

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

SSM3K44MFV

High Speed Switching Applications

Analog Switch Applications

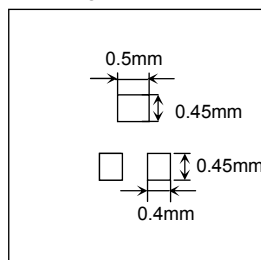
- Compact package suitable for high-density mounting
- Low ON-resistance : $R_{DS(ON)} = 4.0 \Omega$ (max) (@ $V_{GS} = 4 V$)
 : $R_{DS(ON)} = 7.0 \Omega$ (max) (@ $V_{GS} = 2.5 V$)

Absolute Maximum Ratings (Ta = 25°C)

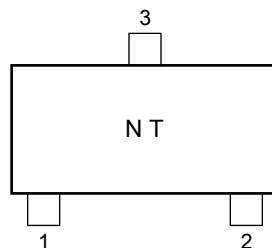
Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	30	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC	I_D	100
	Pulse	I_{DP}	200
Drain power dissipation (Ta = 25°C)	P_D (Note 1)	150	mW
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to 150	°C

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).

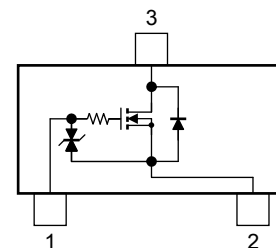
Note 1: Total rating, mounted on FR4 board (25.4 mm × 25.4 mm × 1.6 mm)



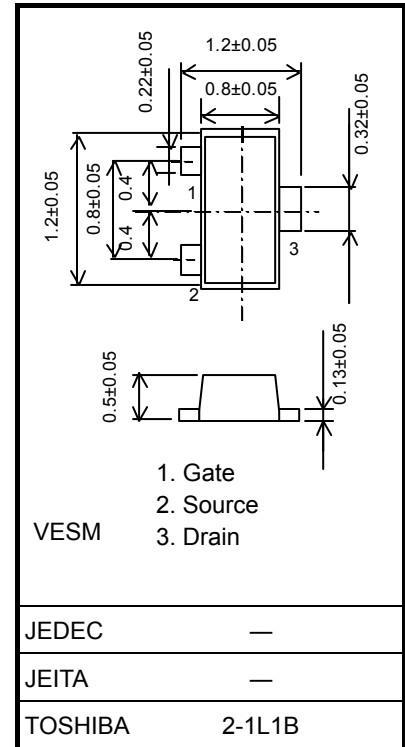
Marking



Equivalent Circuit



Unit: mm



Weight: 1.5 mg (typ.)

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.

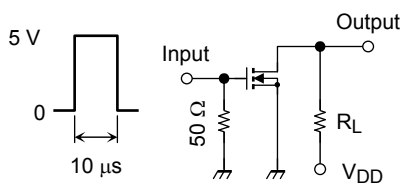
Start of commercial production
2009-12

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 14\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 1	μA
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 0.1\text{ mA}, V_{GS} = 0\text{ V}$	30	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	—	—	1	μA
Gate threshold voltage	V_{th}	$V_{DS} = 3\text{ V}, I_D = 0.1\text{ mA}$	0.8	—	1.5	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 3\text{ V}, I_D = 10\text{ mA}$	25	—	—	mS
Drain-Source on-resistance	$R_{DS(ON)}$	$I_D = 10\text{ mA}, V_{GS} = 4\text{ V}$	—	2.2	4.0	Ω
		$I_D = 10\text{ mA}, V_{GS} = 2.5\text{ V}$	—	4.0	7.0	
Input capacitance	C_{iss}	$V_{DS} = 3\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	8.5	—	pF
Reverse transfer capacitance	C_{rss}		—	5.3	—	
Output capacitance	C_{oss}		—	9.4	—	
Switching time	Turn-on time	t_{on}	$V_{DD} = 5\text{ V}, I_D = 10\text{ mA},$		—	ns
	Turn-off time	t_{off}	$V_{GS} = 0\text{ to }5\text{ V}$		—	

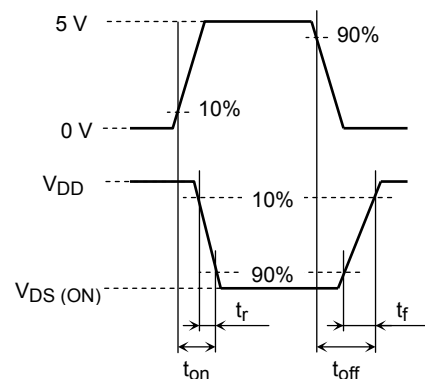
Switching Time Test Circuit

(a) Test circuit



$V_{DD} = 5\text{ V}$
 Duty $\leq 1\%$
 Input: $t_r, t_f < 5\text{ ns}$
 $(Z_{out} = 50\ \Omega)$
 Common Source
 $T_a = 25^\circ\text{C}$

(b) V_{IN}



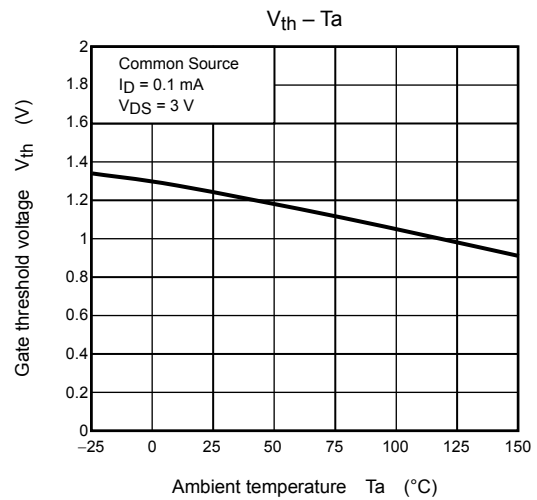
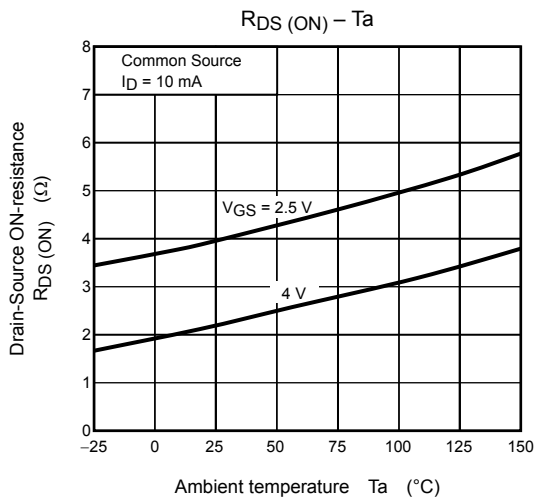
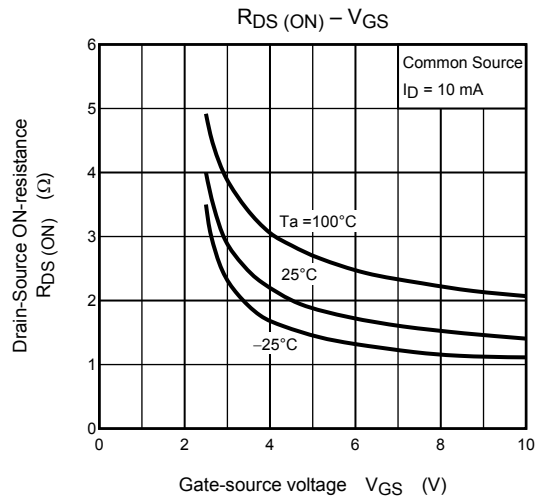
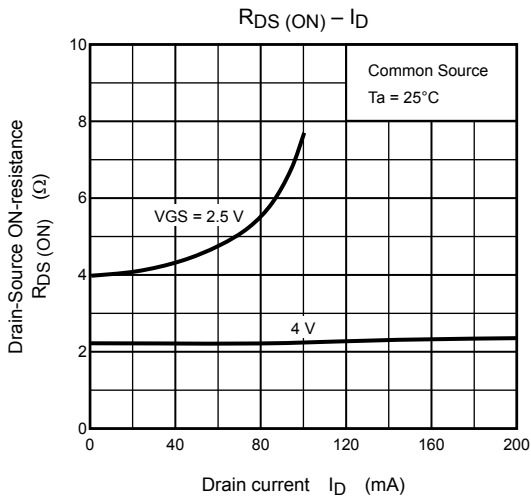
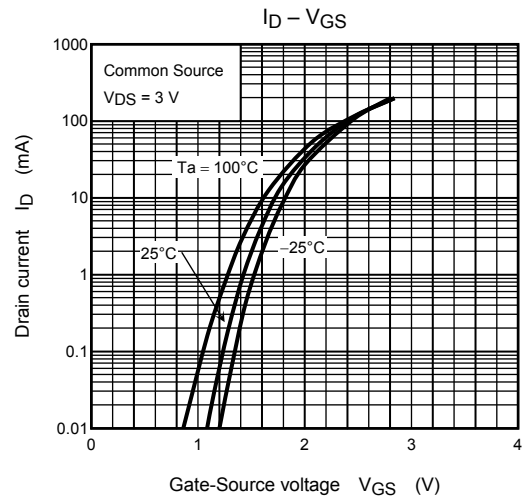
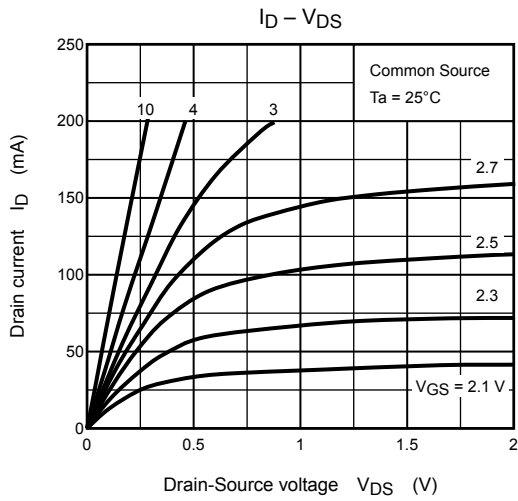
(c) V_{OUT}

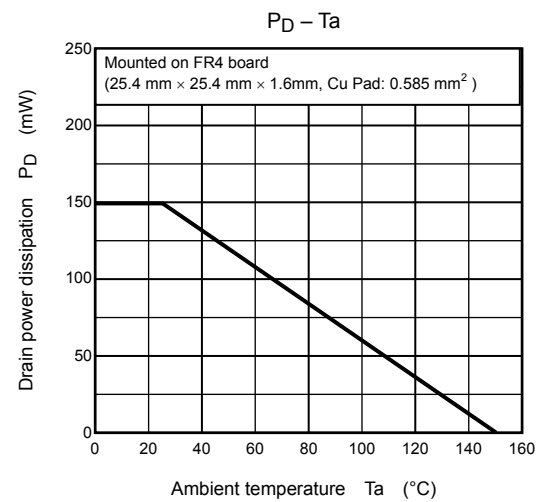
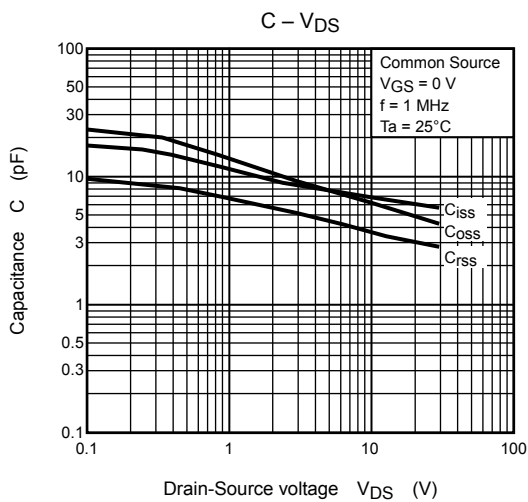
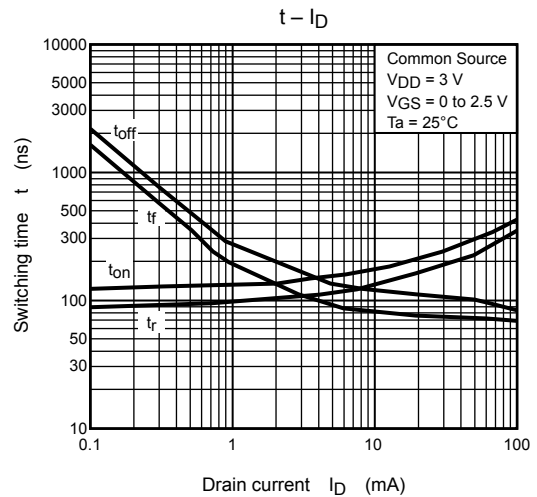
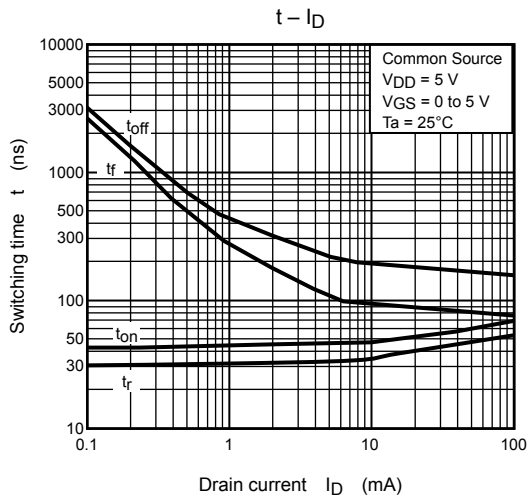
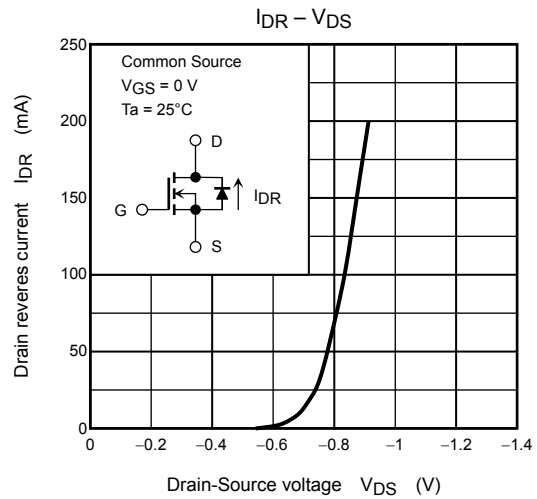
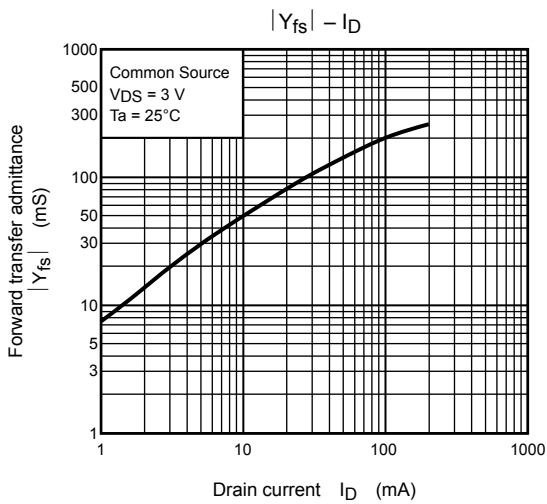
Precaution

V_{th} can be expressed as the voltage between gate and source when the low operating current value is $I_D = 100\ \mu\text{A}$ 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: $V_{GS(off)} < V_{th} < V_{GS(on)}$)

Please take this into consideration when using the device.





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