

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

SSM3K05FU**High Speed Switching Applications**

- Small package
- Low on resistance: $R_{on} = 0.8 \Omega$ max (@ $V_{GS} = 4$ V)
: $R_{on} = 1.2 \Omega$ max (@ $V_{GS} = 2.5$ V)
- Low gate threshold voltage

Absolute Maximum Ratings (Ta = 25°C)

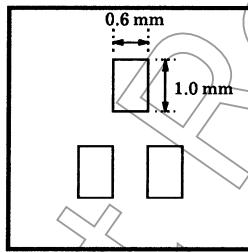
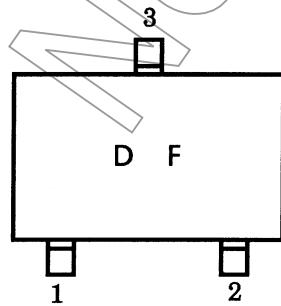
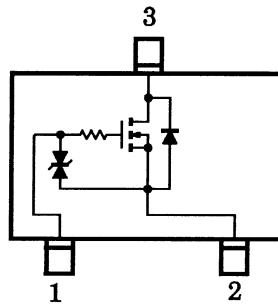
Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GSS}	± 12	V
Drain current	DC I_D	400	mA
	Pulse I_{DP}	800	
Drain power dissipation (Ta = 25°C)	P_D (Note 1)	150	mW
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55~150	°C

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.

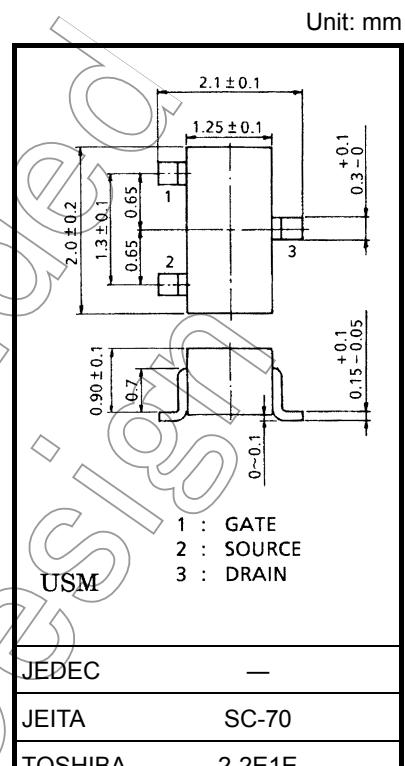
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Note 1: Mounted on FR4 board.

(25.4 mm × 25.4 mm × 1.6 t, Cu pad: 0.6 mm² × 3)

**Marking****Equivalent Circuit****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.



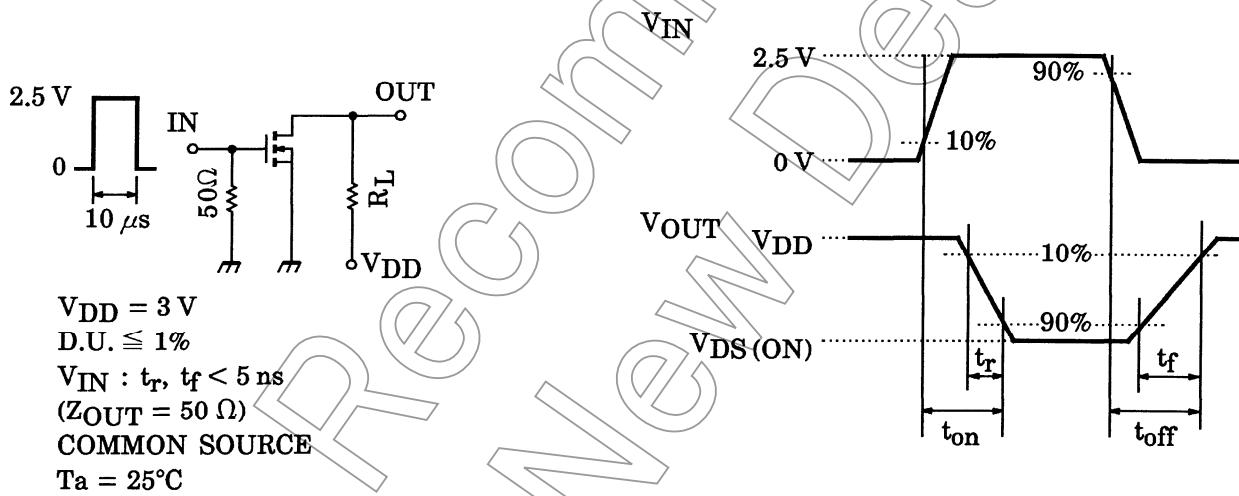
Weight: 0.006 g (typ.)

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 12 \text{ V}$, $V_{DS} = 0$	—	—	± 1	μA	
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 1 \text{ mA}$, $V_{GS} = 0$	20	—	—	V	
Drain cut-off current	I_{DSS}	$V_{DS} = 20 \text{ V}$, $V_{GS} = 0$	—	—	1	μA	
Gate threshold voltage	V_{th}	$V_{DS} = 3 \text{ V}$, $I_D = 0.1 \text{ mA}$	0.6	—	1.1	V	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 3 \text{ V}$, $I_D = 200 \text{ mA}$	(Note 2)	350	—	—	mS
Drain-source ON resistance	$R_{DS(\text{ON})}$	$I_D = 200 \text{ mA}$, $V_{GS} = 4 \text{ V}$		0.6	0.8	Ω	
		$I_D = 200 \text{ mA}$, $V_{GS} = 2.5 \text{ V}$	(Note 2)	0.85	1.2		
Input capacitance	C_{iss}	$V_{DS} = 3 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$	—	22	—	pF	
Reverse transfer capacitance	C_{rss}	$V_{DS} = 3 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$	—	9	—	pF	
Output capacitance	C_{oss}	$V_{DS} = 3 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$	—	21	—	pF	
Switching time	Turn-on time	t_{on}	$V_{DD} = 3 \text{ V}$, $I_D = 100 \text{ mA}$, $V_{GS} = 0\text{--}2.5 \text{ V}$	—	60	ns	
	Turn-off time	t_{off}		—	70		

Note 2: Pulse test

Switching Time Test Circuit

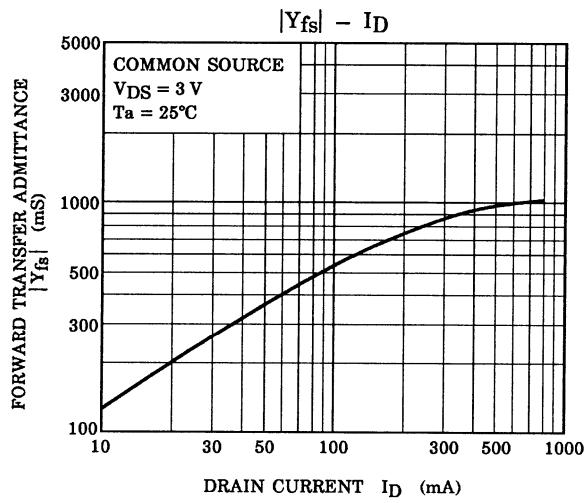
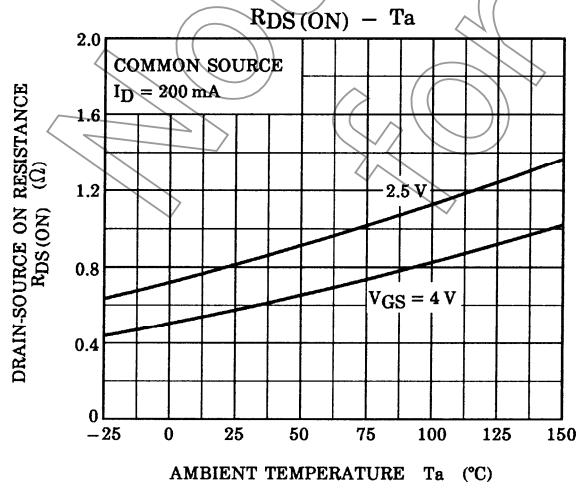
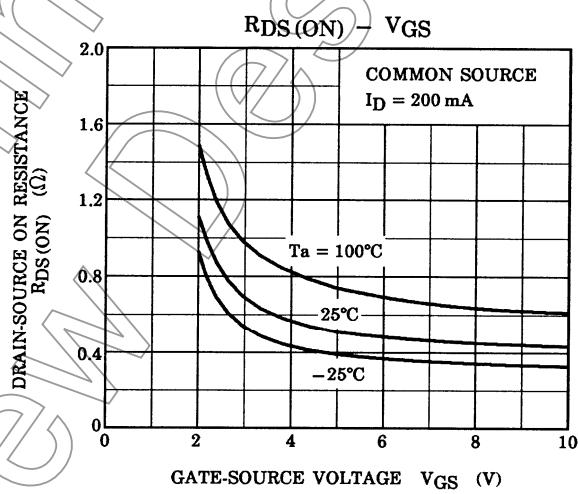
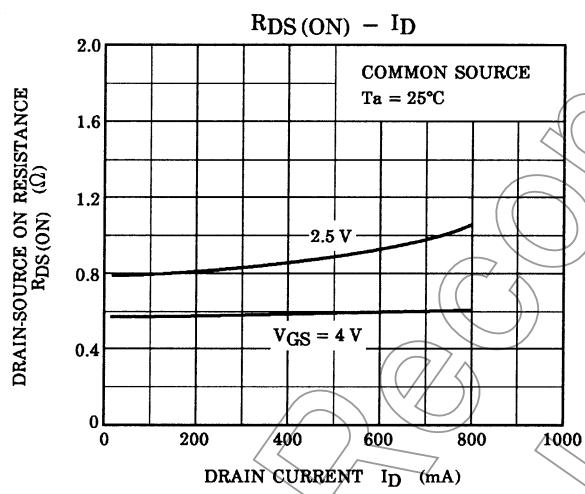
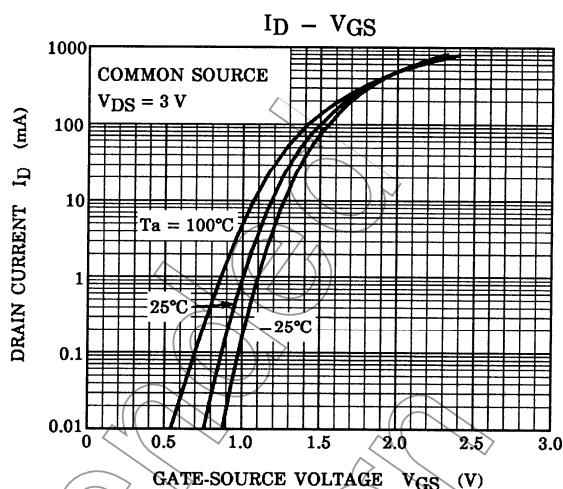
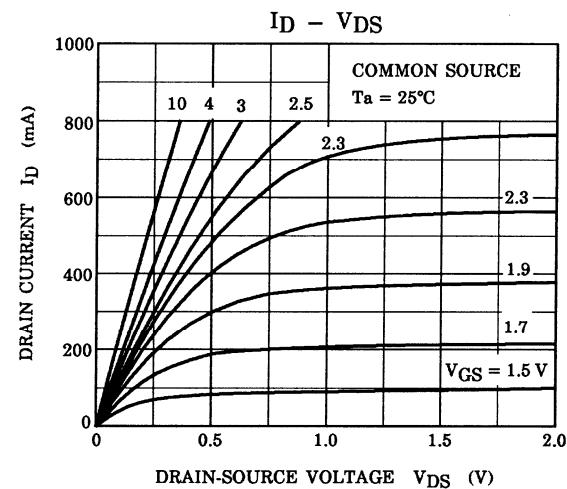


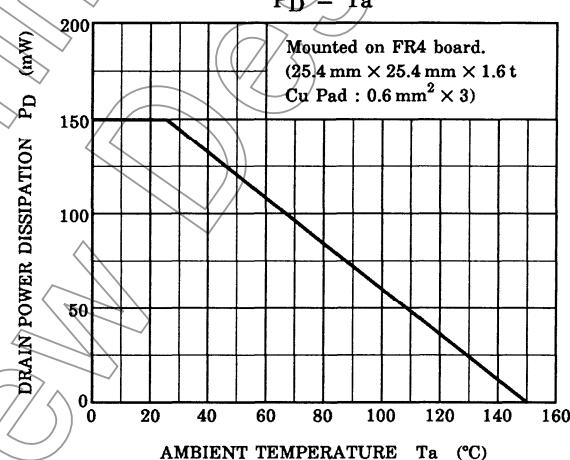
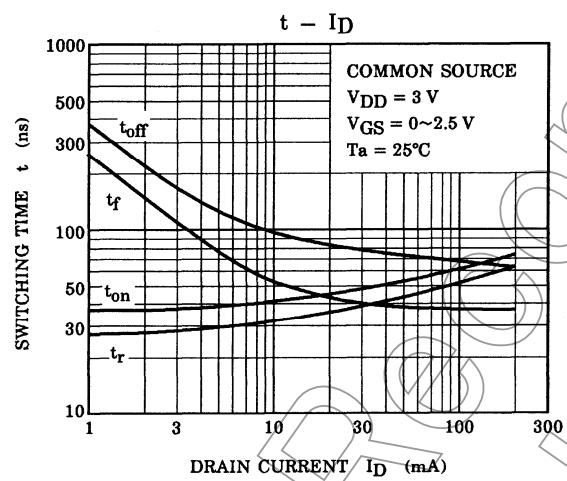
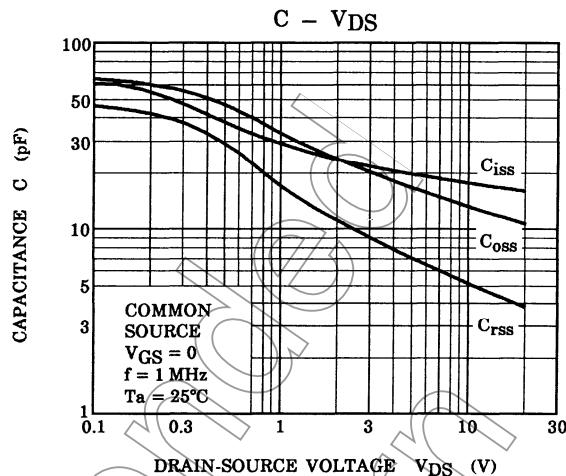
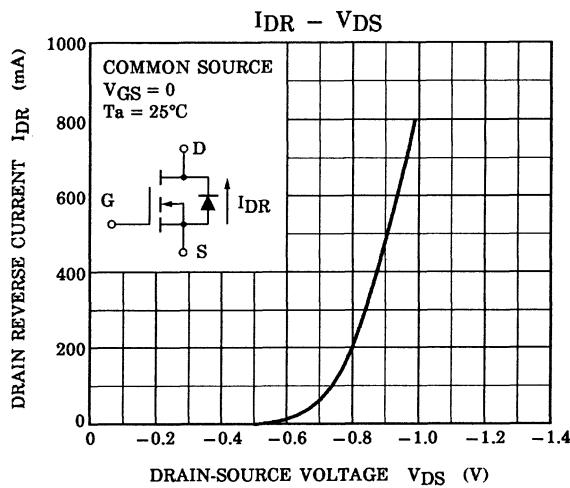
Precaution

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.





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