TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π-MOSII<sup>-5</sup>)

# 2SK1930

# Chopper Regulator, DC-DC Converter, and Motor Drive Applications

 $\begin{array}{ll} \bullet & Low\ drain-source\ ON\ resistance & \vdots\ R_{DS}\ (ON)=3.0\ \Omega\ (typ.) \\ \bullet & High\ forward\ transfer\ admittance & \vdots\ |Y_{fs}|=2.0\ S\ (typ.) \\ \bullet & Low\ leakage\ current & \vdots\ I_{DSS}=300\ \mu A\ (max)\ (V_{DS}=800\ V) \\ \bullet & Enhancement-mode & \vdots\ V_{th}=1.5{\sim}3.5\ V\ (V_{DS}=10\ V,\ I_{D}=1\ mA) \end{array}$ 

#### Maximum Ratings (Ta = 25°C)

Characteris	stics	Symbol	Rating	Unit	
Drain-source voltage		$V_{DSS}$	1000	V	
Drain-gate voltage (R <sub>GS</sub> = 20 kΩ)		$V_{DGR}$	1000	V	
Gate-source voltage		$V_{GSS}$	±20	V	
Drain current	DC (Note 1)	I <sub>D</sub>	4	Α	
	Pulse (Note 1)	I <sub>DP</sub>	12	A	
Drain power dissipation (Tc = 25°C)		$P_{D}$	80	W	
Channel temperature		T <sub>ch</sub>	150	°C	
Storage temperature range		T <sub>stg</sub>	-55~150	°C	

#### **Thermal Characteristics**

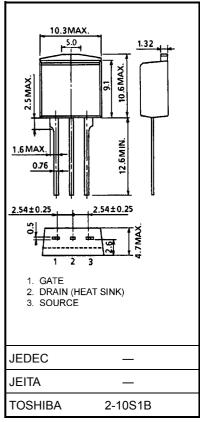
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	R <sub>th (ch-c)</sub>	1.56	°C/W
Thermal resistance, channel to ambient	R <sub>th (ch-a)</sub>	83.3	°C/W

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

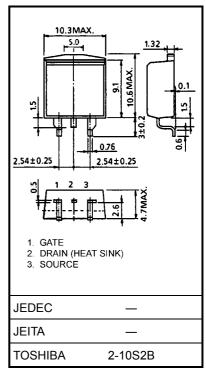
This transistor is an electrostatic sensitive device.

Please handle with caution.

Unit: mm



Weight: 1.5 g (typ.)



Weight: 1.5 g (typ.)

### **Electrical Characteristics (Ta = 25°C)**

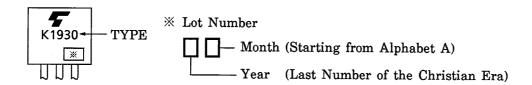
Charac	teristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	rrent	I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V	_	_	±100	nA
Drain cut-off cur	rent	I <sub>DSS</sub>	V <sub>DS</sub> = 800 V, V <sub>GS</sub> = 0 V	_	_	300	μΑ
Drain-source brovoltage	eakdown	V <sub>(BR) DSS</sub>	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0 V	1000	_	_	V
Gate threshold v	oltage	$V_{th}$	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	1.5	_	3.5	V
Drain-source Of	N resistance	R <sub>DS (ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2 A	_	3.0	3.8	Ω
Forward transfer	admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 20 V, I <sub>D</sub> = 2 A	1.0	2.0	_	S
Input capacitanc	е	C <sub>iss</sub>		_	700	_	
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz	_	55	_	pF
Output capacitance		Coss		_	100	_	
Switching time	Rise time	t <sub>r</sub>	$V_{GS}$ $V_{OV}$ $V_{DD}$ $V_{OUT}$ $V_{DD}$ $V_{DD}$	_	18	_	- ns
	Turn-on time	t <sub>on</sub>		_	30	_	
	Fall time	t <sub>f</sub>			12	_	
	Turn-off time	t <sub>off</sub>	Duty $\leq 1\%$ , $t_{\mathbf{W}} = 10 \mu \text{s}$	_	70	_	
Total gate charge (Gate-source plus gate-drain)		Qg		_	60	_	nC
Gate-source charge		Q <sub>gs</sub>	$V_{DD} \approx 400 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}$	_	35	_	
Gate-drain ("miller") charge		Q <sub>gd</sub>			25	_	

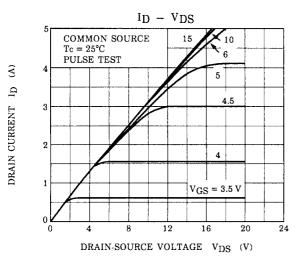
## Source-Drain Ratings and Characteristics (Ta = 25°C)

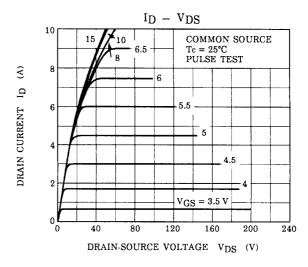
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I <sub>DR</sub>	_	_	_	4	Α
Pulse drain reverse current (Note 1)	I <sub>DRP</sub>	-	_	_	12	Α
Forward voltage (diode)	$V_{DSF}$	$I_{DR}$ = 4 A, $V_{GS}$ = 0 V			-1.9	V

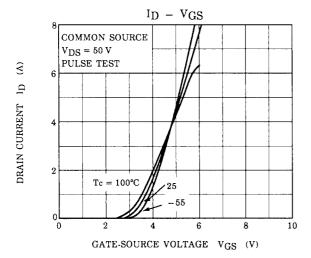
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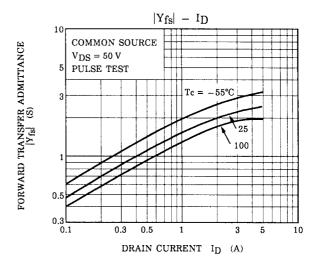
### Marking

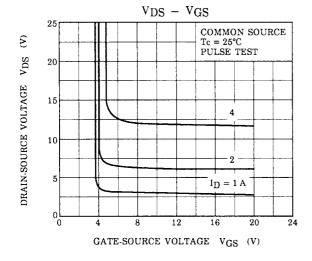


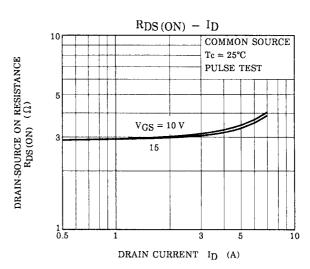




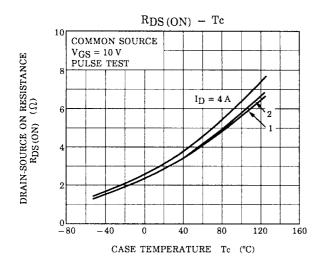


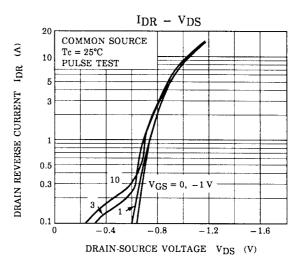


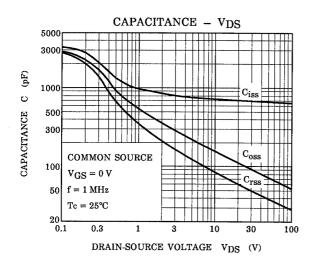


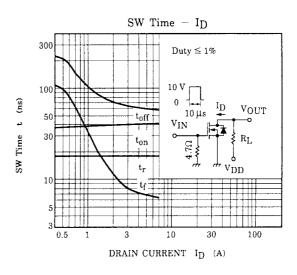


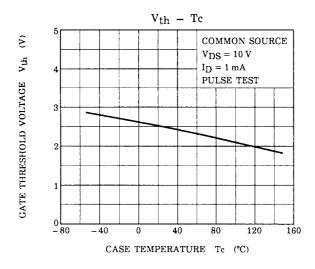
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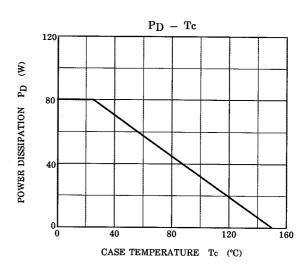




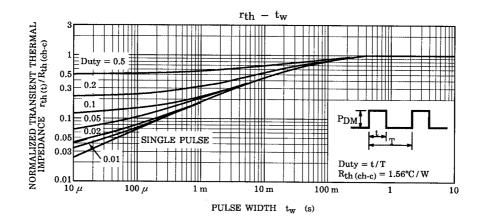


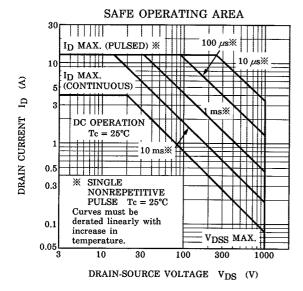






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