Unit: mm

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

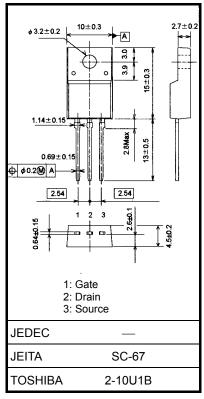
TK7A50D

Switching Regulator Applications

- Low drain-source ON-resistance: $R_{DS (ON)} = 1.0 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 2.5 \text{ S}$ (typ.)
- Low leakage current: I_{DSS} = 10 μ A (max) (V_{DS} = 500 V)
- Enhancement mode: V_{th} = 2.4 to 4.4 V (V_{DS} = 10 V, I_D = 1 mA)

Characteristics		Symbol	Rating	Unit	
Drain-source voltage		V _{DSS}	500	V	
Gate-source voltage		V _{GSS}	±30	V	
Drain current	DC (Note 1)	ID	7		
	Pulse (t = 1 ms) (Note 1)	I _{DP}	28	A	
Drain power dissipation (Tc = 25° C)		PD	35	W	
Single pulse avalanche energy (Note 2)		E _{AS}	129	mJ	
Avalanche current		I _{AR}	7	А	
Repetitive avalanche energy (Note 3)		E _{AR}	3.5	mJ	
Channel temperature		T _{ch}	150	°C	
Storage temperature range		T _{stg}	-55 to 150	°C	

Absolute Maximum Ratings (Ta = 25°C)



Weight: 1.7 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

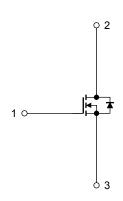
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	R _{th (ch-c)}	3.57	°C/W
Thermal resistance, channel to ambient	R _{th (ch-a)}	62.5	°C/W

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

Note 2: V_{DD} = 90 V, T_{ch} = 25°C (initial), L = 4.5 mH, R_G = 25 Ω , I_{AR} = 7 A

This transistor is an electrostatic-sensitive device. Handle with care.

Internal Connection



Start of commercial production 2008-10

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

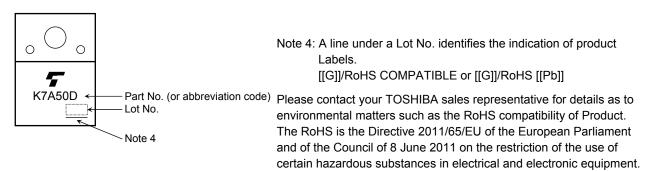
Electrical Characteristics (Ta = 25°C)

Char	acteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage current		I _{GSS}	$V_{GS}=\pm 30~V,~V_{DS}=0~V$			±1	μA
Drain cut-off current		I _{DSS}	$V_{DS} = 500 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			10	μA
Drain-source bre	akdown voltage	V (BR) DSS	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	500			V
Gate threshold v	oltage	V _{th}	$V_{DS} = 10 \text{ V}, \text{ I}_{D} = 1 \text{ mA}$	2.4		4.4	V
Drain-source ON	-resistance	R _{DS (ON)}	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 3.5 \text{ A}$		1.0	1.22	Ω
Forward transfer	admittance	Y _{fs}	$V_{DS} = 10 \text{ V}, \text{ I}_{D} = 3.5 \text{ A}$	0.7	2.5		S
Input capacitance		C _{iss}			600		pF
Reverse transfer capacitance		C _{rss}	$V_{DS} = 25 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ f} = 1 \text{ MHz}$		4		
Output capacitance		C _{oss}			70		
Switching time	Rise time	tr	V_{GS} 0 V 0 V V 0 V V 0 V V 0 V V V V V V V V V V V V V V V V V V V		18	_	ns
	Turn-on time	t _{on}			40		
	Fall time	t _f			8		
	Turn-off time	t _{off}	Duty \le 1%, t _W = 10 µs	_	55	_	
Total gate charge		Qg			12		
Gate-source charge		Q _{gs}	$V_{DD} \approx 400 \text{ V}, \text{ V}_{GS} = 10 \text{ V}, \text{ I}_{D} = 7 \text{ A}$		7		nC
Gate-drain charge		Q _{gd}]		5	—	

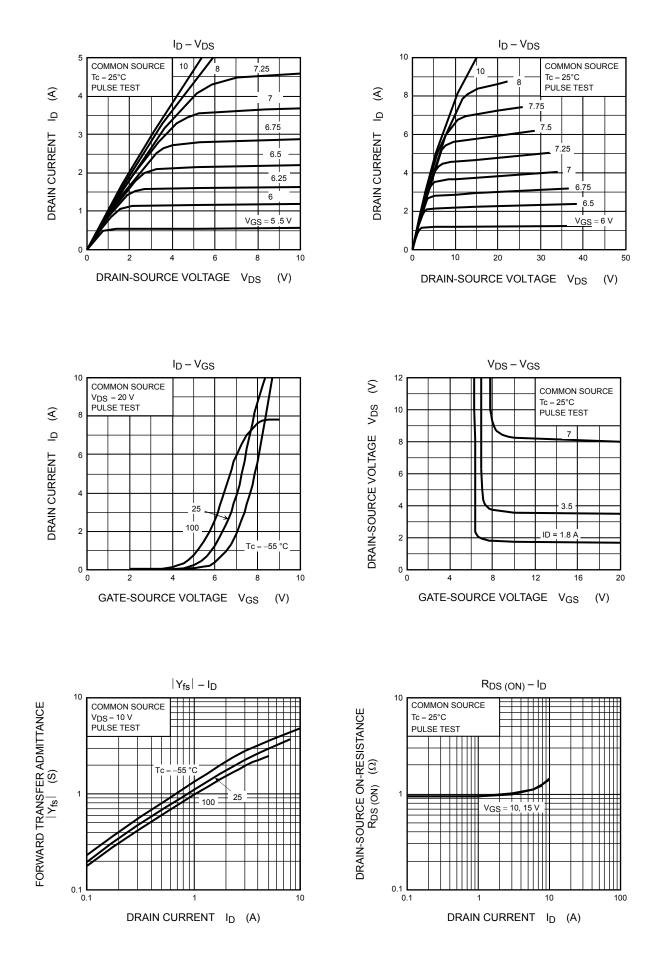
Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	—	_	_	7	А
Pulse drain reverse current (Note 1)	I _{DRP}	—	_	_	28	А
Forward voltage (diode)	V _{DSF}	$I_{DR} = 7 \text{ A}, V_{GS} = 0 \text{ V}$	_	_	-1.7	V
Reverse recovery time	t _{rr}	$I_{DR} = 7 \text{ A}, V_{GS} = 0 \text{ V},$	_	1200	_	ns
Reverse recovery charge	Q _{rr}	dl _{DR} /dt = 100 A/μs	_	7	_	μC

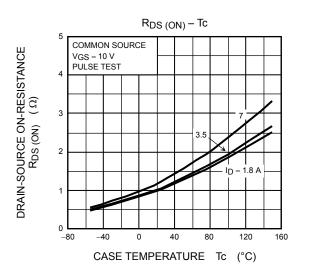
Marking

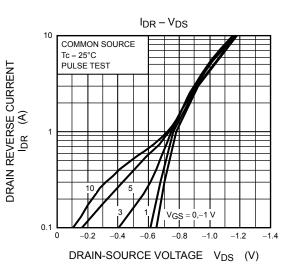


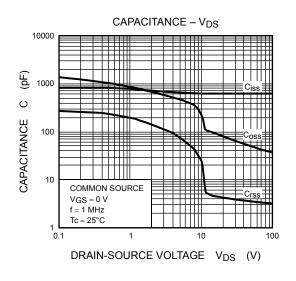
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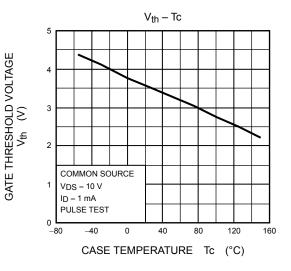


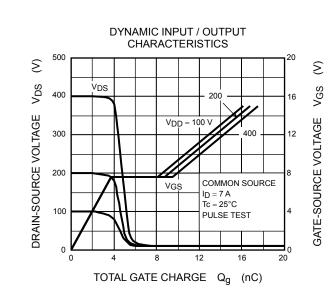
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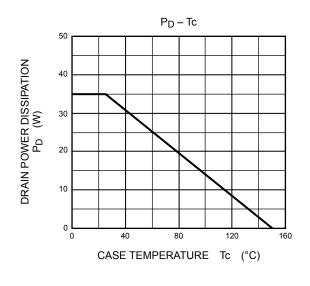


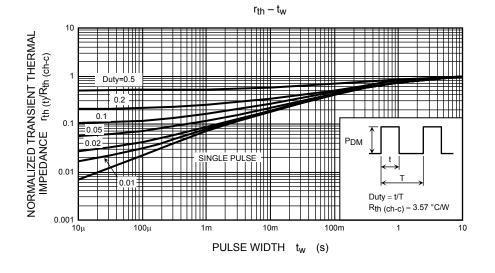


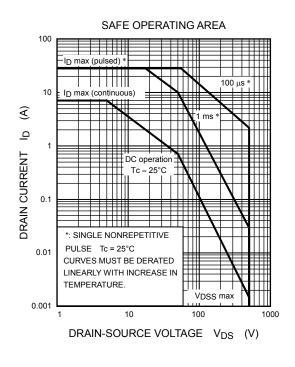


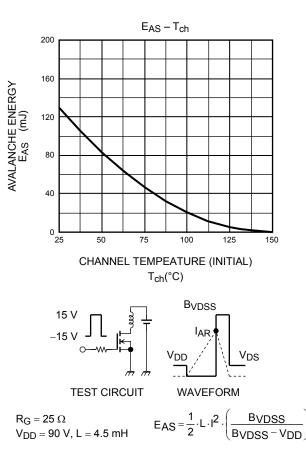












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