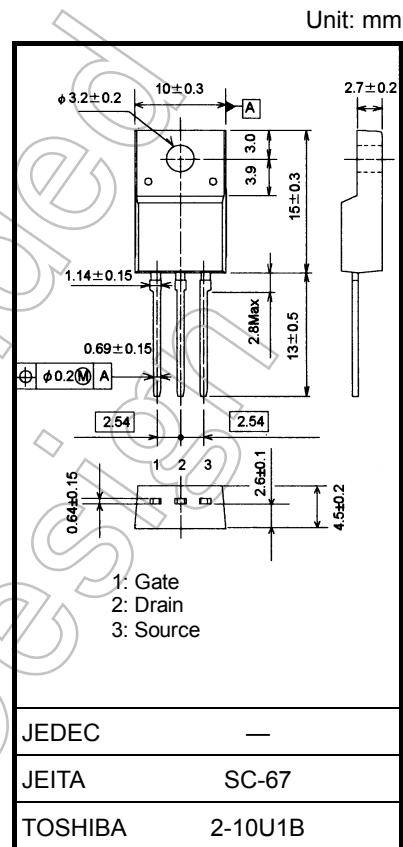


TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π -MOSVII)

TK6A60D

Switching Regulator Applications

- Low drain-source ON-resistance: $R_{DS(ON)} = 1.0 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 3.0 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \mu\text{A}$ (max) ($V_{DS} = 600 \text{ V}$)
- Enhancement mode: $V_{th} = 2.0$ to 4.0 V ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)



Weight : 1.7 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

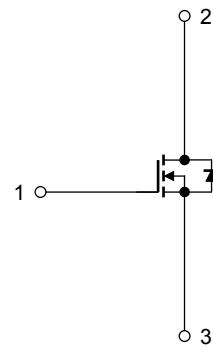
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th}(\text{ch-c})$	3.125	$^{\circ}\text{C/W}$
Thermal resistance, channel to ambient	$R_{th}(\text{ch-a})$	62.5	$^{\circ}\text{C/W}$

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

Note 2: $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^{\circ}\text{C}$ (initial), $L = 8.4 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 6 \text{ A}$

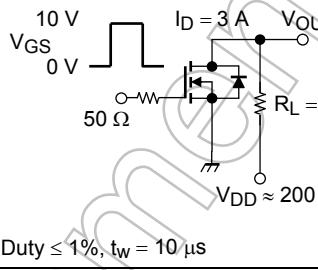
Note 3: Repetitive rating: pulse width limited by maximum channel temperature

This transistor is an electrostatic-sensitive device. Handle with care.



Start of commercial production
2008-07

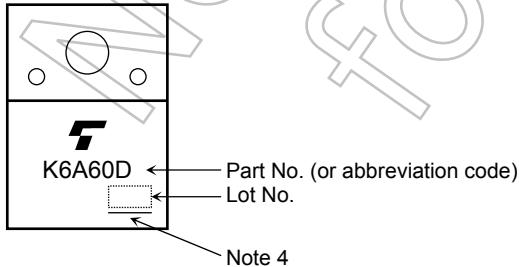
Electrical Characteristics ($T_a = 25^\circ C$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	—	—	± 1	μA
Drain cut-off current	I_{DSS}	$V_{DS} = 600 V, V_{GS} = 0 V$	—	—	10	μA
Drain-source breakdown voltage	$V_{(BR) DSS}$	$I_D = 10 mA, V_{GS} = 0 V$	600	—	—	V
Gate threshold voltage	V_{th}	$V_{DS} = 10 V, I_D = 1 mA$	2.0	—	4.0	V
Drain-source ON-resistance	$R_{DS} (\text{ON})$	$V_{GS} = 10 V, I_D = 3 A$	—	1.0	1.25	Ω
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 V, I_D = 3 A$	0.8	3.0	—	S
Input capacitance	C_{iss}	$V_{DS} = 25 V, V_{GS} = 0 V, f = 1 \text{ MHz}$	—	800	—	pF
Reverse transfer capacitance	C_{rss}		—	4	—	
Output capacitance	C_{oss}		—	100	—	
Switching time	Rise time	t_r		—	20	—
	Turn-on time	t_{on}		—	40	—
	Fall time	t_f		—	12	—
	Turn-off time	t_{off}		—	60	—
Total gate charge	Q_g	$V_{DD} \approx 400 V, V_{GS} = 10 V, I_D = 6 A$	—	16	—	nC
Gate-source charge	Q_{gs}		—	10	—	
Gate-drain charge	Q_{gd}		—	6	—	

Source-Drain Ratings and Characteristics ($T_a = 25^\circ C$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	6	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	24	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 6 A, V_{GS} = 0 V$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 6 A, V_{GS} = 0 V,$ $dI_{DR}/dt = 100 A/\mu s$	—	1200	—	ns
Reverse recovery charge	Q_{rr}	—	—	10	—	μC

Marking

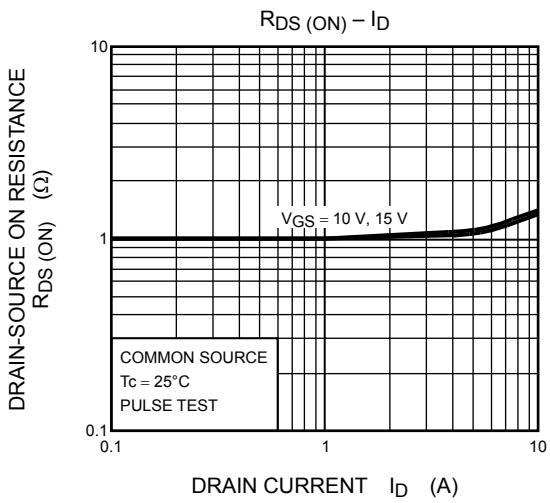
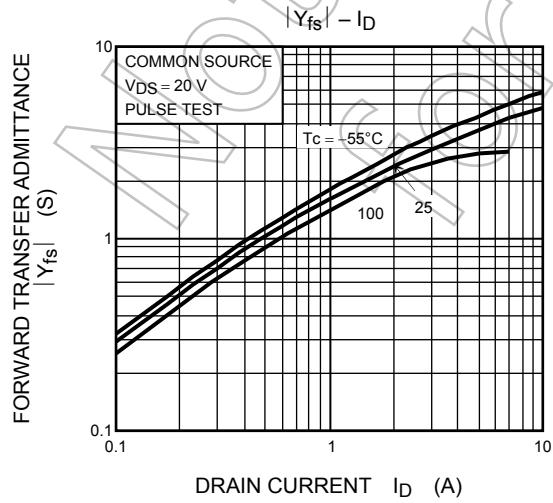
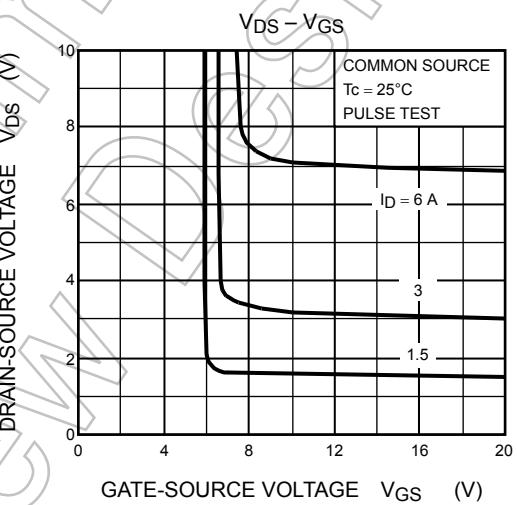
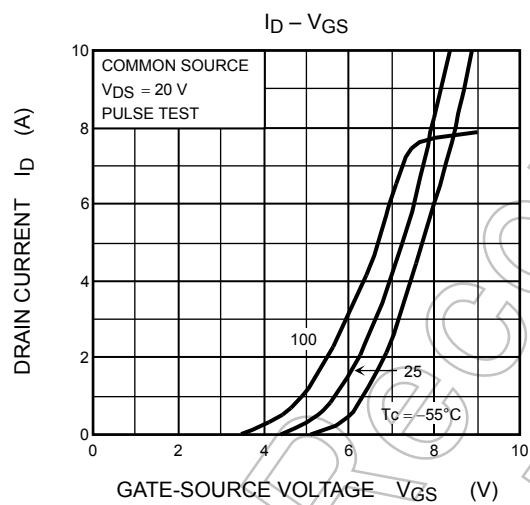
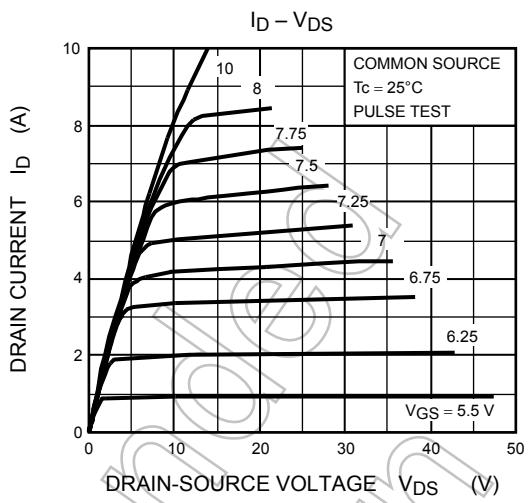
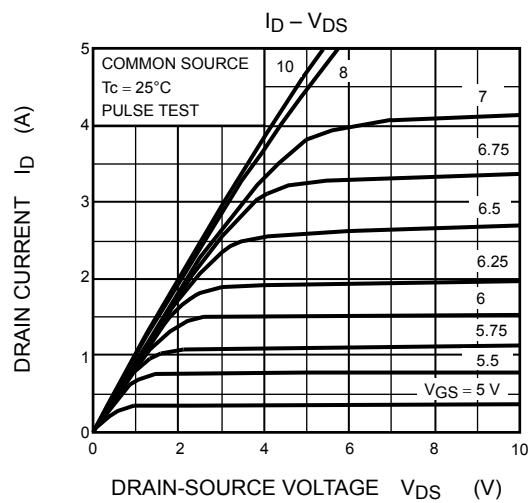


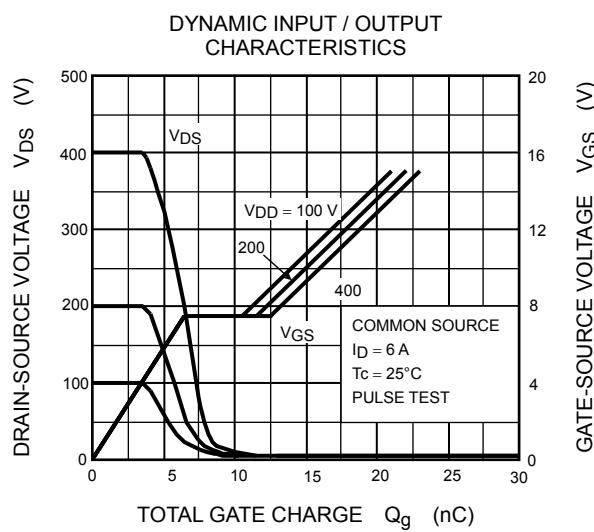
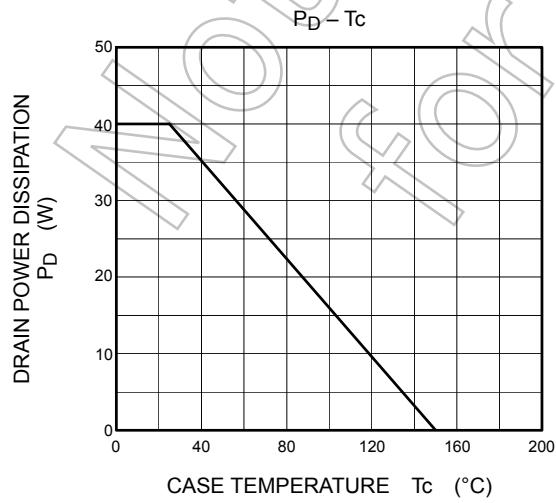
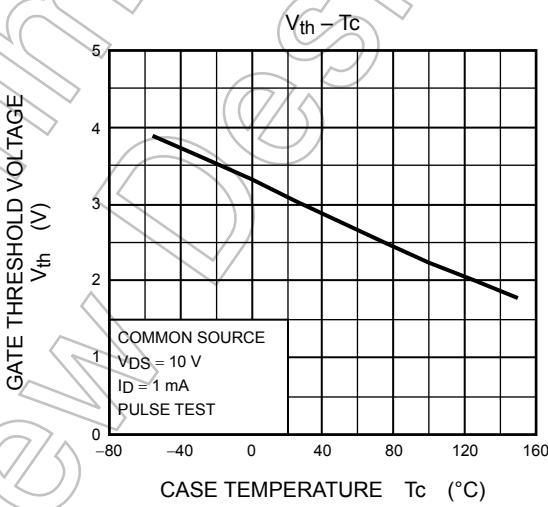
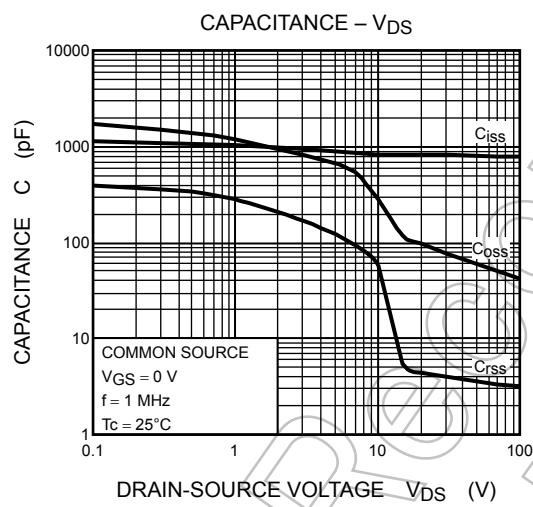
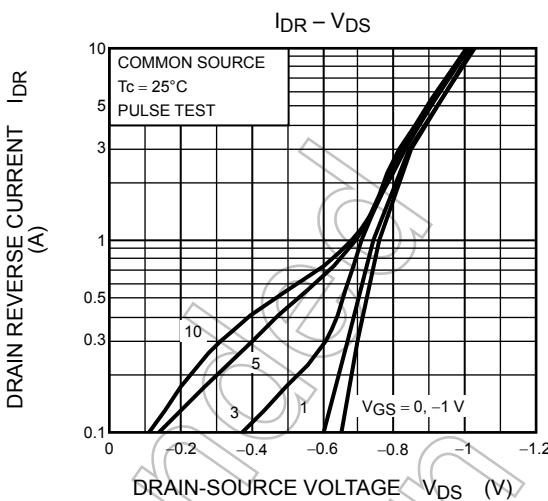
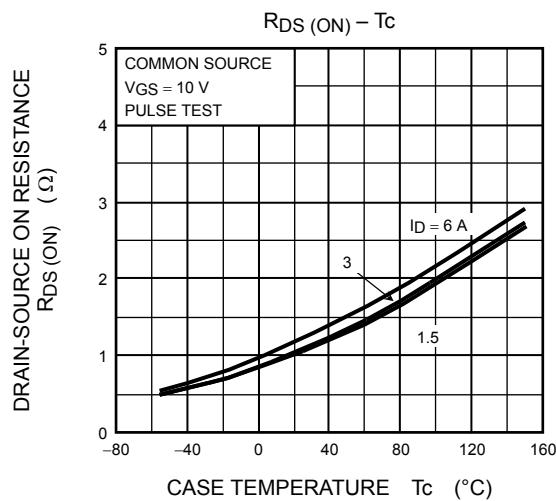
Note 4: A line under a Lot No. identifies the indication of product Labels.

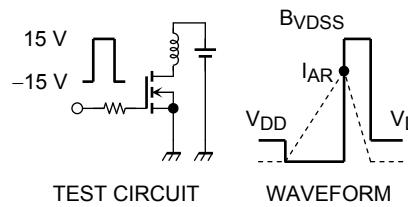
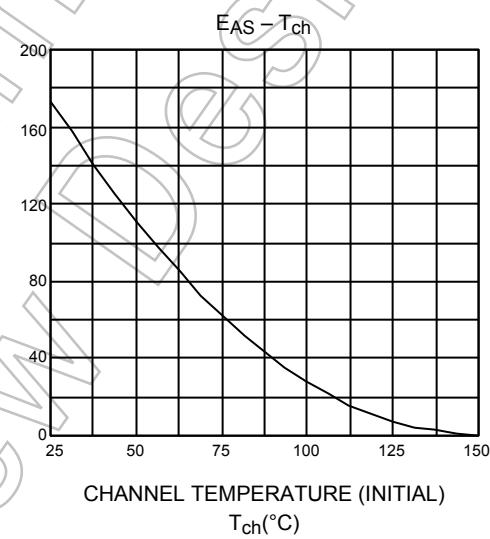
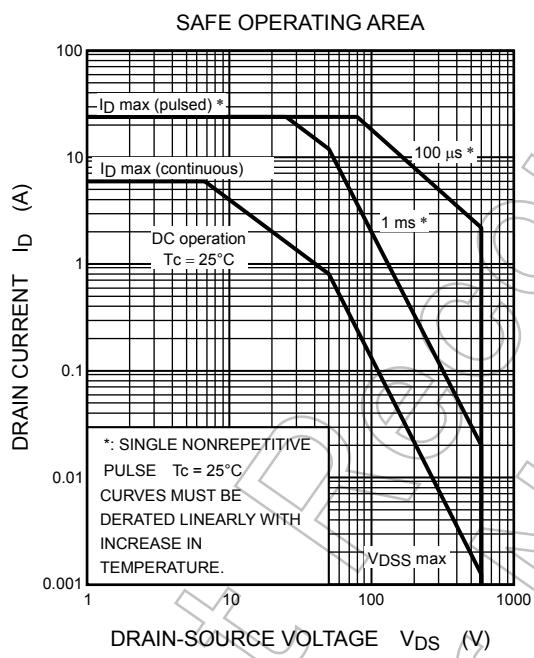
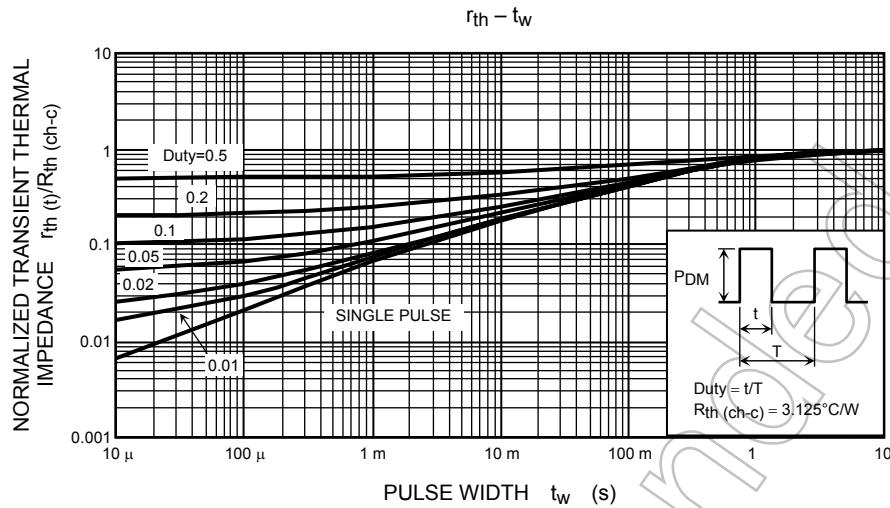
Not underlined: [[Pb]]/INCLUDES > MCV

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

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$$R_G = 25 \Omega$$

$$V_{DD} = 90 \text{ V}, L = 8.4 \text{ mH}$$

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

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