Unit: mm

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (L^2 - π -MOSV)

2SK2314

Chopper Regulator, DC-DC Converter and Motor Drive Applications

• 4-V gate drive

• Low drain–source ON resistance : R_{DS} (ON) = 66 m Ω (typ.)

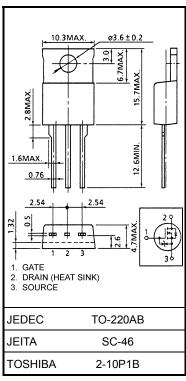
• High forward transfer admittance $|Y_{fs}| = 16 \text{ S (typ.)}$

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

• Enhancement mode : $V_{th} = 0.8 \sim 2.0 \text{ V (V}_{DS} = 10 \text{ V, I}_{D} = 1 \text{ mA})$

Absolute Maximum Ratings (Ta = 25°C)

Characteri	stics	Symbol	Rating	Unit	
Drain-source voltage		V_{DSS}	100	V	
Drain-gate voltage (R _{GS} = 20 kΩ)		V_{DGR}	100	V	
Gate-source voltage		V _{GSS}	±20	V	
Drain current	DC (Note 1)	I_{D}	27	Α	
	Pulse (Note 1)	I_{DP}	108	Α	
Drain power dissipation	n (Tc = 25°C)	P_{D}	75	W	
Single pulse avalanche energy (Note 2)		E _{AS}	193	mJ	
Avalanche current		I _{AR}	27	Α	
Repetitive avalanche energy (Note 3)		E _{AR}	7.5	mJ	
Channel temperature		T _{ch}	150	°C	
Storage temperature range		T _{stg}	-55~150	°C	



Weight: 2.0 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)}	1.67	°C/W
Thermal resistance, channel to ambient	R _{th (ch-a)}	83.3	°C/W

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

Note 2: V_{DD} = 25 V, T_{ch} = 25 °C (initial), L = 428 μ H, R_{G} = 25 Ω , I_{AR} = 27 A

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

This transistor is an electrostatic-sensitive device.

Please handle with caution.

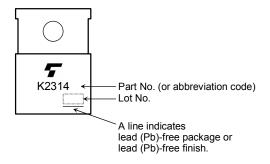
Electrical Characteristics (Ta = 25°C)

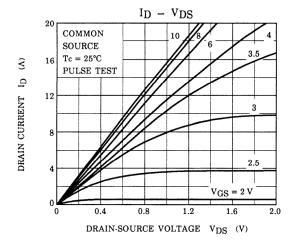
Charac	cteristics	Symbol	Test Condition	Min	Тур.	Max	Unit	
Gate leakage cu	ırrent	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	_	_	±10	μΑ	
Drain cut-off cu	rrent	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V	_	_	100	μA	
Drain-source br	eakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	100	_	_	V	
Gate threshold v	/oltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	0.8	_	2.0	V	
Drain-source ON resistance		R _{DS (ON)}	V _{GS} = 4 V, I _D = 15 A		0.09	0.13	Ω	
			V _{GS} = 10 V, I _D = 15 A		0.066	0.085		
Forward transfe	r admittance	Y _{fs}	V _{DS} = 10 V, I _D = 15 A	8	16	_	S	
Input capacitano	ce	C _{iss}		_	1100	_		
Reverse transfer capacitance		C _{rss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	_	180	_	pF	
Output capacitance		Coss			400	_		
Switching time	Rise time	t _r	VGS 0V ID=15A VOUT RL= 3.3 \Omega	_	20	_	ns ns	
	Turn-on time	t _{on}		_	30	_		
	Fall time	t _f		_	50	_		
	Turn-off time	t _{off}	$V_{DD} = 50V$ Duty $\leq 1\%$, $t_{W} = 10 \mu s$	_	140	_		
Total gate charg plus gate-drain)		Qg			50			
Gate-source charge		Q _{gs}	$V_{DD} \approx 80 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 27 \text{ A}$		34	_	nC	
Gate-drain ("miller") charge		Q _{gd}			16	_		

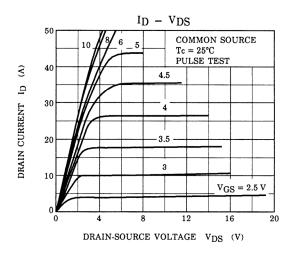
Source-Drain Ratings and Characteristics (Ta = 25°C)

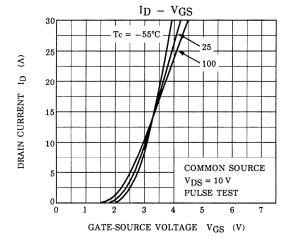
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	_	_	_	27	Α
Pulse drain reverse current (Note 1)	I _{DRP}	_	_	_	108	Α
Forward voltage (diode)	V _{DSF}	I _{DR} = 27 A, V _{GS} = 0 V	_	_	-1.7	V
Reverse recovery time	t _{rr}	I _{DR} = 27 A, V _{GS} = 0 V	_	155		ns
Reverse recovered charge	Q _{rr}	dl _{DR} / dt = 50 A / μs	_	0.31	_	μC

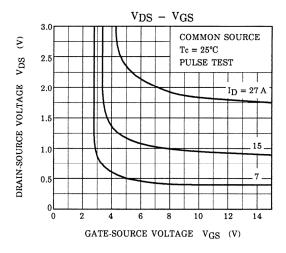
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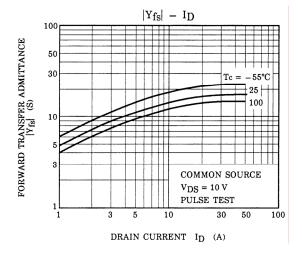


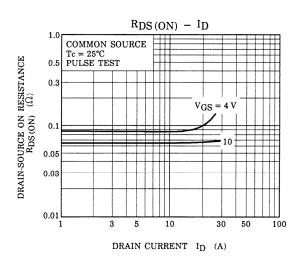


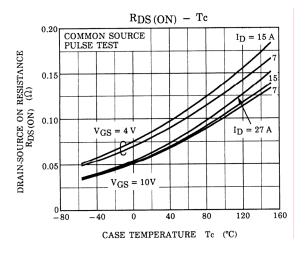


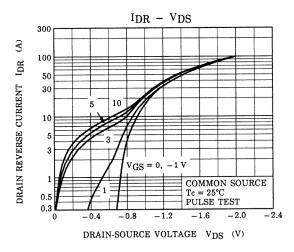


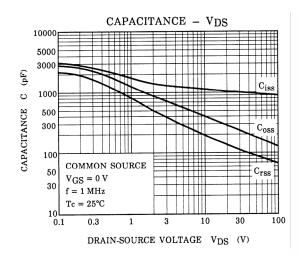


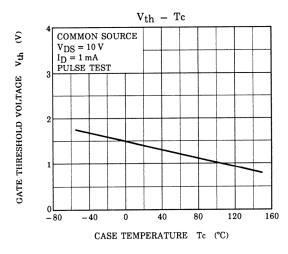


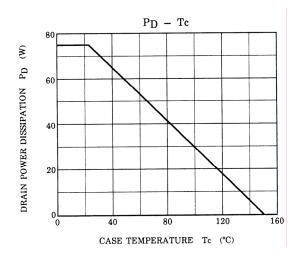


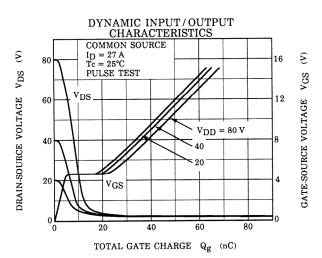




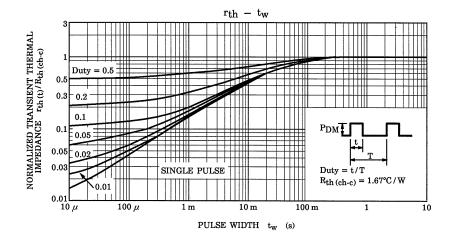


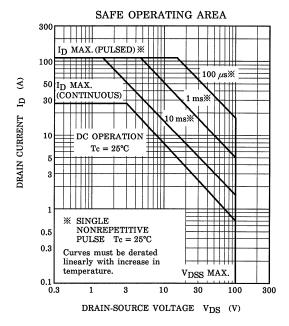


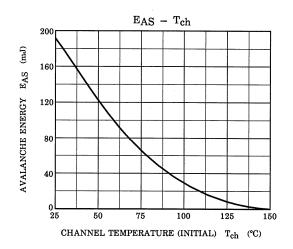


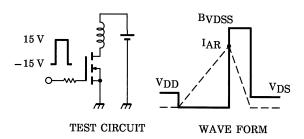


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$$\begin{aligned} R_G &= 25~\Omega \\ V_{DD} &= 25~\text{V},~L = 428~\mu H \end{aligned} \qquad EAS &= \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - VDD} \right) \end{aligned}$$

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