

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L^2 - π -MOS V)**2SK2311**

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
CHOPPER REGULATOR, DC-DC CONVERTER AND SWITCHING
REGULATOR APPLICATIONS

- 4V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 36m\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 16S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 60V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0V$ ($V_{DS} = 10V$, $I_D = 1mA$)

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}	± 20	V
Drain Current	DC	I_D	25	A
	Pulse	I_{DP}	100	A
Drain Power Dissipation ($T_c = 25^\circ C$)		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	$^\circ C$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ C$

THERMAL CHARACTERISTICS

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

Note ;

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

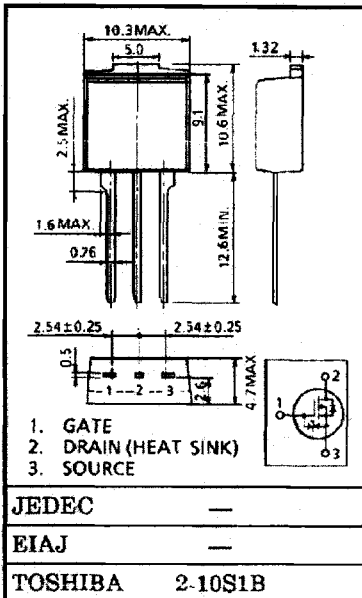
** $V_{DD} = 25V$, $T_{ch} = 25^\circ C$, $L = 339\mu H$, $R_G = 25\Omega$, $I_{AR} = 25A$

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

INDUSTRIAL APPLICATIONS

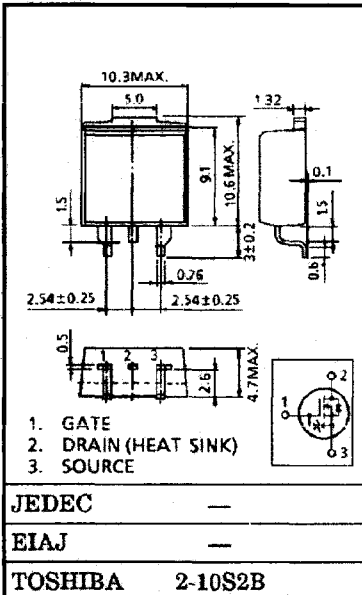
TO-220FL

Unit in mm



TO-220SM

Unit in mm

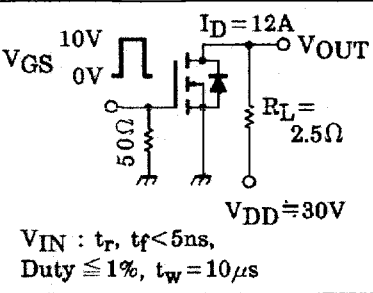


Weight : 1.5g

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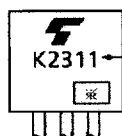
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	± 10	μA
Drain Cut-off Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$	—	—	100	μA
Drain-Source Breakdown Voltage	$V_{(BR) DSS}$	$I_D = 10mA, V_{GS} = 0V$	60	—	—	V
Gate Threshold Voltage	V_{th}	$V_{DS} = 10V, I_D = 1mA$	0.8	—	2.0	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 4V, I_D = 12A$	—	57	80	$m\Omega$
		$V_{GS} = 10V, I_D = 12A$	—	36	46	
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 10V, I_D = 12A$	10	16	—	S
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	—	1000	—	pF
Reverse Transfer Capacitance	C_{rss}		—	200	—	
Output Capacitance	C_{oss}		—	550	—	
Switching Time	Rise Time		—	20	—	ns
	Turn-on Time		—	30	—	
	Fall Time		—	55	—	
	Turn-off Time		—	130	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	$V_{DD} = 48V, V_{GS} = 10V, I_D = 25A$	—	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}	$I_{DR} = 25A, V_{GS} = 0V$	—	—	-1.8	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 25A, V_{GS} = 0V$	—	50	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR}/dt = 50A/\mu s$	—	35	—	μC

MARKING



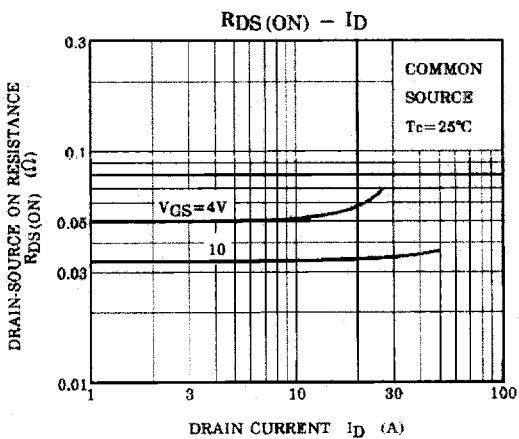
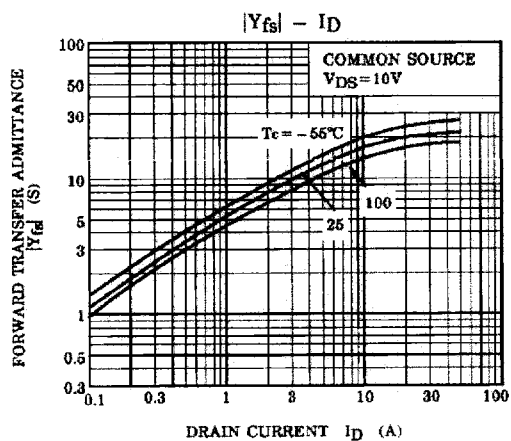
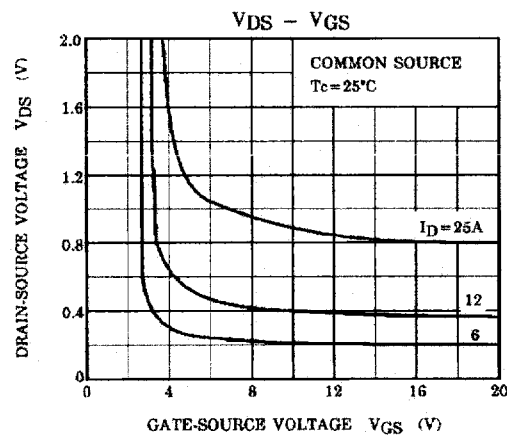
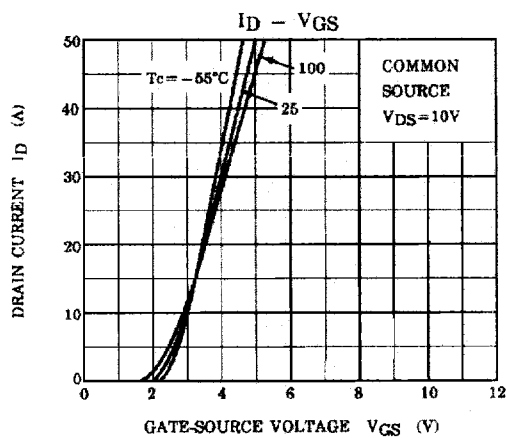
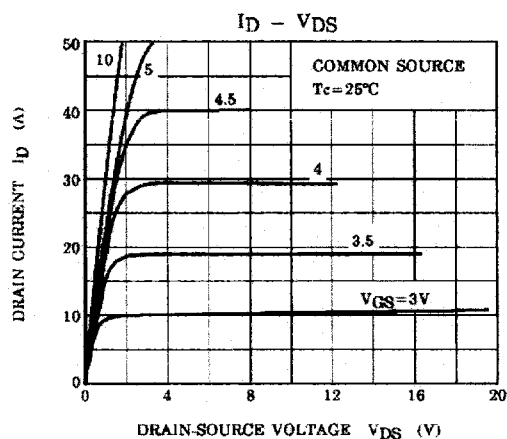
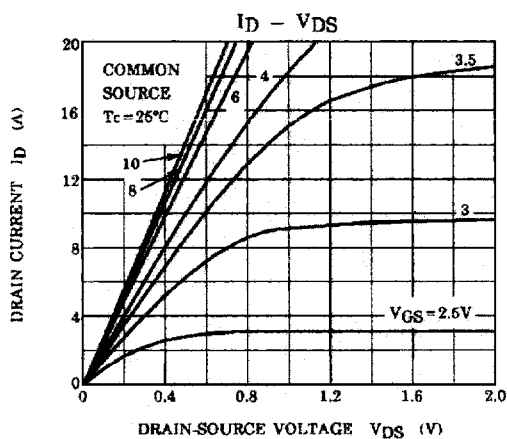
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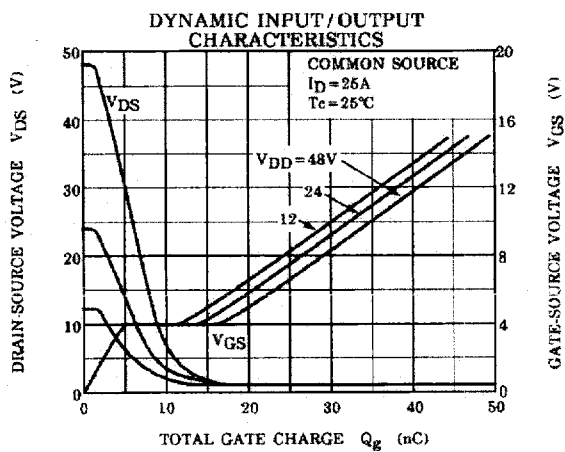
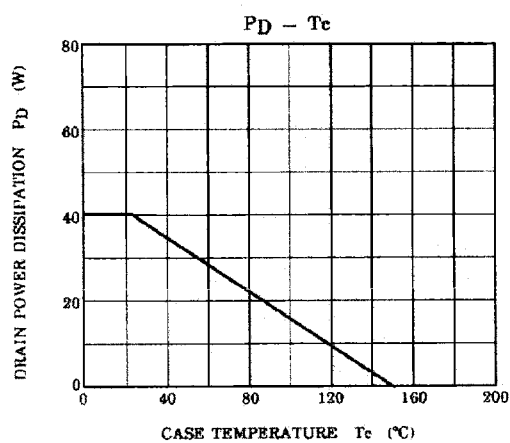
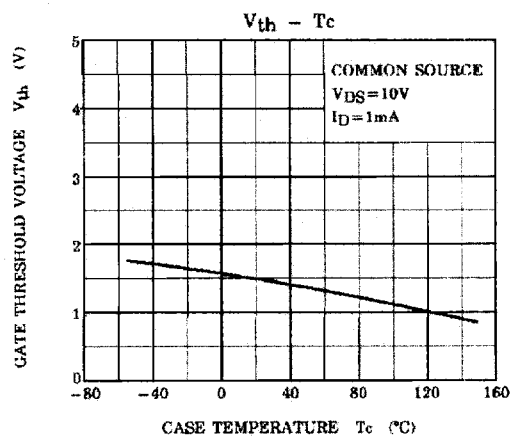
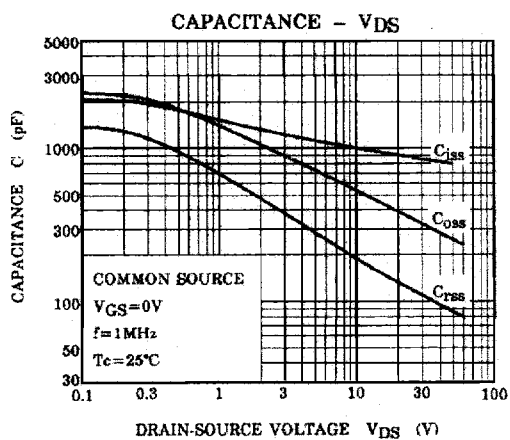
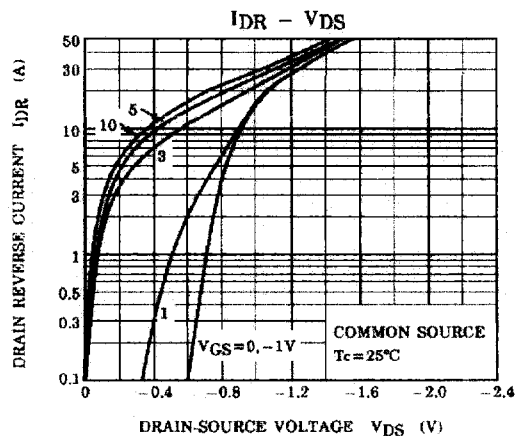
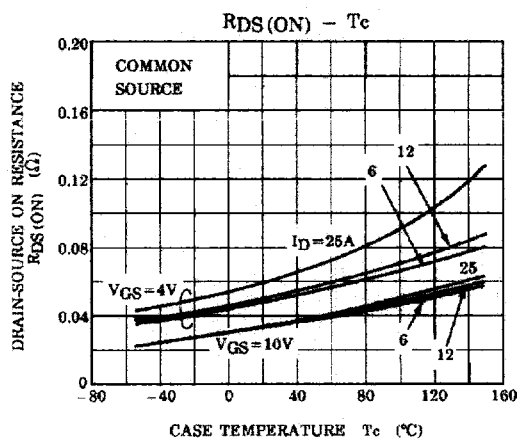
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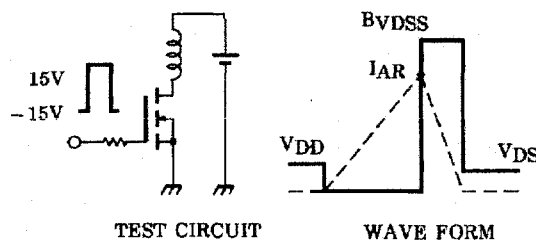
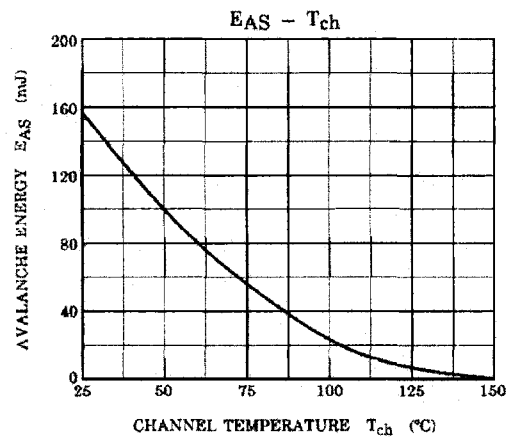
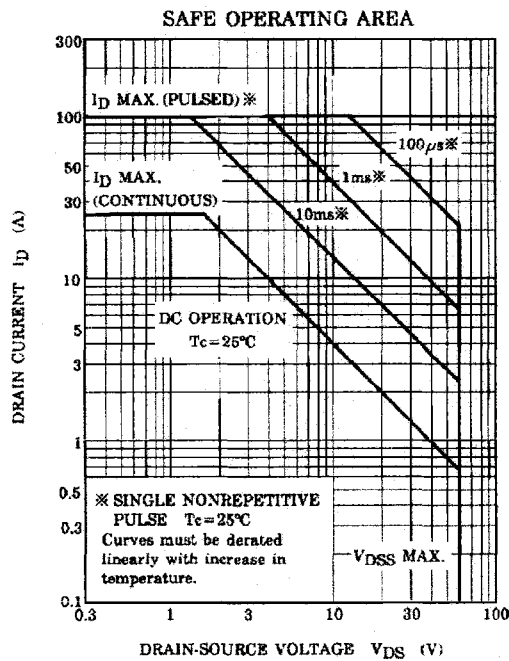
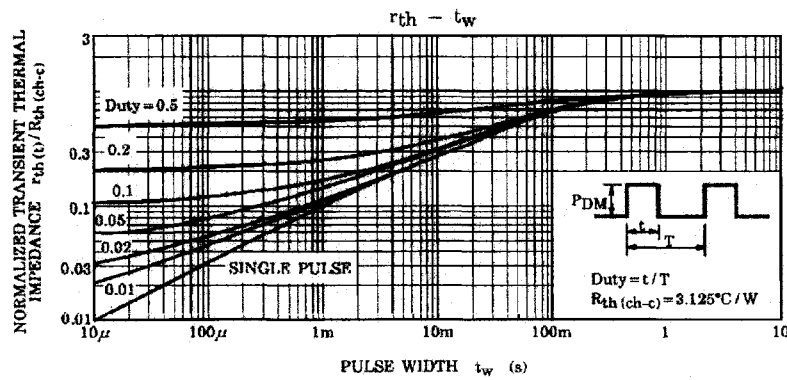


Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)







Peak $I_{AR} = 25A$, $R_G = 25\Omega$, $V_{DD} = 25V$, $L = 339\mu H$

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