

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

2SK2599

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

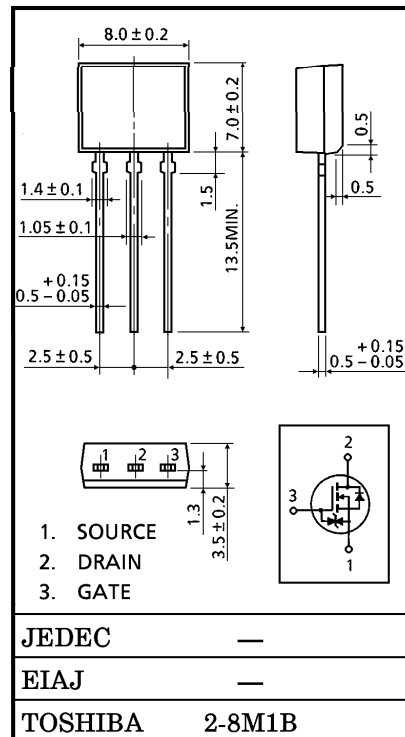
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 2.9\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 1.7S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 500V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0V$ ($V_{DS} = 10V, I_D = 1mA$)

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	500	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)	V_{DGR}	500	V
Gate-Source Voltage	V_{GSS}	± 30	V
Drain Current	DC	I_D	2 A
	Pulse ($t = 1ms$)	I_{DP}	5 A
	Pulse ($t = 100\mu s$)	I_{DP}	12 A
Drain Power Dissipation ($T_a = 25^\circ C$)	P_D	1.3	W
Single Pulse Avalanche Energy**	E_{AS}	112	mJ
Avalanche Current	I_{AR}	2	A
Repetitive Avalanche Energy*	E_{AR}	0.13	mJ
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ C$



Weight : 0.54g

HERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	96.1	$^\circ C / W$

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = 90V$, Starting $T_{ch} = 25^\circ C$, $L = 48.4mH$, $R_G = 25\Omega$, $I_{AR} = 2A$

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

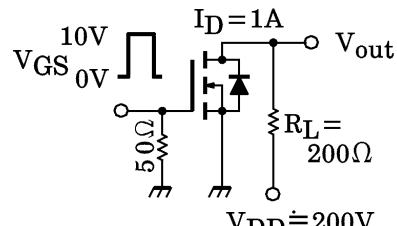
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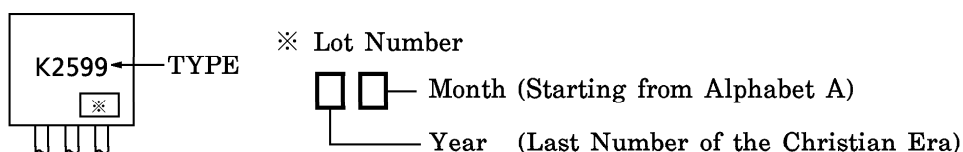
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

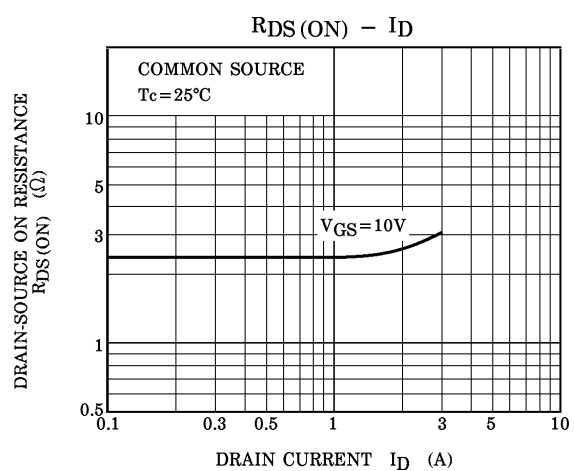
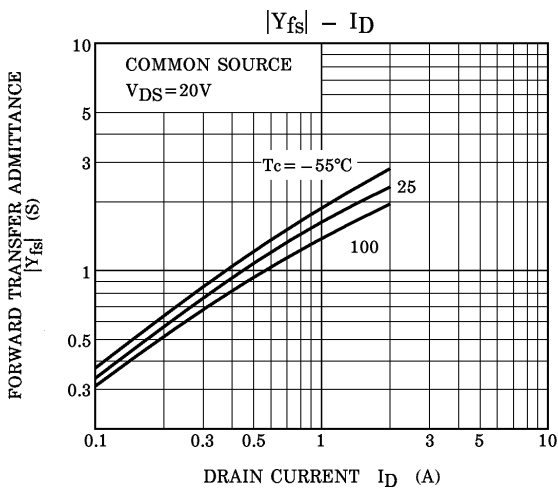
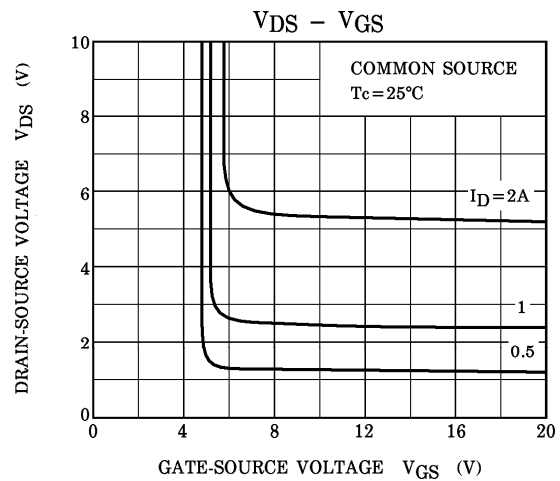
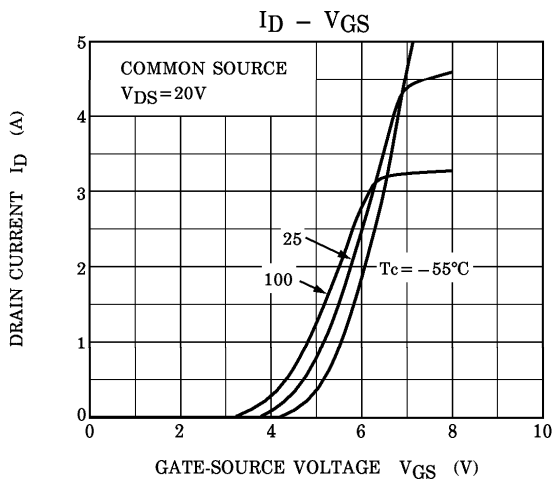
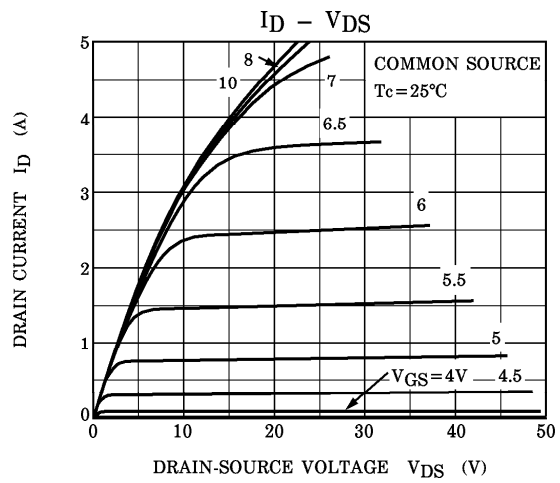
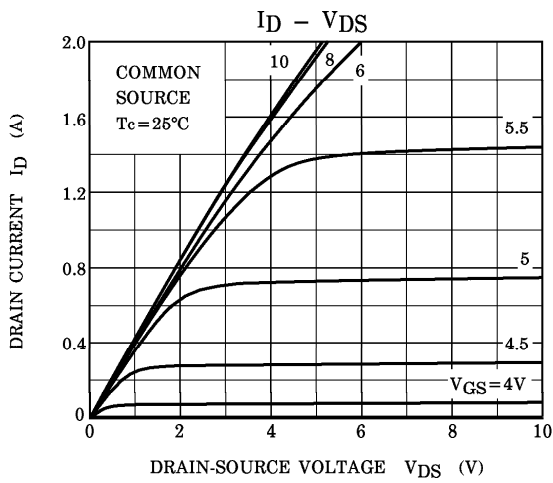
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±25V, VDS = 0V	—	—	±10	μA
Gate-Source Breakdown Voltage		V(BR)GSS	IG = ±10μA, VDS = 0V	±30	—	—	V
Drain Cut-off Current		IDSS	VDS = 500V, VGS = 0V	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = 10mA, VGS = 0V	500	—	—	V
Gate Threshold Voltage		Vth	VDS = 10V, ID = 1mA	2.0	—	4.0	V
Drain-Source ON Resistance		RDS(ON)	VGS = 10V, ID = 1A	—	2.9	3.2	Ω
Forward Transfer Admittance		Yfs	VDS = 10V, ID = 1A	0.8	1.7	—	S
Input Capacitance		Ciss	VDS = 10V, VGS = 0V, f = 1MHz	—	380	—	pF
Reverse Transfer Capacitance		Crss		—	40	—	
Output Capacitance		Coss		—	120	—	
Switching Time	Rise Time	tr		—	15	—	ns
	Turn-on Time	ton		—	25	—	
	Fall Time	tf		—	20	—	
	Turn-off Time	t _{off}		VIN : tr, tf < 5ns, Duty ≤ 1%, tw = 10μs	—	80	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD ≈ 400V, VGS = 10V, ID = 2A	—	9	—	nC
Gate-Source Charge		Qgs		—	5	—	
Gate-Drain ("Miller") Charge		Qgd		—	4	—	

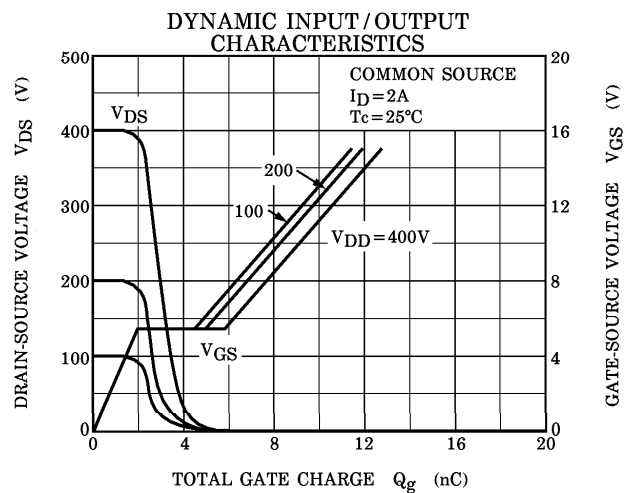
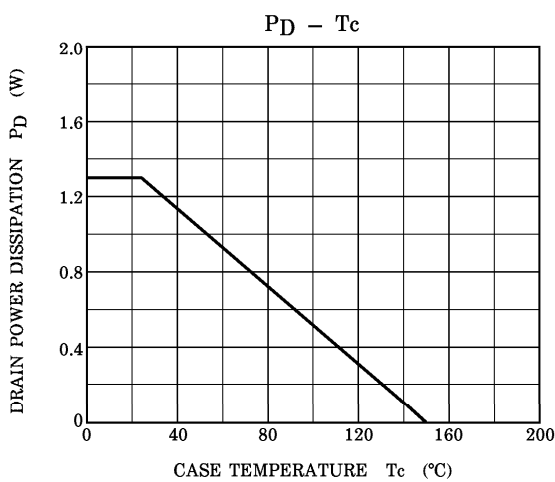
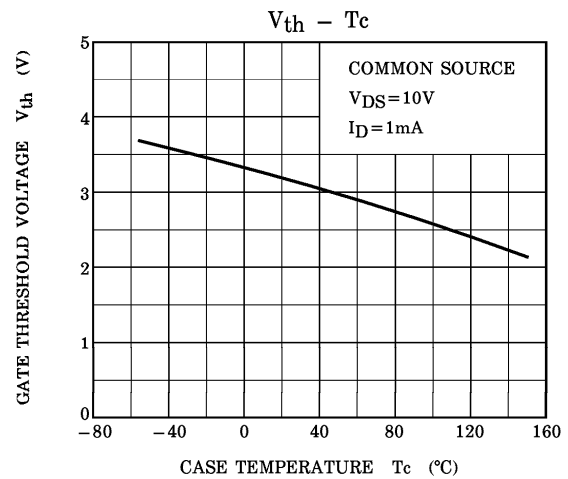
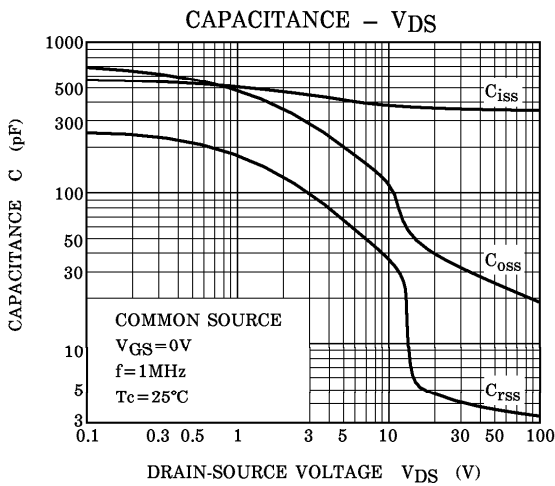
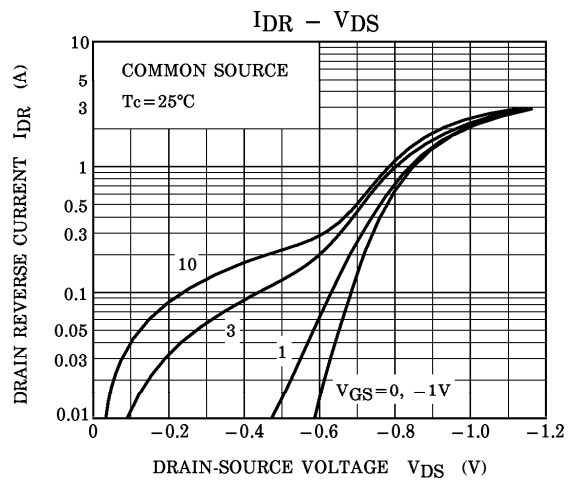
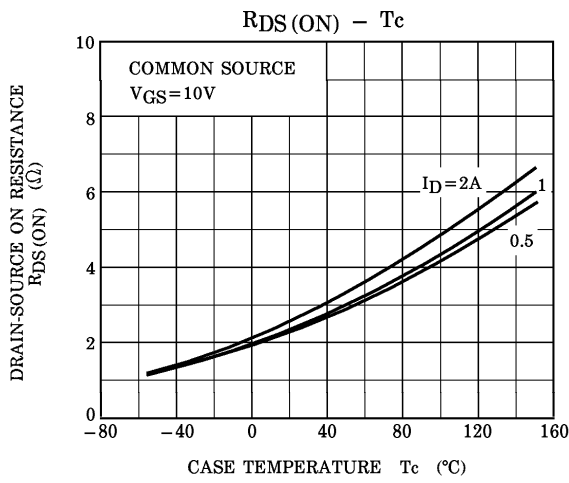
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

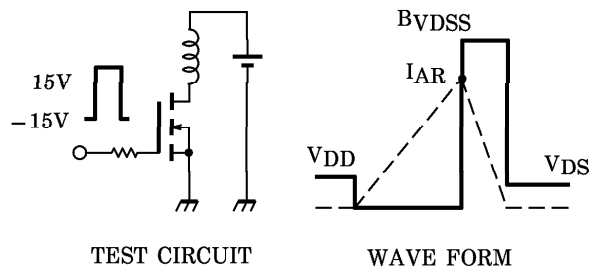
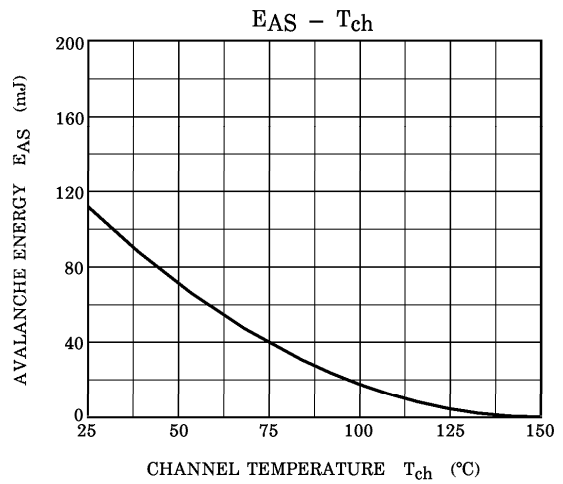
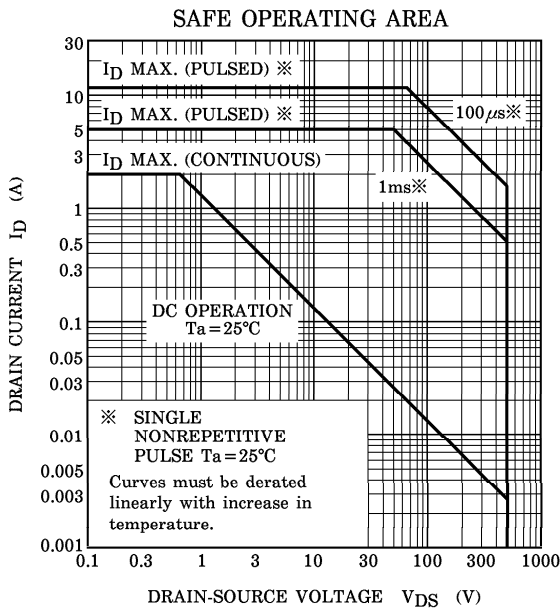
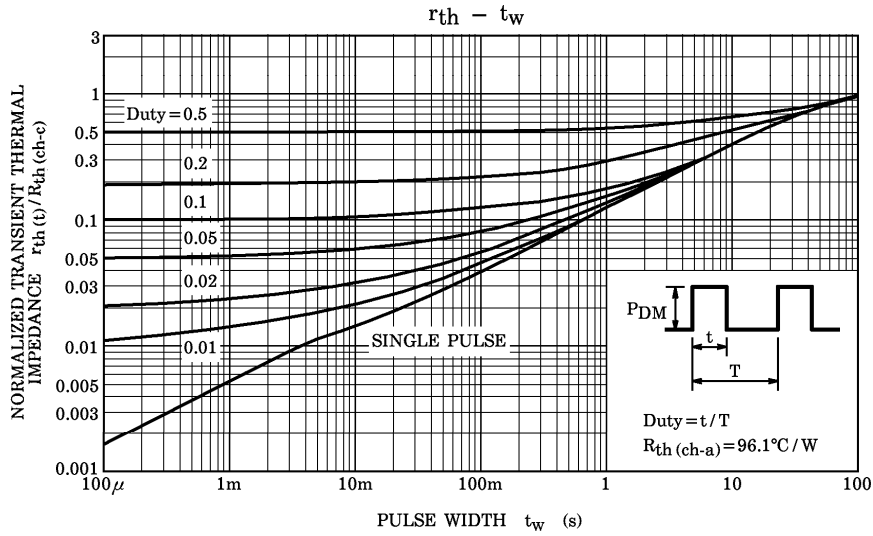
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	2	A
Pulse Drain Reverse Current	IDRP	t = 1ms	—	—	5	A
	IDRP	t = 100μs	—	—	12	A
Diode Forward Voltage	VDSF	IDR = 2A, VGS = 0V	—	—	-1.5	V
Reverse Recovery Time	trr	IDR = 2A, VGS = 0V	—	1000	—	ns
Reverse Recovery Charge	Qrr	dIDR / dt = 100A / μs	—	3.5	—	μC

MARKING









Peak $I_{AR} = 2A$, $R_G = 25\Omega$
 $V_{DD} = 90V$, $L = 48.4mH$

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