TOSHIBA Field-Effect Transistor Silicon N-Channel MOS Type

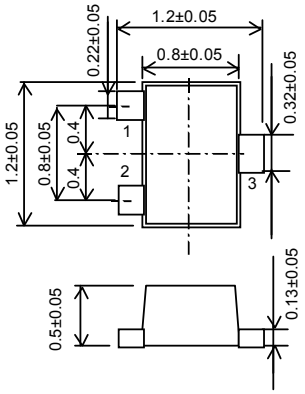
SSM3K35MFV

○ High-Speed Switching Applications

○ Analog Switch Applications

- 1.2 V drive
- Low ON-resistance : R_{on} = 20 Ω (max) (@V_{GS} = 1.2 V)
  : R_{on} = 8 Ω (max) (@V_{GS} = 1.5 V)
  : R_{on} = 4 Ω (max) (@V_{GS} = 2.5 V)
  : R_{on} = 3 Ω (max) (@V_{GS} = 4.0 V)

Unit: mm



VESM

1.Gate
2.Source
3.Drain

JEDEC	―
JEITA	―
TOSHIBA	2-1L1B

Weight: 1.5 mg (typ.)

Absolute Maximum Ratings (Ta = 25˚C)

Characteristic		Symbol	Rating	Unit
Drain–source voltage		V_{DSS}	20	V
Gate–source voltage		V_{GSS}	±10	V
Drain current	DC	I_D	180	mA
	Pulse	I_{DP}	360	
Drain power dissipation		P_D (Note 1)	150	mW
Channel temperature		T_{ch}	150	°C
Storage temperature		T_{stg}	−55 to 150	°C

Note 1: Mounted on an FR4 board
(25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 0.585 mm^2)

Electrical Characteristics (Ta = 25°C)

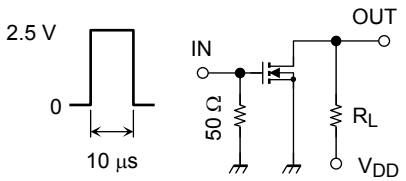
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±10 V, V_{DS} = 0 V	―	―	±10	μA
Drain–source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 0.1 mA, V_{GS} = 0 V	20	―	―	V
Drain cutoff current		I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V	―	―	1	μA
Gate threshold voltage		V_{th}	V_{DS} = 3 V, I_D = 1 mA	0.4	―	1.0	V
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 3 V, I_D = 50 mA (Note 2)	115	―	―	mS
Drain–source ON-resistance		$R_{DS\ (ON)}$	I_D = 50 mA, V_{GS} = 4 V (Note 2)	―	1.5	3	Ω
			I_D = 50 mA, V_{GS} = 2.5 V (Note 2)	―	2	4	
			I_D = 5 mA, V_{GS} = 1.5 V (Note 2)	―	3	8	
			I_D = 5 mA, V_{GS} = 1.2 V (Note 2)	―	5	20	
Input capacitance		C_{iss}	V_{DS} = 3 V, V_{GS} = 0 V, f = 1 MHz	―	9.5	―	pF
Reverse transfer capacitance		C_{rss}		―	4.1	―	
Output capacitance		C_{oss}		―	9.5	―	
Switching time	Turn-on time	t_{on}	V_{DD} = 3 V, I_D = 50 mA, V_{GS} = 0 to 2.5 V	―	115	―	ns
	Turn-off time	t_{off}		―	300	―	
Drain–source forward voltage		V_{DSF}	I_D = - 180 mA, V_{GS} = 0 V (Note 2)	―	-0.9	-1.2	V

Note 2: Pulse test

Start of commercial production
2008-01

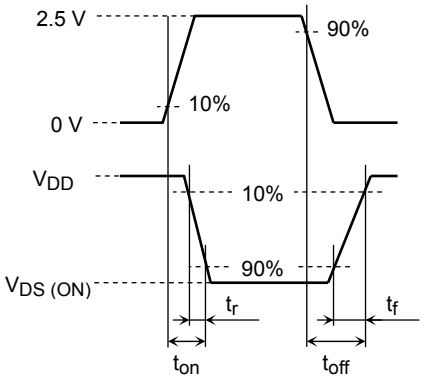
Switching Time Test Circuit

(a) Test Circuit



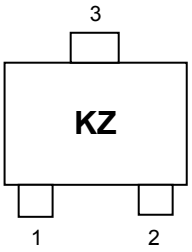
V_{DD} = 3 V
Duty ≤ 1%
V_{IN}: t_r, t_f < 5 ns
(Z_{out} = 50 Ω)
Common Source
Ta = 25°C

(b) V_{IN}

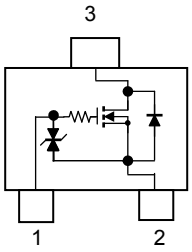


(c) V_{OUT}

Marking



Equivalent Circuit (top view)



Notice on Usage

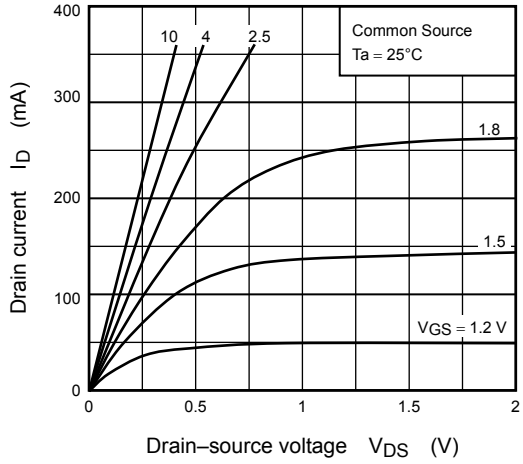
V_{th} can be expressed as the voltage between gate and source when the low operating current value is I_D = 1 mA for this product. For normal switching operation, $V_{GS\ (on)}$ requires a higher voltage than V_{th} and $V_{GS\ (off)}$ requires a lower voltage than V_{th}. (The relationship can be established as follows: $V_{GS\ (off)} < V_{th} < V_{GS\ (on)}$.)

Take this into consideration when using the device.

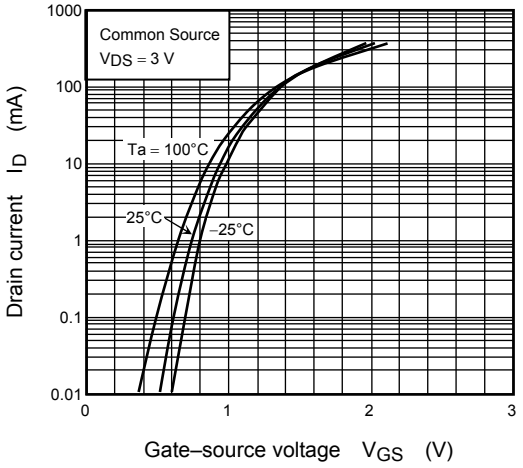
Handling Precaution

When handling individual devices that are not yet mounted on a circuit board, make sure that the environment is protected against electrostatic discharge. Operators should wear antistatic clothing, and containers and other objects that come into direct contact with devices should be made of antistatic materials.

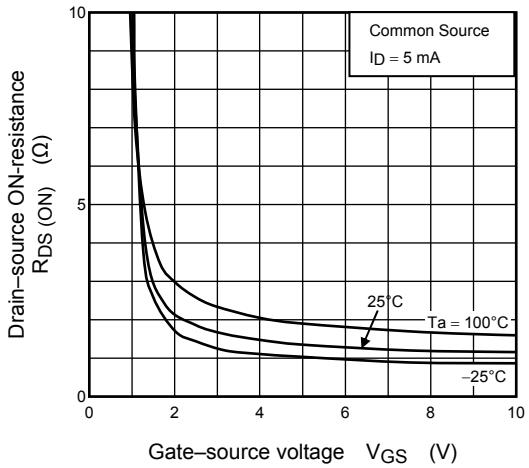
$I_D - V_{DS}$



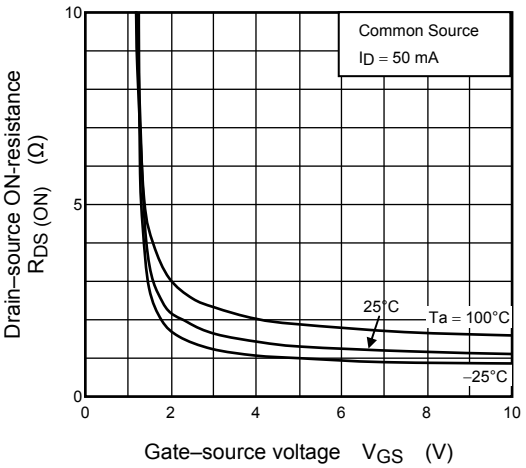
$I_D - V_{GS}$



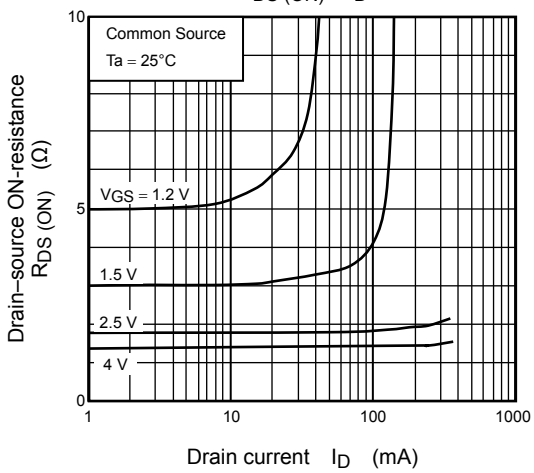
$R_{DS\ (ON)} - V_{GS}$



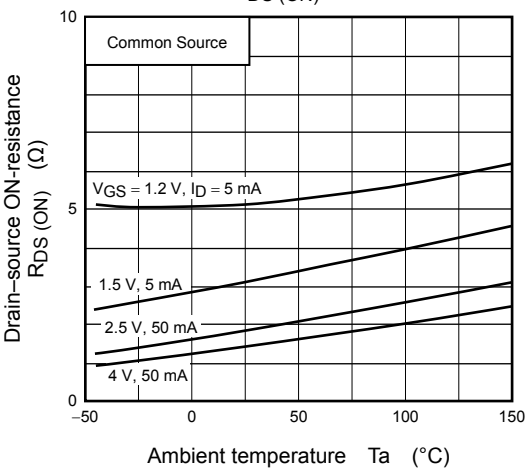
$R_{DS\ (ON)} - V_{GS}$



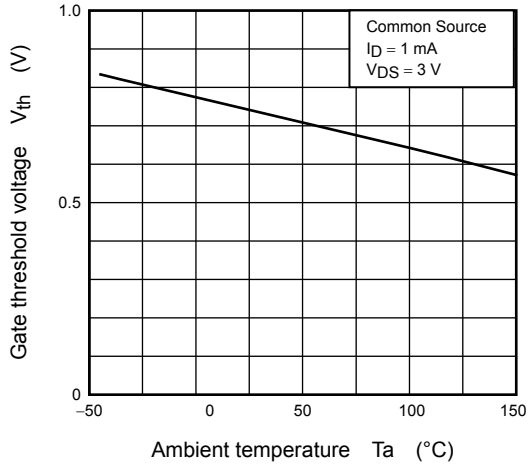
$R_{DS\ (ON)} - I_D$



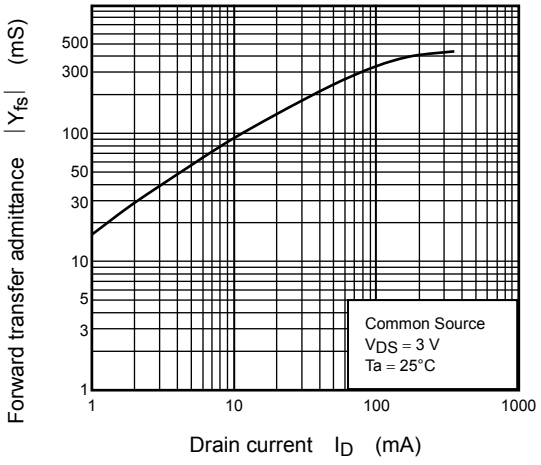
$R_{DS\ (ON)} - Ta$



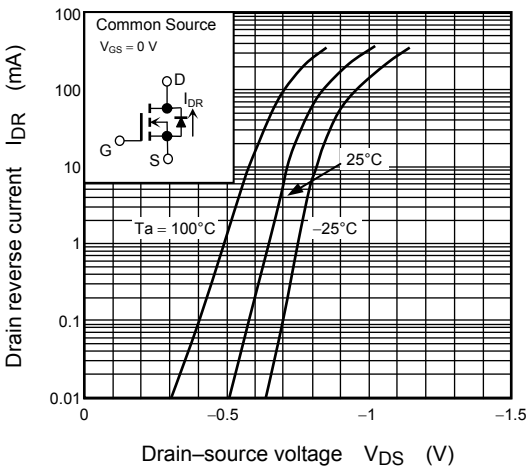
V_{th} – Ta



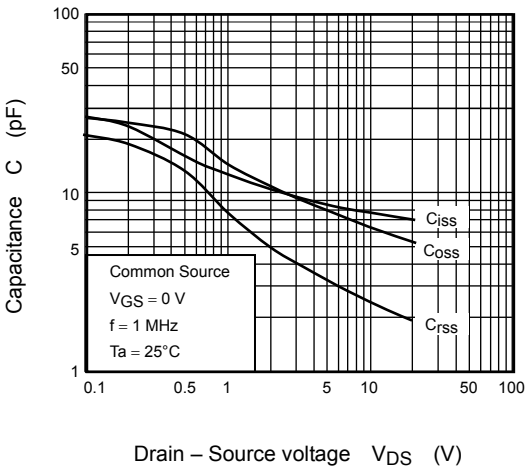
$|Y_{fs}|$ – I_D



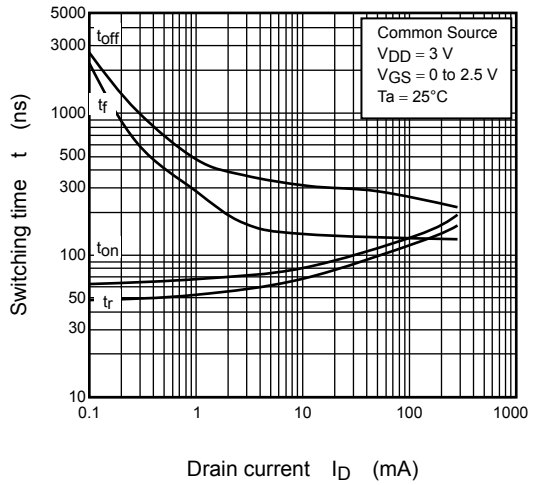
I_{DR} – V_{DS}



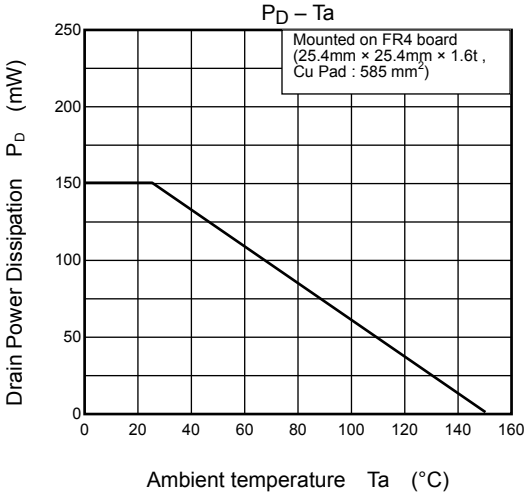
C – V_{DS}



t – I_D



P_D – Ta



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