

2SK2549

DC-DC Converter, Relay Drive and Motor Drive Applications

- 2.5-V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 0.29 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 3.0 \text{ S}$ (typ.)
- Low leakage current : $I_{DSS} = 100 \mu\text{A}$ (max) ($V_{DS} = 16 \text{ V}$)
- Enhancement mode : $V_{th} = 0.5 \sim 1.1 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 200 \mu\text{A}$)

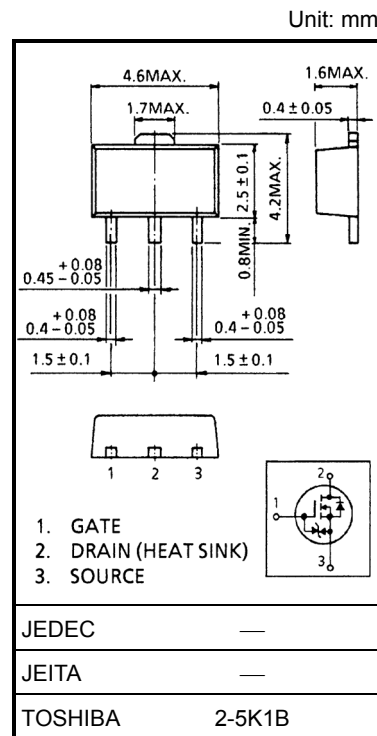
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

| Characteristics | | Symbol | Rating | Unit |
|--|----------------|-----------|----------------|------------------|
| Drain-source voltage | | V_{DSS} | 16 | V |
| Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$) | | V_{DGR} | 16 | V |
| Gate-source voltage | | V_{GSS} | ± 8 | V |
| Drain current | DC (Note 1) | I_D | 2 | A |
| | Pulse (Note 1) | I_{DP} | 6 | |
| Drain power dissipation | | P_D | 0.5 | W |
| Drain power dissipation (Note 2) | | P_D | 1.5 | W |
| Channel temperature | | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | $-55 \sim 150$ | $^\circ\text{C}$ |

Note 1: Ensure that the channel temperature does not exceed 150°C .

Note 2: Mounted on a ceramic substrate ($25.4 \text{ mm} \times 25.4 \text{ mm} \times 0.8 \text{ mm}$)

Note 3: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



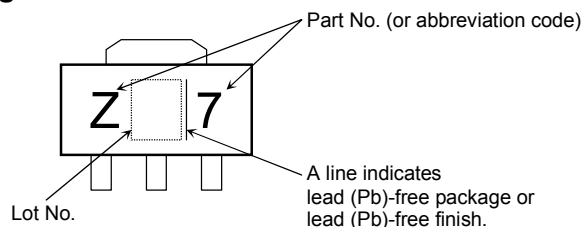
Weight: 0.05 g (typ.)

Thermal Characteristics

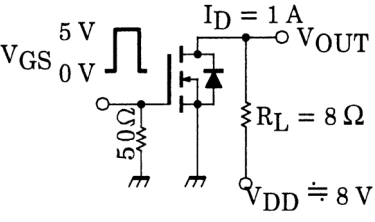
| Characteristics | Symbol | Max | Unit |
|--|----------------|-----|-----------------------------|
| Thermal resistance, channel to ambient | $R_{th(ch-a)}$ | 250 | $^\circ\text{C} / \text{W}$ |

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

Marking

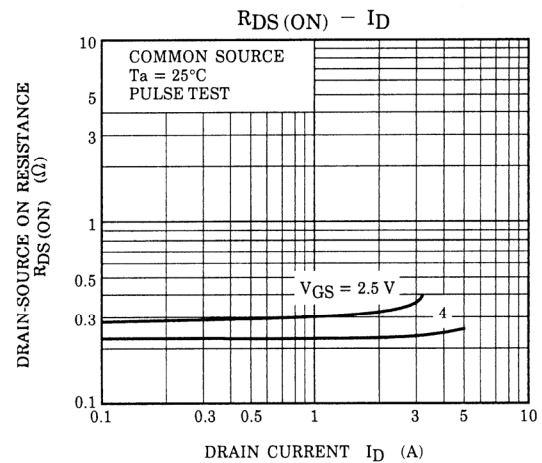
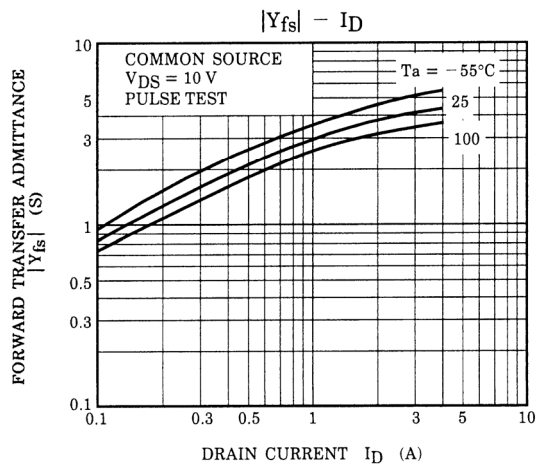
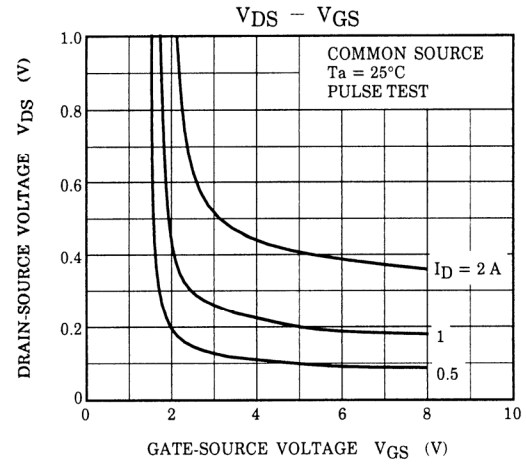
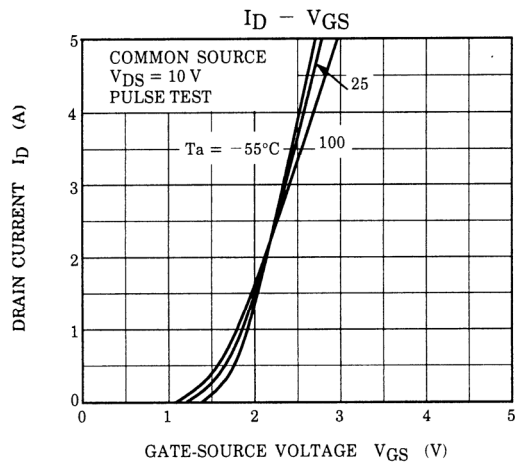
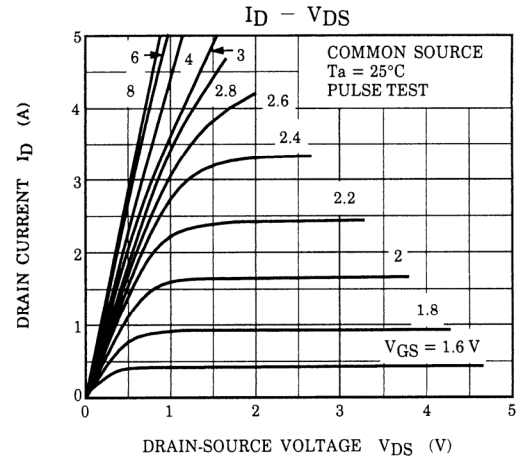
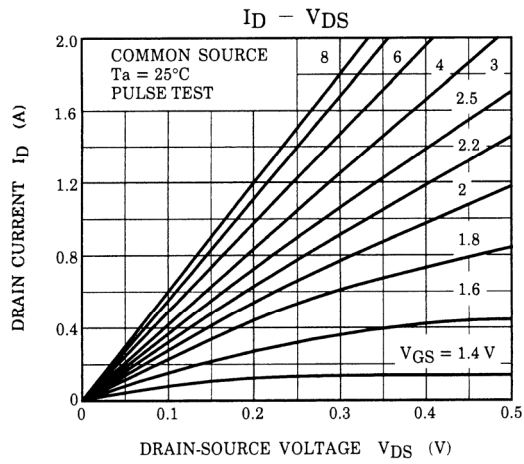


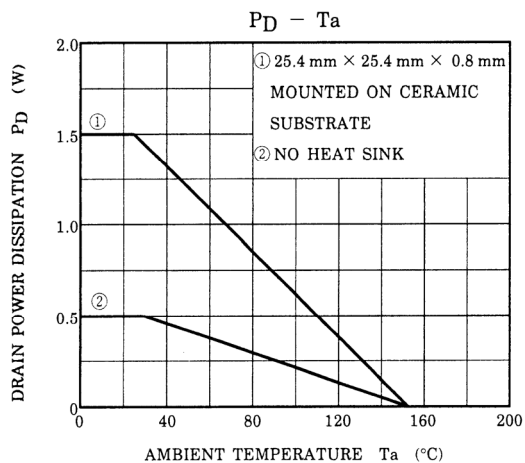
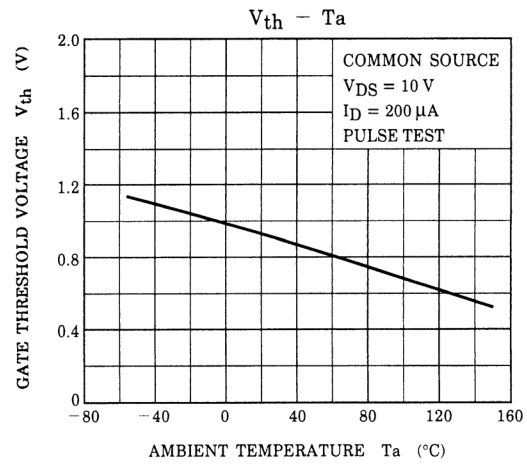
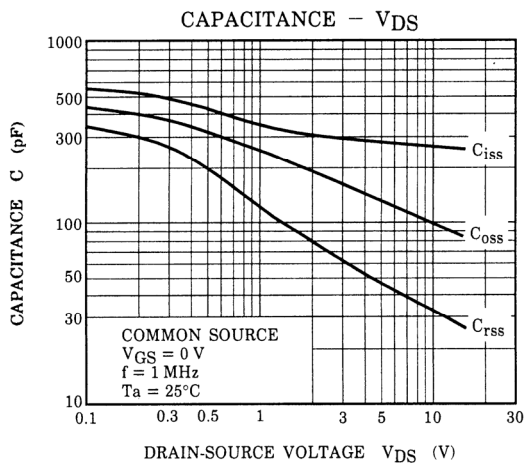
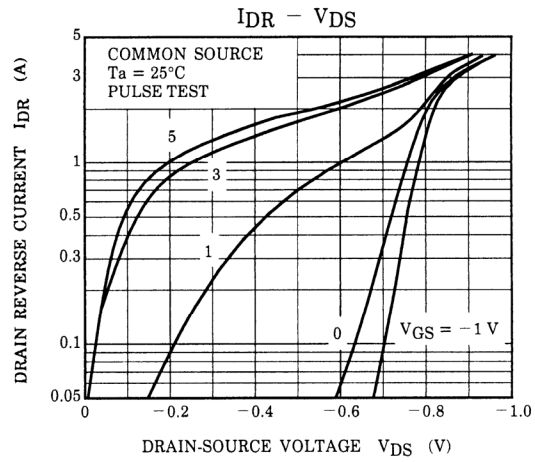
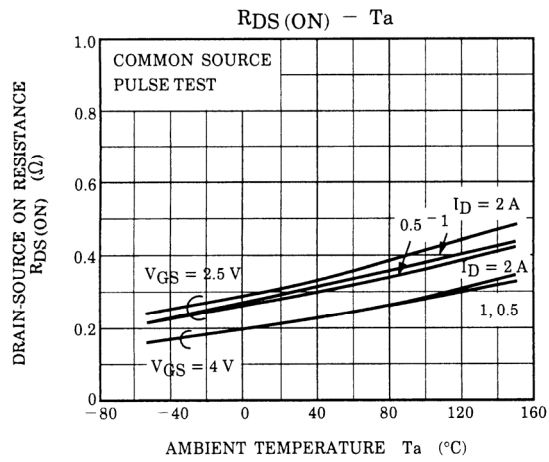
Electrical Characteristics (Ta = 25°C)

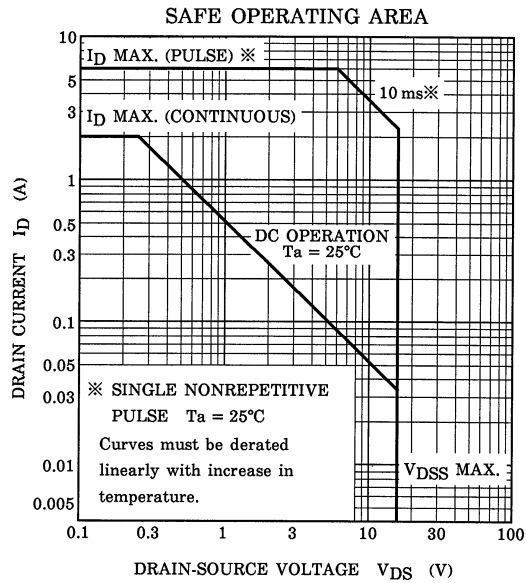
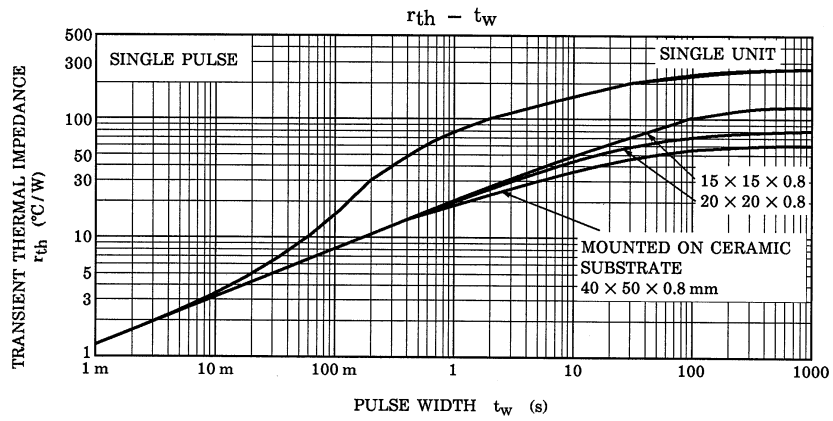
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---------------|---------------|--|-----|------|----------|---------------|
| Gate leakage current | | I_{GSS} | $V_{GS} = \pm 6.5 \text{ V}, V_{DS} = 0 \text{ V}$ | — | — | ± 10 | μA |
| Drain cut-off current | | I_{DSS} | $V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}$ | — | — | 100 | μA |
| Drain-source breakdown voltage | | $V_{(BR)DSS}$ | $I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$ | 16 | — | — | V |
| Gate threshold voltage | | V_{th} | $V_{DS} = 10 \text{ V}, I_D = 200 \mu\text{A}$ | 0.5 | — | 1.1 | V |
| Drain-source ON resistance | | $R_{DS(ON)}$ | $V_{GS} = 2.5 \text{ V}, I_D = 0.5 \text{ A}$ | — | 0.29 | 0.38 | Ω |
| | | | $V_{GS} = 4 \text{ V}, I_D = 1 \text{ A}$ | — | 0.22 | 0.29 | |
| Forward transfer admittance | | $ Y_{fs} $ | $V_{DS} = 10 \text{ V}, I_D = 1 \text{ A}$ | 1.5 | 3.0 | — | S |
| Input capacitance | | C_{iss} | $V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 260 | — | pF |
| Reverse transfer capacitance | | C_{rss} | | — | 34 | — | |
| Output capacitance | | C_{oss} | | — | 103 | — | |
| Switching time | Rise time | t_r |  <p>$I_D = 1 \text{ A}$ $V_{GS} = 5 \text{ V}$ $V_{DS} = 0 \text{ V}$ 50Ω $R_L = 8 \Omega$ $V_{DD} \approx 8 \text{ V}$</p> | — | 200 | — | ns |
| | Turn-on time | t_{on} | | — | 250 | — | |
| | Fall time | t_f | | — | 300 | — | |
| | Turn-off time | t_{off} | | — | 800 | — | |
| Total gate charge (Gate-source plus gate-drain) | | Q_g | $V_{DD} \approx 16 \text{ V}, V_{GS} = 5 \text{ V}, I_D = 2 \text{ A}$ | — | 5.0 | — | nC |
| Gate-source charge | | Q_{gs} | | — | 3.2 | — | |
| Gate-drain ("miller") charge | | Q_{gd} | | — | 1.8 | — | |

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

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|-----------|--|-----|------|------|---------------|
| Continuous drain reverse current (Note 1) | I_{DR} | — | — | — | 2 | A |
| Pulse drain reverse current (Note 1) | I_{DRP} | — | — | — | 6 | A |
| Forward voltage (diode) | V_{DSF} | $I_{DR} = 2 \text{ A}, V_{GS} = 0 \text{ V}$ | — | — | -1.7 | V |
| Reverse recovery time | t_{rr} | $I_{DR} = 2 \text{ A}, V_{GS} = 0 \text{ V}$ | — | 220 | — | ns |
| Reverse recovered charge | Q_{rr} | $dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$ | — | 0.32 | — | μC |







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