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

## 2SK3090

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

• Low drain-source ON resistance :  $R_{DS}$  (ON) = 16 m $\Omega$  (typ.) • High forward transfer admittance :  $|Y_{fs}| = 26 S$  (typ.)

• Low leakage current :  $IDSS = 100 \mu A (max) (VDS = 30 V)$ 

• Enhancement-mode :  $V_{th} = 1.5 \sim 3.0 \text{ V (V}_{DS} = 10 \text{ V, I}_{D} = 1 \text{ mA})$ 

#### Maximum Ratings (Ta = 25°C)

Characteris	stics	Symbol	Rating	Unit	
Drain-source voltage		$V_{DSS}$	30	V	
Drain-gate voltage (Ro	<sub>SS</sub> = 20 kΩ)	$V_{DGR}$	30	V	
Gate-source voltage		V <sub>GSS</sub>	±20	V	
Drain current	DC (Note 1)	I <sub>D</sub>	45	А	
	Pulse (Note 1)	I <sub>DP</sub>	135		
Drain power dissipation	n (Tc = 25°C)	P <sub>D</sub>	60	W	
Single pulse avalanche	e energy (Note 2)	E <sub>AS</sub>	220	mJ	
Avalanche current		I <sub>AR</sub>	45	Α	
Repetitive avalanche e	nergy (Note 3)	E <sub>AR</sub>	6	mJ	
Channel temperature		T <sub>ch</sub>	150	°C	
Storage temperature ra	ange	T <sub>stg</sub>	-55~150	°C	

#### **Thermal Characteristics**

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	R <sub>th (ch-c)</sub>	2.08	°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.

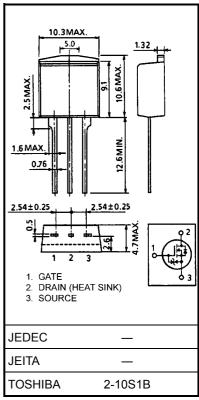
Note 2:  $V_{DD}$  = 25 V,  $T_{ch}$  = 25°C (initial), L = 78  $\mu$ H,  $R_{G}$  = 25  $\Omega$ ,  $I_{AR}$  = 45 A

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

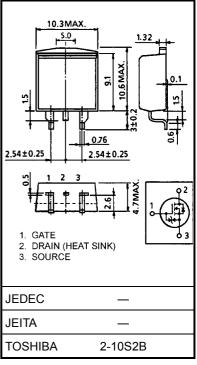
This transistor is an electrostatic sensitive device.

Please handle with caution.





Weight: 1.5 g (typ.)



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

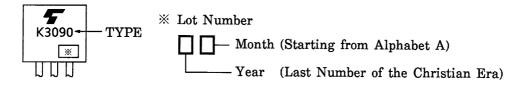
Charac	teristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	rrent	I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0 V	_	_	±10	μΑ
Drain cut-off cur	rent	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V	-	_	100	μΑ
Drain-source bro	eakdown voltage	V (BR) DSS	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0 V	30	_	_	V
Gate threshold v	oltage	V <sub>th</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	1.5	_	3.0	V
Drain-source Of	N resistance	R <sub>DS (ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A	-	16	20	mΩ
Forward transfer	admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 25 A	13	26	_	S
Input capacitanc	е	C <sub>iss</sub>			1500	_	pF
Reverse transfer	capacitance	C <sub>rss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz		480	_	
Output capacitar	nce	Coss		-	680	_	
Switching time -	Rise time	tr	$V_{GS}$ $V_{OV}$ $V_{OUT}$ $V_{OUT}$ $V_{OUT}$ $V_{OUT}$ $V_{OUT}$ $V_{OUT}$ $V_{OUT}$	_	11	_	ns
	Turn-on time	t <sub>on</sub>		_	18	_	
	Fall time	t <sub>f</sub>		_	60	_	
	Turn-off time	t <sub>off</sub>	Duty $\leq 1\%$ , $t_{\rm W} = 10 \mu \rm s$	_	130	_	
Total gate charge (Gate-source plus gate-drain)		Qg	V <sub>DD</sub> ≈ 24 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 45 A		39	_	nC
Gate-source charge		Q <sub>gs</sub>			25		
Gate-drain ("miller") charge		Q <sub>gd</sub>			14	_	

## 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>		_	_	45	Α
Pulse drain reverse current (Note 1)	I <sub>DRP</sub>	-	_	_	135	Α
Forward voltage (diode)	V <sub>DSF</sub>	I <sub>DR</sub> = 45 A, V <sub>GS</sub> = 0 V	_	_	-1.7	V
Reverse recovery time	t <sub>rr</sub>	I <sub>DR</sub> = 45 A, V <sub>GS</sub> = 0 V		100	_	ns
Reverse recovery charge	$Q_{rr}$	$dI_{DR}$ / $dt = 50 A$ / $\mu s$	_	200	_	nC

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### Marking



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