

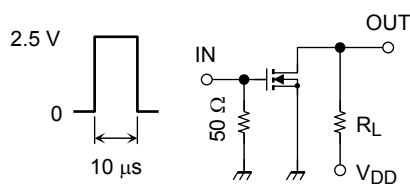


## Electrical Characteristics (Ta = 25°C)

| Characteristics                | Symbol        | Test Condition                                      | Min | Typ. | Max     | Unit          |
|--------------------------------|---------------|---|-----|------|---------|---------------|
| Gate leakage current           | $I_{GSS}$     | $V_{GS} = \pm 10\text{ V}, V_{DS} = 0$              | —   | —    | $\pm 1$ | $\mu\text{A}$ |
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | $I_D = 0.1\text{ mA}, V_{GS} = 0$                   | 20  | —    | —       | V             |
| Drain cut-off current          | $I_{DSS}$     | $V_{DS} = 20\text{ V}, V_{GS} = 0$                  | —   | —    | 1       | $\mu\text{A}$ |
| Gate threshold voltage         | $V_{th}$      | $V_{DS} = 3\text{ V}, I_D = 0.1\text{ mA}$          | 0.6 | —    | 1.1     | V             |
| Forward transfer admittance    | $ Y_{fs} $    | $V_{DS} = 3\text{ V}, I_D = 10\text{ mA}$           | 40  | —    | —       | mS            |
| Drain-Source ON-resistance     | $R_{DS(ON)}$  | $I_D = 10\text{ mA}, V_{GS} = 4\text{ V}$           | —   | 1.5  | 3.0     | $\Omega$      |
|                                |               | $I_D = 10\text{ mA}, V_{GS} = 2.5\text{ V}$         | —   | 2.2  | 4.0     |               |
|                                |               | $I_D = 1\text{ mA}, V_{GS} = 1.5\text{ V}$          | —   | 5.2  | 15      |               |
| Input capacitance              | $C_{iss}$     | $V_{DS} = 3\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$ | —   | 9.3  | —       | pF            |
| Reverse transfer capacitance   | $C_{rss}$     | $V_{DS} = 3\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$ | —   | 4.5  | —       | pF            |
| Output capacitance             | $C_{oss}$     | $V_{DS} = 3\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$ | —   | 9.8  | —       | pF            |
| Switching time                 | Turn-on time  | $t_{on}$  | —   | 70   | —       | ns            |
|                                | Turn-off time | $t_{off}$   |     | 125  |         |               |

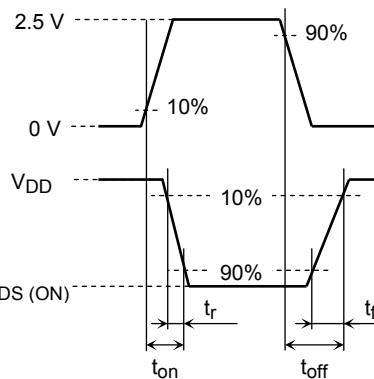
## Switching Time Test Circuit

### (a) Test circuit

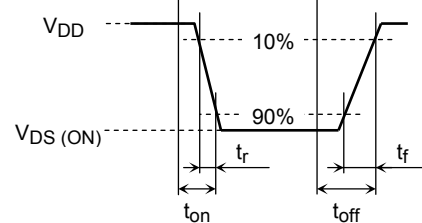


$V_{DD} = 3\text{ V}$   
 Duty  $\leq 1\%$   
 $V_{IN}$ :  $t_r, t_f < 5\text{ ns}$   
 $(Z_{out} = 50\ \Omega)$   
 Common Source  
 $T_a = 25^\circ\text{C}$

### (b) $V_{IN}$



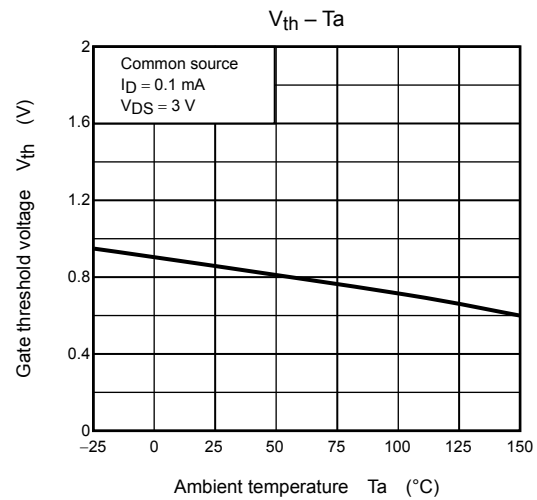
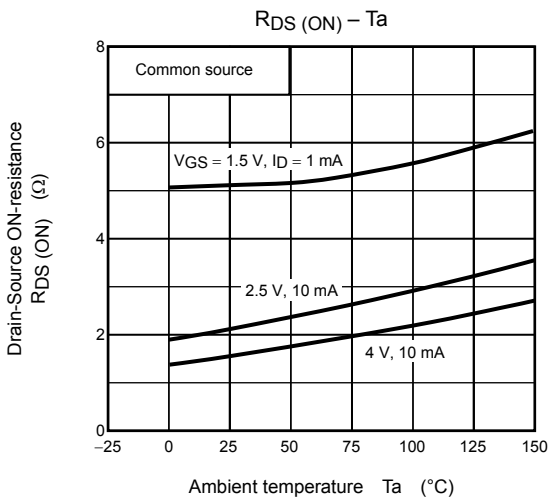
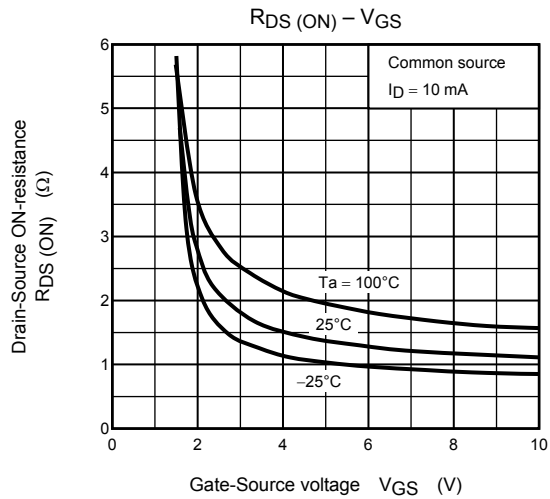
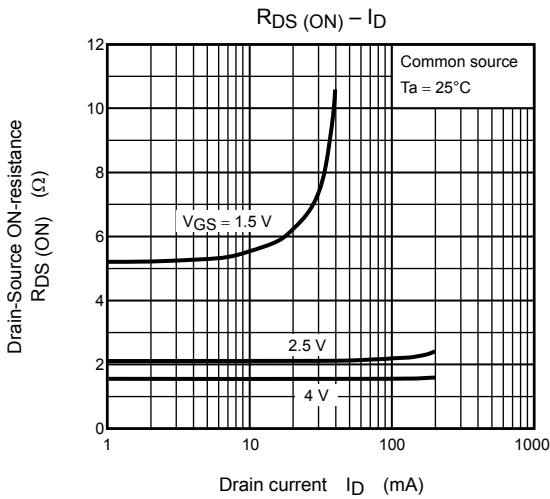
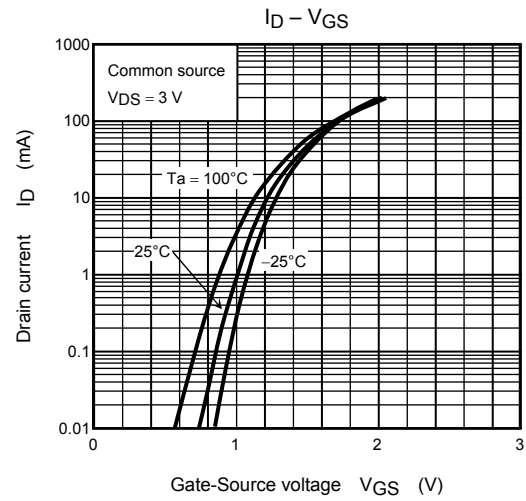
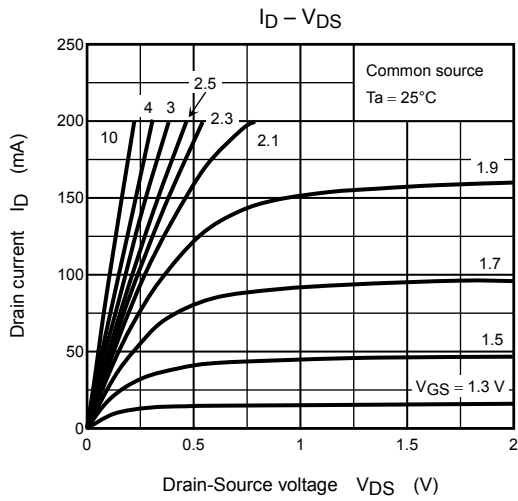
### (c) $V_{OUT}$

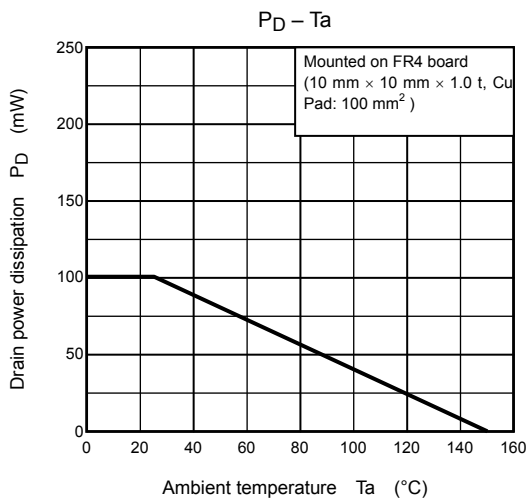
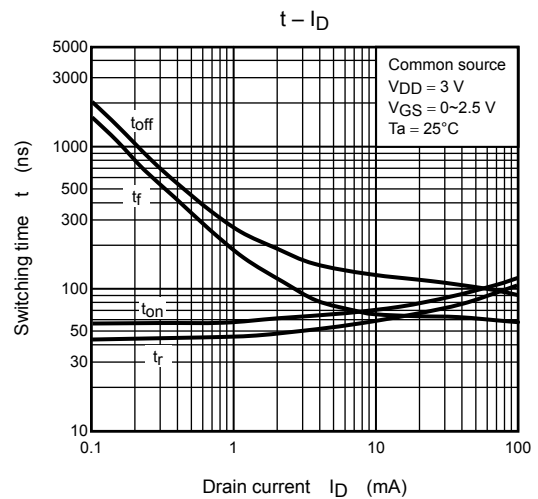
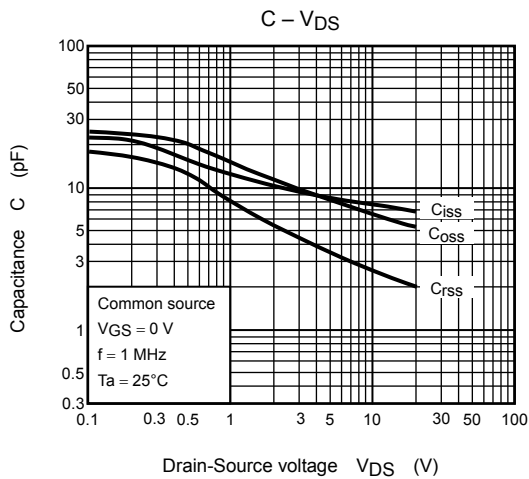
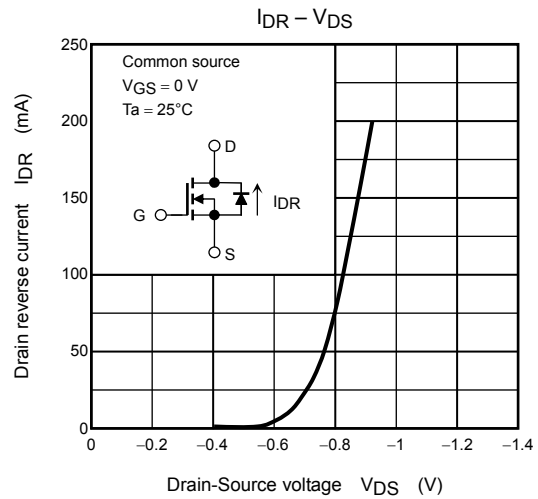
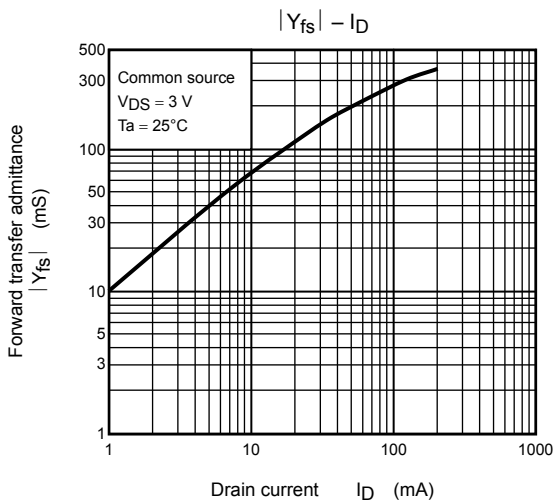


## Precaution

$V_{th}$  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:  $V_{GS(off)} < V_{th} < V_{GS(on)}$ .)

Take this into consideration when using the device.





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20070701-EN GENERAL

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