

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

SSM6J08FU

Power Management Switch
DC-DC Converter

- Small Package
- Low on Resistance : $R_{on} = 0.18 \Omega$ (max) (@ $V_{GS} = -4 V$)
: $R_{on} = 0.26 \Omega$ (max) (@ $V_{GS} = -2.5 V$)
- Low Gate Threshold Voltage

Absolute Maximum Ratings (Ta = 25°C)

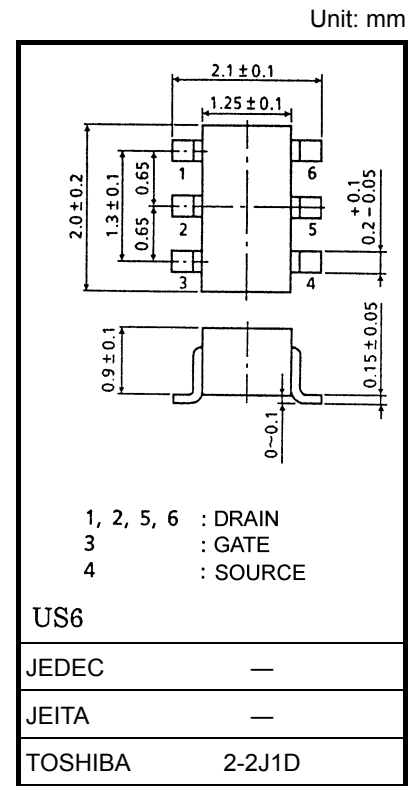
Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V_{DS}	-20	V
Gate-Source voltage	V_{GSS}	± 12	V
Drain current	DC	I_D	-1.3
	Pulse	I_{DP} (Note 2)	-2.6
Drain power dissipation	P_D (Note 1)	300	mW
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55~150	°C

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).

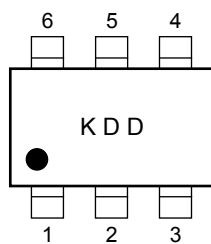
Note 1: Mounted on FR4 board
(25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 0.32 mm² × 6) Fig: 1.

Note 2: The pulse width limited by max channel temperature.



Weight: 6.8 mg (typ.)

Marking



Equivalent Circuit

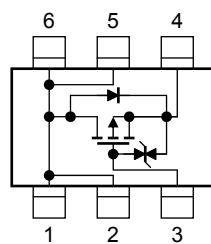
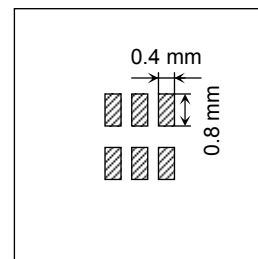


Fig 1: 25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 0.32 mm² × 6



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.

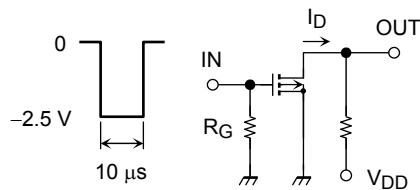
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 12\text{ V}, V_{DS} = 0$	—	—	± 1	μA
Drain-Source breakdown voltage	$V_{(BR)DSS}$	$I_D = -1\text{ mA}, V_{GS} = 0$	-20	—	—	V
	$V_{(BR)DSX}$	$I_D = -1\text{ mA}, V_{GS} = 12\text{ V}$	-8	—	—	
Drain Cut-off current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0$	—	—	-1	μA
Gate threshold voltage	V_{th}	$V_{DS} = -3\text{ V}, I_D = -0.1\text{ mA}$	-0.5	—	-1.1	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = -3\text{ V}, I_D = -0.65\text{ A}$ (Note 3)	1.3	2.7	—	S
Drain-Source ON resistance	$R_{DS(ON)}$	$I_D = -0.65\text{ A}, V_{GS} = -4\text{ V}$ (Note 3)	—	140	180	m Ω
		$I_D = -0.65\text{ A}, V_{GS} = -2.5\text{ V}$ (Note 3)	—	200	260	
		$I_D = -0.65\text{ A}, V_{GS} = -2.0\text{ V}$ (Note 3)	—	260	460	
Input capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	370	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	73	—	pF
Output capacitance	C_{oss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	116	—	pF
Switching time	Turn-on time	t_{on}	—	33	—	ns
	Turn-off time	t_{off}				

Note 3: Pulse test

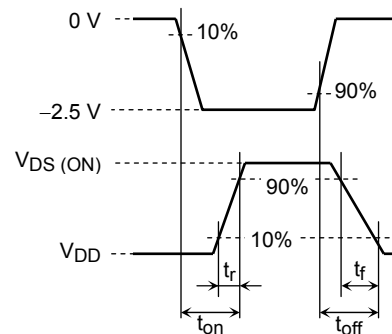
Switching Time Test Circuit

(a) Test circuit



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

(b) V_{IN}



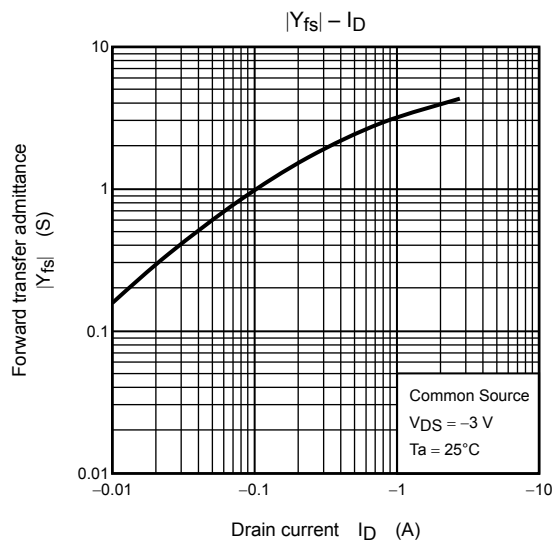
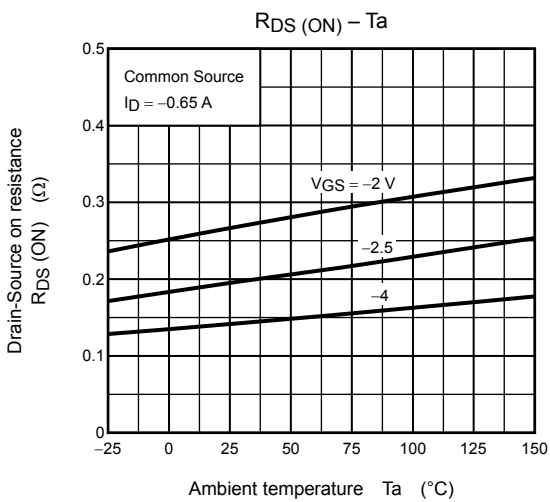
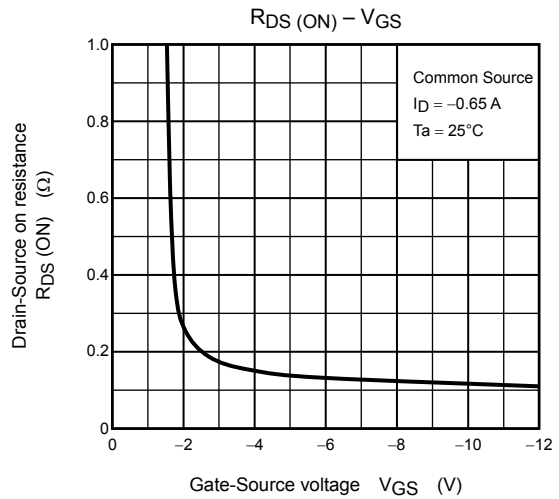
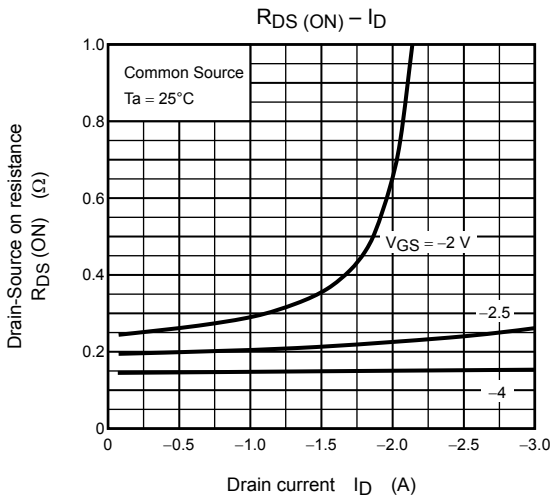
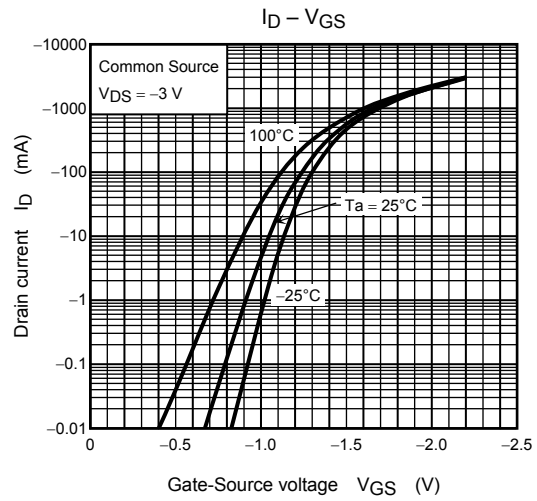
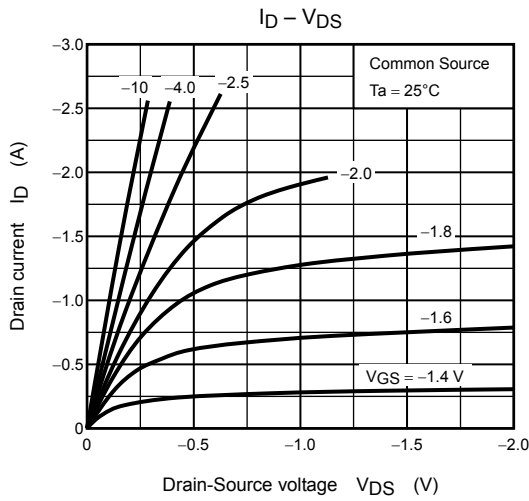
(c) V_{OUT}

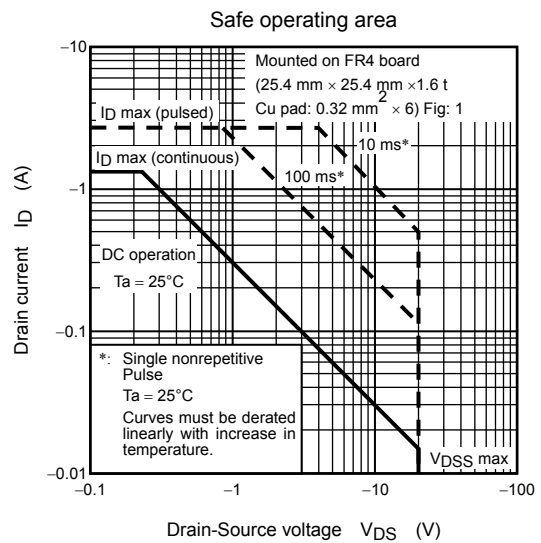
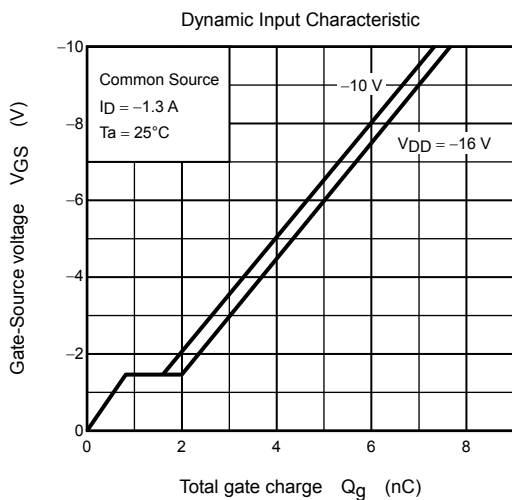
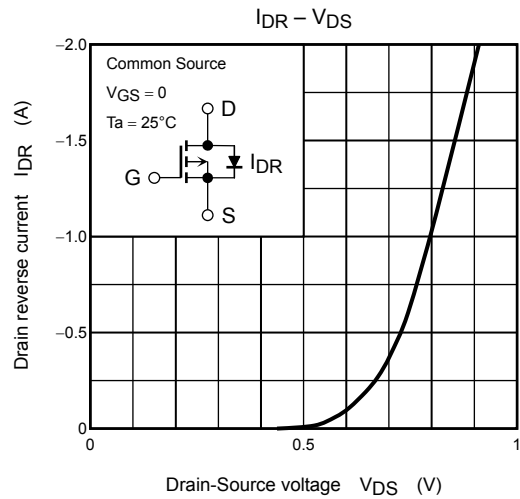
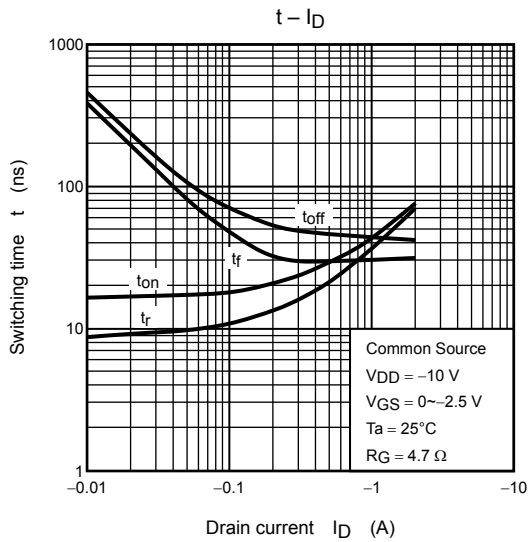
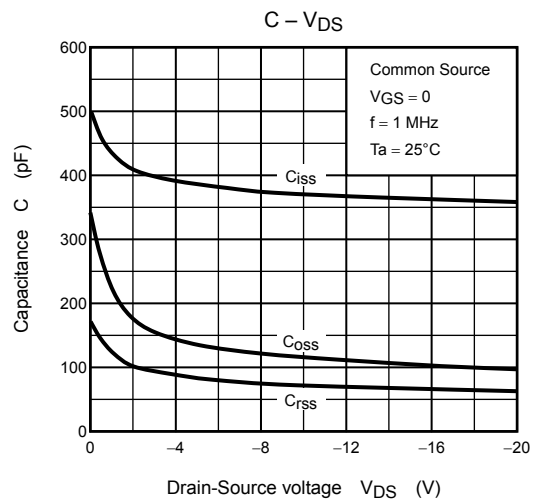
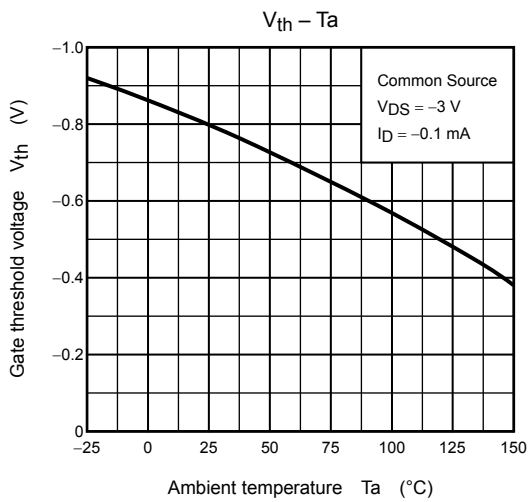
Precaution

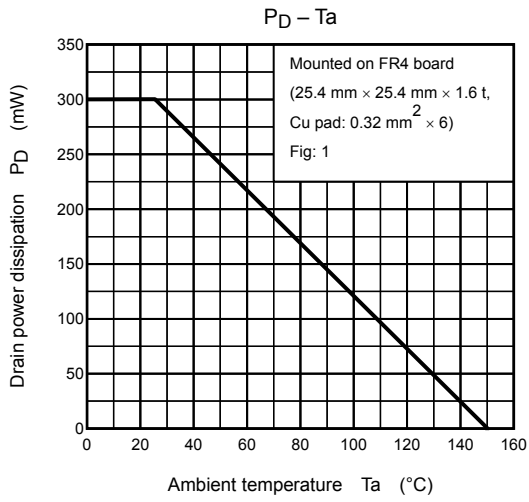
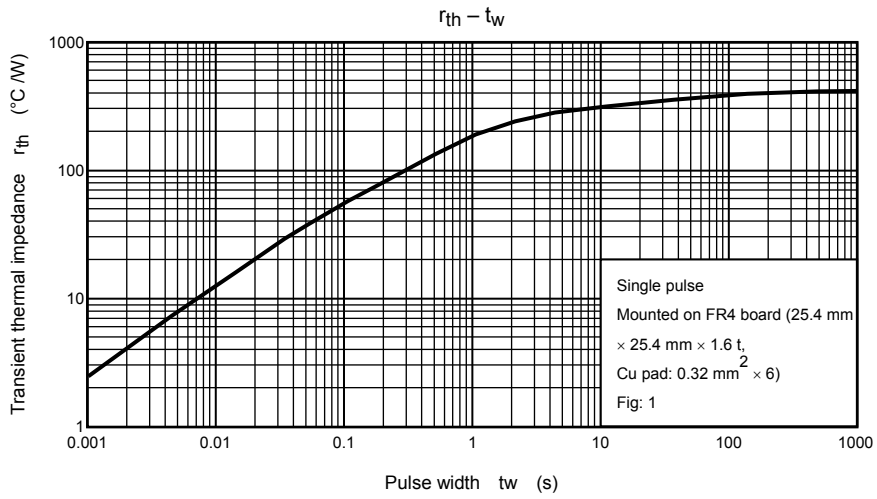
V_{th} can be expressed as voltage between gate and source when low operating current value is $I_D = -100\ \mu\text{A}$ for this product. For normal switching operation, $V_{GS(ON)}$ requires higher voltage than V_{th} and $V_{GS(OFF)}$ requires lower voltage than V_{th} .

(relationship can be established as follows: $V_{GS(OFF)} < V_{th} < V_{GS(ON)}$)

Please take this into consideration for using the device.







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