

SSM6J51TU

High Current Switching Applications

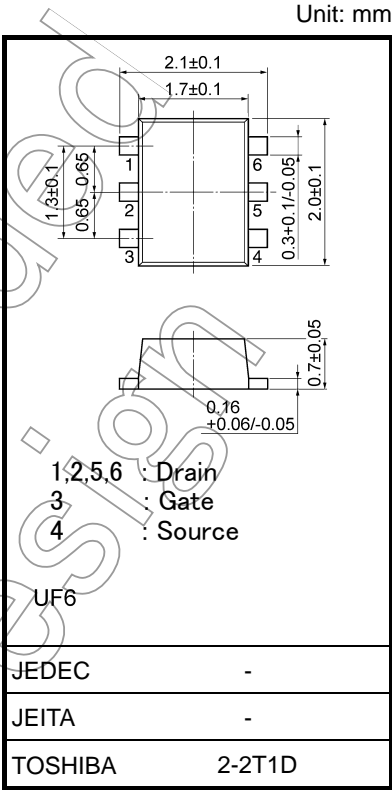
- Suitable for high-density mounting due to compact package
- Low on-resistance: $R_{on} = 54\text{ m}\Omega\text{ (max) (@}V_{GS} = -2.5\text{ V)}$
 $85\text{ m}\Omega\text{ (max) (@}V_{GS} = -1.8\text{ V)}$
 $150\text{ m}\Omega\text{ (max) (@}V_{GS} = -1.5\text{ V)}$

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

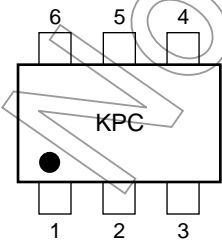
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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 mm²)

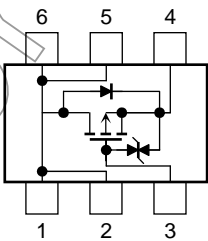


Weight: 7 mg (typ.)

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.

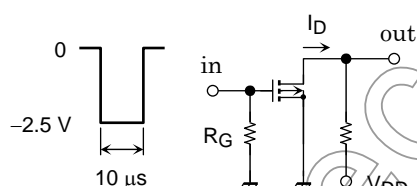
Electrical Characteristics (Ta = 25°C)

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}	—	57	—	ns
	Turn-off time	t _{off}	—	120	—	

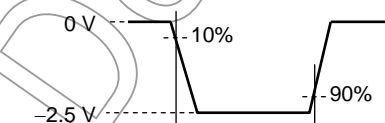
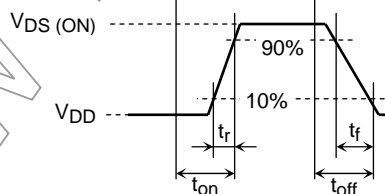
Note 2: Pulse test

Switching Time Test Circuit

(a) Test Circuit



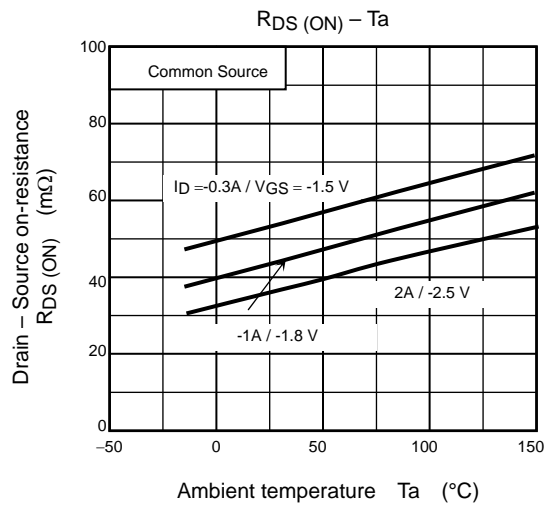
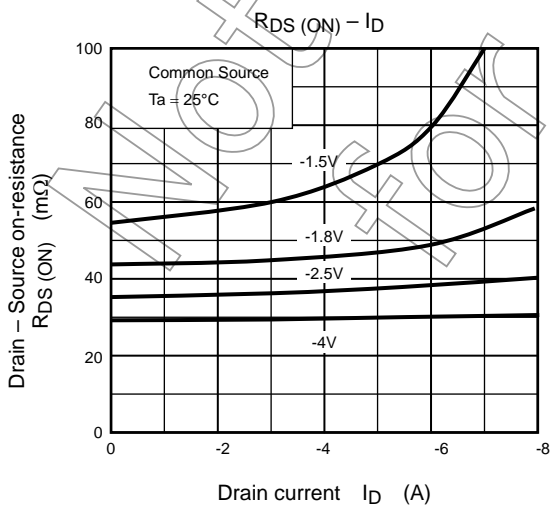
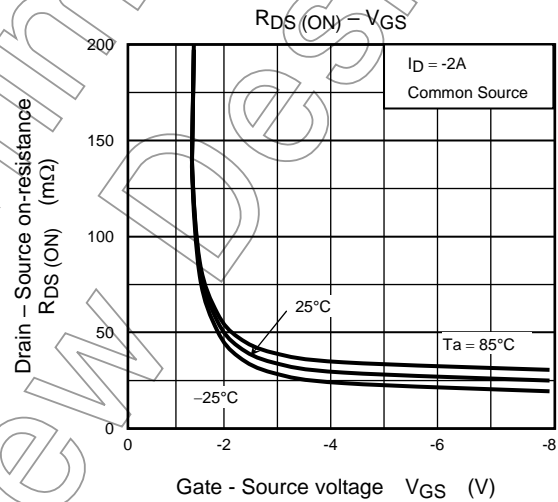
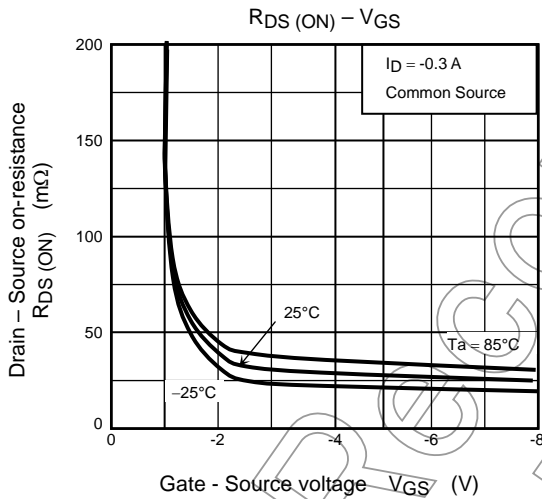
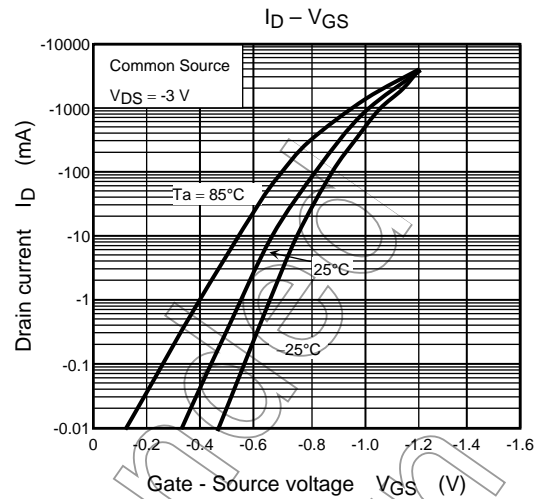
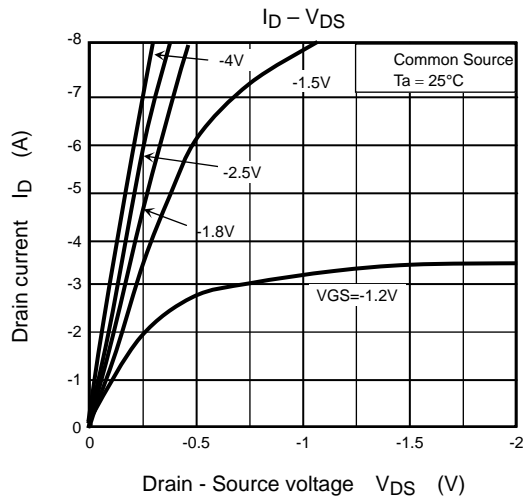
$V_{DD} = -10 \text{ V}$
 $R_G = 4.7 \text{ } \Omega$
 $\text{D.U.} \leq 1\%$
 $V_{IN}: t_r, t_f < 5 \text{ ns}$
 Common Source
 $T_a = 25^\circ\text{C}$

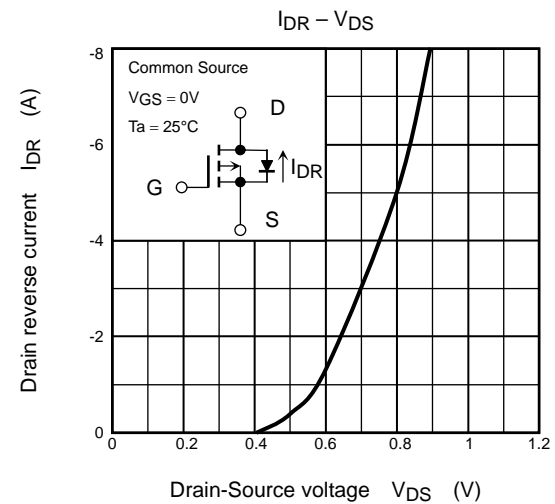
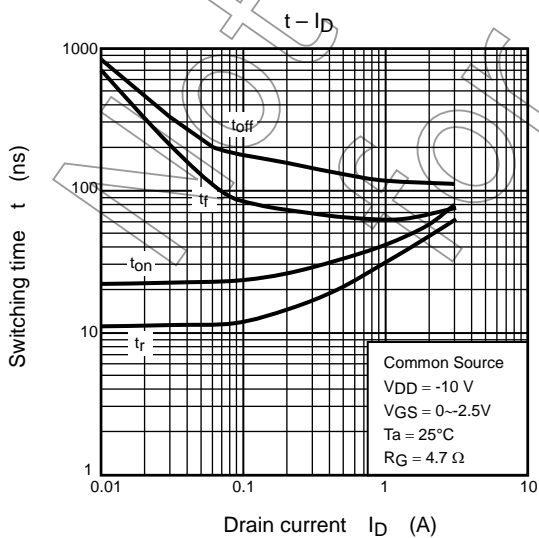
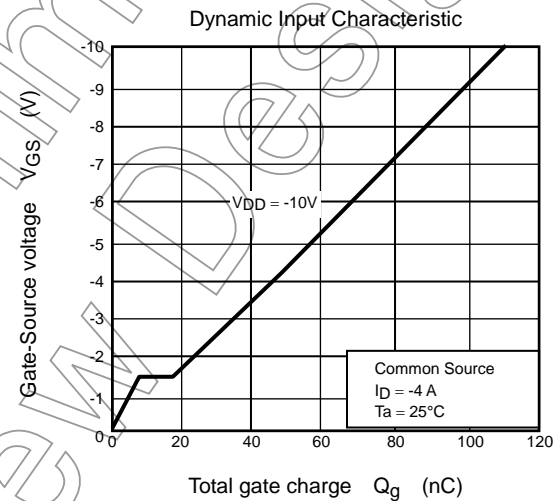
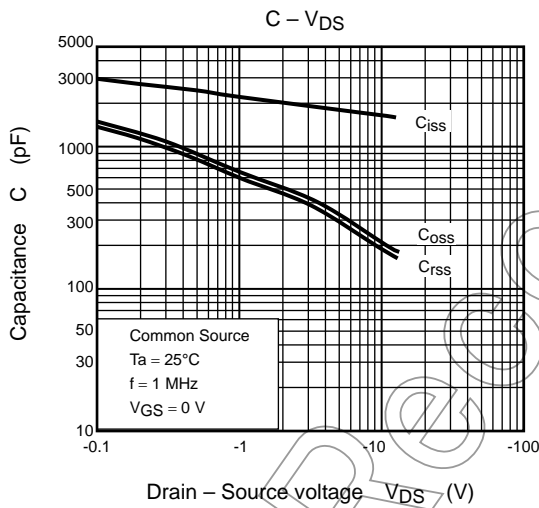
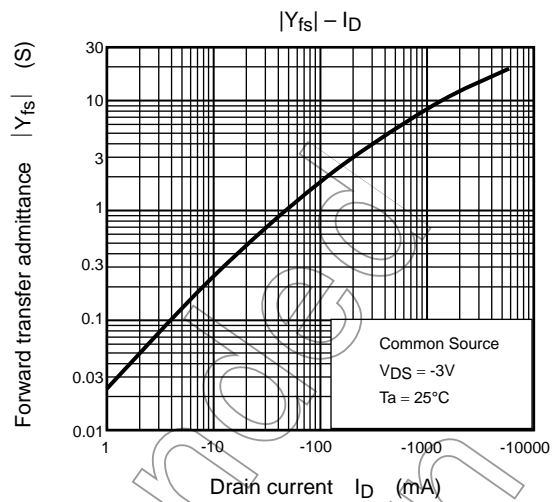
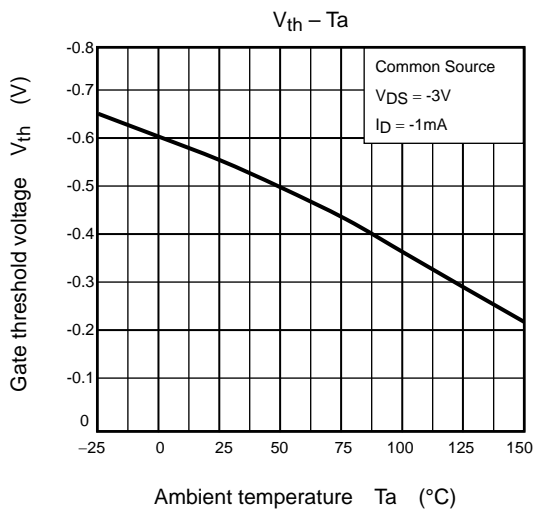
(b) V_{IN}(c) V_{OUT}

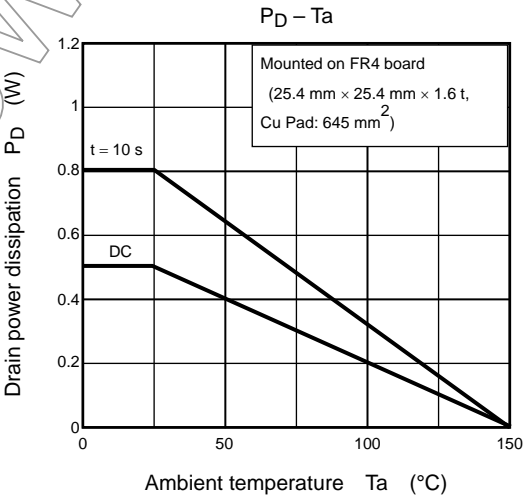
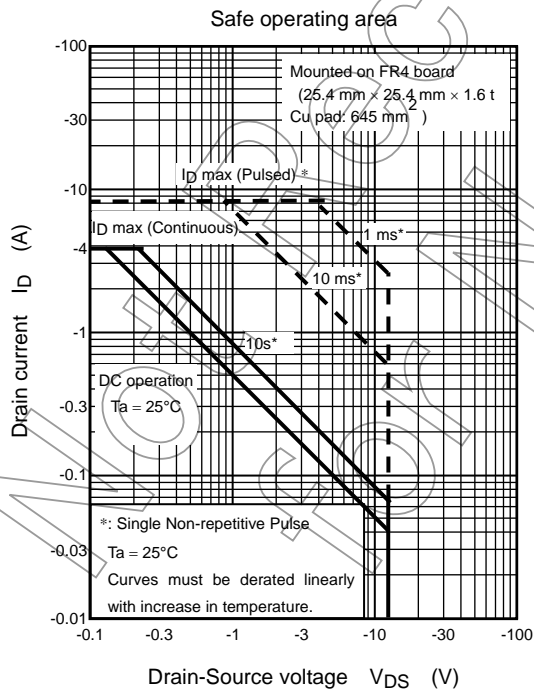
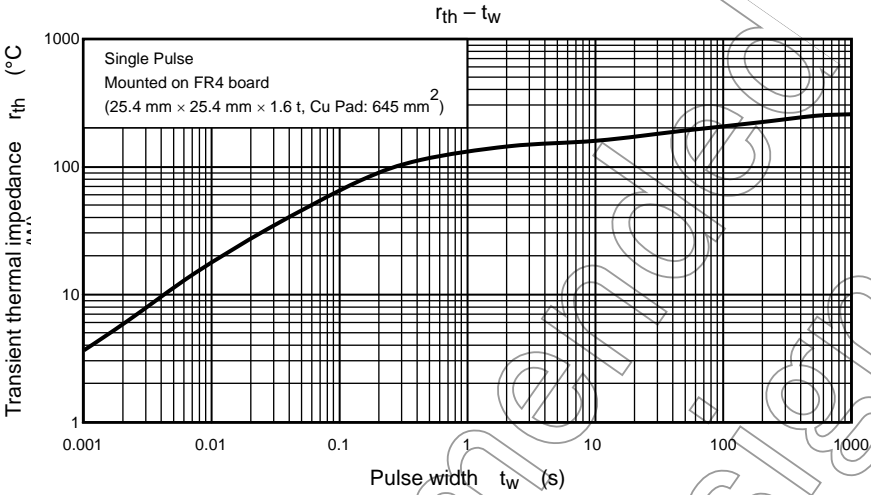
Precaution

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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