

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (U-MOSII)

2SK2986

HIGH CURRENT SWITCHING APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 4.5 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 80 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A}$ (Max.) ($V_{DS} = 60 \text{ V}$)
- Enhancement-Mode : $V_{th} = 1.3 \sim 2.5 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	55	A
	Pulse ($t \leq 10 \text{ s}$)	I_{DP}	70	
	Pulse ($t \leq 1 \text{ ms}$)		280	
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)		P_D	100	W
Single Pulse Avalanche Energy**		E_{AS}	525	mJ
Avalanche Current		I_{AR}	55	A
Repetitive Avalanche Energy*		E_{AR}	10	mJ
Channel Temperature		T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

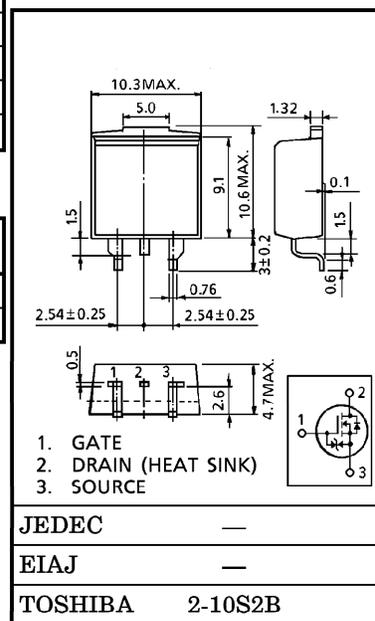
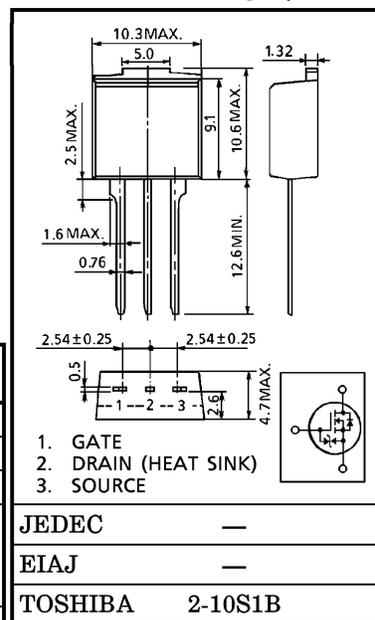
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel To Case	$R_{th(ch-c)}$	1.25	$^\circ\text{C}/\text{W}$
Thermal Resistance, Channel To Ambient	$R_{th(ch-a)}$	83.3	$^\circ\text{C}/\text{W}$

Note ;

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

** $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$, $L = 236 \mu\text{H}$, $I_{AR} = 55 \text{ A}$, $R_G = 25 \Omega$

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



Weight : 1.5 g

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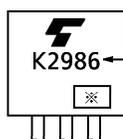
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	60	—	—	V
		$V_{(BR)DSX}$	$I_D = 10\text{ mA}, V_{GS} = -20\text{ V}$	40	—	—	
Gate Threshold Voltage		V_{th}	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.3	—	2.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 35\text{ A}$	—	4.5	5.8	m Ω
			$V_{GS} = 4\text{ V}, I_D = 35\text{ A}$	—	5.8	10	
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 35\text{ A}$	40	80	—	S
Input Capacitance		C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	—	9300	—	pF
Reverse Transfer Capacitance		C_{rss}		—	910	—	
Output Capacitance		C_{oss}		—	1435	—	
Switching Time	Rise Time	t_r		—	18	—	ns
	Turn-on Time	t_{on}		—	50	—	
	Fall Time	t_f		—	110	—	
	Turn-off Time	t_{off}		$V_{IN} : t_r, t_f < 5\text{ ns}$ $Duty \leq 1\%, t_w = 10\ \mu\text{s}$	—	480	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \cong 48\text{ V}, V_{GS} = 10\text{ V},$ $I_D = 55\text{ A}$	—	210	—	nC
Gate-Source Charge		Q_{gs}		—	145	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	65	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	55	A
Pulse Drain Reverse Current	I_{DRP}	$t \leq 10\text{ s}$	—	—	70	A
		$t \leq 1\text{ ms}$	—	—	280	
Diode Forward Voltage	V_{DSF}	$I_{DR} = 55\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.5	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 55\text{ A}, V_{GS} = 0\text{ V}$	—	60	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR}/dt = 50\text{ A}/\mu\text{s}$	—	50	—	nC

MARKING

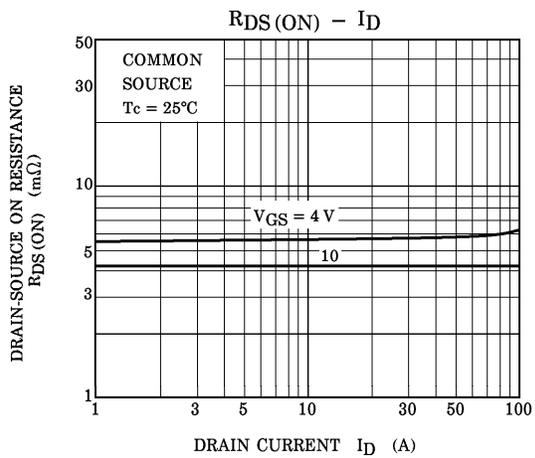
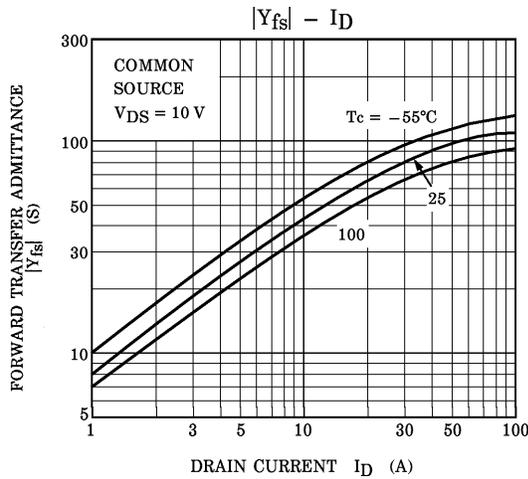
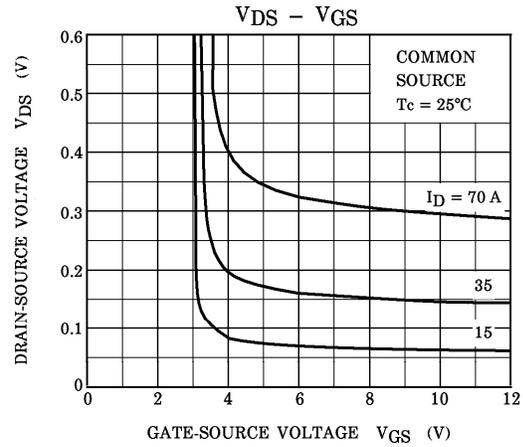
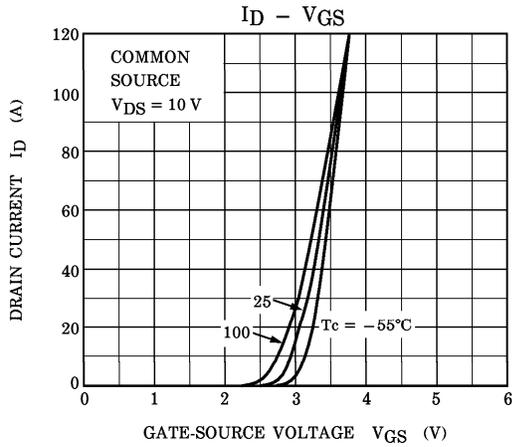
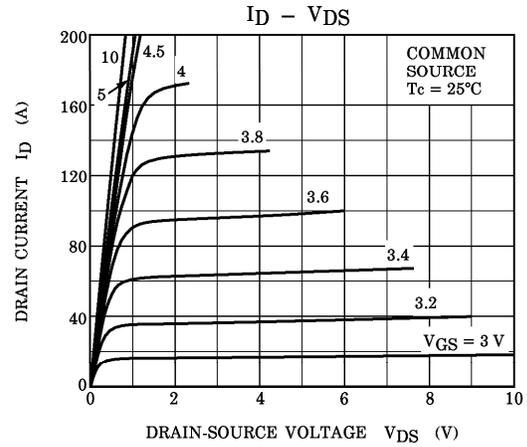
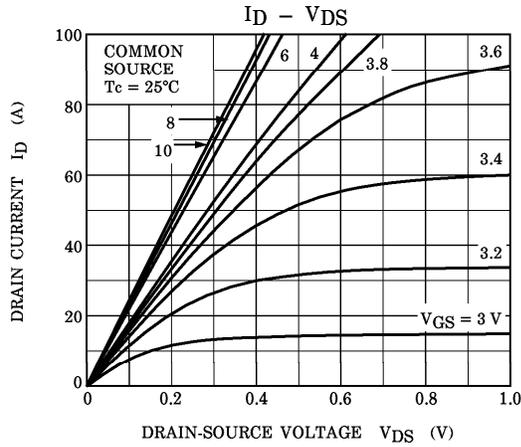


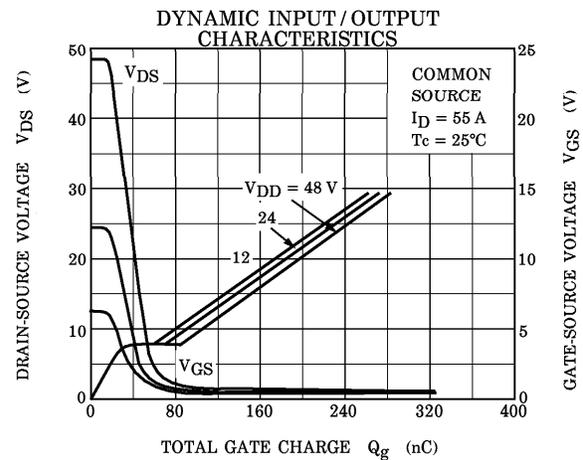
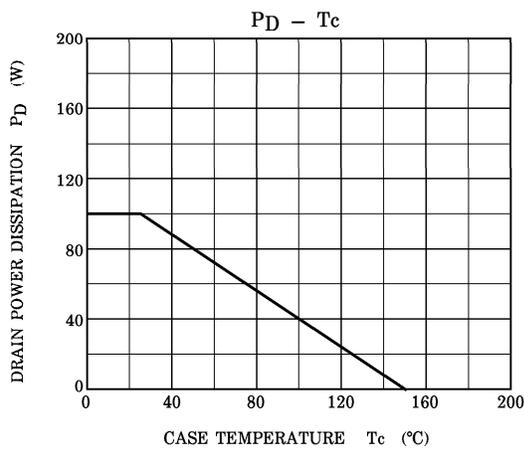
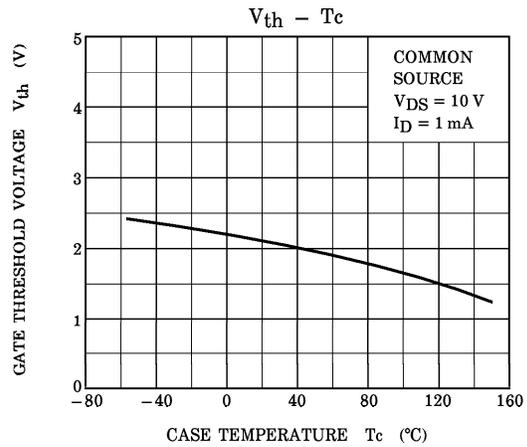
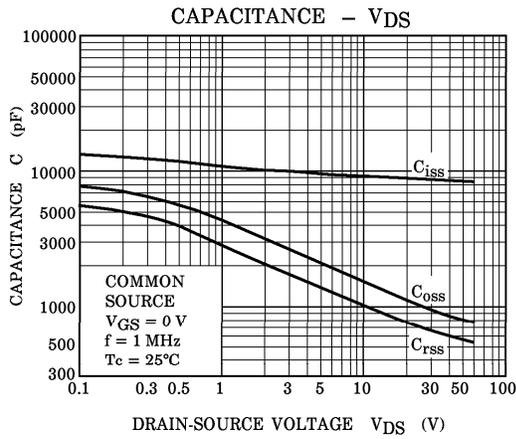
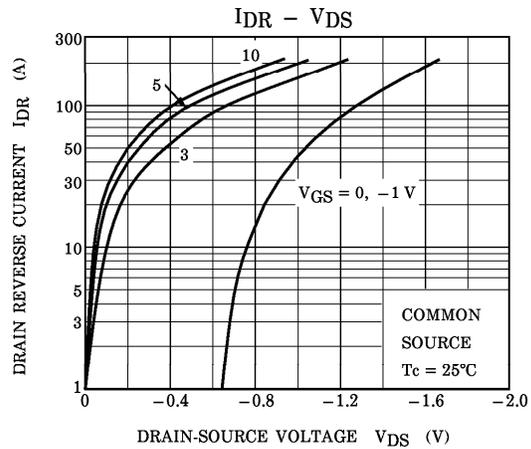
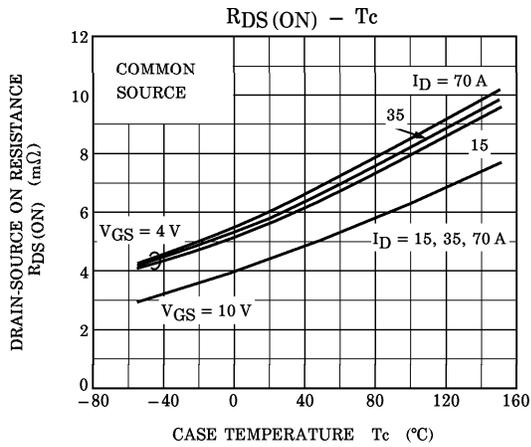
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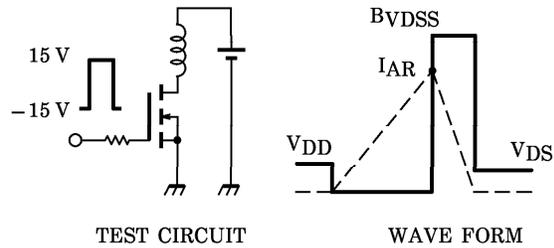
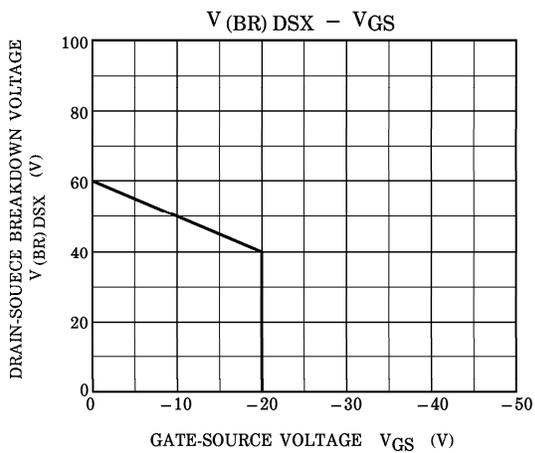
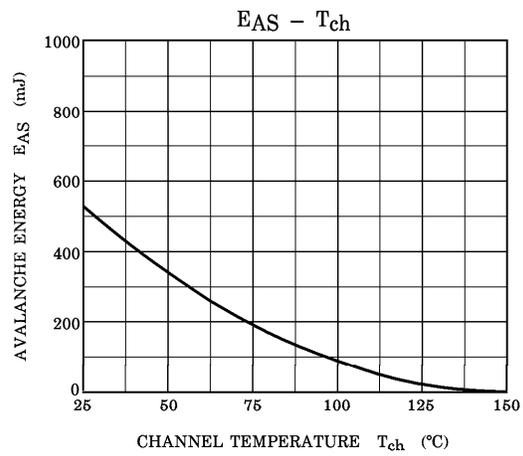
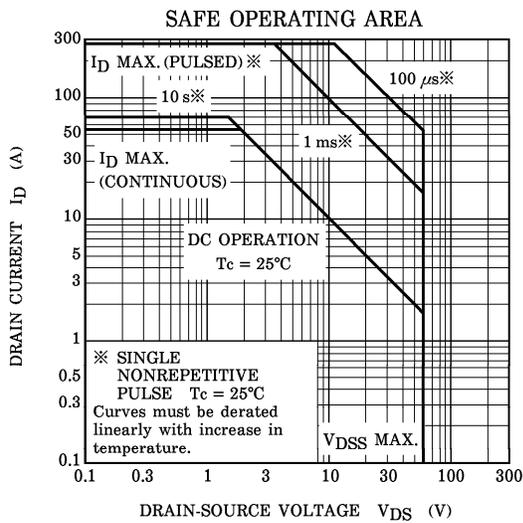
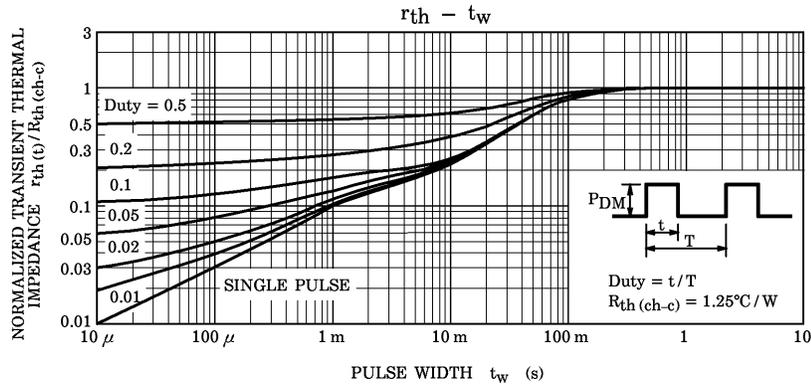
※ Lot Number

□ □ Month (Starting from Alphabet A)

□ Year (Last Number of the Christian Era)







Peak IAR = 55 A, RG = 25 Ω, VDD = 25 V, L = 236 μH

$$EAS = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSX}{BVDSX - VDD} \right)$$