Tentative

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

SSM6K201FE

Power Management Switch Applications High Speed Switching Applications

• 1.8 V drive

• Low ON-resistance: $R_{on} = 186 \text{ m}\Omega \text{ (max) (@V}_{GS} = 1.8\text{V)}$

 $R_{on} = 119 \text{ m}\Omega \text{ (max) (@V_{GS} = 2.5V)}$

 $R_{on} = 91 \text{ m}\Omega \text{ (max) (@V_{GS} = 4.0V)}$

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit	
Drain-source voltage		V _{DS}	20	V	
Gate-source voltage		V_{GSS}	± 12	V	
Drain current	DC	I _D	2.3	А	
	Pulse	I _{DP}	4.6		
Drain power dissipation		P _D (Note 1)	500	W	
Channel temperature		T _{ch}	150	°C	
Storage temperature range		T _{stg}	-55~150	°C	

Note 1: Mounted on an FR4 board. (25.4 mm \times 25.4 mm \times 1.6 t, Cu Pad: 645 mm 2)

1.6±0.05 1.2

Weight: 3 mg (typ.)

Electrical Characteristics (Ta = 25°C)

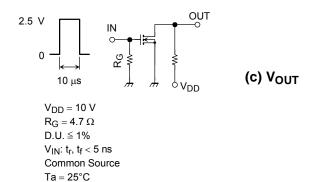
Charac	teristic	Symbol	Test Condition		Min	Тур.	Max	Unit
Drain–source breakdown voltage		V (BR) DSS	$I_D = 1 \text{ mA}, V_{GS} = 0$		20	_	_	V
		V (BR) DSX	I _D = 1 mA, V _{GS} = -12 V		10	_	_	V
Drain cutoff curren	t	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0		_	_	1	μА
Gate leakage curre	ent	I _{GSS}	$V_{GS} = \pm 12 \text{ V}, V_{DS} = 0$		_	_	±1	μΑ
Gate threshold vol	tage	V _{th}	$V_{DS} = 3 \text{ V}, I_D = 1 \text{ mA}$		0.4	_	1.0	V
Forward transfer a	dmittance	Y _{fs}	$V_{DS} = 3 \text{ V}, I_{D} = 1.0 \text{ A}$	(Note2)	2.8	5.5	_	S
Drain–source ON-resistance		R _{DS (ON)}	I _D = 1.0 A, V _{GS} = 4.0 V	(Note2)		71	91	mΩ
			I _D = 0.5 A, V _{GS} = 2.5 V	(Note2)		91	119	
			I _D = 0.2 A, V _{GS} = 1.8 V	(Note2)	_	121	186	
Input capacitance		C _{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$		_	220	_	pF
Output capacitance	capacitance C_{OSS} $V_{DS} = 10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$		Hz	_	51	_	pF	
Reverse transfer capacitance		C _{rss}	V _{DS} = 10 V, V _{GS} = 0, f = 1 MHz			42	_	pF
Switching time	Turn-on time	t _{on}	$V_{DD} = 10 \text{ V}, I_D = 2.0 \text{ A},$		_	12	_	
	Turn-off time	t _{off}	$V_{GS} = 0$ to 2.5 V, $R_G = 4.7 \Omega$		_	10	_	ns
Drain-source forward voltage		V _{DSF}	$I_D = -2.3 \text{ A}, V_{GS} = 0 \text{ V}$	(Note2)	_	- 0.85	- 1.20	٧

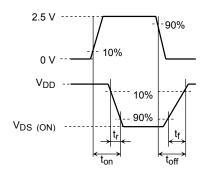
Note2: Pulse test

Switching Time Test Circuit

(a) Test Circuit

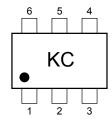


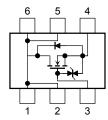




Marking

Equivalent Circuit (top view)





Notice on Usage

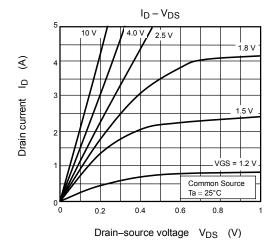
 V_{th} can be expressed as the voltage between gate and source when the low operating current value is I_D = 1 mA for this product. For normal switching operation, $V_{GS\ (on)}$ requires a higher voltage than V_{th} and $V_{GS\ (off)}$ requires a lower voltage than V_{th} .

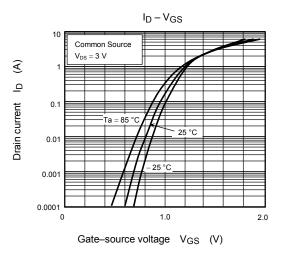
(The relationship can be established as follows: $V_{GS (off)} < V_{th} < V_{GS (on)}$.)

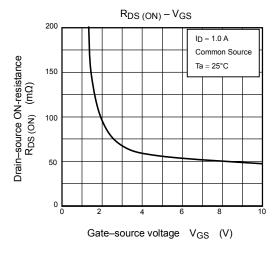
Take this into consideration when using the device. The V_{GS} recommended voltage for turning on this product is 1.8 V or higher.

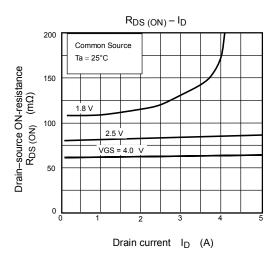
Handling Precaution

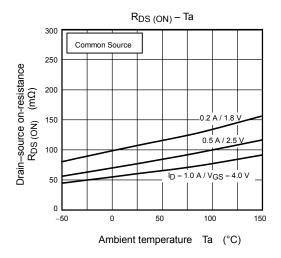
When handling individual devices that are not yet mounted on a circuit board, make sure that the environment is protected against electrostatic discharge. Operators should wear antistatic clothing, and containers and other objects that come into direct contact with devices should be made of antistatic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

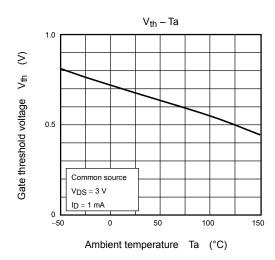


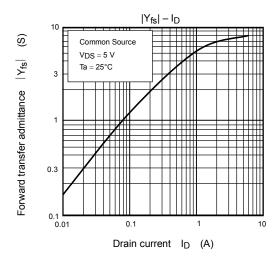


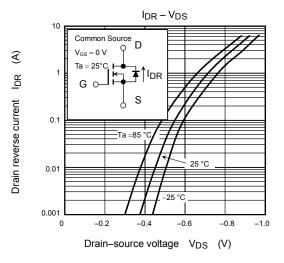


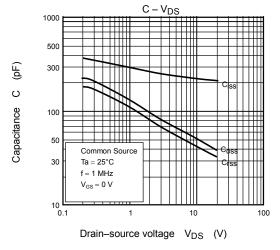


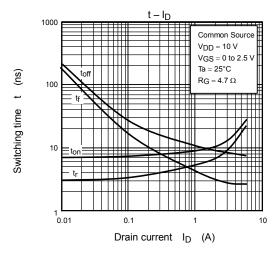


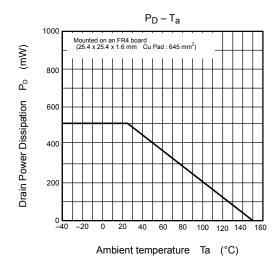












4

RESTRICTIONS ON PRODUCT USE

Handbook" etc. 021023_A

060116EAA

- The information contained herein is subject to change without notice. 021023_D
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
 In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk. 021023_B
- The products described in this document shall not be used or embedded to any downstream products of which
 manufacture, use and/or sale are prohibited under any applicable laws and regulations. 060106_Q
- The information contained herein is presented only as a guide for the applications of our products. No responsibility
 is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from
 its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
 021023_C