

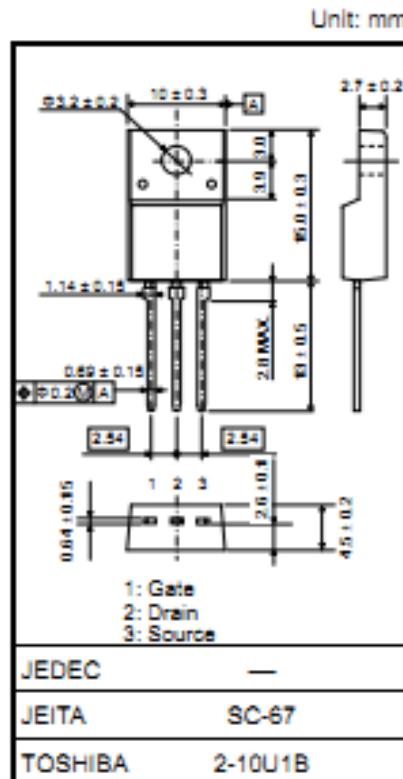


Switching Regulator Applications

- Low drain-source ON-resistance: $R_{DS(ON)} = 0.5 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 3.2 S$ (typ.)
- Low leakage current: $I_{DSS} = 10 \mu A$ (max) ($V_{DS} = 450 V$)
- Enhancement mode: $V_{th} = 2.0$ to $4.0 V$ ($V_{DS} = 10 V$, $I_D = 1 mA$)

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

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	450	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current DC (Note 1)	I_D	11	A
	I_{DP}	44	
Drain power dissipation ($T_c = 25^\circ C$)	P_D	40	W
Single pulse avalanche energy (Note 2)	E_{AS}	238	mJ
Avalanche current	I_{AR}	11	A
Repetitive avalanche energy (Note 3)	E_{AR}	4.0	mJ
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-65 to 150	°C



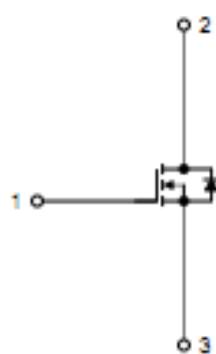
Weight: 1.7 g (typ.)

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

Internal Connection

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th}(ch\rightarrow c)$	3.125	°C/W
Thermal resistance, channel to ambient	$R_{th}(ch\rightarrow a)$	62.5	°C/W



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

Note 2: $V_{DD} = 90 V$, $T_{ch} = 25^\circ C$ (initial), $L = 3.27 mH$, $R_G = 25 \Omega$, $I_{AR} = 11 A$

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

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

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 1	μA	
Drain cut-off current	I_{GSS}	$V_{DS} = 450\text{ V}, V_{GS} = 0\text{ V}$	—	—	10	μA	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	450	—	—	V	
Gate threshold voltage	V_{th}	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	2.0	—	4.0	V	
Drain-source ON-resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}$	—	0.5	0.82	Ω	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 5.5\text{ A}$	0.8	3.2	—	S	
Input capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	1050	—	pF	
Reverse transfer capacitance	C_{rss}		—	5	—		
Output capacitance	C_{oss}		—	100	—		
Switching time	Rise time	t_r	 Duty $\leq 1\%$, $t_w = 10\text{ }\mu\text{s}$	—	25	—	ns
	Turn-on time	t_{on}		—	60	—	
	Fall time	t_f		—	10	—	
	Turn-off time	t_{off}		—	75	—	
Total gate charge	Q_g	$V_{DD} = 380\text{ V}, V_{GS} = 10\text{ V}, I_D = 11\text{ A}$	—	20	—	nC	
Gate-source charge	Q_{gs}		—	13	—		
Gate-drain charge	Q_{gd}		—	7	—		

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}	—	—	—	11	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	44	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 11\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 11\text{ A}, V_{GS} = 0\text{ V},$ $dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	1350	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	14	—	μC

Marking

