

SSM3J09FU

Power Management Switch

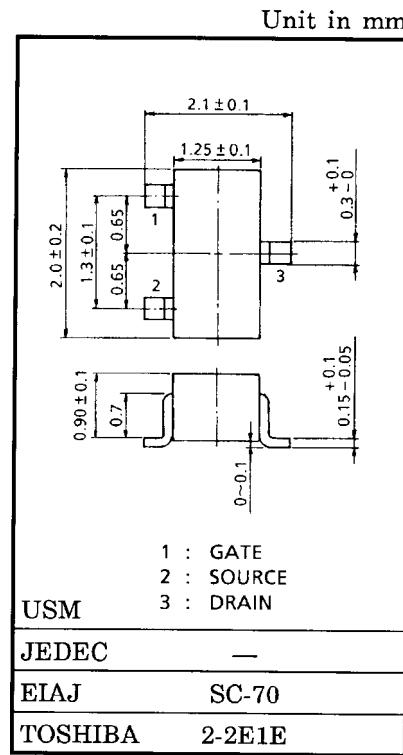
High Speed Switching Applications

- Small package
- Low on resistance
 - $R_{on} = 2.7 \Omega$ (max) (@ $V_{GS} = -10$ V)
 - $R_{on} = 4.2 \Omega$ (max) (@ $V_{GS} = -4$ V)

Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V_{DS}	-30	V
Gate-Source voltage	V_{GSS}	± 20	V
Drain current	DC I_D	-200	mA
	Pulse I_{DP}	-400	
Drain power dissipation ($T_a = 25^\circ\text{C}$)	P_D (Note1)	150	mW
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55~150	$^\circ\text{C}$

Note1: Mounted on FR4 board
(25.4 mm \times 25.4 mm \times 1.6 t, Cu Pad: 0.6 mm² \times 3) Figure 1.

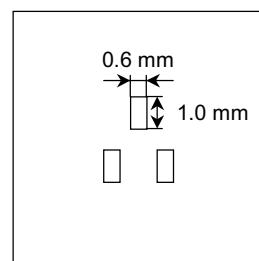
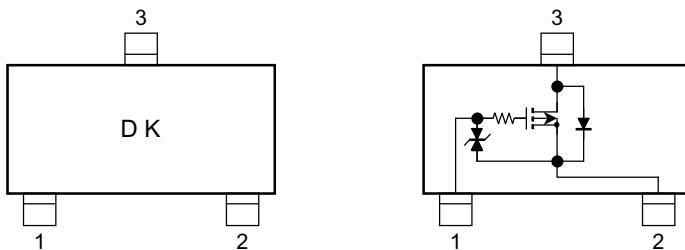


Weight : 0.006 g (Typ.)

Marking

Equivalent Circuit (top view)

Figure 1: 25.4 mm \times 25.4 mm \times 1.6 t,
Cu Pad: 0.6 mm² \times 3



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.

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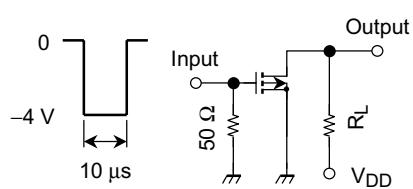
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0$	—	—	± 1	μA	
Drain-Source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = -1\text{ mA}$, $V_{GS} = 0$	-30	—	—	V	
Drain cut-off current	I_{DSS}	$V_{DS} = -30\text{ V}$, $V_{GS} = 0$	—	—	-1	μA	
Gate threshold voltage	V_{th}	$V_{DS} = -5\text{ V}$, $I_D = -0.1\text{ mA}$	-1.1	—	-1.8	V	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = -5\text{ V}$, $I_D = -100\text{ mA}$ (Note2)	115	—	—	mS	
Drain-Source ON resistance	$R_{DS(\text{ON})}$	$I_D = -100\text{ mA}$, $V_{GS} = -10\text{ V}$ (Note2)	—	2.1	2.7	Ω	
		$I_D = -100\text{ mA}$, $V_{GS} = -4\text{ V}$ (Note2)	—	3.3	4.2		
		$I_D = -100\text{ mA}$, $V_{GS} = -3.3\text{ V}$ (Note2)	—	4.0	6.0		
Input capacitance	C_{iss}	$V_{DS} = -5\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	—	22	—	pF	
Reverse transfer capacitance	C_{rss}	$V_{DS} = -5\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	—	5	—	pF	
Output capacitance	C_{oss}	$V_{DS} = -5\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	—	14	—	pF	
Switching time	Turn-on time	t_{on}	$V_{DD} = -5\text{ V}$, $I_D = -100\text{ mA}$,	—	85	—	ns
	Turn-off time	t_{off}	$V_{GS} = 0\text{~}4\text{ V}$	—	85	—	ns

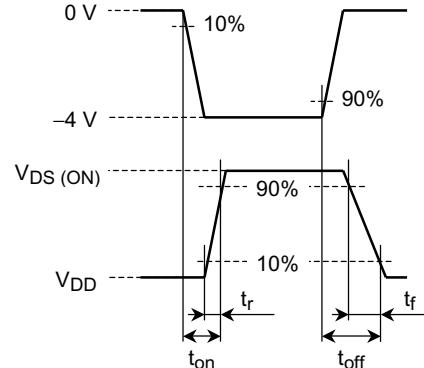
Note2: Pulse test

Switching Time Test Circuit

(a) Test circuit



$V_{DD} = -5\text{ V}$
 D.U. $\leq 1\%$
 Input: $t_r, t_f < 5\text{ ns}$
 $(Z_{out} = 50\ \Omega)$
 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.

V_{GS} recommended voltage of -4.0 V or higher to turn on this product.

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