

TOSHIBA Field Effect Transistor Silicon P Channel MOS Type

SSM3J02T

Power Management Switch
High Speed Switching Applications

- Component package suitable for high-density mounting
- Small Package
- Low ON Resistance : $R_{on} = 0.5 \Omega$ (max) (@ $V_{GS} = -4 V$)
: $R_{on} = 0.7 \Omega$ (max) (@ $V_{GS} = -2.5 V$)
- Low-voltage operation possible

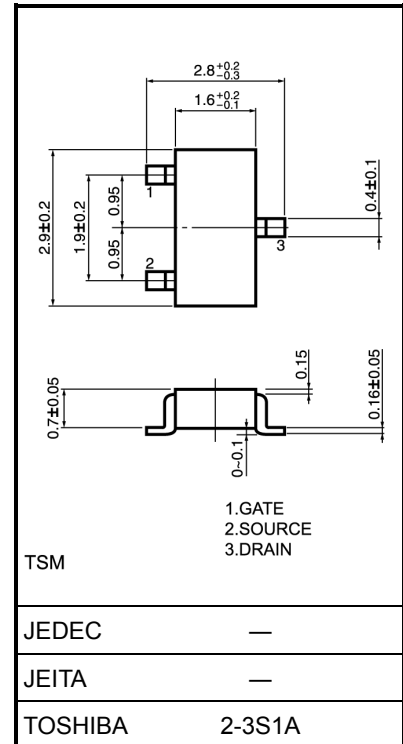
Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Drain-Source voltage		V_{DS}	-30	V
Gate-Source voltage		V_{GSS}	± 10	V
Drain current	DC	I_D	-1.5	A
	Pulse	I_{DP} (Note2)	-3.0	
Drain power dissipation (Ta = 25°C)		P_D (Note1)	1250	mW
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55 to 150	°C

Note1: Mounted on FR4 board
(25.4 mm × 25.4 mm × 1.6 t, Cu pad: 645 mm², t = 10 s)

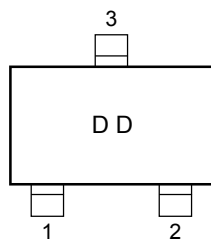
Note2: The pulse width limited by max channel temperature.

Unit: mm

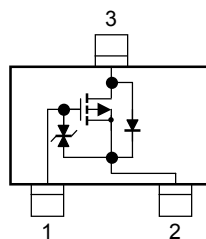


Weight: 10 mg (typ.)

Marking



Equivalent Circuit



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.

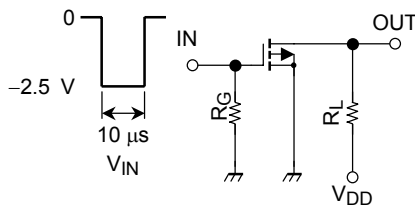
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 10 \text{ V}, V_{DS} = 0$	—	—	± 1	μA
Drain-Source breakdown voltage		$V_{(BR)DSS}$	$I_D = -1 \text{ mA}, V_{GS} = 0$	-30	—	—	V
Drain Cut-off current		I_{DSS}	$V_{DS} = -30 \text{ V}, V_{GS} = 0$	—	—	-1	μA
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} $	$V_{DS} = -3 \text{ V}, I_D = -0.3 \text{ A}$ (Note3)	0.6	—	—	S
Drain-Source ON resistance		$R_{DS(ON)}$	$I_D = -0.3 \text{ A}, V_{GS} = -4 \text{ V}$ (Note3)	—	0.4	0.5	Ω
			$I_D = -0.3 \text{ A}, V_{GS} = -2.5 \text{ V}$ (Note3)	—	0.55	0.7	
Input capacitance		C_{iss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	150	—	pF
Reverse transfer capacitance		C_{rss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	21	—	pF
Output capacitance		C_{oss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	61	—	pF
Switching time	Turn-on time	t_{on}	$V_{DD} = -15 \text{ V}, I_D = -0.3 \text{ A},$ $V_{GS} = 0 \text{ to } -2.5 \text{ V}, R_G = 4.7 \Omega$	—	55	—	ns
	Turn-off time	t_{off}		—	52	—	

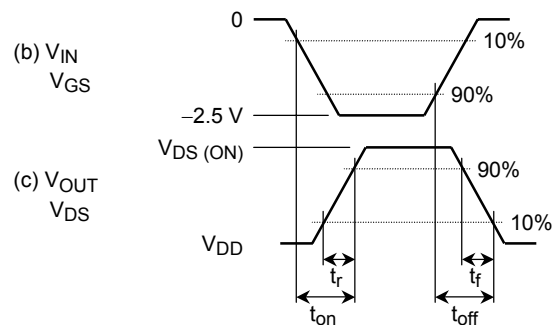
Note3: Pulse test

Switching Time Test Circuit

(a) Test circuit



$V_{DD} = -15 \text{ V}$
 $R_G = 4.7 \Omega$
 D.U. $\leq 1\%$
 $V_{IN}: t_r, t_f < 5 \text{ ns}$
 COMMON SOURCE
 $T_a = 25^\circ\text{C}$



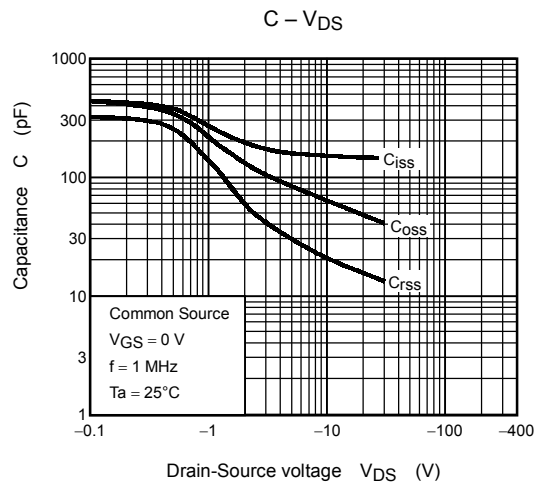
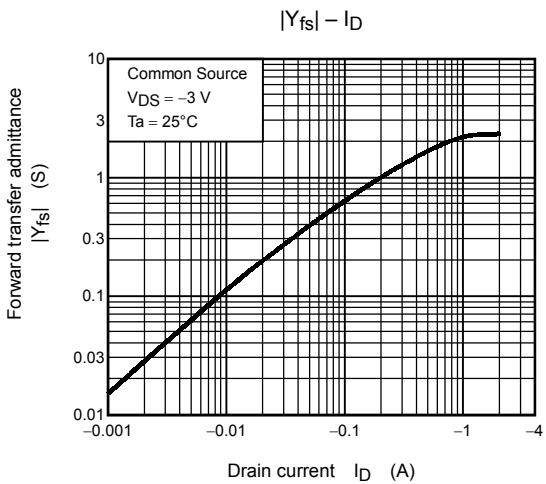
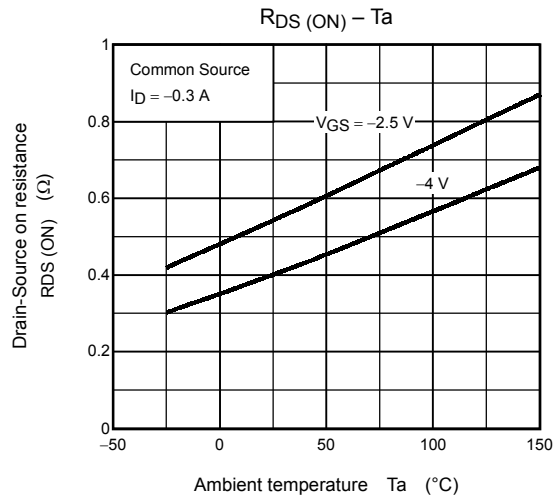
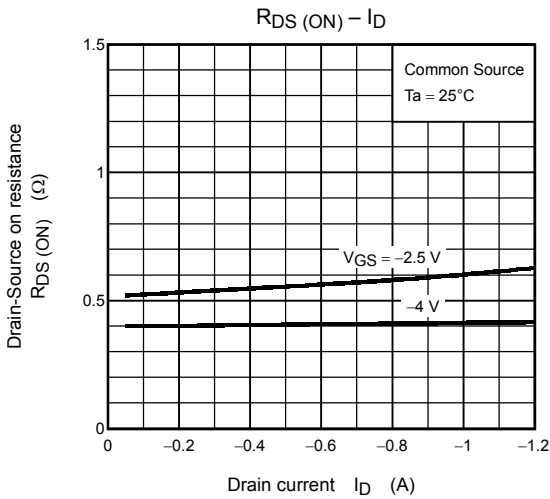
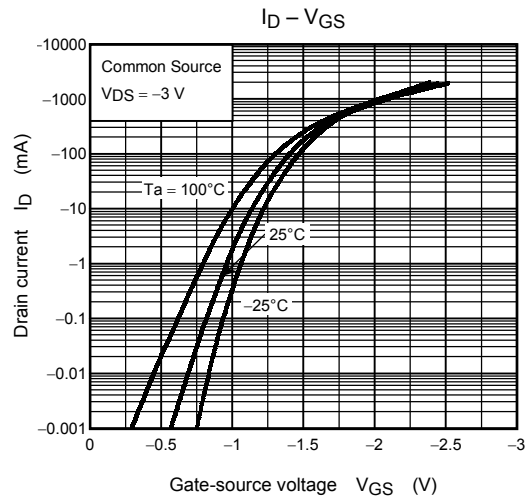
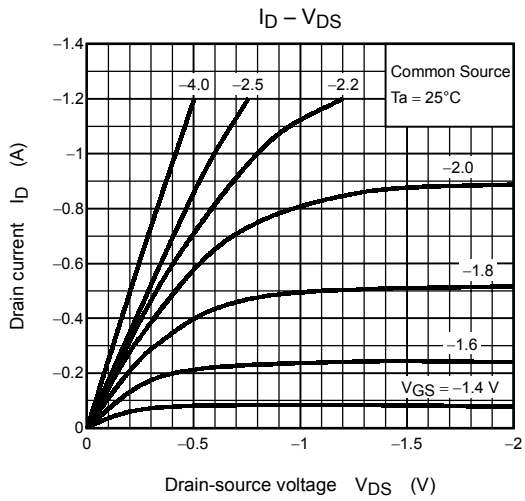
Precaution

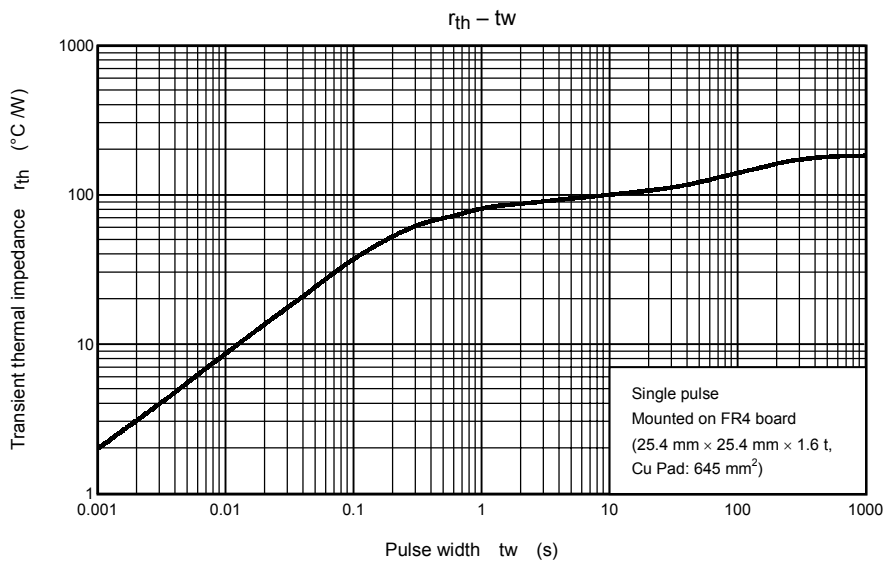
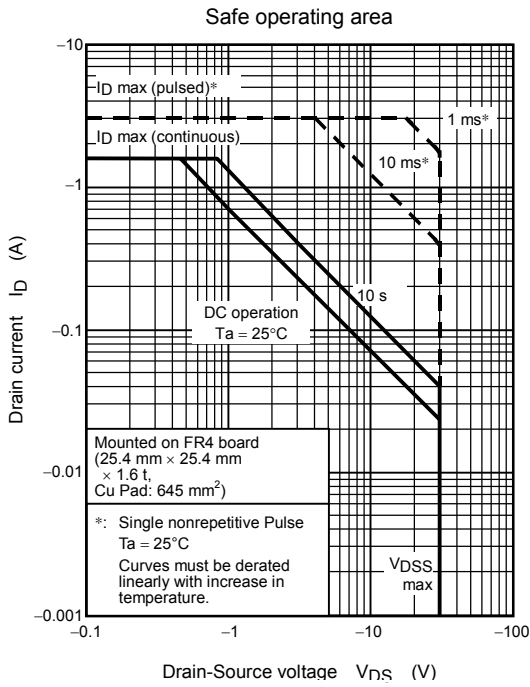
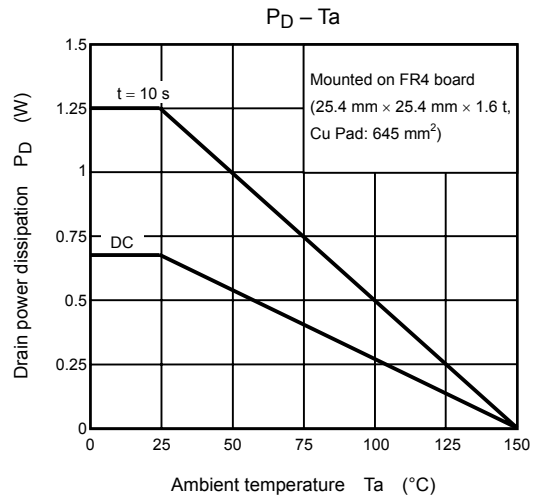
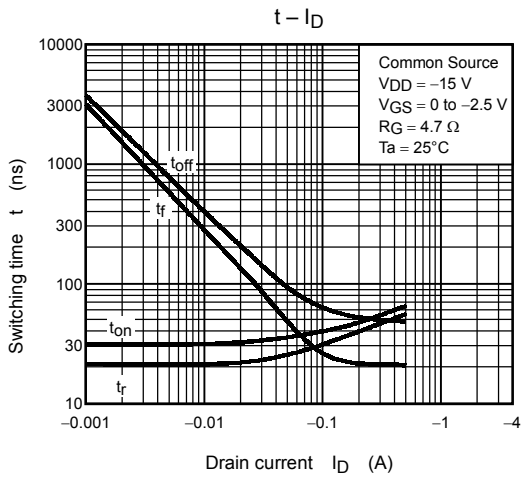
V_{th} can be expressed as voltage between gate and source when low operating current value is $I_D = -100 \mu\text{A}$ for this product. For normal switching operation, $V_{GS(on)}$ requires higher voltage than V_{th} and $V_{GS(off)}$ requires lower voltage than V_{th} .

(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.





RESTRICTIONS ON PRODUCT USE

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