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

2SK2611

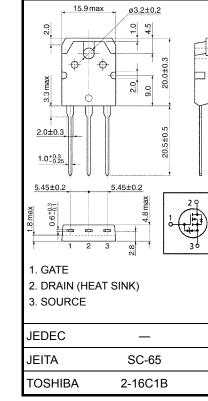
DC–DC Converter, Relay Drive and Motor Drive Applications

- Low drain-source ON-resistance $: RDS (ON) = 1.2 \Omega (typ.)$
- High forward transfer admittance $|Y_{fs}| = 7.0 \text{ S (typ.)}$

Absolute Maximum Ratings (Ta = 25°C)

- Low leakage current $: I_{DSS} = 100 \ \mu A \ (max) \ (V_{DS} = 720 \ V)$
- Enhancement-mode $: V_{th} = 2.0 \text{ to } 4.0 \text{ V} (V_{DS} = 10 \text{ V}, \text{ ID} = 1 \text{ mA})$

Characteristics Symbol Rating Unit Drain-source voltage 900 v VDSS Drain-gate voltage (R_{GS} = 20 k Ω) 900 V VDGR V Gate-source voltage ±30 VGSS 9 DC (Note 1) I_D А Drain current Pulse (Note 1) IDP 27 А Drain power dissipation (Tc = 25° C) 150 w P_D Single pulse avalanche energy 663 EAS m.J (Note 2) Avalanche current 9 А IAR 15 Repetitive avalanche energy (Note 3) EAR m.J °C Channel temperature T_{ch} 150 -55 to 150 °C Storage temperature range Tstg



Weight: 4.6 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)}	0.833	°C / W
Thermal resistance, channel to ambient	R _{th (ch−a)}	50	°C / W

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

Note 2: V_{DD} = 90 V, T_{ch} = 25°C (initial), L = 15 mH, R_G = 25 Ω , I_{AR} = 9 A

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

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

Unit: mm

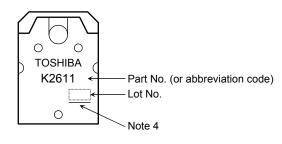
Electrical Characteristics (Ta = 25°C)

Charao	cteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	ırrent	I _{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V	_	—	±10	μA
Gate-source bro	eakdown voltage	V _(BR) GSS	I _G = ±10 μA, V _{DS} = 0 V	±30	_	_	V
Drain cut-off cu	rrent	I _{DSS}	V _{DS} = 720 V, V _{GS} = 0 V	_	_	100	μA
Drain-source br	eakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	900	_	_	V
Gate threshold v	/oltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	2.0	_	4.0	V
Drain-source O	N-resistance	R _{DS (ON)}	V _{GS} = 10 V, I _D = 4 A	_	1.2	1.4	Ω
Forward transfe	r admittance	Y _{fs}	V _{DS} = 15 V, I _D = 4 A	3.0	7.0		S
Input capacitance	e	C _{iss}			2040	_	
Reverse transfer capacitance C_{rss} V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz			45		pF		
Output capacitance		C _{oss}		_	190	_	
Switching time	Rise time	tr	$V_{\rm GS} \stackrel{10V}{}_{\rm OV} \prod_{\substack{I_{\rm D}=4A\\ P_{\rm C}=1\\ 00\Omega}} V_{\rm out}$	_	25		
	Turn-on time	t _{on}		_	60	_	
	Fall time	t _f	$\begin{array}{c c} & \overrightarrow{\bullet} & \overrightarrow{\bullet} & \overrightarrow{\bullet} \\ & \overrightarrow{\bullet} & \overrightarrow{\bullet} & \overrightarrow{\bullet} \\ & & \nabla_{\text{DD}} \rightleftharpoons_{400} \nabla \end{array}$	_	20	_	ns
	Turn-off time	t _{off}	Duty $\leq 1\%$, t _w =10µs	_	95	_	
Total gate charge (gate-source plus gate-drain)		Qg		_	58	_	
Gate-source charge		Q _{gs}	V _{DD} ≈ 400 V, V _{GS} = 10 V, I _D = 9 A		32	_	nC
Gate-drain ("miller") Charge		Q _{gd}			26	_	

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	—	_	_	9	А
Pulse drain reverse current (Note 1)	I _{DRP}	_	_	_	27	А
Forward voltage (diode)	V _{DSF}	I _{DR} = 9 A, V _{GS} = 0 V	_		-1.9	V
Reverse recovery time	t _{rr}	- I _{DR} = 9 A, V _{GS} = 0 V, dI _{DR} / dt = 100 A / μs		1.6	_	μs
Reverse recovery charge	Q _{rr}	$10R = 9 A$, $v_{GS} = 0 v$, $010R / 01 = 100 A / \mu s$	_	20	_	μC

Marking

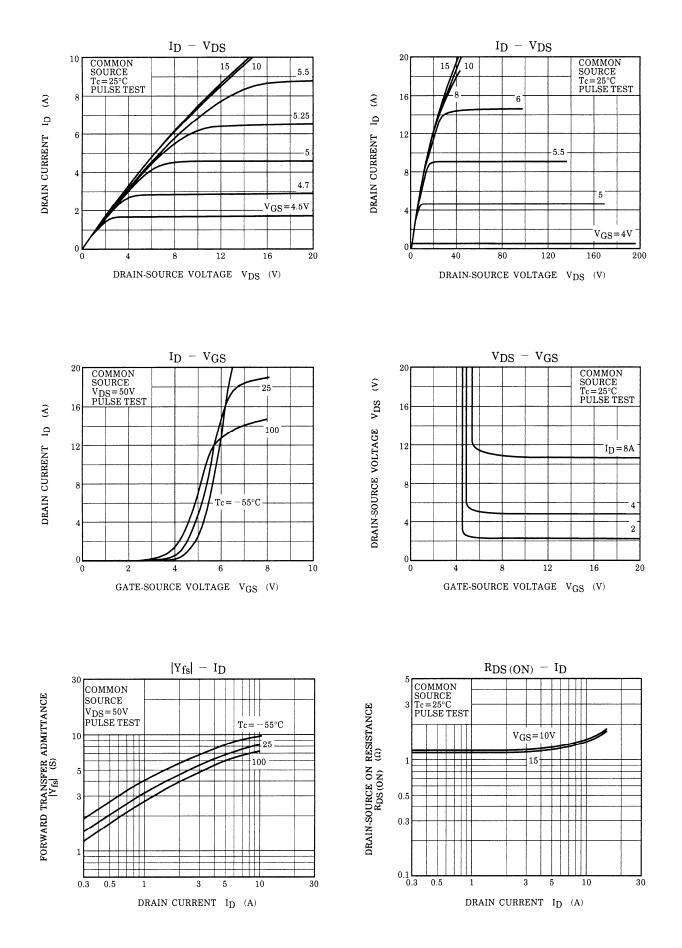


Note 4: A line under a Lot No. identifies the indication of product Labels.

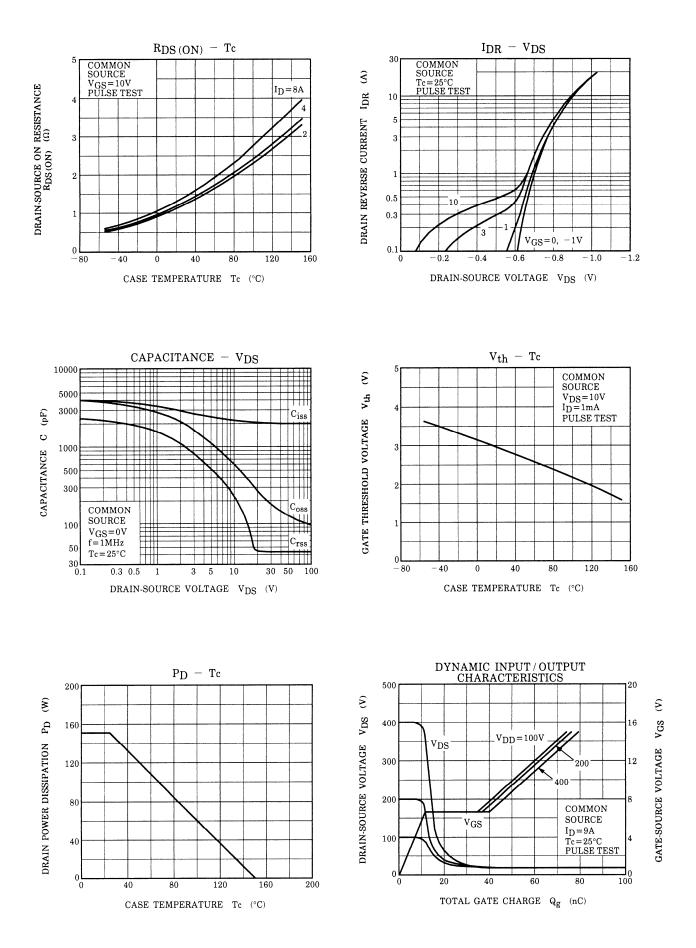
Not underlined: [[Pb]]/INCLUDES > MCV Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

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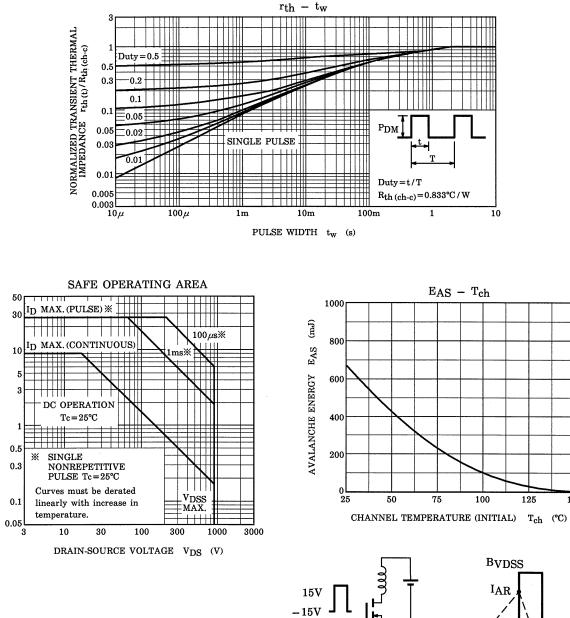


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DRAIN CURRENT ID



15V I I I AR 15V VDD VDS TEST CIRCUIT WAVE FORM

$$\begin{array}{l} \mathrm{R}_{\mathrm{G}} = 25 \ \Omega \\ \mathrm{V}_{\mathrm{DD}} = 90 \ \mathrm{V}, \ \mathrm{L} = 15 \ \mathrm{mH} \end{array} \qquad \mathrm{E}_{\mathrm{AS}} = \frac{1}{2} \cdot \mathrm{L} \cdot \mathrm{I}^{2} \cdot \left(\frac{\mathrm{B} \mathrm{VDSS}}{\mathrm{B} \mathrm{VDSS} - \mathrm{V}\mathrm{DD}} \right) \end{array}$$

2010-01-29

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