

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE

SSM3J02F

POWER MANAGEMENT SWITCH

HIGH SPEED SWITCHING APPLICATIONS

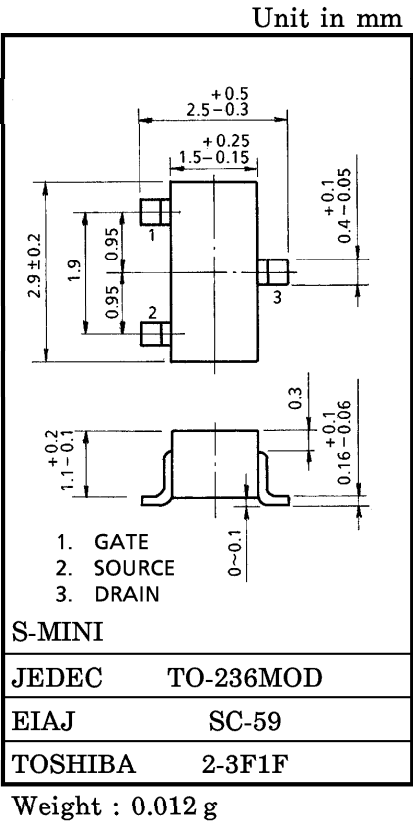
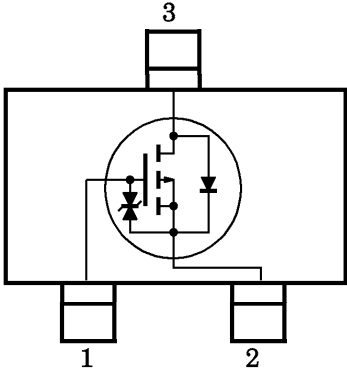
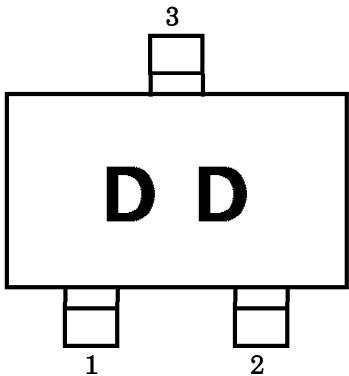
- Small Package
- Low on Resistance : $R_{on} = 0.5 \Omega$ (Max.) (@ $V_{GS} = -4 V$)
: $R_{on} = 0.7 \Omega$ (Max.) (@ $V_{GS} = -2.5 V$)
- Low Gate Threshold Voltage

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GSS}	± 10	V
Drain Current	DC	I_D	-600	mA
	Pulse	I_{DP}	-1200	
Drain Power Dissipation ($T_a = 25^{\circ}C$)		P_D	200	mW
Channel Temperature		T_{ch}	150	$^{\circ}C$
Storage Temperature Range		T_{stg}	-55~150	$^{\circ}C$

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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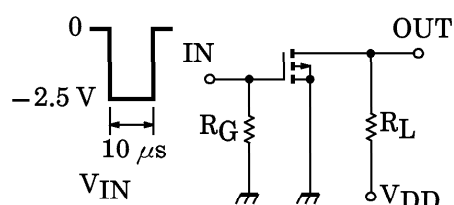
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

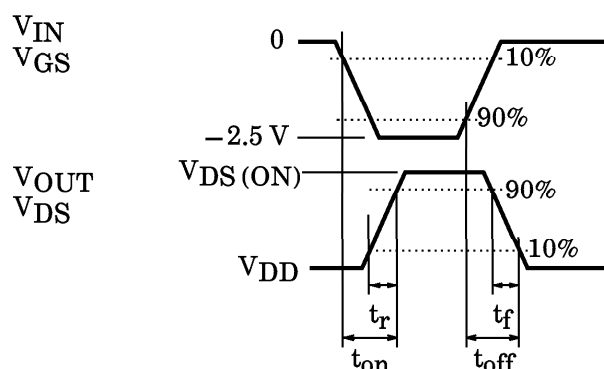
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 10 \text{ V}, V_{DS} = 0$	—	—	± 1	μA
Drain-Source Breakdown Voltage		$V_{(BR) DSS}$	$I_D = -1 \text{ mA}, V_{GS} = 0$	-30	—	—	V
Drain Cut-off Current		I_{DSS}	$V_{DS} = -30 \text{ V}, V_{GS} = 0$	—	—	-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
 $T_a = 25^\circ\text{C}$



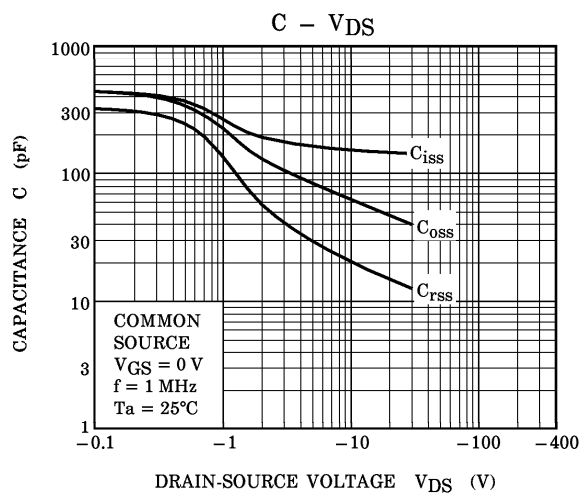
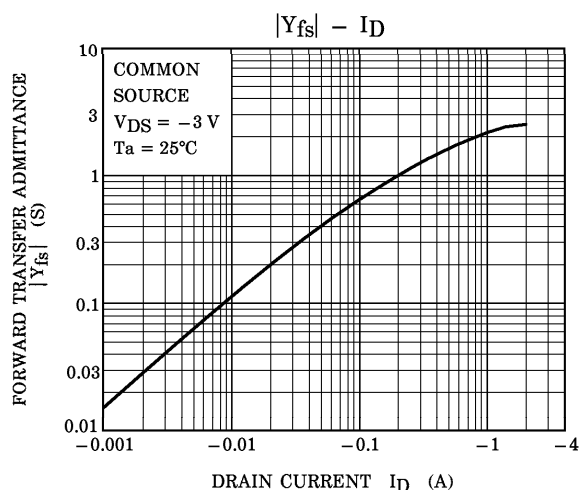
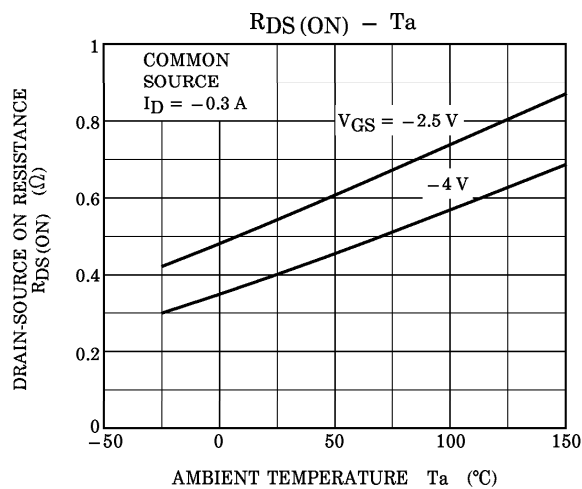
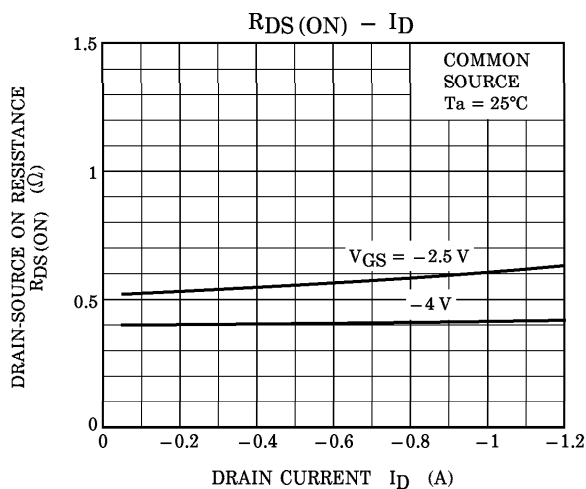
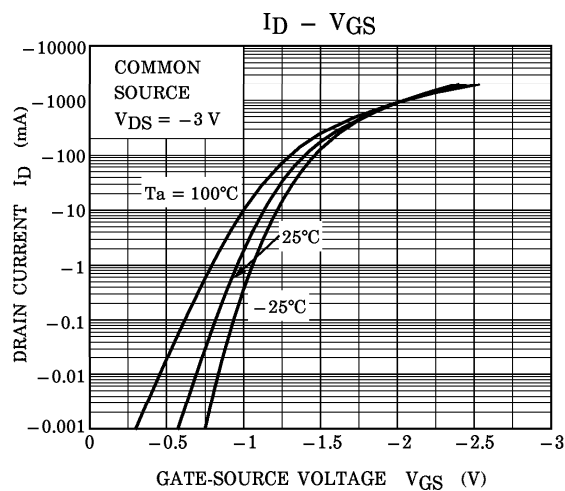
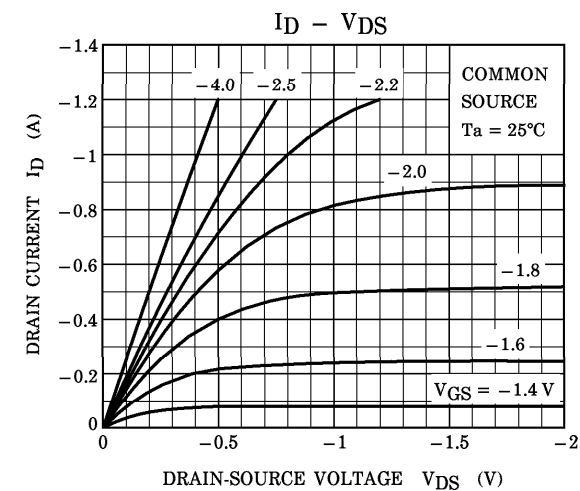
PRECAUTION

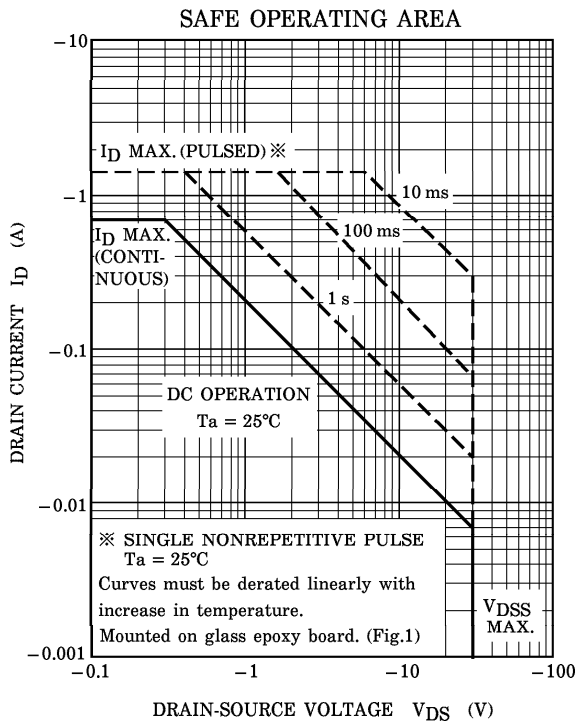
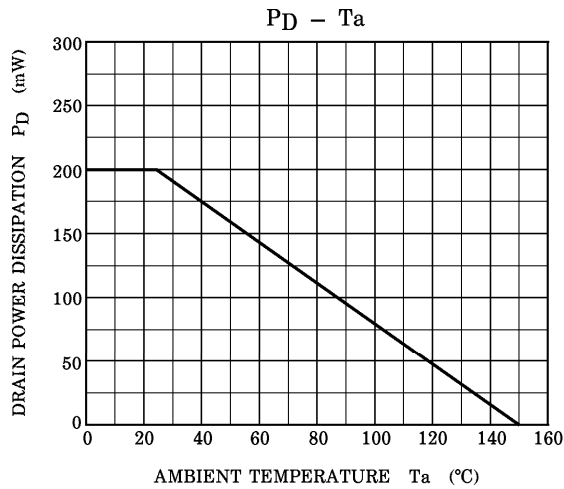
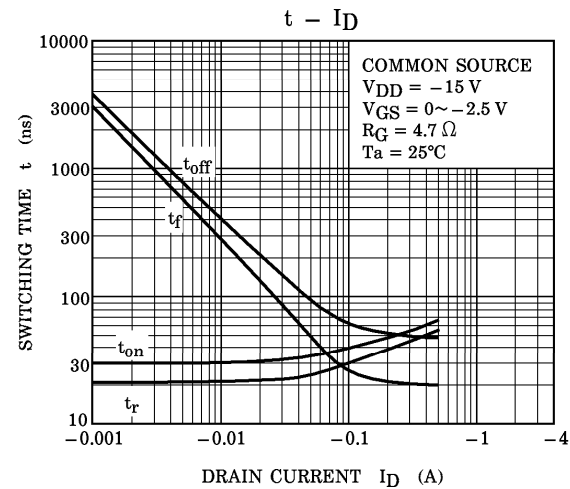
V_{th} can be expressed as voltage between gate and source when low operating current value is $I_D = -100 \mu\text{A}$ for this product. For normal switching operation, $V_{GS(ON)}$ requires higher voltage than V_{th} and $V_{GS(off)}$ requires lower voltage than V_{th} .

(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.





(Fig.1) : 25.4 mm × 25.4 mm × 1.6 t (a Cu pad of 0.8 mm² area)

