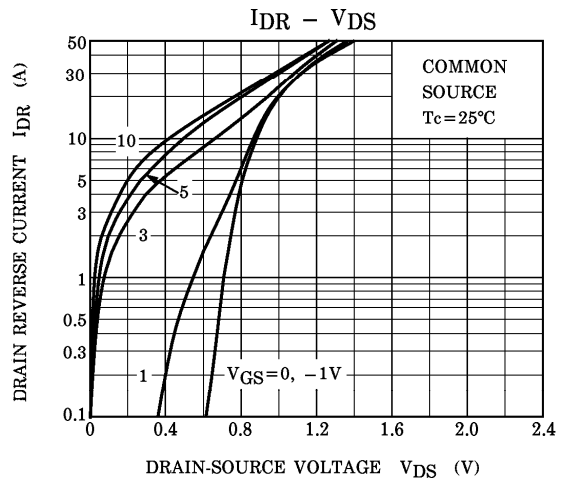
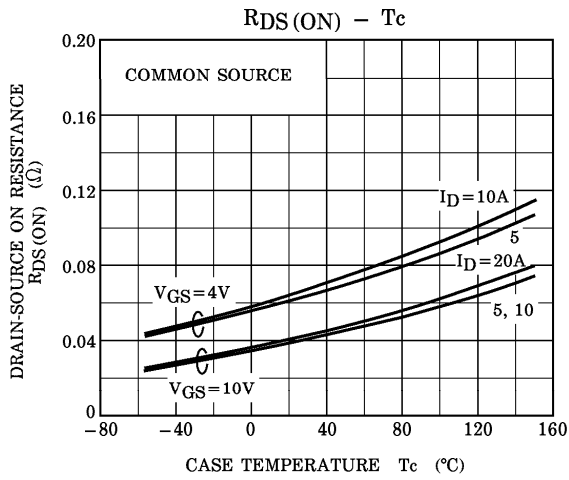
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

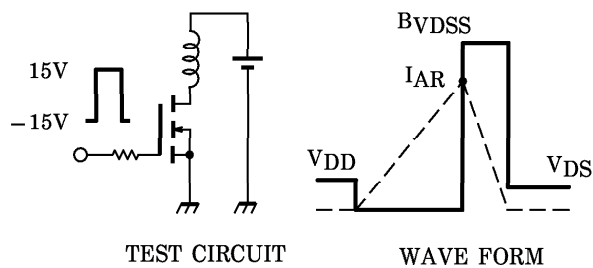
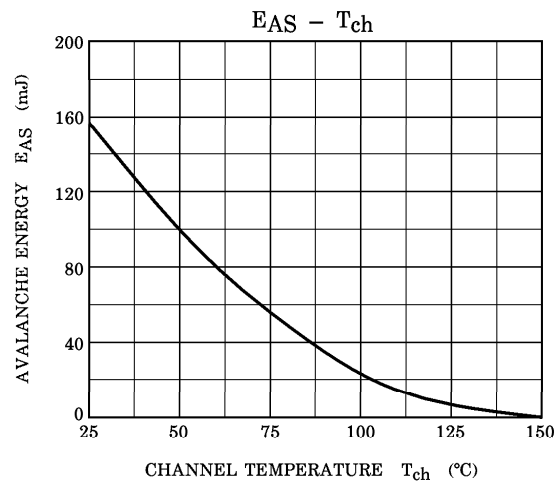
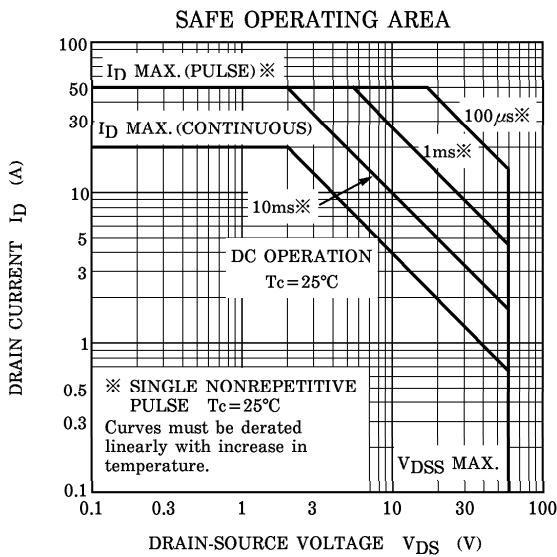
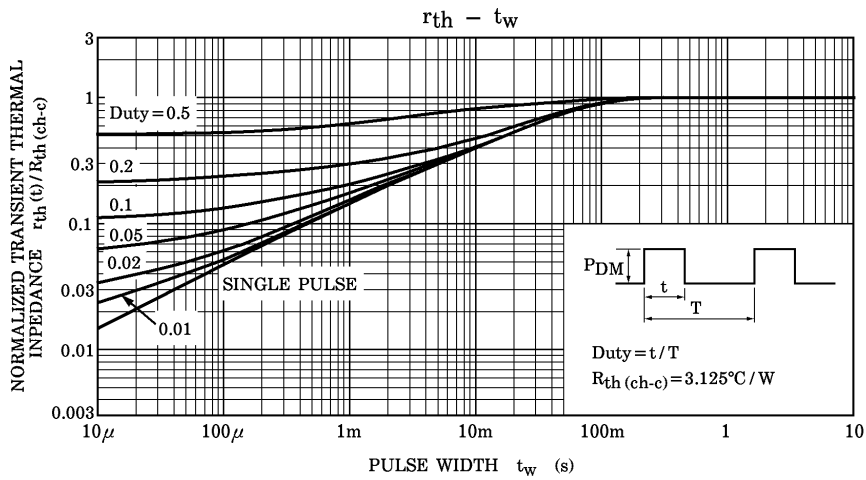
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|--------|----------------------|------|------|------|------|
| Continuous Drain Reverse Current | IDR | — | — | — | 20 | A |
| Pulse Drain Reverse Current | IDRP | — | — | — | 50 | A |
| Diode Forward Voltage | VDSF | IDR = 20A, VGS = 0V | — | — | -2.0 | V |
| Reverse Recovery Time | trr | IDR = 20A, VGS = 0V | — | 60 | — | ns |
| Reverse Recovery Charge | Qrr | dIDR / dt = 50A / μs | — | 45 | — | μC |

MARKING









Peak $I_{AR} = 20A$, $R_G = 25\Omega$
 $V_{DD} = 25V$, $L = 530\mu H$

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