TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

SSM3K02F

High Speed Switching Applications

- Small package
- Low on resistance: $R_{on} = 200 \text{ m}\Omega \text{ (max)} (V_{GS} = 4 \text{ V})$
 - $R_{on} = 250 \text{ m}\Omega \text{ (max)} (V_{GS} = 2.5 \text{ V})$
- Low gate threshold voltage: V_{th} = 0.6~1.1 V (V_{DS} = 3 V, I_D = 0.1 mA)

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
Drain-source voltage		V _{DS}	30	V	
Gate-source voltage		V _{GSS}	±10	V	
Drain current	DC	۱ _D	1.0	А	
	Pulse	I _{DP}	2.0	~	
Drain power dissipation		PD	200	mW	
Channel temperature		T _{ch}	150	°C	
Storage temperature range		T _{stg}	-55~150	°C	



Weight: 0.012 g (typ.)

Marking



Equivalent Circuit



Handling Precaution

When handling individual devices (which are not yet mounted 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.

Unit: mm

Electrical Characteristics (Ta = 25°C)

Chara	acteristics	Symbol	Test Condition		Min	Тур.	Max	Unit
Gate leakage cur	rent	I _{GSS}	$V_{GS}=\pm 10~V,~V_{DS}=0$		_		±5	μA
Drain-source brea	akdown voltage	V (BR) DSS	$I_{D} = 1 \text{ mA}, V_{GS} = 0$		30			V
Drain cut-off curre	ent	I _{DSS}	$V_{DS} = 30 V, V_{GS} = 0$		_		1	μA
Gate threshold vo	oltage	V _{th}	$V_{DS} = 3 V, I_D = 0.1 mA$		0.6		1.1	V
Forward transfer	admittance	Y _{fs}	$V_{DS} = 3 V, I_D = 0.5 A$	(Note)	1.5			S
Drain-source ON resistance		R _{DS (ON)}	$I_D = 0.5 \text{ A}, V_{GS} = 4 \text{ V}$	(Note)		140	200	mΩ
			$I_D = 0.5 \text{ A}, \text{ V}_{GS} = 2.5 \text{ V}$	(Note)		180	250	
Input capacitance	9	C _{iss}	$V_{DS} = 10 \text{ V}, \text{ V}_{GS} = 0, \text{ f} = 1 \text{ MHz}$			115		pF
Reverse transfer	se transfer capacitance C_{rss} $V_{DS} = 10 V$, $V_{GS} = 0$, f = 1 MHz				24		pF	
Output capacitan	се	C _{oss}	$V_{DS} = 10 \text{ V}, \text{ V}_{GS} = 0, \text{ f} = 1 \text{ MHz}$			60		pF
Switching time	Turn-on time	t _{on}	$\begin{array}{l} V_{DD} = 15 \; V, \; I_{D} = 0.5 \; A, \\ V_{GS} = 0 {\sim} 2.5 \; V, \; R_{G} = 4.7 \; \Omega \end{array}$		_	52		20
	Turn-off time	t _{off}				80		ns

Note: Pulse test

Switching Time Test Circuit



Precaution

 V_{th} can be expressed as voltage between gate and source when low operating current value is ID = 100 μA 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: $\mathrm{VGS}\left(\mathrm{off}\right) < \mathrm{Vth} < \mathrm{VGS}\left(\mathrm{ON}\right)$)

Please take this into consideration for using the device.

 V_{GS} recommended voltage of 2.5~V or higher to turn on this product.

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Figure 1 25.4 mm \times 25.4 mm \times 1.6 t (a Cu pad of 0.8 mm² area)

RESTRICTIONS ON PRODUCT USE

Handbook" etc.,

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 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"
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