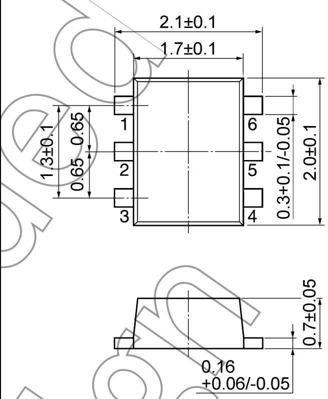
TOSHIBA Field Effect Transistor Silicon P Channel MOS Type (U-MOSⅣ)

SSM6J51TU

High Current Switching Applications

Unit: mm



1,2,5,6 : Drain
3 : Gate
4 : Source

UF6

JEDEC	-
JEITA	-
TOSHIBA	2-2T1D

Weight: 7 mg (typ.)

- Suitable for high-density mounting due to compact package
- Low on-resistance: R_{on} = 54 mΩ (max) (@V_{GS} = -2.5 V)
  85 mΩ (max) (@V_{GS} = -1.8 V)
  150mΩ (max) (@V_{GS} = -1.5 V)

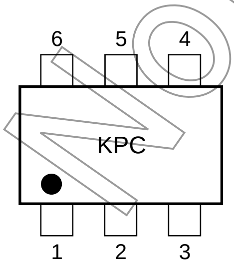
Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source voltage		V_{DS}	-12	V
Gate-Source voltage		V_{GSS}	±8	V
Drain current	DC	I_D	-4	A
	Pulse	I_{DP}	-8	
Drain power dissipation		P_D (Note 1)	500	mW
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55~150	°C

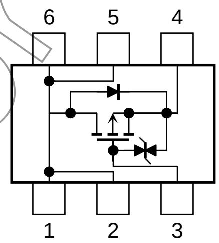
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Mounted on an FR4 board.
(25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 645 mm^2)

Marking



Equivalent Circuit (top view)



Handling Precaution

When handling individual devices (which are not yet mounted on a circuit board), ensure that the environment is protected against static 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.

Not Recommended for New Design

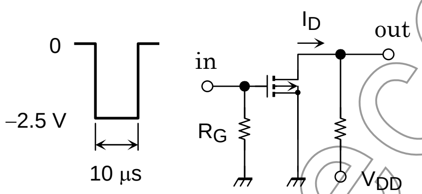
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±8 V, V_{DS} = 0	–	–	±10	μA
Drain-Source breakdown voltage		$V_{(BR)DSS}$	I_D = –1 mA, V_{GS} = 0	–12	–	–	V
		$V_{(BR)DSX}$	I_D = –1 mA, V_{GS} = +8 V	–4	–	–	
Drain cut-off current		I_{DSS}	V_{DS} = –12 V, V_{GS} = 0	–	–	–10	μA
Gate threshold voltage		V_{th}	V_{DS} = –3 V, I_D = –1 mA	–0.3	–	–1.0	V
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = –3 V, I_D = –2.0 A (Note 2)	6.0	12.0	–	S
Drain-Source on-resistance		$R_{DS(ON)}$	I_D = –2.0 A, V_{GS} = –2.5 V (Note 2)	–	38	54	mΩ
			I_D = –1.0 A, V_{GS} = –1.8 V (Note 2)	–	48	85	
			I_D = –0.3 A, V_{GS} = –1.5 V (Note 2)	–	60	150	
Input capacitance		C_{iss}	V_{DS} = –10 V, V_{GS} = 0, f = 1 MHz	–	1700	–	
Reverse transfer capacitance		C_{rss}	V_{DS} = –10 V, V_{GS} = 0, f = 1 MHz	–	190	–	pF
Output capacitance		C_{oss}	V_{DS} = –10 V, V_{GS} = 0, f = 1 MHz	–	210	–	pF
Switching time	Turn-on time	t_{on}	V_{DS} = –10 V, I_D = –2.0 A,	–	57	–	ns
	Turn-off time	t_{off}	V_{GS} = 0~–2.5 V, R_G = 4.7 Ω	–	120	–	

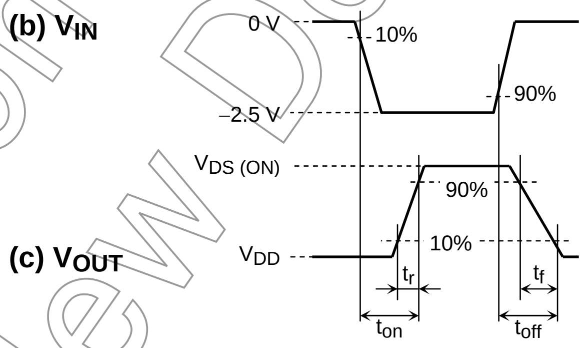
Note 2: Pulse test

Switching Time Test Circuit

(a) Test Circuit



V_{DD} = -10 V
R_G = 4.7 Ω
D.U. ≦ 1%
V_{IN}: t_r, t_f < 5 ns
Common Source
Ta = 25°C



Precaution

V_{th} can be expressed as the voltage between the gate and source when the low operating current value is I_D = -1mA 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: $V_{GS (off)} < V_{th} < V_{GS (on)}$.)

Be sure to take this into consideration when using the device.

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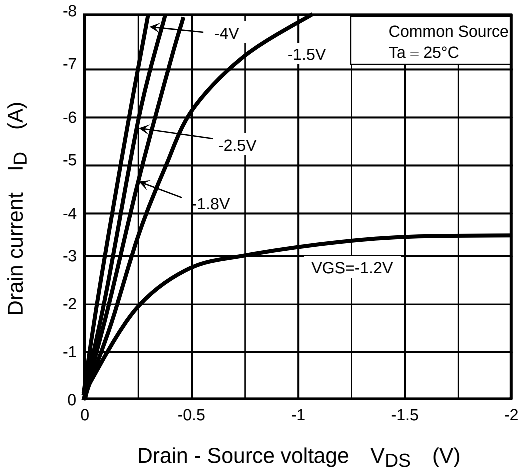
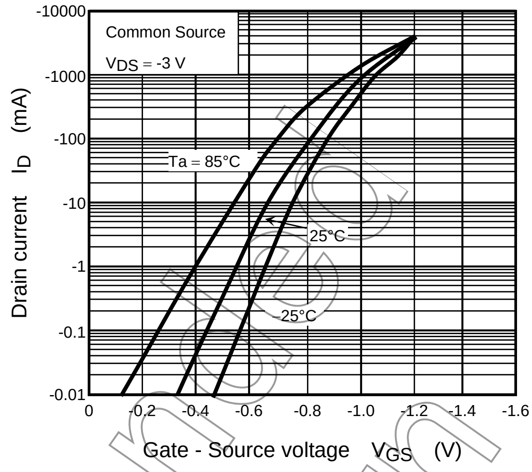
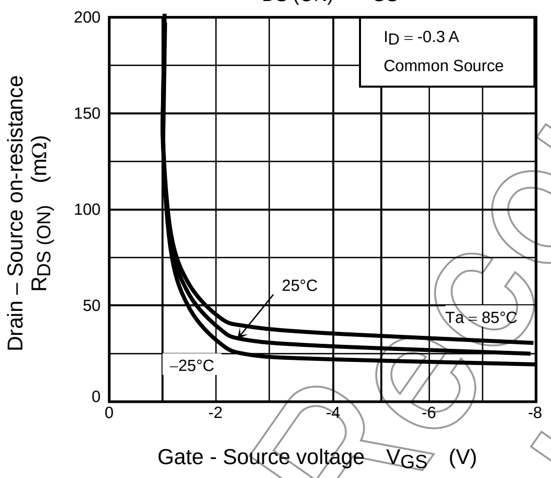
I_D – V_{DS}



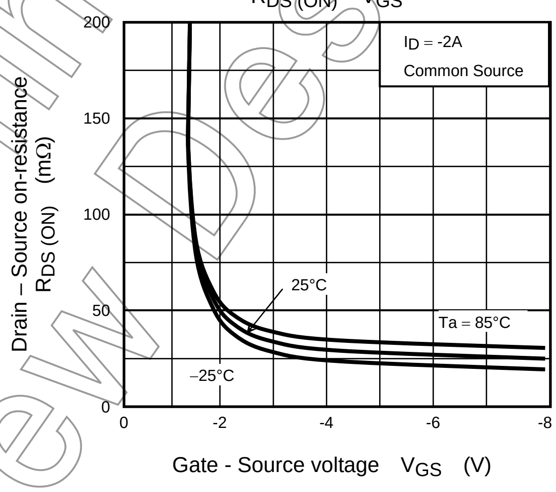
I_D – V_{GS}



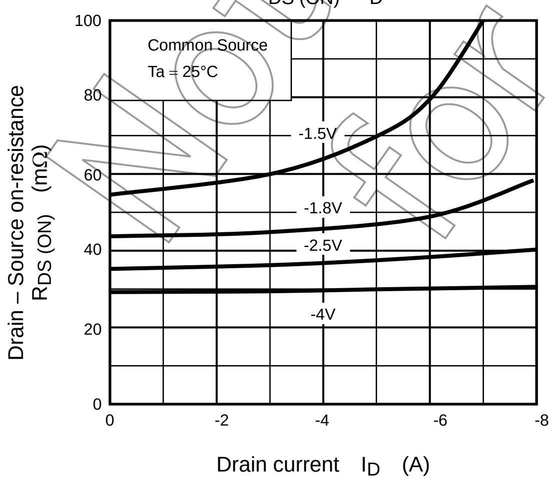
$R_{DS\,(ON)}$ – V_{GS}



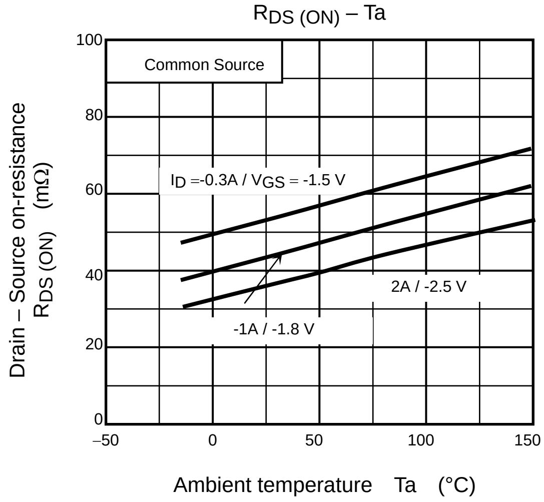
$R_{DS\,(ON)}$ – V_{GS}



$R_{DS\,(ON)}$ – I_D



$R_{DS\,(ON)}$ – Ta



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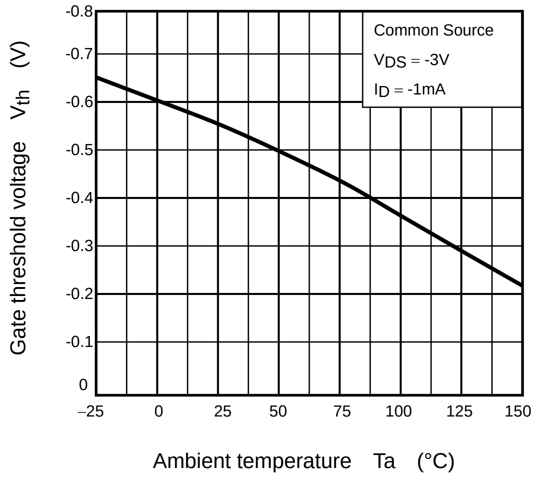
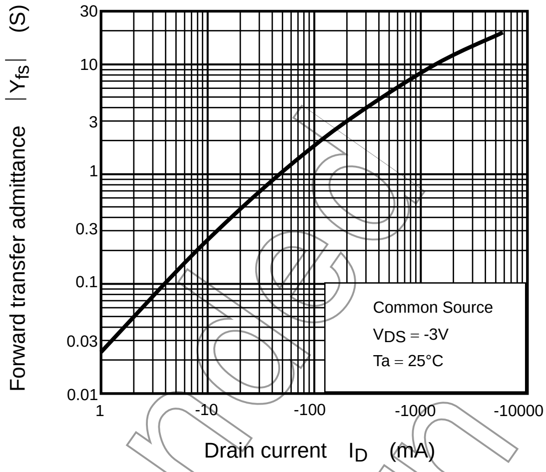
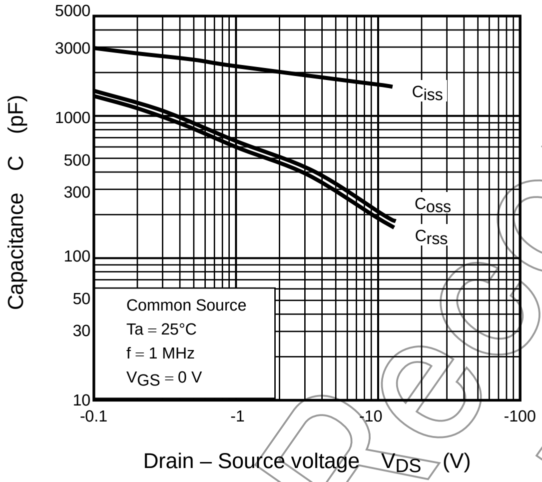
V_{th} – Ta



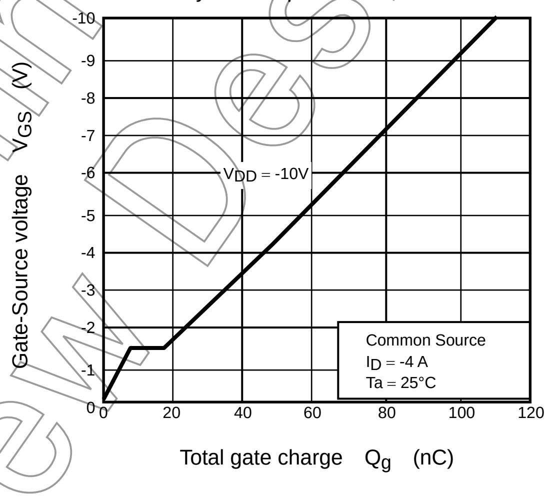
|Y_{fs}| – I_D



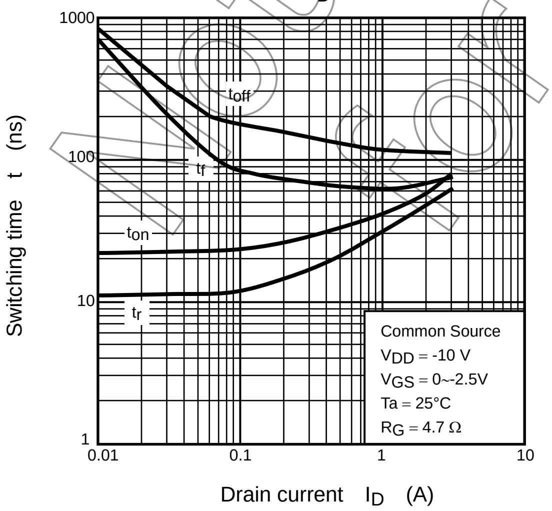
C – V_{DS}



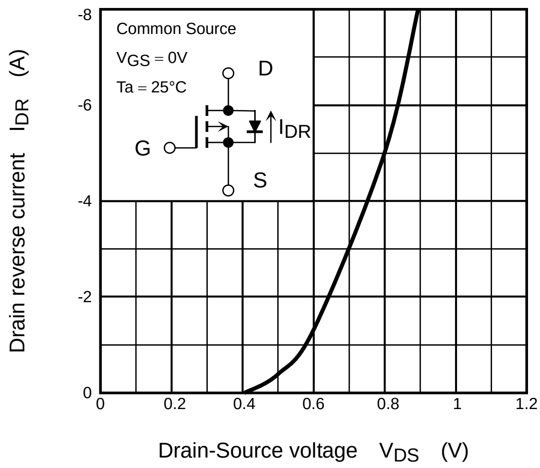
Dynamic Input Characteristic



t – I_D



I_{DR} – V_{DS}



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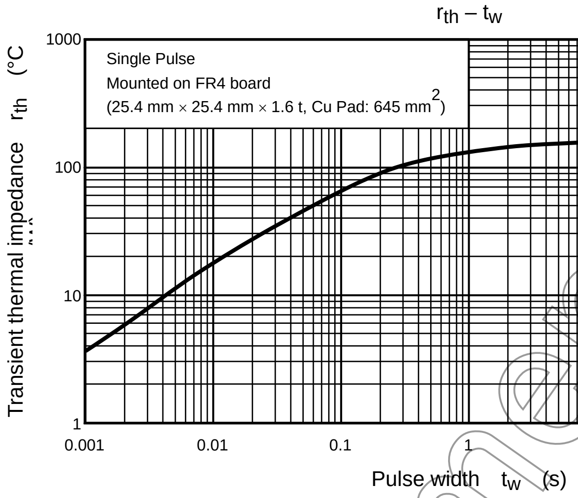

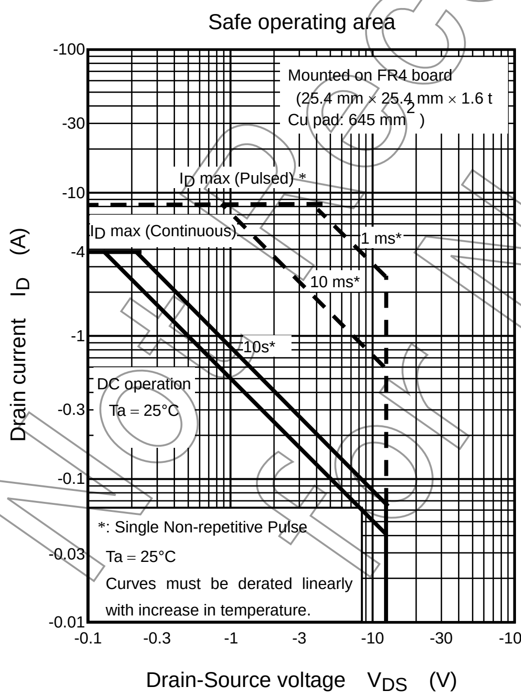

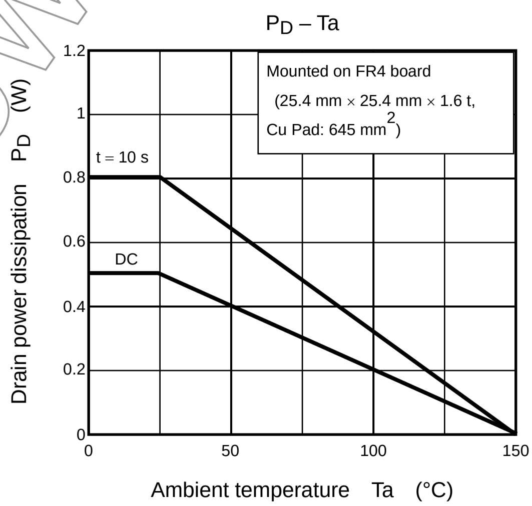

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