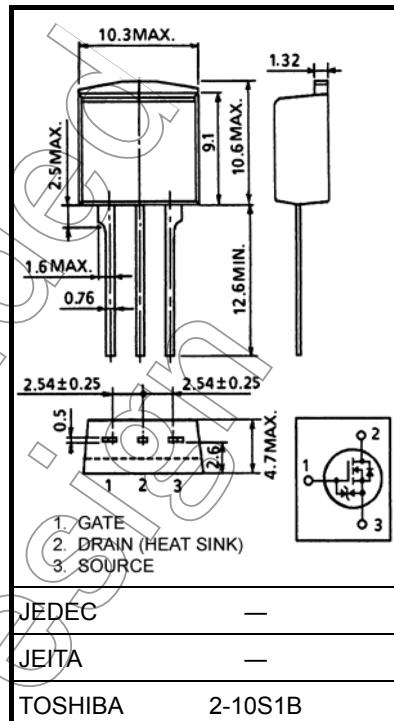


TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (L^2 - π -MOSV)

2SK2311

Chopper Regulator, DC-DC Converter and Switching
Regulator Applications

Unit: mm



Weight: 1.5 g (typ.)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	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 (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	A
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	40	W
Single pulse avalanche energy (Note 2)	E_{AS}	156	mJ
Avalanche current	I_{AR}	25	A
Repetitive avalanche energy (Note 3)	E_{AR}	3.5	mJ
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	R_{th} (ch-c)	3.125	$^\circ\text{C} / \text{W}$
Thermal resistance, channel to ambient	R_{th} (ch-a)	83.3	$^\circ\text{C} / \text{W}$

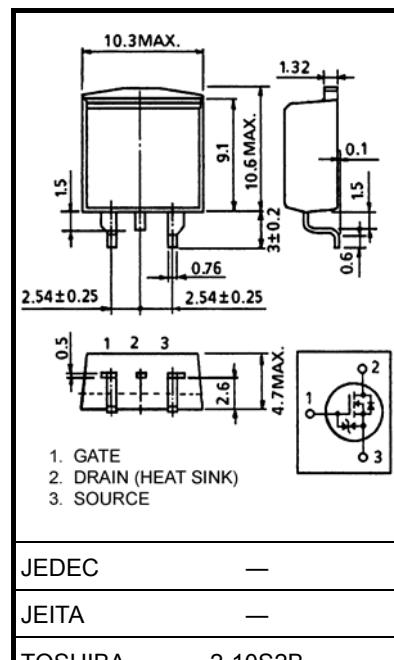
Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: $V_{DD} = 25\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 339\text{ }\mu\text{H}$, $R_G = 25\text{ }\Omega$, $I_{AR} = 25\text{ A}$

Note 3: Repetitive rating: pulse width limited by maximum channel temperature

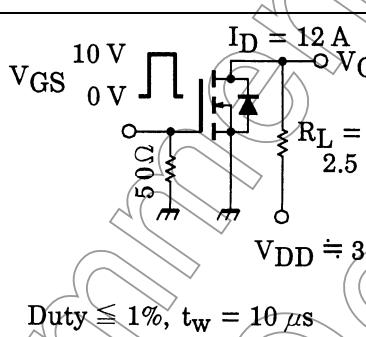
This transistor is an electrostatic-sensitive device.

Please handle with caution.



Weight: 1.5 g (typ.)

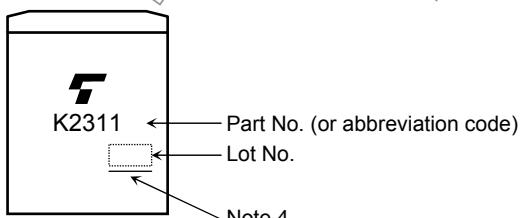
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cut-off current	I_{DSS}	$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	60	—	—	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	$R_{DS(\text{ON})}$	$V_{GS} = 4\text{ V}$, $I_D = 12\text{ A}$	—	57	80	$\text{m}\Omega$
		$V_{GS} = 10\text{ V}$, $I_D = 12\text{ A}$	—	36	46	
Forward transfer admittance	$ Y_{fsl} $	$V_{DS} = 10\text{ V}$, $I_D = 12\text{ A}$	10	16	—	S
Input capacitance	C_{iss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	1000	—	pF
Reverse transfer capacitance	C_{rss}		—	200	—	
Output capacitance	C_{oss}		—	550	—	
Switching time	Rise time	t_r		—	20	—
	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	$V_{DD} \approx 48\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 25\text{ A}$	—	38	—	nC
Gate-source charge	Q_{gs}		—	25	—	
Gate-drain ("miller") charge	Q_{gd}		—	13	—	

Source-Drain Ratings and Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	25	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	100	A
Forward voltage (diode)	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

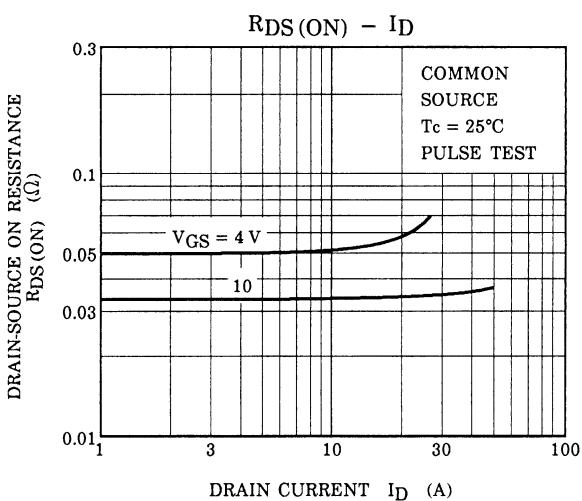
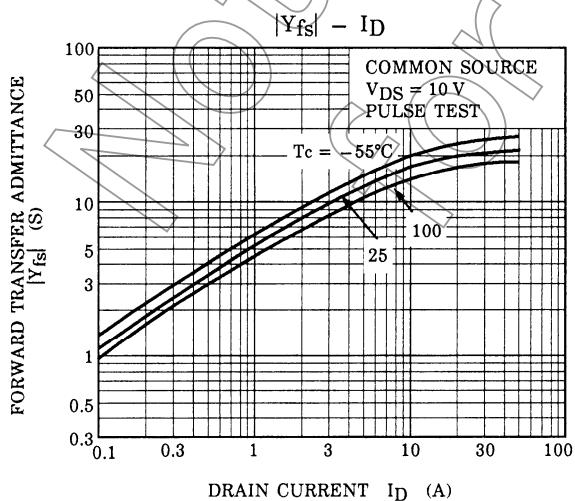
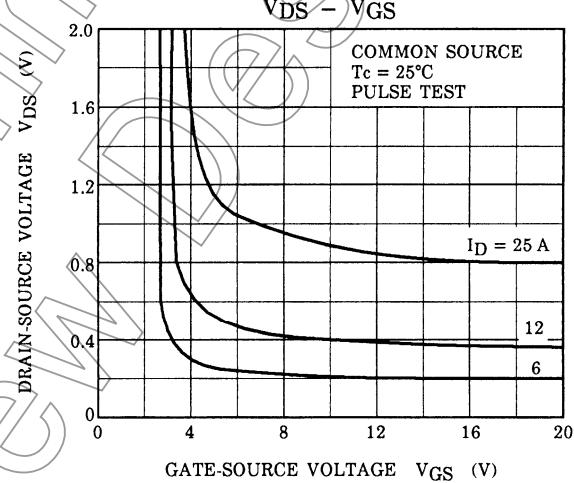
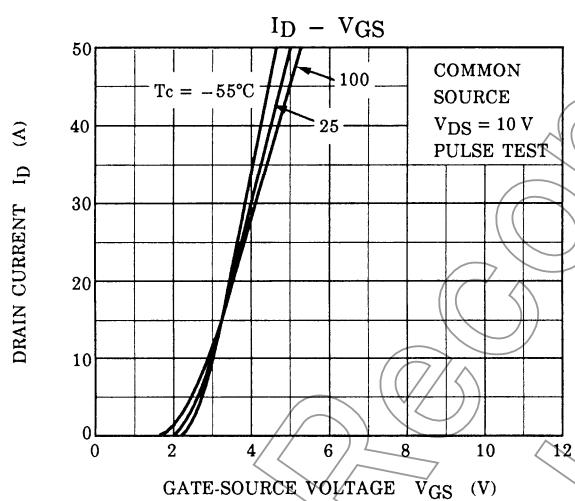
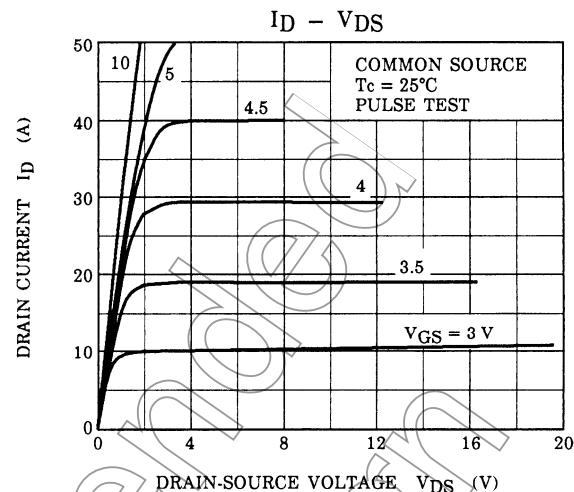
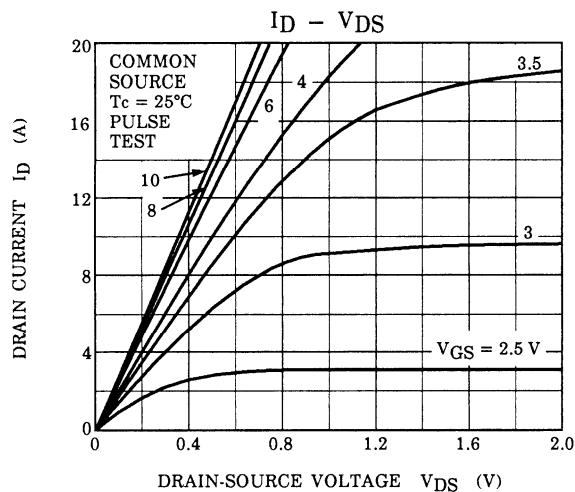


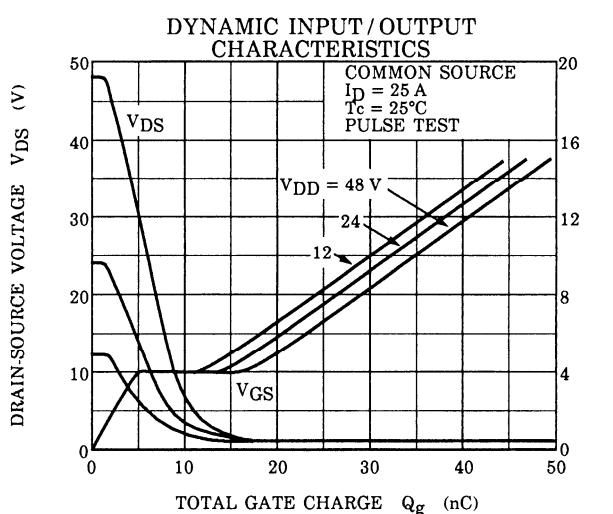
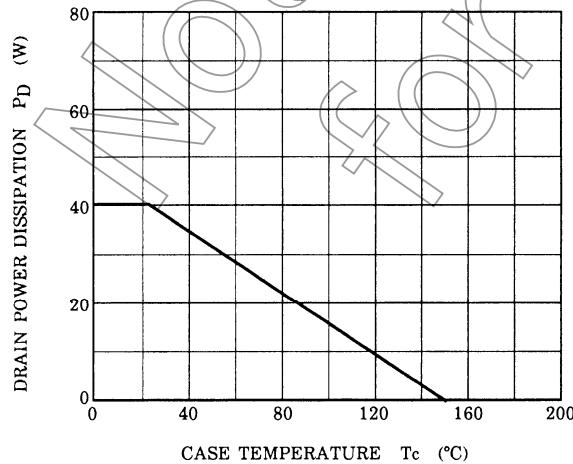
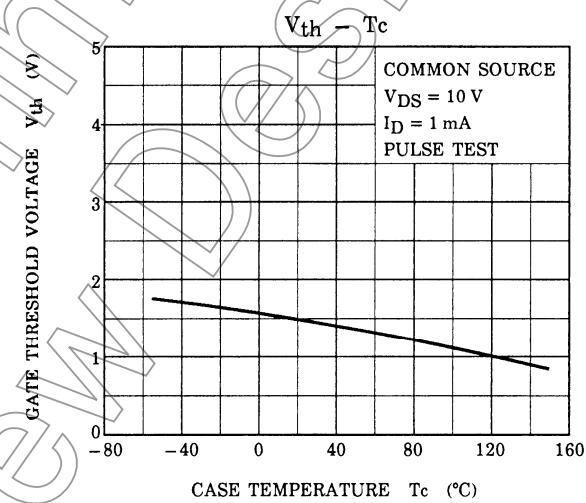
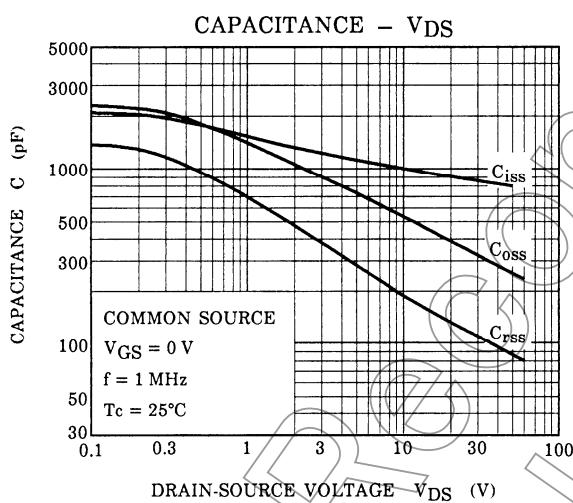
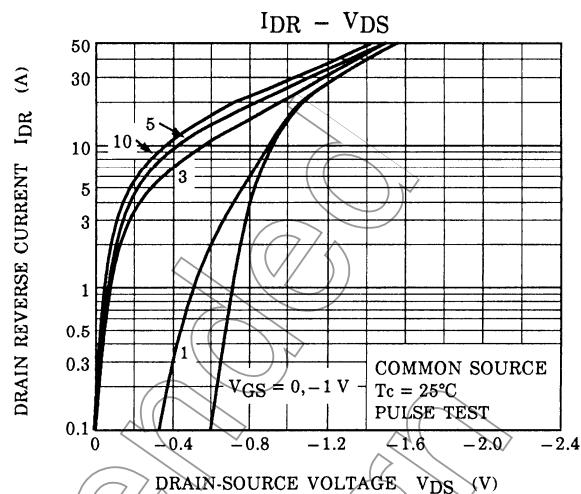
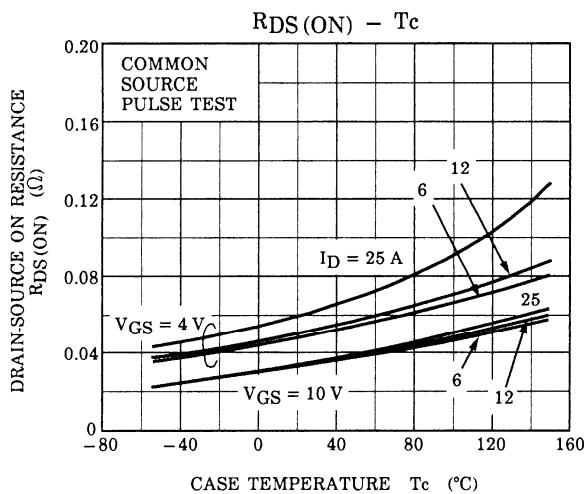
Note 4: A line under a Lot No. identifies the indication of product Labels.

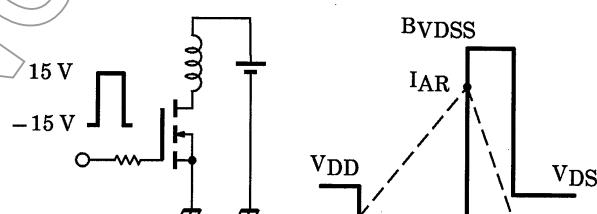
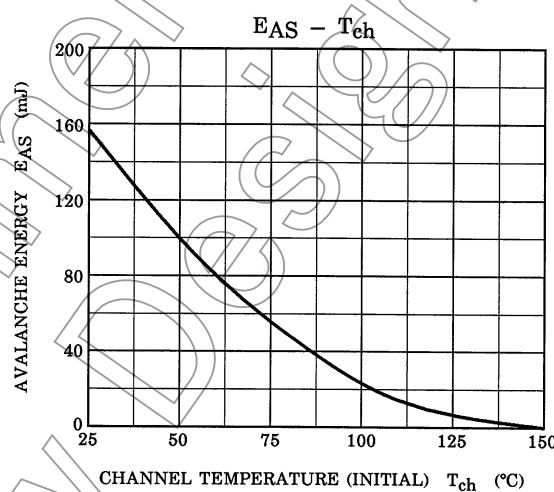
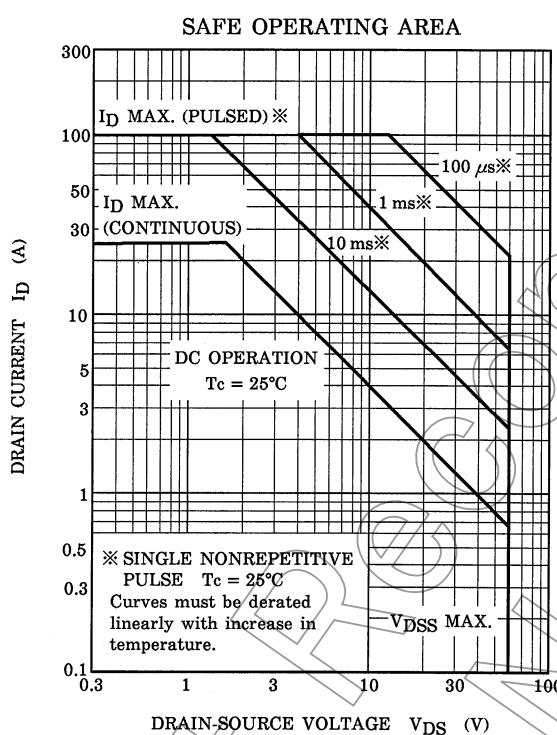
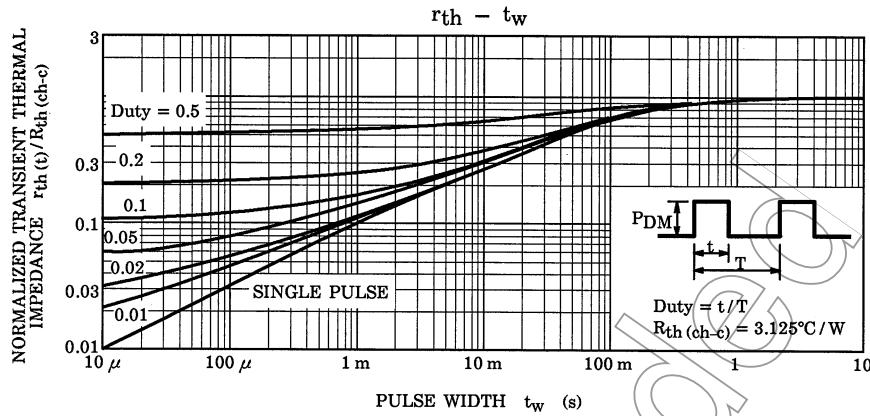
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