



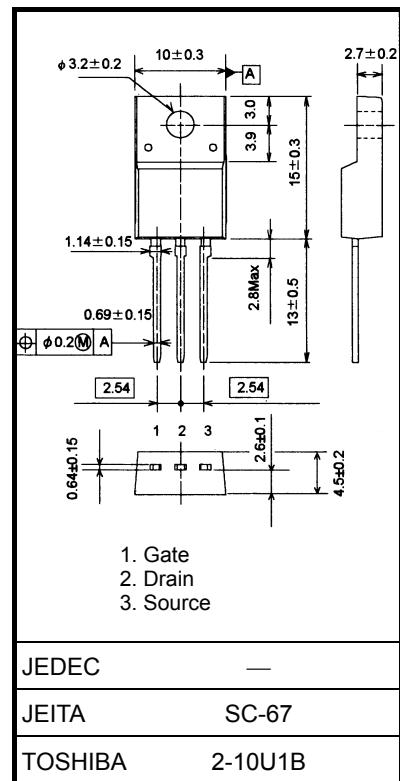
2SK3799

Switching Regulator Applications

- Low drain-source ON-resistance: $R_{DS\ (ON)} = 1.0\ \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 6.0\ S$ (typ.)
- Low leakage current: $I_{DSS} = 100\ \mu A$ (max) ($V_{DS} = 720\ V$)
- Enhancement model: $V_{th} = 2.0$ to $4.0\ V$ ($V_{DS} = 10\ V$, $I_D = 1\ mA$)

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

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	900	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)	V_{DGR}	900	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	A
Drain power dissipation ($T_c = 25^\circ C$)	P_D	50	W
Single pulse avalanche energy (Note 2)	E_{AS}	1080	mJ
Avalanche current	I_{AR}	8	A
Repetitive avalanche energy (Note 3)	E_{AR}	5	mJ
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature range	T_{stg}	-55 to 150	$^\circ C$



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

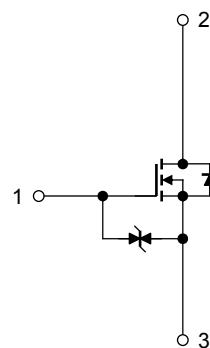
Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th\ (ch-c)}$	2.5	$^\circ C / W$
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	62.5	$^\circ C / W$

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

Note 2: $V_{DD} = 90\ V$, $T_{ch} = 25^\circ C$ (initial), $L = 30.9\ mH$, $R_G = 25\ \Omega$, $I_{AR} = 8\ A$

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

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



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

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 10	μA
Gate-source breakdown voltage	$V_{(\text{BR})\text{GSS}}$	$I_G = \pm 10\text{ }\mu\text{A}$, $V_{DS} = 0\text{ V}$	± 30	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 720\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	900	—	—	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	$R_{DS\text{ (ON)}}$	$V_{GS} = 10\text{ V}$, $I_D = 4\text{ A}$	—	1.0	1.3	Ω
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 15\text{ V}$, $I_D = 4\text{ A}$	3.5	6.0	—	S
Input capacitance	C_{iss}	$V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	2200	—	pF
Reverse transfer capacitance	C_{rss}		—	45	—	
Output capacitance	C_{oss}		—	190	—	
Switching time	Rise time	t_r	 Duty $\leq 1\%$, $t_w = 10\text{ }\mu\text{s}$	—	25	ns
	Turn-on time	t_{on}		—	65	
	Fall time	t_f		—	20	
	Turn-off time	t_{off}		—	120	
Total gate charge (Gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 8\text{ A}$	—	60	—	nC
Gate-source charge	Q_{gs}		—	34	—	
Gate-drain ("miller") charge	Q_{gd}		—	26	—	

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

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	8	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	24	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 8\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 8\text{ A}$, $V_{GS} = 0\text{ V}$	—	1700	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR} / dt = 100\text{ A} / \mu\text{s}$	—	23	—	μC

Marking

