

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

2SK2493

Chopper Regulator and DC-DC Converter Applications

- 2.5-V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 0.08 \text{ m}\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 8.0 \text{ S}$ (typ.)
- Low leakage current : $I_{DSS} = 100 \text{ }\mu\text{A}$ (max) ($V_{DS} = 16 \text{ V}$)
- Enhancement mode : $V_{th} = 0.5\sim 1.1 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

Characteristics	Symbol	Rating	Unit	
Drain-source voltage	V_{DSS}	16	V	
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	16	V	
Gate-source voltage	V_{GSS}	± 8	V	
Drain current	DC (Note 1)	I_D	5	A
	Pulse (Note 1)	I_{DP}	20	A
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	20	W	
Channel temperature	T_{ch}	150	$^\circ\text{C}$	
Storage temperature range	T_{stg}	$-55\sim 150$	$^\circ\text{C}$	

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).

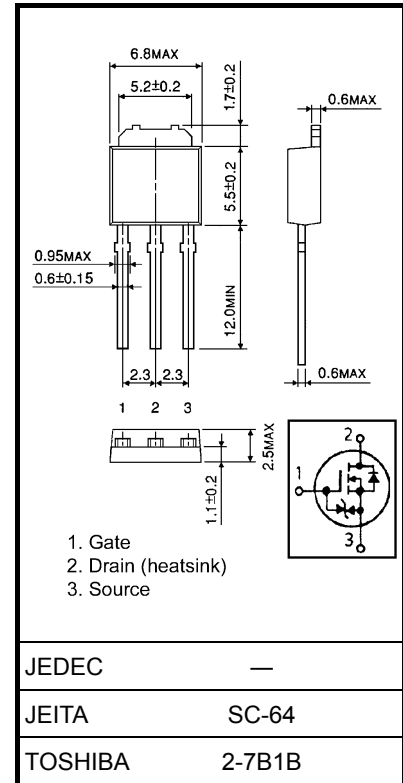
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	6.25	$^\circ\text{C} / \text{W}$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	125	$^\circ\text{C} / \text{W}$

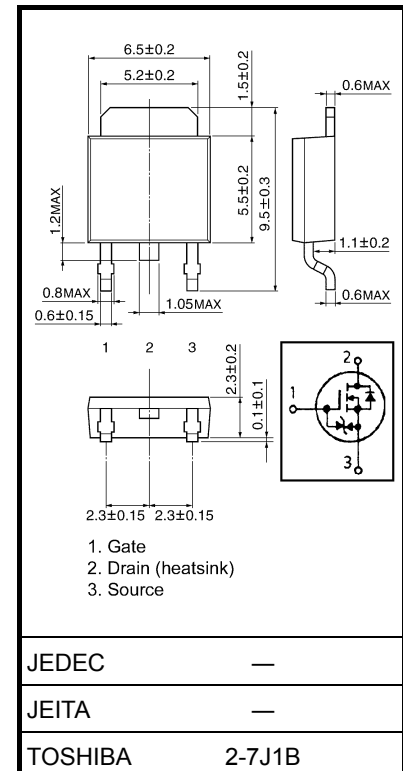
Note 1: Ensure that the channel temperature does not exceed 150°C .

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

Unit: mm

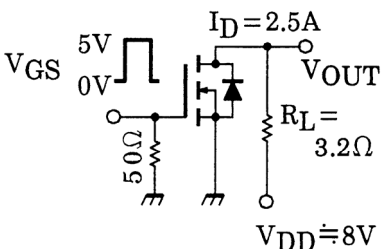


Weight: 0.36 g (typ.)



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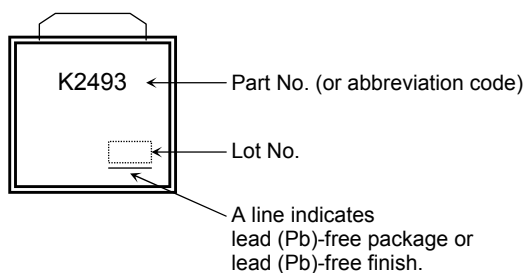
Electrical Characteristics (Ta = 25°C)

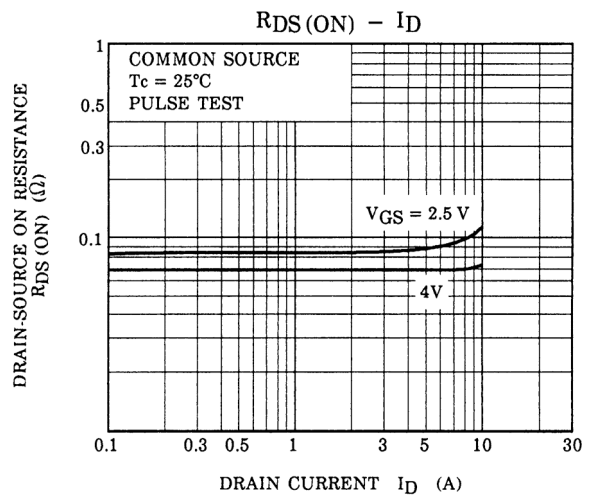
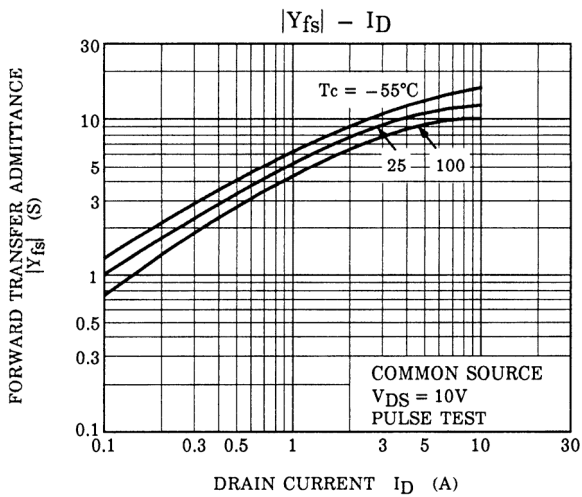
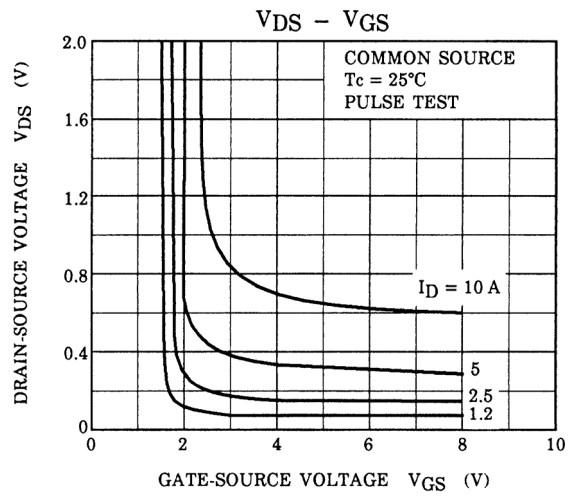
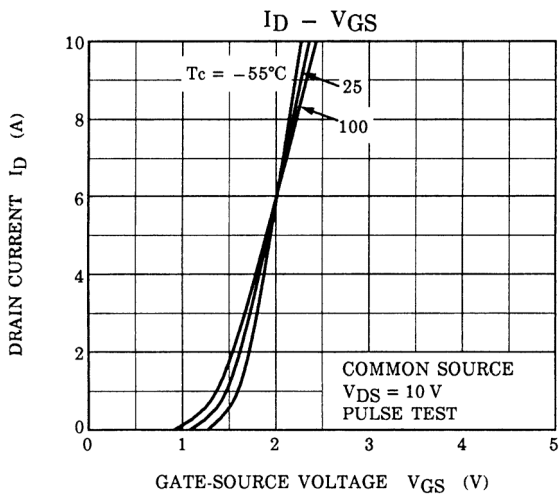
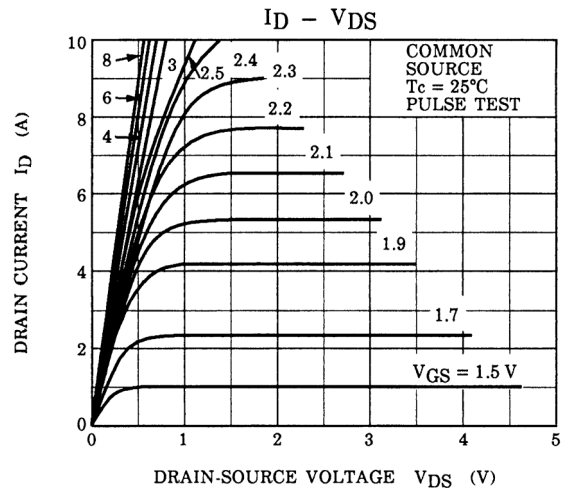
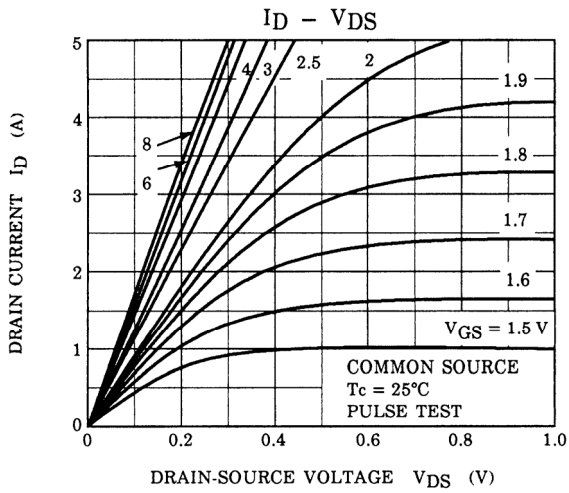
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 6.5 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-off current		I_{DSS}	$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	16	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	0.5	—	1.1	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = 2.5 \text{ V}, I_D = 2.5 \text{ A}$	—	0.08	0.12	Ω
			$V_{GS} = 4 \text{ V}, I_D = 2.5 \text{ A}$	—	0.07	0.1	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 2.5 \text{ A}$	4.0	8.0	—	S
Input capacitance		C_{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	1200	—	pF
Reverse transfer capacitance		C_{rss}		—	110	—	
Output capacitance		C_{oss}		—	380	—	
Switching time	Rise time	t_r	 <p>$I_D = 2.5 \text{ A}$ $V_{GS} = 5 \text{ V}$ V_{OUT} $R_L = 3.2 \Omega$ $V_{DD} \approx 8 \text{ V}$ 50Ω</p>	—	30	—	ns
	Turn-on time	t_{on}		—	50	—	
	Fall time	t_f		—	200	—	
	Turn-off time	t_{off}		—	650	—	
Total gate charge (Gate-source plus gate-drain)		Q_g	$V_{DD} \approx 16 \text{ V}, V_{GS} = 5 \text{ V}, I_D = 5 \text{ A}$	—	23	—	nC
Gate-source charge		Q_{gs}		—	17	—	
Gate-drain ("miller") charge		Q_{gd}		—	6	—	

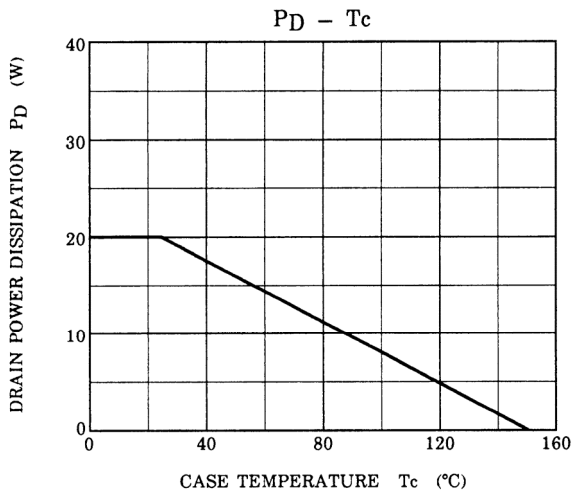
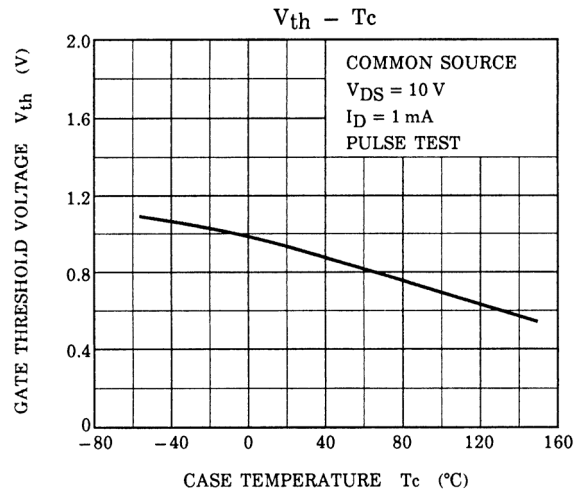
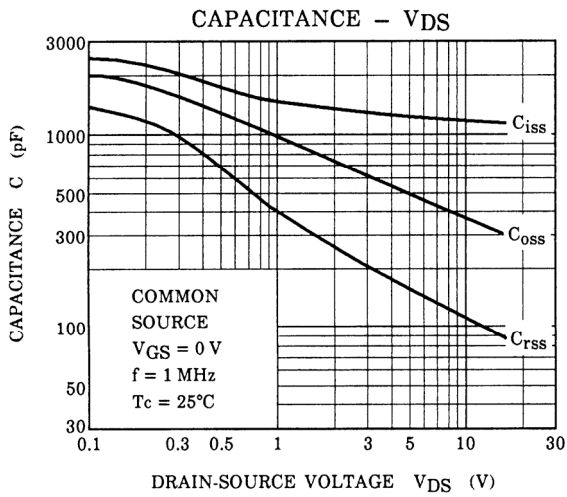
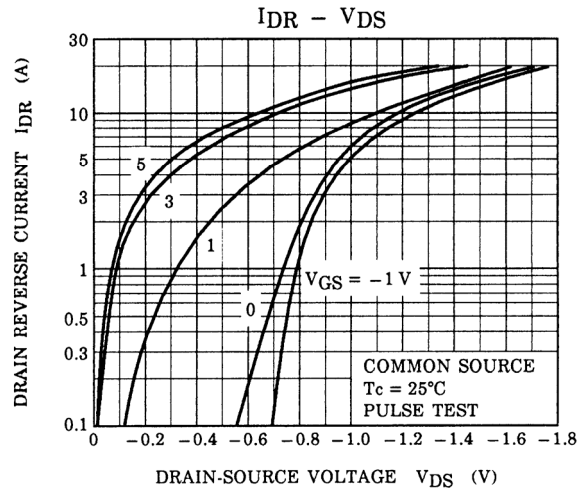
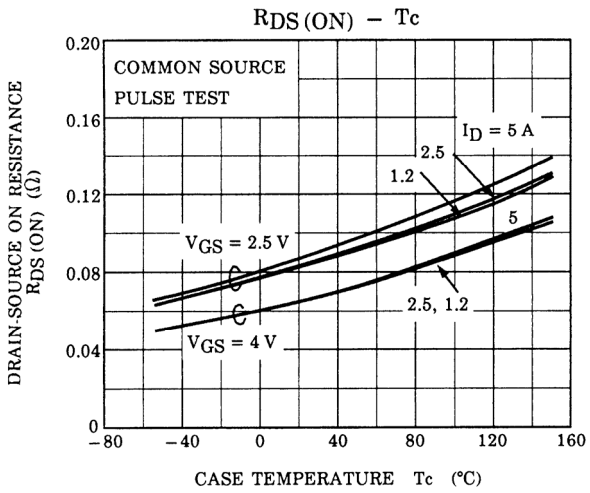
Source-Drain Ratings and Characteristics (Ta = 25°C)

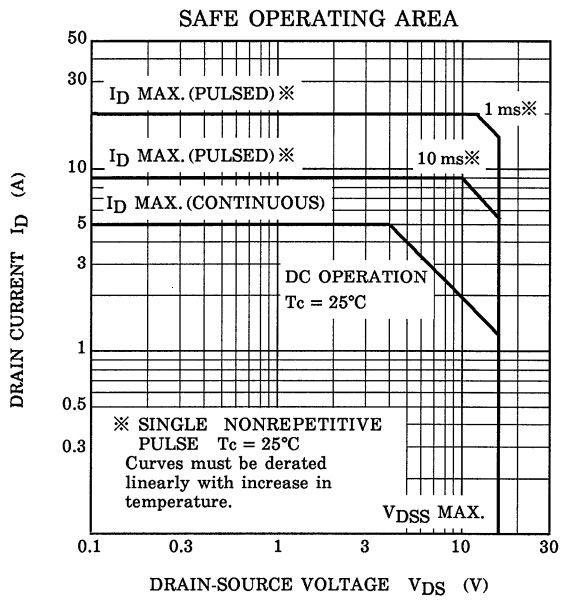
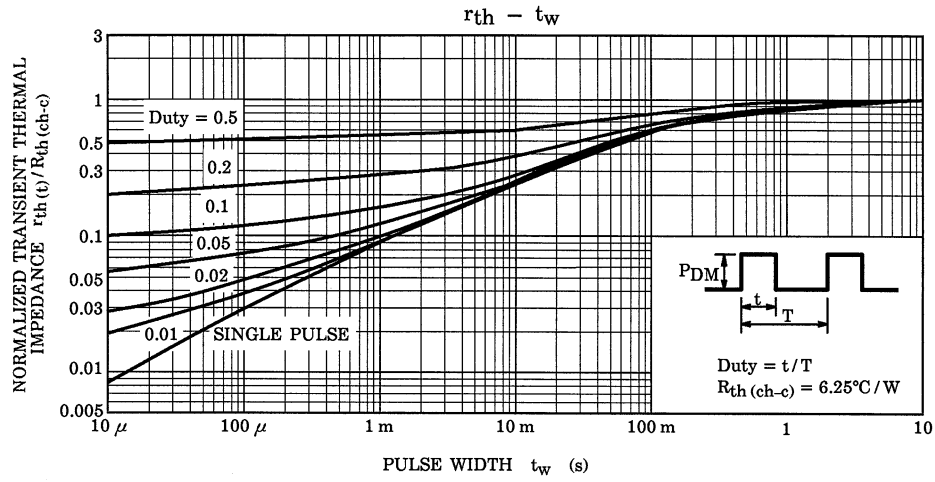
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	5	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	20	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 5 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 5 \text{ A}, V_{GS} = 0 \text{ V}$	—	120	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	0.12	—	μC

Marking









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20070701-EN

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