

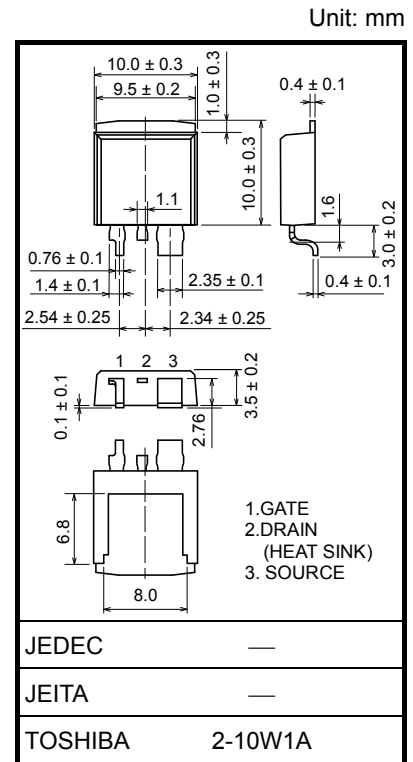
TK80F08K3

Switching Regulator

- Low drain-source ON-resistance: $R_{DS(ON)} = 3.4 \text{ m}\Omega$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 75 \text{ V}$)
- Enhancement-model: $V_{th} = 2.0 \text{ to } 4.0 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

| Characteristics | | Symbol | Rating | Unit |
|--|----------------|-----------|------------|------------------|
| Drain-source voltage | | V_{DSS} | 75 | V |
| Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$) | | V_{DGR} | 75 | V |
| Gate-source voltage | | V_{GSS} | ± 20 | V |
| Drain current | DC (Note 1) | I_D | 80 | A |
| | Pulse (Note 1) | I_{DP} | 320 | |
| Drain power dissipation ($T_c = 25^\circ\text{C}$) | | P_D | 300 | W |
| Single pulse avalanche energy (Note 2) | | E_{AS} | 250 | mJ |
| Avalanche current | | I_{AR} | 80 | A |
| Repetitive avalanche energy (Note 3) | | E_{AR} | 30 | mJ |
| Channel temperature (Note 4) | | T_{ch} | 175 | $^\circ\text{C}$ |
| Storage temperature range (Note 4) | | T_{stg} | -55 to 175 | $^\circ\text{C}$ |



Weight: 1.07 g (typ.)

Thermal Characteristics

| Characteristics | Symbol | Max | Unit |
|-------------------------------------|----------------|-----|--------------------|
| Thermal resistance, channel to case | $R_{th(ch-c)}$ | 0.5 | $^\circ\text{C/W}$ |

Note 1: Please use devices on condition that the channel temperature is below 175°C .

Note 2: $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$, $L = 58 \text{ }\mu\text{H}$, $R_G = 1 \text{ }\Omega$, $I_{AR} = 80 \text{ A}$

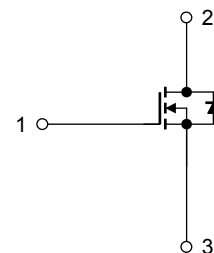
Note 3: Repetitive rating; pulse width limited by maximum channel temperature.

Note 4: 175°C refers to AEC-Q101.

Note 5: 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).

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



Start of commercial production
2012-06

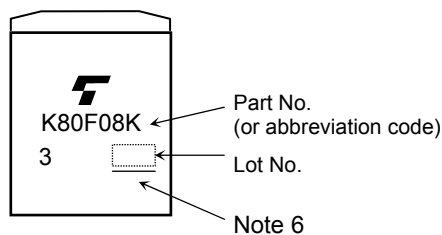
Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---------------|---------------|---|-----|------|---------|------------------|
| Gate leakage current | | I_{GSS} | $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ | — | — | ± 1 | μA |
| Drain cut-off current | | I_{DSS} | $V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}$ | — | — | 10 | μA |
| Drain-source breakdown voltage | | $V_{(BR)DSS}$ | $I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$ | 75 | — | — | V |
| | | $V_{(BR)DSX}$ | $I_D = 10\text{ mA}, V_{GS} = -20\text{ V}$ | 50 | — | — | |
| Gate threshold voltage | | V_{th} | $V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$ | 2.0 | — | 4.0 | V |
| Drain-source ON-resistance | | $R_{DS(ON)}$ | $V_{GS} = 10\text{ V}, I_D = 40\text{ A}$ | — | 3.4 | 4.3 | $\text{m}\Omega$ |
| Input capacitance | | C_{iss} | $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ | — | 8200 | — | pF |
| Reverse transfer capacitance | | C_{rss} | | — | 770 | — | |
| Output capacitance | | C_{oss} | | — | 1140 | — | |
| Switching time | Rise time | t_r | <p>Duty $\leq 1\%$, $t_w = 10\ \mu\text{s}$</p> | — | 30 | — | ns |
| | Turn-on time | t_{on} | | — | 55 | — | |
| | Fall time | t_f | | — | 33 | — | |
| | Turn-off time | t_{off} | | — | 150 | — | |
| Total gate charge (gate-source plus gate-drain) | | Q_g | $V_{DD} \approx 60\text{ V}, V_{GS} = 10\text{ V}, I_D = 80\text{ A}$ | — | 175 | — | nC |
| Gate-source charge1 | | Q_{gs1} | | — | 40 | — | |
| Gate-drain ("miller") charge | | Q_{gd} | | — | 65 | — | |
| Gate switch charge | | Q_{sw} | | — | 80 | — | |

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

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|-----------|--|-----|------|------|------|
| Continuous drain reverse current (Note 1) | I_{DR} | — | — | — | 80 | A |
| Pulse drain reverse current (Note 1) | I_{DRP} | — | — | — | 320 | A |
| Forward voltage (diode) | V_{DSF} | $I_{DR} = 80\text{ A}, V_{GS} = 0\text{ V}$ | — | -0.9 | -1.2 | V |
| Reverse recovery time | t_{rr} | $I_{DR} = 80\text{ A}, V_{GS} = 0\text{ V},$ | — | 60 | — | ns |
| Reverse recovery charge | Q_{rr} | $dI_{DR}/dt = 50\text{ A}/\mu\text{s}$ | — | 60 | — | nC |

Marking



Note 6: A line under a Lot No. identifies the indication of product Labels [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Moisture-Proof Packing

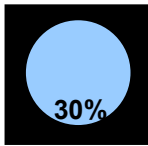
The TK150F04K3L is packed in a moisture-proof laminated aluminum bag.

Precautions for Transportation and Storage

- (1) Avoid excessive vibration during transportation.
- (2) Do not toss or drop the packed devices to avoid ripping of the bag.
- (3) After opening the moisture-proof bag, the devices should be assembled within two weeks in an environment of 5°C to 30°C and RH70% or below. Perform reflow at most twice.
- (4) The moisture-proof bag may be stored unopened for up to 12 months at 5°C to 30°C and RH90% or below.
- (5) If, upon opening the bag, the moisture indicator card shows humidity of 30% or above (the color of the 30% dot has changed from blue to pink) or the expiration date has passed, the devices should be baked as follows:

Baking conditions: 125°C for 48 hours.

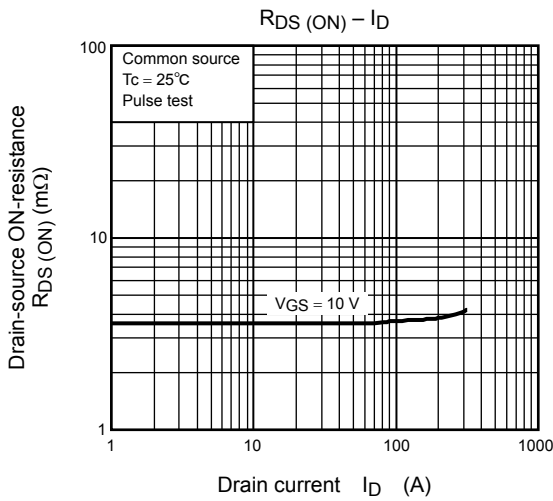
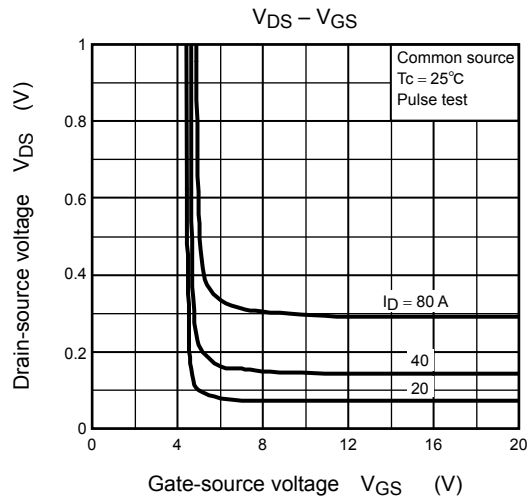
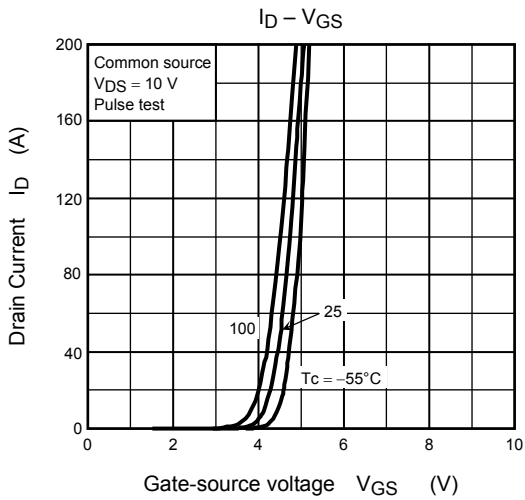
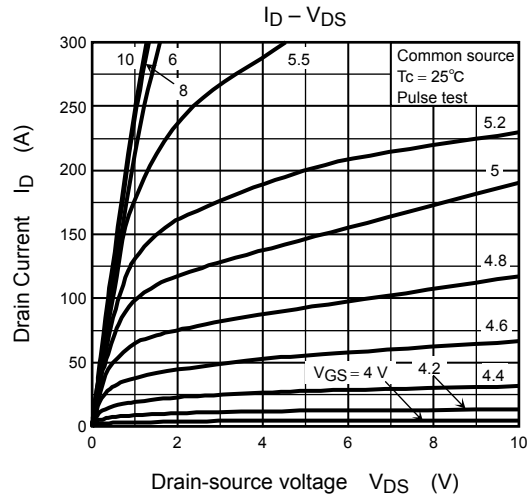
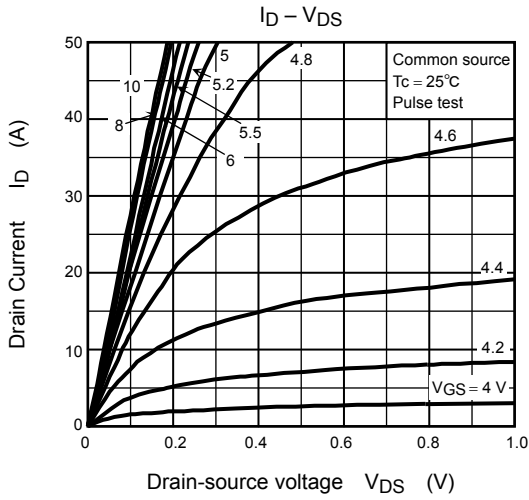
Since the tape materials are not heat-proof, devices should be placed on either heat-proof trays or aluminum magazines when baking.

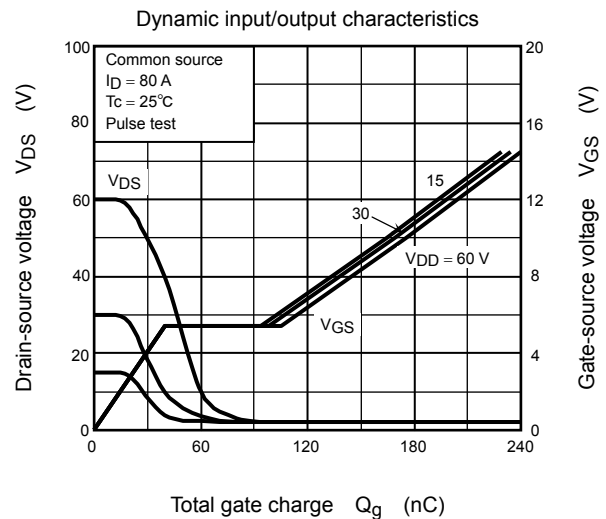
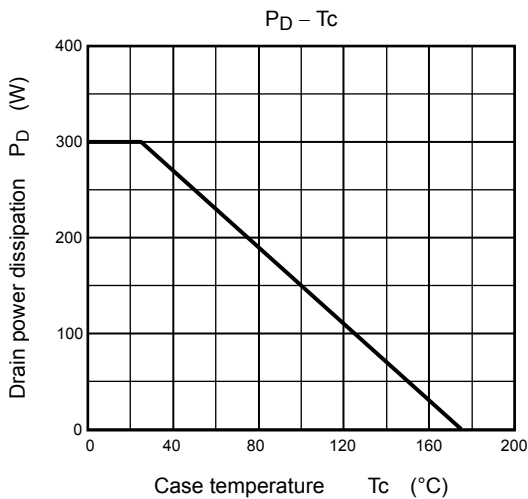
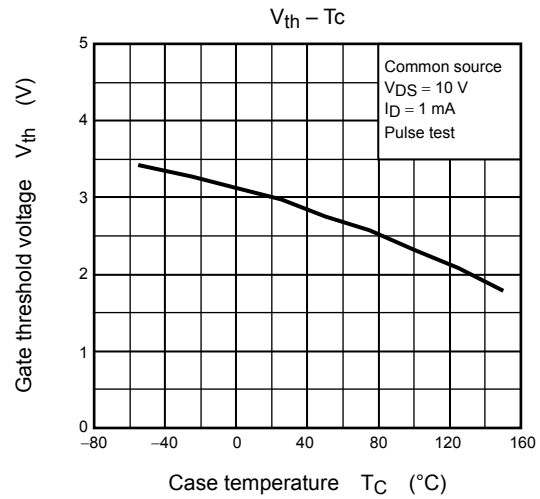
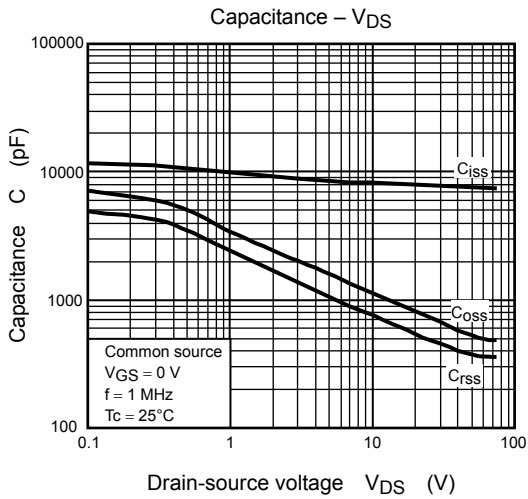
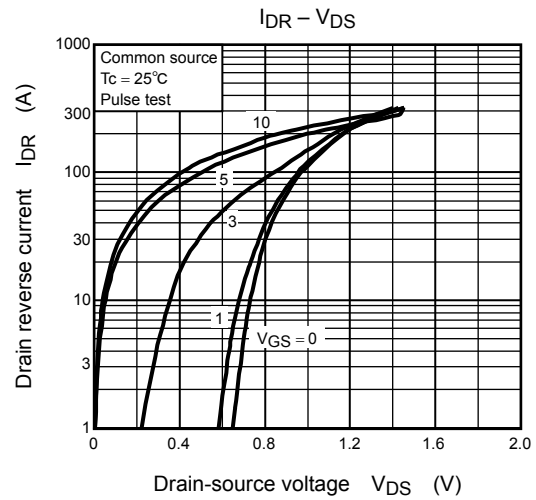
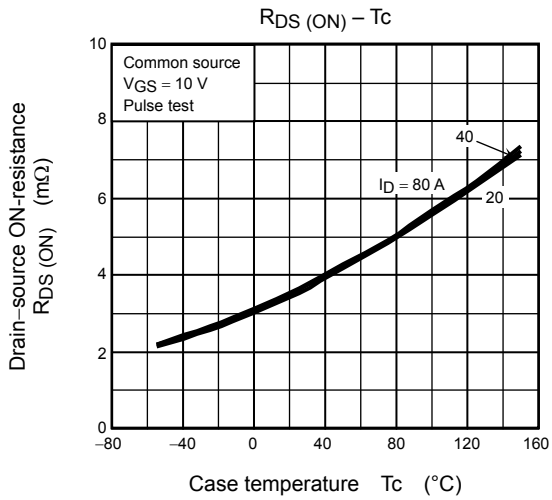


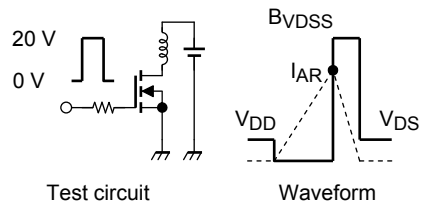
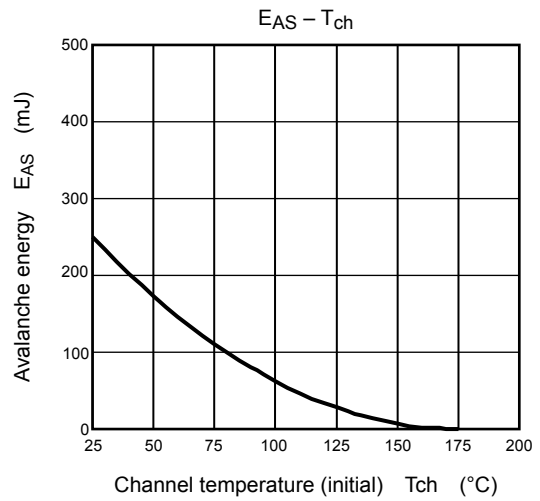
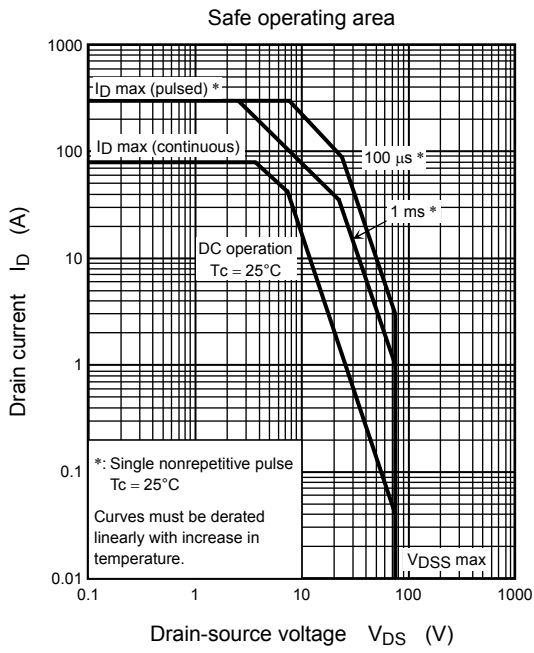
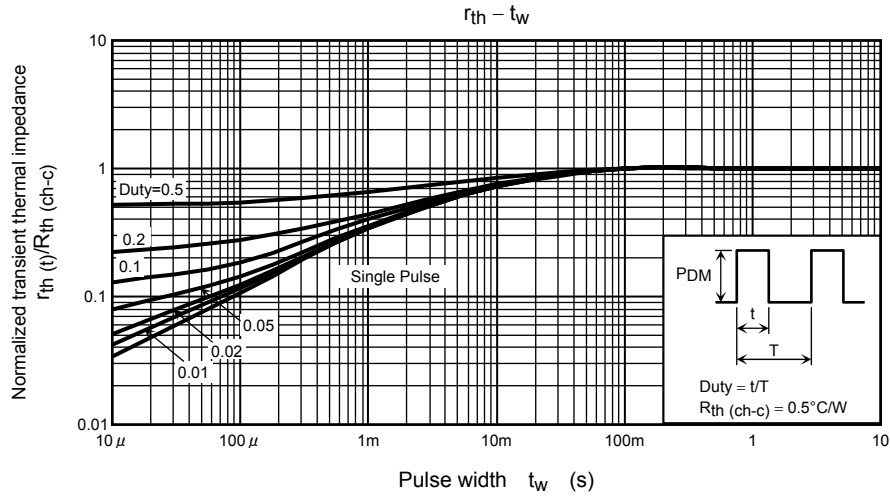
The humidity indicator shows an approximate ambient humidity at 25°C.

If the ambient humidity is below 30%, the color of all the indicator dots is blue.

If, upon opening the bag, the color of the 30% dot has changed from blue to pink, the devices should be baked before assembly.







$R_G = 1 \Omega$
 $V_{DD} = 25 \text{ V}, L = 58 \mu\text{H}$

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

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