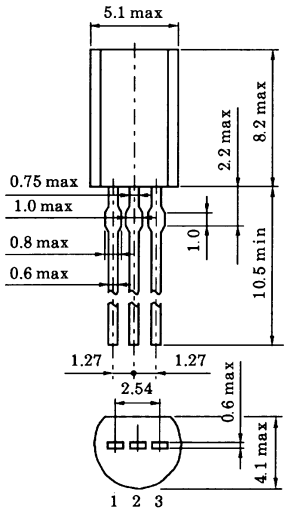
TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π−MOSV)

2SK3670

Chopper Regulator and DC−DC Converter Applications

- 2.5V-Gate Drive
- Low drain-source ON resistance: $R_{DS\ (ON)}$ = 1.0 Ω (typ.)
- High forward transfer admittance: $|Y_{fs}|$ = 2.1 S (typ.)
- Low leakage current: I_{DSS} = 100 μA (max) (V_{DS} = 150 V)
- Enhancement mode: V_{th} = 0.5~1.3 V (V_{DS} = 10 V, I_D =200 μA)

Unit: mm



1.SOURCE
2.DRAIN
3.GATE

JEDEC	TO-92MOD
JEITA	—
TOSHIBA	2-5J1C

Weight: 0.36 g (typ.)

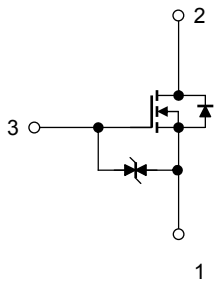
Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain−source voltage		V_{DSS}	150	V
Drain−gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	150	V
Gate−source voltage		V_{GSS}	±12	V
Drain current	DC (Note 1)	I_D	0.67	A
	Pulse(t≦5s) (Note 1)	I_{DP}	1	
	Pulse (Note 1)	I_{DP}	3	
Drain power dissipation		P_D	0.9	W
Single pulse avalanche energy (Note 2)		E_{AS}	41	m J
Avalanche current		I_{AR}	0.67	A
Repetitive avalanche energy (Note 3)		E_{AS}	0.09	m J
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55~150	°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 ambient	$R_{th\ (ch-a)}$	138	°C / W



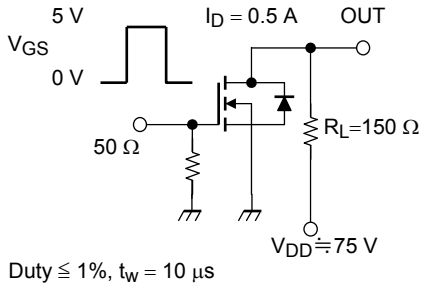
Note 1: Ensure that the channel temperature does not exceed 150℃.

Note 2: V_{DS} = 50V、T_{ch} = 25℃(initial)、L = 135mH、I_{AR} = 0.67A、R_G = 25Ω

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)

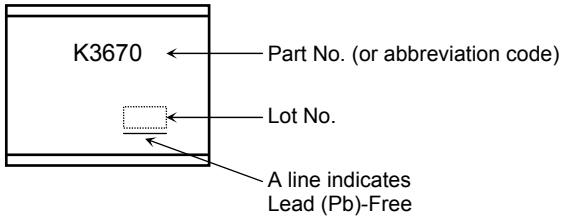
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±9.6 V, V_{DS} = 0 V	—	—	±10	μA
Drain cut−off current		I_{DSS}	V_{DS} = 150 V, V_{GS} = 0 V	—	—	100	μA
Drain−source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	150	—	—	V
Gate threshold voltage		V_{th}	V_{DS} = 10 V, I_D = 200 μA	0.5	—	1.3	V
Drain−source ON resistance		$R_{DS\ (ON)}$	V_{GS} = 2.5 V, I_D = 0.5 A	—	1.1	2	Ω
			V_{GS} = 4 V, I_D = 0.5 A	—	1.0	1.7	
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 0.5 A	1.0	2.1	—	S
Input capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	230	—	pF
Reverse transfer capacitance		C_{rss}		—	14	—	
Output capacitance		C_{oss}		—	50	—	
Switching time	Rise time	t_r		—	16	—	ns
	Turn−on time	t_{on}		—	40	—	
	Fall time	t_f		—	23	—	
	Turn−off time	t_{off}		—	95	—	
Total gate charge (gate−source plus gate−drain)		Q_g	V_{DD} ≈ 120 V, V_{GS} = 5 V, I_D = 1 A	—	4.6	—	nC
Gate−source charge		Q_{gs}		—	2.9	—	
Gate−drain (“miller”) Charge		Q_{gd}		—	1.7	—	

Duty ≦ 1%, t_w = 10 μs

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	0.67	A
Pulse drain reverse current (t=5s) (Note 1)	I_{DRP}	—	—	—	1	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	3	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 0.5 A, V_{GS} = 0 V	—	—	−1.5	V
Reverse recovery time	t_{rr}	I_{DR} = 1A, V_{GS} = 0V	—	95	—	ns
Reverse recovery charge	Q_{rr}	dI_{DR} / dt = 50A / μs	—	110	—	nC

Marking



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