

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

2SK3569

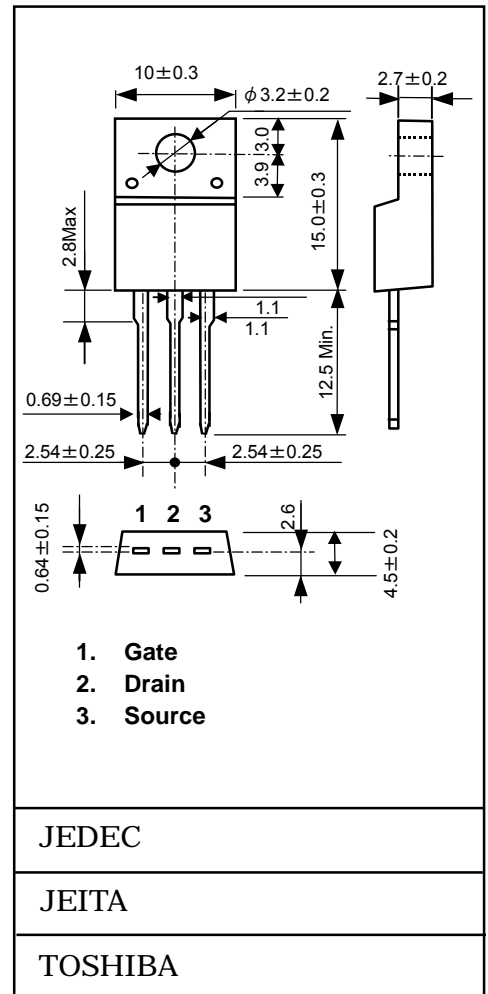
unit : mm

Switching Regulator Applications

- Low drain-source ON resistance: $R_{DS(ON)} = 0.54$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 9.0$ S (typ.)
- Low leakage current: $I_{DSS} = 100 \mu A$ ($V_{DS} = 600$ V)
- Enhancement-mode: $V_{th} = 2.0\sim 4.0$ V ($V_{DS} = 10$ V, $I_D = 1$ mA)

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	600	V
Drain-gate voltage ($R_{GS} = 20$ kΩ)		V_{DGR}	600	V
Gate-source voltage		V_{GSS}	±30	V
Drain current	DC (Note 1)	I_D	10	A
	Pulse (Note 1)	I_{DP}	40	
Drain power dissipation ($T_c = 25^\circ C$)		P_D	45	W
Single pulse avalanche energy (Note 2)		E_{AS}	TBD	mJ
Avalanche current		I_{AR}	10	A
Repetitive avalanche energy (Note 3)		E_{AR}	4.5	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55~150	°C



Thermal Characteristics

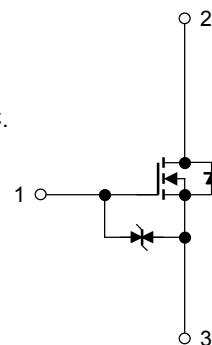
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	2.78	°C/W
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	62.5	°C/W

Note 1: Please use devices on conditions that the channel temperature is below 150°C.

Note 2: $V_{DD} = 90$ V, $T_{ch} = 25^\circ C$, $L = 6.36$ mH, $I_{AR} = 10$ A, $R_G = 25 \Omega$

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

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



Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 25\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Gate-source breakdown voltage		$V_{(BR)GSS}$	$I_D = \pm 10\ \mu\text{A}, V_{GS} = 0\text{ V}$	± 30	—	—	V
Drain cut-off current		I_{DSS}	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	600	—	—	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		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$	—	0.54	0.75	Ω
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 5\text{ A}$	3.0	9.0	—	S
Input capacitance		C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	1800	—	pF
Reverse transfer capacitance		C_{rss}		—	15	—	
Output capacitance		C_{oss}		—	180	—	
Switching time	Rise time	t_r		—	22	—	ns
	Turn-on time	t_{on}		—	50	—	
	Fall time	t_f		—	36	—	
	Turn-off time	t_{off}		Duty $\leq 1\%$, $t_w = 10\ \mu\text{s}$	—	180	
Total gate charge		Q_g	$V_{DD} = 400\text{ V}, V_{GS} = 10\text{ V}, I_D = 10\text{ A}$	—	42	—	nC
Gate-source charge		Q_{gs}		—	23	—	
Gate-drain charge		Q_{gd}		—	19	—	

Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)		I_{DR}	—	—	—	10	A
Pulse drain reverse current (Note 1)		I_{DRP}	—	—	—	40	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 10\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time		t_{rr}	$I_{DR} = 10\text{ A}, V_{GS} = 0\text{ V},$	—	1300	—	ns
Reverse recovery charge		Q_{rr}	$dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	1.63	—	μC

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