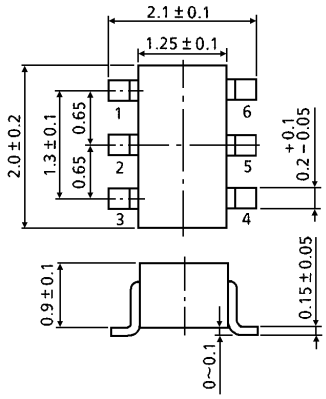
TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE

SSM6K06FU

HIGH SPEED SWITCHING APPLICATIONS

Unit in mm

- Small Package
- Low on Resistance : R_{on} = 160 mΩ Max. (@V_{GS} = 4 V)
  : R_{on} = 210 mΩ Max. (@V_{GS} = 2.5 V)
- Low Gate Threshold Voltage



1, 2, 5, 6 : DRAIN
3 : GATE
4 : SOURCE

US6	
JEDEC	—
EIAJ	—
TOSHIBA	2-2J1D

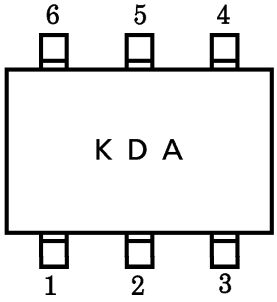
Weight : 6.8 mg

MAXIMUM RATINGS (Ta = 25°C)

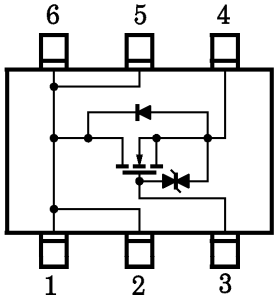
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current	DC	I_D	1.1	A
	Pulse	I_{DP}	2.2	
Drain Power Dissipation (Ta = 25°C)		P_D*	300	mW
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

* Mounted on FR4 Board.
(25.4 mm × 25.4 mm × 1.6 t, Cu Pad : 0.32 mm^2 × 6) Fig.1.

MARKING



EQUIVALENT CIRCUIT (TOP VIEW)



HANDLING PRECAUTION

When handling individual devices (which are not yet mounting 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.

961001EAA1

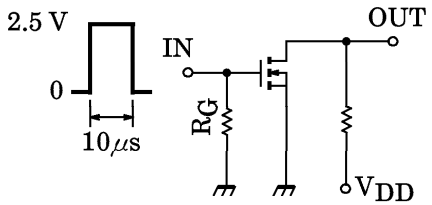
- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

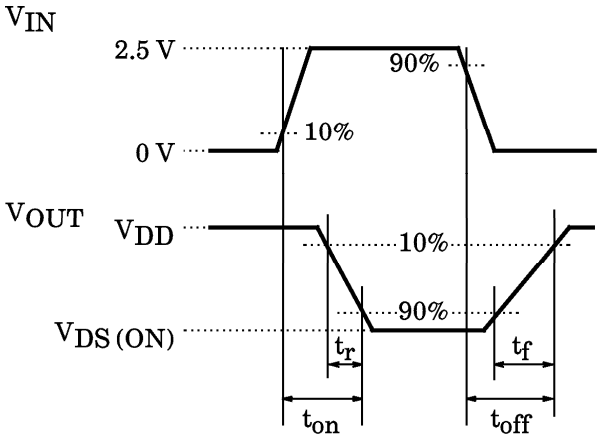
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±12 V, V_{DS} = 0	—	—	±1	μA
Drain-Source Breakdown Voltage		$V_{(BR)\,DSS}$	I_D = 1 mA, V_{GS} = 0	20	—	—	V
Drain Cut-off Current		I_{DSS}	V_{DS} = 20 V, V_{GS} = 0	—	—	1	μA
Gate Threshold Voltage		V_{th}	V_{DS} = 3 V, ID = 0.1 mA	0.6	—	1.1	V
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 3 V, I_D = 0.5 A (Note)	1.2	—	—	S
Drain-Source ON Resistance		$R_{DS\,(ON)}$	I_D = 0.5 A, V_{GS} = 4 V (Note)	—	120	160	mΩ
			I_D = 0.5 A, V_{GS} = 2.5 V (Note)	—	160	210	
Input Capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz	—	125	—	pF
Reverse Transfer Capacitance		C_{rss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz	—	30	—	pF
Output Capacitance		C_{oss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz	—	75	—	pF
Switching Time	Turn-on Time	t_{on}	V_{DD} = 10 V, I_D = 0.5 A,	—	42	—	ns
	Turn-off Time	t_{off}	V_{GS} = 0~2.5 V, R_G = 4.7 Ω	—	100	—	

(Note) : Pulse test

SWITCHING TIME 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

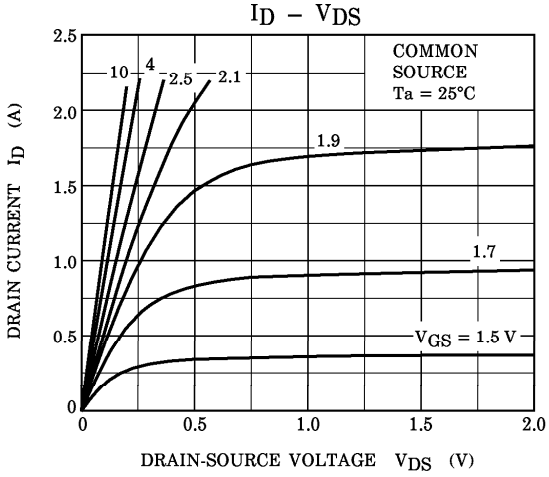


PRECAUTION

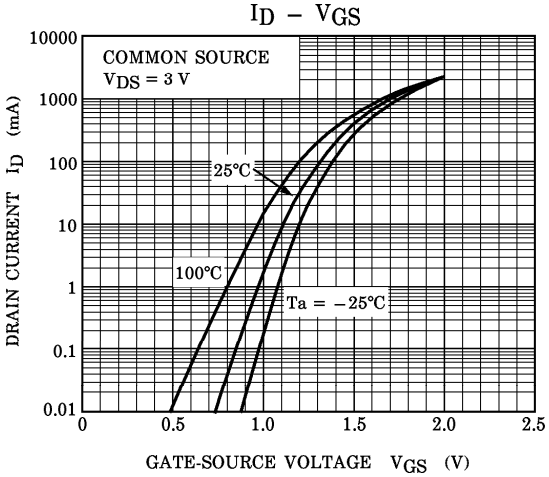
V_{th} can be expressed as voltage between gate and source when low operating current value is I_D = 100 μA for this product. For normal switching operation, $V_{GS\,(ON)}$ requires higher voltage than V_{th} and $V_{GS\,(off)}$ requires lower voltage than V_{th}.
(Relationship can be established as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

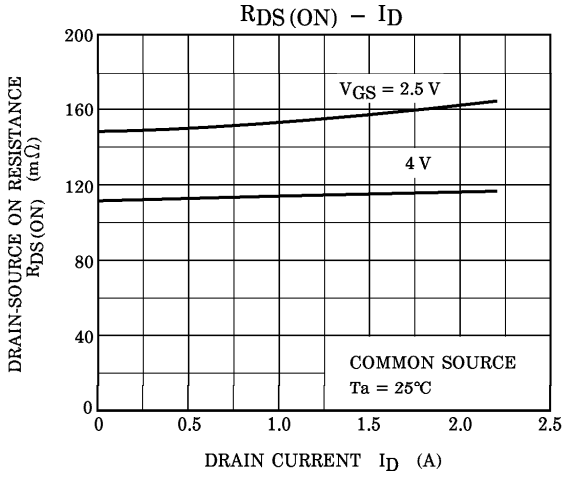
$I_D - V_{DS}$



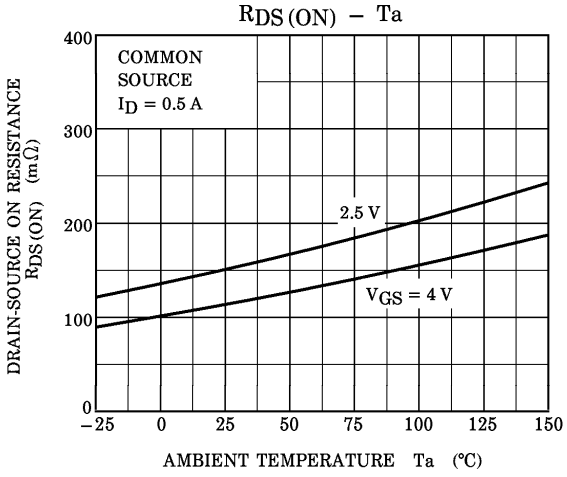
$I_D - V_{GS}$



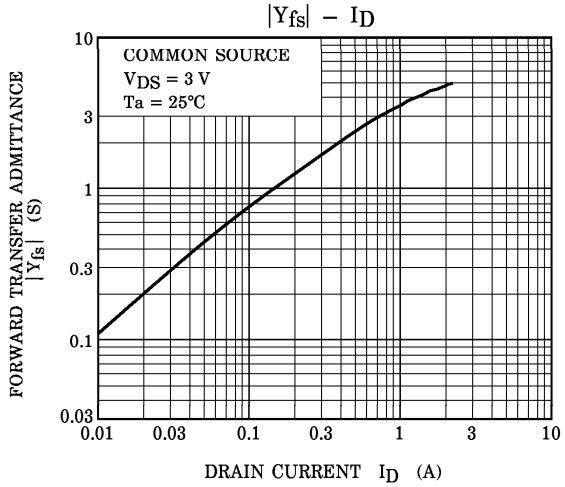
$R_{DS\,(ON)} - I_D$



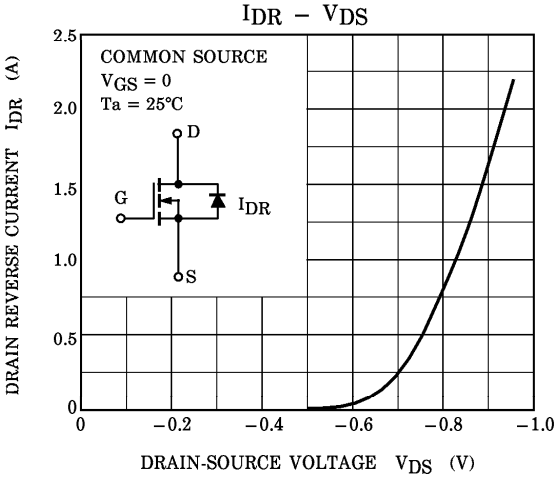
$R_{DS\,(ON)} - Ta$



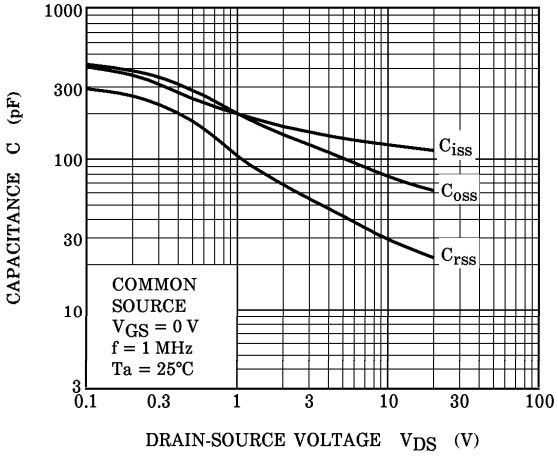
$|Y_{fs}| - I_D$



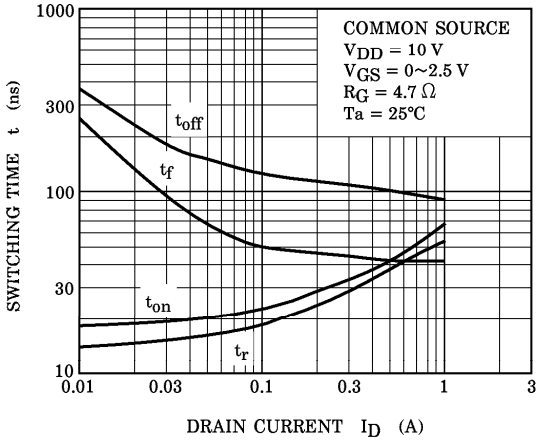
$I_{DR} - V_{DS}$



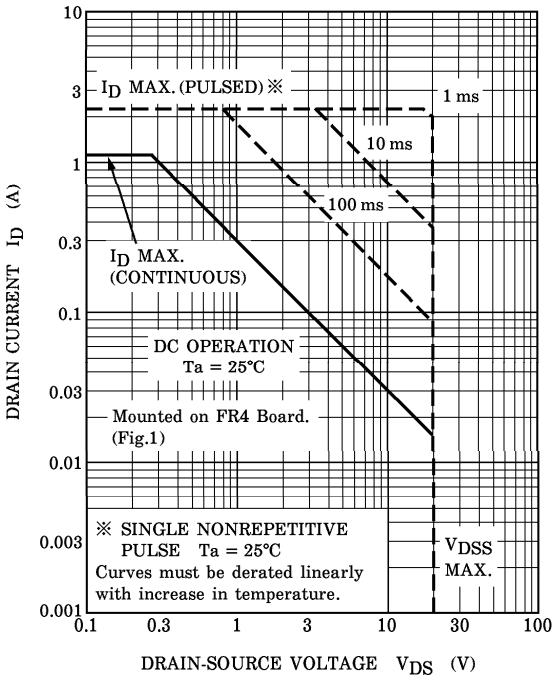
C – V_{DS}



t – I_D



SAFE OPERATING AREA



P_D – Ta

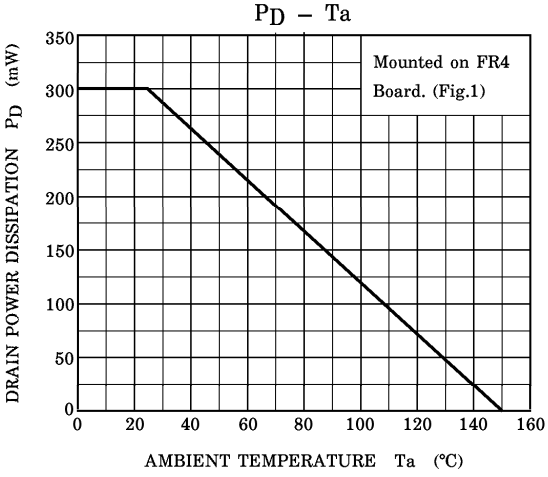
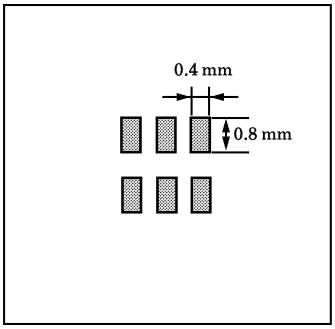



Fig.1 : 25.4 mm × 25.4 mm × 1.6 t, Cu Pad : 0.32 mm^2 × 6