

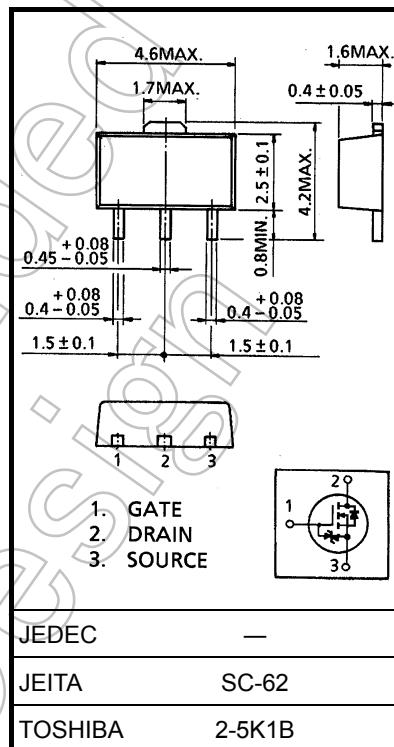
TOSHIBA Field Effect Transistor Silicon N Channel MOS Type ( $\pi$ -MOSV)**2SK2992**

Chopper Regulator, DC-DC Converter and Motor Drive Applications

- Low drain-source ON resistance :  $R_{DS\ (ON)} = 2.2\ \Omega\ (\text{typ.})$
- High forward transfer admittance :  $|Y_{fs}| = 0.9\ \text{S}\ (\text{typ.})$
- Low leakage current :  $I_{DSS} = 100\ \mu\text{A}\ (\text{max})\ (V_{DS} = 200\ \text{V})$
- Enhancement mode :  $V_{th} = 2.0\ \text{to}\ 3.5\ \text{V}\ (V_{DS} = 10\ \text{V}, I_D = 1\ \text{mA})$

**Absolute Maximum Ratings (Ta = 25°C)**

Characteristics	Symbol	Rating	Unit
Drain-source voltage	$V_{DSS}$	200	V
Drain-gate voltage ( $R_{GS} = 20\ \text{k}\Omega$ )	$V_{DGR}$	200	V
Gate-source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	DC (Note 1)	$I_D$	A
	Pulse (Note 1)	$I_{DP}$	A
Drain power dissipation	$P_D$	0.5	W
Drain power dissipation (Note 2)	$P_D$	1.5	W
Single pulse avalanche energy (Note 3)	$E_{AS}$	36	mJ
Avalanche current	$I_{A\bar{R}}$	1	A
Repetitive avalanche energy (Note 4)	$E_{A\bar{R}}$	0.05	mJ
Channel temperature	$T_{ch}$	150	°C
Storage temperature range	$T_{stg}$	-55~150	°C



Weight: 0.05 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 ambient	$R_{th\ (ch-a)}$	250	°C / W

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

Note 2: Mounted on a ceramic substrate (25.4 mm × 25.4 mm × 0.8 mm)

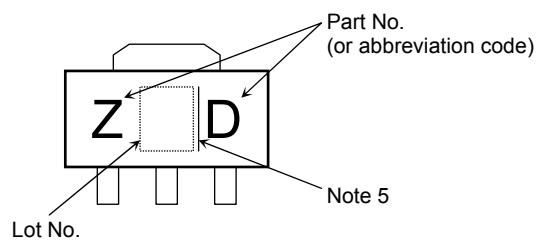
Note 3:  $V_{DD} = 50\ \text{V}$ ,  $T_{ch} = 25\ \text{°C}$  (initial),  $L = 56.7\ \text{mH}$ ,  $R_G = 25\ \Omega$ ,  $I_{A\bar{R}} = 1\ \text{A}$ 

Note 4: Repetitive rating: pulse width limited by maximum channel temperature

This transistor is an electrostatic-sensitive device.

Please handle with caution.

## Marking



Note 5: A line to the right of a Lot No. identifies the indication of product Labels.

Without a line: [[Pb]]/INCLUDES > MCV

With a line: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

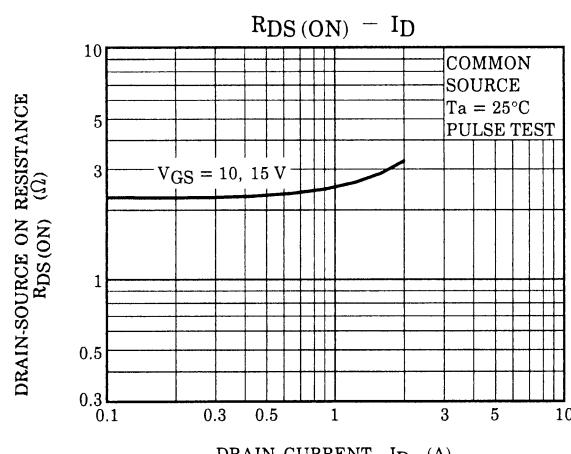
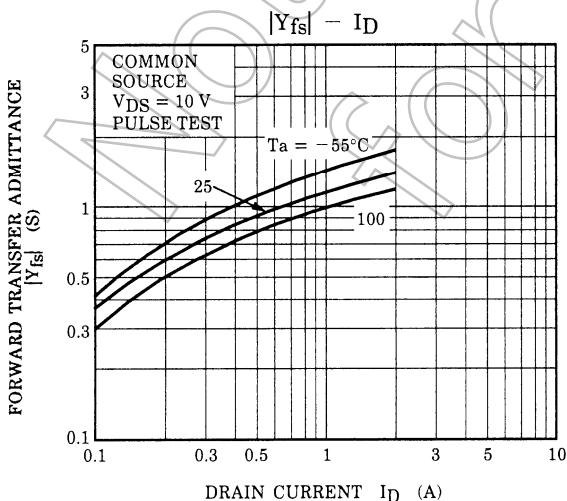
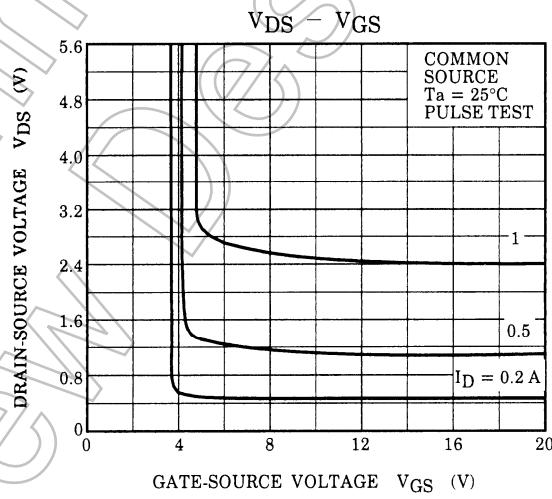
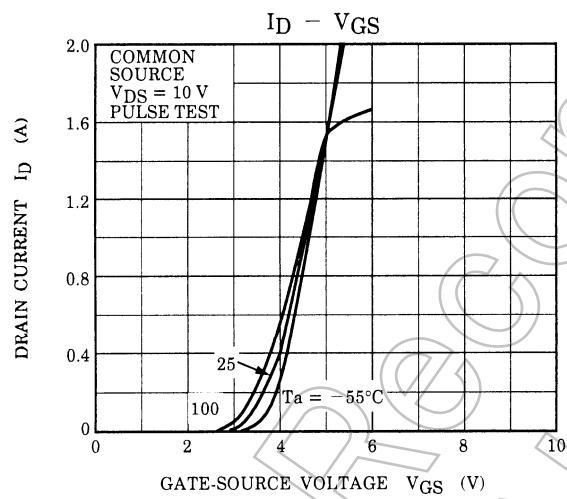
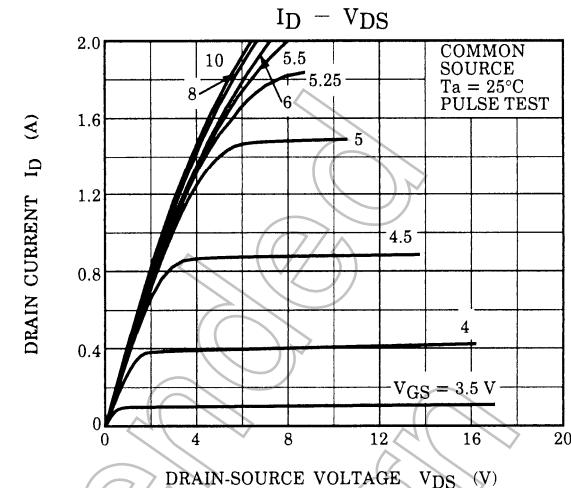
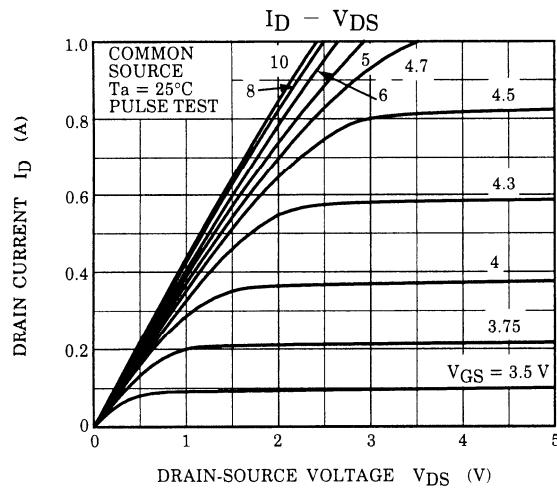
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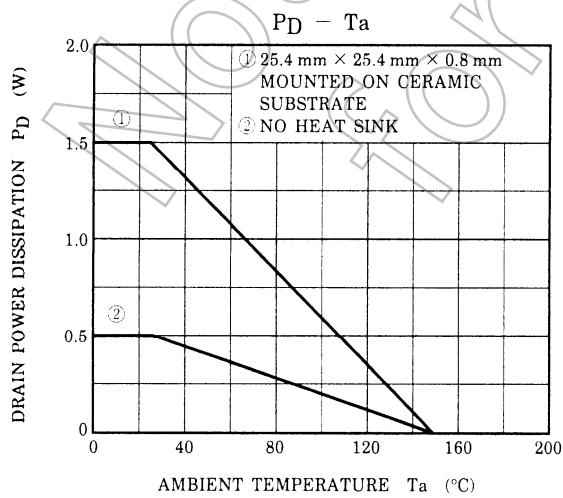
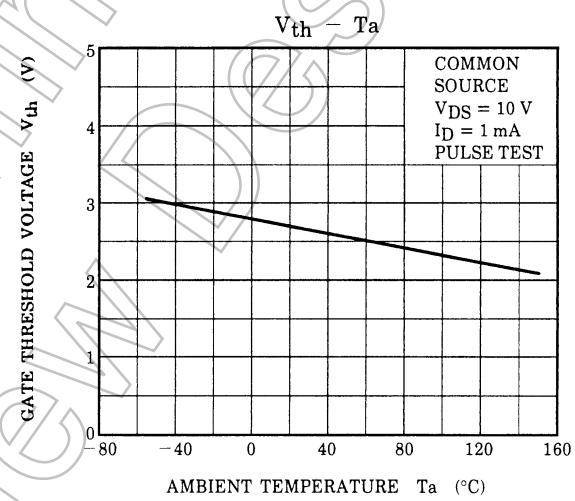
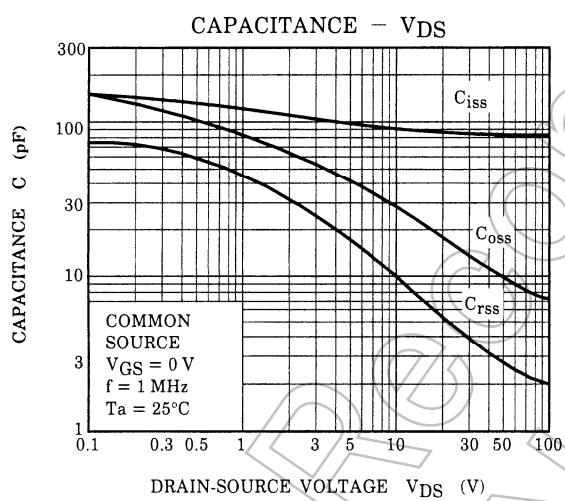
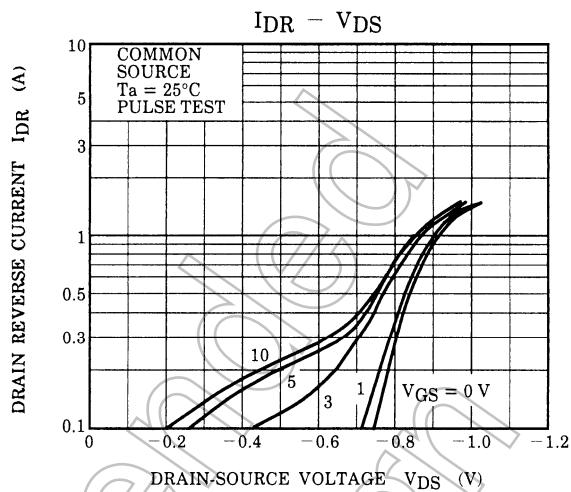
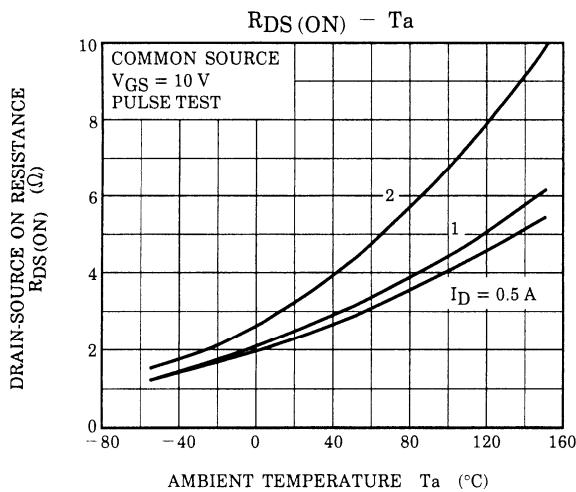
Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

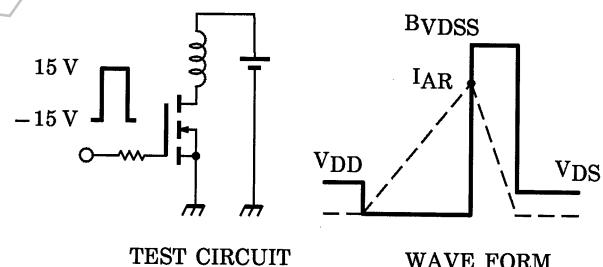
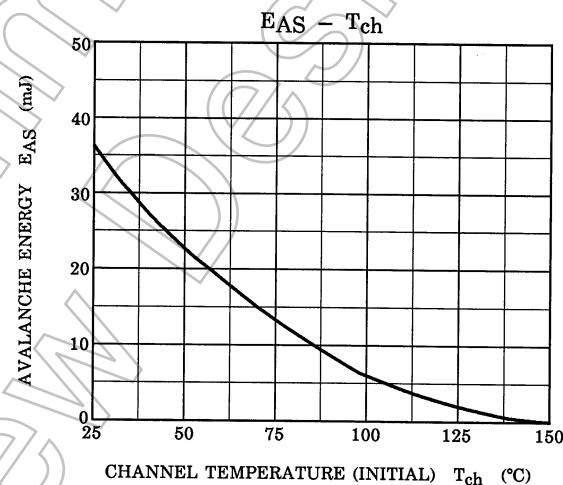
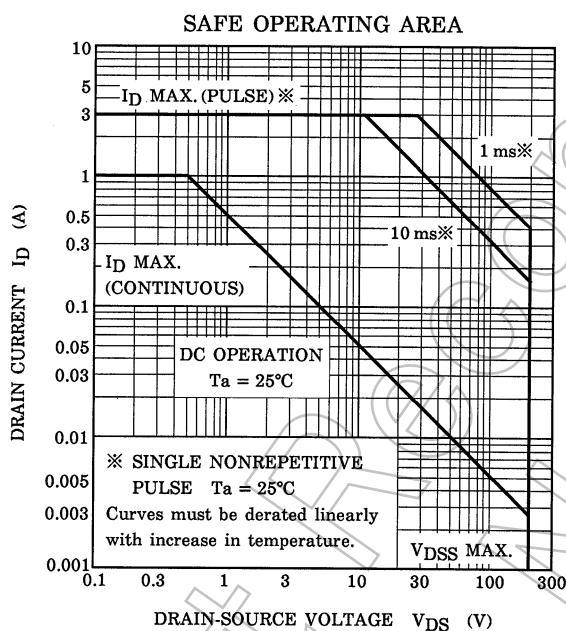
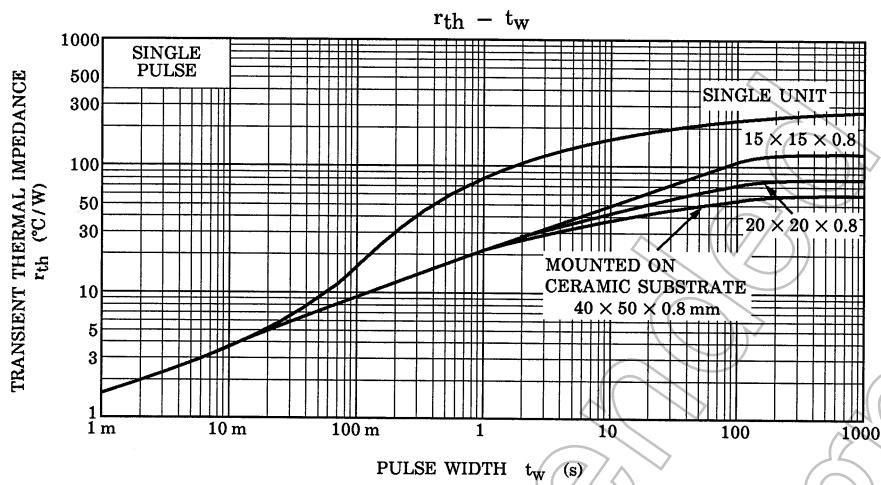
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	$I_{GSS}$	$V_{GS} = \pm 16\text{ V}$ , $V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$
Drain cut-off current	$I_{DSS}$	$V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$	—	—	100	$\mu\text{A}$
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$ , $V_{GS} = 0\text{ V}$	200	—	—	$\text{V}$
Gate threshold voltage	$V_{th}$	$V_{DS} = 10\text{ V}$ , $I_D = 1\text{ mA}$	2.0	—	3.5	$\text{V}$
Drain-source ON resistance	$R_{DS\text{ (ON)}}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5\text{ A}$	—	2.2	3.5	$\Omega$
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}$ , $I_D = 0.5\text{ A}$	0.5	0.9	—	$\text{S}$
Input capacitance	$C_{iss}$	$V_{DS} = 10\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$	—	90	—	$\text{pF}$
Reverse transfer capacitance	$C_{rss}$		—	10	—	
Output capacitance	$C_{oss}$		—	30	—	
Switching time	Rise time	$t_r$		—	9	—
	Turn-on time	$t_{on}$		—	17	—
	Fall time	$t_f$		—	16	—
	Turn-off time	$t_{off}$		—	45	—
Total gate charge (gate-source plus gate-drain)	$Q_g$	$V_{DD} \approx 160\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 1\text{ A}$	—	3.0	—	$\text{nC}$
Gate-source charge	$Q_{gs}$		—	1.8	—	
Gate-drain ("miller") charge	$Q_{gd}$		—	1.2	—	

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)	$I_{DR}$	—	—	—	1	$\text{A}$
Pulse drain reverse current (Note 1)	$I_{DRP}$	—	—	—	3	$\text{A}$
Forward voltage (diode)	$V_{DSF}$	$I_{DR} = 1\text{ A}$ , $V_{GS} = 0\text{ V}$	—	—	-1.5	$\text{V}$
Reverse recovery time	$t_{rr}$	$I_{DR} = 1\text{ A}$ , $V_{GS} = 0\text{ V}$ , $dI_{DR} / dt = 100\text{ A} / \mu\text{s}$	—	85	—	ns
Reverse recovery charge	$Q_{rr}$		—	190	—	$\text{nC}$







$$RG = 25 \Omega$$

$$VDD = 50 \text{ V}, L = 56.7 \text{ mH}$$

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

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