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

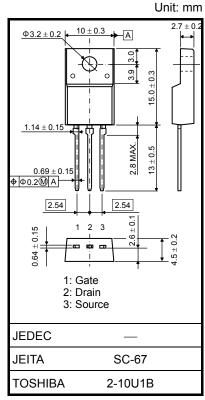
TK4A55DA

Switching Regulator Applications

- Low drain-source ON-resistance: $RDS(ON) = 2.0 \Omega(typ.)$
- High forward transfer admittance: $|Y_{fs}| = 1.8 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \ \mu A \ (max) \ (V_{DS} = 550 \ V)$
- Enhancement mode: $V_{th} = 2.4$ to 4.4 V ($V_{DS} = 10$ V, $I_D = 1$ mA)

5 ()								
Characteristics			Symbol	Rating	Unit			
Drain-source voltage			V _{DSS}	550	V			
Gate-source voltage			V _{GSS}	±30	V			
Drain current	DC	(Note 1)	۱ _D	3.5	А			
	Pulse	(Note 1)	I _{DP}	14	Ā			
Drain power dissipation (Tc = 25° C)			PD	30	W			
Single pulse avalanche energy (Note 2)			E _{AS}	139	mJ			
Avalanche current			I _{AR}	3.5	А			
Repetitive avalanche energy (Note 3)			E _{AR}	3.0	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

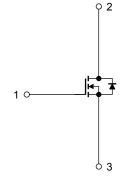
Characteristics	Symbol	Max	Unit	
Thermal resistance, channel to case	R _{th (ch-c)}	4.17	°C/W	
Thermal resistance, channel to ambient	R _{th (ch-a)}	62.5	°C/W	

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

Note 2: $V_{DD} = 90 \text{ V}, \text{ T}_{ch} = 25^{\circ}\text{C}(\text{initial}), \text{ L} = 19.5 \text{ mH}, \text{ R}_{G} = 25 \Omega, \text{ I}_{AR} = 3.5 \text{ A}$

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

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



Start of commercial production 2009-02

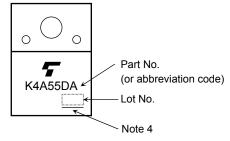
Electrical Characteristics (Ta = 25°C)

Characteristics		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}	$V_{DS} = 550 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$	_		10	μA
Drain-source bre	rain-source breakdown voltage		$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	550			V
Gate threshold voltage		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)}	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 1.8 \text{ A}$	_	2.0	2.45	Ω
Forward transfer admittance		Y _{fs}	$V_{DS} = 10 \text{ V}, \text{ I}_{D} = 1.8 \text{ A}$	0.4	1.8		S
Input capacitance		C _{iss}		_	380		
Reverse transfer capacitance		C _{rss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	_	2.5		pF
Output capacitance		C _{oss}			45		
Switching time	Rise time	tr	10 V ID = 1.8 A VOUT		15		- ns
	Turn-on time	t _{on}	$0 \lor -1 \lor + 1 = 111 \Omega$		35		
	Fall time	t _f	 		7		
	Turn-off time	t _{off}	Duty \leq 1%, t _W = 10 μ s	_	55	_	
Total gate charge		Qg		_	9		
Gate-source charge		Q _{gs}	$V_{DD}\approx 400$ V, $V_{GS}=10$ V, $I_{D}=3.5$ A	_	5		nC
Gate-drain 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}	—	_	_	3.5	А
Pulse drain reverse current (Note 1)	I _{DRP}	_	_	_	14	А
Forward voltage (diode)	V _{DSF}	$I_{DR} = 3.5 \text{ A}, V_{GS} = 0 \text{ V}$	_	_	-1.7	V
Reverse recovery time	t _{rr}	$I_{DR} = 3.5 \text{ A}, V_{GS} = 0 \text{ V},$	_	800	_	ns
Reverse recovery charge	Q _{rr}	dl _{DR} /dt = 100 A/μs	_	4.4		μC

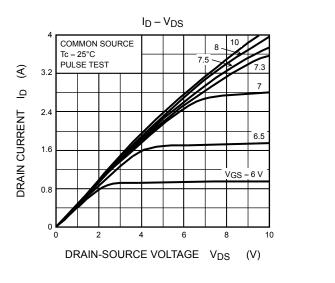
Marking

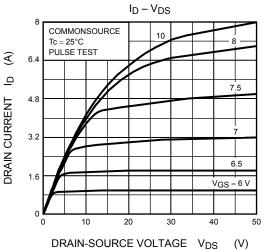


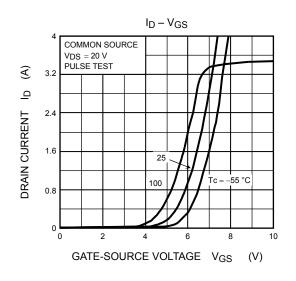
Note 4 : A line under a Lot No. identifies the indication of product Labels [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

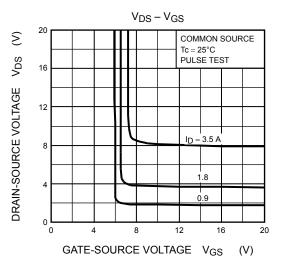
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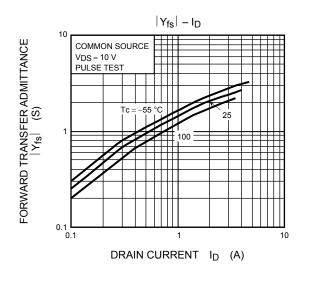
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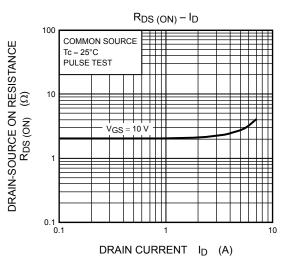




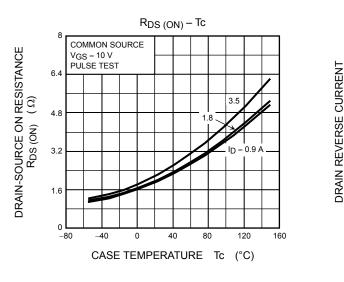


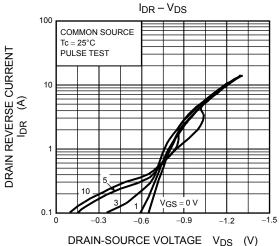




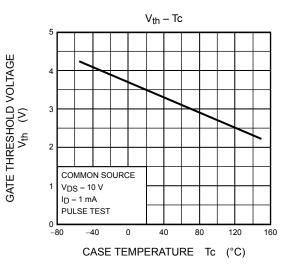


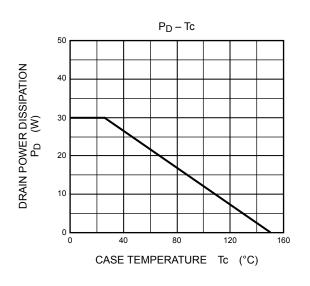
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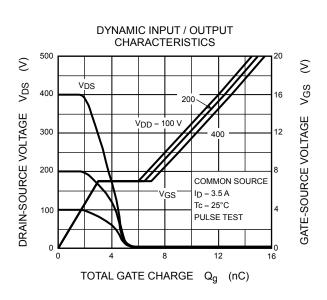


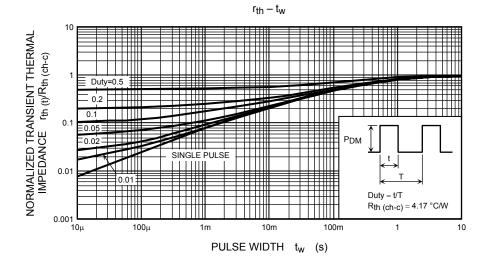


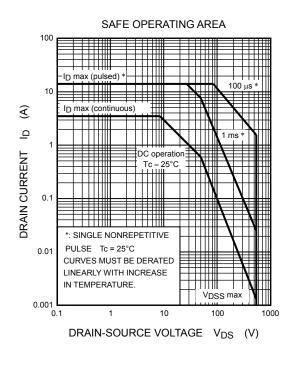
CAPACITANCE - VDS 10000 COMMON SOURCE VGS = 0 V f = 1 MHz (PF) Tc = 25°C 1000 1111 ပ CAPACITANCE 100 10 1 L 10 100 1 DRAIN-SOURCE VOLTAGE VDS (V)

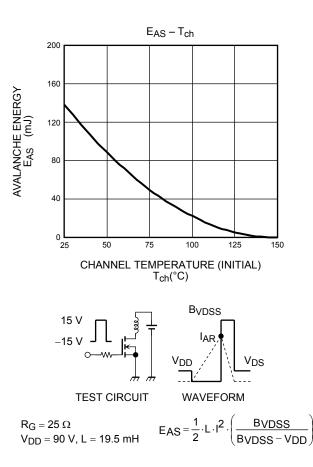












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