Unit: mm

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (U-MOS III)

# SSM3K15AFS

#### Load Switching Applications

2.5 V drive

Low ON-resistance:  $R_{DS(ON)} = 3.6 \Omega \text{ (max) } (@V_{GS} = 4 \text{ V})$  $R_{DS(ON)} = 6.0 \Omega \text{ (max) } (@V_{GS} = 2.5 \text{ V})$ 

# **Absolute Maximum Ratings (Ta = 25°C)**

Characteristics		Symbol	Rating	Unit	
Drain-Source voltage		$V_{DSS}$	30	V	
Gate-Source voltage		V <sub>GSS</sub>	± 20	V	
Drain current	DC	ID	100	mA	
	Pulse	I <sub>DP</sub>	400		
Power dissipation		$P_{D}$	100	mW	
Channel temperature		T <sub>ch</sub>	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	

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

**A** 1. Gate 2. Source 3. Drain SSM

2-2H1B

Weight: 2.4 mg (typ.)

**JEDEC** 

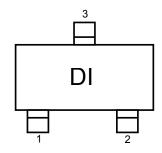
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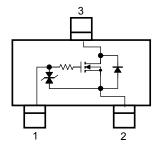
**TOSHIBA** 

Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

#### Marking

## **Equivalent Circuit (top view)**





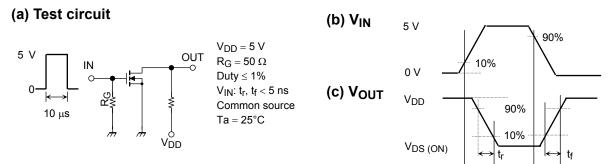
# **Electrical characteristics (Ta = 25°C)**

Chara	acteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Drain-Source breakdown voltage		V (BR) DSS	$I_D = 0.1 \text{ mA}, V_{GS} = 0 \text{ V}$	30	_	_	· V
		V (BR) DSX	$I_D = 0.1 \text{ mA}, V_{GS} = -10 \text{ V}$ (Note 3)	16	_	_	
Drain cut-off currer	nt	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V	_	_	1	μА
Gate leakage curre	ent	I <sub>GSS</sub>	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	_	_	±1	μА
Gate threshold vol	tage	V <sub>th</sub>	$V_{DS} = 3 \text{ V}, I_D = 0.1 \text{ mA}$	0.8	_	1.5	V
Forward transfer a	dmittance	Y <sub>fs</sub>	$V_{DS} = 3 \text{ V}, I_D = 10 \text{ mA}$ (Note 2)	35	_	_	mS
Drain-Source ON-resistance		R <sub>DS</sub> (ON)	$I_D = 10 \text{ mA}, V_{GS} = 4 \text{ V}$ (Note 2)	_	2.3	3.6	Ω
			$I_D = 10 \text{ mA}, V_{GS} = 2.5 \text{ V}$ (Note 2)	_	3.5	6.0	
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0 V, f = 1 MHz	_	13.5	_	pF
Output capacitance		Coss		_	8.0	_	
Reverse transfer capacitance		C <sub>rss</sub>		_	6.5	_	
Switching time	Turn-on time	t <sub>on</sub>	$V_{DD}$ = 5 V, $I_D$ = 10 mA $V_{GS}$ = 0 to 5 V, $R_G$ = 50 $\Omega$	_	5.5	_	- ns
	Turn-off time	t <sub>off</sub>		_	35	_	
Drain-source forward voltage		V <sub>DSF</sub>	$I_D = -100 \text{ mA}, V_{GS} = 0 \text{ V}$ (Note 2)	_	-0.85	-1.2	V

Note 2: Pulse test

Note 3: If a reverse bias is applied between gate and source, this device enters V(BR)DSX mode. Note that the drain-source breakdown voltage is lowered in this mode.

## **Switching Time Test Circuit**



#### **Precaution**

 $V_{th}$  can be expressed as voltage between gate and source when low operating current value is  $I_D$  = 0.1 mA for this product. For normal switching operation,  $V_{GS\ (on)}$  requires higher voltage than  $V_{th}$  and  $V_{GS\ (off)}$  requires lower voltage than  $V_{th}$ . (Relationship can be established as follows:  $V_{GS\ (off)} < V_{th} < V_{GS\ (on)}$ )

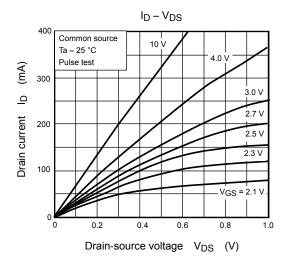
Please take this into consideration for using the device.

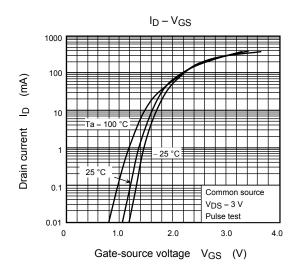
Do not use this device under avalanche mode. It may cause the device to break down.

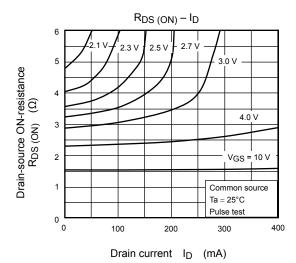
#### **Handling Precaution**

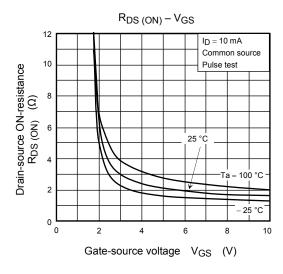
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

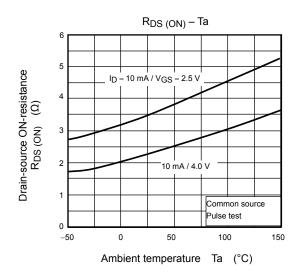
Thermal resistance  $R_{th\ (ch-a)}$  and power dissipation  $P_D$  vary depending on board material, board area, board thickness and pad area. When using this device, please take heat dissipation into consideration

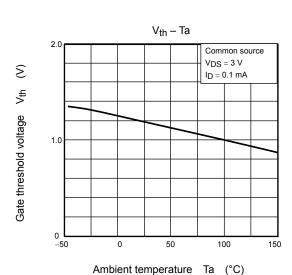






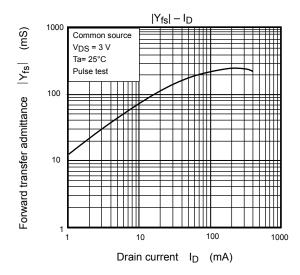


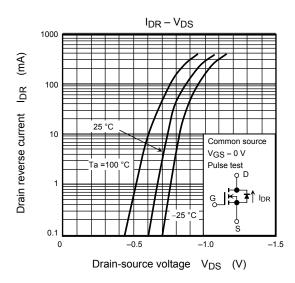


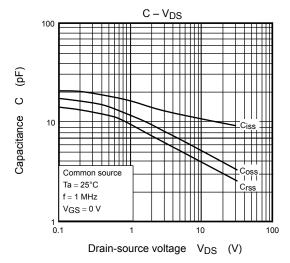


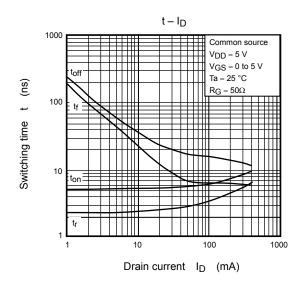
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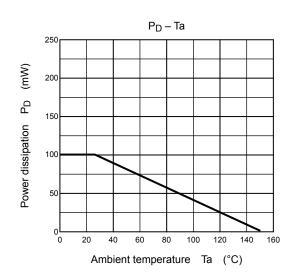
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