

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

# 2SK2746

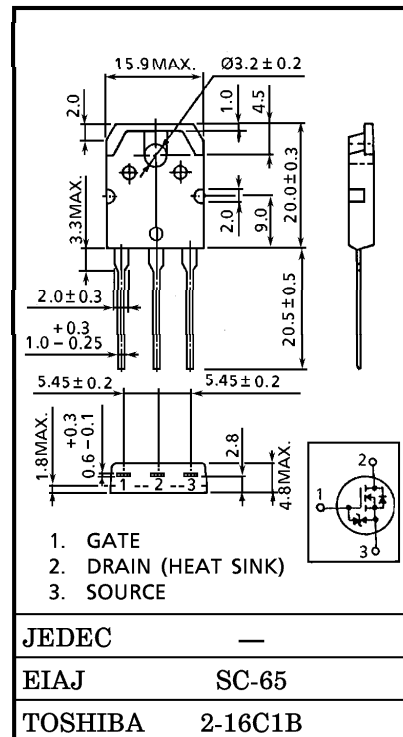
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS  
DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS  
Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)}=1.3\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}|=5.0S$  (Typ.)
- Low Leakage Current :  $I_{DSS}=100\mu A$  (Max.) ( $V_{DS}=640V$ )
- Enhancement-Mode :  $V_{th}=2.0\sim 4.0V$  ( $V_{DS}=10V, I_D=1mA$ )

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	800	V
Drain-Gate Voltage ( $R_{GS}=20k\Omega$ )	$V_{DGR}$	800	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Drain Current	DC	$I_D$	7 A
	Pulse	$I_{DP}$	21 A
Drain Power Dissipation ( $T_c=25^\circ C$ )	$P_D$	150	W
Single Pulse Avalanche Energy**	$E_{AS}$	673	mJ
Avalanche Current	$I_{AR}$	7	A
Repetitive Avalanche Energy*	$E_{AR}$	15	mJ
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	$-55\sim 150$	$^\circ C$



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.

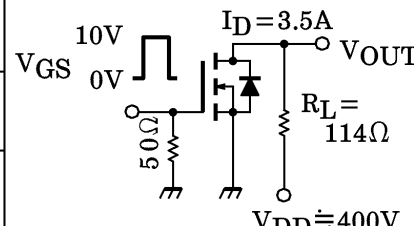
\*\*  $V_{DD}=90V$ , Starting  $T_{ch}=25^\circ C$ ,  $L=24.9mH$ ,  $R_G=25\Omega$ ,  $I_{AR}=7A$

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

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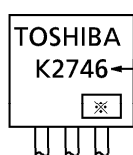
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GSS</sub>	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V	—	—	±10	μA
Gate-Source Breakdown Voltage		V (BR) GSS	I <sub>G</sub> = ±10μA, V <sub>DS</sub> = 0V	±30	—	—	V
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub> = 640V, V <sub>GS</sub> = 0V	—	—	100	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0V	800	—	—	V
Gate Threshold Voltage		V <sub>th</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA	2.0	—	4.0	V
Drain-Source ON Resistance		R <sub>DS (ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.5A	—	1.3	1.7	Ω
Forward Transfer Admittance		Y <sub>fs</sub>	V <sub>DS</sub> = 20V, I <sub>D</sub> = 3.5A	1.25	5.0	—	S
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1MHz	—	1500	—	pF
Reverse Transfer Capacitance		C <sub>rss</sub>		—	30	—	
Output Capacitance		C <sub>oss</sub>		—	140	—	
Switching Time	Rise Time	t <sub>r</sub>		—	35	—	ns
	Turn-on Time	t <sub>on</sub>		—	80	—	
	Fall Time	t <sub>f</sub>		—	50	—	
	Turn-off Time	t <sub>off</sub>		V <sub>IN</sub> : t <sub>r</sub> , t <sub>f</sub> < 5ns, Duty ≤ 1%, t <sub>w</sub> = 10μs	—	220	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q <sub>g</sub>	V <sub>DD</sub> = 400V, V <sub>GS</sub> = 10V	—	55	—	nC
Gate-Source Charge		Q <sub>gs</sub>	I <sub>D</sub> = 7A	—	30	—	
Gate-Drain ("Miller") Charge		Q <sub>gd</sub>		—	25	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I <sub>DR</sub>	—	—	—	7	A
Pulse Drain Reverse Current	I <sub>DRP</sub>	—	—	—	21	A
Diode Forward Voltage	V <sub>DSF</sub>	I <sub>DR</sub> = 7A, V <sub>GS</sub> = 0V	—	—	-1.9	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = 7A, V <sub>GS</sub> = 0V	—	1300	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt = 100A / μs	—	14	—	μC

MARKING

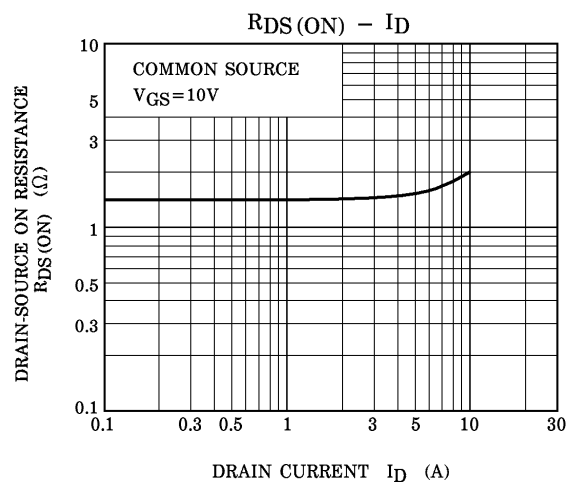
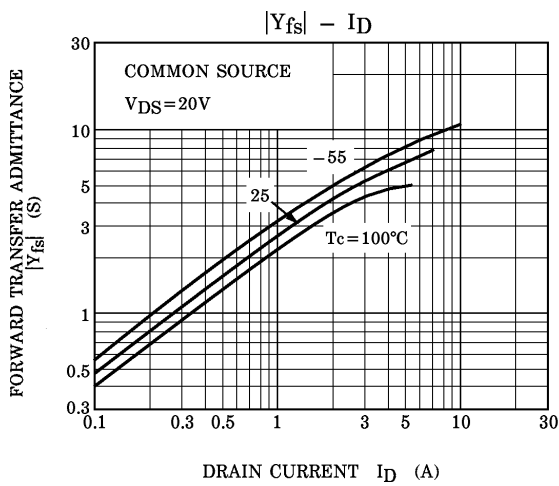
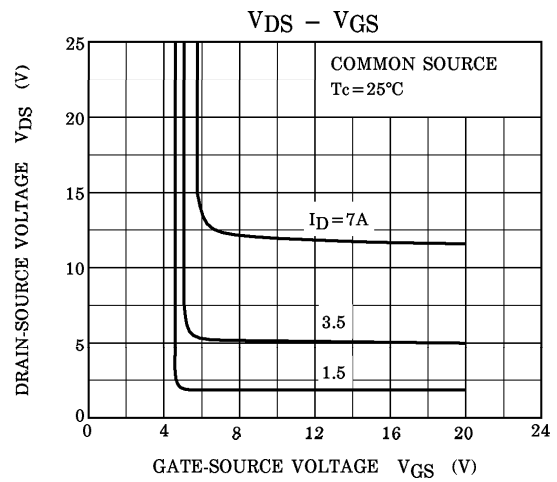
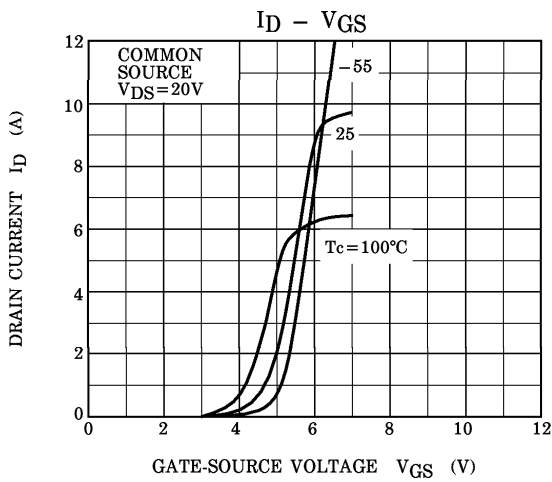
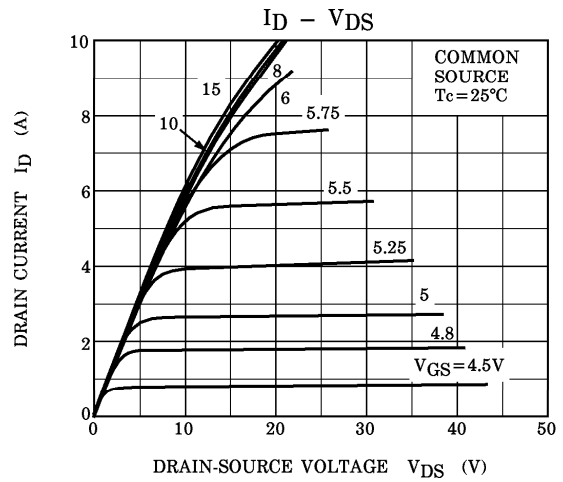
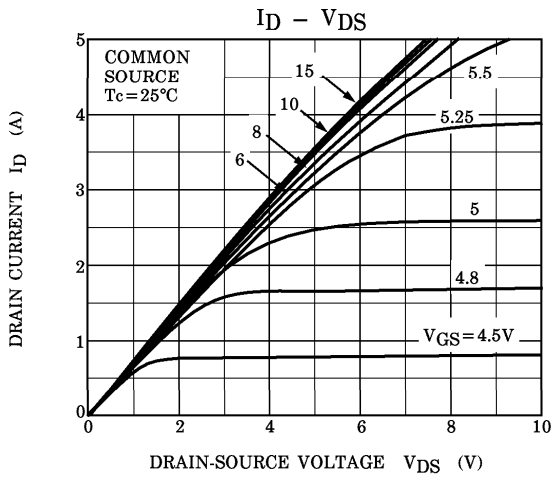


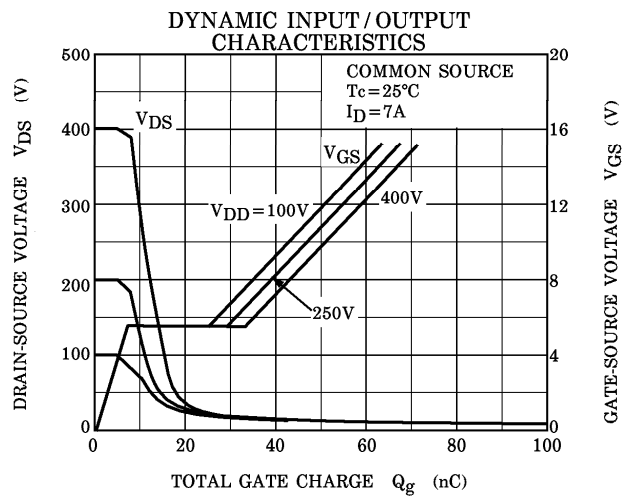
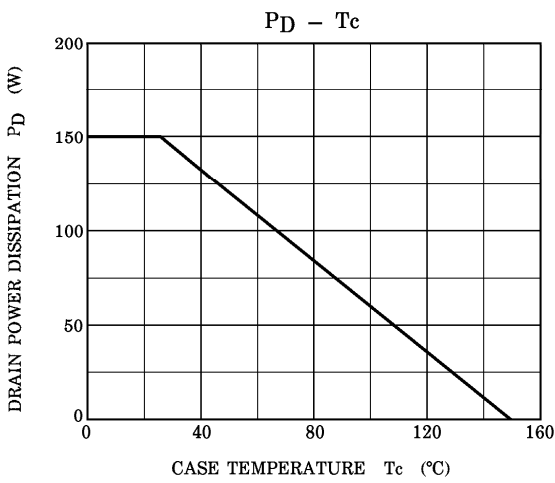
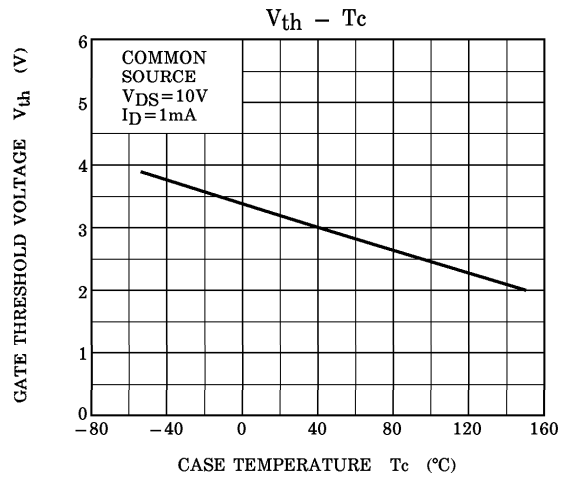
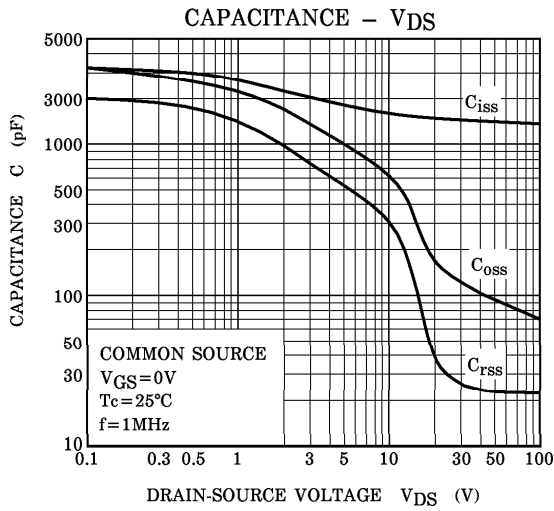
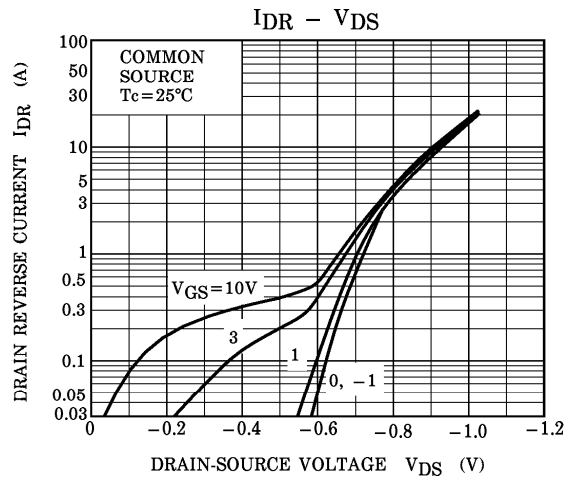
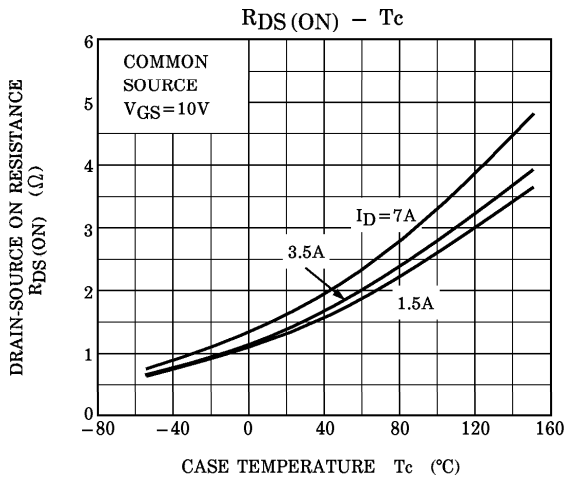
TYPE

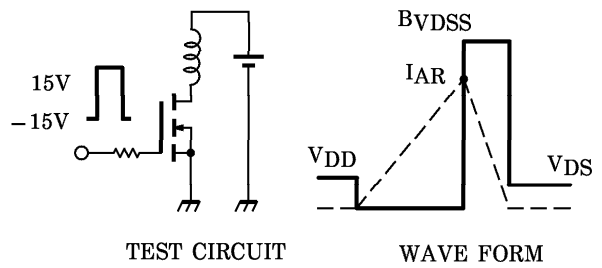
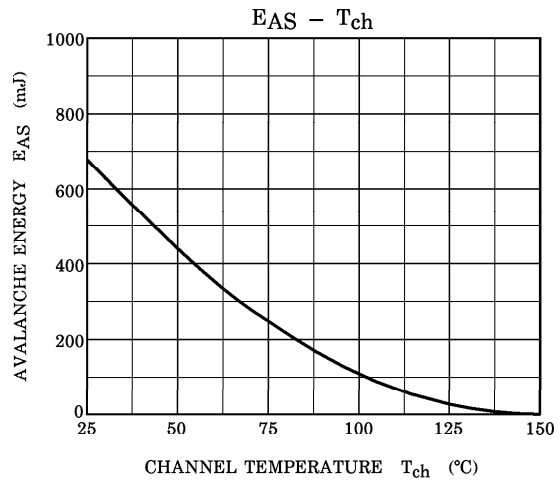
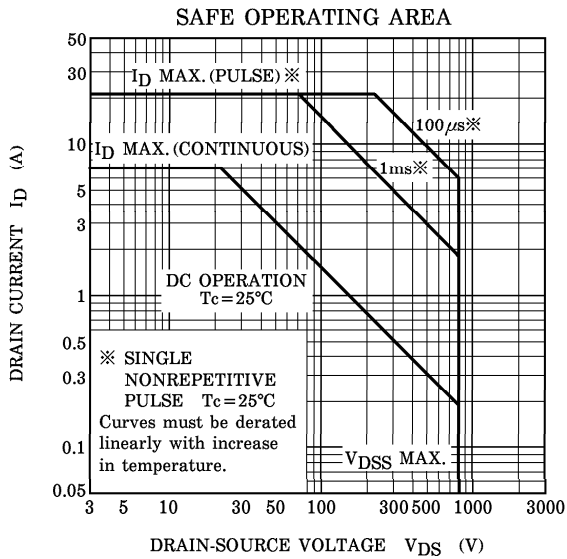
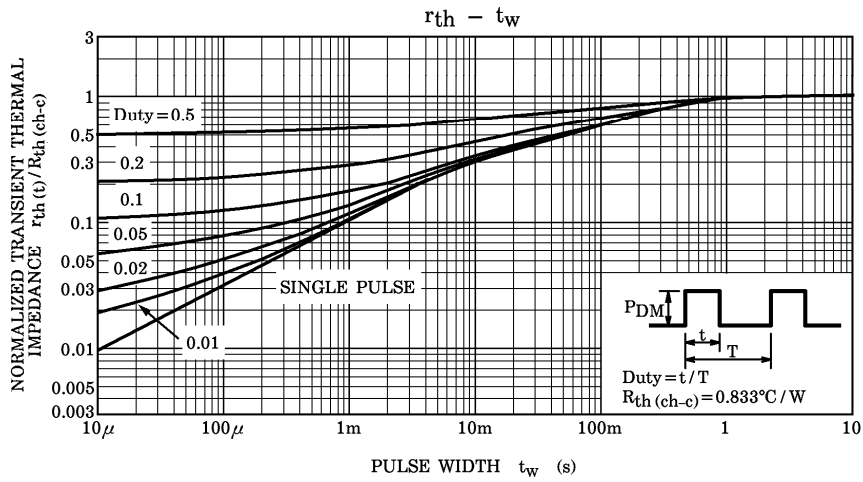
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 7A$ ,  $R_G = 25\Omega$   
 $V_{DD} = 90V$ ,  $L = 24.9mH$

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