

2SK1119

DC-DC Converter and Motor Drive Applications

- Low drain-source ON resistance : $R_{DS(ON)} = 3.0 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 2.0 S$ (typ.)
- Low leakage current : $I_{DSS} = 300 \mu A$ (max) ($V_{DS} = 800 V$)
- Enhancement mode : $V_{th} = 1.5 \sim 3.5 V$ ($V_{DS} = 10 V, I_D = 1 mA$)

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

| Characteristics | Symbol | Rating | Unit |
|--|----------------|----------------|------------|
| Drain-source voltage | V_{DSS} | 1000 | V |
| Drain-gate voltage ($R_{GS} = 20 k\Omega$) | V_{DGR} | 1000 | V |
| Gate-source voltage | V_{GSS} | ± 20 | V |
| Drain current | DC (Note 1) | I_D | 4 |
| | Pulse (Note 1) | I_{DP} | 12 |
| Drain power dissipation ($T_c = 25^\circ C$) | P_D | 100 | W |
| Channel temperature | T_{ch} | 150 | $^\circ C$ |
| Storage temperature range | T_{stg} | $-55 \sim 150$ | $^\circ C$ |

Note: 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).

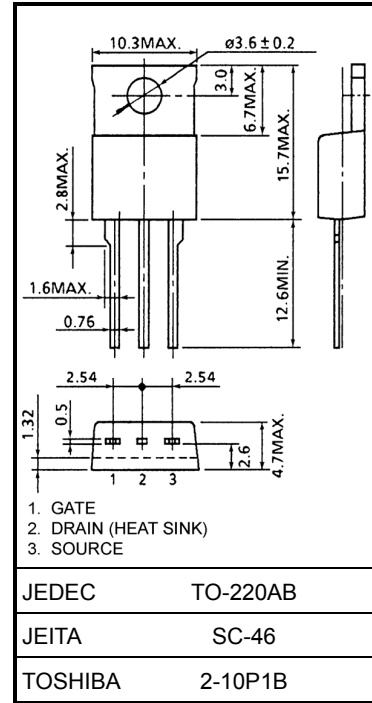
Thermal Characteristics

| Characteristics | Symbol | Max | Unit |
|--|----------------|------|----------------|
| Thermal resistance, channel to case | $R_{th(ch-c)}$ | 1.25 | $^\circ C / W$ |
| Thermal resistance, channel to ambient | $R_{th(ch-a)}$ | 83.3 | $^\circ C / W$ |

Note 1: Ensure that the channel temperature does not exceed $150^\circ C$.

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

Unit: mm



Weight: 2.0 g (typ.)

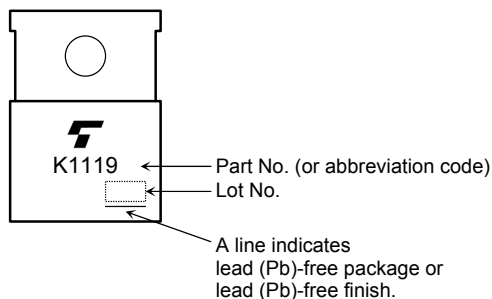
Electrical Characteristics (Ta = 25°C)

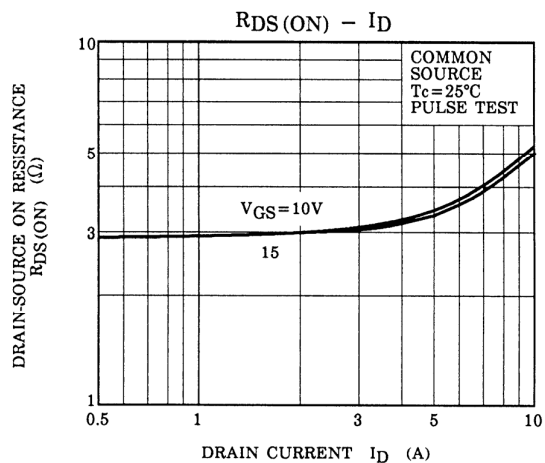
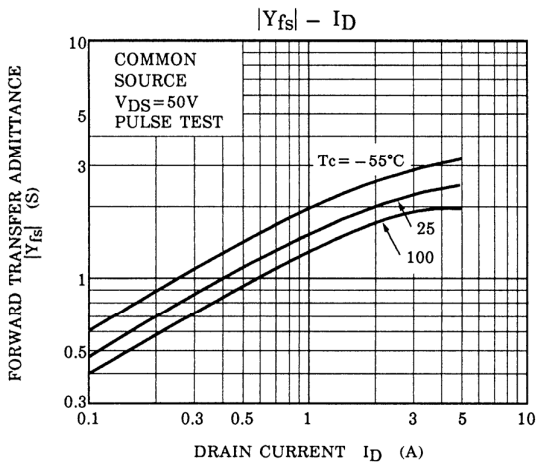
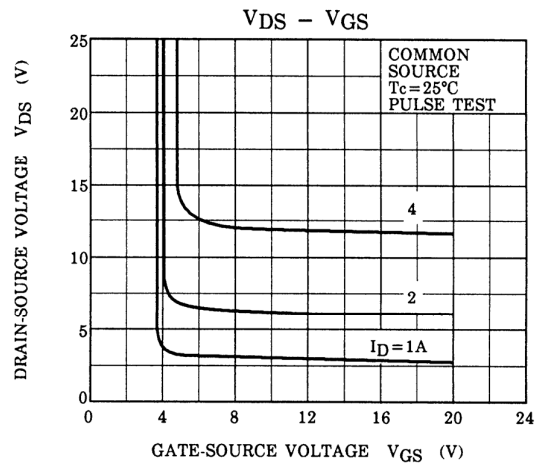
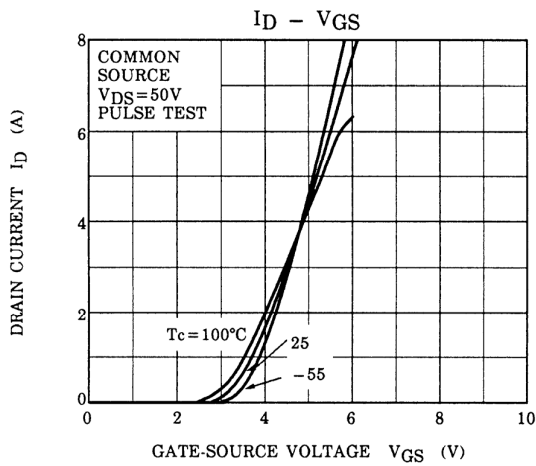
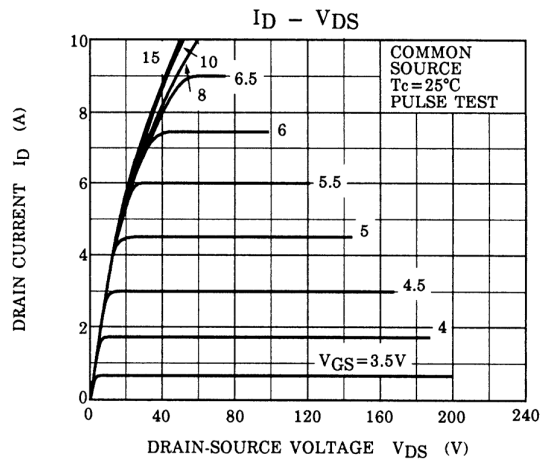
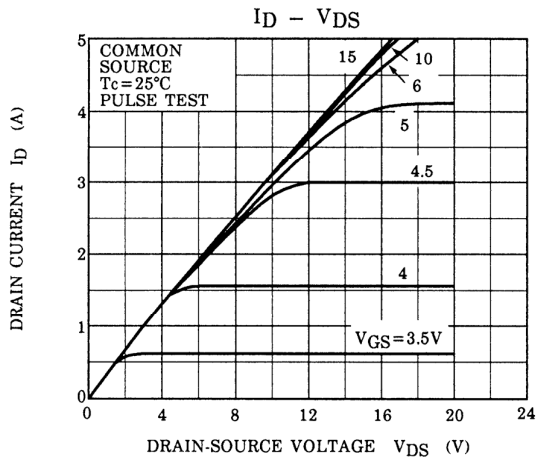
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---------------|---------------|---|------|------|-----------|---------------|
| Gate leakage current | | I_{GSS} | $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ | — | — | ± 100 | nA |
| Drain cut-off current | | I_{DSS} | $V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$ | — | — | 300 | μA |
| Drain-source breakdown voltage | | $V_{(BR)DSS}$ | $I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$ | 1000 | — | — | V |
| Gate threshold voltage | | V_{th} | $V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$ | 1.5 | — | 3.5 | V |
| Drain-source ON resistance | | $R_{DS(ON)}$ | $V_{GS} = 10\text{ V}, I_D = 2\text{ A}$ | — | 3.0 | 3.8 | Ω |
| Forward transfer admittance | | $ Y_{fs} $ | $V_{DS} = 20\text{ V}, I_D = 2\text{ A}$ | 1.0 | 2.0 | — | S |
| Input capacitance | | C_{iss} | $V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ | — | 700 | — | pF |
| Reverse transfer capacitance | | C_{rss} | | — | 55 | — | |
| Output capacitance | | C_{oss} | | — | 100 | — | |
| Switching time | Rise time | t_r | <p>$I_D = 2\text{ A}$ $V_{GS} = 10\text{ V}, 0\text{ V}$ $4.7\ \Omega$ $V_{DD} \approx 400\text{ V}$ $R_L = 200\ \Omega$ V_{OUT} Duty $\leq 1\%$, $t_w = 10\ \mu\text{s}$</p> | — | 18 | — | ns |
| | Turn-on time | t_{on} | | — | 30 | — | |
| | Fall time | t_f | | — | 12 | — | |
| | Turn-off time | t_{off} | | — | 70 | — | |
| Total gate charge (Gate-source plus gate-drain) | | Q_g | $V_{DD} \approx 400\text{ V}, V_{GS} = 10\text{ V}, I_D = 6\text{ A}$ | — | 60 | — | nC |
| Gate-source charge | | Q_{gs} | | — | 35 | — | |
| Gate-drain ("miller") charge | | Q_{gd} | | — | 25 | — | |

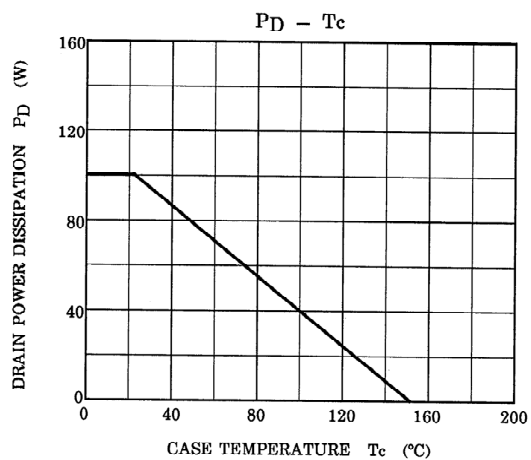
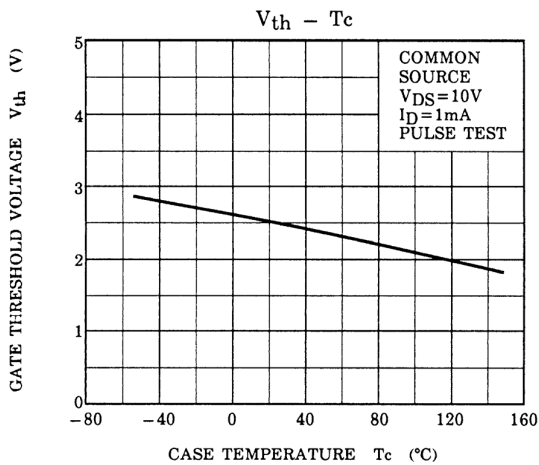
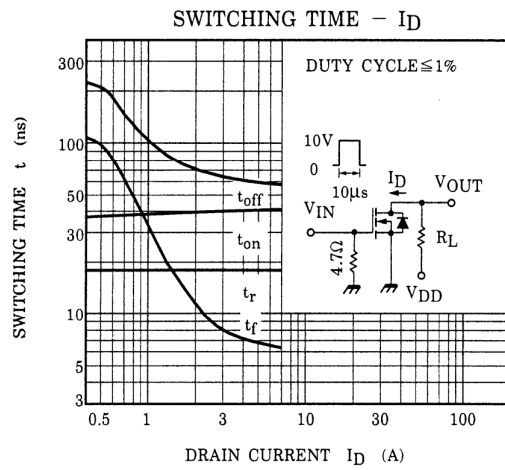
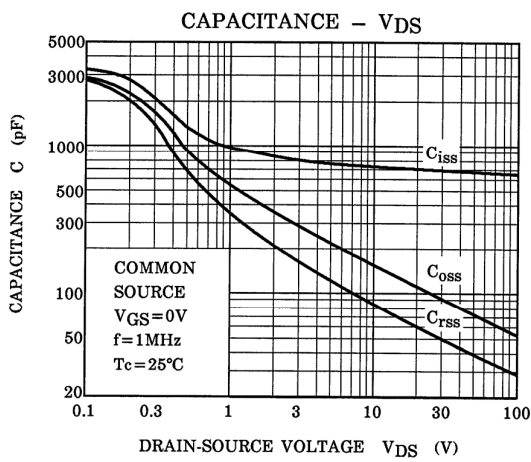
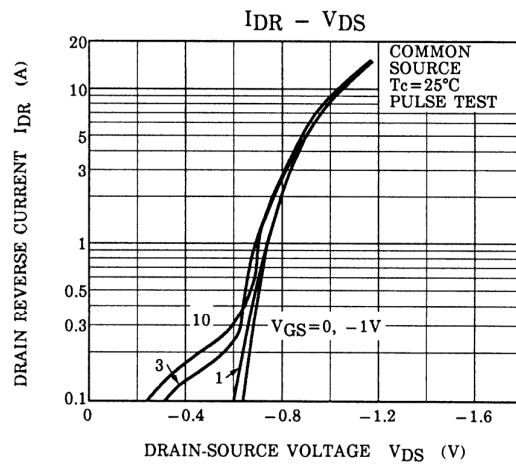
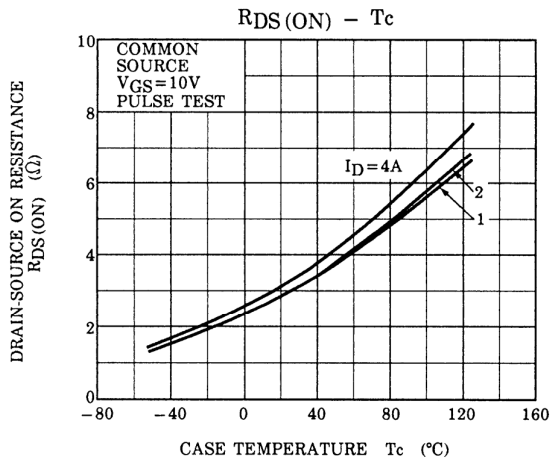
Source-Drain Ratings and Characteristics (Ta = 25°C)

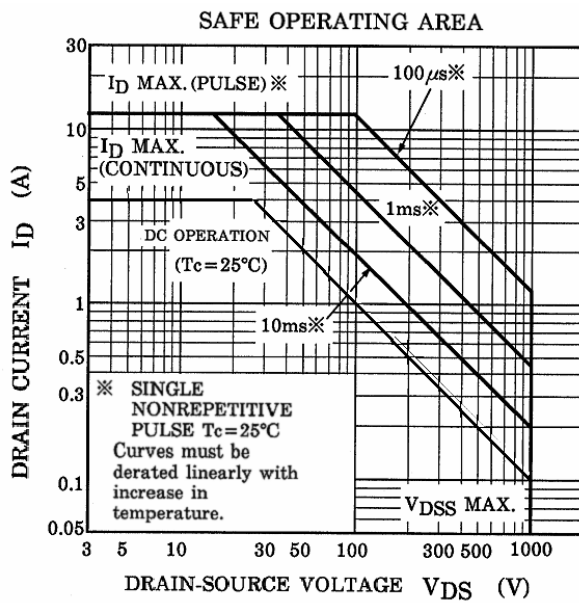
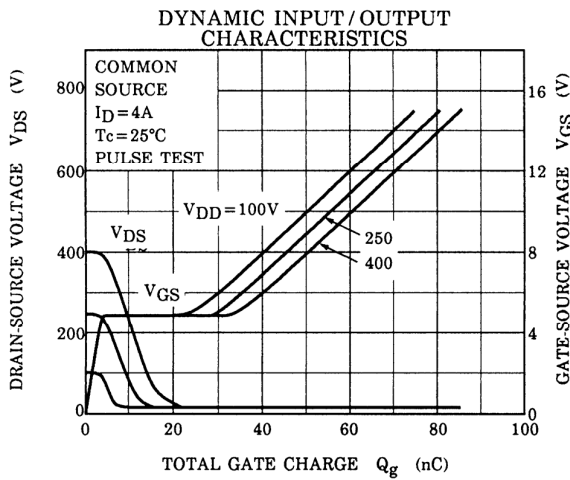
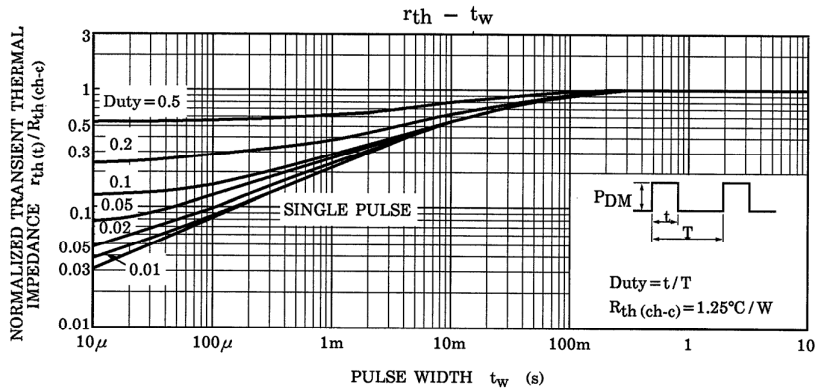
| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|-----------|--|-----|------|------|------|
| Continuous drain reverse current (Note 1) | I_{DR} | — | — | — | 4 | A |
| Pulse drain reverse current (Note 1) | I_{DRP} | — | — | — | 12 | A |
| Forward voltage (diode) | V_{DSF} | $I_{DR} = 4\text{ A}, V_{GS} = 0\text{ V}$ | — | — | -1.9 | V |

Marking









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20070701-EN

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