

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE

# SSM3J05FU

POWER MANAGEMENT SWITCH

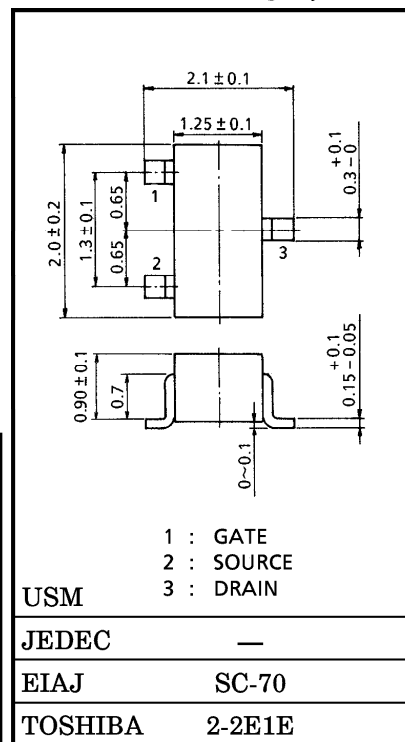
Unit in mm

HIGH SPEED SWITCHING APPLICATIONS

- Small Package
- Low on Resistance :  $R_{on} = 3.3 \Omega$  Max. (@ $V_{GS} = -4 V$ )  
:  $R_{on} = 4.0 \Omega$  Max. (@ $V_{GS} = -2.5 V$ )
- Low Gate Threshold Voltage

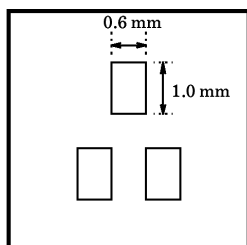
MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DS}$	-20	V
Gate-Source Voltage		$V_{GSS}$	$\pm 12$	V
Drain Current	DC	$I_D$	-200	mA
	Pulse	$I_{DP}$	-400	
Drain Power Dissipation ( $T_a = 25^\circ C$ )		$P_D^*$	150	mW
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	-55~150	$^\circ C$



Weight : 0.006 g (Typ.)

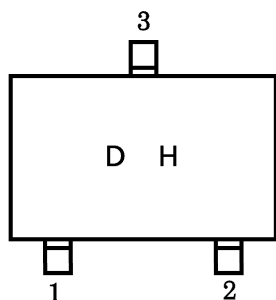
\* Mounted on FR4 board.  
(25.4 mm × 25.4 mm × 1.6 t, Cu Pad : 0.6 mm<sup>2</sup> × 3)



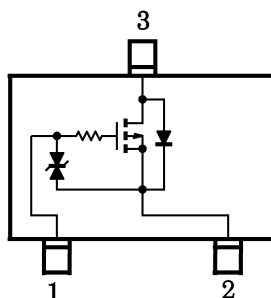
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**MARKING**



**EQUIVALENT CIRCUIT (TOP VIEW)**



**HANDLING PRECAUTION**

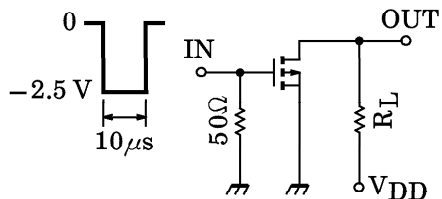
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

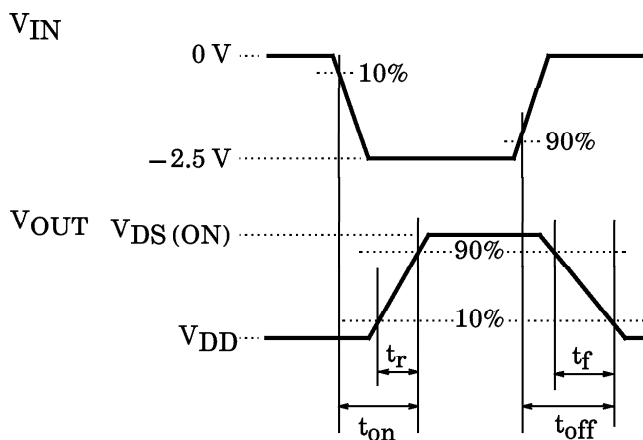
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 12\text{ V}, V_{DS} = 0$	—	—	$\pm 1$	$\mu\text{A}$
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -1\text{ mA}, V_{GS} = 0$	-20	—	—	V
Drain Cut-off Current	$I_{DSS}$	$V_{DS} = -20\text{ V}, V_{GS} = 0$	—	—	-1	$\mu\text{A}$
Gate Threshold Voltage	$V_{th}$	$V_{DS} = -3\text{ V}, I_D = -0.1\text{ mA}$	-0.6	—	-1.1	V
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = -3\text{ V}, I_D = -50\text{ mA}$ (Note)	100	—	—	mS
Drain-Source ON Resistance	$R_{DS(ON)}$	$I_D = -100\text{ mA}, V_{GS} = -4\text{ V}$ (Note)	—	2.1	3.3	$\Omega$
		$I_D = -50\text{ mA}, V_{GS} = -2.5\text{ V}$ (Note)	—	3.2	4.0	
Input Capacitance	$C_{iss}$	$V_{DS} = -3\text{ V}, V_{GS} = 0,$ $f = 1\text{ MHz}$	—	27	—	pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS} = -3\text{ V}, V_{GS} = 0,$ $f = 1\text{ MHz}$	—	7	—	pF
Output Capacitance	$C_{oss}$	$V_{DS} = -3\text{ V}, V_{GS} = 0,$ $f = 1\text{ MHz}$	—	21	—	pF
Switching Time	Turn-on Time	$t_{on}$	—	70	—	ns
	Turn-off Time	$t_{off}$		70		

(Note) : Pulse test

SWITCHING TIME TEST CIRCUIT



$V_{DD} = -3\text{ V}$   
 $D.U. \leq 1\%$   
 $V_{IN} : t_r, t_f < 5\text{ ns}$   
 $(Z_{OUT} = 50\ \Omega)$   
**COMMON SOURCE**  
 $T_a = 25^\circ\text{C}$



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.

$V_{GS}$  recommended voltage of  $-2.5\text{ V}$  or higher to turn on this product.

