Unit: mm

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type ( $\pi$ -MOSV)

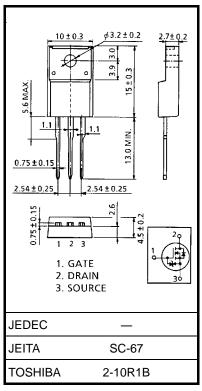
# 2SK2679

Chopper Regulator, DC–DC Converter and Motor Drive Applications

- Low drain-source ON resistance  $RDS(ON) = 0.84 \Omega$  (typ.)
- High forward transfer admittance  $: |Y_{fs}| = 4.4 \text{ S (typ.)}$
- Low leakage current  $: I_{DSS} = 100 \ \mu A \ (max) \ (V_{DS} = 400 \ V)$
- Enhancementmode :  $V_{th} = 2.0 \sim 4.0 V (V_{DS} = 10 V, I_D = 1 mA)$

#### Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
Drain-source voltage		V <sub>DSS</sub>	400	V	
Drain-gate voltage (R	<sub>GS</sub> = 20 kΩ)	V <sub>DGR</sub>	400	V	
Gate-source voltage		V <sub>GSS</sub>	±30	V	
Drain current	DC (Note 1)	۱ <sub>D</sub>	5.5	A	
	Pulse (Note 1)	I <sub>DP</sub>	22	A	
Drain power dissipation	n (Tc = 25°C)	PD	35	W	
Single pulse avalanche	e energy (Note 2)	E <sub>AS</sub>	223	mJ	
Avalanche current		I <sub>AR</sub>	5.5	А	
Repetitive avalanche e	nergy (Note 3)	E <sub>AR</sub>	3.5	mJ	
Channel temperature		T <sub>ch</sub>	150	°C	
Storage temperature ra	ange	T <sub>stg</sub>	-55~150	°C	



Weight: 1.9 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 <sub>th (ch−c)</sub>	3.57	°C / W
Thermal resistance, channel to ambient	R <sub>th (ch−a)</sub>	62.5	°C / W

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

Note 2:  $V_{DD}$  = 90 V,  $T_{ch}$  = 25°C (initial), L = 12 mH,  $R_G$  = 25  $\Omega$ ,  $I_{AR}$  = 5.5 A

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

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

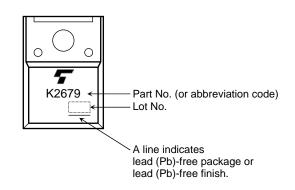
Electrical Characteristics (Ta = 25°C)

Charao	cteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	ırrent	I <sub>GSS</sub>	$V_{GS} = \pm 25 V, V_{DS} = 0 V$		_	±10	μA
Gate-source bre	eakdown voltage	V (BR) GSS	$I_{G} = \pm 10 \ \mu A, \ V_{DS} = 0 \ V$			_	V
Drain cut-off cu	rrent	I <sub>DSS</sub>	V <sub>DS</sub> = 400 V, V <sub>GS</sub> = 0 V			100	μA
Drain-source br	eakdown voltage	V (BR) DSS	$I_D = 10 \text{ mA}, \text{ V}_{GS} = 0 \text{ V}$	400	_		V
Gate threshold v	/oltage	V <sub>th</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	2.0		4.0	V
Drain-source O	N resistance	R <sub>DS (ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 3 A	—	0.84	1.2	Ω
Forward transfe	r admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 3 A	2.0	4.4		S
Input capacitance	e	C <sub>iss</sub>		—	720		
Reverse transfe	everse transfer capacitance $C_{rss}$ $V_{DS} = 10 V$ , $V_{GS} = 0 V$ , f = 1 MHz		_	80	_	pF	
Output capacitance		C <sub>oss</sub>			250		_
Switching time	Rise time	tr	$V_{\rm GS} \stackrel{10V}{}_{\rm 0V} \prod_{\substack{O \\ O \\ IC}} I_{\rm D} \stackrel{I_{\rm D}=2A}{}_{\rm O V_{\rm out}} V_{\rm out}$	_	15	_	
	Turn-on time	t <sub>on</sub>		_	30	_	
	Fall time	t <sub>f</sub>		_	25	_	ns
	Turn-off time	toff	Duty $\leq 1\%$ , t <sub>w</sub> =10µs	— 110	_		
Total gate charge (gate-source plus gate-drain)		Qg		_	17	_	
Gate-source charge		Q <sub>gs</sub>	V <sub>DD</sub> ≈ 320 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.5 A		10		nC
Gate-drain ("miller") Charge		Q <sub>gd</sub>			7		

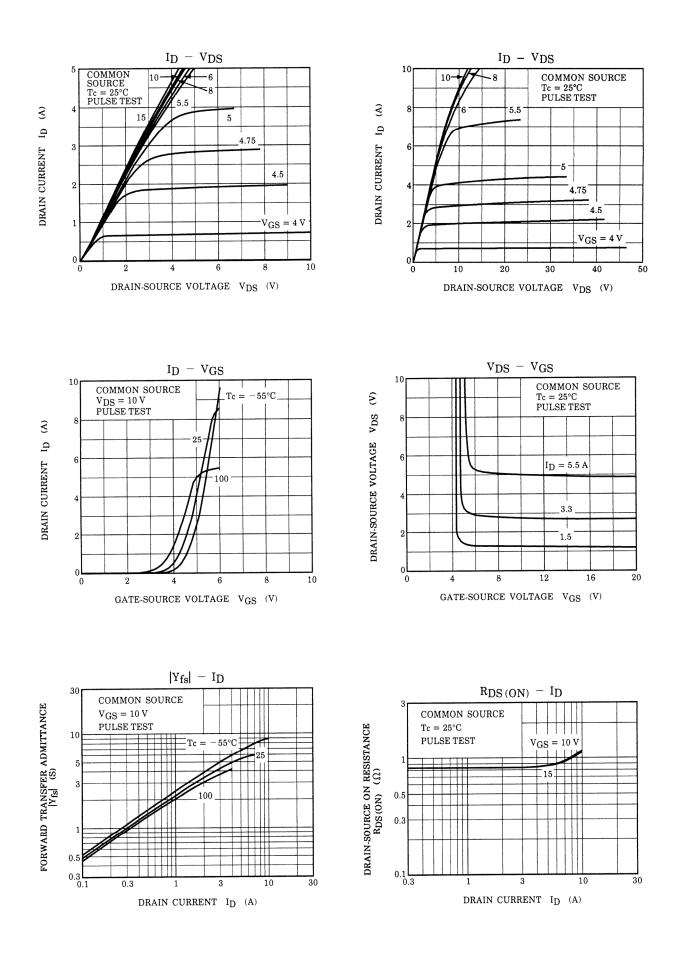
## Source–Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I <sub>DR</sub>	—	_	_	5.5	А
Pulse drain reverse current (Note 1)	I <sub>DRP</sub>	_	_	_	22	А
Forward voltage (diode)	V <sub>DSF</sub>	I <sub>DR</sub> = 5.5 A, V <sub>GS</sub> = 0 V	_	_	-1.7	V
Reverse recovery time	t <sub>rr</sub>	I <sub>DR</sub> = 5.5 A, V <sub>GS</sub> = 0 V		350		ns
Reverse recovery charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt = 100 Å / µs		2.1		μC

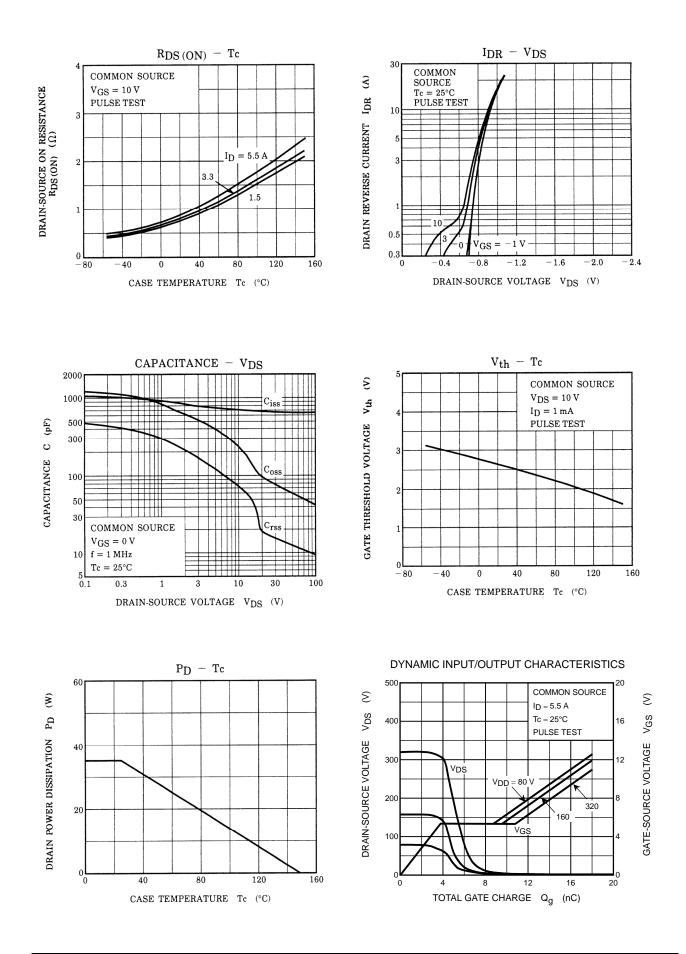
# Marking

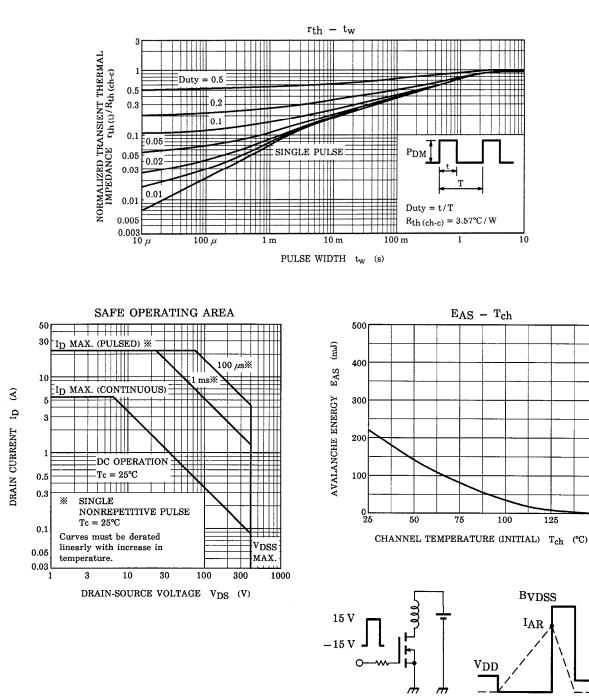


# **TOSHIBA**



# **TOSHIBA**





WAVE FORM



TEST CIRCUIT

150

VDS

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