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

2SK2381

Chopper Regulator, DC-DC Converter and Motor Drive Applications

• Low drain–source ON resistance : RDS (ON) = 0.56 Ω (typ.)

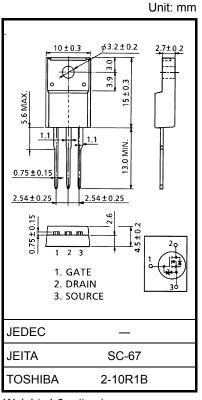
• High forward transfer admittance $|Y_{fs}| = 4.5 \text{ S (typ.)}$

• Low leakage current $: I_{DSS} = 100 \mu A \text{ (max) (V}_{DS} = 200 \text{ V)}$

• Enhancement mode : $V_{th} = 1.5 \text{ to } 3.5 \text{ V (V}_{DS} = 10 \text{ V, I}_{D} = 1 \text{ mA})$

Absolute Maximum Ratings (Ta = 25°C)

Characteri	stics	Symbol	Rating	Unit	
Drain-source voltage		V_{DSS}	200	V	
Drain-gate voltage (R	_{GS} = 20 kΩ)	V_{DGR}	200	V	
Gate-source voltage		V _{GSS}	±20	V	
Drain current	DC (Note 1)	ID	5	Α	
	Pulse (Note 1)	I_{DP}	20	Α	
Drain power dissipation	n (Tc = 25°C)	P_{D}	25	W	
Single pulse avalanch	e energy (Note 2)	E _{AS}	65	mJ	
Avalanche current		I _{AR}	5	Α	
Repetitive avalanche	energy (Note 3)	E _{AR}	2.5	mJ	
Channel temperature		T _{ch}	150	°C	
Storage temperature r	ange	T _{stg}	-55 to 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 _{th (ch-c)}	5.0	°C/W
Thermal resistance, channel to ambient	R _{th (ch-a)}	62.5	°C/W

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

Note 2: V_{DD} = 50 V, T_{ch} = 25°C (initial), L = 4.2 mH, R_G = 25 Ω , I_{AR} = 5 A

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

This transistor is an electrostatic-sensitive device.

Please handle with caution.

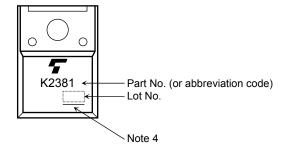
Electrical Characteristics (Ta = 25°C)

Charac	cteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	ırrent	ent I _{GSS} V _{GS} = ±16 V, V _{DS} = 0 V		_	_	±10	μΑ
Drain cut-off cu	rrent	I _{DSS}	V _{DS} = 200 V, V _{GS} = 0 V	_	_	100	μA
Drain-source br	eakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	200	_	_	V
Gate threshold v	/oltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.5	_	3.5	V
Drain-source O	N resistance	R _{DS} (ON)	V _{GS} = 10 V, I _D = 2.5 A	_	0.56	0.8	Ω
Forward transfe	r admittance	Y _{fs}	V _{DS} = 10 V, I _D = 2.5 A	2.0	4.5	_	S
Input capacitano	e	C _{iss}			440	_	pF
Reverse transfer capacitance		C _{rss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	_	35	_	
Output capacitance		C _{oss}			120	_	
Switching time	Rise time	t _r	$V_{GS} = \frac{10V}{0V}$ $V_{OUT} = \frac{V_{OUT}}{V_{OUT}}$ $V_{DD} = 100V$ $V_{DD} = 100V$ $V_{DD} = 100V$	_	15	_	
	Turn-on time	t _{on}		_	20	_	
	Fall time	t _f		_	15	_	ns
	Turn-off time	t _{off}		_	60	_	
Total gate charge (Gate-source plus gate-drain)		Qg			10		
Gate-source charge		Q _{gs}	$V_{DD} \approx 100 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 5 \text{ A}$		6	_	nC
Gate-drain ("miller") charge		Q _{gd}			4	_	

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	_	_	_	5	Α
Pulse drain reverse current (Note 1)	I _{DRP}	_	-	_	20	Α
Forward voltage (diode)	V _{DSF}	I _{DR} = 5 A, V _{GS} = 0 V	_	_	-2.0	٧
Reverse recovery time	t _{rr}	I _{DR} = 5 A, V _{GS} = 0 V	_	150	_	ns
Reverse recovered charge	Q _{rr}	dl _{DR} / dt = 100 A / μs	_	0.45	_	μC

Marking

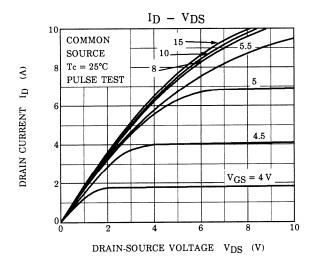


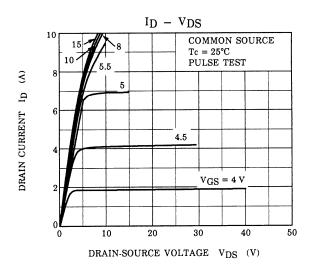
Note 4: A line under a Lot No. identifies the indication of product Labels.

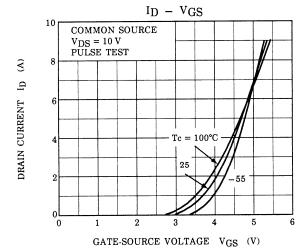
Not underlined: [[Pb]]/INCLUDES > MCV

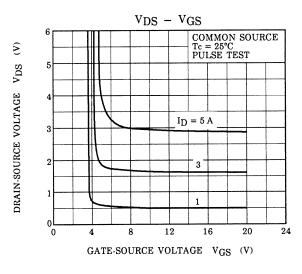
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

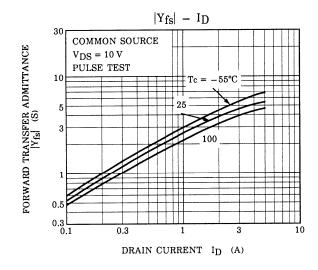
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

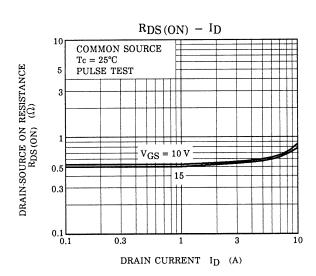




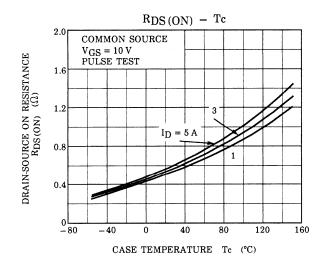


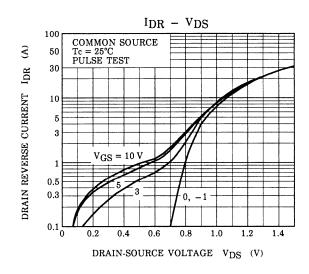


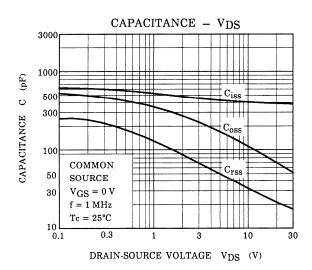


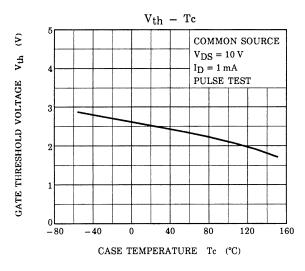


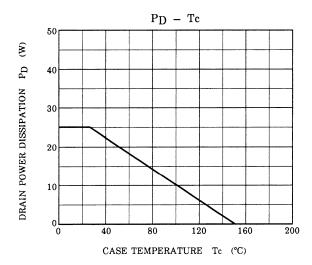
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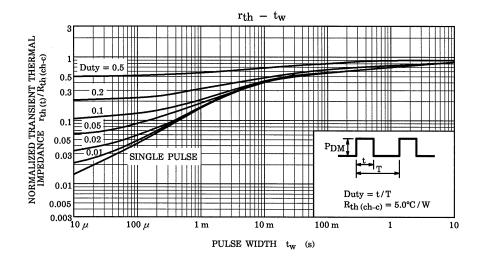


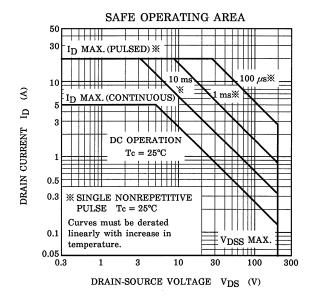


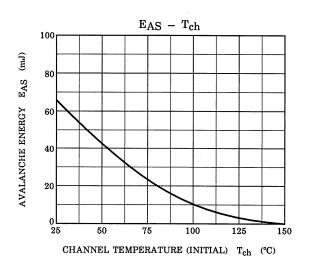


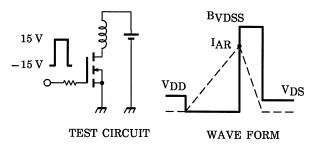












$$\begin{aligned} &R_G = 25~\Omega \\ &V_{DD} = 50~V,~L = 4.2~mH \end{aligned} \qquad EAS = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - VDD} \right)$$

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