

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

# 2SK2886

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

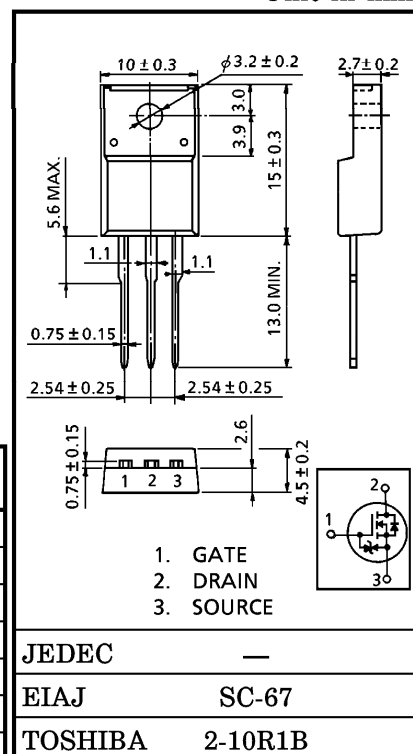
CHOPPER REGULATORS, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 14 \text{ m}\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 31 \text{ S}$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100 \mu\text{A}$  (Max.) ( $V_{DS} = 50 \text{ V}$ )
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0 \text{ V}$   
( $V_{DS} = 10 \text{ V}$ ,  $I_D = 1 \text{ mA}$ )

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	50	V
Drain-Gate Voltage ( $R_{GS} = 20 \text{ k}\Omega$ )	$V_{DGR}$	50	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	45
	Pulse	$I_{DP}$	135
Drain Power Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_D$	40	W
Single Pulse Avalanche Energy**	$E_{AS}$	350	mJ
Avalanche Current	$I_{AR}$	45	A
Repetitive Avalanche Energy*	$E_{AR}$	4	mJ
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	$-55 \sim 150$	$^\circ\text{C}$

**INDUSTRIAL APPLICATIONS**



Weight : 1.9 g (Typ.)

**THERMAL CHARACTERISTICS**

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	3.125	$^\circ\text{C/W}$
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.

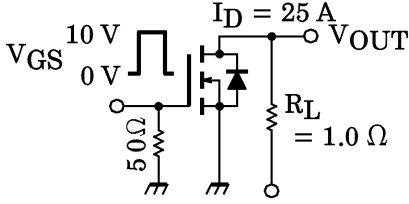
\*\*  $V_{DD} = 25 \text{ V}$ ,  $T_{ch} = 25^\circ\text{C}$  (initial),  $L = 213 \mu\text{H}$ ,  $R_G = 25 \Omega$ ,  $I_{AR} = 45 \text{ A}$

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

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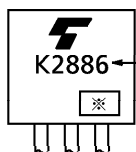
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$	
Drain Cut-off Current	$I_{DSS}$	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	$\mu\text{A}$	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	50	—	—	V	
Gate Threshold Voltage	$V_{th}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	0.8	—	2.0	V	
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 4\text{ V}, I_D = 25\text{ A}$	—	27	36	m $\Omega$	
	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 25\text{ A}$	—	14	20		
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 25\text{ A}$	18	31	—	S	
Input Capacitance	$C_{iss}$	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	—	2200	—	pF	
Reverse Transfer Capacitance	$C_{rss}$		—	390	—		
Output Capacitance	$C_{oss}$		—	1090	—		
Switching Time	Rise Time	$t_r$		—	40	—	ns
	Turn-on Time	$t_{on}$		—	70	—	
	Fall Time	$t_f$		—	130	—	
	Turn-off Time	$t_{off}$		$V_{IN} : t_r, t_f < 5\text{ ns},$ $Duty \leq 1\%, t_w = 10\ \mu\text{s}$	—	360	
Total Gate Charge (Gate-Source Plus Gate-Drain)	$Q_g$	$V_{DD} \doteq 40\text{ V}, V_{GS} = 10\text{ V},$ $I_D = 45\text{ A}$	—	66	—	nC	
Gate-Source Charge	$Q_{gs}$		—	43	—		
Gate-Drain ("Miller") Charge	$Q_{gd}$		—	23	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	45	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	135	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = 45\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = 45\text{ A}, V_{GS} = 0\text{ V}$ $dI_{DR}/dt = 50\text{ A}/\mu\text{s}$	—	78	—	ns
Reverse Recovery Charge	$Q_{rr}$		—	90	—	nC

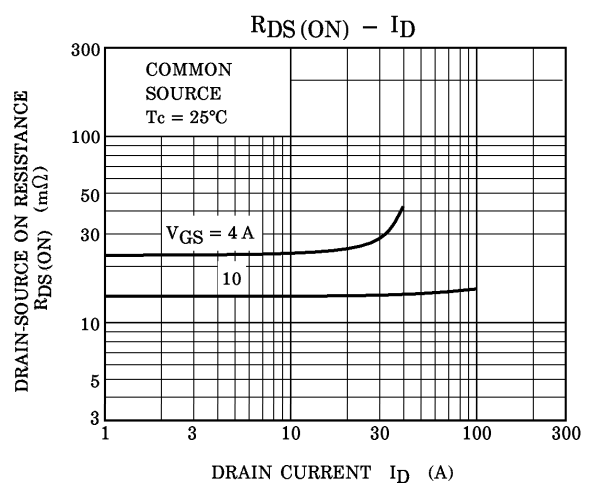
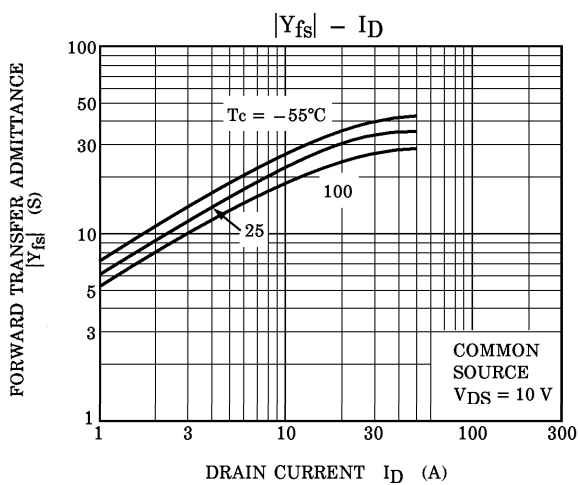
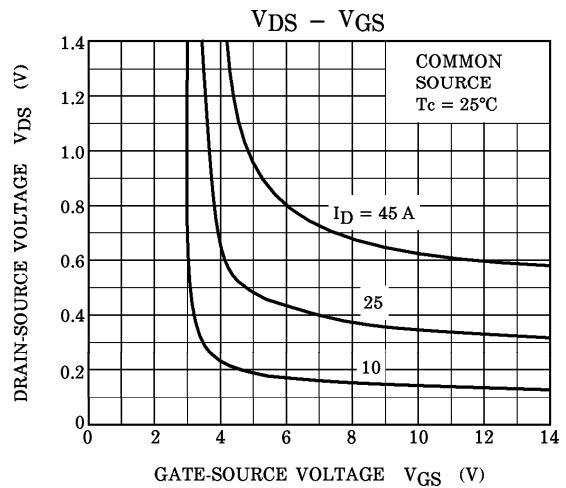
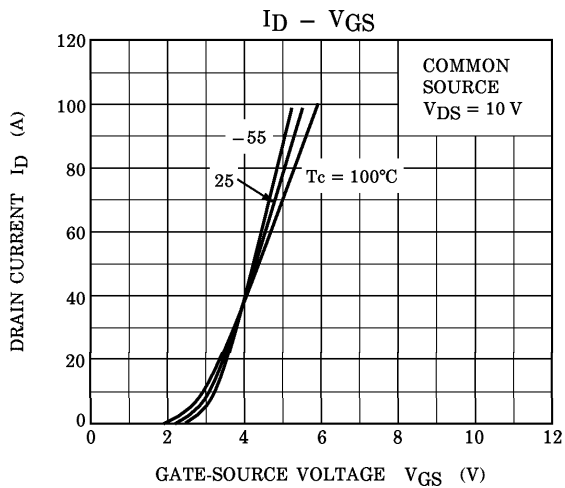
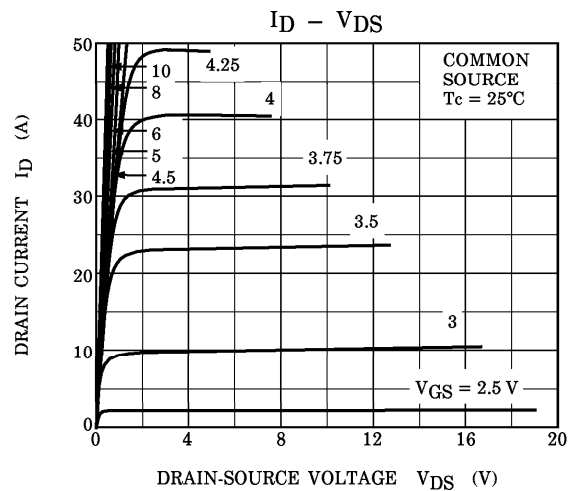
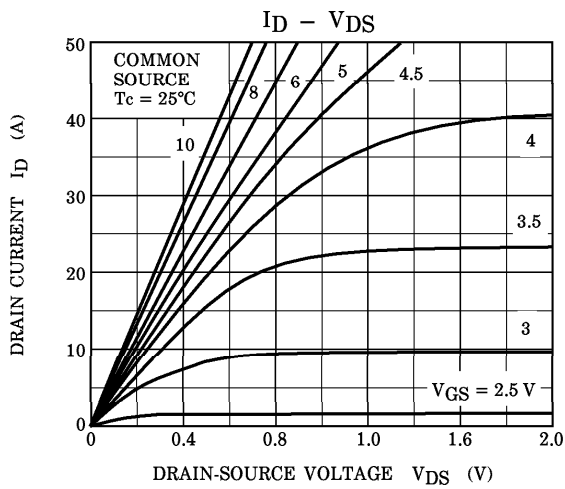
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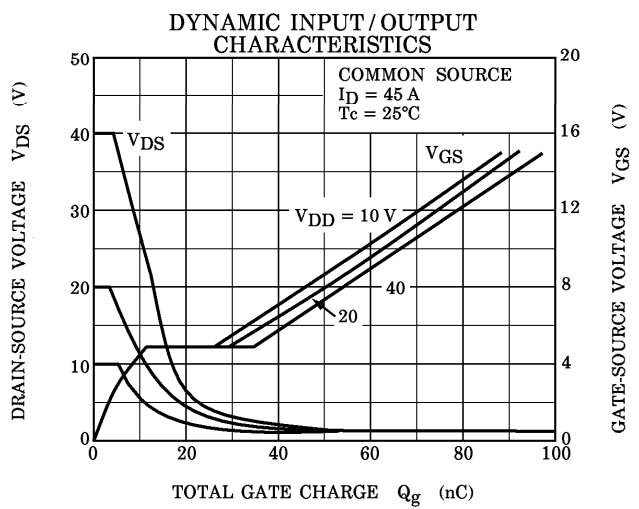
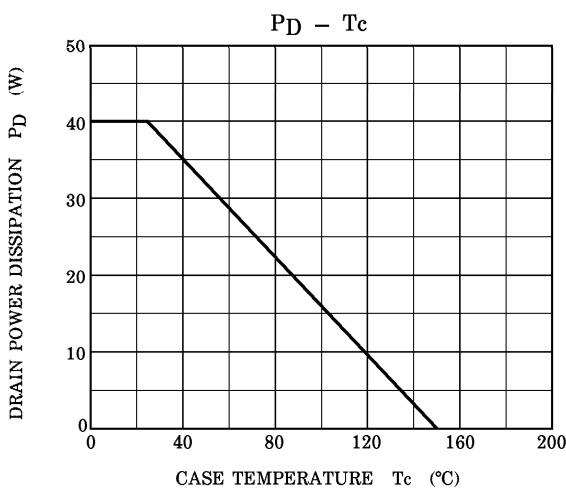
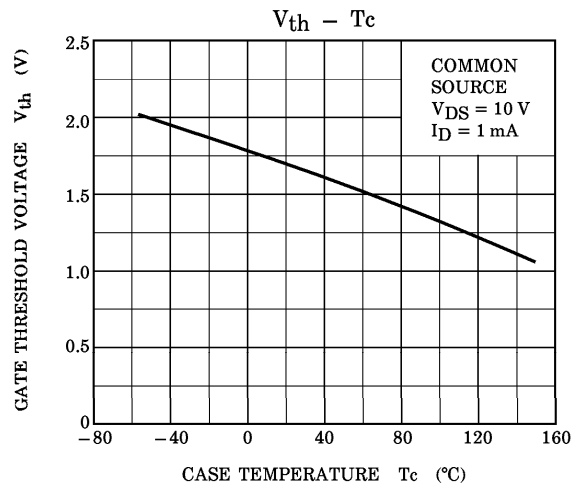
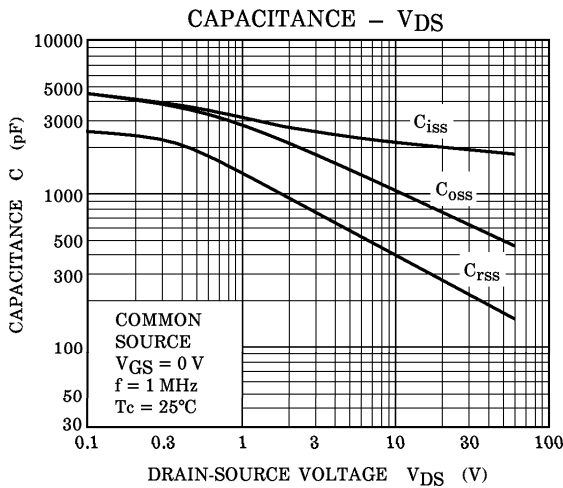
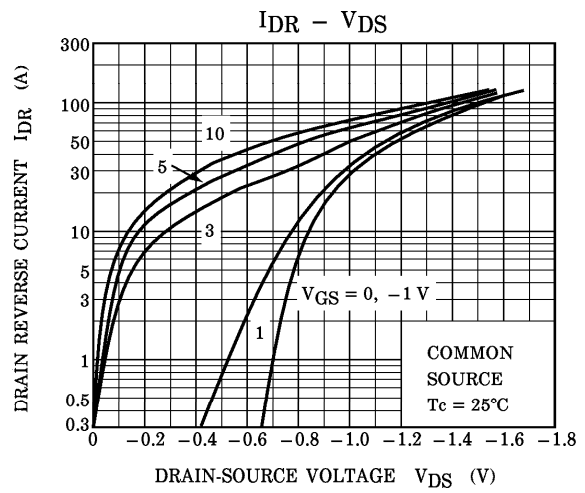
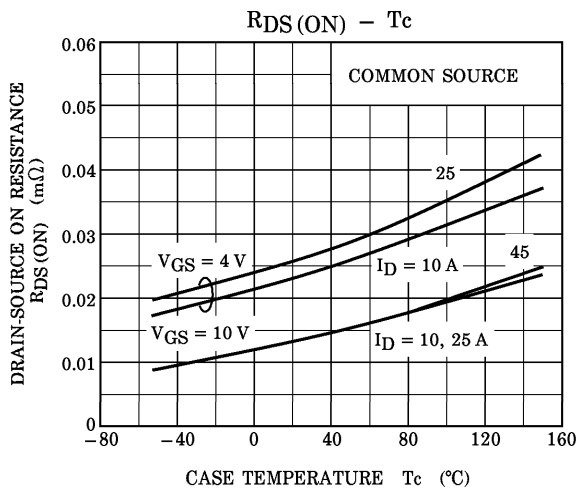


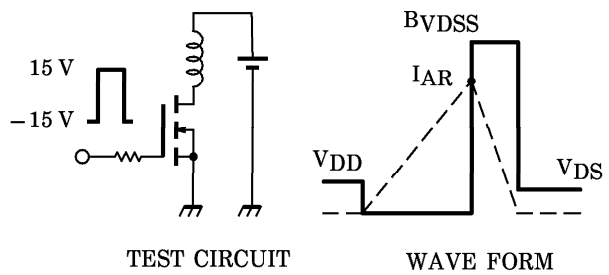
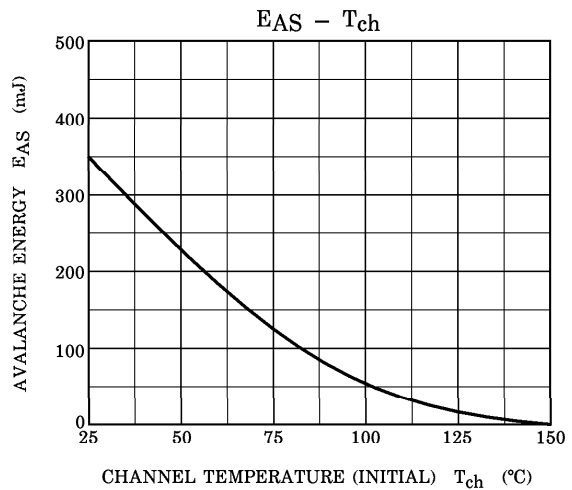
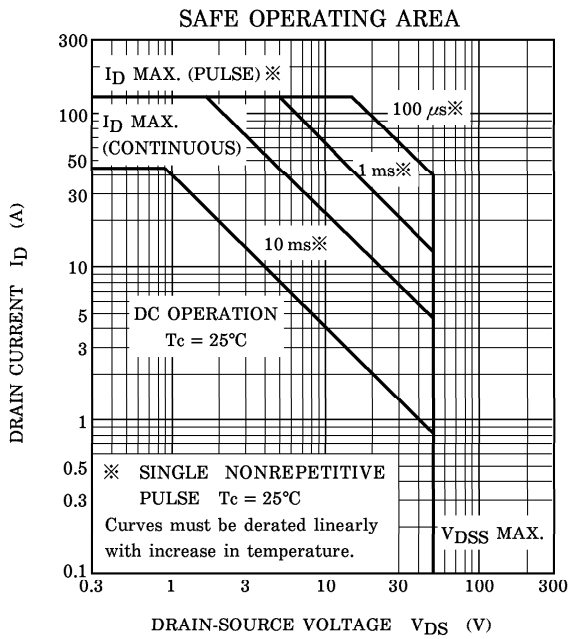
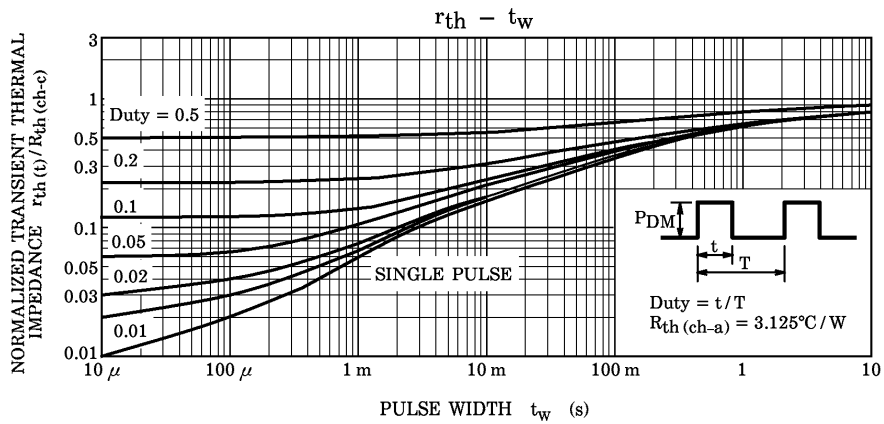
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = 45 \text{ A}$ ,  $R_G = 25 \Omega$ ,  $V_{DD} = 25 \text{ V}$ ,  $L = 213 \mu\text{H}$

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