

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π -MOSIII)**2SK3301**

Switching Regulator and DC-DC Converter Applications

Unit: mm

- Low drain-source ON resistance: $R_{DS(ON)} = 15 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 0.65 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 100 \mu\text{A}$ (max) ($V_{DS} = 720 \text{ V}$)
- Enhancement mode: $V_{th} = 2.4$ to 3.4 V ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	900	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	900	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	20	W
Single pulse avalanche energy (Note 2)	E_{AS}	140	mJ
Avalanche current	I_{AR}	1	A
Repetitive avalanche energy (Note 3)	E_{AR}	2.0	mJ
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55 to 150	°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

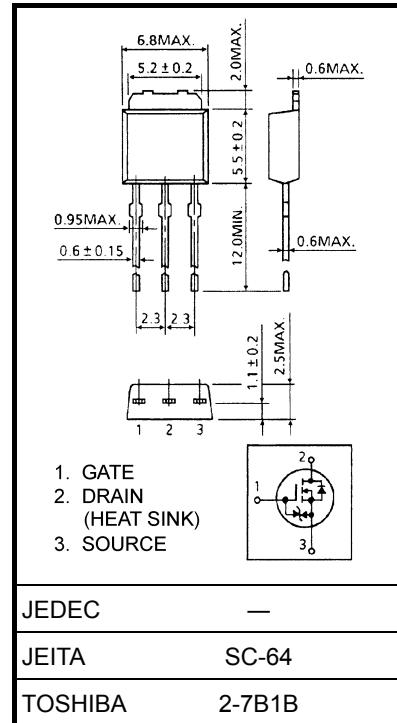
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th}(\text{ch-c})$	6.25	°C/W
Thermal resistance, channel to ambient	$R_{th}(\text{ch-a})$	125	°C/W

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

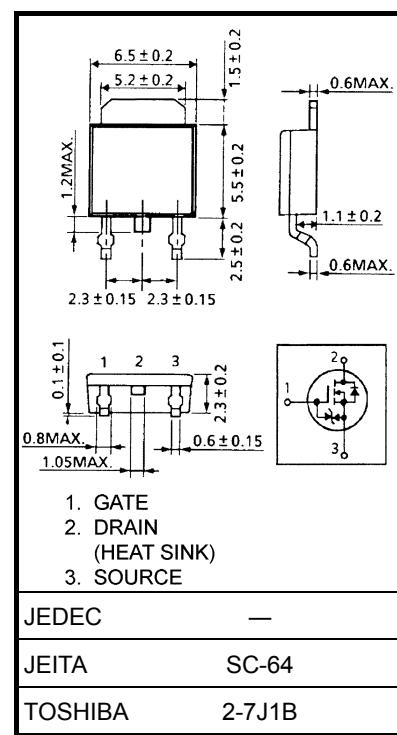
Note 2: $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 257 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 1 \text{ A}$

Note 3: Repetitive rating: pulse width limited by max junction temperature

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

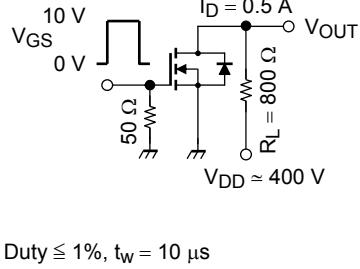


Weight: 0.36 g (typ.)



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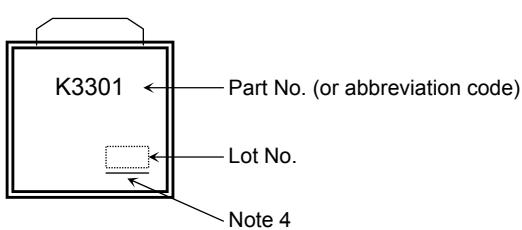
Electrical Characteristics ($T_a = 25^\circ C$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	—	—	± 10	μA	
Gate-source breakdown voltage	$V_{(BR) GSS}$	$I_G = \pm 10 \mu A, V_{DS} = 0 V$	± 30	—	—	V	
Drain cut-off current	I_{DSS}	$V_{DS} = 720 V, V_{GS} = 0 V$	—	—	100	μA	
Drain-source breakdown voltage	$V_{(BR) DSS}$	$I_D = 10 mA, V_{GS} = 0 V$	900	—	—	V	
Gate threshold voltage	V_{th}	$V_{DS} = 10 V, I_D = 1 mA$	2.4	—	3.4	V	
Drain-source ON resistance	$R_{DS (ON)}$	$V_{GS} = 10 V, I_D = 0.5 A$	—	15	20	Ω	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 V, I_D = 0.5 A$	0.3	0.65	—	S	
Input capacitance	C_{iss}	$V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz$	—	165	—	pF	
Reverse transfer capacitance	C_{rss}		—	6	—	pF	
Output capacitance	C_{oss}		—	21	—	pF	
Switching time	Rise time	t_r	 Duty $\leq 1\%$, $t_W = 10 \mu s$	—	15	—	ns
	Turn-on time	t_{on}		—	60	—	
	Fall time	t_f		—	40	—	
	Turn-off time	t_{off}		—	110	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400 V, V_{GS} = 10 V, I_D = 1 A$	—	6	—	nC	
Gate-source charge	Q_{gs}		—	3	—	nC	
Gate-drain ("miller") charge	Q_{gd}		—	3	—	nC	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	1	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	2	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 1 A, V_{GS} = 0 V$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 1 A, V_{GS} = 0 V$ $dI_{DR}/dt = 100 A/\mu s$	—	1300	—	ns
Reverse recovery charge	Q_{rr}		—	1.95	—	μC

Marking



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

Not underlined: [[Pb]]/INCLUDES > MCV

Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

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