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

SSM6N7002BFU

High-Speed Switching Applications
Analog Switch Applications

· Small package

• Low ON-resistance : $R_{DS(ON)} = 3.3 \Omega \text{ (max) (@V_{GS} = 4.5 V)}$

: $R_{DS(ON)} = 2.6 \Omega \text{ (max) } (@V_{GS} = 5 \text{ V})$: $R_{DS(ON)} = 2.1 \Omega \text{ (max) } (@V_{GS} = 10 \text{ V})$

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

Characteristics		Symbol	Rating	Unit	
Drain-source voltage		V_{DSS}	60	V	
Gate-source voltage		V _{GSS}	± 20	V	
Drain current	DC	ID	200	mA	
	Pulse	I _{DP}	800		
Drain power dissipation (Ta = 25°C)		P _D (Note 1)	300	mW	
Channel temperature		T _{ch}	150	°C	
Storage temperature range		T _{stg}	-55 to 150	°C	

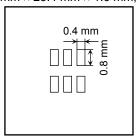
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the

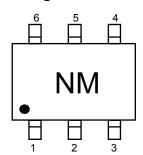
Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1:Total rating, mounted on FR4 board

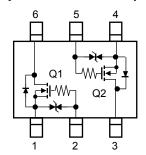
 $(25.4 \text{ mm} \times 25.4 \text{ mm} \times 1.6 \text{ mm}, \text{ Cu Pad: } 0.32 \text{mm}^2 \times 6)$



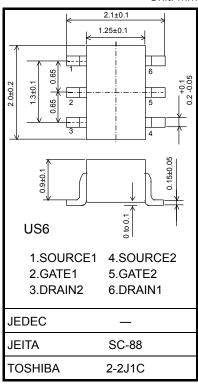
Marking



Equivalent Circuit (top view)



Unit: mm



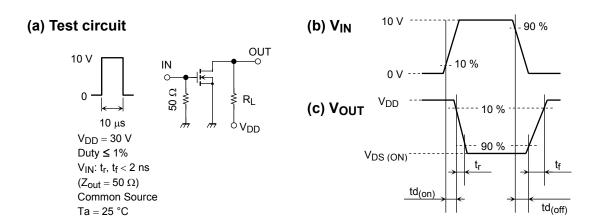
Weight: 6.8 mg (typ.)

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

Chara	acteristics	Symbol	Test Condition	N	Иin	Тур	Max	Unit	
Gate leakage curre	ent	I _{GSS}	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$	-		_	±10	μΑ	
Drain-source breakdown voltage		V (BR) DSS	$I_D = 10$ mA, $V_{GS} = 0$ V	(60			V	
		V (BR) DSX	$I_D = 10 \text{ mA}, V_{GS} = -10 \text{ V}$	4	45				
Drain cutoff curren	t	I _{DSS}	$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}$	-	_		1	μΑ	
Gate threshold vol	tage	V_{th}	$V_{DS} = 10 \text{ V}, I_D = 0.25 \text{ mA}$	1	1.5		3.1	V	
Forward transfer a	dmittance	Y _{fs}	$V_{DS} = 10 \text{ V}, I_D = 200 \text{ mA}$ (Not	e 2) 2	225	_	_	mS	
Drain-source ON-resistance		R _{DS} (ON)	$I_D = 500 \text{ mA}, V_{GS} = 10 \text{ V}$ (Not	e 2) -		1.62	2.1	Ω	
			$I_D = 100 \text{ mA}, V_{GS} = 5 \text{ V}$ (Not	e 2) -		1.90	2.6		
			$I_D = 100 \text{ mA}, V_{GS} = 4.5 \text{ V}$ (Not	e 2) -		2.10	3.3		
Input capacitance Reverse transfer capacitance Output capacitance		C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz			17.0	_	pF	
		C _{rss}				1.9	_		
		Coss				3.6	_		
Switching time	Turn-on delay time	td _(on)	$V_{DD} = 30 \text{ V}$, $I_D = 200 \text{ mA}$, $V_{GS} = 0 \text{ to } 10 \text{ V}$	-		3.3	6.6	ns	
	Turn-off delay time	td _(off)				14.5	40		
Drain-source forward voltage		V_{DSF}	$I_D = -200 \text{ mA}, V_{GS} = 0 \text{ V}$ (Not	e 2) -	_	-0.84	-1.2	V	

Note2: Pulse test

Switching Time Test Circuit



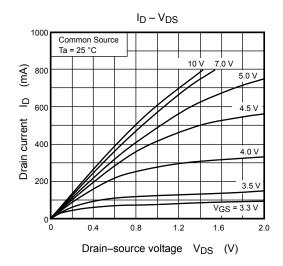
Precaution

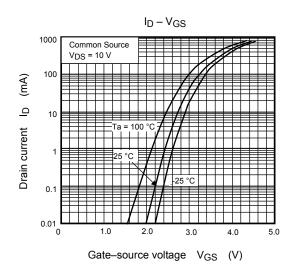
Let V_{th} be the voltage applied between gate and source that causes the drain current (I_D) to be low (0.25 mA for the SSM6N7002BFU). Then, for normal switching operation, $V_{GS(on)}$ must be higher than V_{th} , and $V_{GS(off)}$ must be lower than V_{th} . This relationship can be expressed as: $V_{GS(off)} < V_{th} < V_{GS(on)}$. Take this into consideration when using the device

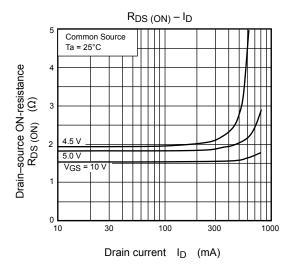
Handling Precaution

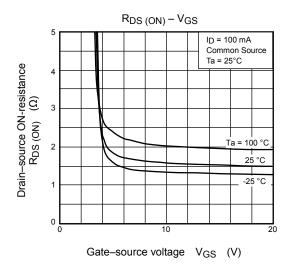
When handling individual devices that are not yet mounted on a circuit board, make sure that the environment is protected against electrostatic discharge. Operators should wear antistatic clothing, and containers and other objects that come into direct contact with devices should be made of antistatic materials.

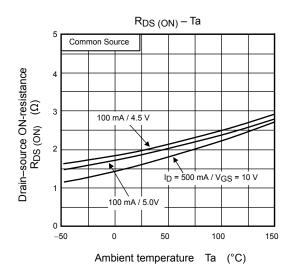
(Q1,Q2 Common)

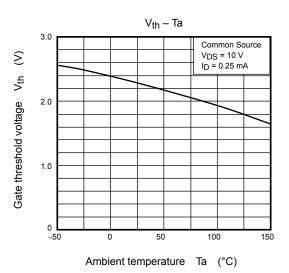






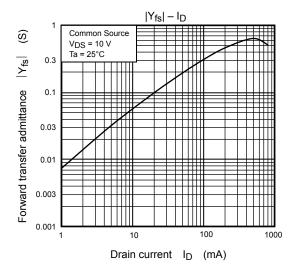


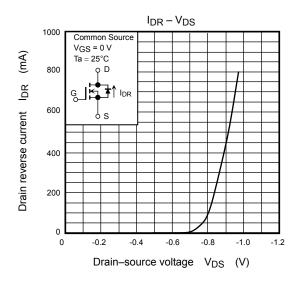


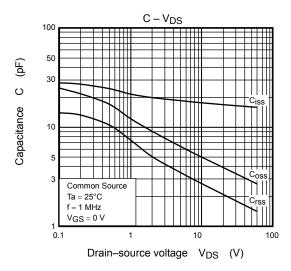


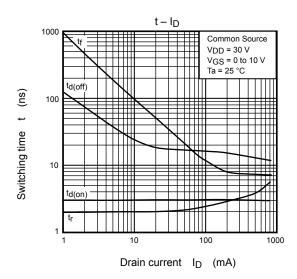
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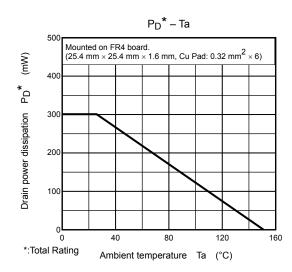
(Q1, Q2 Common)











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