

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

2SK2610

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

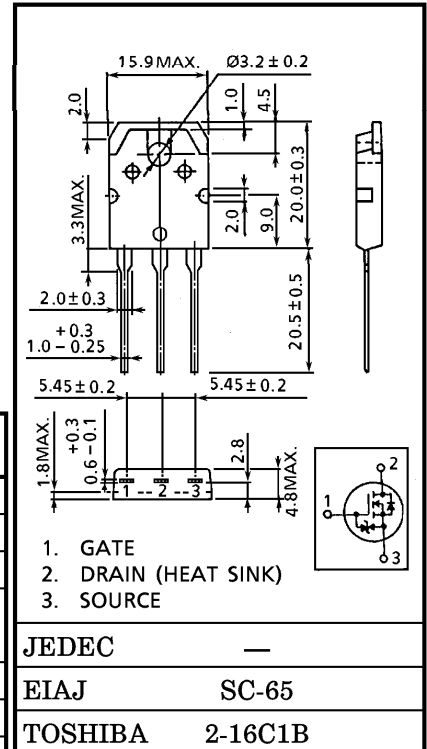
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 2.3 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 4.4 S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu A$ (Max.) ($V_{DS} = 720 V$)
- 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}	900	V
Drain-Gate Voltage ($R_{GS} = 20 k\Omega$)	V_{DGR}	900	V
Gate-Source Voltage	V_{GSS}	± 30	V
Drain Current	DC	I_D	5
	Pulse	I_{DP}	15
Drain Power Dissipation ($T_c = 25^\circ C$)	P_D	150	W
Single Pulse Avalanche Energy**	E_{AS}	595	mJ
Avalanche Current	I_{AR}	5	A
Repetitive Avalanche Energy*	E_{AR}	15	mJ
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ C$



Weight : 4.6 g

Thermal Characteristics

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	0.833	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	50	$^\circ C/W$

Note ;

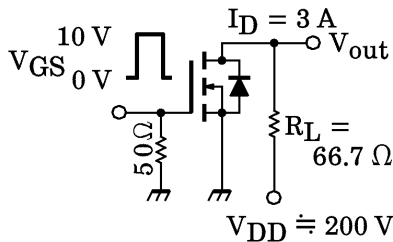
- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = 90 V, T_{ch} = 25^\circ C$ (initial), $L = 43.6 mH, I_{AR} = 5 A, R_G = 25 \Omega$

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

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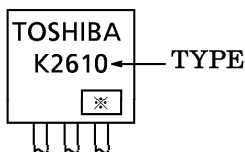
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±30 V, VDS = 0 V	—	—	±10	μA
Gate-Source Breakdown Voltage		V(BR)GSS	IG = ±10 μA, VDS = 0 V	±30	—	—	V
Drain Cut-off Current		IDSS	VDS = 720 V, VGS = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = 10 mA, VGS = 0 V	900	—	—	V
Gate Threshold Voltage		Vth	VDS = 10 V, ID = 1 mA	2.0	—	4.0	V
Drain-Source ON Resistance		RDS(ON)	VGS = 10 V, ID = 3.0 A	—	2.3	2.5	Ω
Forward Transfer Admittance		Yfs	VDS = 20 V, ID = 3.0 A	1.1	4.4	—	S
Input Capacitance		Ciss	VDS = 25 V, VGS = 0 V, f = 1 MHz	—	1200	—	pF
Reverse Transfer Capacitance		Crss		—	20	—	
Output Capacitance		Coss		—	120	—	
Switching Time	Rise Time	tr	 <p> $V_{GS} = 10\text{ V}$ $V_{GS} = 0\text{ V}$ $I_D = 3\text{ A}$ $R_L = 66.7\ \Omega$ $V_{DD} \approx 200\text{ V}$ </p>	—	40	—	ns
	Turn-on Time	ton		—	90	—	
	Fall Time	tf		—	60	—	
	Turn-off Time	toff		$V_{IN} : t_r, t_f < 5\text{ ns},$ $\text{Duty} \leq 1\%, t_w = 10\ \mu\text{s}$	—	200	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD ≈ 400 V, VGS = 10 V, ID = 5 A	—	45	—	nC
Gate-Source Charge		Qgs		—	25	—	
Gate-Drain ("Miller") Charge		Qgd		—	20	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	5	A
Pulse Drain Reverse Current	IDRP	—	—	—	15	A
Diode Forward Voltage	VDSF	IDR = 5 A, VGS = 0 V	—	—	-1.9	V
Reverse Recovery Time	t _{rr}	IDR = 5 A, VGS = 0 V	—	1300	—	ns
Reverse Recovery Charge	Q _{rr}	dIDR / dt = 100 A / μs	—	11	—	μC

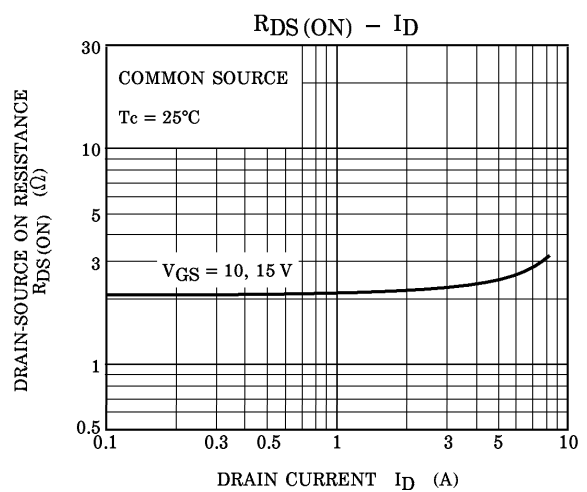
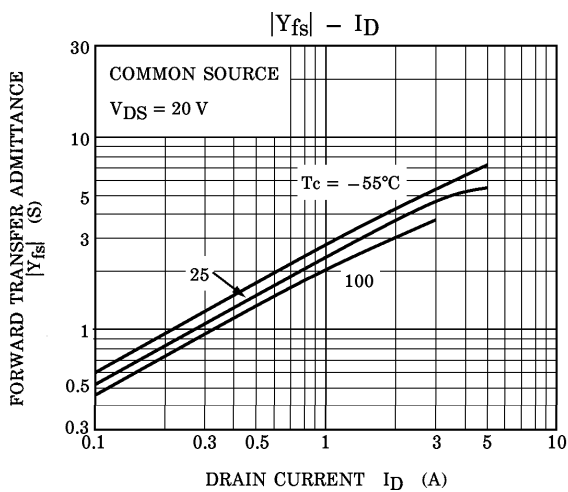
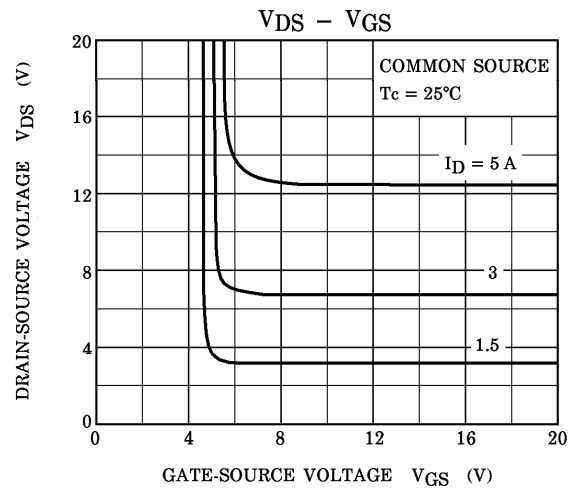
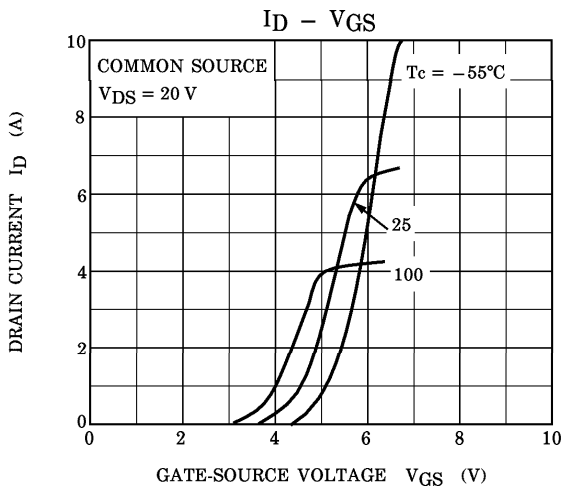
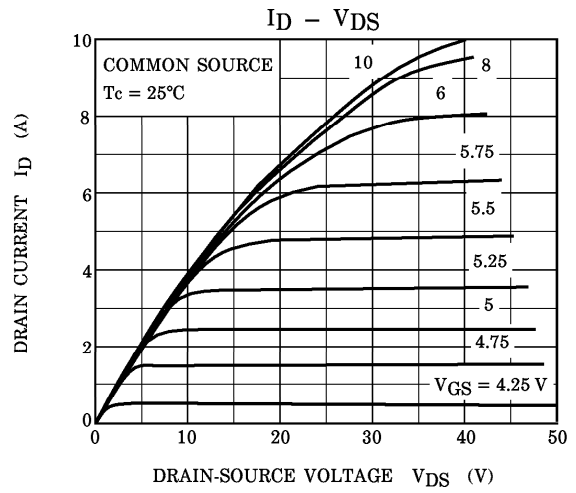
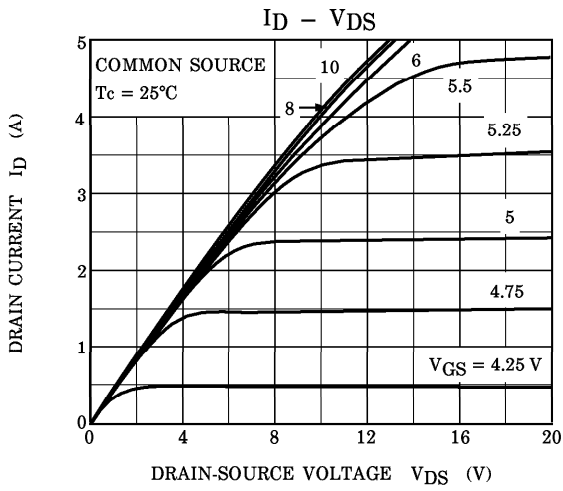
MARKING



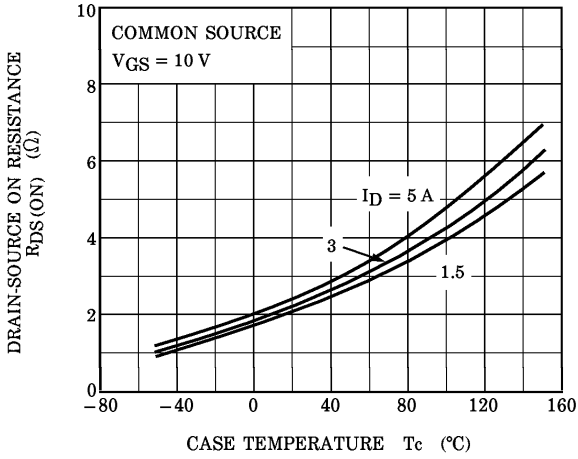
※ Lot Number

□ □ — Month (Starting from Alphabet A)

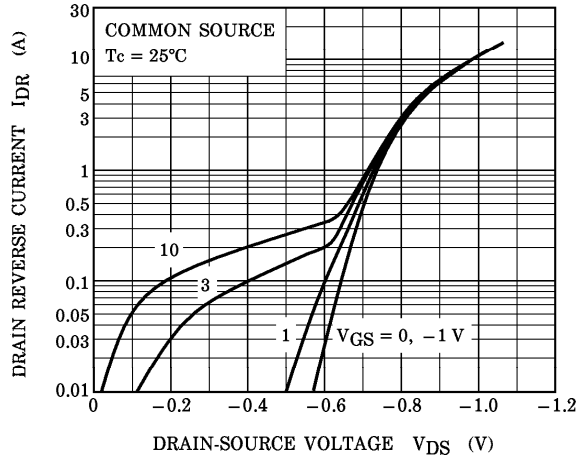
— Year (Last Number of the Christian Era)



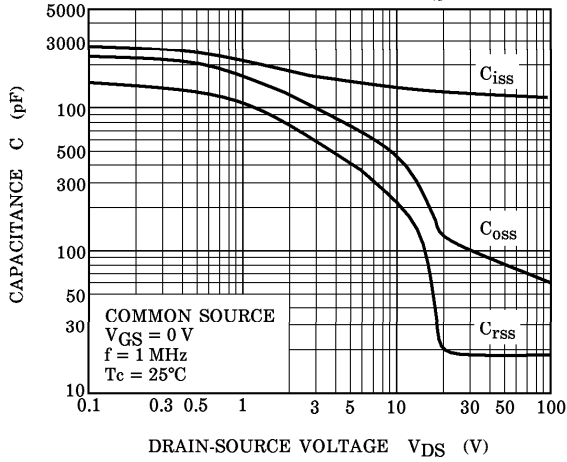
$R_{DS(ON)} - T_c$



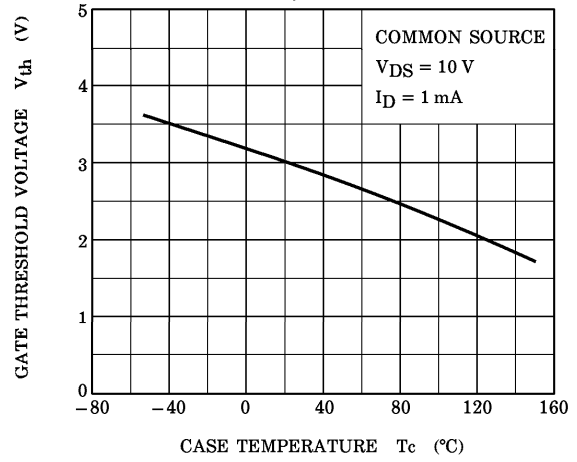
$I_{DR} - V_{DS}$



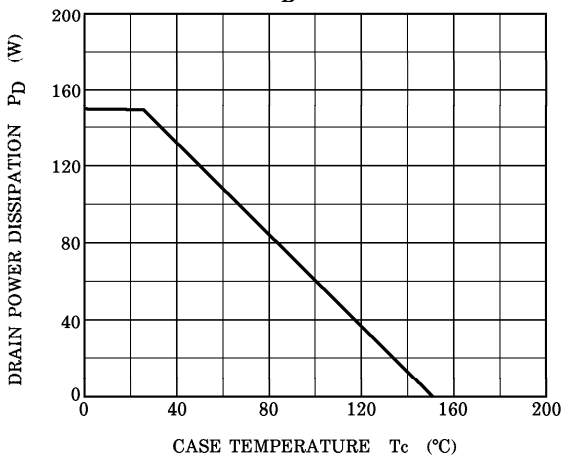
CAPACITANCE - V_{DS}



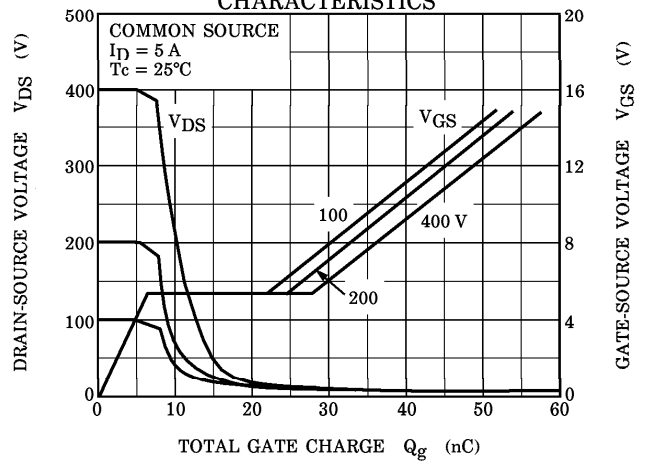
$V_{th} - T_c$

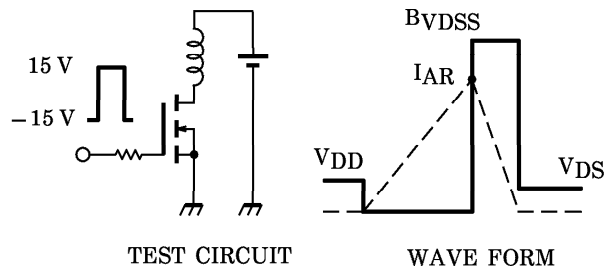
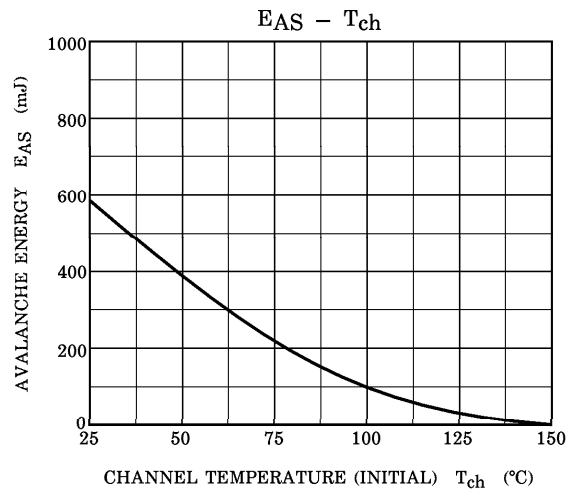
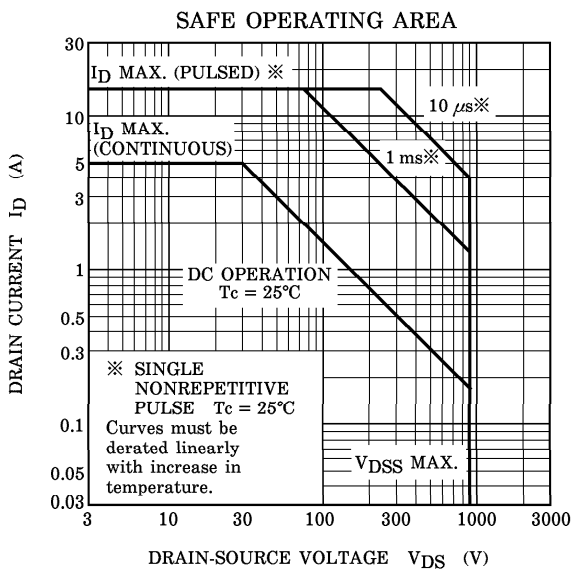
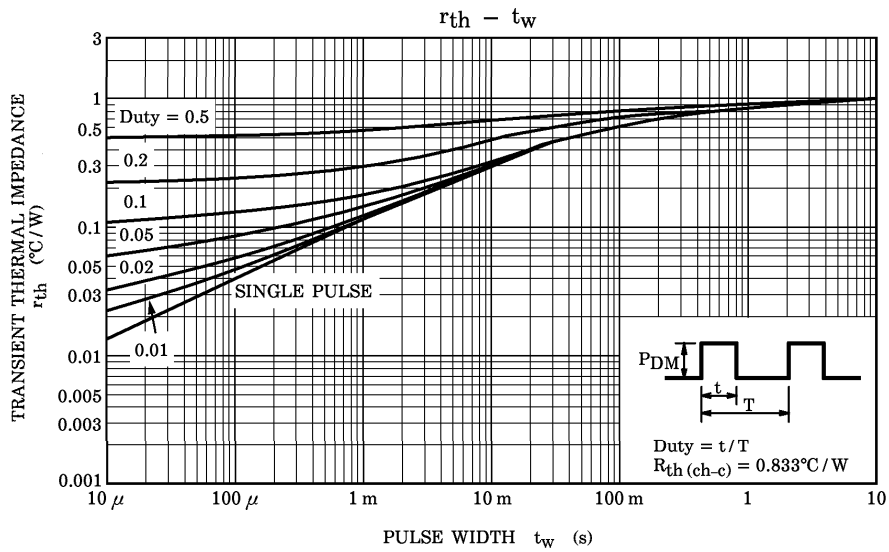


$P_D - T_c$



DYNAMIC INPUT / OUTPUT CHARACTERISTICS





Peak $I_{AR} = 5 \text{ A}$, $R_G = 25 \Omega$
 $V_{DD} = 90 \text{ V}$, $L = 43.6 \text{ mH}$ $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$