TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

## SSM6N09FU

### **High Speed Switching Applications**

Unit: mm

- · Small package
- Low Drain-Source ON resistance.
  - :  $R_{on} = 0.7 \Omega \text{ (max) } (@V_{GS} = 10 \text{ V})$
  - :  $R_{on} = 1.2 \Omega (max) (@V_{GS} = 4 V)$

### Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

Characteristics		Symbol	Rating	Unit	
Drain-Source voltage		$V_{DS}$	30	V	
Gate-Source voltage		$V_{GSS}$	±20	V	
Drain current	DC	I <sub>D</sub>	400	mA	
	Pulse	I <sub>DP</sub>	800		
Drain power dissipation (Ta = 25°C)		P <sub>D</sub> (Note1)	300	mW	
Channel temperature		T <sub>ch</sub>	150	°C	
Storage temperature range		T <sub>stg</sub>	−55~150	°C	

Note1: Total rating, mounted on FR4 board (25.4 mm  $\times$  25.4 mm  $\times$  1.6 t, Cu Pad: 0.32 mm<sup>2</sup>  $\times$  6) Figure 1.

1. SOURCE 1 4. SOURCE 2
2. GATE 1 5. GATE 2
3. DRAIN 2 6. DRAIN 1

US6

JEDEC —

JEITA —

TOSHIBA 2-2J1C

2.1 ± 0.1

Weight: 6.8 mg (typ.)

## **Handling Precaution**

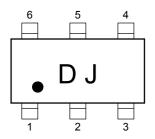
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

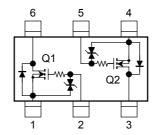
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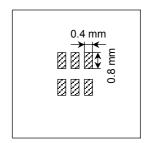
### Marking

# Equivalent Circuit (top view)

Figure 1: 25.4 mm  $\times$  25.4 mm  $\times$  1.6 t, Cu Pad: 0.32 mm<sup>2</sup>  $\times$  6





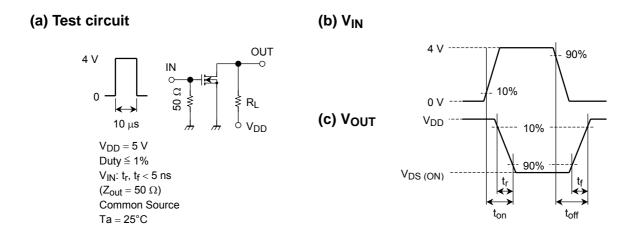


## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage current		I <sub>GSS</sub>	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$	_	_	±1	μΑ
Drain-Source breakdown voltage		V (BR) DSS	$I_D = 1 \text{ mA}, V_{GS} = 0$	30	_	_	V
Drain cut-off current		I <sub>DSS</sub>	$V_{DS} = 30 \text{ V}, V_{GS} = 0$	_	_	1	μΑ
Gate threshold voltage		V <sub>th</sub>	$V_{DS} = 5 \text{ V}, I_D = 0.1 \text{ mA}$	1.1	_	1.8	V
Forward transfer admittance		Y <sub>fs</sub>	$V_{DS} = 5 \text{ V}, I_D = 200 \text{ mA}$ (Note2)	270	_	_	mS
Drain-Source ON resistance		R <sub>DS</sub> (ON)	$I_D = 200 \text{ mA}, V_{GS} = 10 \text{ V}$ (Note2)	_	0.53	0.7	Ω
			$I_D = 200 \text{ mA}, V_{GS} = 4 \text{ V}$ (Note2)	_	0.8	1.2	
			I <sub>D</sub> = 200 mA, V <sub>GS</sub> = 3.3 V (Note2)	_	1.0	1.7	
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 0, f = 1 MHz	_	20		pF
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 0, f = 1 MHz	_	7		pF
Output capacitance		C <sub>oss</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 0, f = 1 MHz		16		pF
Switching time	Turn-on time	t <sub>on</sub>	$V_{DD} = 5 \text{ V}, I_D = 200 \text{ mA},$		72	_	- ns
	Turn-off time	t <sub>off</sub>	V <sub>GS</sub> = 0~4 V	_	68		

Note2: Pulse test

### **Switching Time Test Circuit (Q1, Q2 Common)**

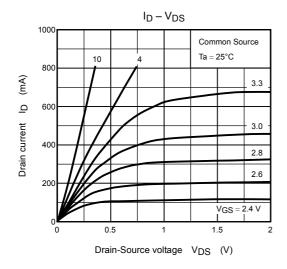


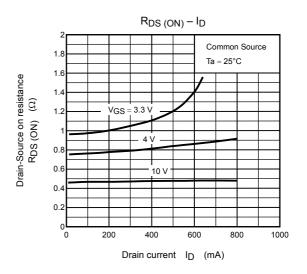
### **Precaution**

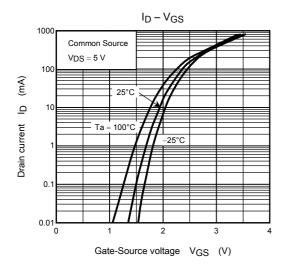
 $V_{th}$  can be expressed as voltage between gate and source when low operating current value is  $I_D$  = 100  $\mu A$  for this product. For normal switching operation,  $V_{GS}$  (on) requires higher voltage than  $V_{th}$  and  $V_{GS}$  (off) requires lower voltage than  $V_{th}$ . (Relationship can be established as follows:  $V_{GS}$  (off) <  $V_{th}$  <  $V_{GS}$  (on))

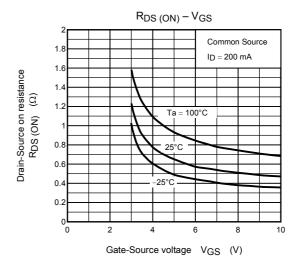
Please take this into consideration for using the device. VGS recommended voltage of 4 V or higher to turn on this product.

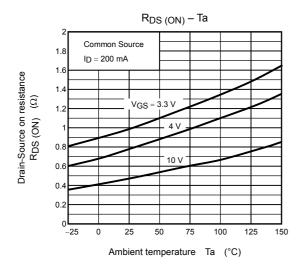
(Q1, Q2 common)

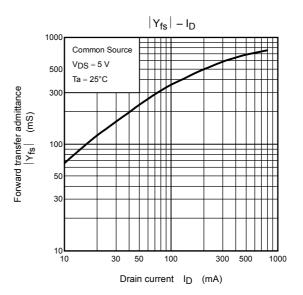






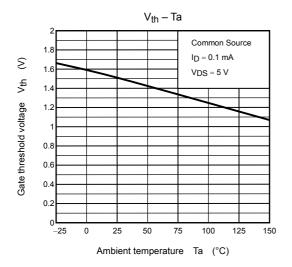


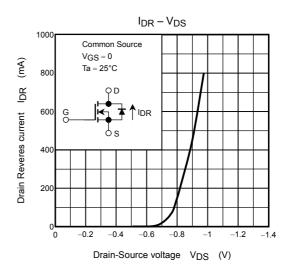


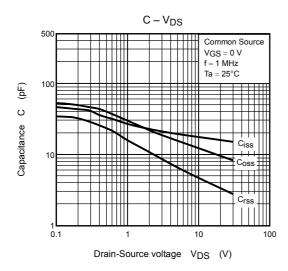


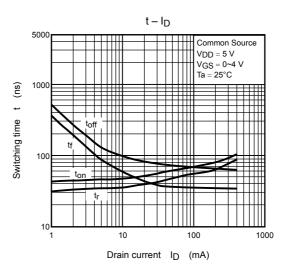
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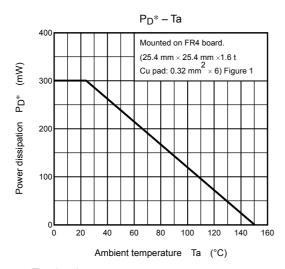
(Q1, Q2 common)











\*: Total rating

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