

TOSHIBA

2SK2996

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

2SK2996

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

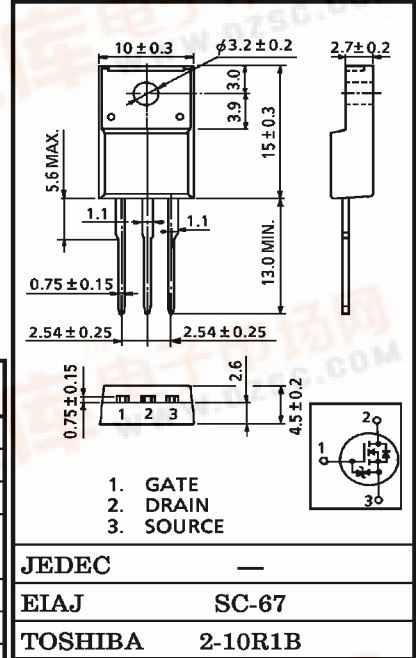
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.74 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 6.8 S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu A$ (Max.) ($V_{DS} = 600 V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0 V$
($V_{DS} = 10 V, I_D = 1 mA$)

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Drain-Gate Voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	600	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	DC	I_D	10	A
	Pulse	I_{DP}	30	
Drain Power Dissipation ($T_c = 25^\circ C$)		P_D	45	W
Single Pulse Avalanche Energy**		E_{AS}	252	mJ
Avalanche Current		I_{AR}	10	A
Repetitive Avalanche Energy*		E_{AR}	4.5	mJ
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ C$



Weight : 1.9 g

THEMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	2.78	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	62.5	$^\circ C/W$

Note ;

* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** $V_{DD} = 90 V$, Starting $T_{ch} = 25^\circ C$, $L = 4.41 mH$, $R_G = 25 \Omega$, $I_{AR} = 10 A$

This transistor is an electrostatic sensitive device.

Please handle with caution.

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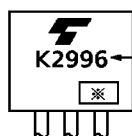
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 25\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Gate-Source Breakdown Voltage		$V_{(BR)GSS}$	$I_G = \pm 10\ \mu\text{A}, V_{DS} = 0\text{ V}$	± 30	—	—	V
Drain Cut-off Current		I_{DSS}	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	600	—	—	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		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	—	0.74	1.0	Ω
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 5\text{ A}$	3.4	6.8	—	S
Input Capacitance		C_{iss}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	1500	—	pF
Reverse Transfer Capacitance		C_{rss}		—	13	—	
Output Capacitance		C_{oss}		—	140	—	
Switching Time	Rise Time	t_r	<p>$I_D = 5\text{ A}$ $V_{GS} = 10\text{ V}$ $V_{DD} \cong 300\text{ V}$ $R_L = 60\ \Omega$</p>	—	15	—	ns
	Turn-on Time	t_{on}		—	55	—	
	Fall Time	t_f		—	27	—	
	Turn-off Time	t_{off}		$V_{IN} : t_r, t_f < 5\text{ ns},$ $\text{Duty} \leq 1\%, t_w = 10\ \mu\text{s}$	—	145	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \cong 400\text{ V}, V_{GS} = 10\text{ V}, I_D = 10\text{ A}$	—	38	—	nC
Gate-Source Charge		Q_{gs}		—	21	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	17	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	10	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	30	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 10\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 10\text{ A}, V_{GS} = 0\text{ V}$	—	1600	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	17	—	μC

MARKING



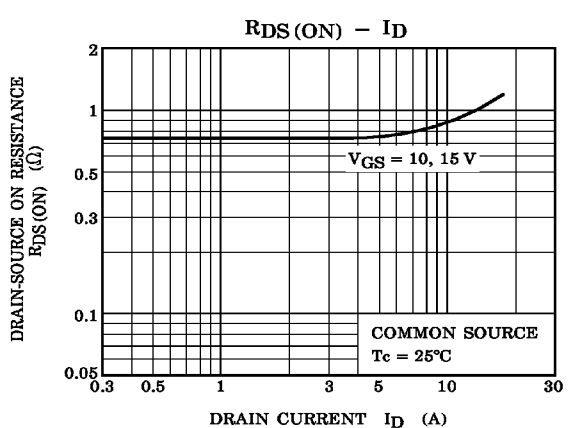
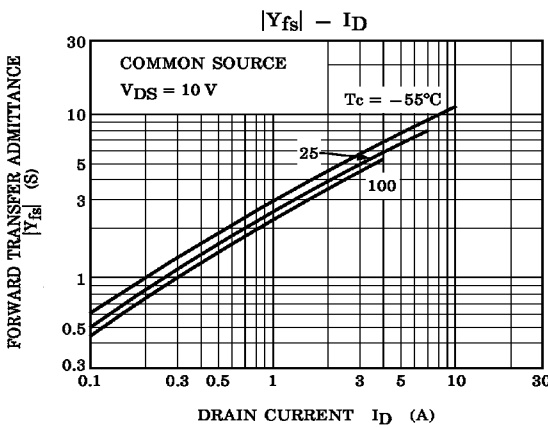
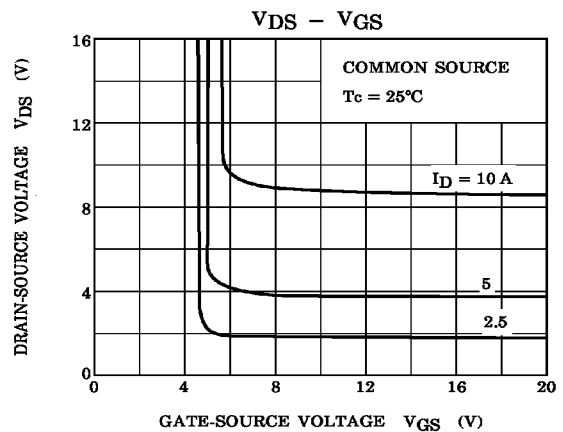
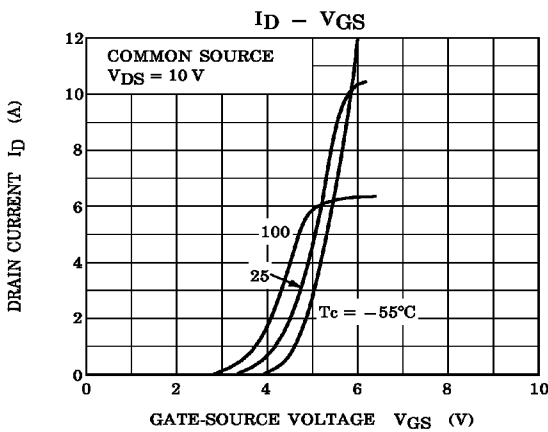
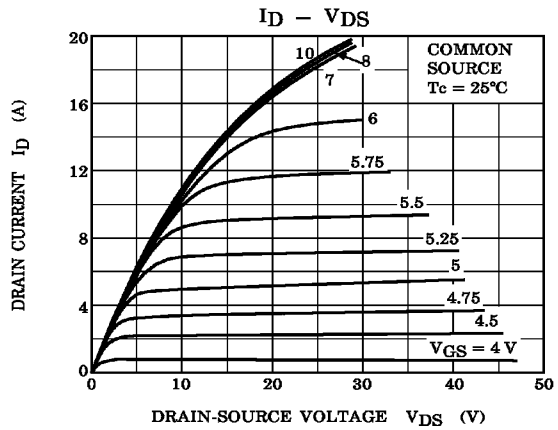
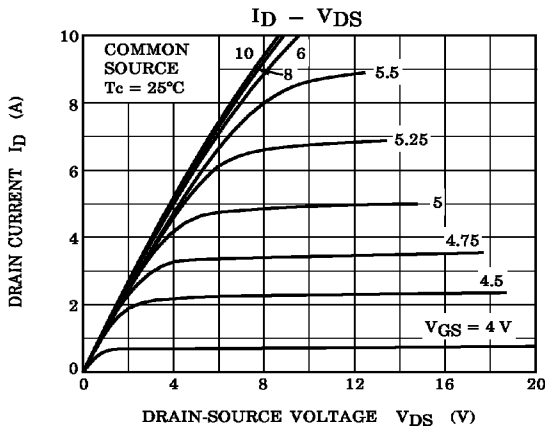
TYPE

※ Lot Number

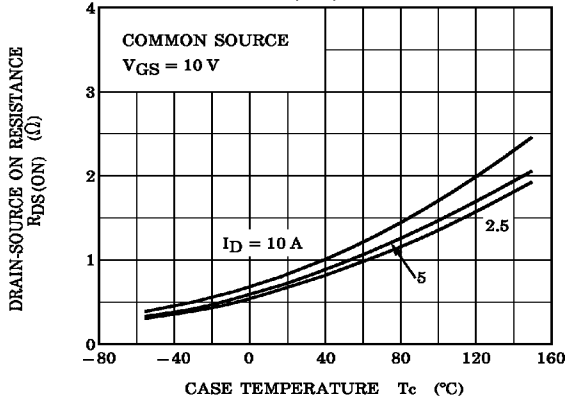
□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

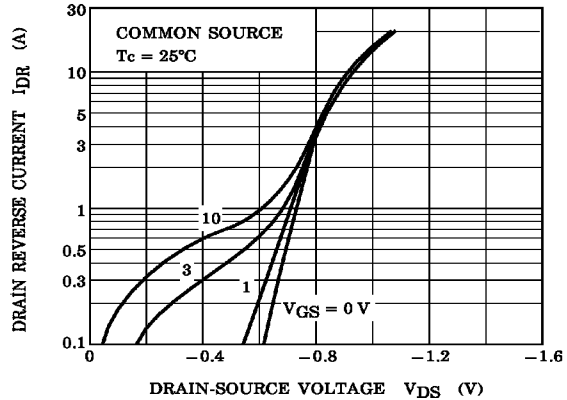




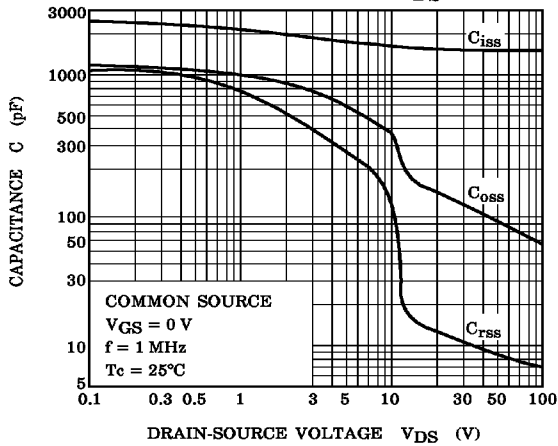
R_{DS(ON)} - T_c



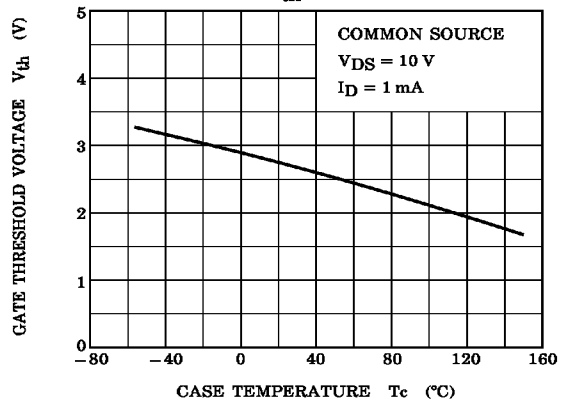
I_{DR} - V_{DS}



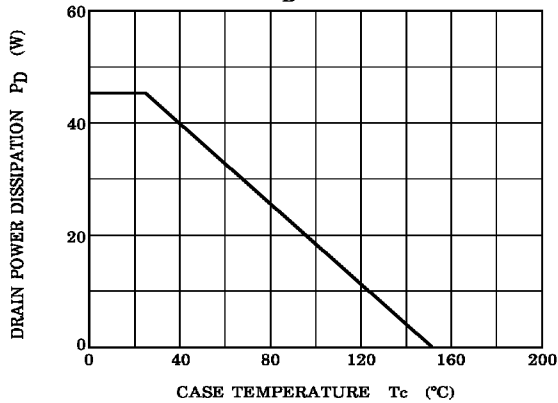
CAPACITANCE - V_{DS}



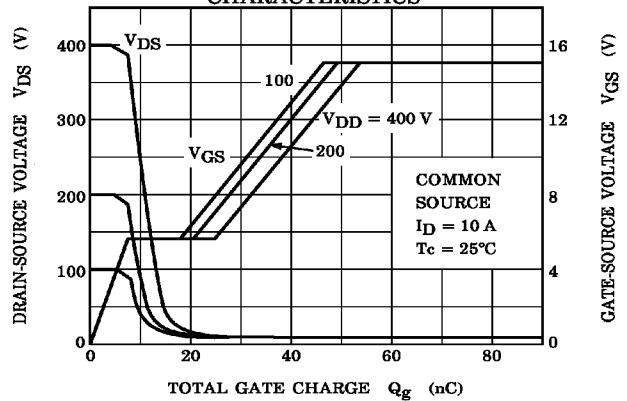
V_{th} - T_c

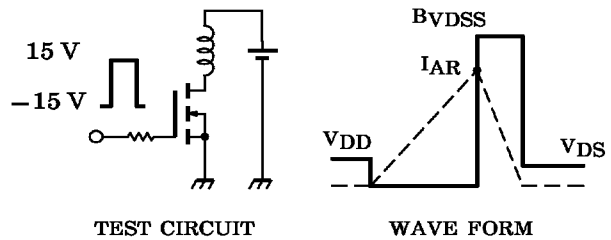
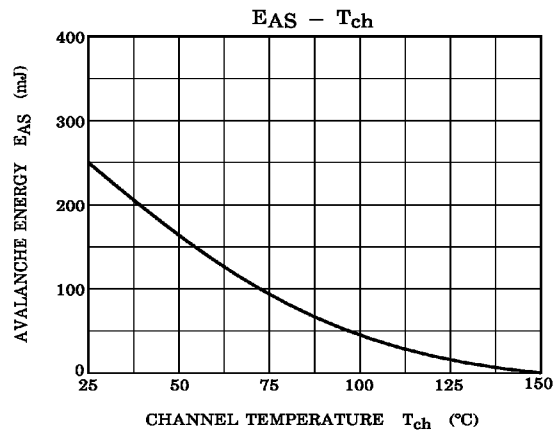
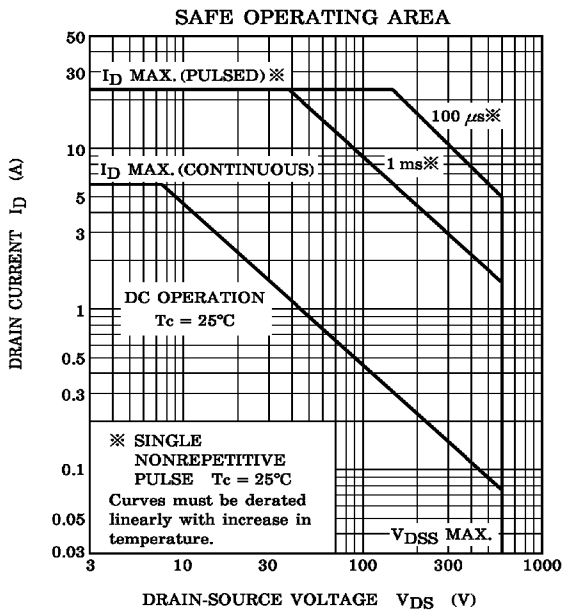
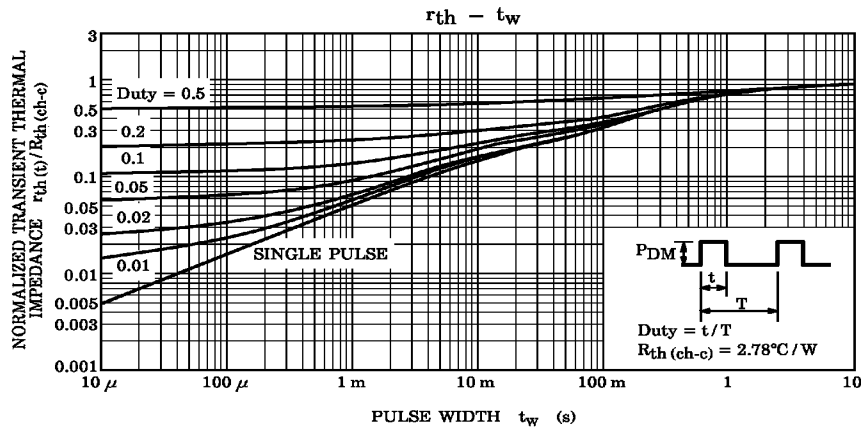


P_D - T_c



DYNAMIC INPUT/OUTPUT CHARACTERISTICS





Peak $I_{AR} = 10 A$, $R_G = 25 \Omega$
 $V_{DD} = 90 V$, $L = 4.41 mH$

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