

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (L^2 - π -MOSV)

2SK2782

Chopper Regulator, DC-DC Converter and Motor Drive Applications

- 4 V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 0.039 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 11 S$ (typ.)
- Low leakage current : $I_{DSS} = 100 \mu A$ (max) ($V_{DS} = 60 V$)
- Enhancement-mode : $V_{th} = 0.8 \sim 2.0 V$ ($V_{DS} = 10 V, I_D = 1 mA$)

Maximum Ratings ($T_a = 25^\circ C$)

| Characteristics | | Symbol | Rating | Unit |
|--|----------------|-----------|----------------|------------|
| Drain-source voltage | | V_{DSS} | 60 | V |
| Drain-gate voltage ($R_{GS} = 20 k\Omega$) | | V_{DGR} | 60 | V |
| Gate-source voltage | | V_{GSS} | ± 20 | V |
| Drain current | DC (Note 1) | I_D | 20 | A |
| | Pulse (Note 1) | I_{DP} | 50 | A |
| Drain power dissipation ($T_c = 25^\circ C$) | | P_D | 40 | W |
| Single pulse avalanche energy (Note 2) | | E_{AS} | 156 | mJ |
| Avalanche current | | I_{AR} | 20 | A |
| Repetitive avalanche energy (Note 3) | | E_{AR} | 4 | mJ |
| Channel temperature | | T_{ch} | 150 | $^\circ C$ |
| Storage temperature range | | T_{stg} | $-55 \sim 150$ | $^\circ C$ |

Thermal Characteristics

| Characteristics | Symbol | Max | Unit |
|--|----------------|-------|----------------|
| Thermal resistance, channel to case | $R_{th(ch-c)}$ | 3.125 | $^\circ C / W$ |
| Thermal resistance, channel to ambient | $R_{th(ch-a)}$ | 125 | $^\circ C / W$ |

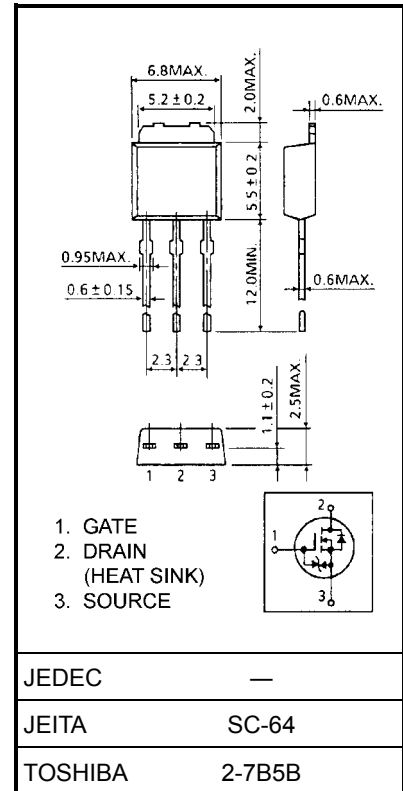
Note 1: Please use devices on condition that the channel temperature is below $150^\circ C$.

Note 2: $V_{DD} = 25 V, T_{ch} = 25^\circ C$ (initial), $L = 530 \mu H, R_G = 25 \Omega, I_D = 20 A$

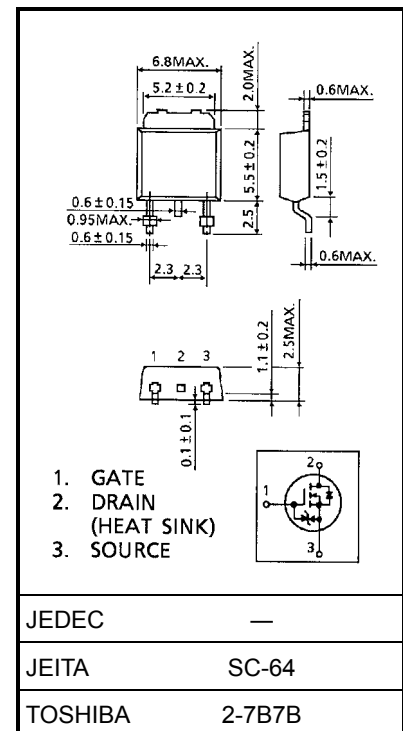
Note 3: Repetitive rating: Pulse width limited by maximum channel temperature

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

Unit: mm



Weight: 0.36 g (typ.)



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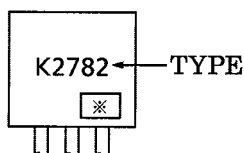
Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---------------|---------------|---|-----|-------|----------|---------------|
| Gate leakage current | | I_{GSS} | $V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$ | — | — | ± 10 | μA |
| Drain cut-off current | | I_{DSS} | $V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$ | — | — | 100 | μA |
| Drain-source breakdown voltage | | $V_{(BR)DSS}$ | $I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$ | 60 | — | — | V |
| Gate threshold voltage | | V_{th} | $V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$ | 0.8 | — | 2.0 | V |
| Drain-source ON resistance | | $R_{DS(ON)}$ | $V_{DS} = 4\text{ V}, I_D = 5\text{ A}$ | — | 0.06 | 0.09 | Ω |
| | | | $V_{DS} = 10\text{ V}, I_D = 10\text{ A}$ | — | 0.039 | 0.055 | |
| Forward transfer admittance | | $ Y_{fs} $ | $V_{DS} = 10\text{ V}, I_D = 10\text{ A}$ | 7 | 11 | — | S |
| Input capacitance | | C_{iss} | $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ | — | 880 | — | pF |
| Reverse transfer capacitance | | C_{rss} | | — | 90 | — | |
| Output capacitance | | C_{oss} | | — | 330 | — | |
| Switching time | Rise time | t_r | <p>$I_D = 10\text{ A}$ $V_{GS} = 10\text{ V}$ 0 V 4.7Ω $R_L = 3.0\Omega$ $V_{DD} \approx 30\text{ V}$ V_{OUT} Duty $\leq 1\%$, $t_W = 10\mu\text{s}$</p> | — | 15 | — | ns |
| | Turn-on time | t_{on} | | — | 25 | — | |
| | Fall time | t_f | | — | 30 | — | |
| | Turn-off time | t_{off} | | — | 100 | — | |
| Total gate charge (gate-source plus gate-drain) | | Q_g | $V_{DD} \approx 48\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$ | — | 25 | — | nC |
| Gate-source charge | | Q_{gs} | | — | 19 | — | |
| Gate-drain ("miller") Charge | | Q_{gd} | | — | 6 | — | |

Source-Drain Ratings and Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|-----------|---|-----|------|------|---------------|
| Continuous drain reverse current (Note 1) | I_{DR} | — | — | — | 20 | A |
| Pulse drain reverse current (Note 1) | I_{DRP} | — | — | — | 50 | A |
| Forward voltage (diode) | V_{DSF} | $I_{DR} = 20\text{ A}, V_{GS} = 0\text{ V}$ | — | — | -2.0 | V |
| Reverse recovery time | t_{rr} | $I_{DR} = 20\text{ A}, V_{GS} = 0\text{ V}, dI_{DR} / dt = 50\text{ A} / \mu\text{s}$ | — | 60 | — | ns |
| Reverse recovery charge | Q_{rr} | | — | 45 | — | μC |

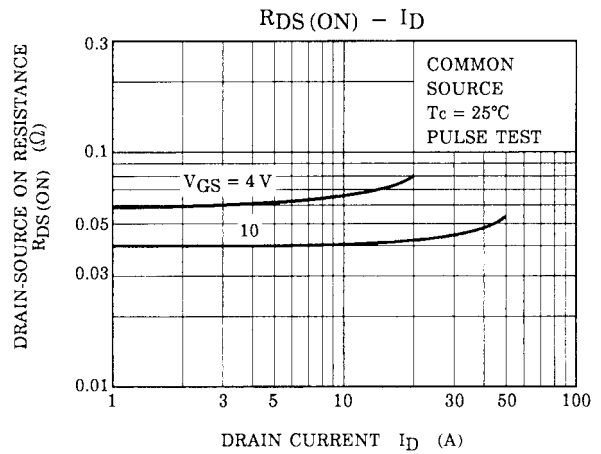
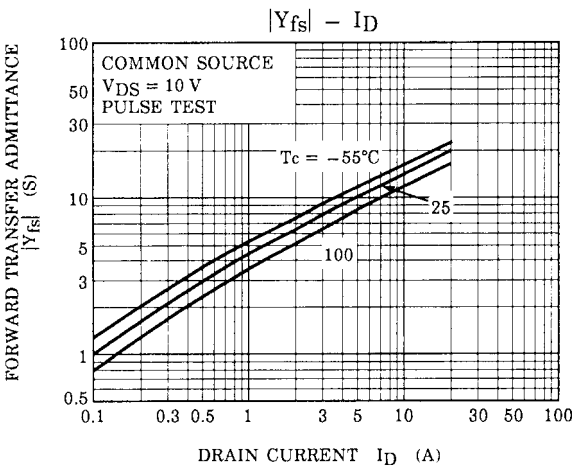
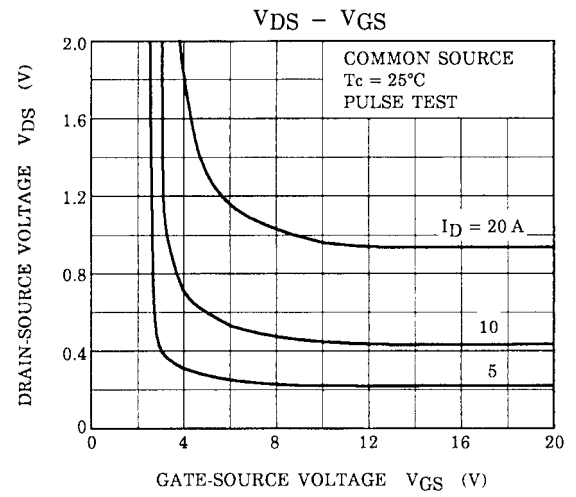
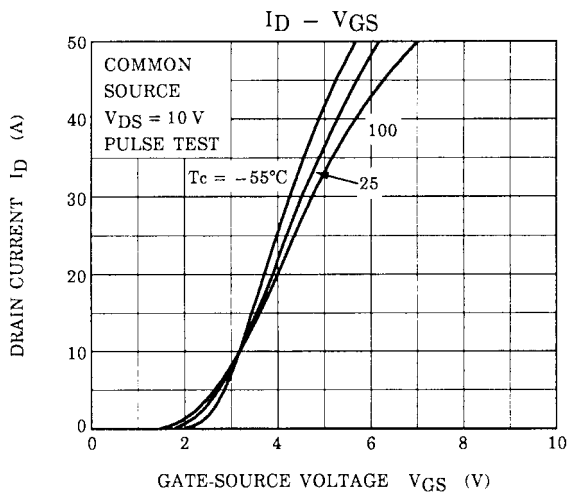
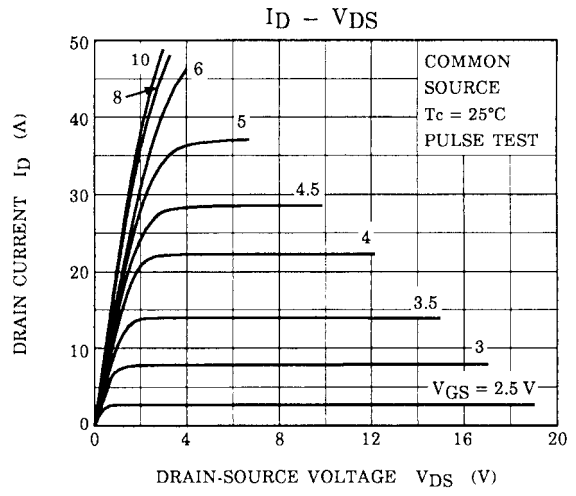
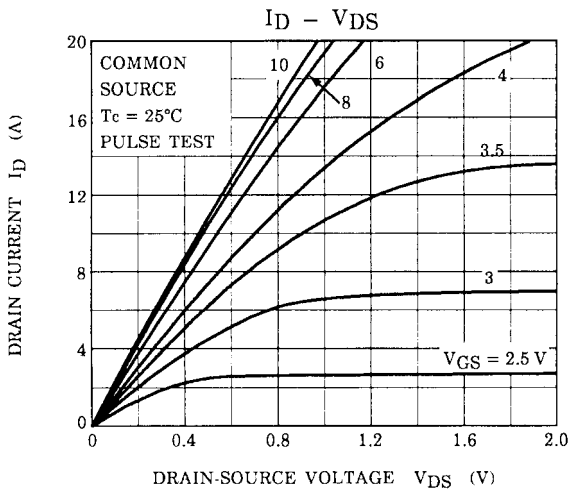
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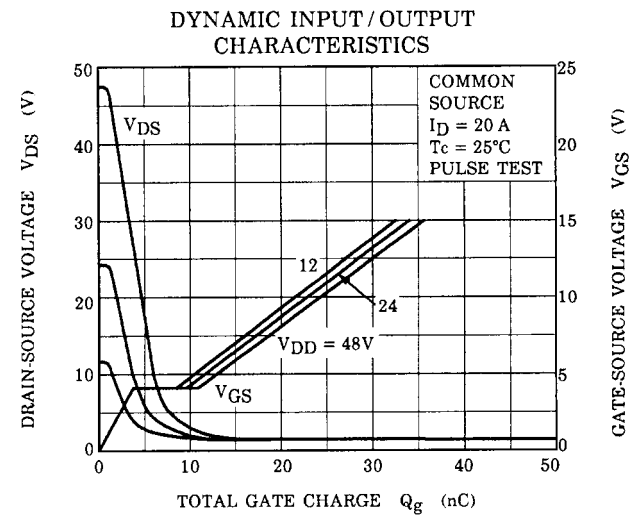
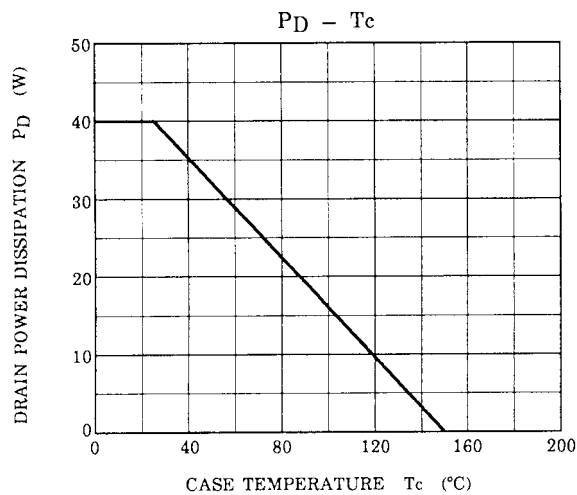
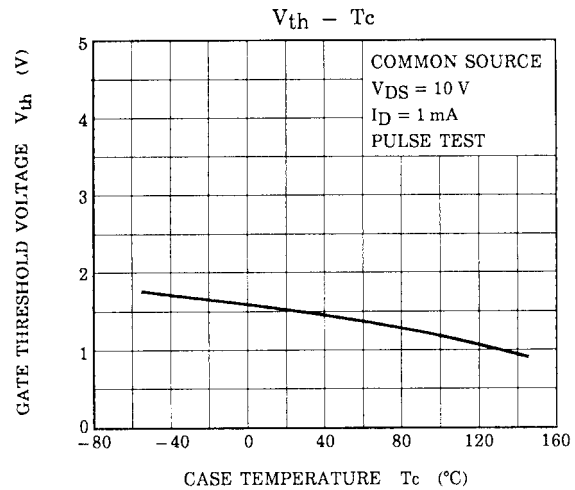
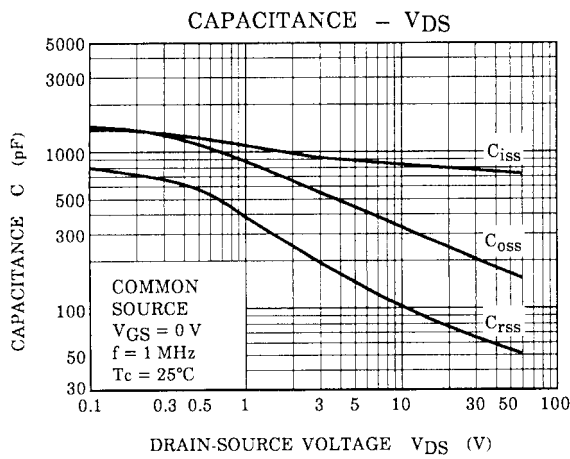
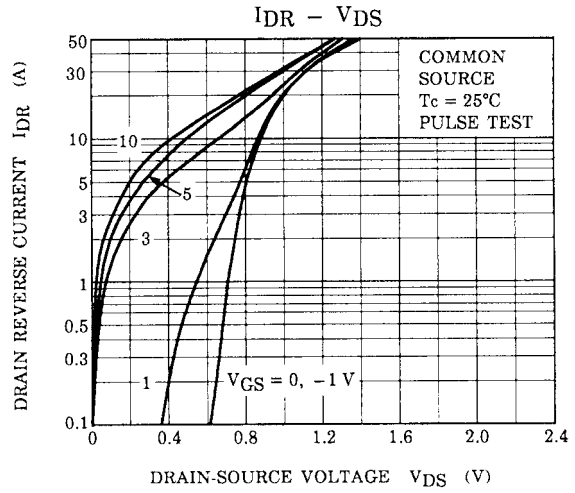
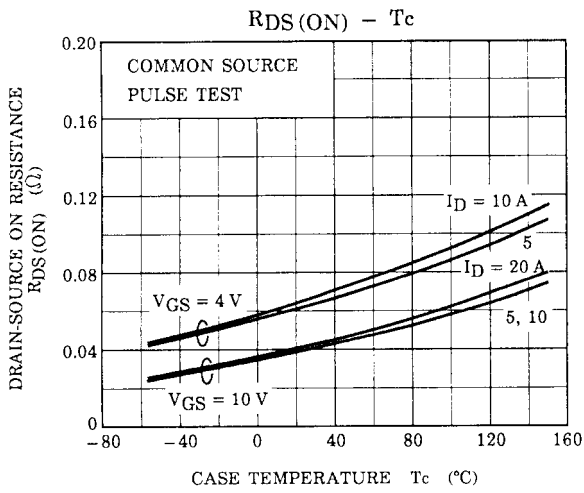


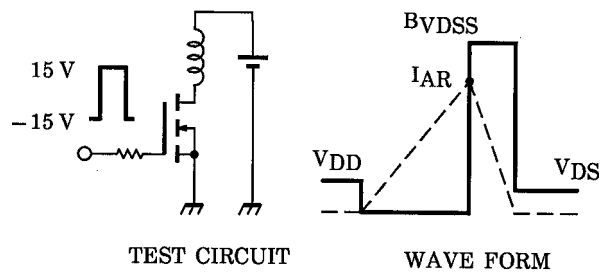
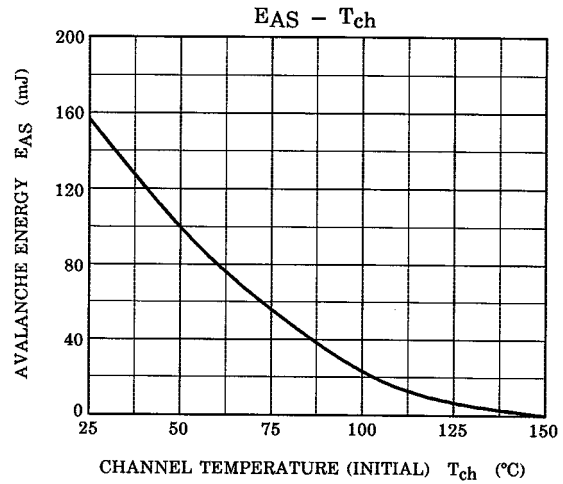
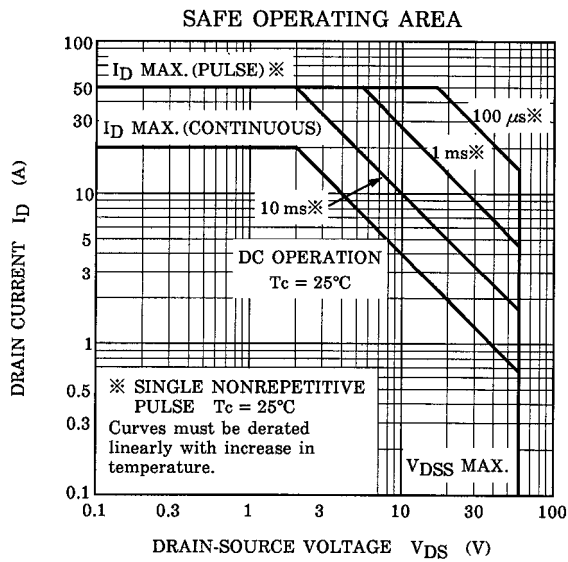
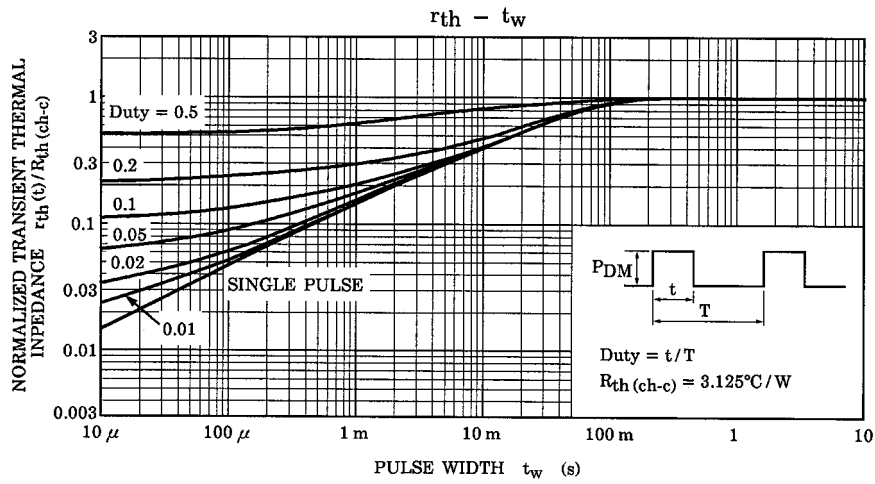
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$R_G = 25 \Omega$
 $V_{DD} = 25 \text{ V}, L = 530 \mu\text{H}$

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

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