

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

SSM3K16FU

High Speed Switching Applications

Analog Switching Applications

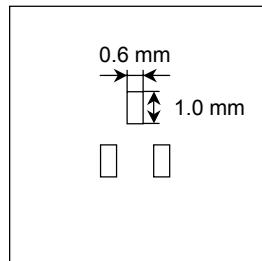
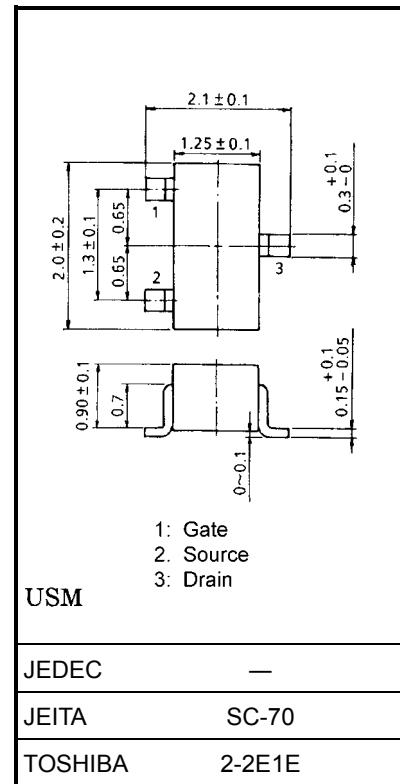
Unit: mm

- Suitable for high-density mounting due to compact package
- Low on resistance: $R_{on} = 3.0 \Omega$ (max) (@ $V_{GS} = 4$ V)
 - : $R_{on} = 4.0 \Omega$ (max) (@ $V_{GS} = 2.5$ V)
 - : $R_{on} = 15 \Omega$ (max) (@ $V_{GS} = 1.5$ V)

Maximum Ratings ($T_a = 25^\circ\text{C}$)

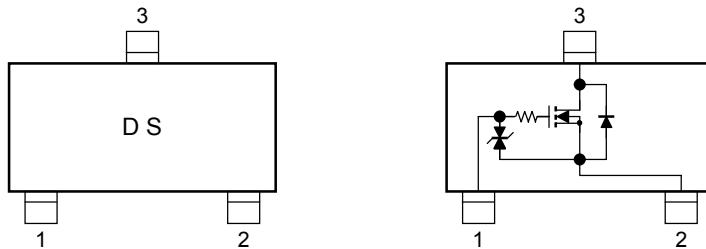
Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V_{DS}	20	V
Gate-Source voltage	V_{GSS}	± 10	V
Drain current	DC	I_D	mA
	Pulse	I_{DP}	
Drain power dissipation ($T_a = 25^\circ\text{C}$)	P_D (Note)	150	mW
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~150	$^\circ\text{C}$

Note: Mounted on FR4 board
(25.4 mm \times 25.4 mm \times 1.6 t, Cu Pad: 0.6 mm 2 \times 3)



Marking

Equivalent Circuit



Handling Precaution

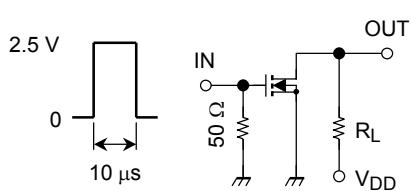
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

Electrical Characteristics (Ta = 25°C)

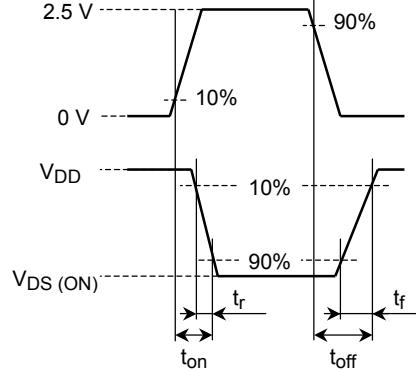
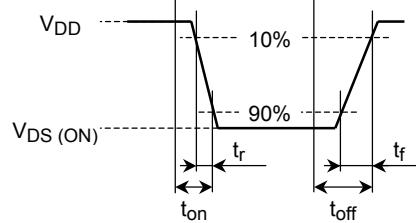
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I _{GSS}	V _{GS} = ±10 V, V _{DS} = 0	—	—	±1	µA
Drain-Source breakdown voltage	V _(BR) DSS	I _D = 0.1 mA, V _{GS} = 0	20	—	—	V
Drain cut-off current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0	—	—	1	µA
Gate threshold voltage	V _{th}	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 = 10 mA	40	—	—	mA
Drain-Source ON resistance	R _{DS} (ON)	I _D = 10 mA, V _{GS} = 4 V	—	1.5	3.0	Ω
		I _D = 10 mA, V _{GS} = 2.5 V	—	2.2	4.0	
		I _D = 1 mA, V _{GS} = 1.5 V	—	5.2	15	
Input capacitance	C _{iss}	V _{DS} = 3 V, V _{GS} = 0, f = 1 MHz	—	9.3	—	pF
Reverse transfer capacitance	C _{rss}	V _{DS} = 3 V, V _{GS} = 0, f = 1 MHz	—	4.5	—	pF
Output capacitance	C _{oss}	V _{DS} = 3 V, V _{GS} = 0, f = 1 MHz	—	9.8	—	pF
Switching time	Turn-on time	t _{on}	V _{DD} = 3 V, I _D = 10 mA, V _{GS} = 0~2.5 V	—	70	ns
	Turn-off time	t _{off}		—	125	

Switching Time Test Circuit

(a) Test circuit



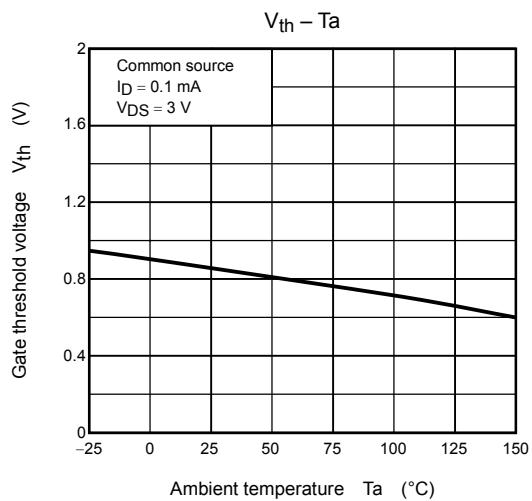
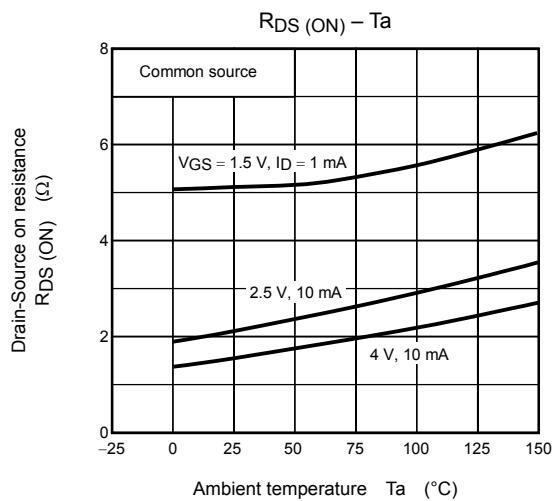
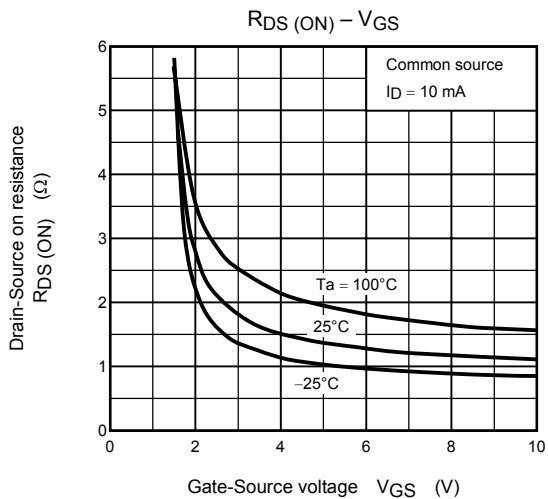
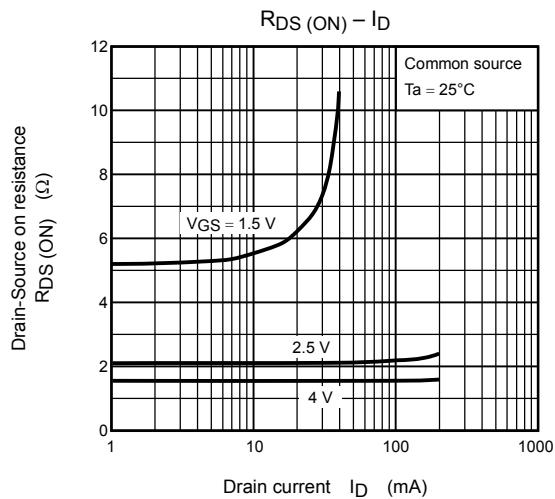
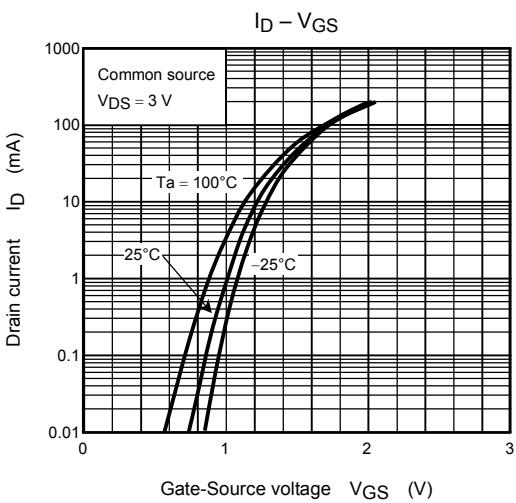
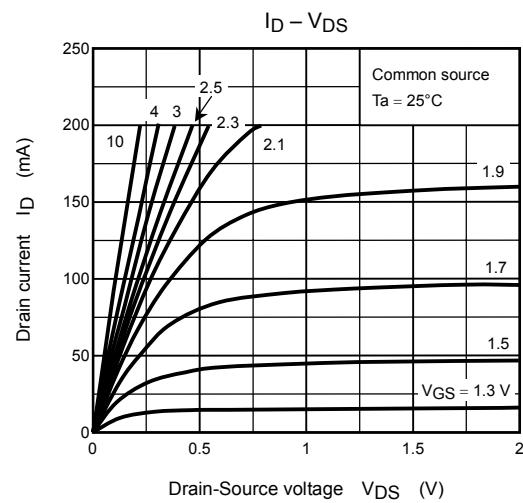
V_{DD} = 3 V
 Duty ≤ 1%
 V_{IN}: t_r, t_f < 5 ns
 (Z_{out} = 50 Ω)
 Common Source
 Ta = 25°C

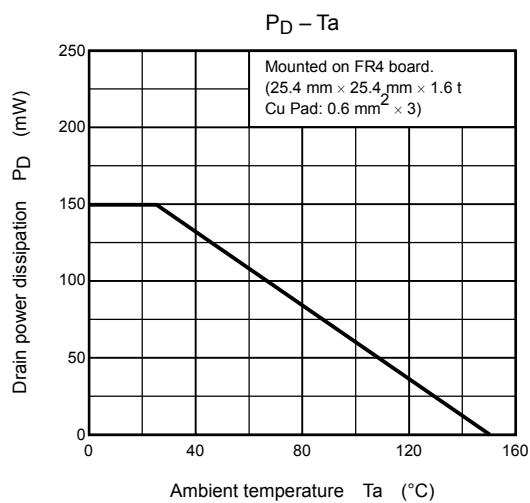
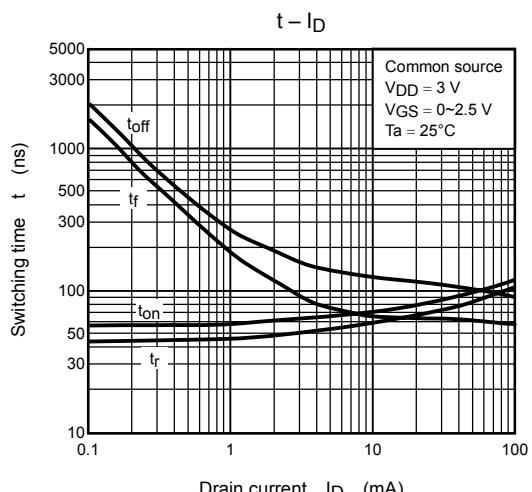
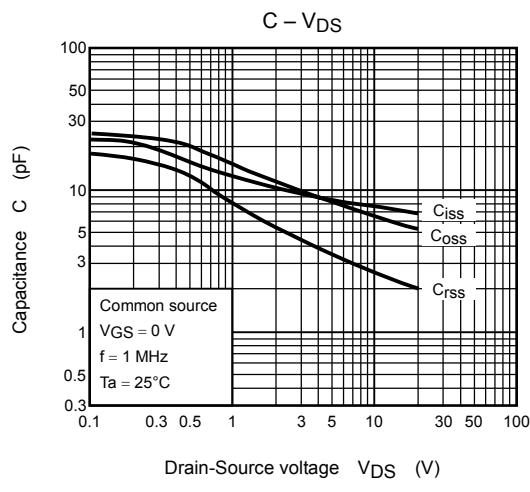
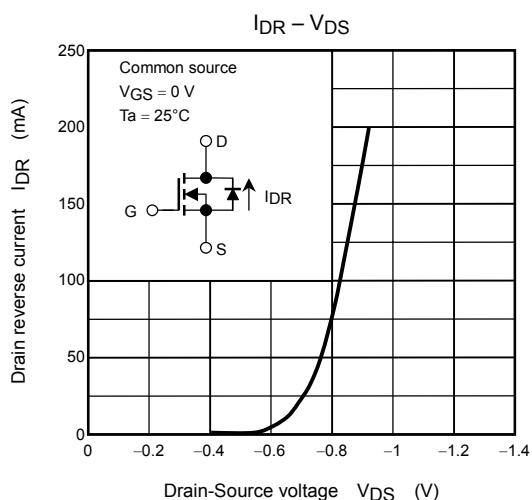
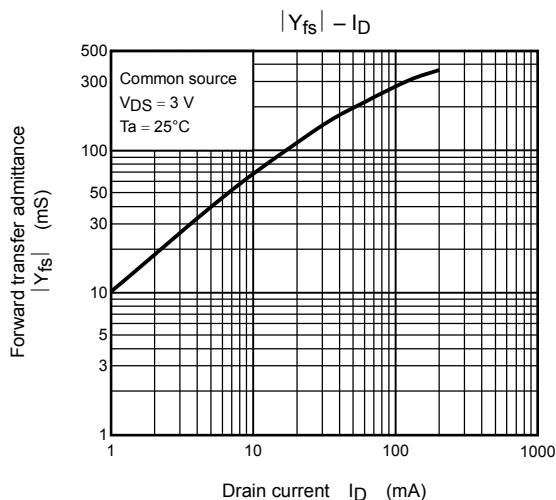
(b) V_{IN}(c) V_{OUT}

Precaution

V_{th} can be expressed as voltage between gate and source when low operating current value is I_D = 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: V_{GS} (off) < V_{th} < V_{GS} (on))

Please take this into consideration for using the device. V_{GS} recommended voltage of 1.5 V or higher to turn on this product.





RESTRICTIONS ON PRODUCT USE

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