

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSIII)

# 2SK2603

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

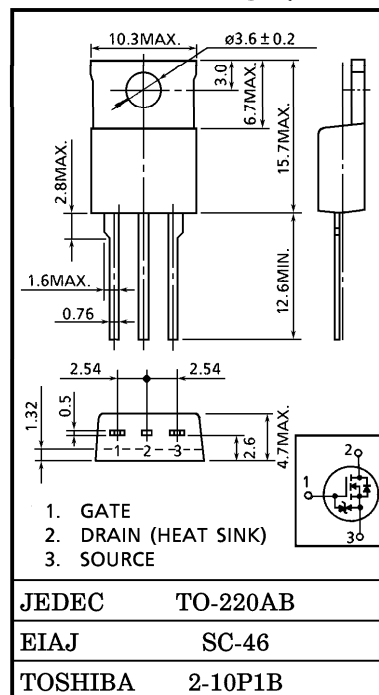
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 3.0\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 2.6S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 640V$ )
- 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		$V_{DSS}$	800	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	800	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	DC	$I_D$	3	A
	Pulse	$I_{DP}$	9	
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	100	W
Single Pulse Avalanche Energy**		$E_{AS}$	300	mJ
Avalanche Current		$I_{AR}$	3	A
Repetitive Avalanche Energy*		$E_{AR}$	10.0	mJ
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 2.0g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.25	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ C/W$

Note ;

- \* Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- \*\*  $V_{DD} = 90V$ , Starting  $T_{ch} = 25^\circ C$ ,  $L = 60.0mH$ ,  $I_{AR} = 3A$ ,  $R_G = 25\Omega$

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

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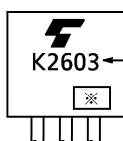
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±30V, VDS = 0V	—	—	±10	μA
Gate-Source Breakdown Voltage		V(BR)GSS	IG = ±10μA, VDS = 0V	±30	—	—	V
Drain Cut-off Current		IDSS	VDS = 640V, VGS = 0V	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = 10mA, VGS = 0V	800	—	—	V
Gate Threshold Voltage		Vth	VDS = 10V, ID = 1mA	2.0	—	4.0	V
Drain-Source ON Resistance		RDS(ON)	VGS = 10V, ID = 1.5A	—	3.0	3.6	Ω
Forward Transfer Admittance		Yfs	VDS = 20V, ID = 1.5A	0.65	2.6	—	S
Input Capacitance		Ciss	VDS = 25V, VGS = 0V, f = 1MHz	—	750	—	pF
Reverse Transfer Capacitance		Crss		—	10	—	
Output Capacitance		Coss		—	70	—	
Switching Time	Rise Time	tr		—	15	—	ns
	Turn-on Time	ton		—	55	—	
	Fall Time	tf		—	30	—	
	Turn-off Time	toff		—	110	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD = 400V, VGS = 10V, ID = 3A	—	25	—	nC
Gate-Source Charge		Qgs		—	13	—	
Gate-Drain ("Miller") Charge		Qgd		—	12	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	3	A
Pulse Drain Reverse Current	IDRP	—	—	—	9	A
Diode Forward Voltage	VDSF	IDR = 3A, VGS = 0V	—	—	-1.9	V
Reverse Recovery Time	trr	IDR = 3A, VGS = 0V	—	900	—	ns
Reverse Recovery Charge	Qrr	dIDR / dt = 100A / μs	—	6	—	μC

MARKING

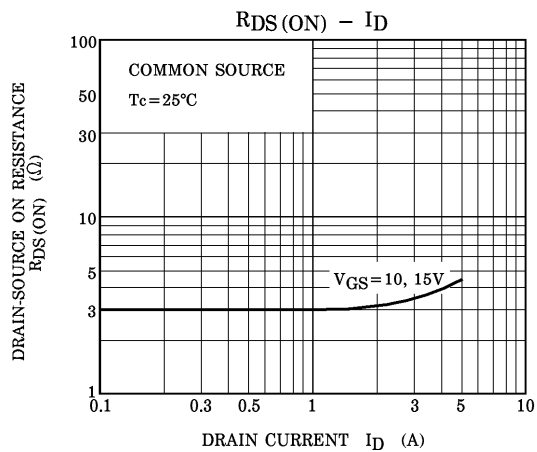
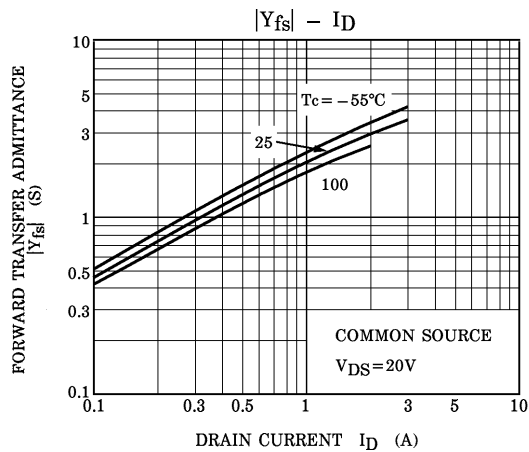
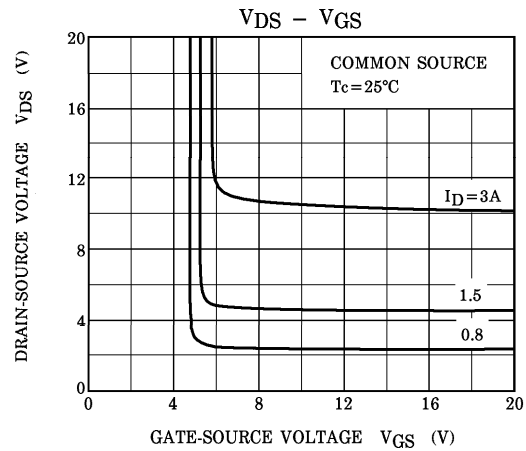
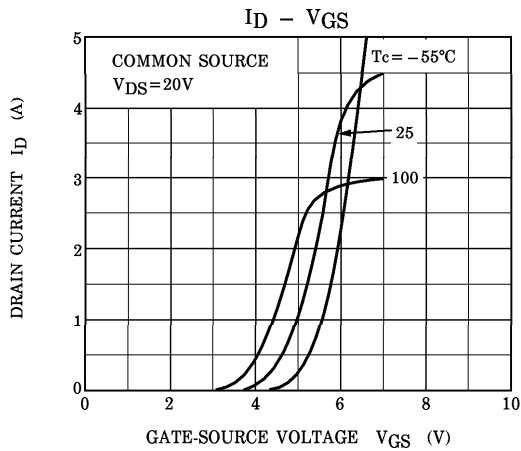
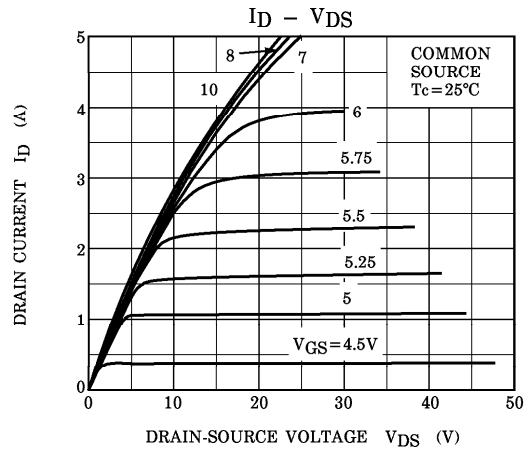
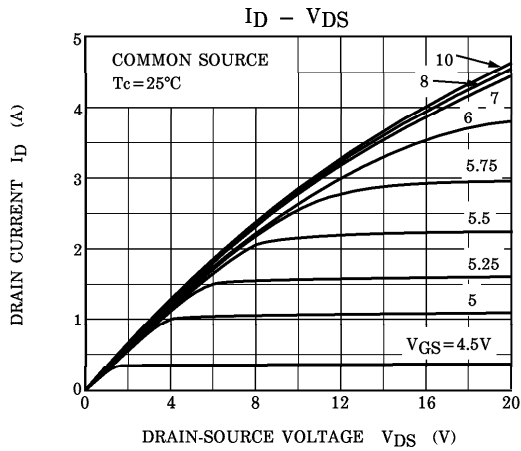


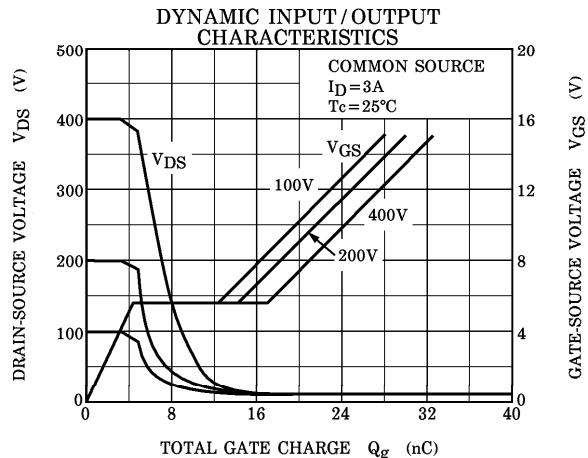
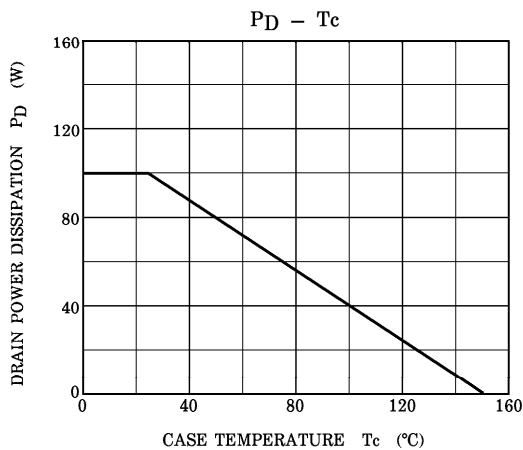
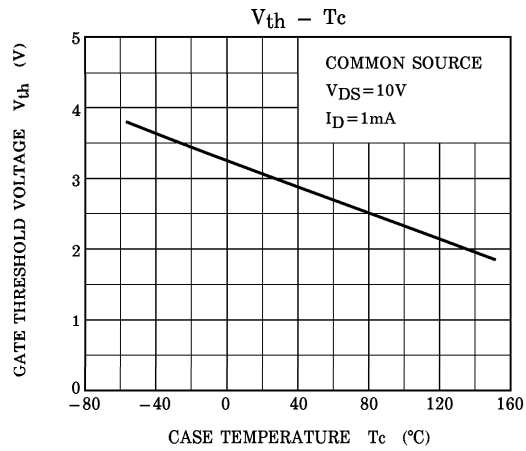
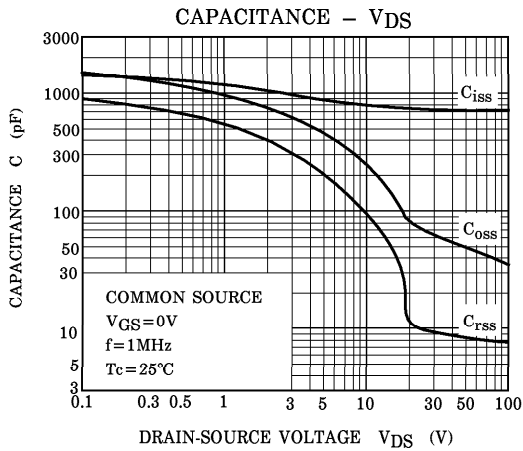
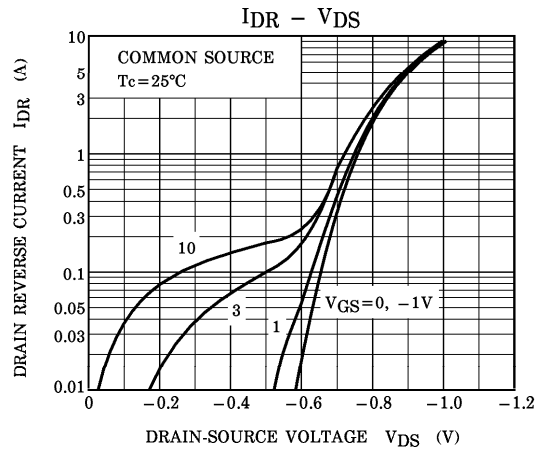
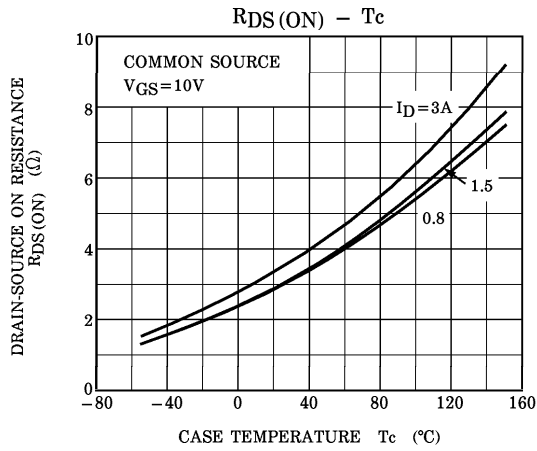
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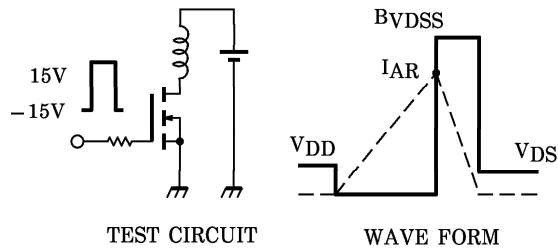
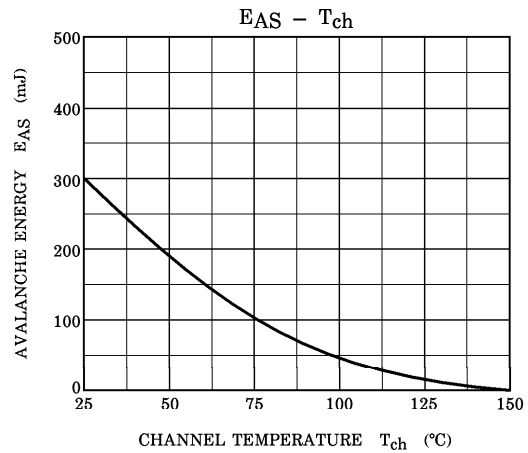
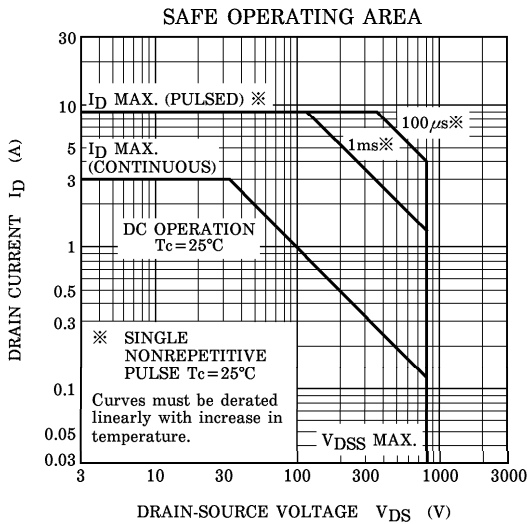
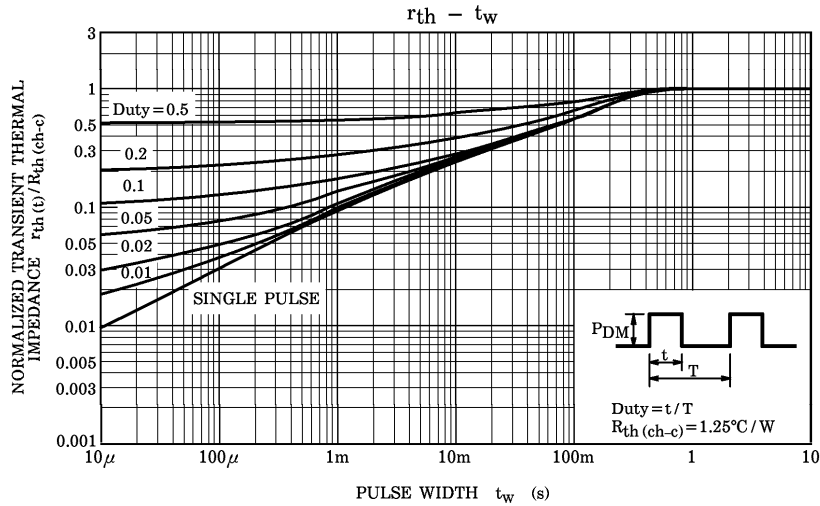
※ Lot Number

□ □ Month (Starting from Alphabet A)

□ Year (Last Number of the Christian Era)







Peak  $I_{AR} = 3A$ ,  $R_G = 25\Omega$   
 $V_{DD} = 90V$ ,  $L = 60mH$

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