

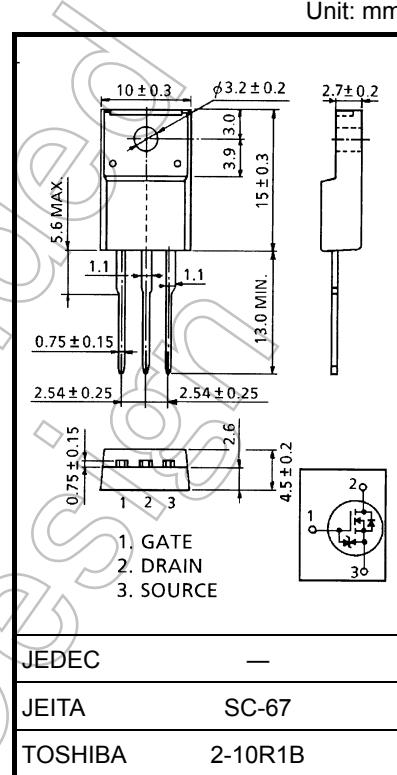
TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π -MOSII)**2SK3662**

Switching Regulator, DC-DC Converter, Motor Drive Applications

- Low drain-source ON-resistance: $R_{DS\ (ON)} = 9.4\ m\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 55\ S$ (typ.)
- Low leakage current: $I_{DSS} = 100\ \mu A$ (max) ($V_{DS} = 60\ V$)
- Enhancement mode: $V_{th} = 1.3$ to $2.5\ V$ ($V_{DS} = 10\ V$, $I_D = 1\ mA$)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	60	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)	V_{DGR}	60	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC (Note 1) I_D	35	A
	Pulse (Note 1) I_{DP}	105	
Drain power dissipation ($T_c = 25^\circ C$)	P_D	35	W
Single pulse avalanche energy (Note 2)	E_{AS}	204	mJ
Avalanche current	I_{AR}	35	A
Repetitive avalanche energy (Note 3)	E_{AR}	3.5	mJ
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C



Weight: 1.9 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	$R_{th\ (ch-c)}$	3.57	°C/W
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	62.5	°C/W

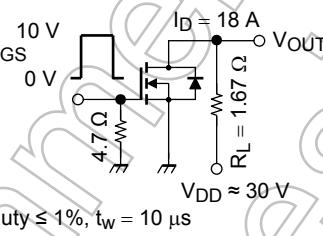
Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: $V_{DD} = 25\ V$, $T_{ch} = 25^\circ C$ (initial), $L = 227\ \mu H$, $I_{AR} = 35\ A$, $R_G = 25\ \Omega$

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

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

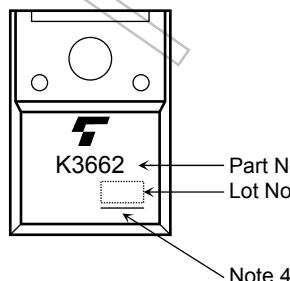
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-off current	I_{DSS}	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(\text{BR}) DSS}$	$I_D = 10 \text{ mA}$, $V_{GS} = 0 \text{ V}$	60	—	—	V
	$V_{(\text{BR}) DSX}$	$I_D = 10 \text{ mA}$, $V_{GS} = -20 \text{ V}$	40	—	—	
Gate threshold voltage	V_{th}	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$	1.3	—	2.5	V
Drain-source ON-resistance	$R_{DS (\text{ON})}$	$V_{GS} = 4 \text{ V}$, $I_D = 18 \text{ A}$	—	12.5	19	$\text{m}\Omega$
		$V_{GS} = 10 \text{ V}$, $I_D = 18 \text{ A}$	—	9.4	12.5	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 \text{ V}$, $I_D = 18 \text{ A}$	28	55	—	S
Input capacitance	C_{iss}	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	—	5120	—	pF
Reverse transfer capacitance	C_{rss}		—	300	—	
Output capacitance	C_{oss}		—	500	—	
Switching time	Rise time	t_r	 V_{GS} (0 V to 10 V)	—	6	ns
	Turn-on time	t_{on}		—	19	
	Fall time	t_f		—	20	
	Turn-off time	t_{off}		—	115	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 48 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 35 \text{ A}$	—	91	—	nC
Gate-source charge	Q_{gs}		—	70	—	
Gate-drain ("miller") charge	Q_{gd}		—	21	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	35	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	105	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 35\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.5	V
Reverse recovery time	t_{rr}	$I_{DR} = 35\text{ A}$, $V_{GS} = 0\text{ V}$, $dI_{DR}/dt = 50\text{ A}/\mu\text{s}$	—	60	—	ns
Reverse recovery charge	Q_{rr}		—	58	—	nC

Marking

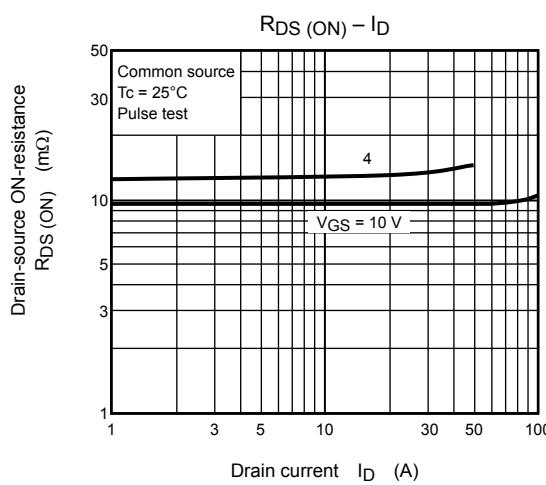
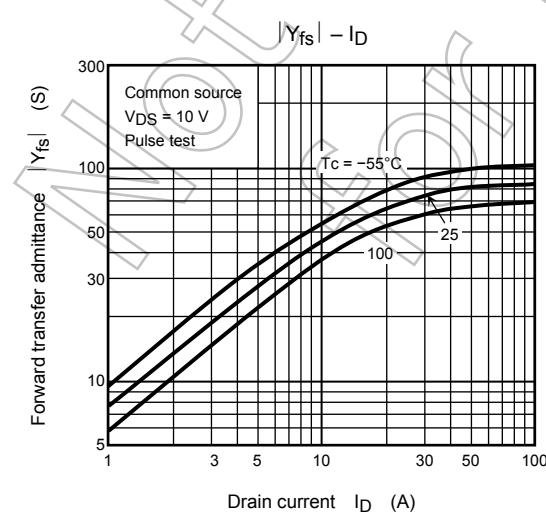
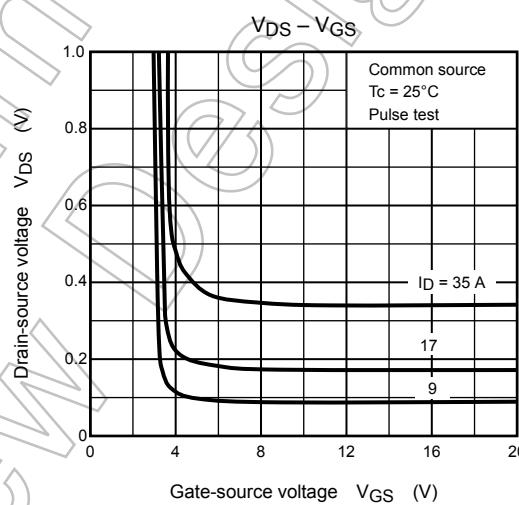
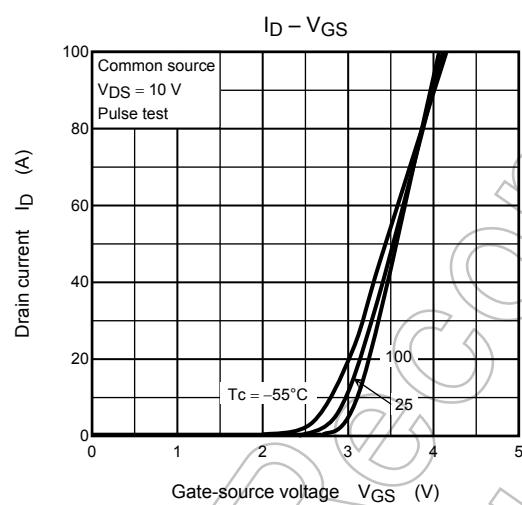
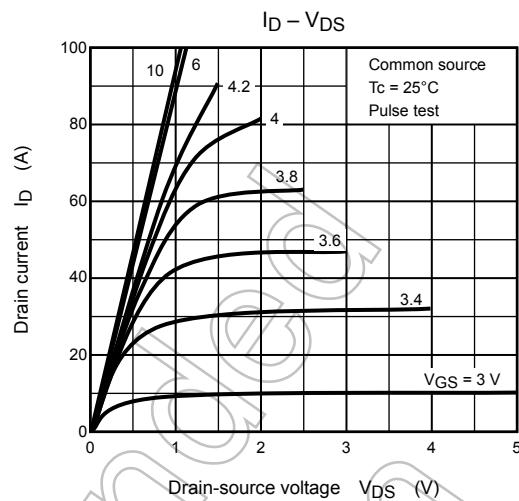
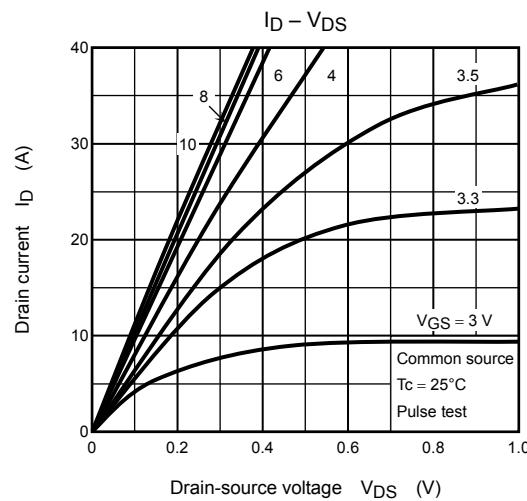


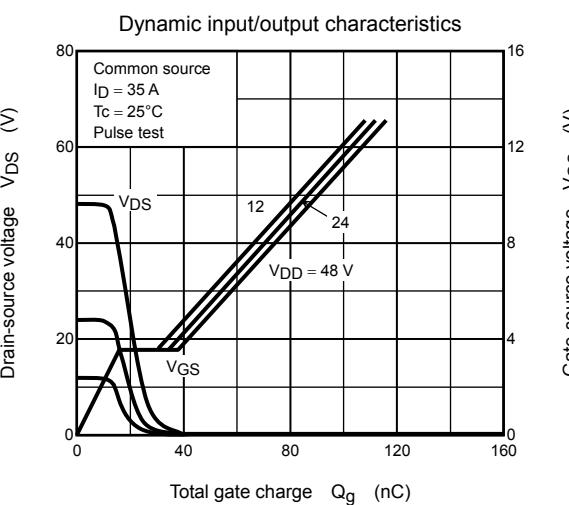
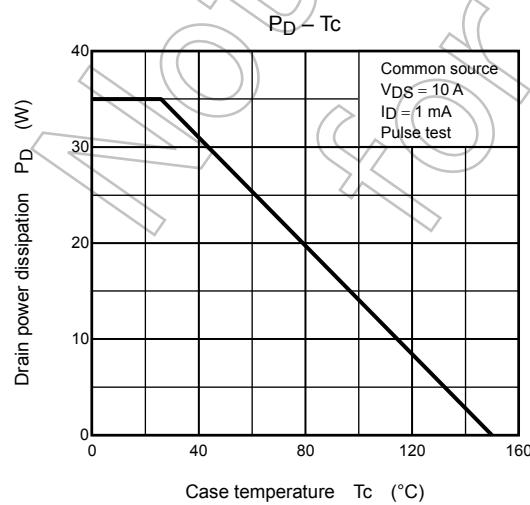
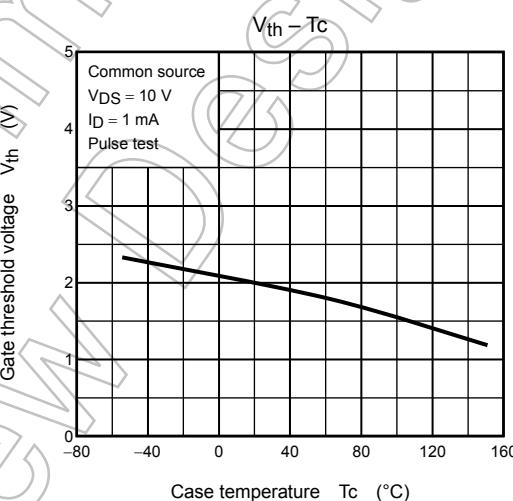
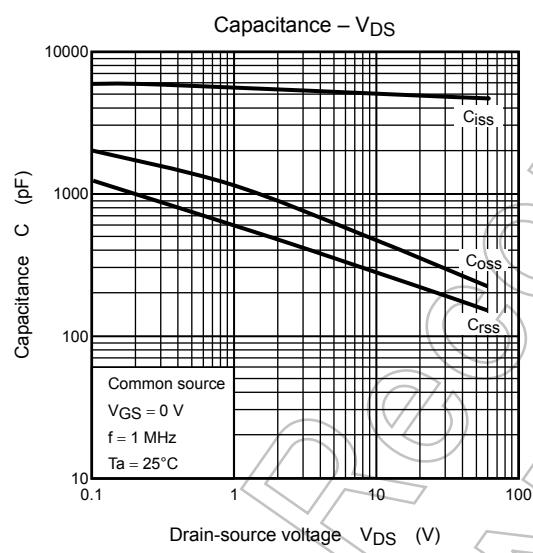
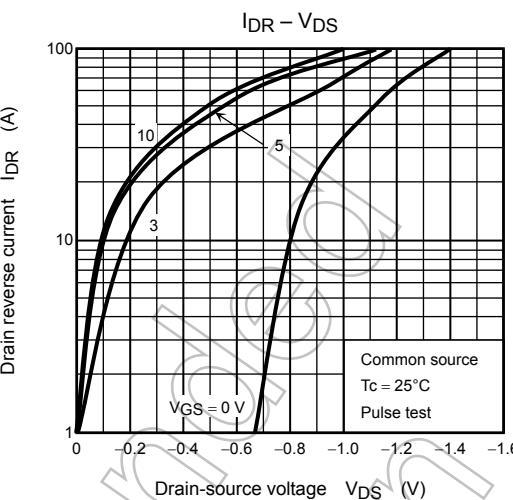
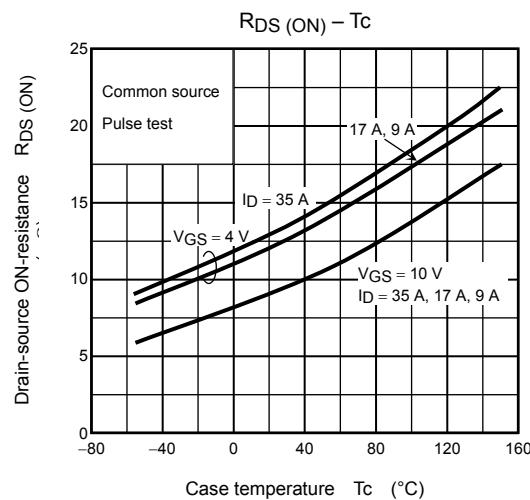
Note 4: A line under a Lot No. identifies the indication of product Labels.

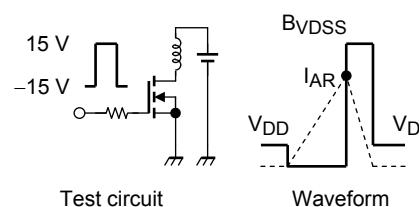
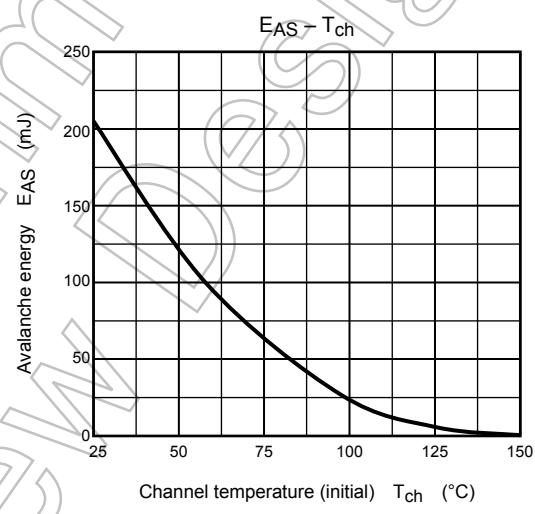
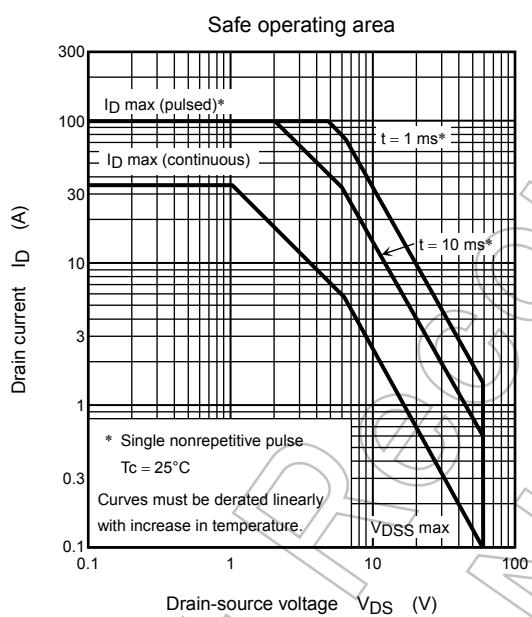
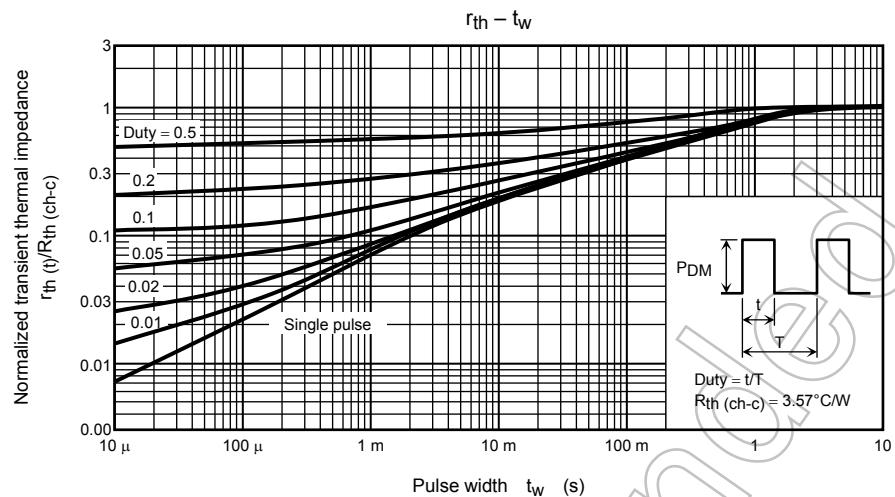
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$$EAS = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$$

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