

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

2SK2381

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

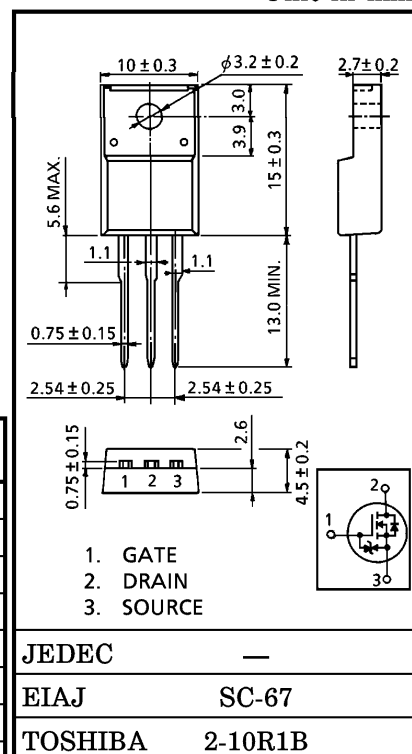
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.56 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 4.5 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A}$ (Max.) ($V_{DS} = 200 \text{ V}$)
- Enhancement-Mode : $V_{th} = 1.5 \sim 3.5 \text{ V}$
($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	200	V
Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	200	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	DC	I_D	5
	Pulse	I_{DP}	20
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)	P_D	25	W
Single Pulse Avalanche Energy**	E_{AS}	65	mJ
Avalanche Current	I_{AR}	5	A
Repetitive Avalanche Energy*	E_{AR}	2.5	mJ
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$



Weight : 1.9 g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel To Case	$R_{th(ch-c)}$	5.0	$^\circ\text{C/W}$
Thermal Resistance, Channel To Ambient	$R_{th(ch-a)}$	62.5	$^\circ\text{C/W}$

Note ;

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

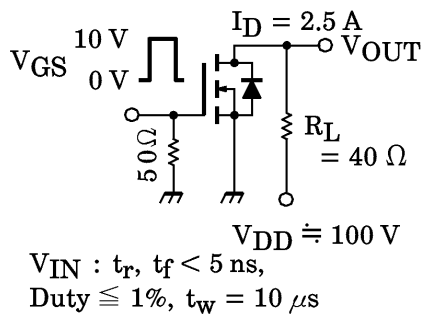
** $V_{DD} = 50 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 4.2 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 5 \text{ A}$

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

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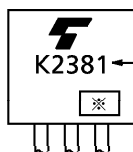
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = 200 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR) DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	200	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	1.5	—	3.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = 10 \text{ V}, I_D = 2.5 \text{ A}$	—	0.56	0.8	Ω
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 2.5 \text{ A}$	2.0	4.5	—	S
Input Capacitance		C_{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	440	—	pF
Reverse Transfer Capacitance		C_{rss}		—	35	—	
Output Capacitance		C_{oss}		—	120	—	
Switching Time	Rise Time	t_r	 $V_{IN} : t_r, t_f < 5 \text{ ns},$ Duty $\leq 1\%, t_W = 10 \mu\text{s}$	—	15	—	ns
	Turn-on Time	t_{on}		—	20	—	
	Fall Time	t_f		—	15	—	
	Turn-off Time	t_{off}		—	60	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \cong 100 \text{ V}, V_{GS} = 10 \text{ V}$ $I_D = 5 \text{ A}$	—	10	—	nC
Gate-Source Charge		Q_{gs}		—	6	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	4	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	5	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	20	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 5 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	—2.0	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 5 \text{ A}, V_{GS} = 0 \text{ V}$ $dI_{DR}/dt = 100 \text{ A}/\mu\text{s}$	—	150	—	ns
Reverse Recovery Charge	Q_{rr}		—	0.45	—	μC

MARKING



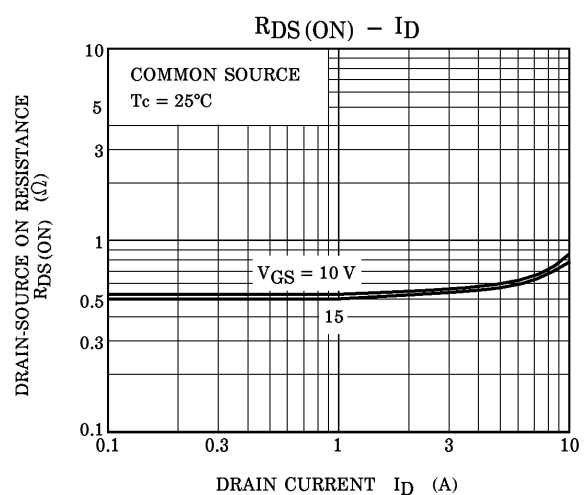
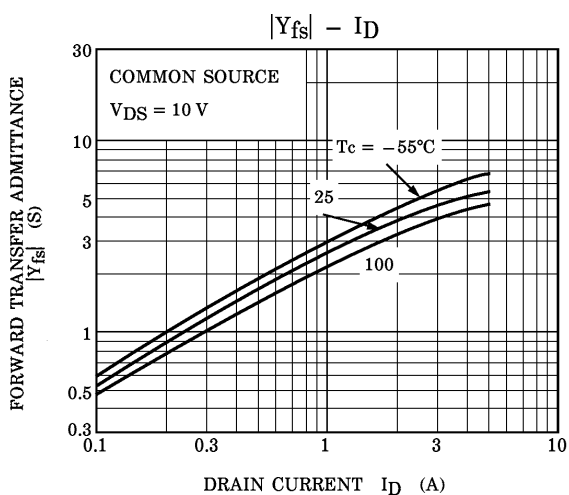
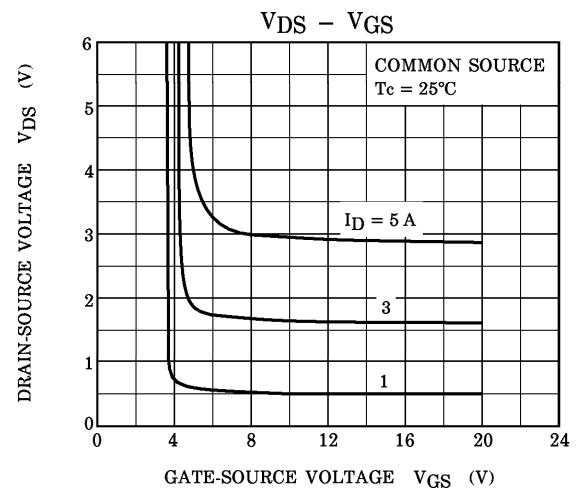
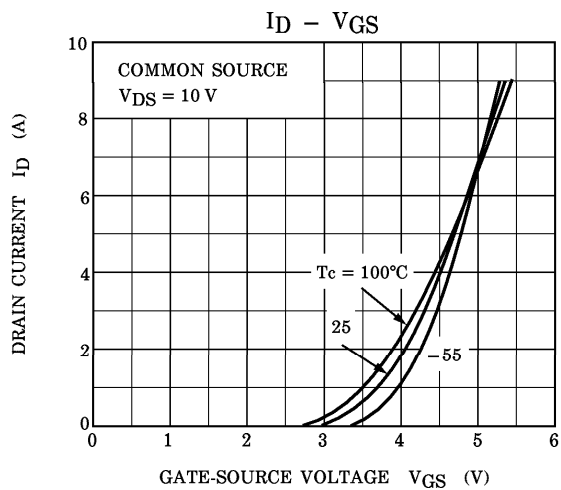
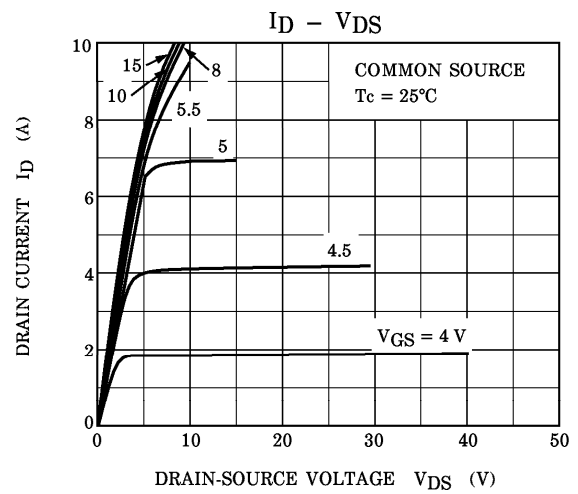
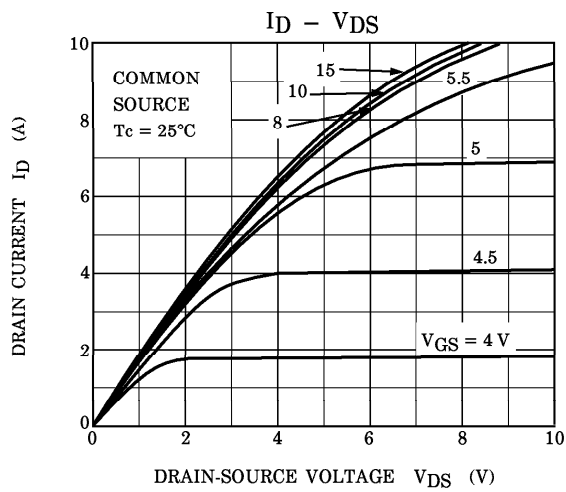
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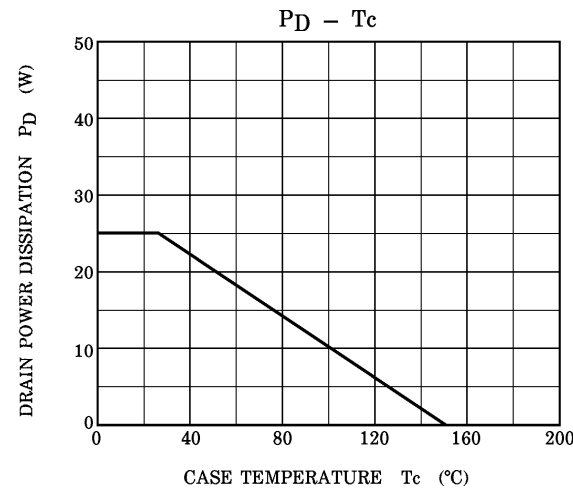
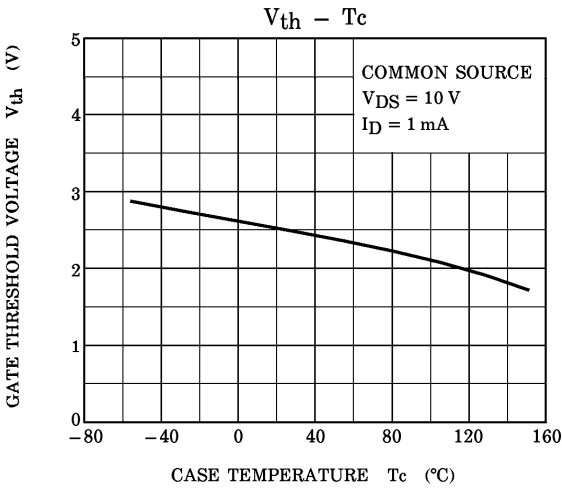
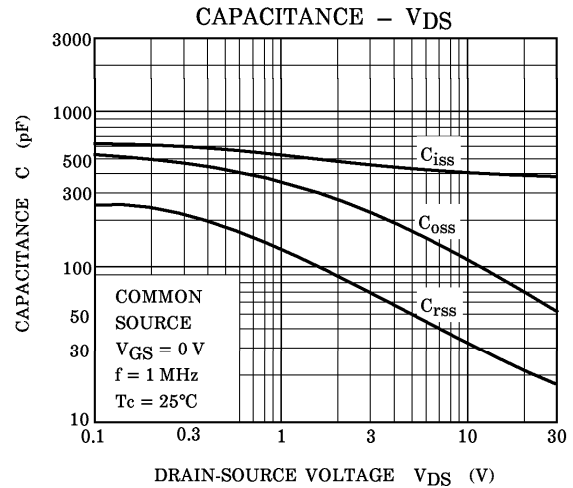
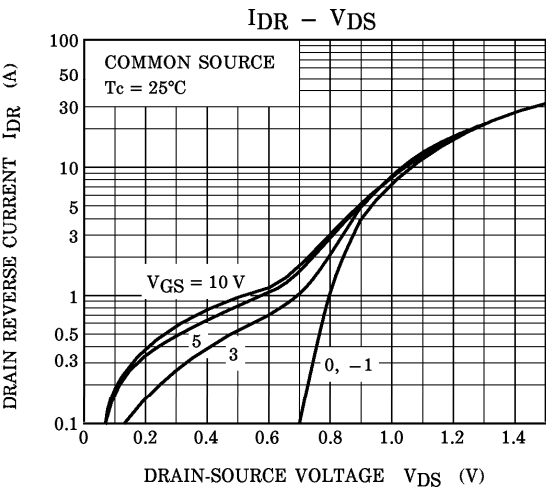
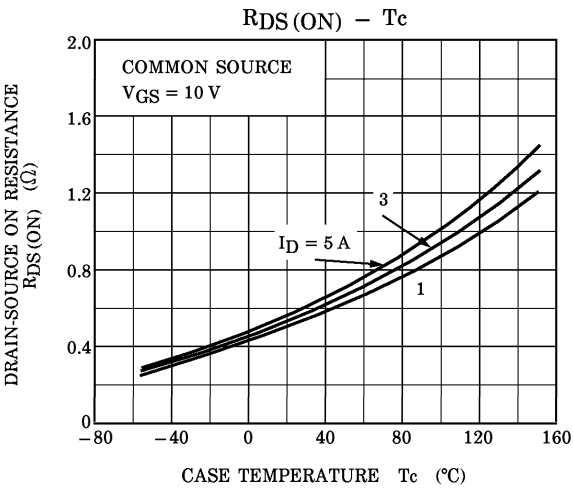
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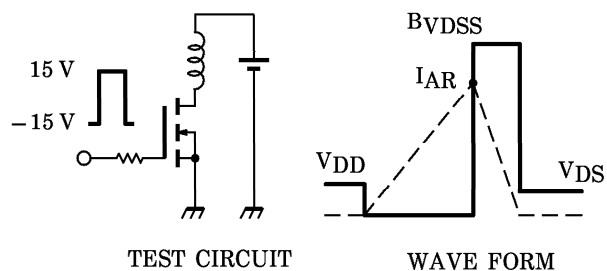
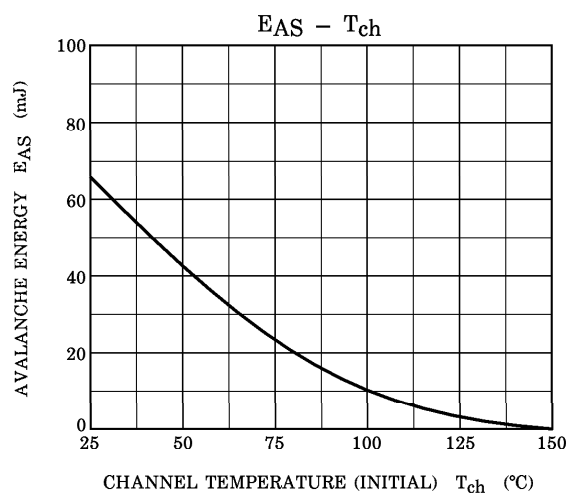
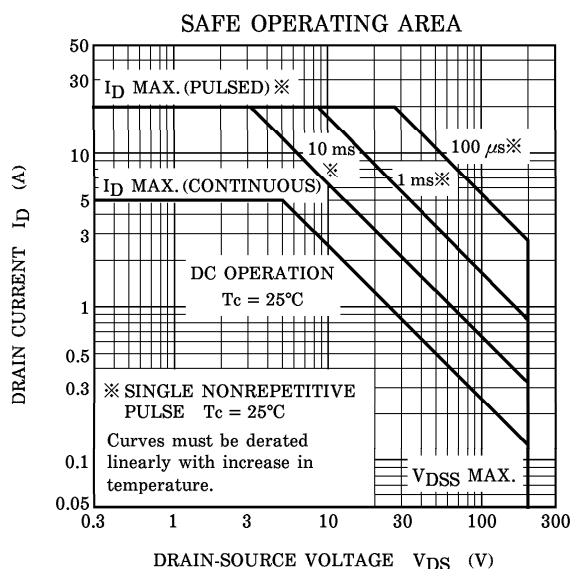
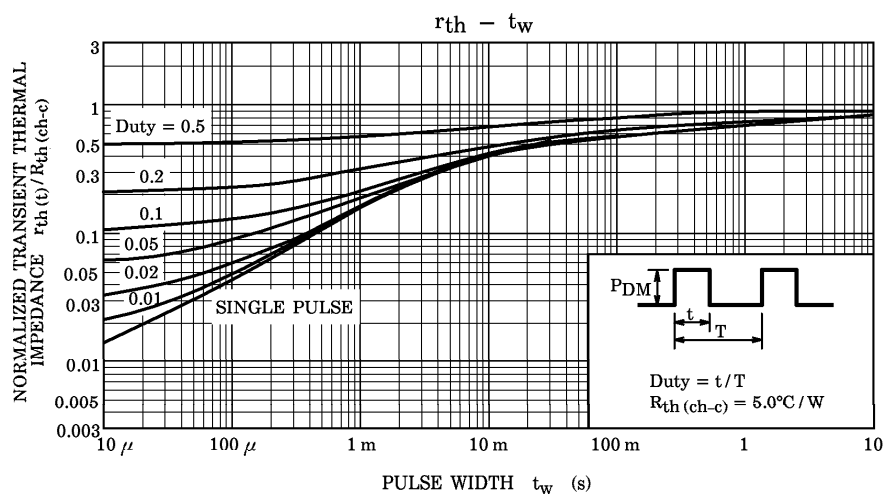


Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)







Peak $I_{AR} = 5\text{ A}$, $R_G = 25\ \Omega$, $V_{DD} = 50\text{ V}$, $L = 4.2\text{ mH}$

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