

TENTATIVE TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOSV)

2SK2992

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

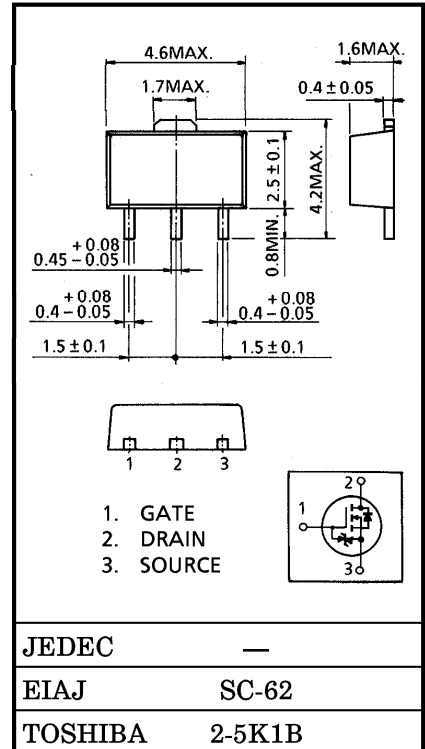
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 2.2 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 0.9 S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu A$ (Max.) ($V_{DS} = 200 V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 3.5 V$
($V_{DS} = 10 V, I_D = 1 mA$)

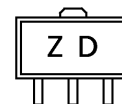
MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	200	V
Drain-Gate Voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	200	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	1	A
	Pulse	I_{DP}	3	A
Drain Power Dissipation ($T_a = 25^\circ C$)		P_D	0.5	W
Drain Power Dissipation***		P_D	1.5	W
Single Pulse Avalanche Energy**		E_{AS}	36	mJ
Avalanche Current		I_{AR}	1	A
Repetitive Avalanche Energy*		E_{AR}	0.05	mJ
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ C$



Weight : 0.05 g (Typ.)

MARKING



THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	250	$^\circ C/W$

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = 50 V, T_{ch} = 25^\circ C$ (initial), $L = 56.7 mH, R_G = 25 \Omega, I_{AR} = 1 A$
- *** Mounted on ceramic substrate ($1 inch^2 \times 0.8 t$)

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

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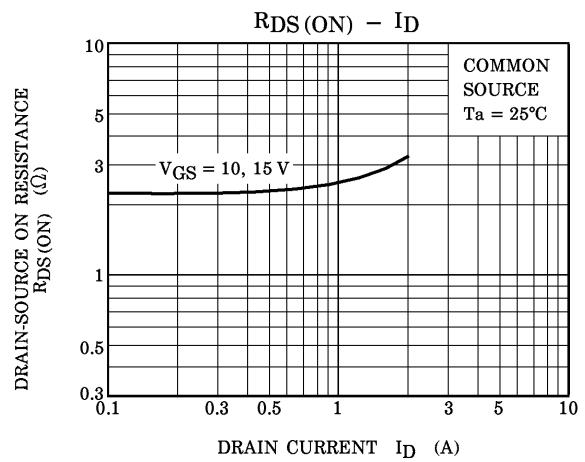
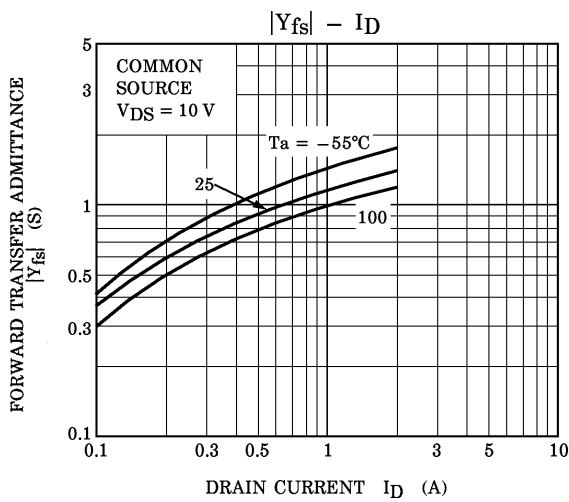
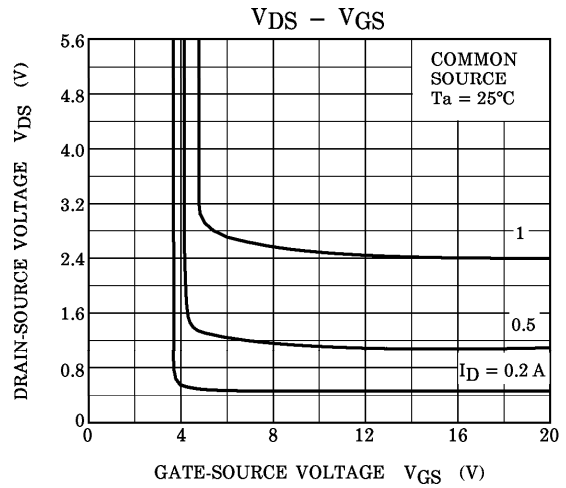
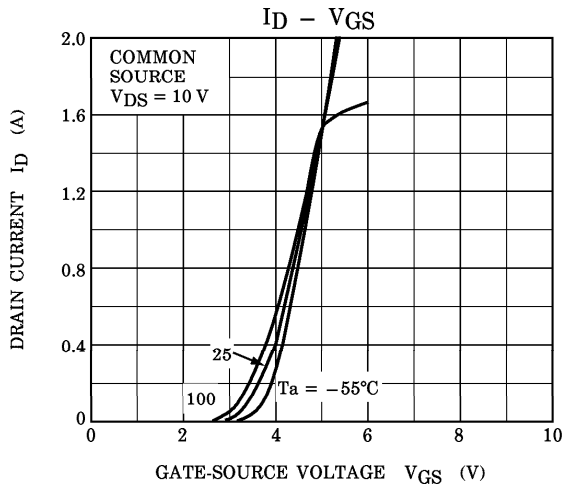
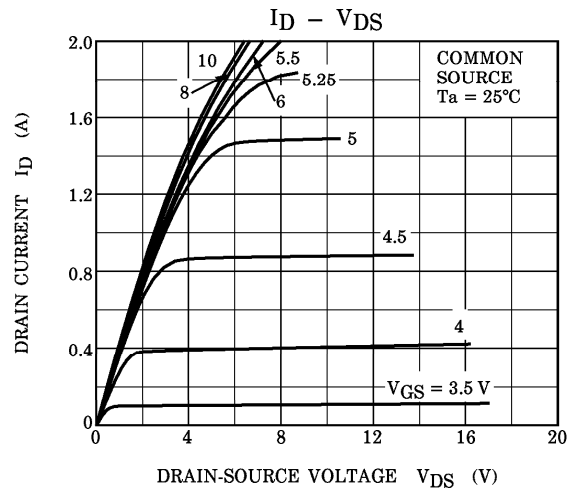
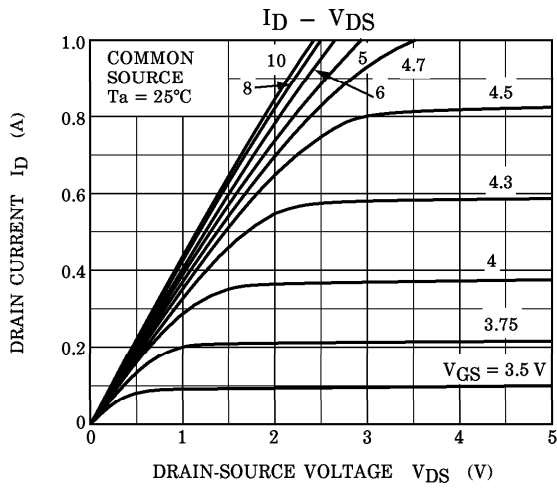
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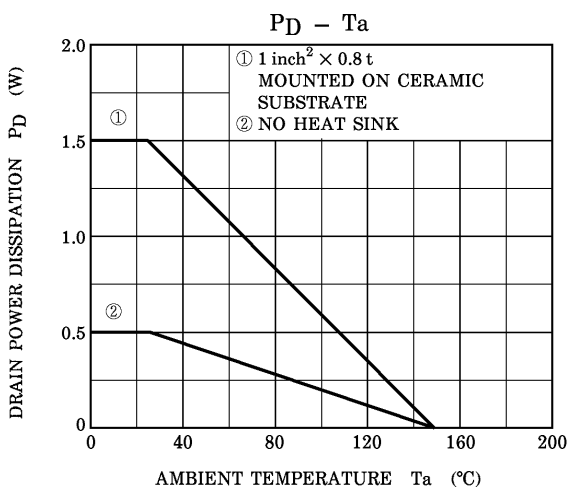
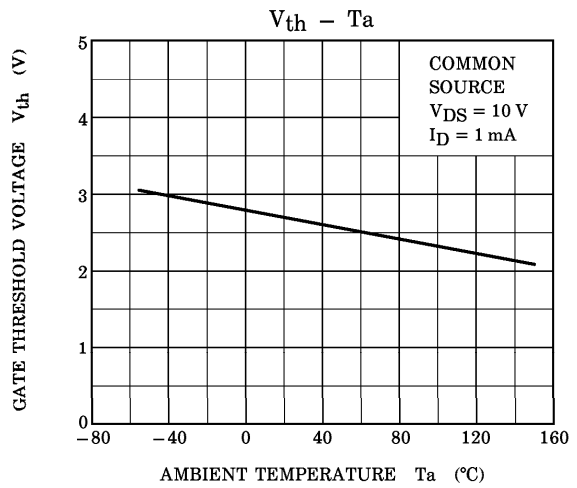
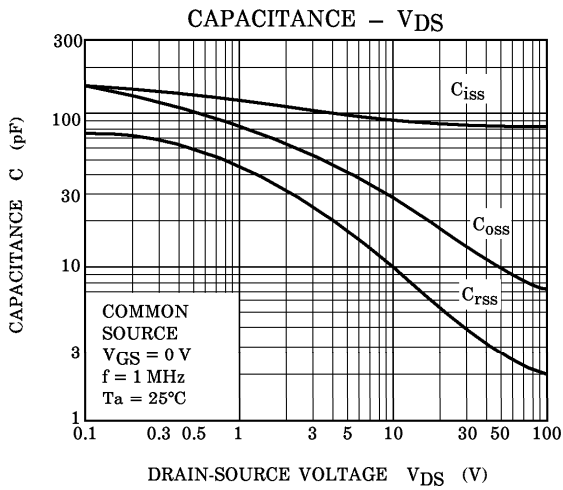
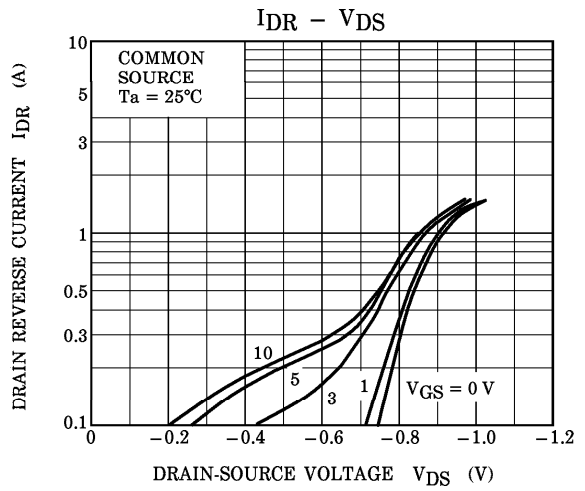
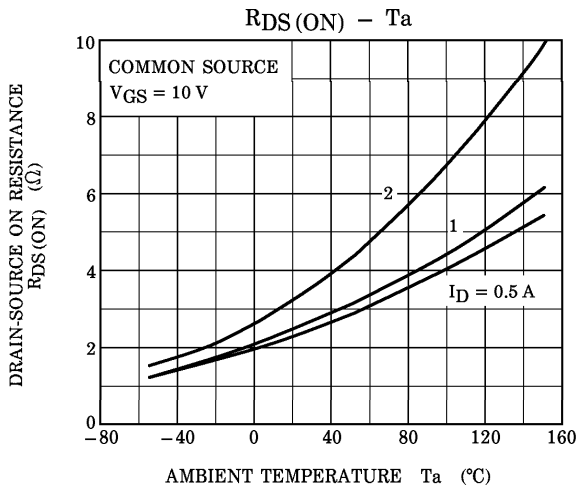
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

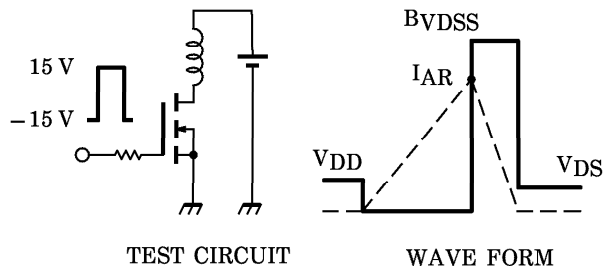
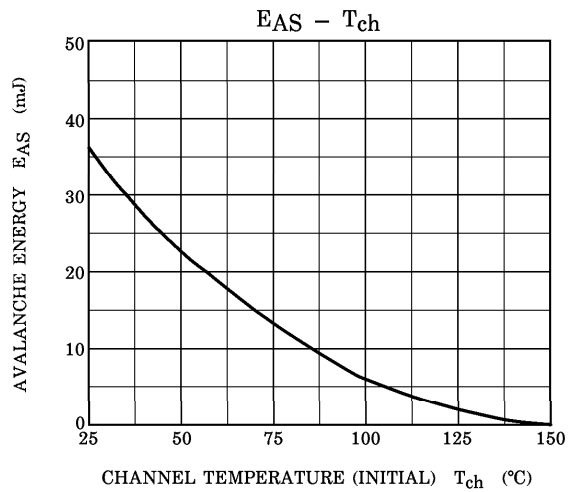
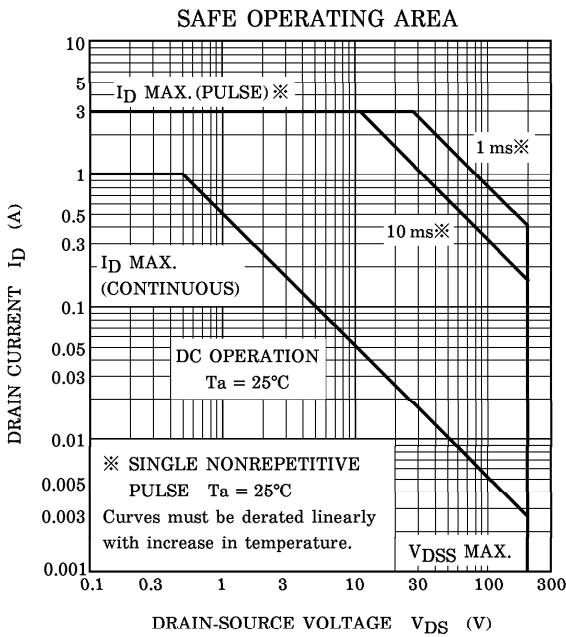
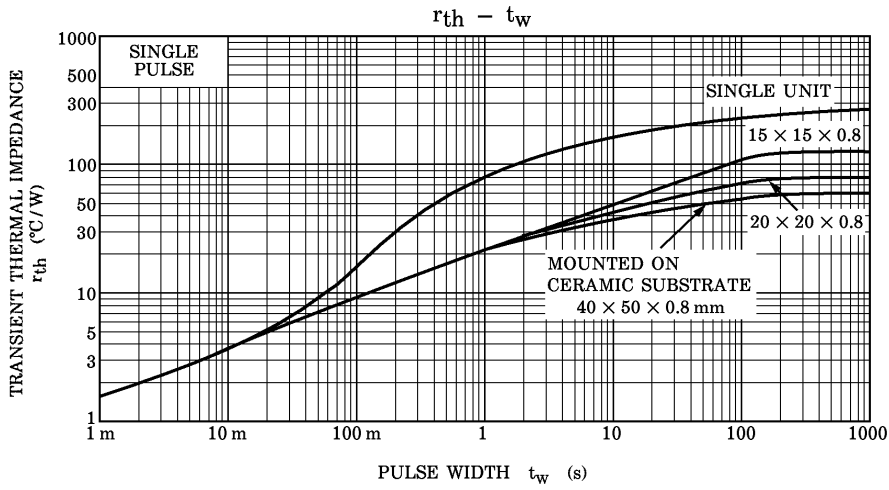
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	200	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	2.0	—	3.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$	—	2.2	3.5	Ω
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 0.5\text{ A}$	0.5	0.9	—	S
Input Capacitance		C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	—	90	—	pF
Reverse Transfer Capacitance		C_{rss}		—	10	—	
Output Capacitance		C_{oss}		—	30	—	
Switching Time	Rise Time	t_r	<p>$I_D = 0.5\text{ A}$ $R_L = 200\ \Omega$ $V_{DD} \cong 100\text{ V}$</p>	—	9	—	ns
	Turn-on Time	t_{on}		—	17	—	
	Fall Time	t_f		—	16	—	
	Turn-off Time	t_{off}		$V_{IN} : t_r, t_f < 5\text{ ns},$ $Duty \leq 1\%, t_w = 10\ \mu\text{s}$	—	45	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \cong 160\text{ V}, V_{GS} = 10\text{ V}$ $I_D = 1\text{ A}$	—	3.0	—	nC
Gate-Source Charge		Q_{gs}		—	1.8	—	
Gate-Drain (“Miller”) Charge		Q_{gd}		—	1.2	—	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	1	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	3	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 1\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.5	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 1\text{ A}, V_{GS} = 0\text{ V}$	—	85	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 100\text{ A} / \mu\text{s}$	—	190	—	nC







Peak $I_{AR} = 1\text{ A}$, $R_G = 25\ \Omega$, $V_{DD} = 50\text{ V}$, $L = 56.7\text{ mH}$

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