

**TOSHIBA**

**2SK2398**

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

# 2SK2398

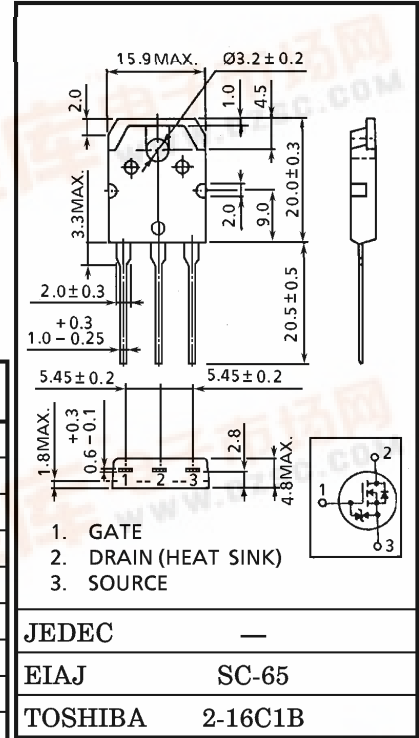
HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS  
DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS  
Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 22m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 27S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 60V$ )
- 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		$V_{DSS}$	60	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	45	A
	Pulse	$I_{DP}$	180	A
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	100	W
Single Pulse Avalanche Energy**		$E_{AS}$	246	mJ
Avalanche Current		$I_{AR}$	45	A
Repetitive Avalanche Energy*		$E_{AR}$	10	mJ
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 4.6g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.25	$^\circ C / W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	50	$^\circ C / W$

Note ;

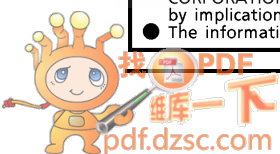
\* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

\*\*  $V_{DD} = 25V$ , Starting  $T_{ch} = 25^\circ C$ ,  $L = 165\mu H$   
 $R_G = 25\Omega$ ,  $I_{AR} = 45A$

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

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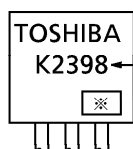
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	IGSS	VGS = ±16V, VDS = 0V	—	—	±10	μA	
Drain Cut-off Current	IDSS	VDS = 60V, VGS = 0V	—	—	100	μA	
Drain-Source Breakdown Voltage	V(BR)DSS	ID = 10mA, VGS = 0V	60	—	—	V	
Gate Threshold Voltage	Vth	VDS = 10V, ID = 1mA	1.5	—	3.0	V	
Drain-Source ON Resistance	RDS(ON)	VGS = 10V, ID = 25A	—	22	30	mΩ	
Forward Transfer Admittance	Yfs	VDS = 10V, ID = 25A	15	27	—	S	
Input Capacitance	Ciss	VDS = 10V, VGS = 0V, f = 1MHz	—	1800	—	pF	
Reverse Transfer Capacitance	Crss		—	350	—		
Output Capacitance	Coss		—	900	—		
Switching Time	Rise Time	tr		—	20	—	ns
	Turn-on Time	ton		—	30	—	
	Fall Time	tf		—	40	—	
	Turn-off Time	t <sub>off</sub>		VIN : tr, tf < 5ns, Duty ≤ 1%, tw = 10μs	—	130	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Qg	VDD ≐ 48V, VGS = 10V ID = 45A	—	60	—	nC	
Gate-Source Charge	Qgs		—	40	—		
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	—	—	—	45	A
Pulse Drain Reverse Current	IDRP	—	—	—	180	A
Diode Forward Voltage	VDSF	IDR = 45A, VGS = 0V	—	—	-1.8	V
Reverse Recovery Time	trr	IDR = 45A, VGS = 0V	—	60	—	ns
Reverse Recovery Charge	Qrr	dIDR / dt = 50A / μs	—	51	—	nC

MARKING



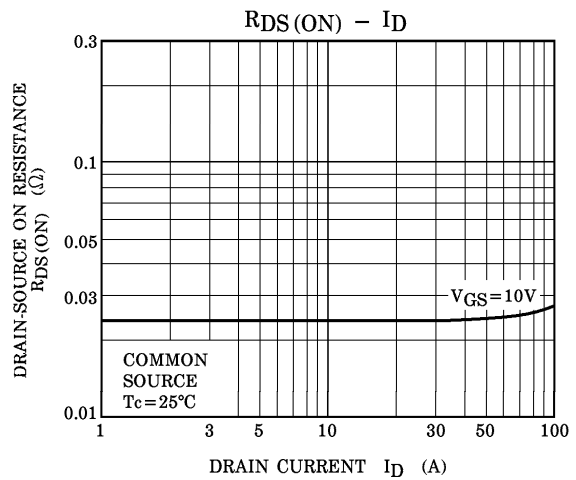
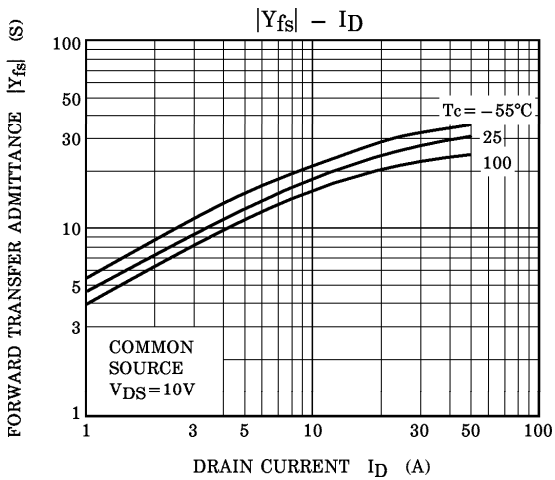
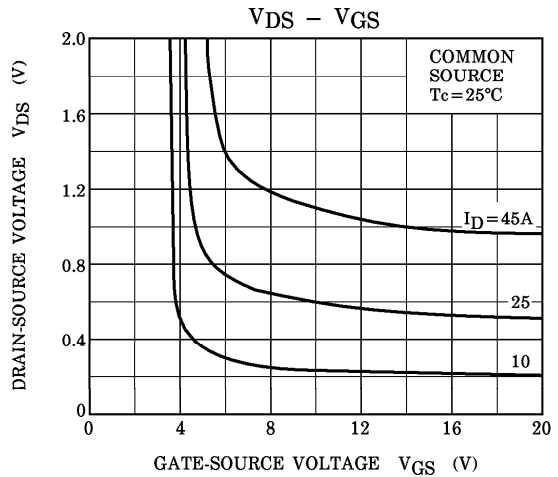
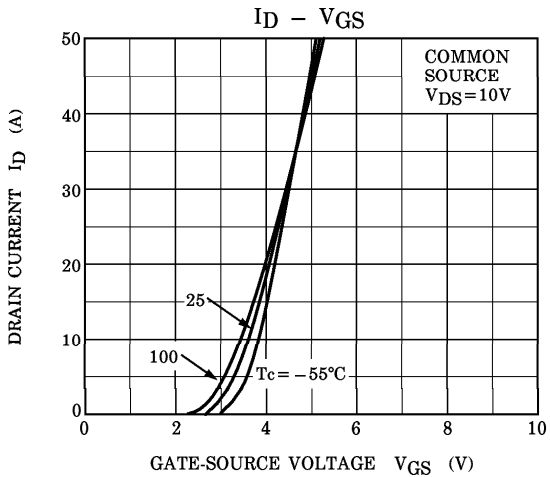
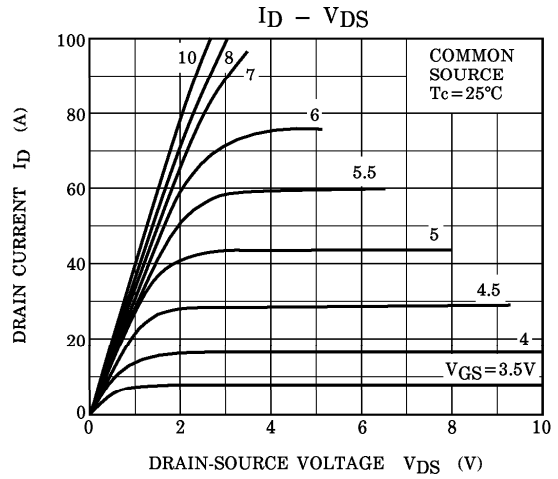
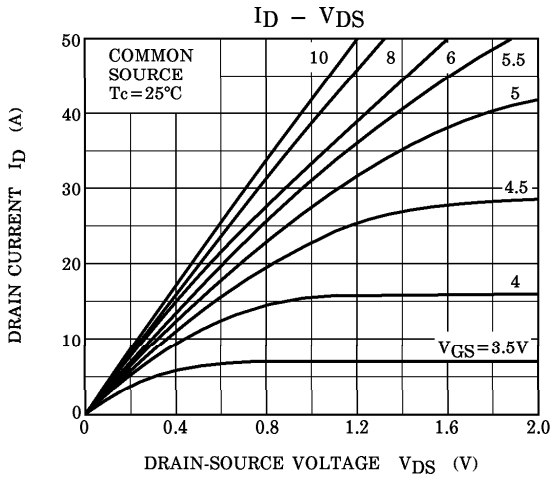
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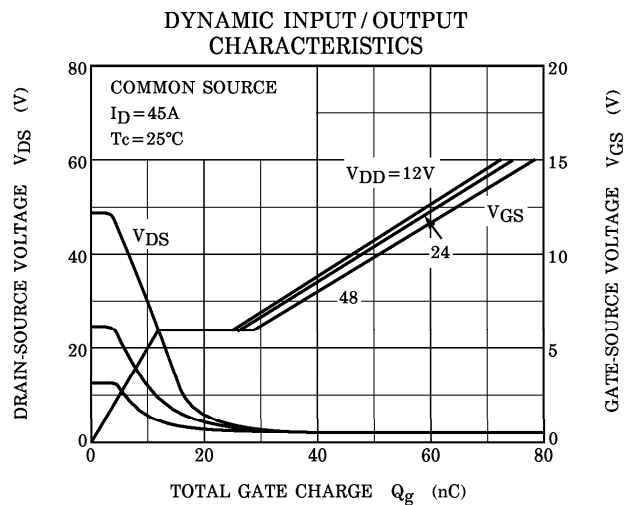
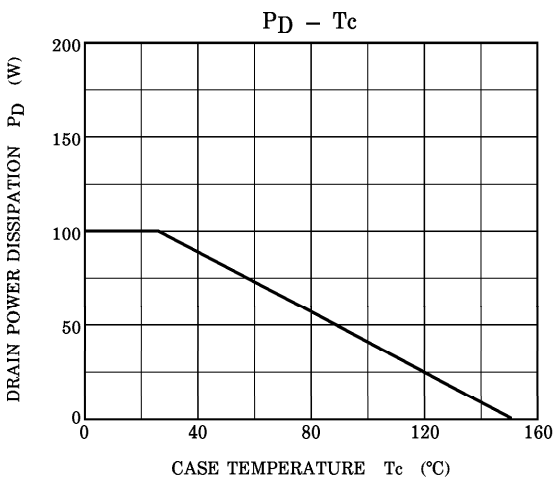
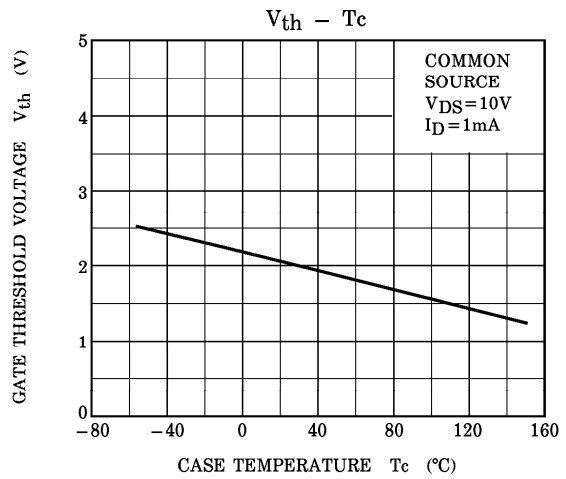
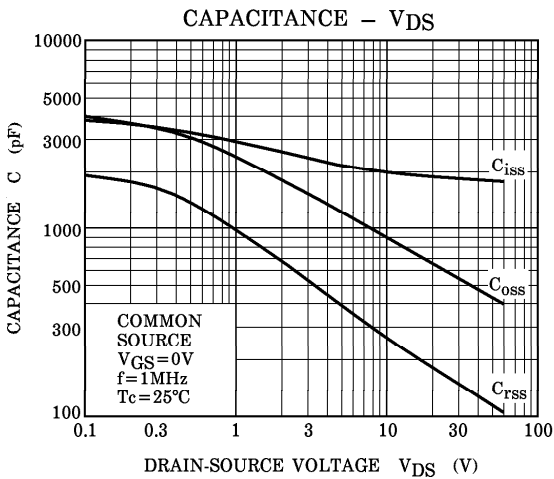
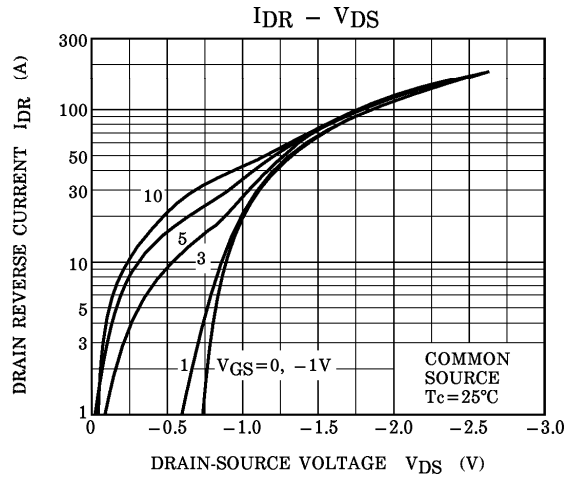
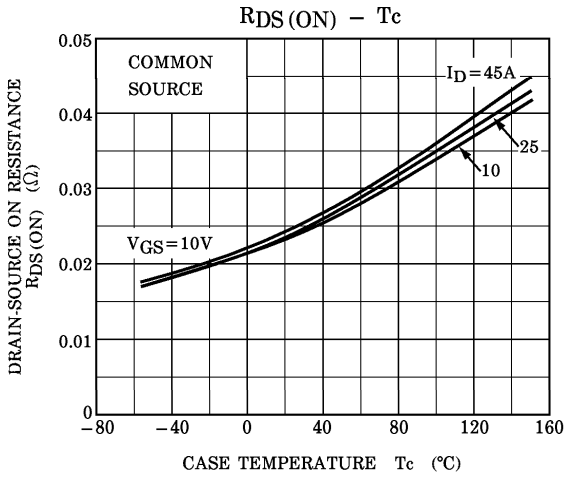
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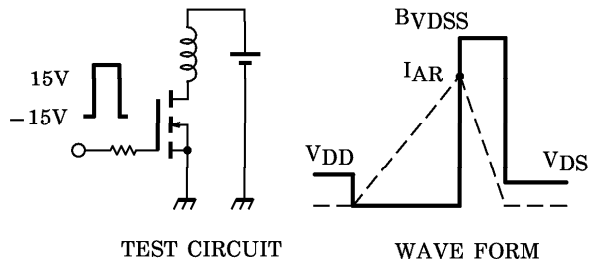
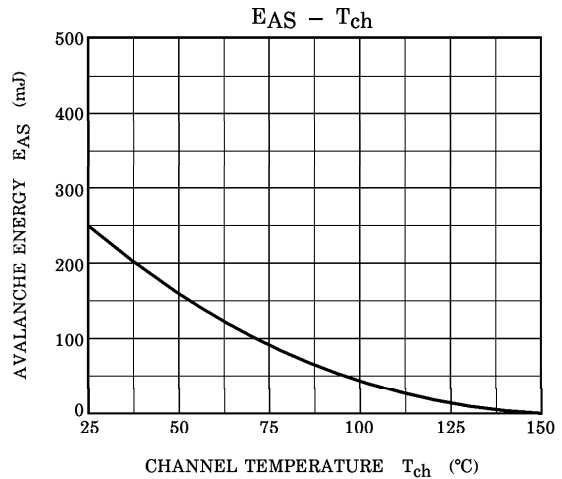
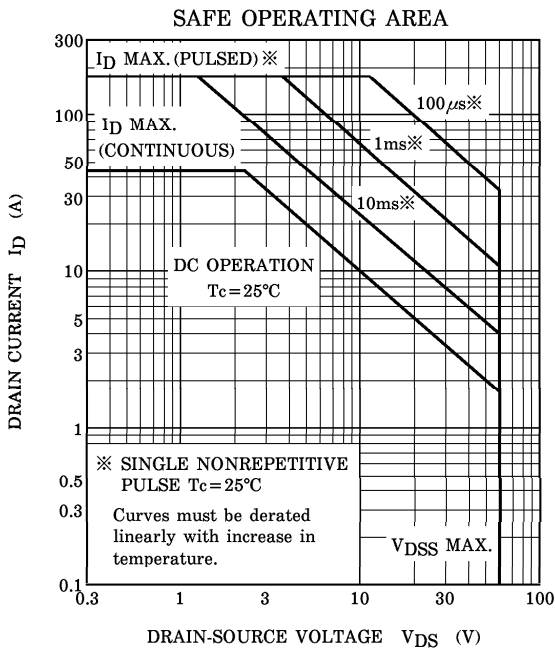
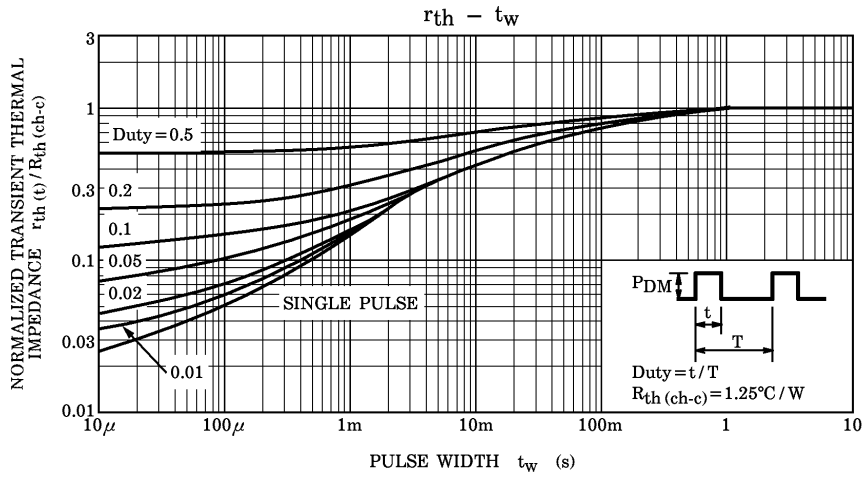


Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)







Peak  $I_{AR} = 45A$ ,  $R_G = 25\Omega$ ,  $V_{DD} = 25V$ ,  $L = 165\mu H$

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