



TK30A06J3A

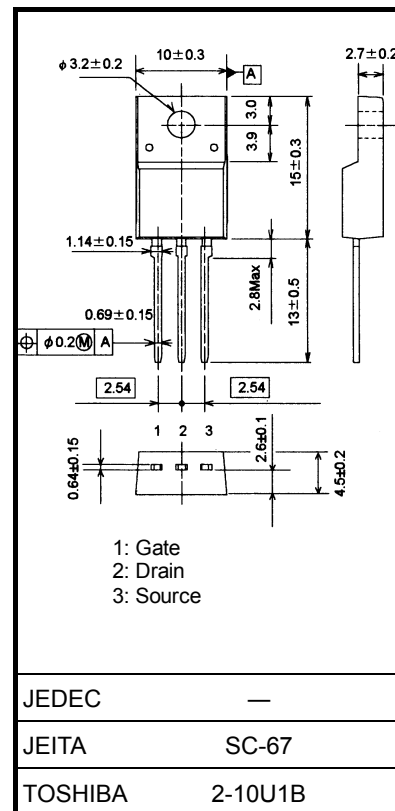
Switching Regulator Applications

Unit: mm

- Low drain-source ON-resistance: $R_{DS(ON)} = 19 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 34 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 60 \text{ V}$)
- Enhancement mode: $V_{th} = 1.3 \text{ to } 2.5 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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	25	W
Single pulse avalanche energy (Note 2)	E_{AS}	40	mJ
Avalanche current	I_{AR}	30	A
Repetitive avalanche energy (Note 3)	E_{AR}	2.5	mJ
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$



Weight : 1.7 g (typ.)

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

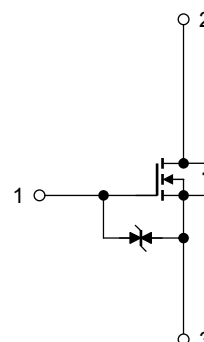
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	5.0	$^\circ\text{C} / \text{W}$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	62.5	$^\circ\text{C} / \text{W}$

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

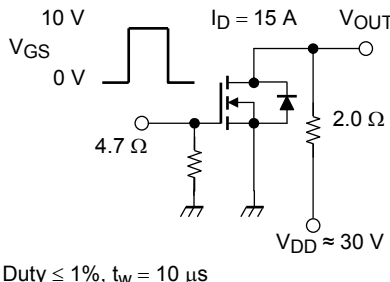
Note 2: $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 60 \text{ }\mu\text{H}$, $R_G = 25 \text{ }\Omega$, $I_{AR} = 30 \text{ A}$

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

This transistor is an electrostatic-sensitive device. Handle with care.



Electrical Characteristics (Ta = 25°C)

Characteristics		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	—	—	10	μA
Drain-source breakdown voltage		V _{(BR) DSS}	I _D = 10 mA, V _{GS} = 0 V	60	—	—	V
		V _{(BR) DSX}	I _D = 10 mA, V _{GS} = -20 V	35	—	—	
Gate threshold voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.3	—	2.5	V
Drain-source ON-resistance		R _{DS (ON)}	V _{GS} = 4.5 V, I _D = 15 A	—	24	35	mΩ
			V _{GS} = 10V, I _D = 15A	—	19	26	
Forward transfer admittance		Y _{fs}	V _{DS} = 10 V, I _D = 15 A	17	34	—	S
Input capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	1950	—	pF
Reverse transfer capacitance		C _{rss}		—	140	—	
Output capacitance		C _{Oss}		—	230	—	
Switching time	Rise time	t _r	 Duty ≤ 1%, t _w = 10 μs	—	4	—	ns
	Turn-on time	t _{on}		—	16	—	
	Fall time	t _f		—	8	—	
	Turn-off time	t _{off}		—	48	—	
Total gate charge (Gate-source plus gate-drain)		Q _g	V _{DD} ≈ 48 V, V _{GS} = 10 V, I _D = 30 A	—	36	—	nC
Gate source charge		Q _{gs}		—	26	—	
Gate-drain (“miller”) charge		Q _{gd}		—	10	—	

Source-Drain Ratings and Characteristics (Ta = 25°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}	—	—	—	90	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 30 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.5	V
Reverse recovery time	t_{rr}	$I_{DR} = 30 \text{ A}, V_{GS} = 0 \text{ V}$	—	40	—	ns
Reverse recovered charge	Q_{rr}	$dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	32	—	nC

Marking

