

TOSHIBA Field Effect Transistor Silicon P Channel MOS Type

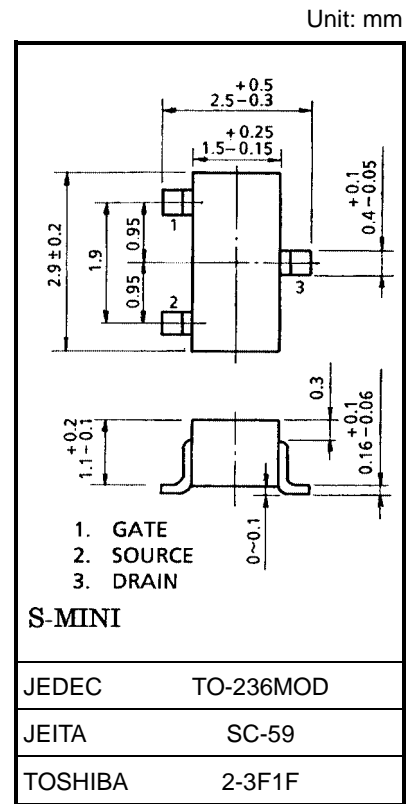
SSM3J02F

Power Management Switch
High Speed Switching Applications

- Small package
- Low on resistance: $R_{on} = 0.5 \Omega$ (max) (@ $V_{GS} = -4 V$)
: $R_{on} = 0.7 \Omega$ (max) (@ $V_{GS} = -2.5 V$)
- Low gate threshold voltage

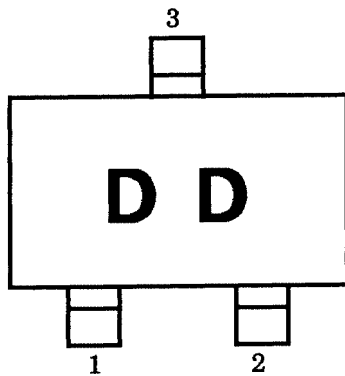
Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	-30	V
Gate-source voltage	V_{GSS}	± 10	V
Drain current	DC	I_D	-600
	Pulse	I_{DP}	-1200
Drain power dissipation (Ta = 25°C)	P_D	200	mW
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55~150	°C

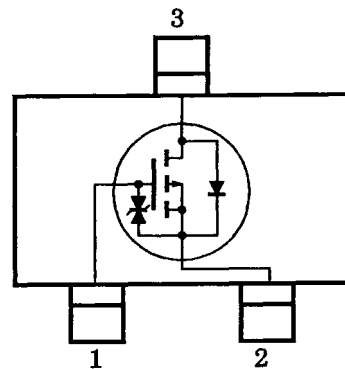


Weight: 0.012 g (typ.)

Marking



Equivalent Circuit



Handling Precaution

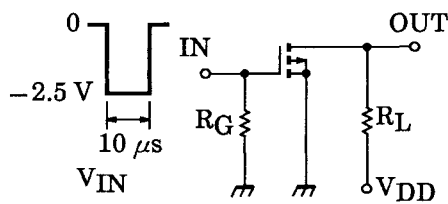
When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 10\text{ V}, V_{DS} = 0$	—	—	± 1	μA	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = -1\text{ mA}, V_{GS} = 0$	-30	—	—	V	
Drain cut-off current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0$	—	—	-1	μA	
Gate threshold voltage	V_{th}	$V_{DS} = -3\text{ V}, I_D = -0.1\text{ mA}$	-0.6	—	-1.1	V	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = -3\text{ V}, I_D = -0.3\text{ A}$ (Note)	0.6	—	—	S	
Drain-source ON resistance	$R_{DS(ON)}$	$I_D = -0.3\text{ A}, V_{GS} = -4\text{ V}$ (Note)	—	0.4	0.5	Ω	
		$I_D = -0.3\text{ A}, V_{GS} = -2.5\text{ V}$ (Note)	—	0.55	0.7		
Input capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	150	—	pF	
Reverse transfer capacitance	C_{rss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	21	—	pF	
Output capacitance	C_{oss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	61	—	pF	
Switching time	Turn-on time	t_{on}	$V_{DD} = -15\text{ V}, I_D = -0.3\text{ A},$ $V_{GS} = 0 \sim -2.5\text{ V}, R_G = 4.7\ \Omega$	—	55	—	ns
	Turn-off time	t_{off}		—	52	—	

Note: Pulse test

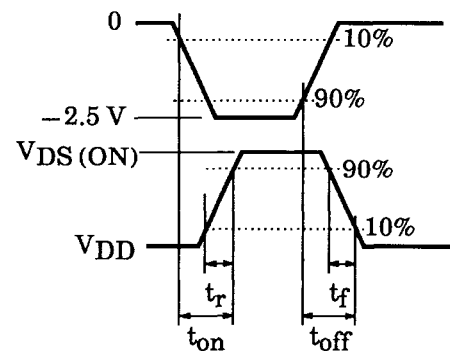
Switching Time Test Circuit



$V_{DD} = -15\text{ V}$
 $R_G = 4.7\ \Omega$
 D.U. $\leq 1\%$
 $V_{IN} : t_r, t_f < 5\text{ ns}$
COMMON SOURCE
 $T_a = 25^\circ\text{C}$

V_{IN}
 V_{GS}

V_{OUT}
 V_{DS}



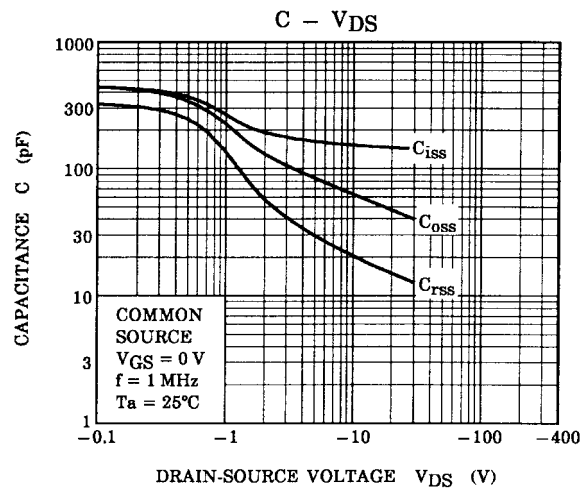
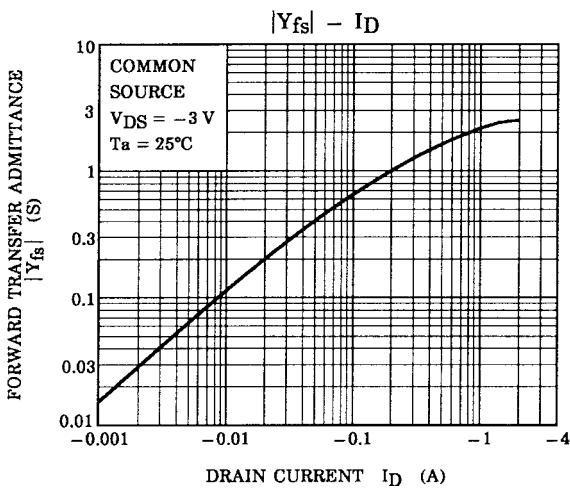
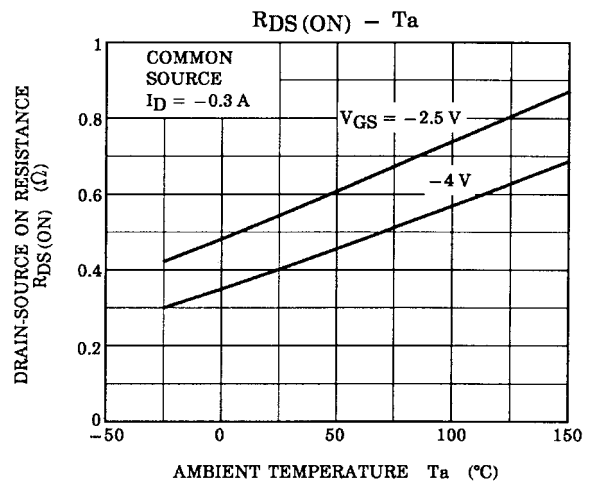
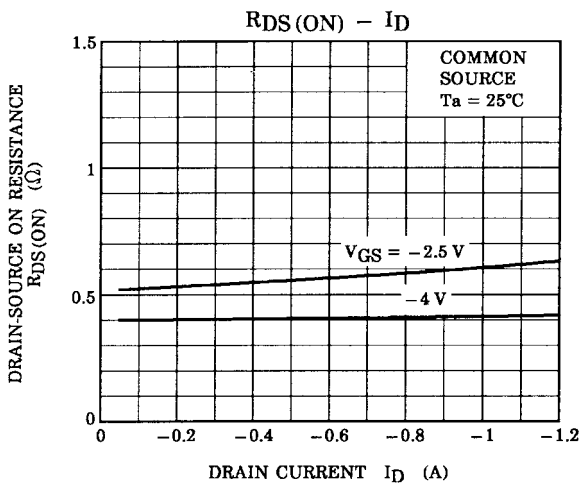
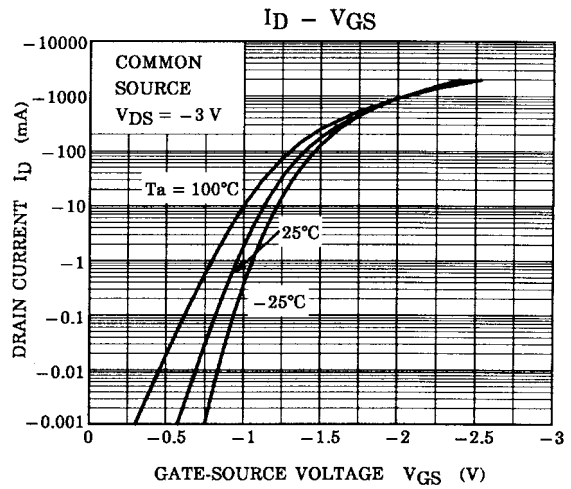
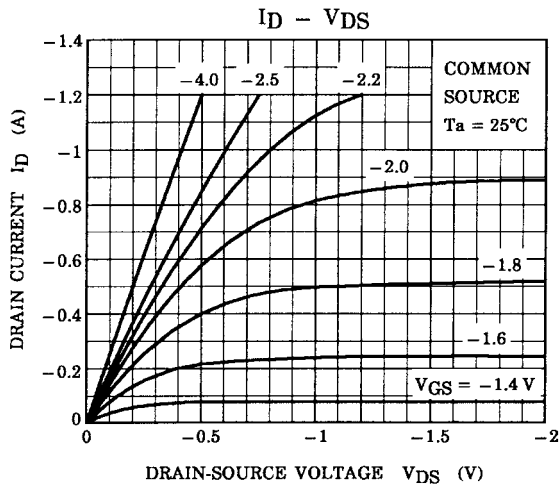
Precaution

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 V or higher to turn on this product.



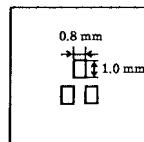
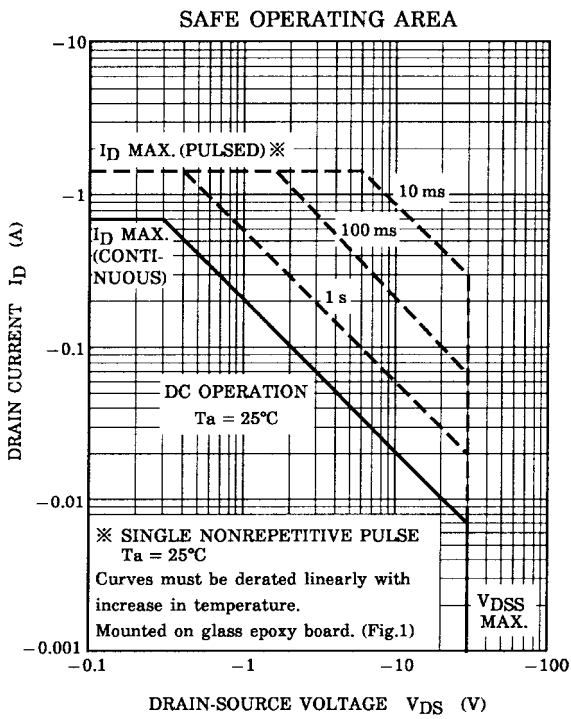
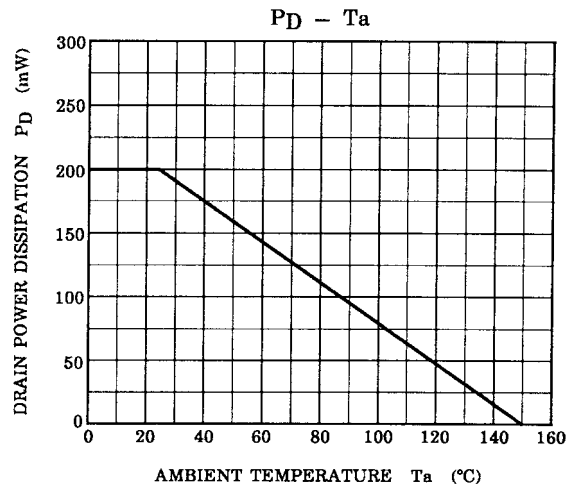
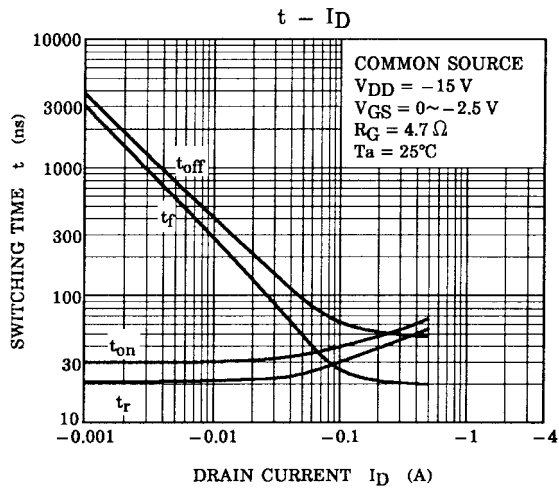


Figure 1 25.4 mm × 25.4 mm × 1.6 t (a Cu pad of 0.8 mm² area)

RESTRICTIONS ON PRODUCT USE

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