

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

2SK2844

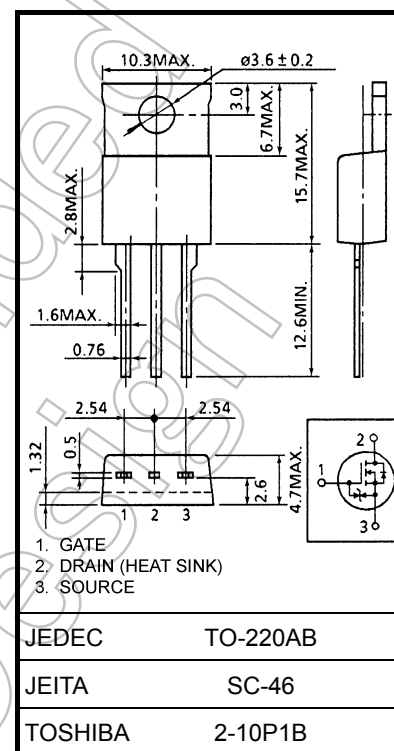
Chopper Regulator, DC-DC Converter and Motor Drive Applications

Unit: mm

- 4-V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 16 \text{ m}\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 26 \text{ S}$ (typ.)
- Low leakage current : $I_{DSS} = 100 \text{ }\mu\text{A}$ (max) ($V_{DS} = 30 \text{ V}$)
- Enhancement mode : $V_{th} = 0.8 \text{ to } 2.0 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

| Characteristics | Symbol | Rating | Unit |
|--|----------------|------------|------------------|
| Drain-source voltage | V_{DSS} | 30 | V |
| Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$) | V_{DGR} | 30 | V |
| Gate-source voltage | V_{GSS} | ± 20 | V |
| Drain current | DC (Note 1) | I_D | A |
| | Pulse (Note 1) | I_{DP} | A |
| Drain power dissipation ($T_c = 25^\circ\text{C}$) | P_D | 60 | W |
| Single pulse avalanche energy (Note 2) | E_{AS} | 259 | mJ |
| Avalanche current | I_{AR} | 35 | A |
| Repetitive avalanche energy (Note 3) | E_{AR} | 6 | mJ |
| Channel temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage temperature range | T_{stg} | -55 to 150 | $^\circ\text{C}$ |



Weight: 2.0 g (typ.)

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 | $R_{th(ch-c)}$ | 2.08 | $^\circ\text{C/W}$ |
| Thermal resistance, channel to ambient | $R_{th(ch-a)}$ | 83.3 | $^\circ\text{C/W}$ |

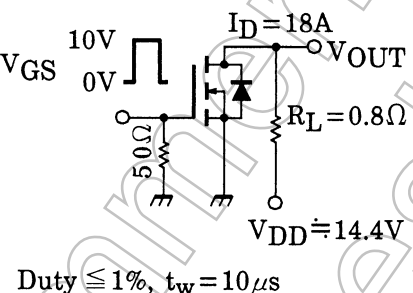
Note 1: Ensure that the channel temperature does not exceed 150°C .

Note 2: $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 152 \text{ }\mu\text{H}$, $R_G = 25 \text{ }\Omega$, $I_{AR} = 35 \text{ A}$

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

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

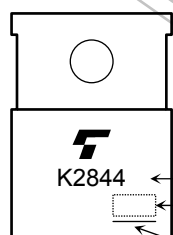
Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---------------|-----------------------|--|-----|------|-----|------|
| Gate leakage current | | I _{GSS} | V _{GS} = ±16 V, V _{DS} = 0 V | — | — | ±10 | μA |
| Drain cut-off current | | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V | — | — | 100 | μA |
| Drain-source breakdown voltage | | V _(BR) DSS | I _D = 10 mA, V _{GS} = 0 V | 30 | — | — | V |
| Gate threshold voltage | | V _{th} | V _{DS} = 10 V, I _D = 1 mA | 0.8 | — | 2.0 | V |
| Drain-source ON resistance | | R _{DS} (ON) | V _{GS} = 4 V, I _D = 18 A | — | 26 | 35 | mΩ |
| | | | V _{GS} = 10 V, I _D = 18 A | — | 16 | 20 | |
| Forward transfer admittance | | Y _{fs} | V _{DS} = 10 V, I _D = 18 A | 13 | 26 | — | S |
| Input capacitance | | C _{iss} | V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz | — | 980 | — | pF |
| Reverse transfer capacitance | | C _{rss} | | — | 270 | — | |
| Output capacitance | | C _{oss} | | — | 580 | — | |
| Switching time | Rise time | t _r |  | — | 14 | — | ns |
| | Turn-on time | t _{on} | | — | 23 | — | |
| | Fall time | t _f | | — | 64 | — | |
| | Turn-off time | t _{off} | | — | 190 | — | |
| Total gate charge (gate-source plus gate-drain) | | Q _g | V _{DD} ≈ 24 V, V _{GS} = 10 V, I _D = 35 A | — | 40 | — | nC |
| Gate-source charge | | Q _{gs} | | — | 32 | — | |
| Gate-drain ("miller") Charge | | Q _{gd} | | — | 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} | — | — | — | 50 | A |
| Pulse drain reverse current (Note 1) | I _{DRP} | — | — | — | 200 | A |
| Forward voltage (diode) | V _{DSF} | I _{DR} = 35 A, V _{GS} = 0 V | — | — | −1.7 | V |
| Reverse recovery time | t _{rr} | I _{DR} = 35 A, V _{GS} = 0 V, dI _{DR} / dt = 50 A / μs | — | 120 | — | ns |
| Reverse recovery charge | Q _{rr} | | — | 180 | — | nC |

Marking



Part No. (or abbreviation code)

Lot No.

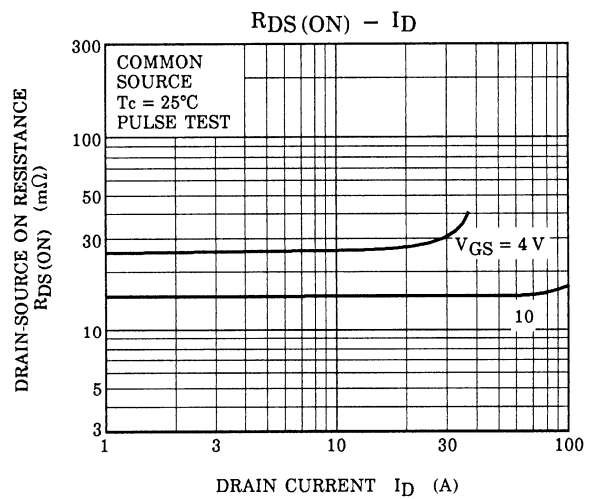
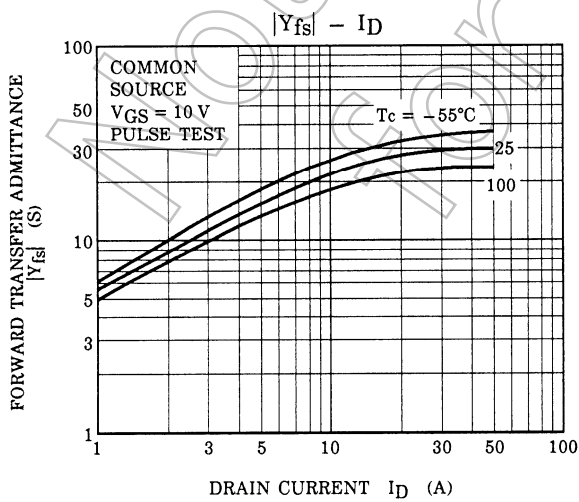
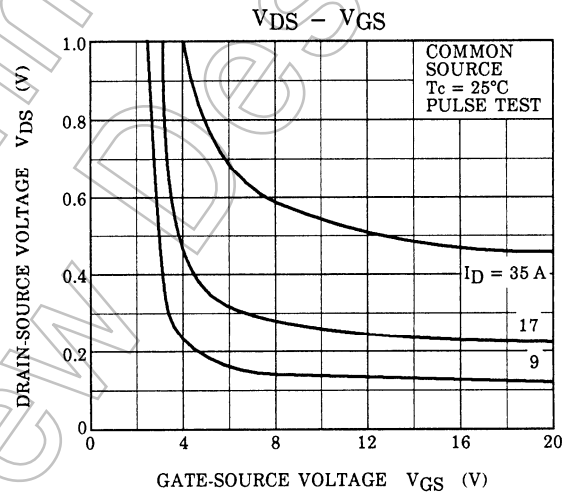
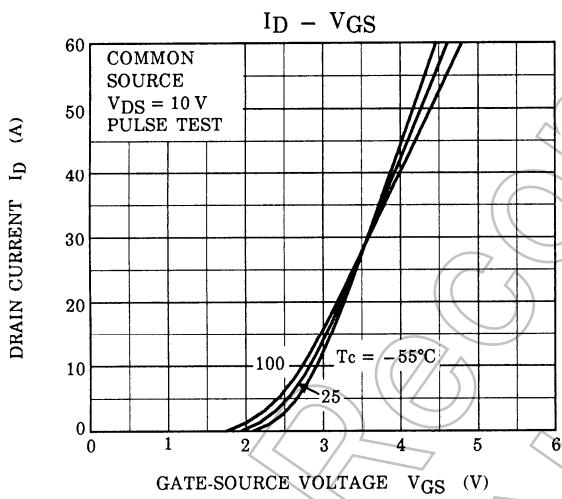
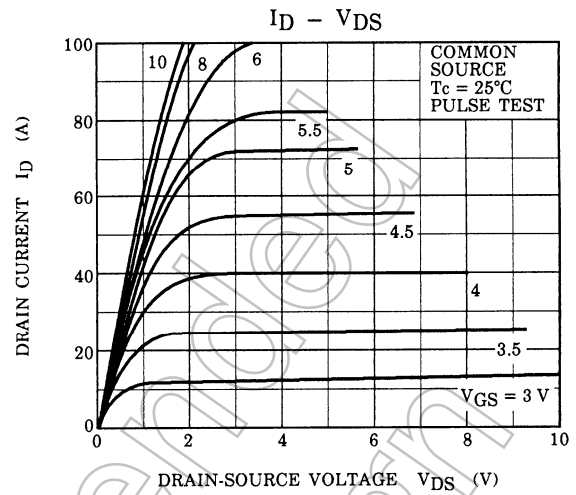
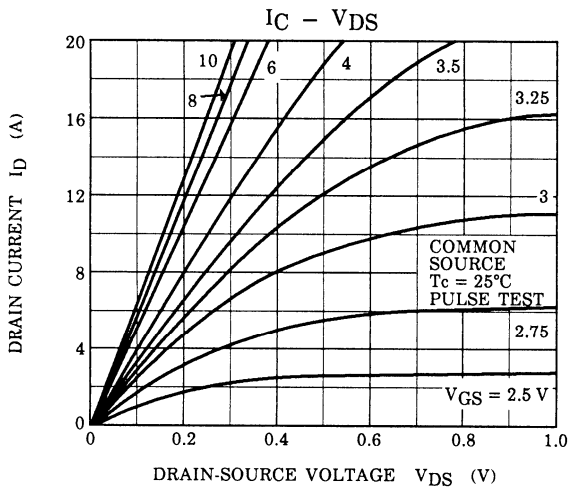
Note 4

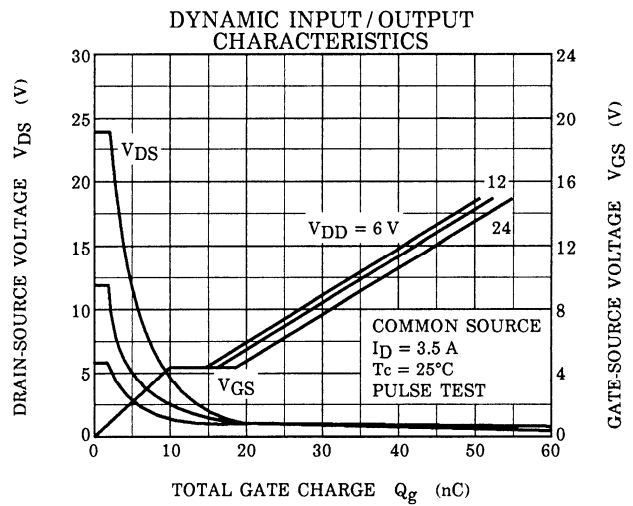
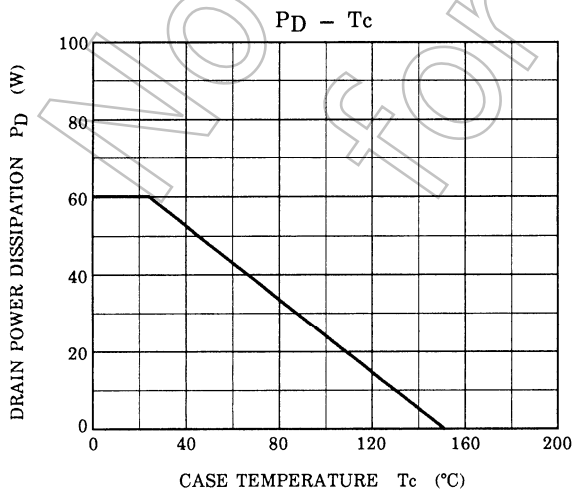
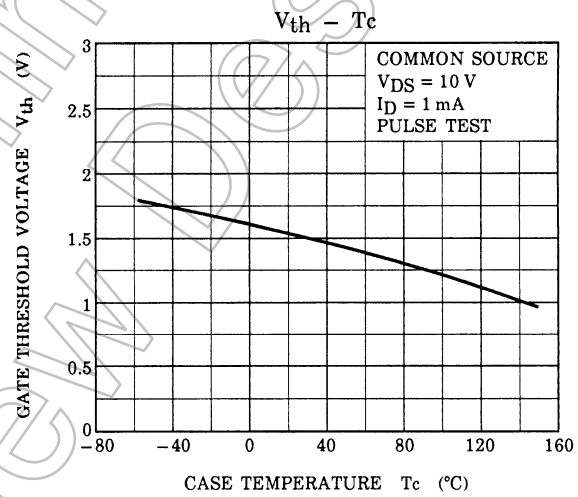
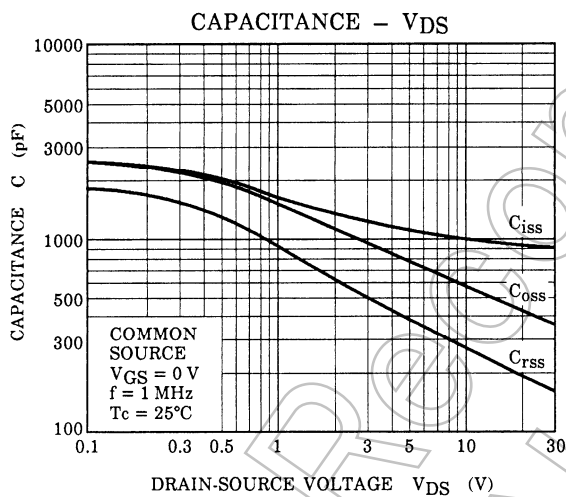
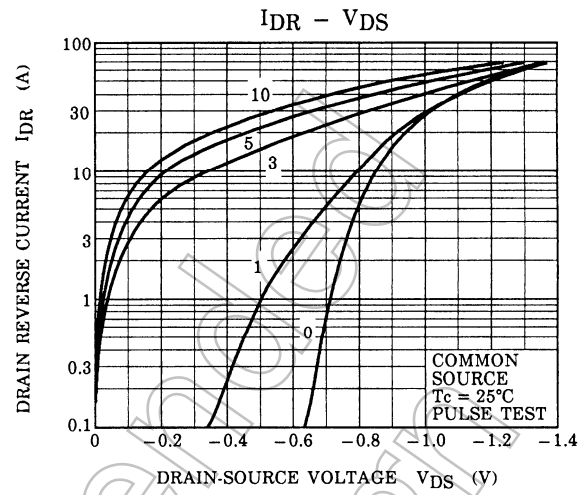
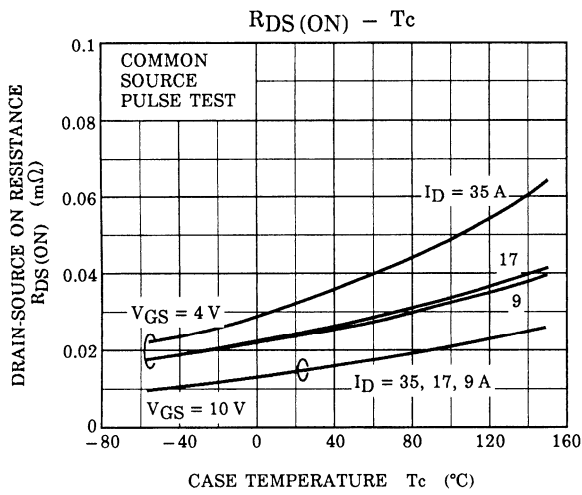
Note 4: A line under a Lot No. identifies the indication of product Labels.

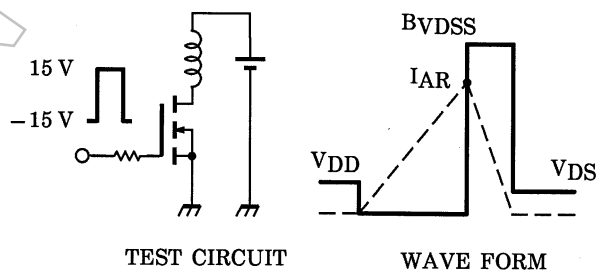
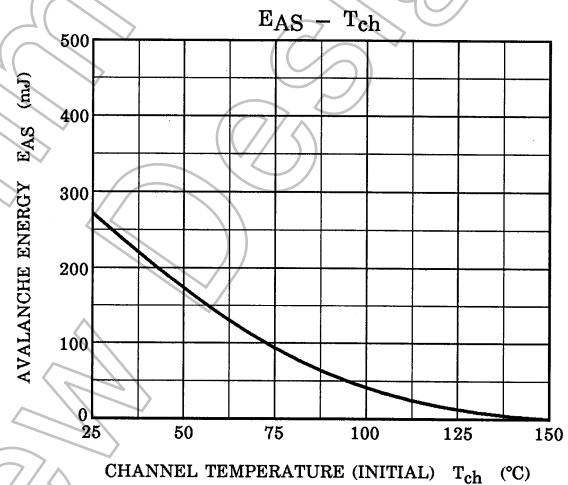
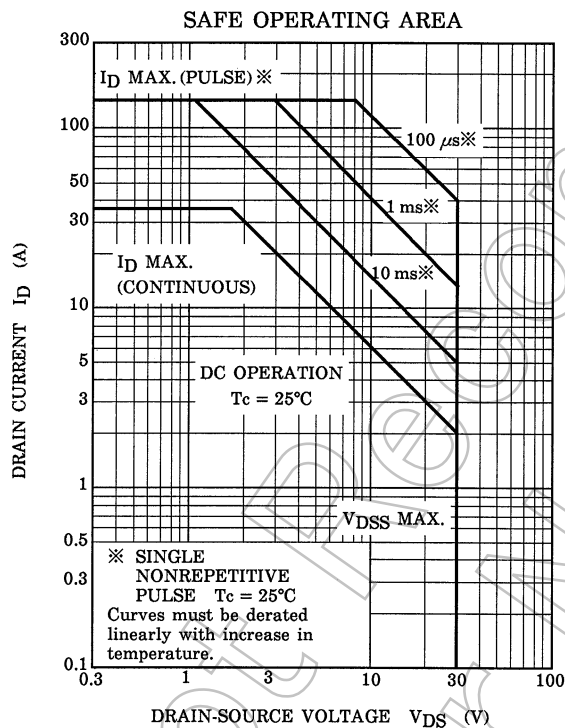
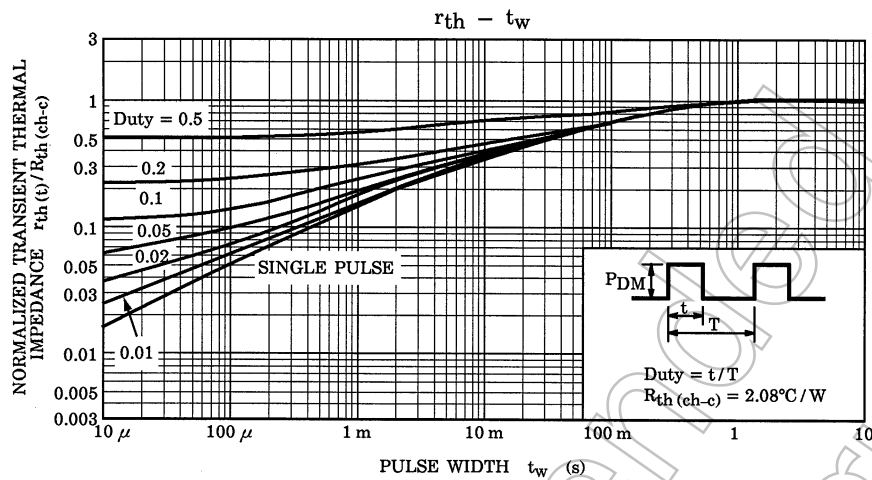
Not underlined: [[Pb]]/INCLUDES > MCV

Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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$$R_G = 25 \, \Omega$$

$$V_{DD} = 25 \, V, L = 152 \, \mu H$$

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

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