TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

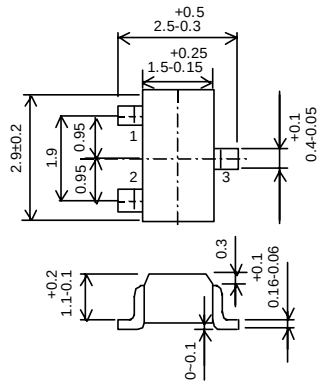
SSM3K15F

High Speed Switching Applications

Analog Switch Applications

- Small package
- Low on resistance
  : R_{on} = 4.0 Ω (max) (@V_{GS} = 4 V)
  : R_{on} = 7.0 Ω (max) (@V_{GS} = 2.5 V)

Unit: mm



1.Gate
2.Source
3.Drain

S-MINI

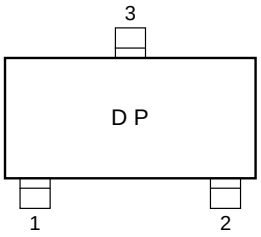
JEDEC	TO-236MOD
JEITA	SC-59
TOSHIBA	2-3F1F

Weight: 0.012 g (typ.)

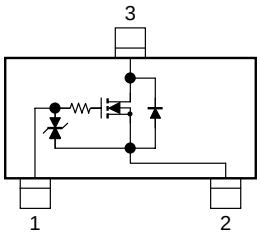
Maximum Ratings (Ta = 25°C)

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

Marking



Equivalent Circuit



Handling Precaution

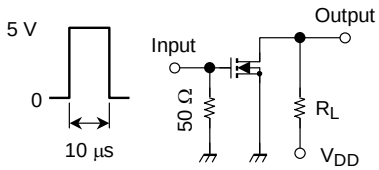
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±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		$R_{DS\ (ON)}$	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} = 0~5 V	—	50	—	ns
	Turn-off time	t_{off}		—	180	—	

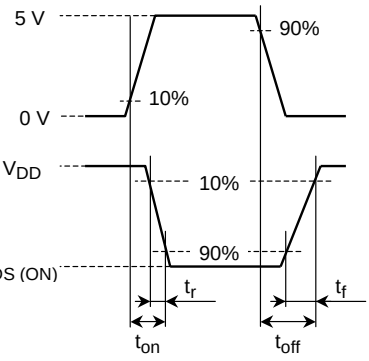
Switching Time Test Circuit

(a) Test circuit



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

(b) V_{IN}

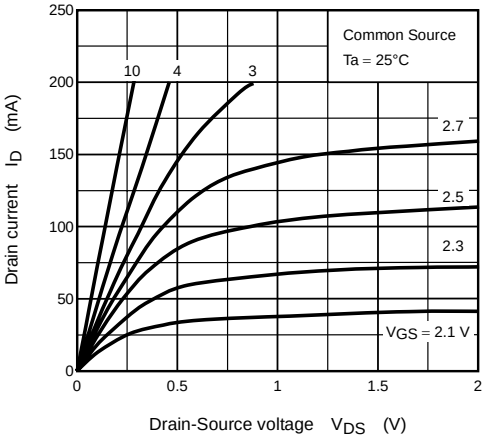


(c) V_{OUT}

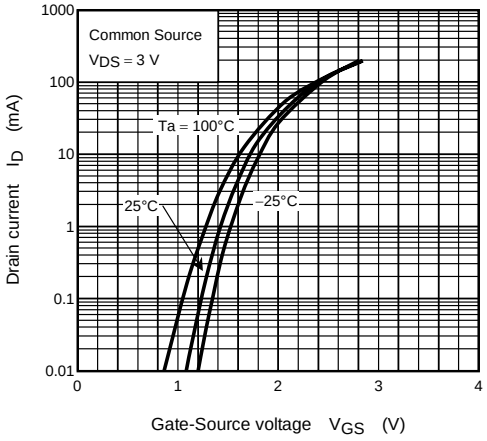
Precaution

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 2.5 V or higher to turn on this product.

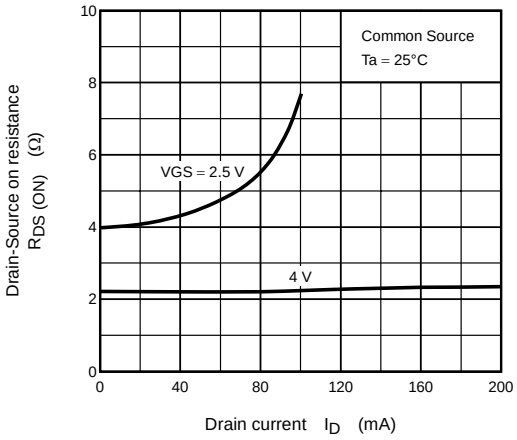
$I_D - V_{DS}$



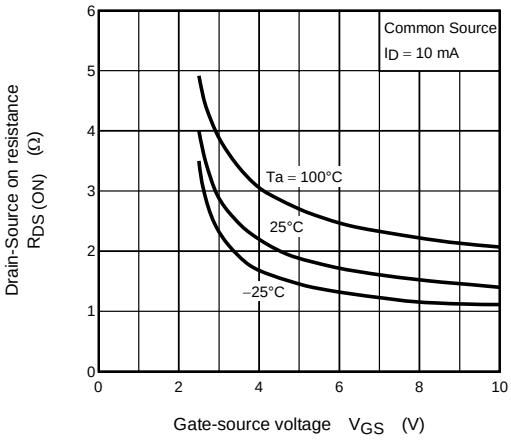
$I_D - V_{GS}$



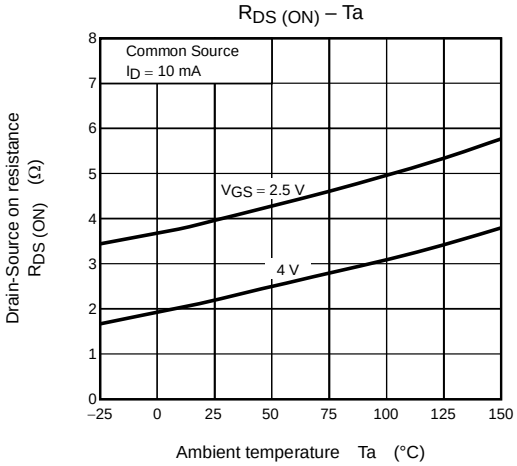
$R_{DS\ (ON)} - I_D$



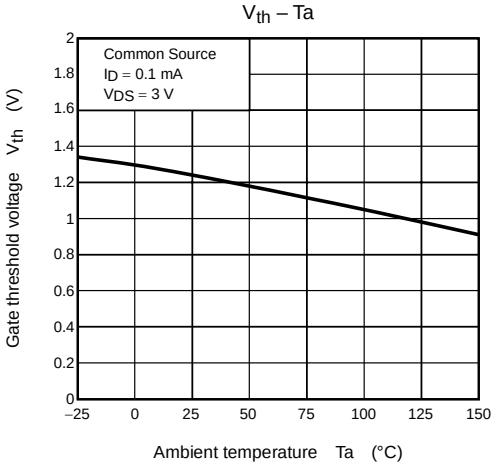
$R_{DS\ (ON)} - V_{GS}$



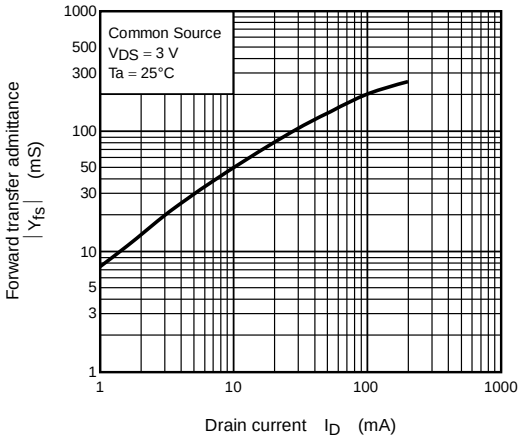
$R_{DS\ (ON)} - Ta$



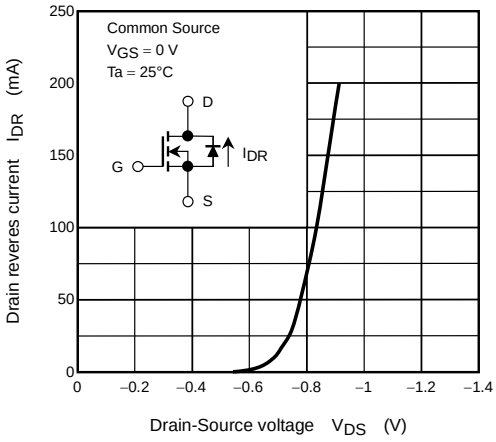
$V_{th} - Ta$



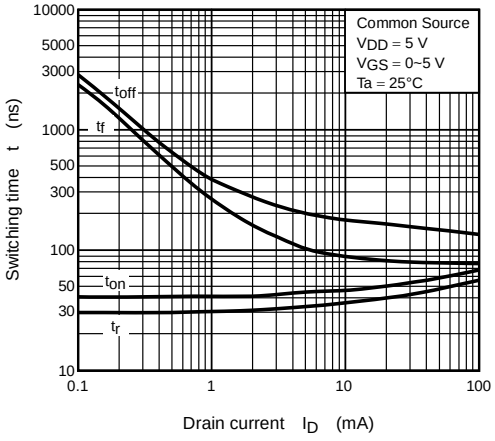
$|Y_{fs}| - I_D$



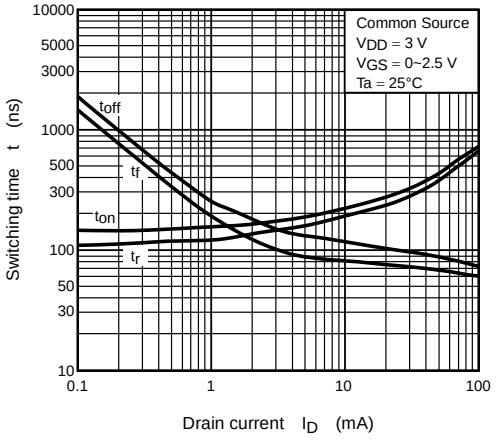
$I_{DR} - V_{DS}$



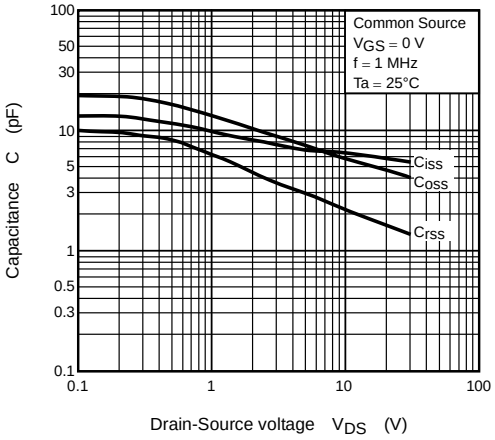
$t - I_D$



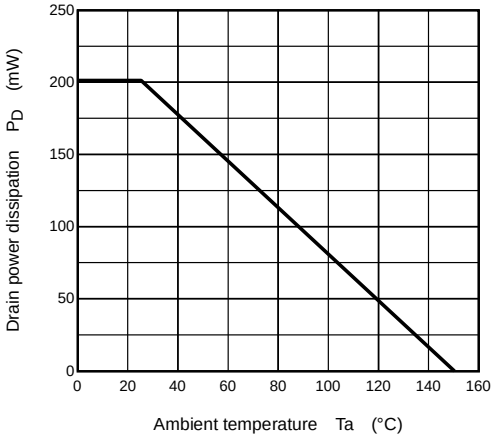
$t - I_D$



$C - V_{DS}$



$P_D - Ta$



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