

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L^2 - π -MOSV)

2SK2311

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND SWITCHING
REGULATOR APPLICATIONS

- 4 V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 36 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 16 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A}$ (Max.) ($V_{DS} = 60 \text{ V}$)
- 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}	60	V
Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	25	A
	Pulse	I_{DP}	100	A
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)		P_D	40	W
Single Pulse Avalanche Energy**		E_{AS}	156	mJ
Avalanche Current		I_{AR}	25	A
Repetitive Avalanche Energy*		E_{AR}	3.5	mJ
Channel Temperature		T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

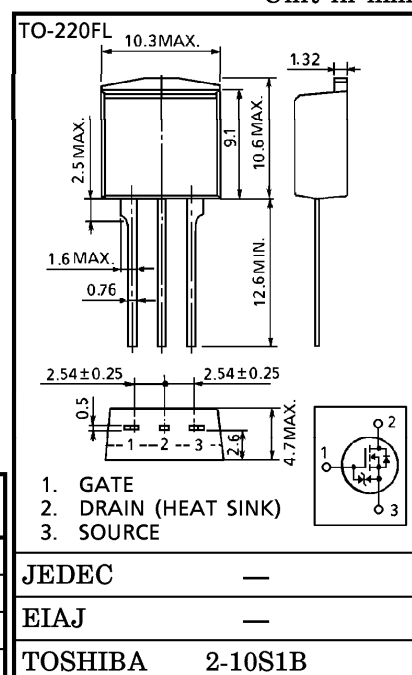
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel To Case	$R_{th(ch-c)}$	3.125	$^\circ\text{C/W}$
Thermal Resistance, Channel To Ambient	$R_{th(ch-a)}$	83.3	$^\circ\text{C/W}$

Note ;

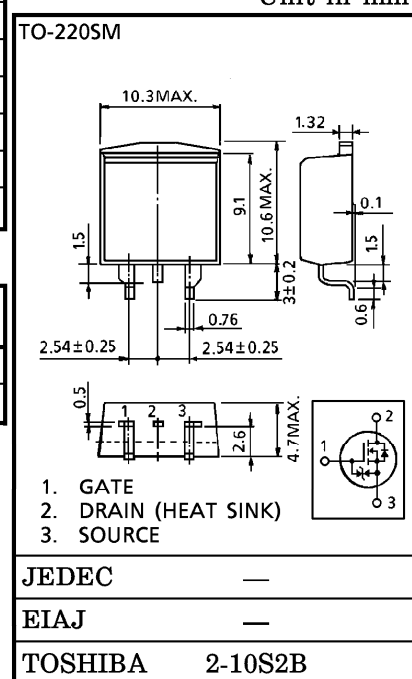
* Repetitive rating ; Pulse Width Limited by Max.
junction temperature.** $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 339 \mu\text{H}$,
 $R_G = 25 \Omega$, $I_{AR} = 25 \text{ A}$ This transistor is an electrostatic sensitive device.
Please handle with caution.

INDUSTRIAL APPLICATIONS

Unit in mm



Unit in mm

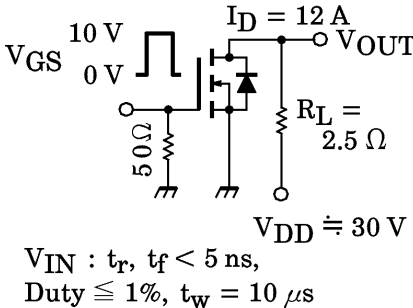


Weight : 1.5 g

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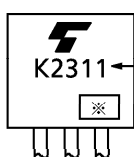
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	±10	μA
Drain Cut-off Current		I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		V _{(BR) DSS}	I _D = 10 mA, V _{GS} = 0 V	60	—	—	V
Gate Threshold Voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	0.8	—	2.0	V
Drain-Source ON Resistance		R _{DS (ON)}	V _{GS} = 4 V, I _D = 12 A	—	57	80	mΩ
			V _{GS} = 10 V, I _D = 12 A	—	36	46	
Forward Transfer Admittance		Y _{fs}	V _{DS} = 10 V, I _D = 12 A	10	16	—	S
Input Capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	1000	—	pF
Reverse Transfer Capacitance		C _{rss}		—	200	—	
Output Capacitance		C _{oss}		—	550	—	
Switching Time	Rise Time	t _r		—	20	—	ns
	Turn-on Time	t _{on}		—	30	—	
	Fall Time	t _f		—	55	—	
	Turn-off Time	t _{off}		—	130	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	V _{DD} ≐ 48 V, V _{GS} = 10 V I _D = 25 A	—	38	—	nC
Gate-Source Charge		Q _{gs}		—	25	—	
Gate-Drain (“Miller”) Charge		Q _{gd}		—	13	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	25	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	100	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 25 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	—1.8	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 25 \text{ A}, V_{GS} = 0 \text{ V}$	—	50	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	35	—	μC

MARKING



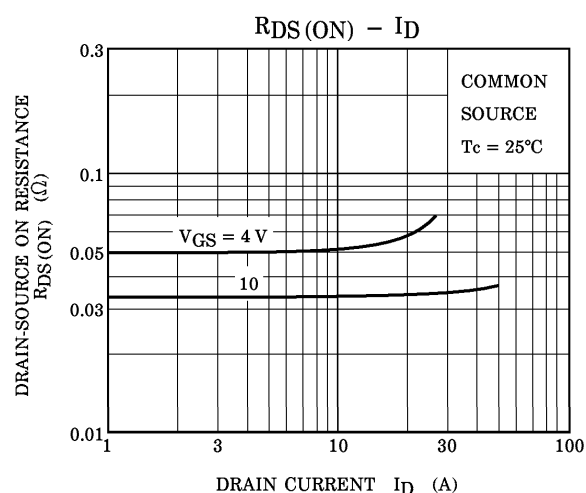
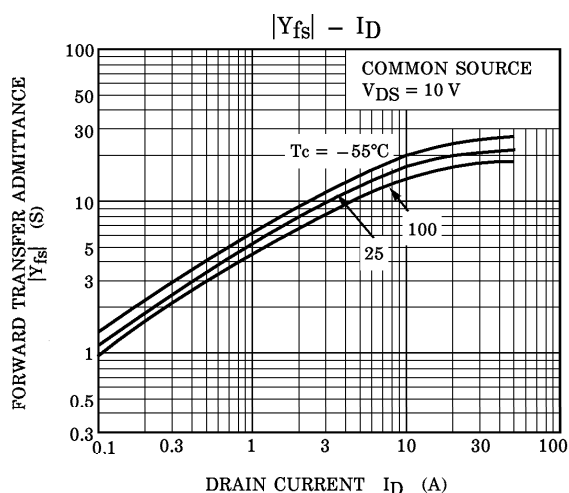
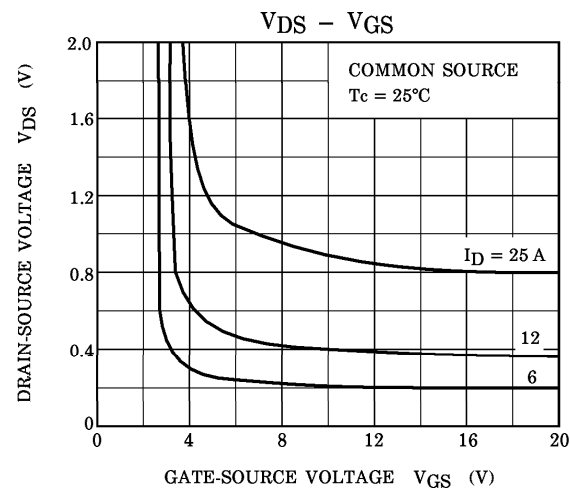
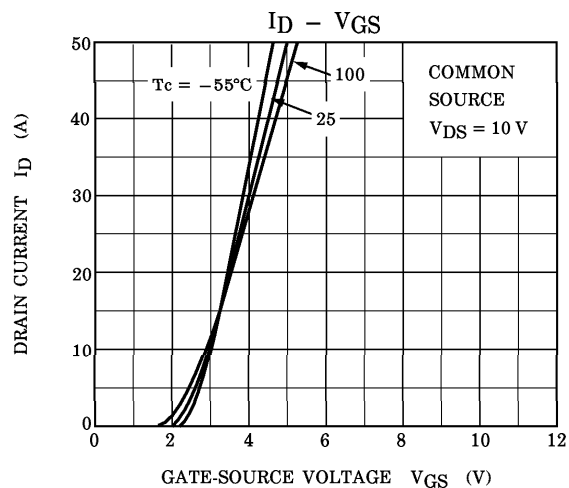
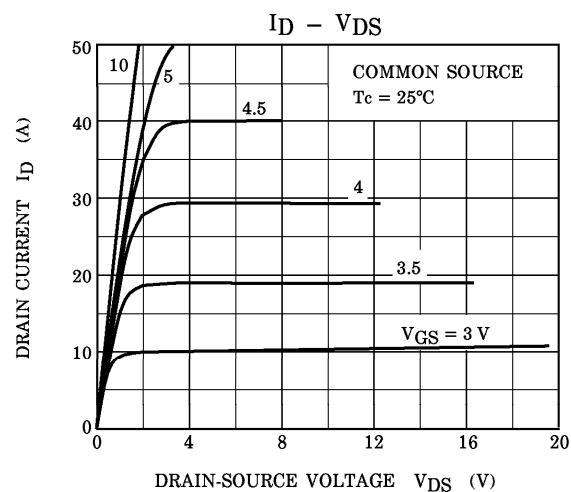
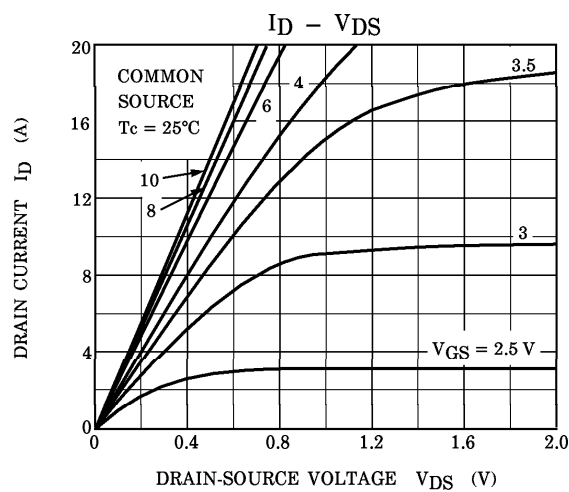
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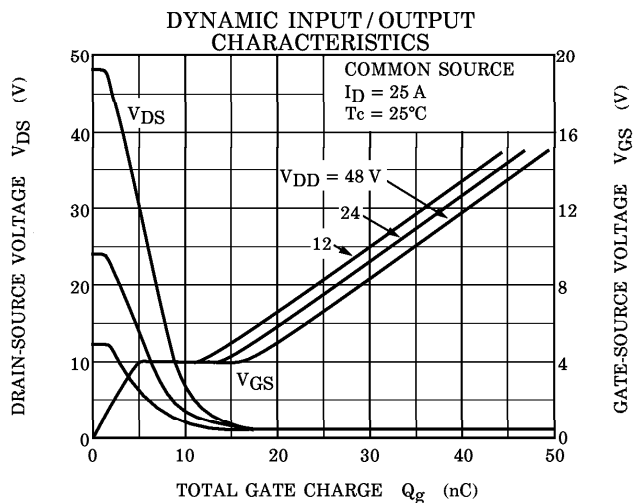
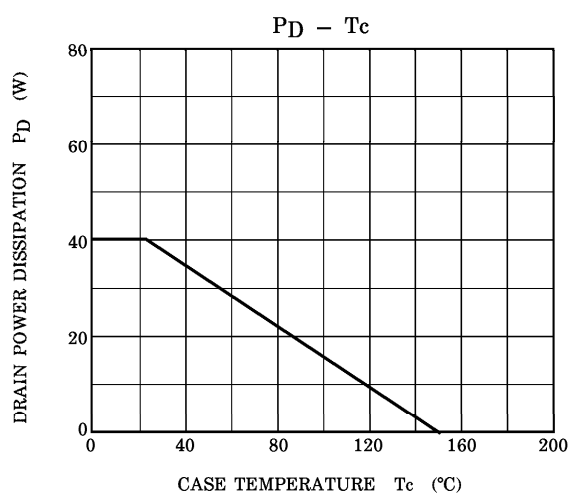
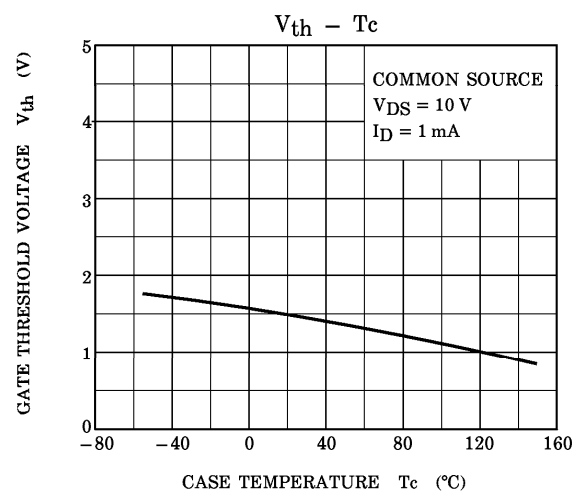
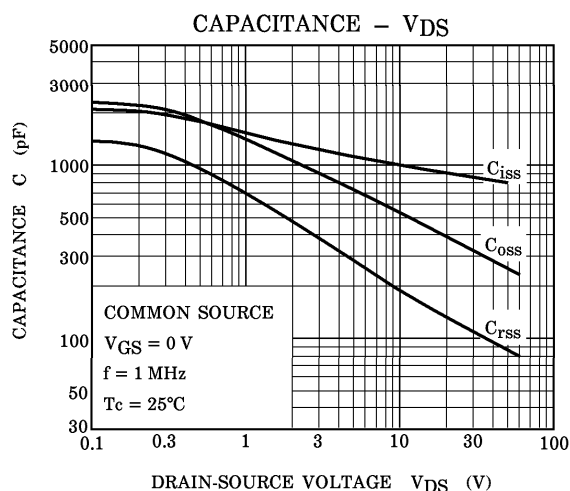
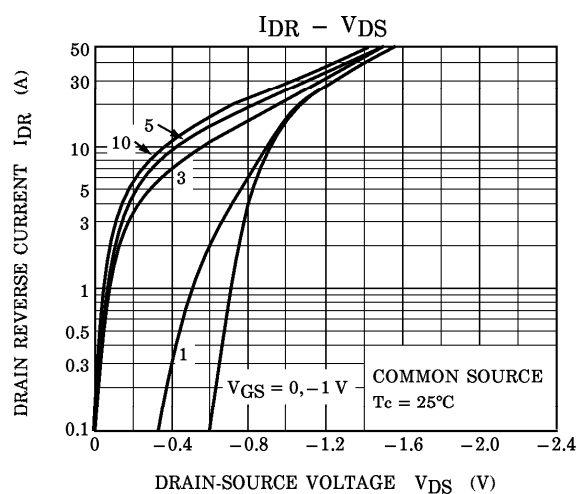
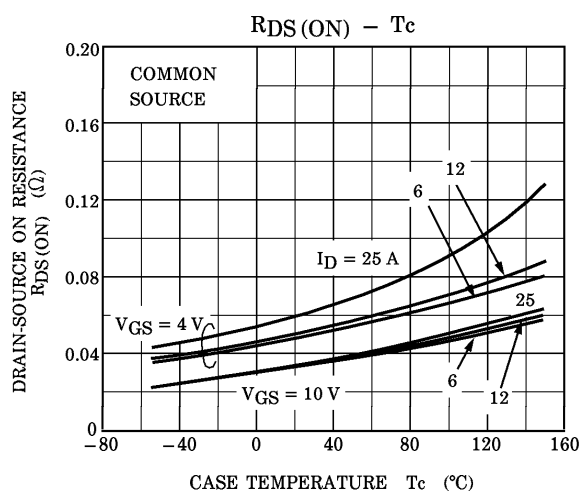
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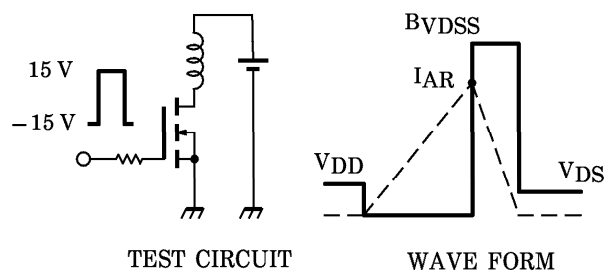
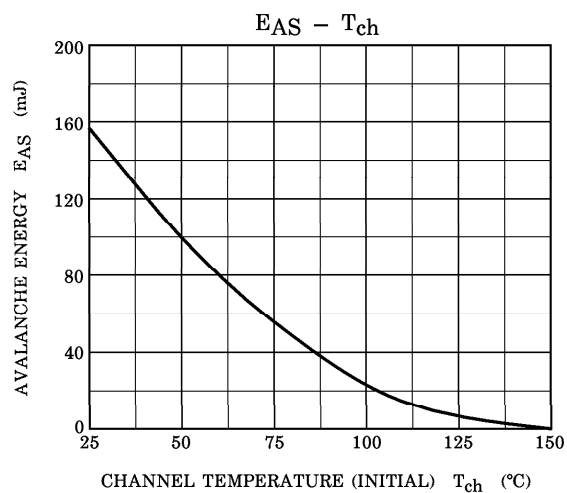
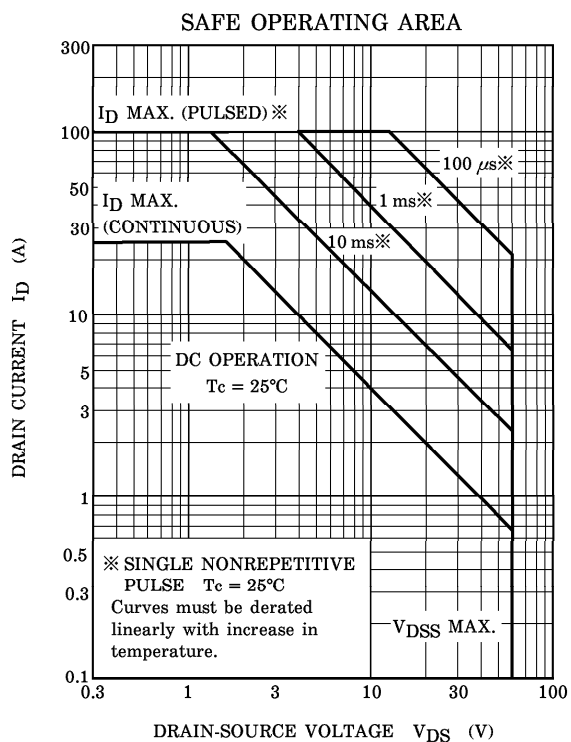
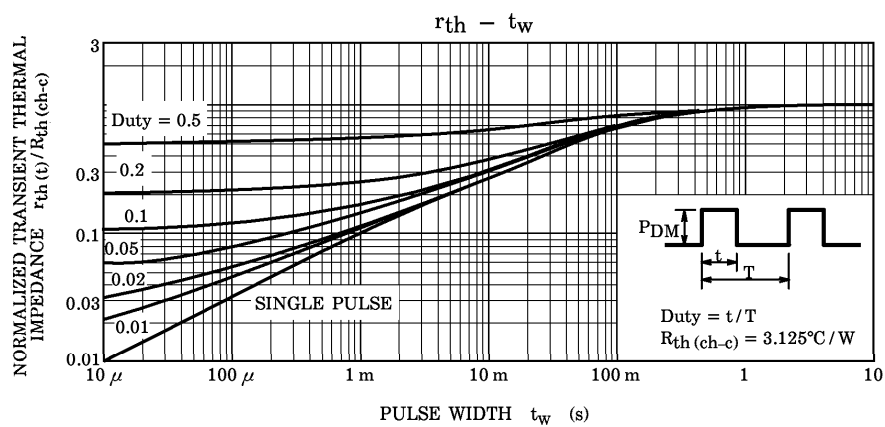


Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)







$$\begin{aligned} \text{Peak } I_{AR} &= 25 \text{ A, } R_G = 25 \, \Omega \\ V_{DD} &= 25 \text{ V, } L = 339 \, \mu\text{H} \end{aligned} \quad E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$$