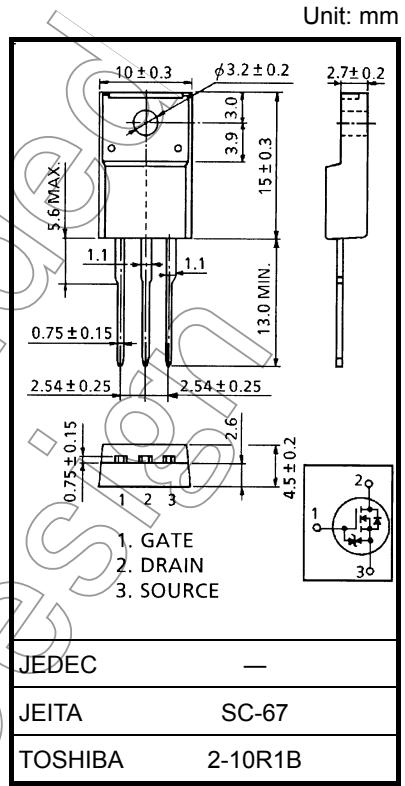


TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π -MOSIII)

2SK2717

DC-DC Converter and Motor Drive Applications

- Low drain-source ON-resistance : $R_{DS\ (ON)} = 2.3\ \Omega\ (\text{typ.})$
- High forward transfer admittance : $|Y_{fs}| = 4.4\ \text{S}\ (\text{typ.})$
- Low leakage current : $I_{DSS} = 100\ \mu\text{A}\ (\text{max})\ (\text{V}_{DS} = 720\ \text{V})$
- Enhancement mode : $V_{th} = 2.0\ \text{to}\ 4.0\ \text{V}\ (\text{V}_{DS} = 10\ \text{V}, I_D = 1\ \text{mA})$



Weight: 1.9 g (typ.)

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

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	900	V
Drain-gate voltage ($R_{GS} = 20\ \text{k}\Omega$)	V_{DGR}	900	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	45	W
Single pulse avalanche energy (Note 2)	E_{AS}	595	mJ
Avalanche current	I_{AR}	5	A
Repetitive avalanche energy (Note 3)	E_{AR}	4.5	mJ
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

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	$R_{th\ (ch-c)}$	2.78	$^\circ\text{C} / \text{W}$
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	62.5	$^\circ\text{C} / \text{W}$

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), $L = 43.6\ \text{mH}$, $R_G = 25\ \Omega$, $I_{AR} = 5\ \text{A}$

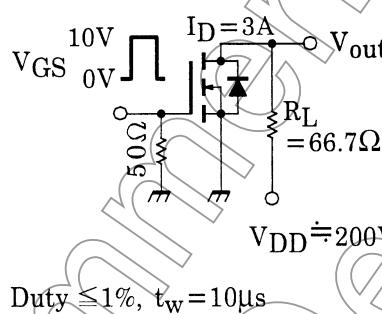
Note 3: Repetitive rating: pulse width limited by maximum channel temperature

This transistor is an electrostatic-sensitive device.

Please handle with caution.

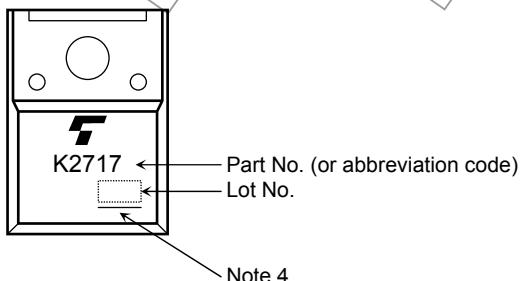
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 10	μA
Gate-source breakdown voltage	$V_{(\text{BR})\text{GSS}}$	$I_G = \pm 10\text{ }\mu\text{A}$, $V_{DS} = 0\text{ V}$	± 30	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 720\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	900	—	—	V
Gate threshold voltage	V_{th}	$V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$	2.0	—	4.0	V
Drain-source ON-resistance	$R_{DS(\text{ON})}$	$V_{GS} = 10\text{ V}$, $I_D = 3.0\text{ A}$	—	2.3	2.5	Ω
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 20\text{ V}$, $I_D = 3.0\text{ A}$	1.1	4.4	—	S
Input capacitance	C_{iss}	$V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	1200	—	pF
Reverse transfer capacitance	C_{rss}		—	20	—	
Output capacitance	C_{oss}		—	120	—	
Switching time	Rise time	t_r	—	40	—	ns
	Turn-on time	t_{on}	—	90	—	
	Fall time	t_f	—	60	—	
	Turn-off time	t_{off}	—	200	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 5\text{ A}$	—	45	—	nC
Gate-source charge	Q_{gs}		—	25	—	
Gate-drain ("miller") Charge	Q_{gd}		—	20	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	5	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	15	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 5\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.9	V
Reverse recovery time	t_{rr}	$I_{DR} = 5\text{ A}$, $V_{GS} = 0\text{ V}$ $dI_{DR} / dt = 100\text{ A} / \mu\text{s}$	—	1300	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR} / dt = 100\text{ A} / \mu\text{s}$	—	11	—	μC

Marking

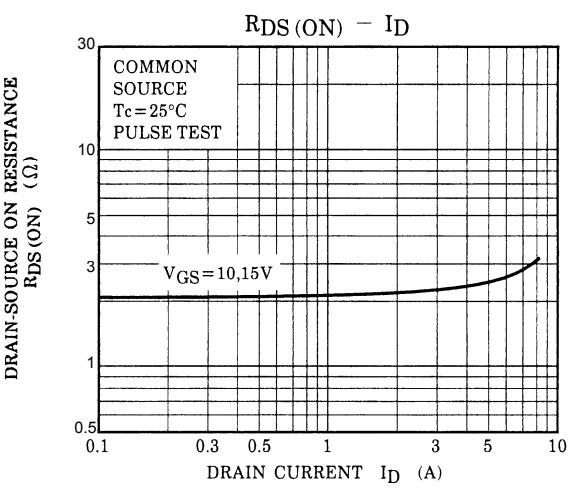
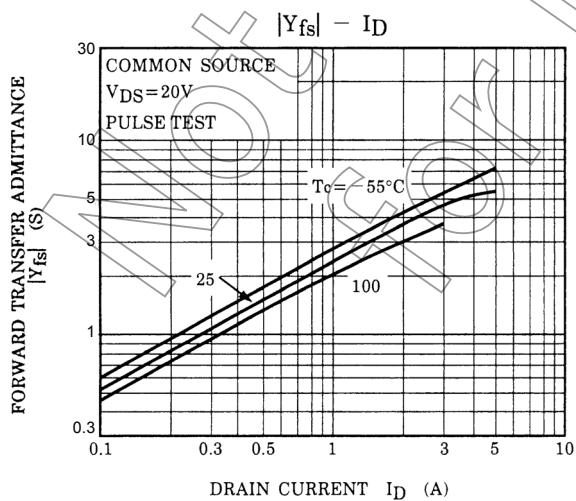
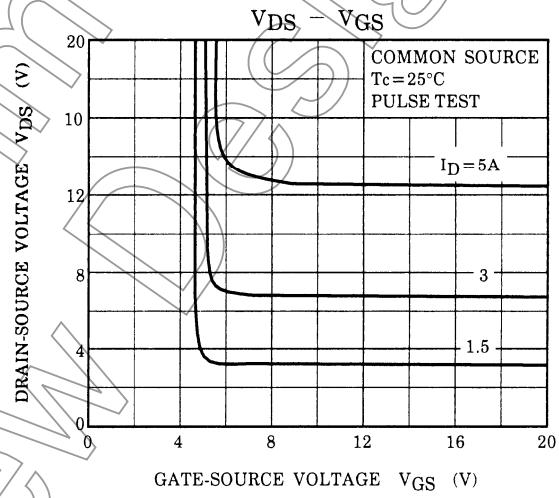
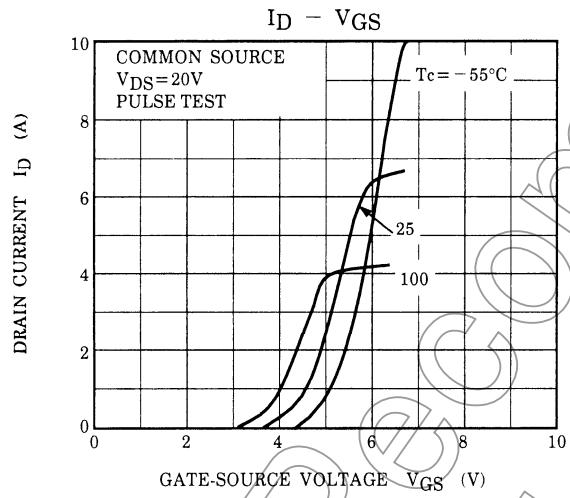
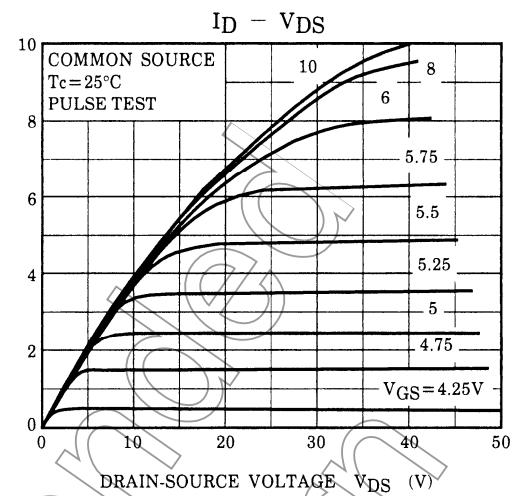
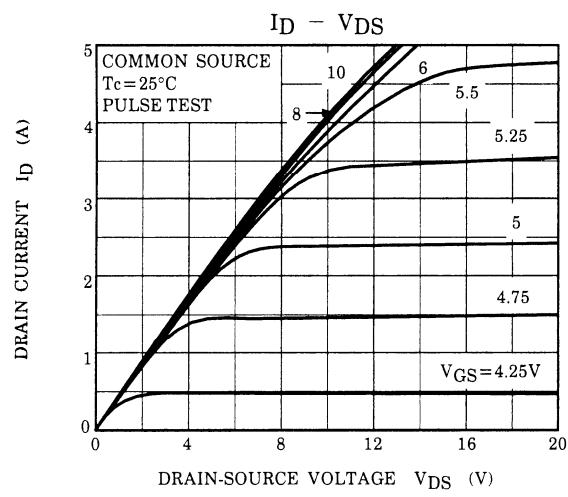


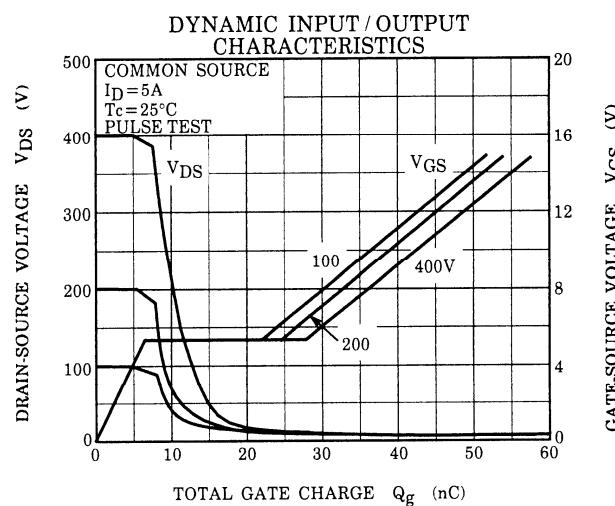
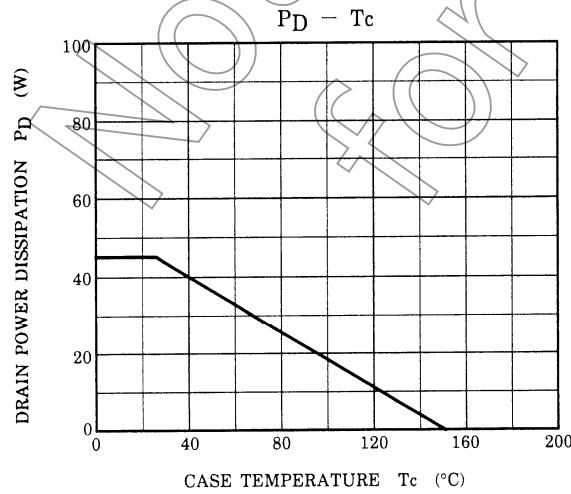
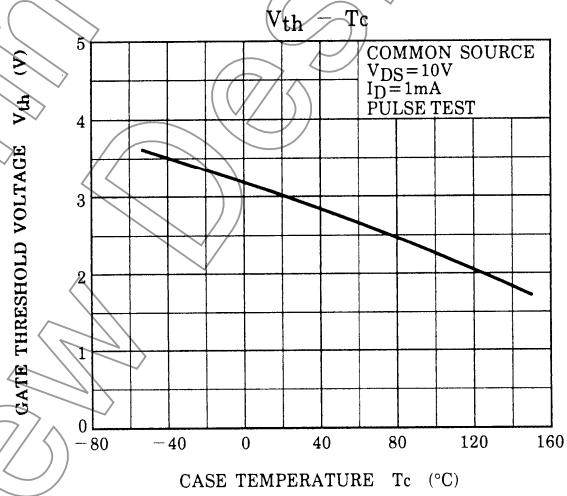
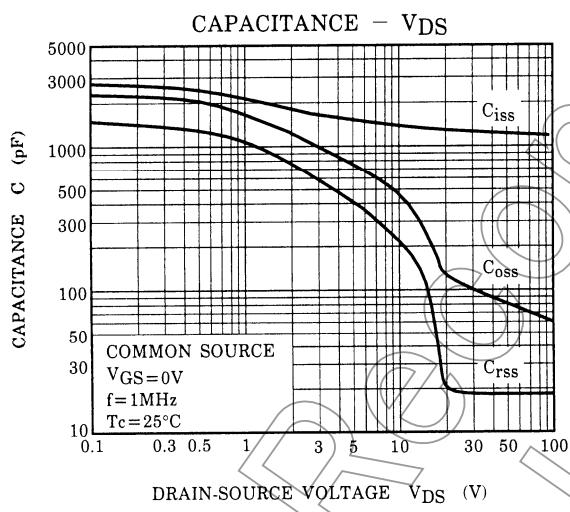
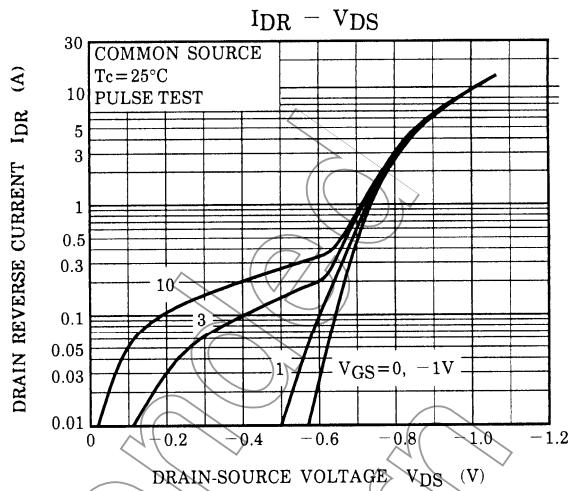
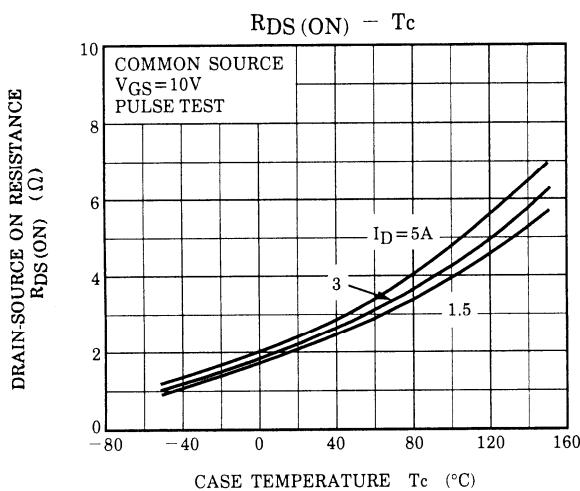
Note 4: A line under a Lot No. identifies the indication of product Labels.

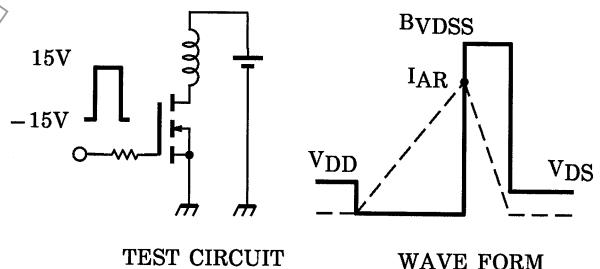
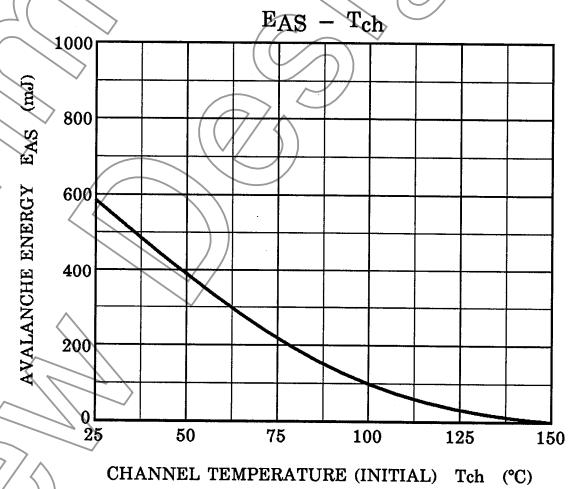
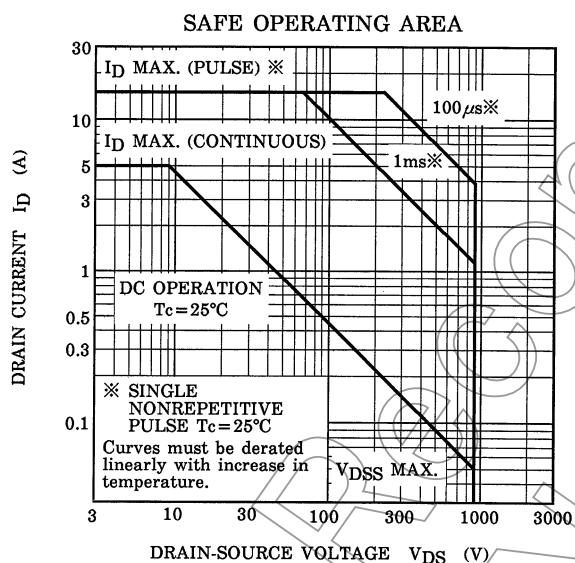
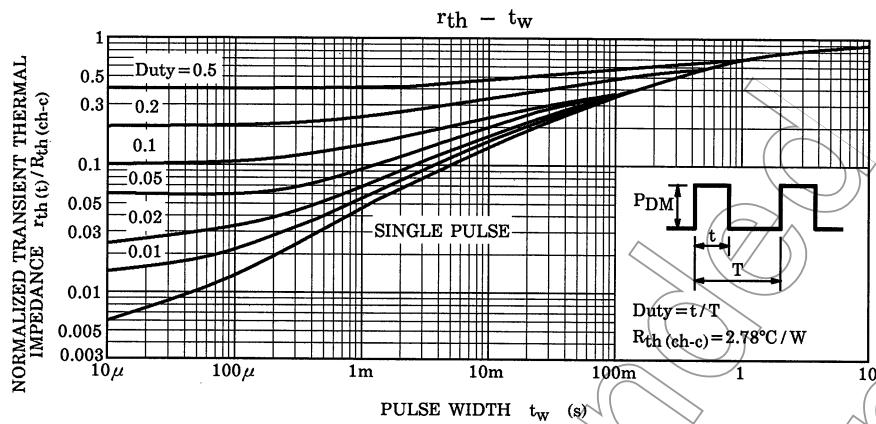
Not underlined: [[Pb]]/INCLUDES > MCV

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$$R_G = 25\Omega$$

$$V_{DD} = 90\text{ V}, L = 43.6\text{ mH}$$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - VDD} \right)$$

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