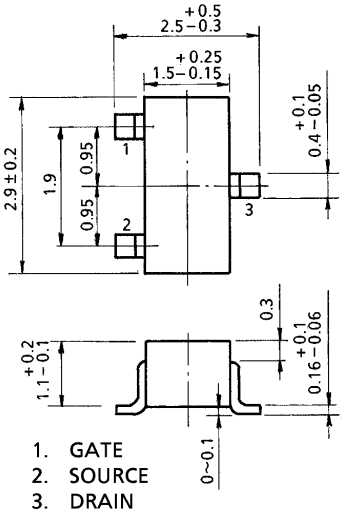
TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE

SSM3K02F

HIGH SPEED SWITCHING APPLICATIONS

- Small Package
- Low on Resistance : R_{on} = 200 mΩ (Max) (V_{GS} = 4 V)
  : R_{on} = 250 mΩ (Max) (V_{GS} = 2.5 V)
- Low Gate Threshold Voltage : V_{th} = 0.6~1.1 V
  (V_{DS} = 3 V, I_D = 0.1 mA)

Unit in mm



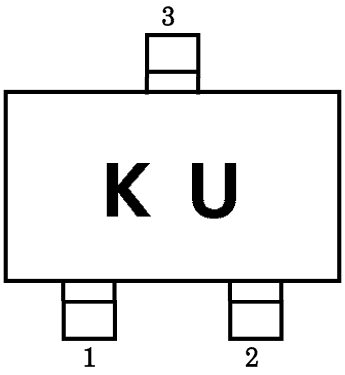
S-MINI	
JEDEC	TO-236MOD
EIAJ	SC-59
TOSHIBA	2-3F1F

Weight : 0.012 g

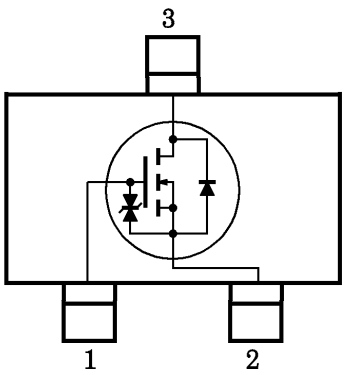
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GSS}	±10	V
Drain Current	DC	I_D	1.0	A
	Pulse	I_{DP}	2.0	
Drain Power Dissipation		P_D	200	mW
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

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.

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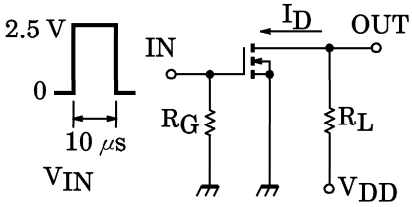
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

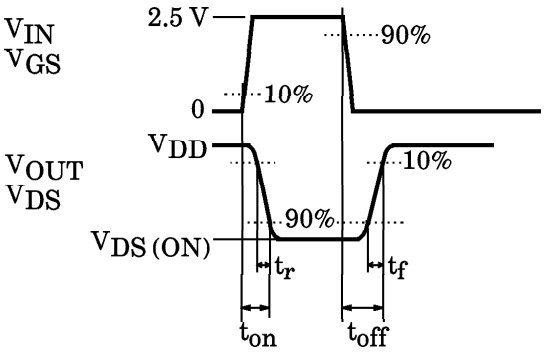
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ± 10 V, V_{DS} = 0	—	—	±5	μA
Drain-Source Breakdown Voltage		$V_{(BR)\,DSS}$	I_D = 1 mA, V_{GS} = 0	30	—	—	V
Drain Cut-off Current		I_{DSS}	V_{DS} = 30 V, V_{GS} = 0	—	—	1	μA
Gate Threshold Voltage		V_{th}	V_{DS} = 3 V, I_D = 0.1 mA	0.6	—	1.1	V
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 3 V, I_D = 0.5 A (Note 1)	1.5	—	—	S
Drain-Source ON Resistance		$R_{DS\,(ON)}$	I_D = 0.5 A, V_{GS} = 4 V (Note 1)	—	140	200	mΩ
			I_D = 0.5 A, V_{GS} = 2.5 V (Note 1)	—	180	250	
Input Capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz	—	115	—	pF
Reverse Transfer Capacitance		C_{rss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz	—	24	—	pF
Output Capacitance		C_{oss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz	—	60	—	pF
Switching Time	Turn-on Time	t_{on}	V_{DD} = 15 V, I_D = 0.5 A,	—	52	—	ns
	Turn-off Time	t_{off}	V_{GS} = 0~2.5 V, R_G = 4.7 Ω	—	80	—	

(Note 1) : Pulse test

SWITCHING TIME TEST CIRCUIT



V_{DD} = 15 V
R_G = 4.7 Ω
D.U. ≦ 1%
V_{IN} : t_r, t_f < 5 ns
COMMON SOURCE
Ta = 25°C

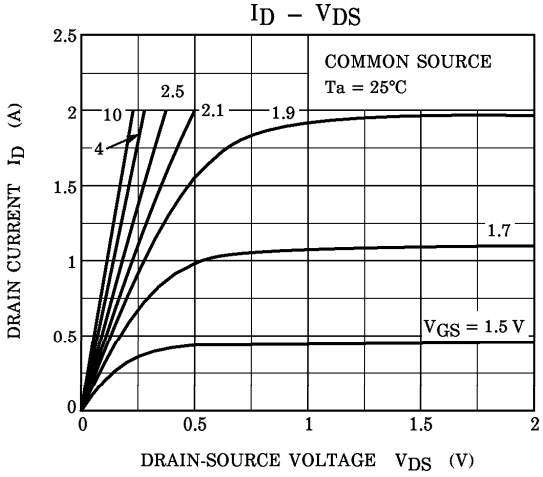


PRECAUTION

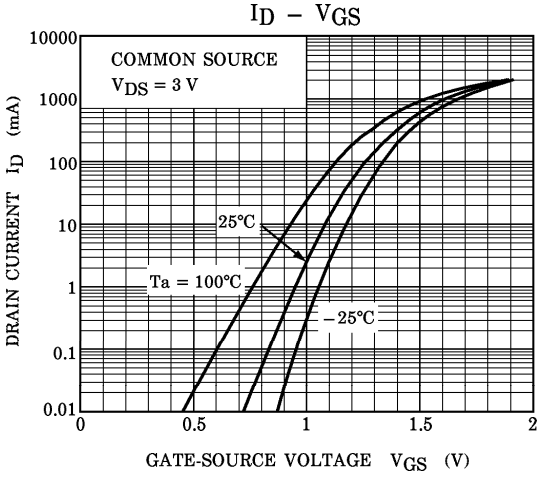
V_{th} can be expressed as voltage between gate and source when low operating current value is I_D = 100 μA for this product. For normal switching operation, $V_{GS\,(ON)}$ requires higher voltage than V_{th} and $V_{GS\,(off)}$ requires lower voltage than V_{th}.
(Relationship can be established as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

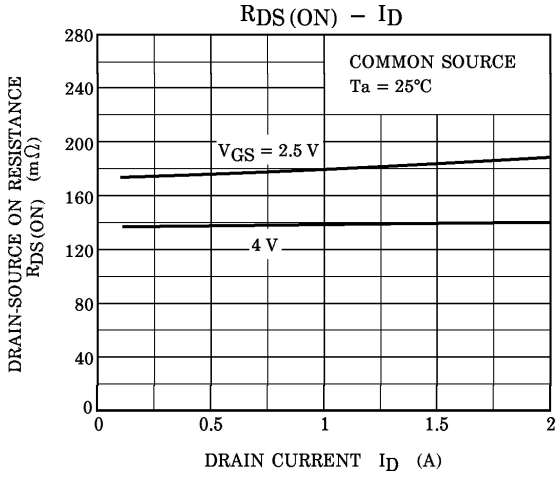
$I_D - V_{DS}$



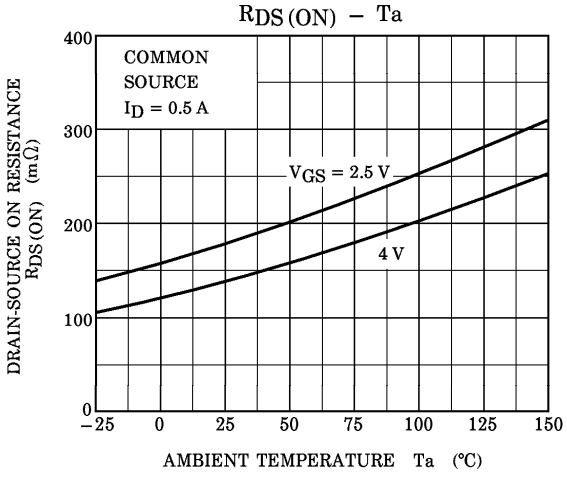
$I_D - V_{GS}$



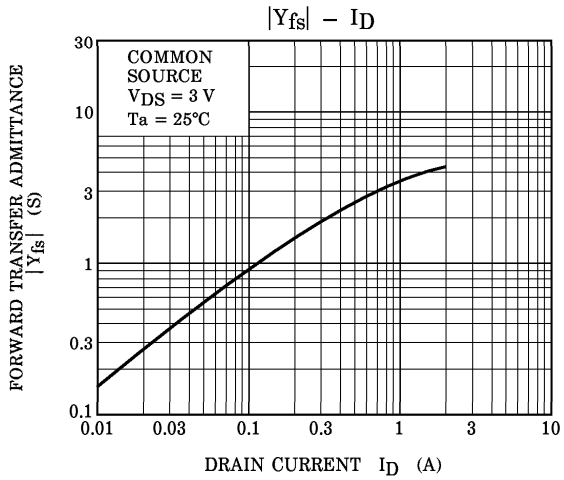
$R_{DS(ON)} - I_D$



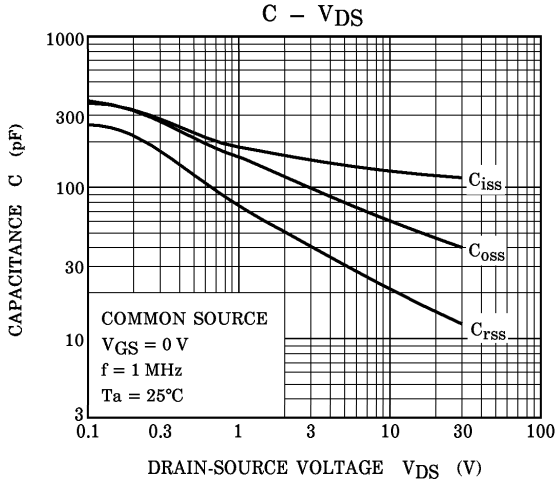
$R_{DS(ON)} - Ta$



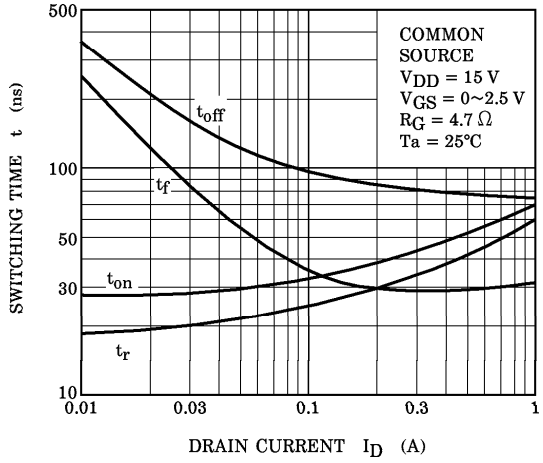
$|Y_{fs}| - I_D$



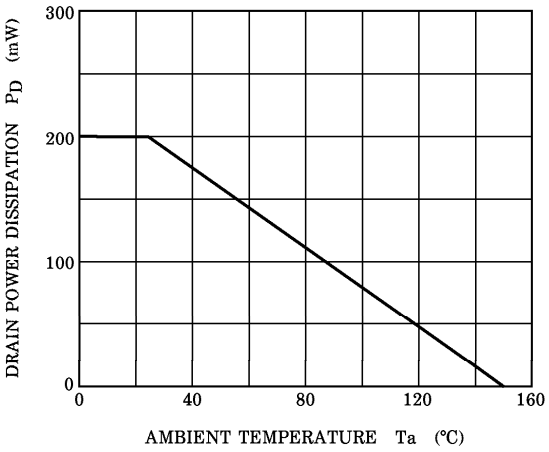
$C - V_{DS}$



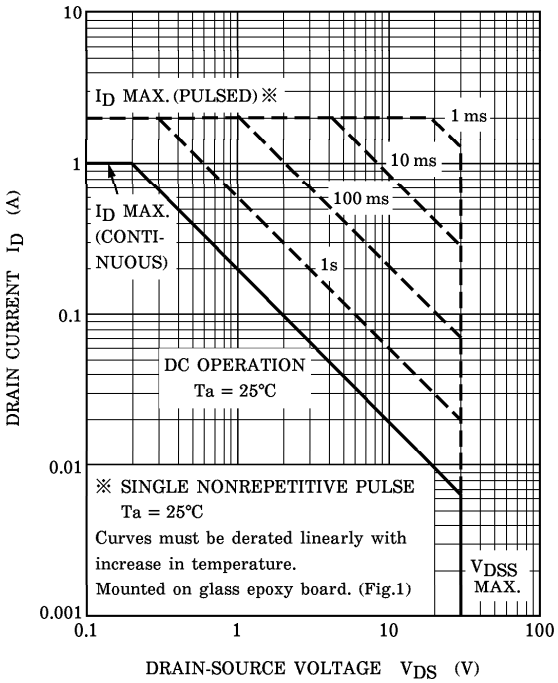
t – I_D



P_D – Ta



SAFE OPERATING AREA



(Fig.1) : 25.4 mm × 25.4 mm × 1.6 t (a Cu pad of 0.8 mm^2 area)