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

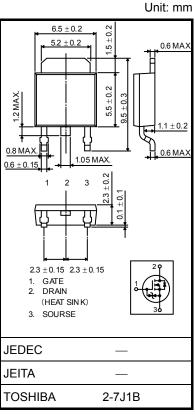
2SK3342

Switching Regulator and DC-DC Converter Applications Motor Drive Applications

• Low drain-source ON resistance : $R_{DS (ON)} = 0.8 \Omega (typ.)$ • High forward transfer admittance : $|Y_{fs}| = 4.5 S (typ.)$ • Low leakage current : $I_{DSS} = 100 \mu A (max) (V_{DS} = 250 V)$ • 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)

Characteris	stics	Symbol	Rating	Unit	
Drain-source voltage		V_{DSS}	250	V	
Drain-gate voltage (Ro	_{SS} = 20 kΩ)	V_{DGR}	250	V	
Gate-source voltage		V _{GSS}	±20	V	
Drain current	DC (Note 1)	I _D	4.5	А	
	Pulse (Note 1)	I _{DP}	18	Α	
Drain power dissipation	n (Tc = 25°C)	P _D	20	W	
Single pulse avalanche	e energy (Note 2)	E _{AS}	51	mJ	
Avalanche current		I _{AR}	4.5	Α	
Repetitive avalanche e	nergy (Note 3)	E _{AR}	2.0	mJ	
Channel temperature		T _{ch}	150	°C	
Storage temperature range		T _{stg}	-55 to 150	°C	



Weight: 0.36 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)}	6.25	°C/W
Thermal resistance, channel to ambient	R _{th (ch-a)}	125	°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 = 4.28 mH, R_G = 25 Ω , I_{AR} = 4.5 A

Note 3: Repetitive rating: pulse width limited by maximum channel temperature This transistor is an electrostatic-sensitive device. Please handle with caution.

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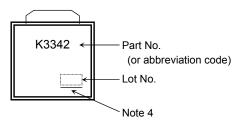
Electrical Characteristics (Ta = 25°C)

Charac	cteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	ırrent	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V		_	±10	μA
Drain cut-off cui	rrent	I _{DSS}	V _{DS} = 250 V, V _{GS} = 0 V		_	100	μA
Drain-source br	eakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	250	_	_	V
Gate threshold v	/oltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.5	_	3.5	V
Drain-source Ol	N resistance	R _{DS} (ON)	V _{GS} = 10 V, I _D = 2.5 A	_	0.8	1.0	Ω
Forward transfer	r admittance	Y _{fs}	V _{DS} = 10 V, I _D = 2.5 A	2.0	4.5	_	S
Input capacitano	e	C _{iss}			440	_	
Reverse transfer	r capacitance	C _{rss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		35	_	pF
Output capacitance		Coss	1		120	_	
Switching time	Rise time	tr	$V_{\rm GS}$ $V_{\rm GS}$ $V_{\rm OV}$ $V_{\rm OUT}$ $V_{\rm DD}$ $V_{\rm DD}$	_	15	_	
	Turn-on time	t _{on}		_	20	_	20
	Fall time	t _f		_	15	_	- ns
	Turn-off time	t _{off}	Duty $\leq 1\%$, $t_{\rm w} = 10 \mu \rm s$	_	60	_	
Total gate charge (Gate-source plus gate-drain)		Qg			10	_	
Gate-source charge		Q _{gs}	$V_{DD} \approx 200 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4.5 \text{ A}$		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}	_	_	_	4.5	Α
Pulse drain reverse current (Note 1)	I _{DRP}	_	_	_	18	Α
Forward voltage (diode)	V _{DSF}	I _{DR} = 4.5 A, V _{GS} = 0 V	_	_	-2.0	V
Reverse recovery time	t _{rr}	I _{DR} = 4.5 A, V _{GS} = 0 V,	_	110	_	ns
Reverse recovery charge	Qrr	dl _{DR} / dt = 100 Å / μs	_	0.47	_	μC

Marking

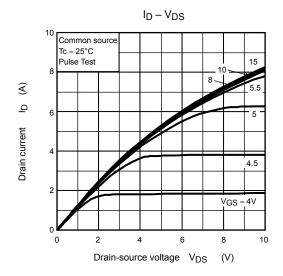


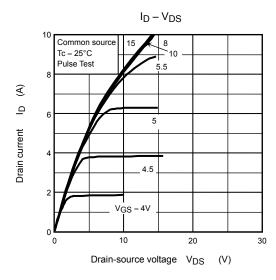
Note 4: A line under a Lot No. identifies the indication of product Labels.

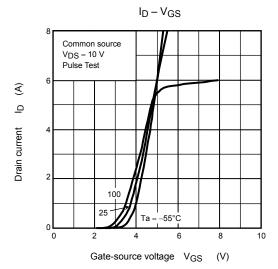
Not underlined: [[Pb]]/INCLUDES > MCV

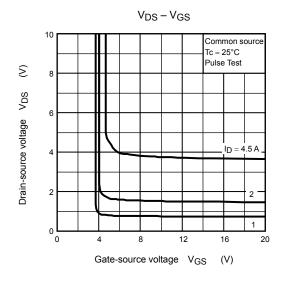
 $\label{thm:compatible} \mbox{Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]}$

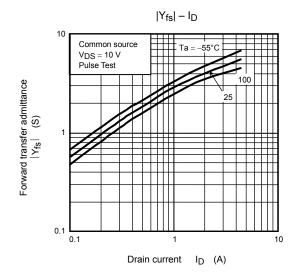
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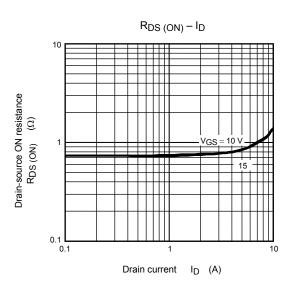


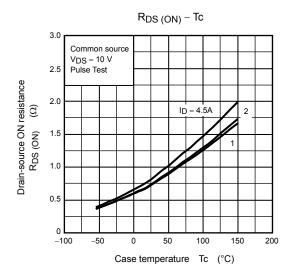


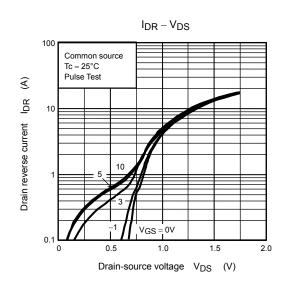


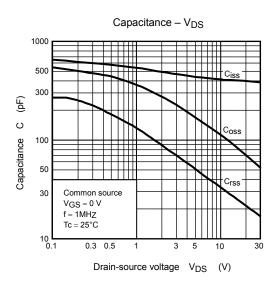


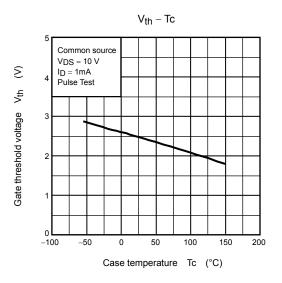


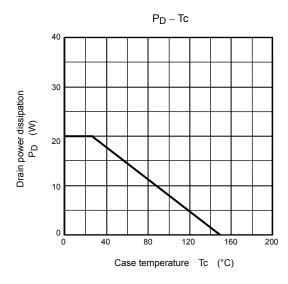


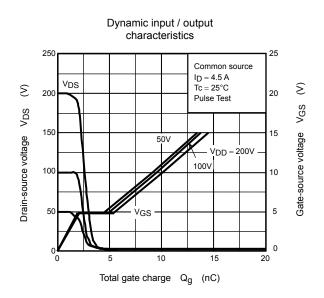


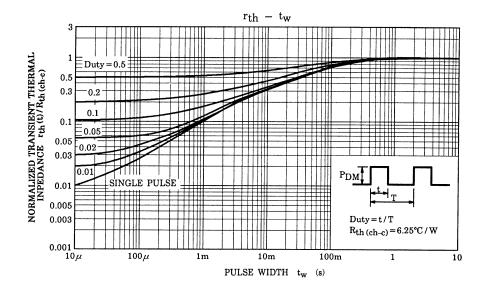


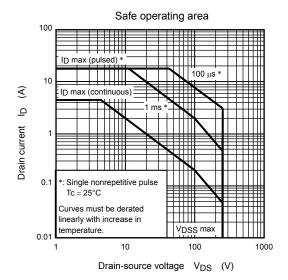


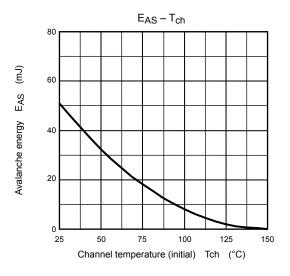


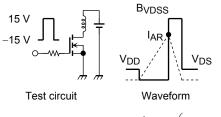












$$R_G$$
 =25 Ω V_{DD} = 50 V, L = 4.28mH

$$\mathsf{EAS} = \frac{1}{2} \cdot L \cdot l^2 \cdot \left(\frac{\mathsf{BVDSS}}{\mathsf{BVDSS} - \mathsf{VDD}} \right)$$

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