

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

SSM3K15FS

High Speed Switching Applications

Analog Switching Applications

- Compact package suitable for high-density mounting
- Low ON-resistance : $R_{on} = 4.0 \Omega$ (max) (@ $V_{GS} = 4$ V)
- : $R_{on} = 7.0 \Omega$ (max) (@ $V_{GS} = 2.5$ V)

Absolute Maximum Ratings (Ta = 25°C)

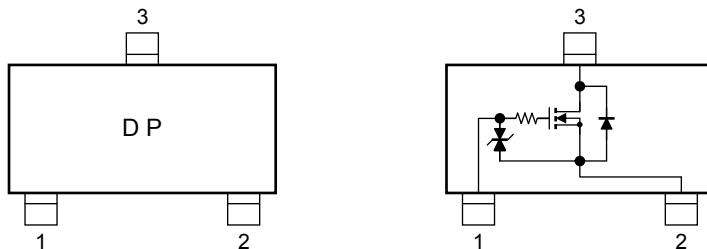
Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V_{DS}	30	V
Gate-Source voltage	V_{GSS}	± 20	V
Drain current	DC	I_D	mA
	Pulse	I_{DP}	
Drain power dissipation (Ta = 25°C)	P_D	100	mW
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C

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).

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.

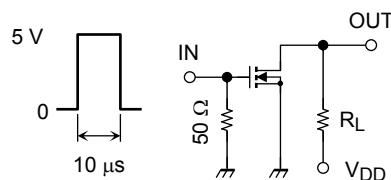
Start of commercial production
2001-02

Electrical Characteristics (Ta = 25°C)

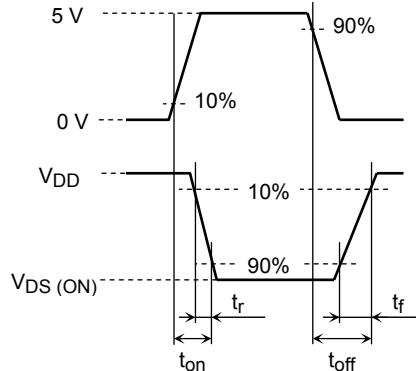
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0	—	—	±1	μA
Drain-Source breakdown voltage	V _{(BR) DSS}	I _D = 0.1 mA, V _{GS} = 0	30	—	—	V
Drain Cut-off current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0	—	—	1	μA
Gate threshold voltage	V _{th}	V _{DS} = 3 V, I _D = 0.1 mA	0.8	—	1.5	V
Forward transfer admittance	Y _{fs}	V _{DS} = 3 V, I _D = 10 mA	25	—	—	mS
Drain-Source ON resistance	R _{DSS} (ON)	I _D = 10 mA, V _{GS} = 4 V	—	2.2	4.0	Ω
		I _D = 10 mA, V _{GS} = 2.5 V	—	4.0	7.0	
Input capacitance	C _{iss}	V _{DS} = 3 V, V _{GS} = 0, f = 1 MHz	—	7.8	—	pF
Reverse transfer capacitance	C _{rss}	V _{DS} = 3 V, V _{GS} = 0, f = 1 MHz	—	3.6	—	pF
Output capacitance	C _{oss}	V _{DS} = 3 V, V _{GS} = 0, f = 1 MHz	—	8.8	—	pF
Switching time	Turn-on time	t _{on}	V _{DD} = 5 V, I _D = 10 mA, V _{GS} = 0 to 5 V	—	50	ns
	Turn-off time	t _{off}		—	180	

Switching Time Test Circuit

(a) Test circuit



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

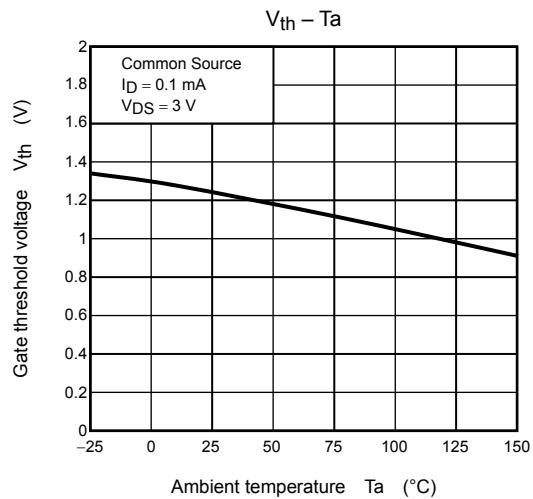
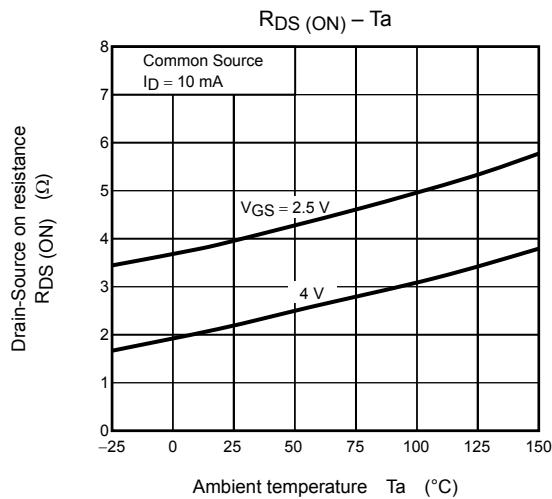
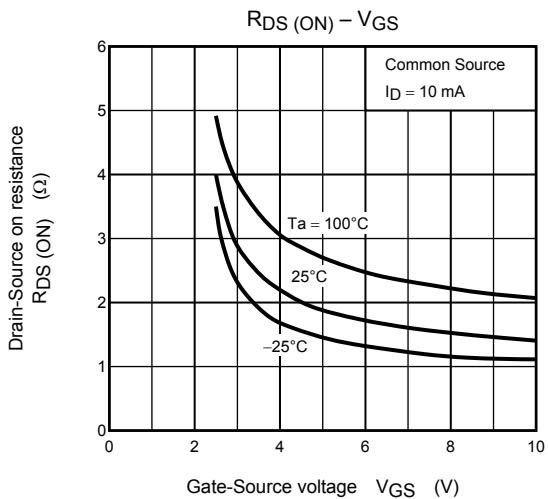
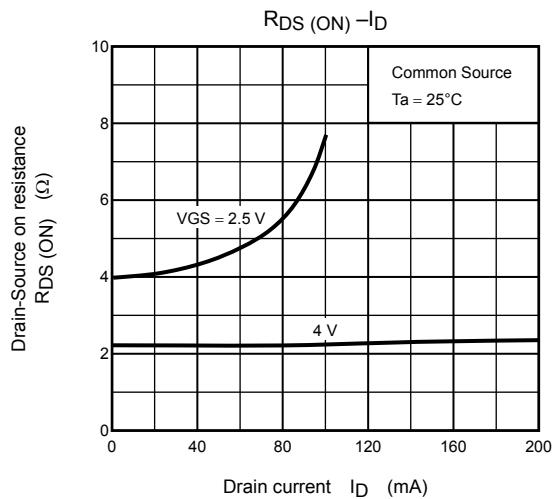
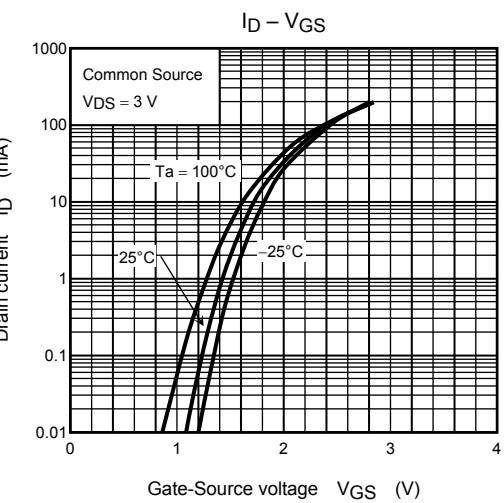
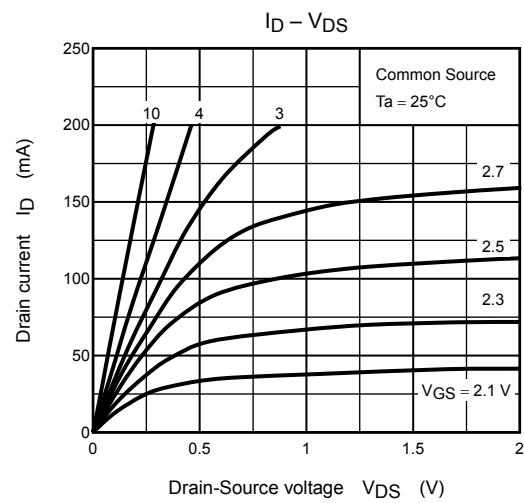
(b) V_{IN}(c) V_{OUT}

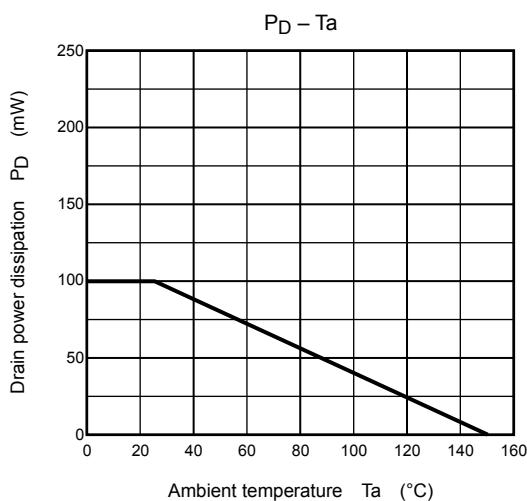
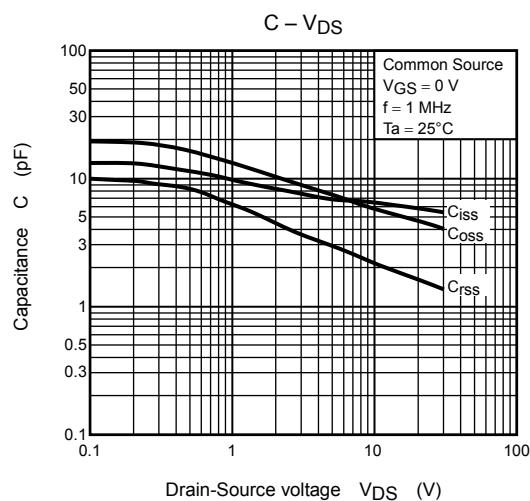
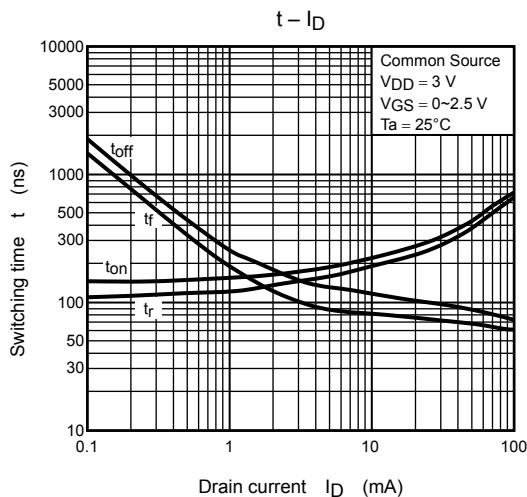
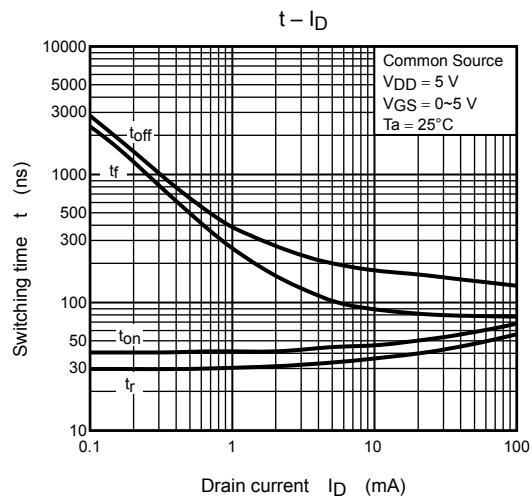
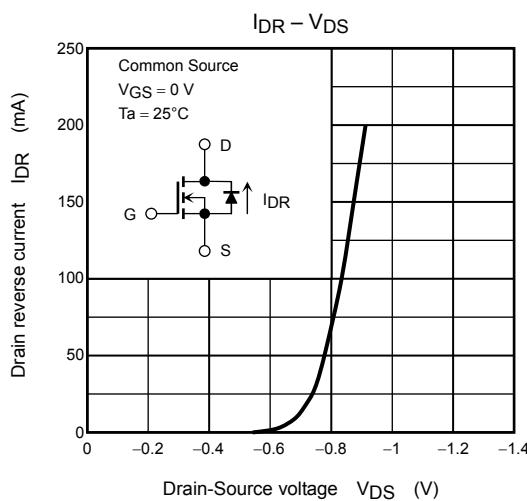
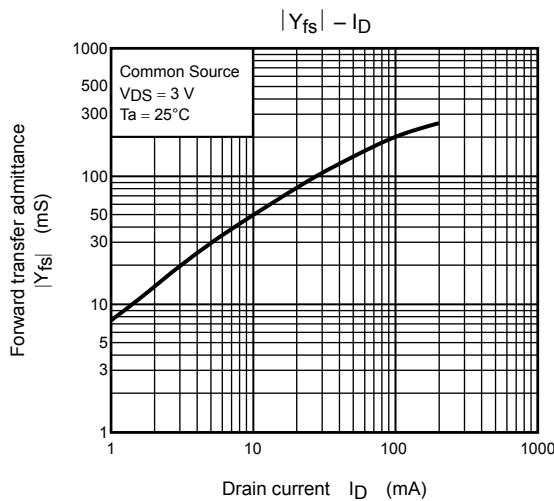
Precaution

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.





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