

TOSHIBA Field-Effect Transistor Silicon N-Channel MOS Type

SSM3K35MFV

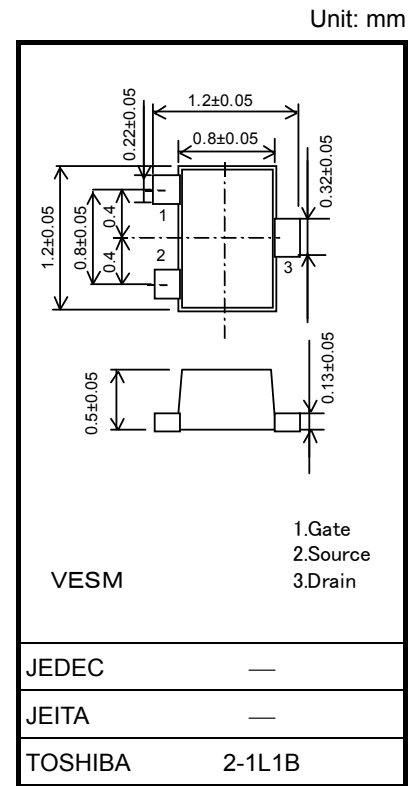
- High-Speed Switching Applications
- Analog Switch Applications

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

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} | -55~150 | °C | |

Note 1: Mounted on an FR4 board
 (25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 0.585 mm²)



Weight: 1.5 mg (typ.)

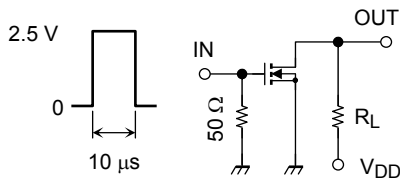
Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------|---------------|---|-----|------|----------|----------|
| Gate leakage current | I_{GSS} | $V_{GS} = \pm 10 V, V_{DS} = 0 V$ | — | — | ± 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} | — | 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

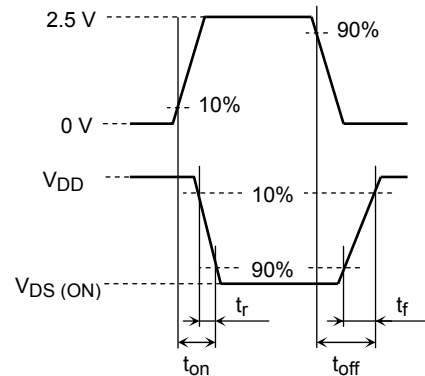
Switching Time Test Circuit

(a) Test Circuit

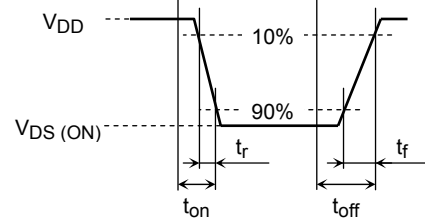


$V_{DD} = 3\text{ V}$
 $D.U. \leq 1\%$
 $V_{IN}: t_r, t_f < 5\text{ ns}$
 $(Z_{out} = 50\ \Omega)$
 Common Source
 $T_a = 25^\circ\text{C}$

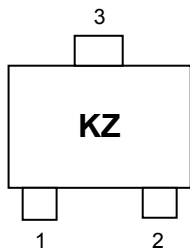
(b) V_{IN}



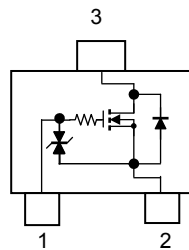
(c) V_{OUT}



Marking



Equivalent Circuit (top view)



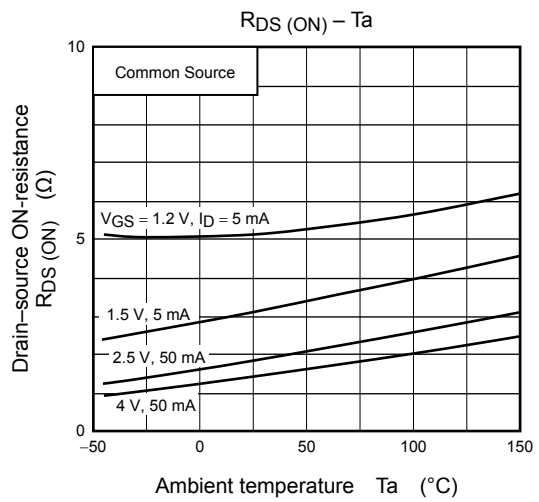
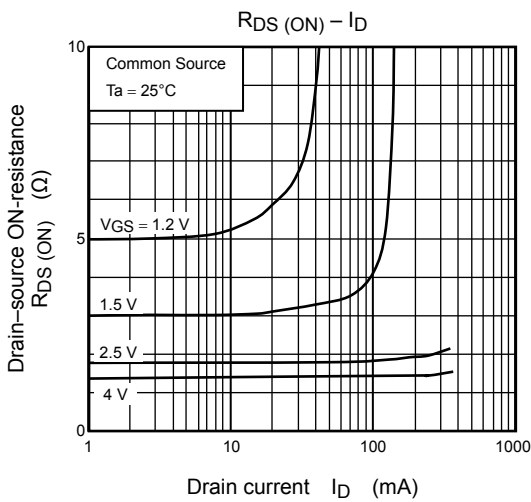
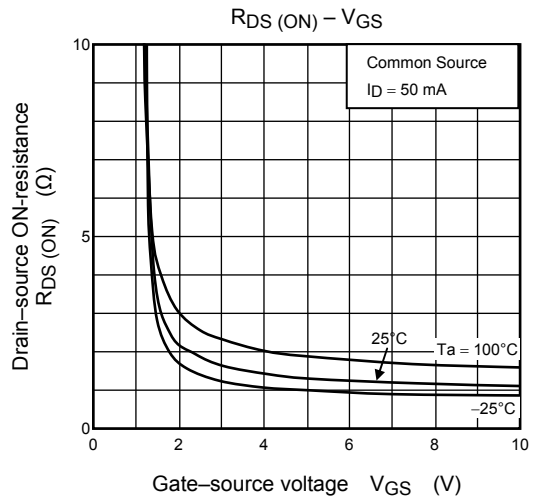
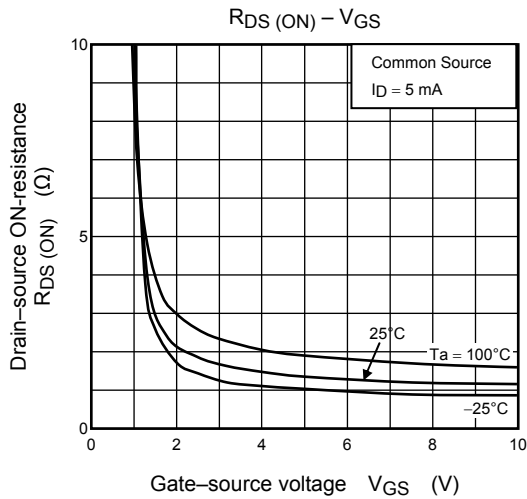
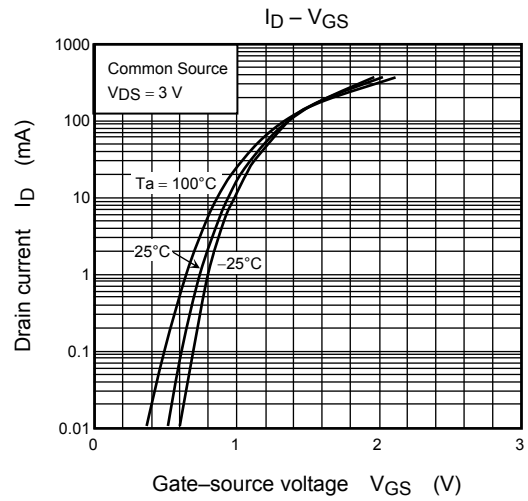
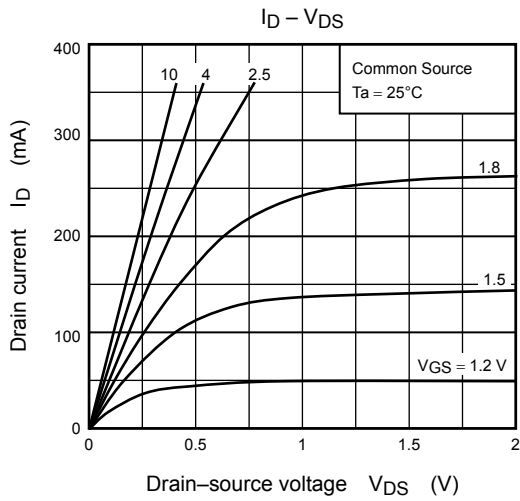
Notice on Usage

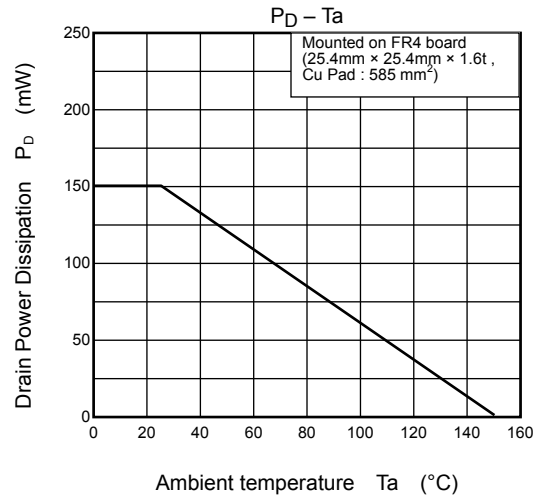
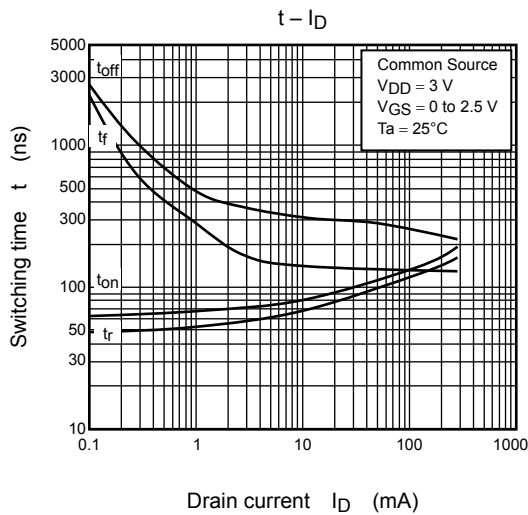
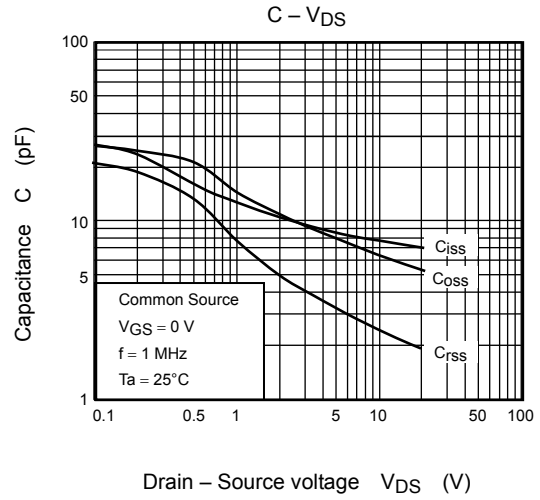
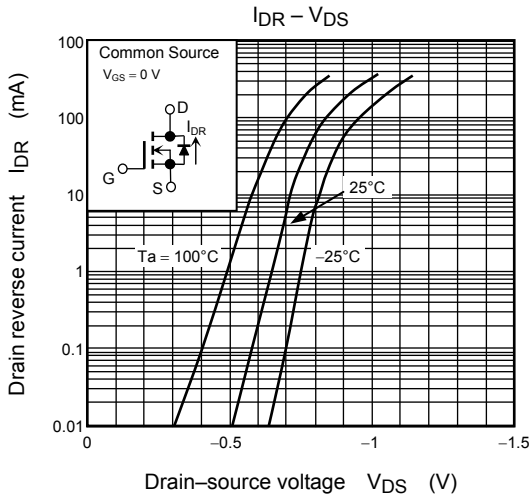
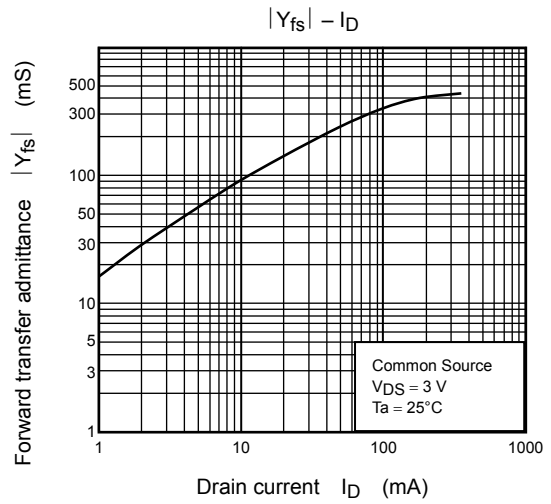
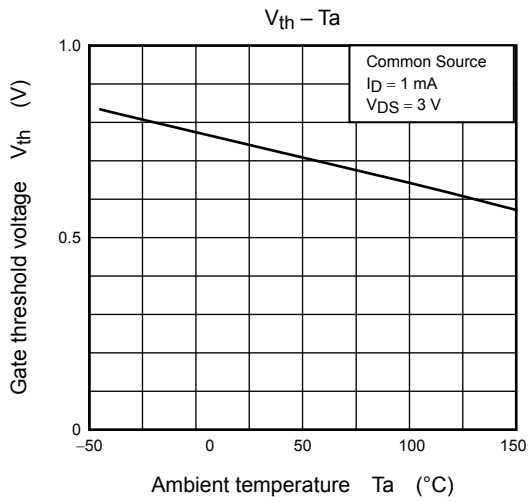
V_{th} can be expressed as the voltage between gate and source when the low operating current value is $I_D = 1\text{ mA}$ for this product. For normal switching operation, $V_{GS(ON)}$ requires a higher voltage than V_{th} and $V_{GS(OFF)}$ requires a lower voltage than V_{th} . (The relationship can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





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