

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

## 2SK2551

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

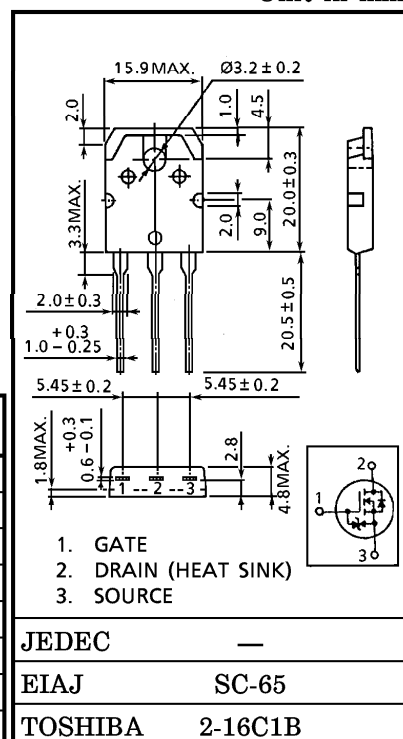
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 7.2m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 50S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 50V$ )
- Enhancement-Mode :  $V_{th} = 1.5 \sim 3.0V$  ( $V_{DS} = 10V$ ,  $I_D = 1mA$ )

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	50	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	50	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	50	A
	Pulse	$I_{DP}$	200	A
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	150	W
Single Pulse Avalanche Energy**		$E_{AS}$	894	mJ
Avalanche Current		$I_{AR}$	50	A
Repetitive Avalanche Energy*		$E_{AR}$	15	mJ
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ C$

INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 4.6g

## 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.

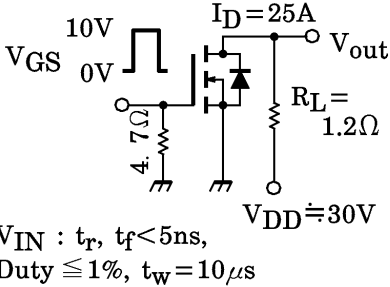
\*\*  $V_{DD} = 25V$ , Starting  $T_{ch} = 25^\circ C$ ,  $L = 440\mu H$ ,  $R_G = 25\Omega$ ,  $I_{AR} = 50A$ 

This transistor is an electrostatic sensitive device.  
please Handle with caution.

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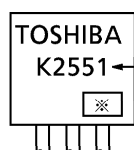
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GSS</sub>	V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V	—	—	±10	μA
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V	—	—	100	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I <sub>D</sub> =10mA, V <sub>GS</sub> =0V	50	—	—	V
Gate Threshold Voltage		V <sub>th</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA	1.5	—	3.0	V
Drain-Source ON Resistance		R <sub>DS</sub> (ON)	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	—	7.2	11	mΩ
Forward Transfer Admittance		Y <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =25A	30	50	—	S
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	—	4000	—	pF
Reverse Transfer Capacitance		C <sub>rss</sub>		—	800	—	
Output Capacitance		C <sub>oss</sub>		—	2000	—	
Switching Time	Rise Time	t <sub>r</sub>	 <p>V<sub>IN</sub> : t<sub>r</sub>, t<sub>f</sub>&lt;5ns, Duty ≤1%, t<sub>w</sub>=10μs</p>	—	25	—	ns
	Turn-on Time	t <sub>on</sub>		—	40	—	
	Fall Time	t <sub>f</sub>		—	120	—	
	Turn-off Time	t <sub>off</sub>		—	360	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q <sub>g</sub>	V <sub>DD</sub> ≐40V, V <sub>GS</sub> =10V I <sub>D</sub> =50A	—	130	—	nC
Gate-Source Charge		Q <sub>gs</sub>		—	90	—	
Gate-Drain (“Miller”) Charge		Q <sub>gd</sub>		—	40	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	50	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	200	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = 50A, V_{GS} = 0V$	—	—	-1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = 50A, V_{GS} = 0V$	—	140	—	ns
Reverse Recovery Charge	$Q_{rr}$	$dI_{DR} / dt = 50A / \mu s$	—	77	—	nC

## MARKING



TYPE

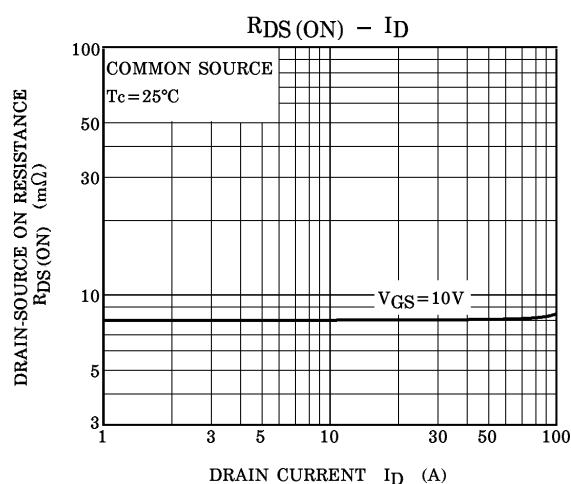
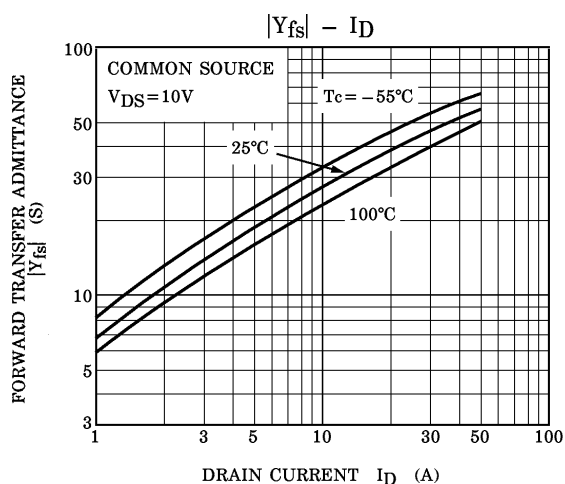
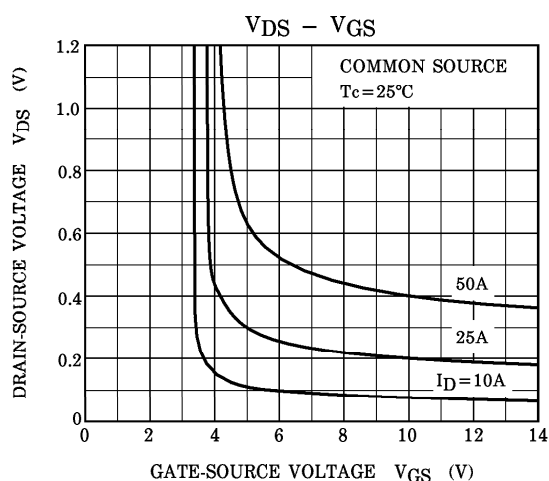
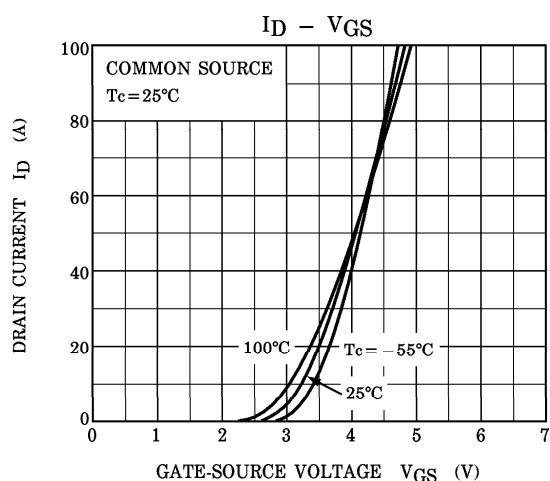
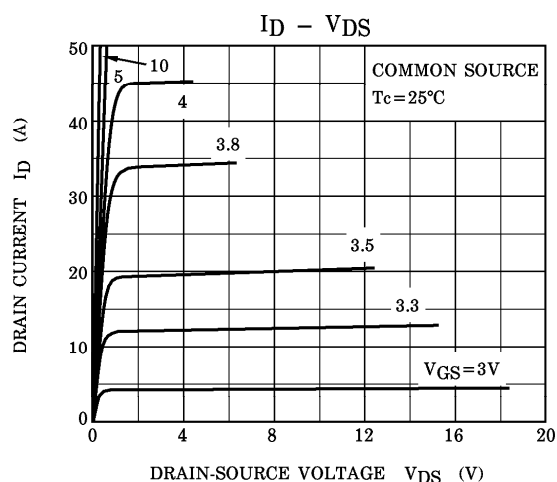
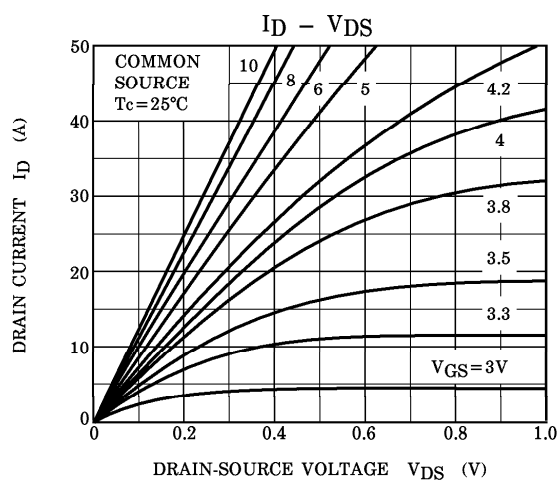
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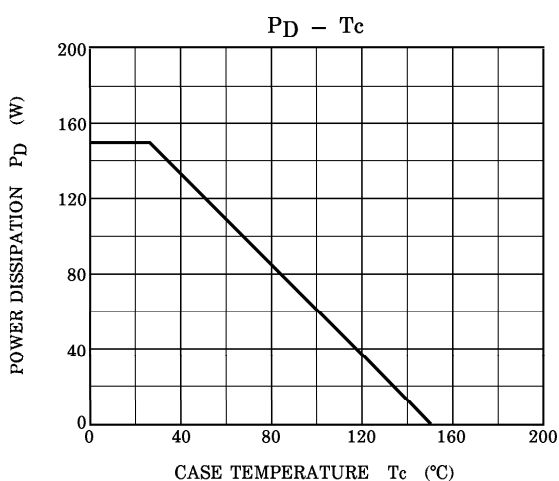
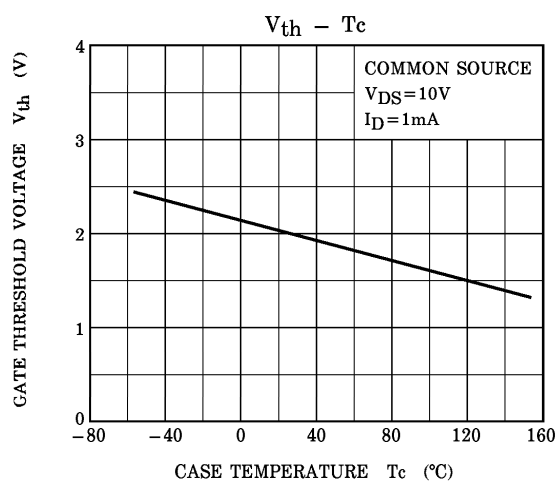
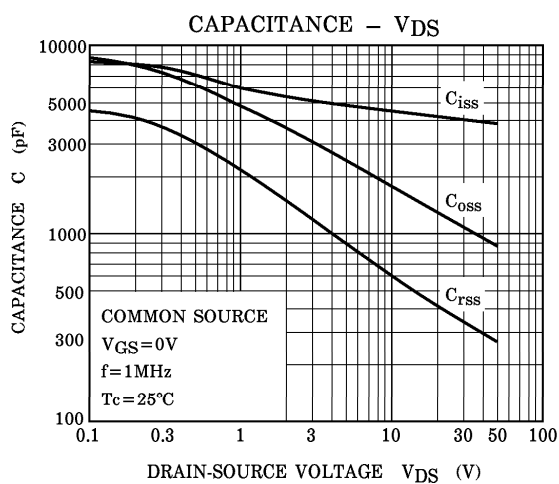
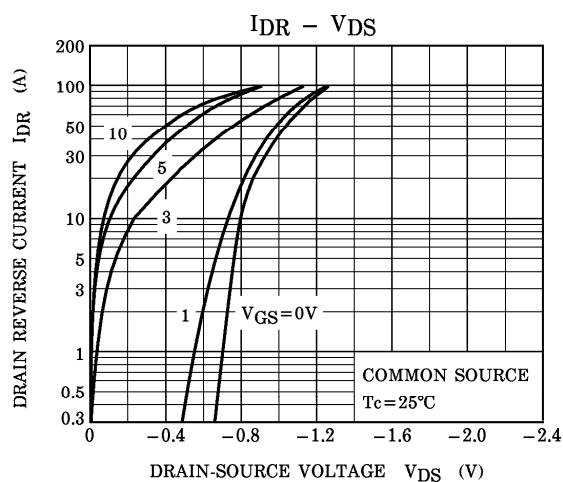
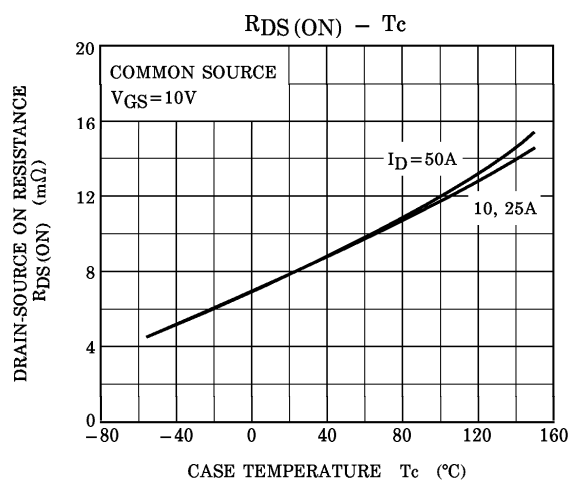


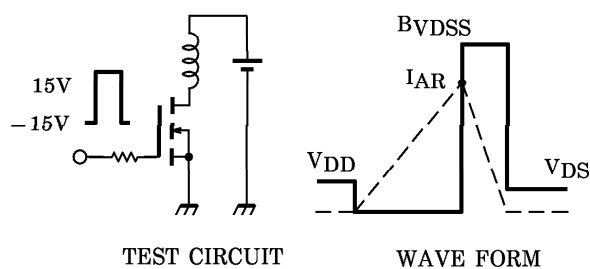
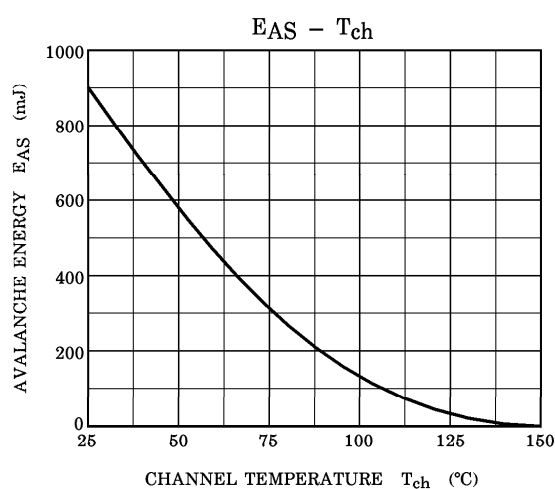
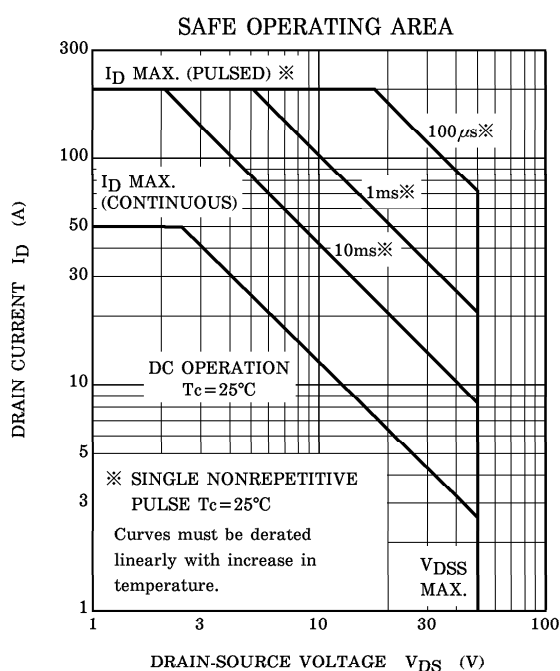
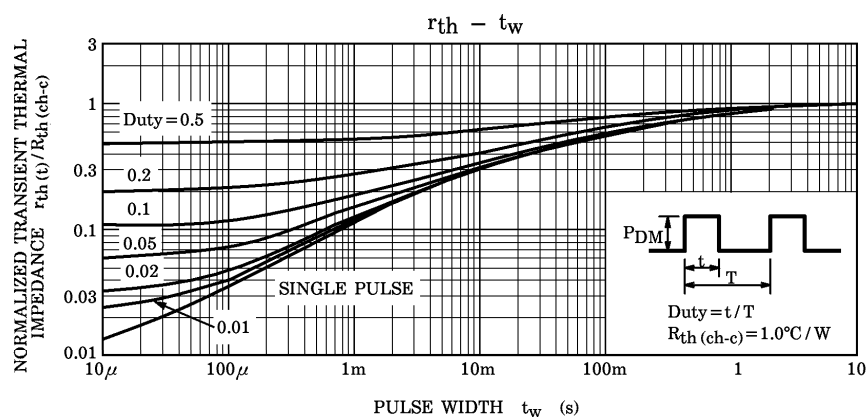
Month (Starting from Alphabet A)



Year (Last Number of the Christian Era)







Peak  $I_{AR} = 50A$ ,  $R_G = 25\Omega$   
 $V_{DD} = 25V$ ,  $L = 440\mu H$

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