

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (U-MOSII)

2SK2986

DC-DC Converter, Relay Drive and Motor Drive Applications

Unit: 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 : $I_{DSS} = 100 \text{ }\mu\text{A}$ (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 ($T_a = 25^\circ\text{C}$)

Characteristics		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 (Note 1)	I_D	55	A
	Pulse ($t \leq 10 \text{ s}$) (Note 1)	I_{DP}	70	
	Pulse ($t \leq 1 \text{ ms}$) (Note 1)		280	
Drain power dissipation ($T_c = 25^\circ\text{C}$)		P_D	100	W
Single pulse avalanche energy (Note 2)		E_{AS}	525	mJ
Avalanche current		I_{AR}	55	A
Repetitive avalanche energy (Note 3)		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

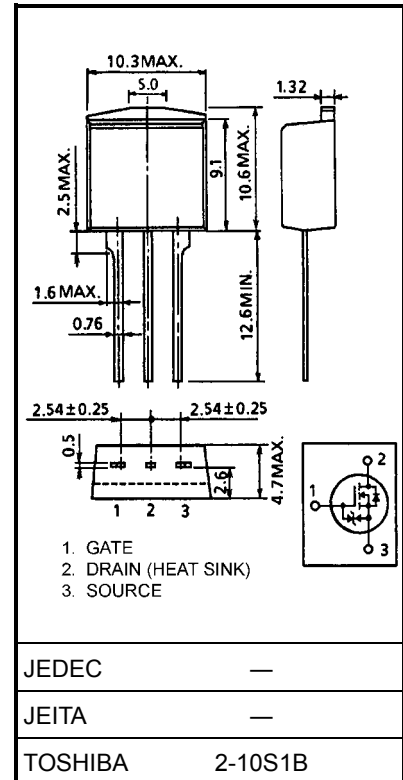
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	1.25	$^\circ\text{C/W}$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	83.3	$^\circ\text{C/W}$

Note 1: Please use devices on condition that the channel temperature is below 150°C .

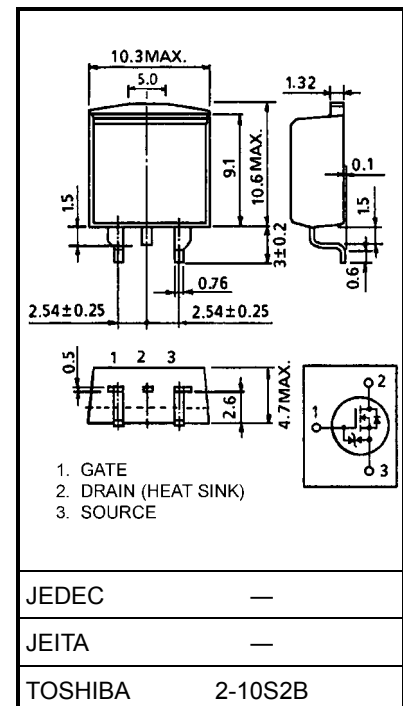
Note 2: $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 236 \text{ }\mu\text{H}$, $I_{AR} = 55 \text{ A}$, $R_G = 25 \text{ }\Omega$

Note 3: Repetitive rating: Pulse width limited by maximum channel temperature

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



Weight: 1.5 g (typ.)



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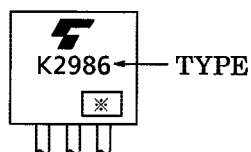
Electrical Characteristics (Ta = 25°C)

Characteristics		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	<p>Duty $\leq 1\%$, $t_w = 10\mu\text{s}$</p>	—	18	—	ns
	Turn-on time	t_{on}		—	50	—	
	Fall time	t_f		—	110	—	
	Turn-off time	t_{off}		—	480	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx 48\text{ V}, V_{GS} = 10\text{ V}, I_D = 55\text{ A}$	—	210	—	nC
Gate-source charge		Q_{gs}		—	145	—	
Gate-drain ("miller") Charge		Q_{gd}		—	65	—	

Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	55	A
Pulse drain reverse current (Note 1)	I_{DRP}	$t \leq 10\text{ s}$	—	—	70	A
		$t \leq 1\text{ ms}$	—	—	280	
Forward voltage (diode)	V_{DSF}	$I_{DR} = 55\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.5	V
Reverse recovery time	t_{rr}	$I_{DR} = 55\text{ A}, V_{GS} = 0\text{ V}, dI_{DR} / dt = 50\text{ A} / \mu\text{s}$	—	60	—	ns
Reverse recovery charge	Q_{rr}		—	50	—	nC

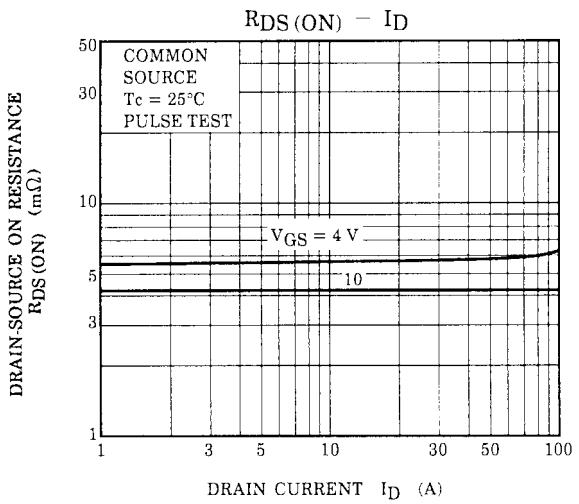
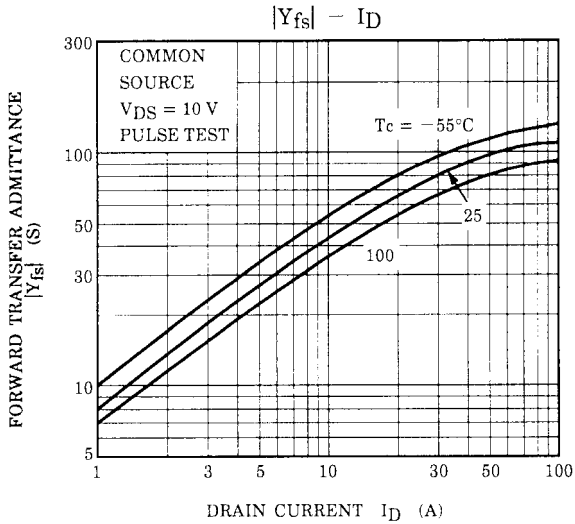
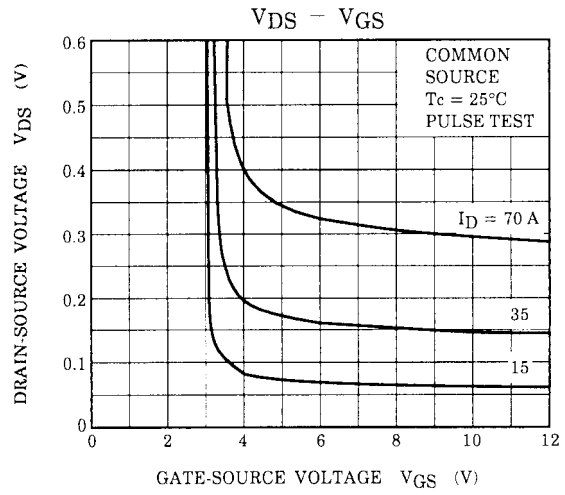
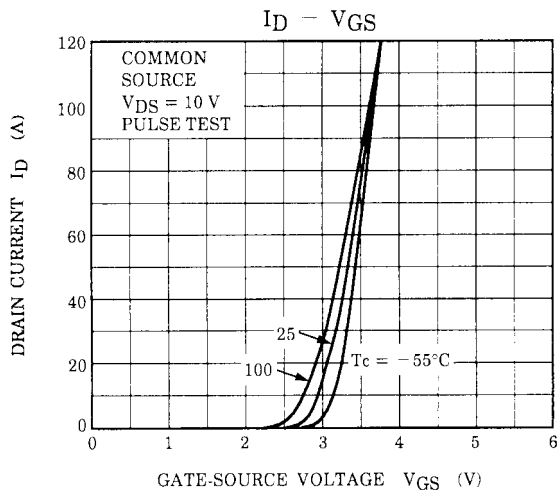
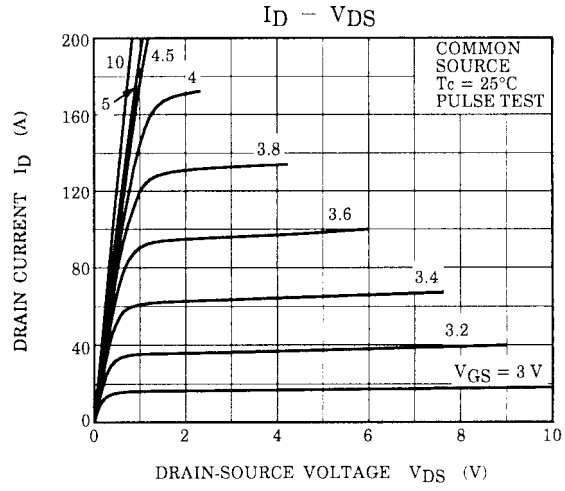
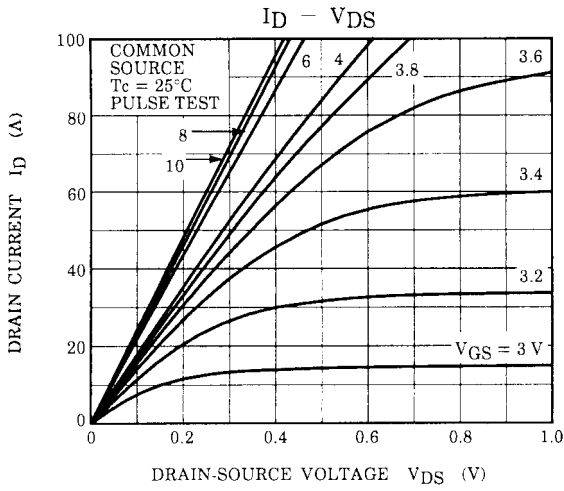
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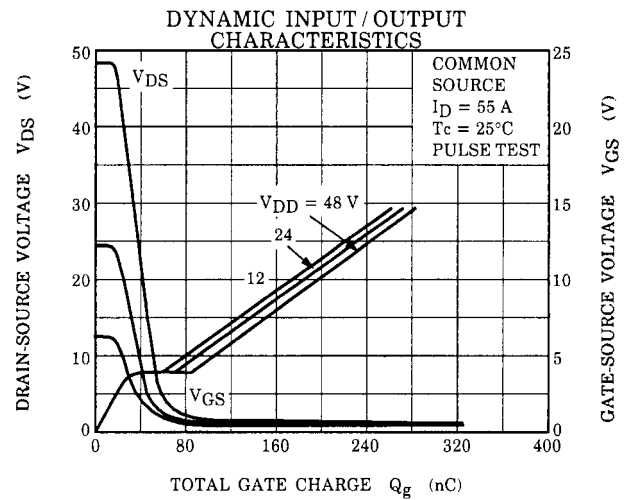
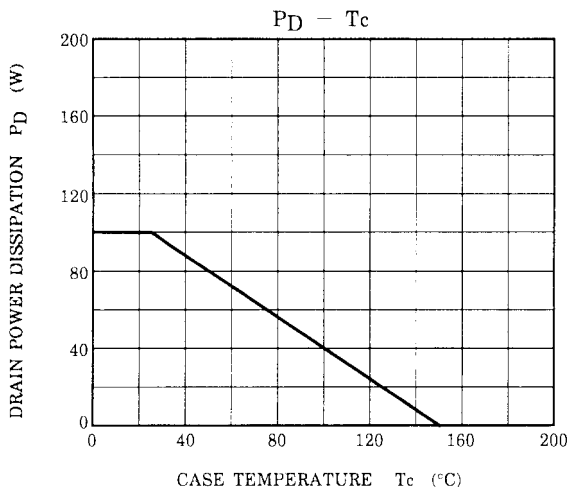
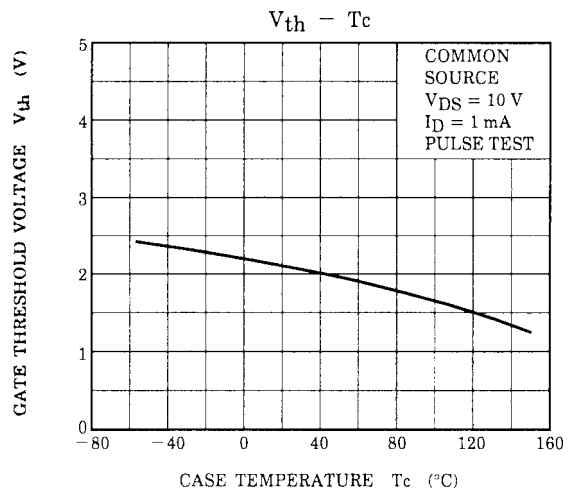
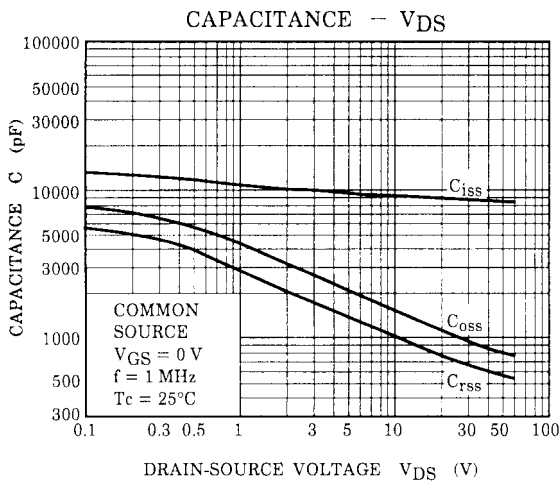
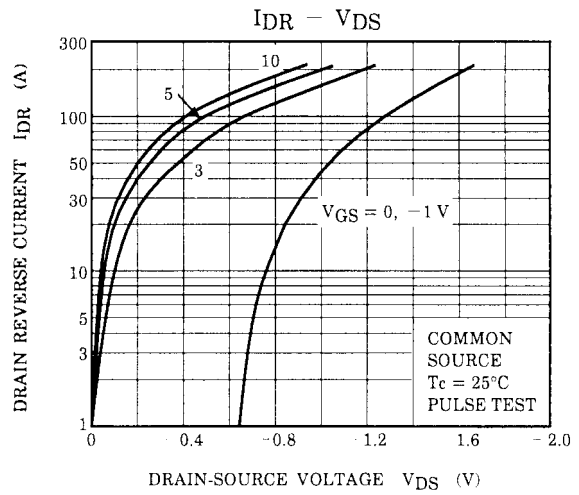
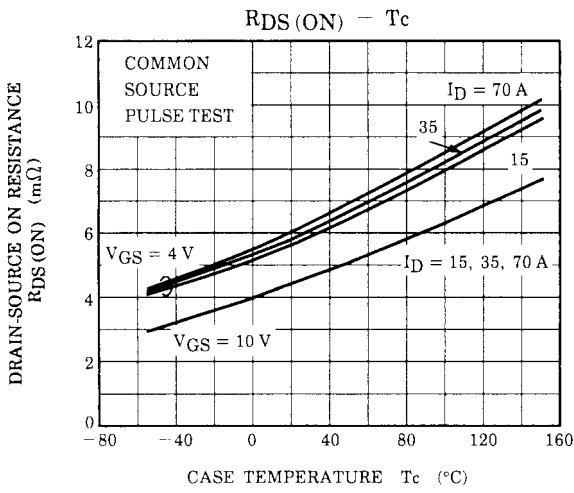


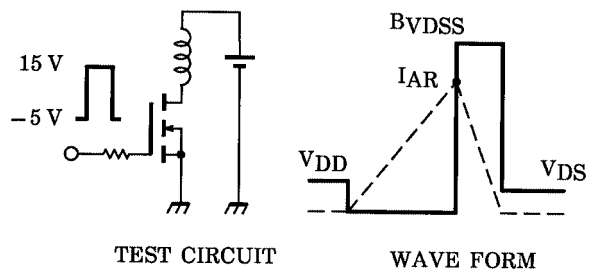
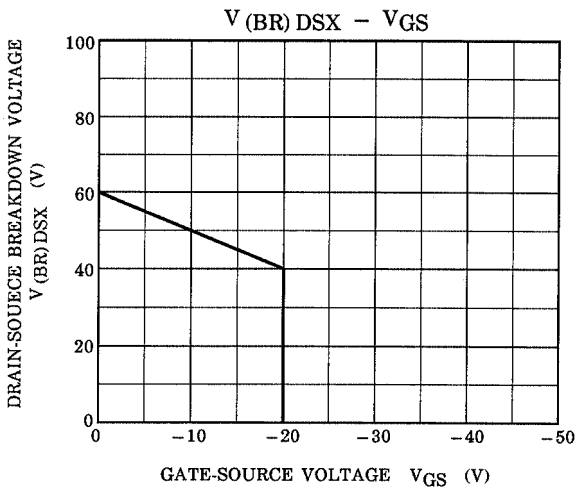
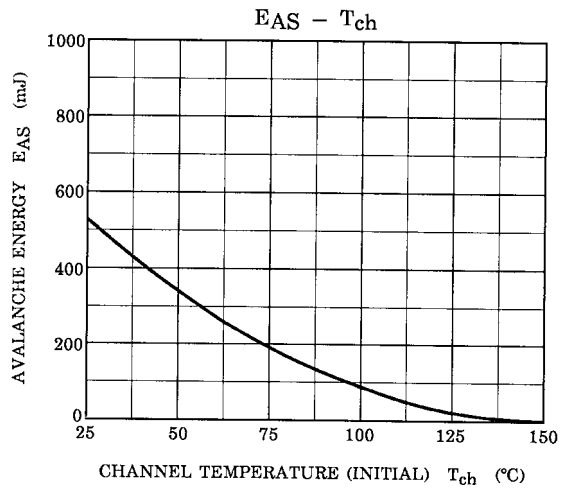
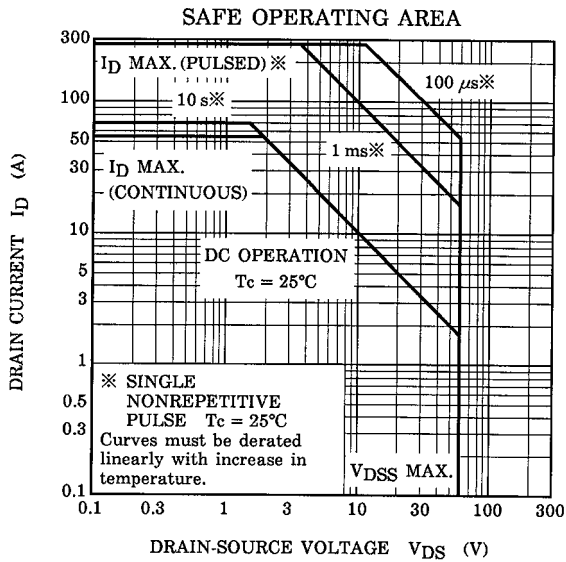
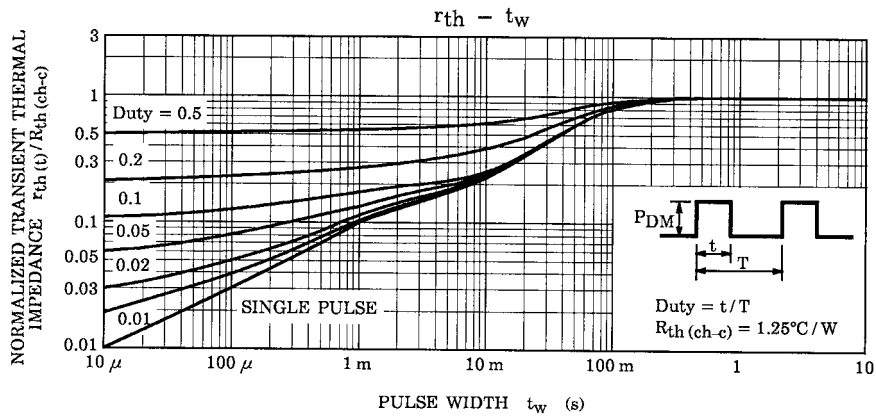
※ Lot Number

□ □ Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$R_G = 25 \Omega$
 $V_{DD} = 25 \text{ V}, L = 236 \mu\text{H}$

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

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