

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (U-MOS)

2SK3084

Chopper Regulator DC-DC Converter, and Motor Drive Applications

Unit: mm

- 4-V gate drive
- Low drain-source ON-resistance : $R_{DS\ (ON)} = 40\ m\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 27\ S$ (typ.)
- Low leakage current : $I_{DSS} = 100\ \mu A$ (max) ($V_{DS} = 100\ V$)
- Enhancement mode : $V_{th} = 0.8$ to $2.0\ V$ ($V_{DS} = 10\ V$, $I_D = 1\ mA$)

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

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	100	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)	V_{DGR}	100	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 ($T_c = 25^\circ C$)	P_D	65	W
Single pulse avalanche energy (Note 2)	E_{AS}	293	mJ
Avalanche current	I_{AAR}	30	A
Repetitive avalanche energy (Note 3)	E_{AR}	6.5	mJ
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature range	T_{stg}	-55 to 150	$^\circ C$

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

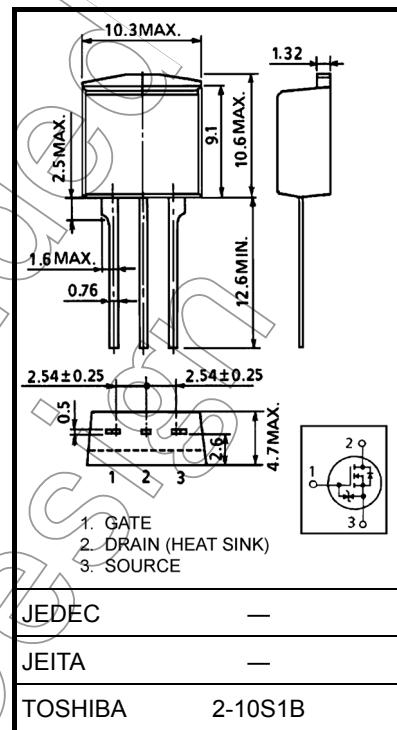
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th\ (ch-c)}$	1.92	$^\circ C / W$
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	83.3	$^\circ C / W$

Note 1: Ensure that the channel temperature does not exceed $150^\circ C$.

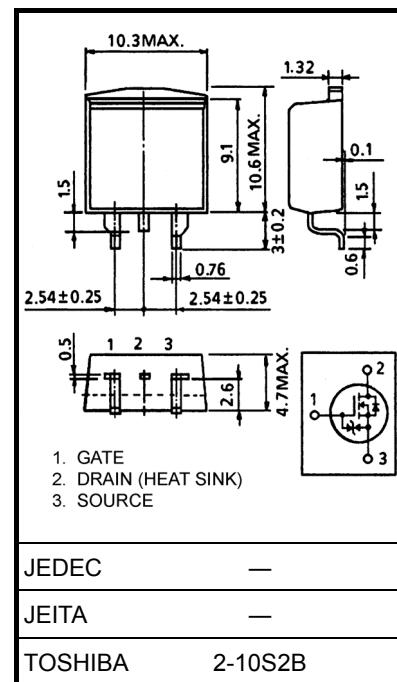
Note 2: $V_{DD} = 25\ V$, $T_{ch} = 25^\circ C$ (initial), $L = 525\ \mu H$, $R_G = 25\ \Omega$, $I_{AAR} = 30\ A$

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

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

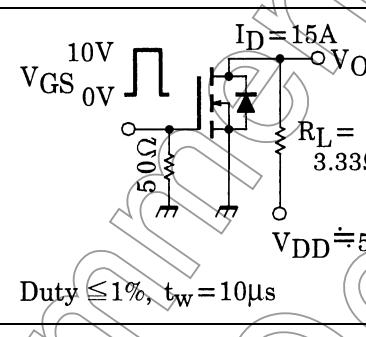


Weight: 1.5 g (typ.)



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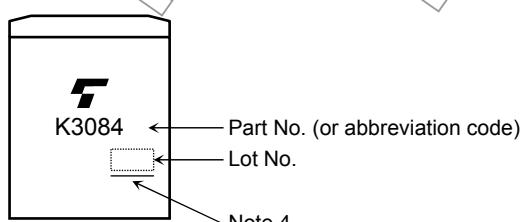
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 20	μA
Drain cut-off current	I_{DSS}	$V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	100	—	—	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	$R_{DS\text{ (ON)}}$	$V_{GS} = 4\text{ V}$, $I_D = 15\text{ A}$	—	46	70	$\text{m}\Omega$
		$V_{GS} = 10\text{ V}$, $I_D = 15\text{ A}$	—	40	46	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}$, $I_D = 15\text{ A}$	13	27	—	S
Input capacitance	C_{iss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	3250	—	pF
Reverse transfer capacitance	C_{rss}		—	230	—	
Output capacitance	C_{oss}		—	520	—	
Switching time	Rise time	t_r		—	33	—
	Turn-on time	t_{on}		—	60	—
	Fall time	t_f		—	95	—
	Turn-off time	t_{off}		—	230	—
Total gate charge (Gate-source plus gate-drain)	Q_g	$V_{DD} \approx 80\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 30\text{ A}$	—	68	—	nC
Gate-source charge	Q_{gs}		—	46	—	
Gate-drain ("miller") charge	Q_{gd}		—	22	—	

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}	—	—	—	30	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	120	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 30\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 30\text{ A}$, $V_{GS} = 0\text{ V}$ $d I_{DR} / dt = 50\text{ A} / \mu\text{s}$	—	140	—	ns
Reverse recovery charge	Q_{rr}		—	370	—	nC

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]]

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