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

## 2SK2839

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

• 4 V gatedrive

• Low drain-source ON resistance  $: R_{DS} (ON) = 30 \text{ m}\Omega \text{ (typ.)}$ • High forward transfer admittance  $: |Y_{fs}| = 11 \text{ S (typ.)}$ 

• Low leakage current  $: I_{DSS} = 100 \mu A \text{ (max) (V}_{DS} = 30 \text{ V)}$ 

• Enhancement-mode :  $V_{th} = 0.8 \sim 2.0 \text{ V (VDS} = 10 \text{ V, ID} = 1 \text{ mA})$ 

#### **Maximum Ratings (Ta = 25°C)**

Characteris	etics	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>	10	Α
	Pulse (Note 1)	I <sub>DP</sub>	40	Α
Drain power dissipation	(Note 2)	$P_{D}$	2.5	W
Single pulse avalanche	e energy (Note 3)	E <sub>AS</sub>	282	mJ
Avalanche current		I <sub>AR</sub>	10	Α
Repetitive avalanche e	nergy (Note 4)	E <sub>AR</sub>	0.25	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 ambient	R <sub>th (ch-a)</sub>	50	°C/W

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

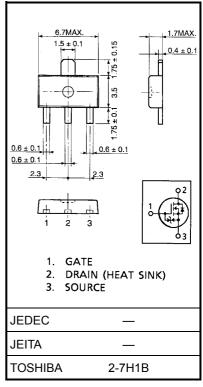
Note 2: Mounted on ceramic substrate (25.4 mm × 25.4 mm × 0.8 mm)

Note 3:  $V_{DD}$  = 25 V,  $T_{ch}$  = 25°C (initial), L = 2 mH,  $R_G$  = 25  $\Omega$ ,  $I_{AR}$  = 10 A

Note 4: Repetitive rating; Pulse width limited by maximum channel temperature.

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

Unit: mm



Weight: 0.12 g (typ.)

#### Marking





## Electrical Characteristics (Ta = 25°C)

Charac	eteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	ırrent	I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0 V	_	_	±10	μΑ
Drain cut-off cu	rrent	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V	_	_	100	μΑ
Drain-source br	eakdown voltage	V (BR) DSS	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0 V	30	_	_	V
Gate threshold v	voltage	$V_{th}$	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	0.8	_	2.0	V
Drain-source ON resistance		R <sub>DS (ON)</sub>	V <sub>DS</sub> = 4 V, I <sub>D</sub> = 5 A	_	45	60	mΩ
			V <sub>DS</sub> = 10 V, I <sub>D</sub> = 5 A		30	40	
Forward transfer	r admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 5 A	5	11	_	S
Input capacitano	e	C <sub>iss</sub>			700	_	pF
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz	-	150	_	
Output capacitance		C <sub>oss</sub>		_	360	_	
Switching time	Rise time	t <sub>r</sub>	$V_{GS}$ $V_{OV}$ $V_{OUT}$ $V_{C}$ $V_{C}$ $V_{C}$ $V_{C}$ $V_{C}$ $V_{DD}$ $V_{DD}$ $V_{C}$ $V_{DD}$ $V_{DD}$	_	20	_	
	Turn-on time	t <sub>on</sub>		_	25	_	- ns
	Fall time	t <sub>f</sub>		_	100	_	
	Turn-off time	t <sub>off</sub>		_	300	_	
Total gate charge (gate-source plus gate-drain)		Qg			26		
Gate-source charge		Q <sub>gs</sub>	$V_{DD} \approx 24 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$		20		nC
Gate-drain ("miller") Charge		Q <sub>gd</sub>			6	_	

### 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>	_	_	_	10	Α
Pulse drain reverse current (Note 1)	I <sub>DRP</sub>		_		40	А
Forward voltage (diode)	V <sub>DSF</sub>	I <sub>DR</sub> = 10 A, V <sub>GS</sub> = 0 V	_	_	-2.0	V
Reverse recovery time	t <sub>rr</sub>	$I_{DR}$ = 10 A, $V_{GS}$ = 0 V, $dI_{DR}$ / $dt$ = 50 A / $\mu$ s	_	120	-	ns
Reverse recovery charge	Q <sub>rr</sub>		_	140	_	nC

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