

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (L²-π-MOSV)

2SJ412

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

- 4V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.15\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 7.7S$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100\mu A$ (Max.) ($V_{DS} = -60V$)
- Enhancement-Mode : $V_{th} = -0.8 \sim -2.0V$
($V_{DS} = -10V$, $I_D = -1mA$)

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	-100	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	-100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	-16	A
	Pulse	I_{DP}	-64	A
Drain Power Dissipation ($T_c = 25^\circ C$)		P_D	60	W
Single Pulse Avalanche Energy**		E_{AS}	292	mJ
Avalanche Current		I_{AR}	-16	A
Repetitive Avalanche Energy*		E_{AR}	6	mJ
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	-55~150	$^\circ C$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	2.08	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ C/W$

Note ;

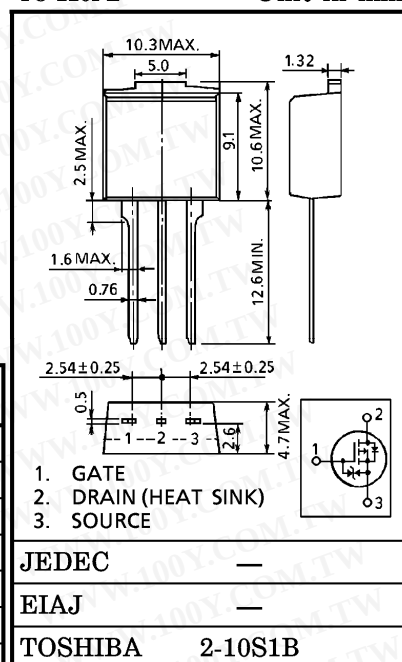
* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** $V_{DD} = -25V$, Starting $T_{ch} = 25^\circ C$, $L = 1.84mH$
 $R_G = 25\Omega$, $I_{AR} = -16A$ This transistor is an electrostatic sensitive device.
Please handle with caution.

INDUSTRIAL APPLICATIONS

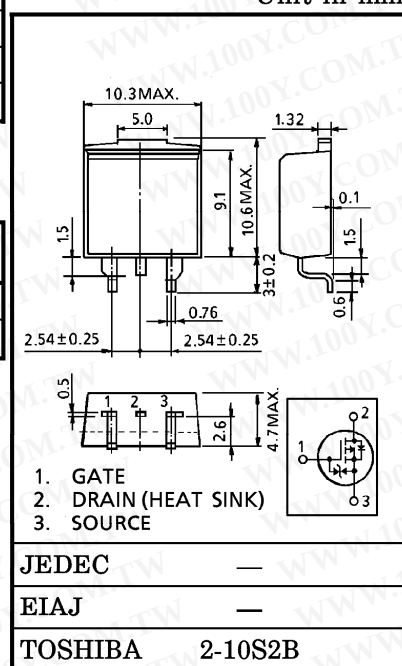
TO-220FL

Unit in mm



TO-220SM

Unit in mm

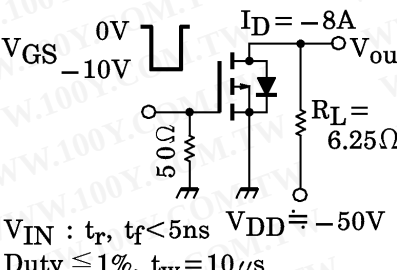


Weight : 1.5g

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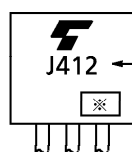
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	± 10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = -100V, V_{GS} = 0V$	—	—	-100	μA
Drain-Source Breakdown Voltage		$V_{(BR) DSS}$	$I_D = -10mA, V_{GS} = 0V$	-100	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = -10V, I_D = -1mA$	-0.8	—	-2.0	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = -4V, I_D = -6A$	—	0.25	0.32	Ω
			$V_{GS} = -10V, I_D = -6A$	—	0.15	0.21	
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = -10V, I_D = -6A$	4.5	7.7	—	S
Input Capacitance		C_{iss}	$V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$	—	1100	—	pF
Reverse Transfer Capacitance		C_{rss}		—	210	—	
Output Capacitance		C_{oss}		—	440	—	
Switching Time	Rise Time	t_r		—	18	—	ns
	Turn-on Time	t_{on}		—	30	—	
	Fall Time	t_f		—	18	—	
	Turn-off Time	t_{off}		—	65	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} = -80V, V_{GS} = -10V, I_D = -16A$	—	48	—	nC
Gate-Source Charge		Q_{gs}		—	29	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	19	—	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	-16	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	-64	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -16A, V_{GS} = 0V$	—	—	1.7	V
Reverse Recovery Time	t_{rr}	$I_{DR} = -16A, V_{GS} = 0V$	—	160	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 50A / \mu s$	—	0.5	—	μC

MARKING



TYPE

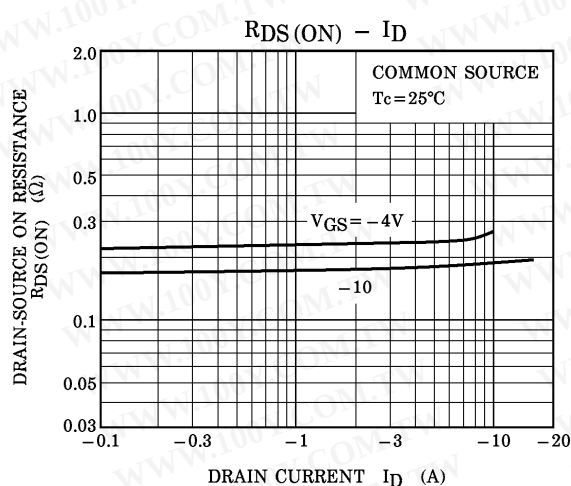
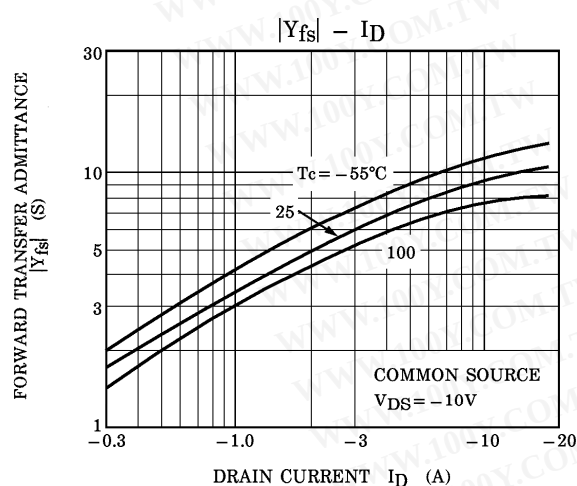
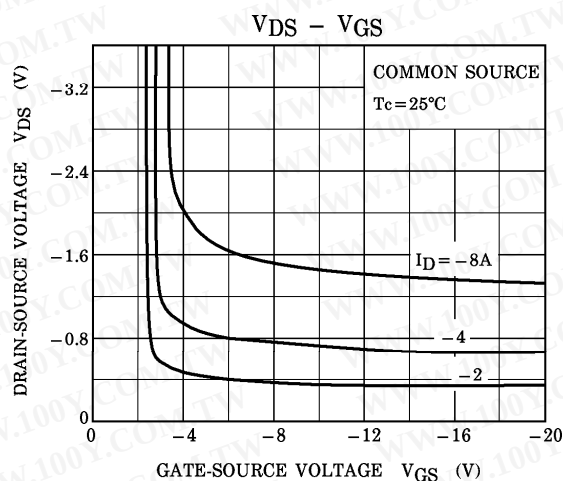
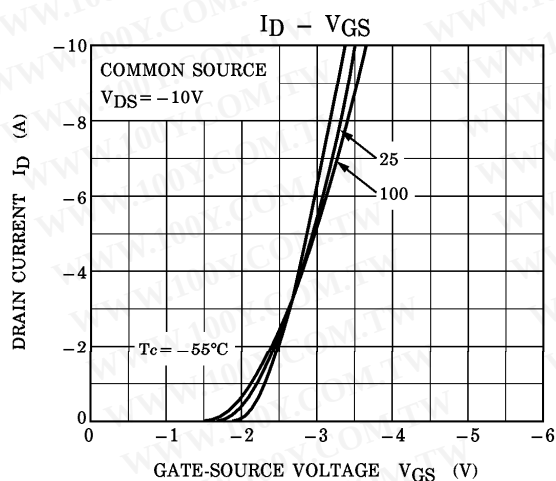
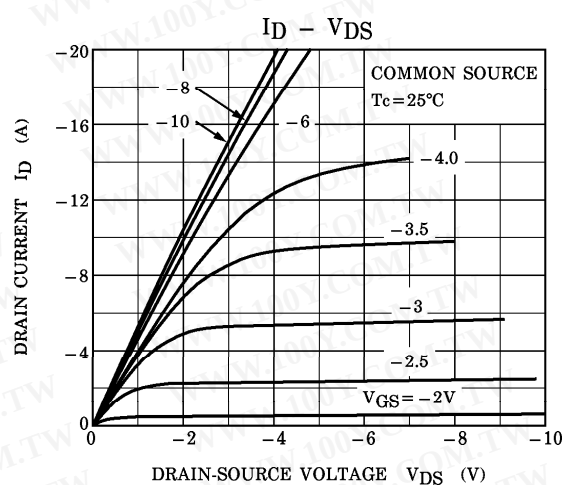
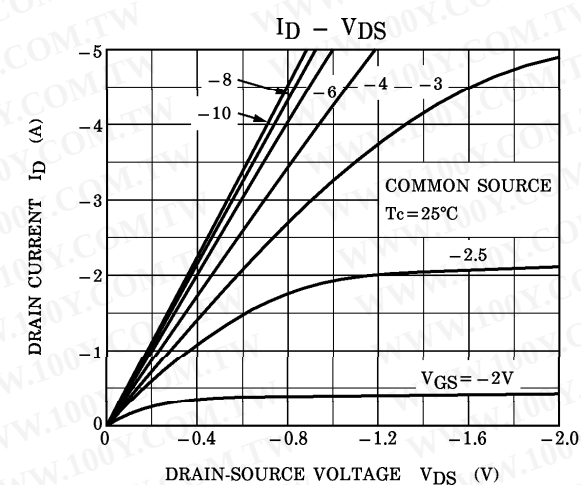
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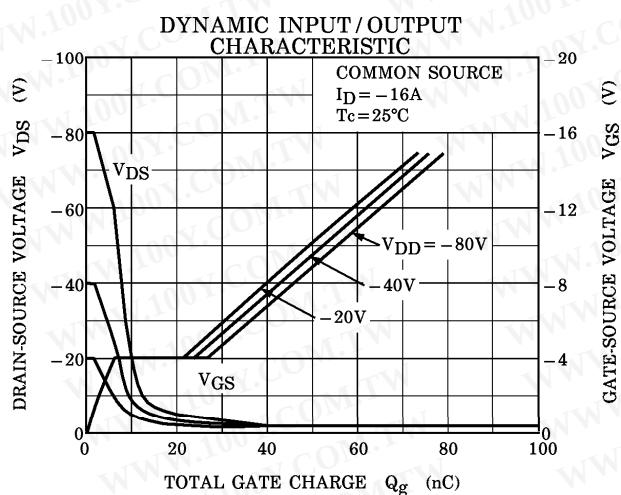
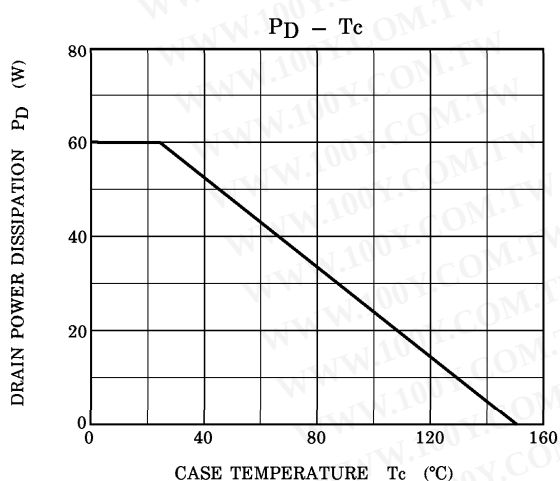
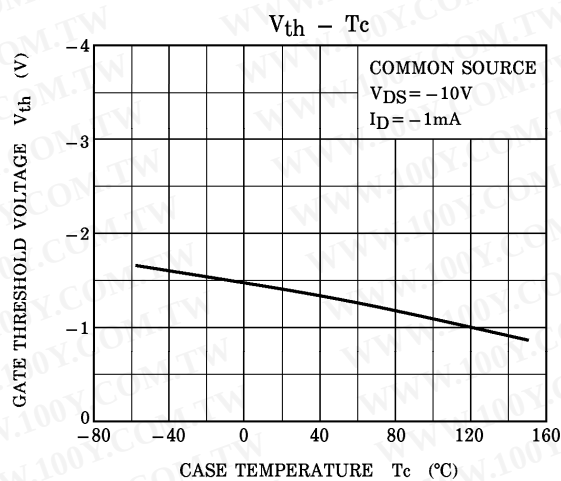
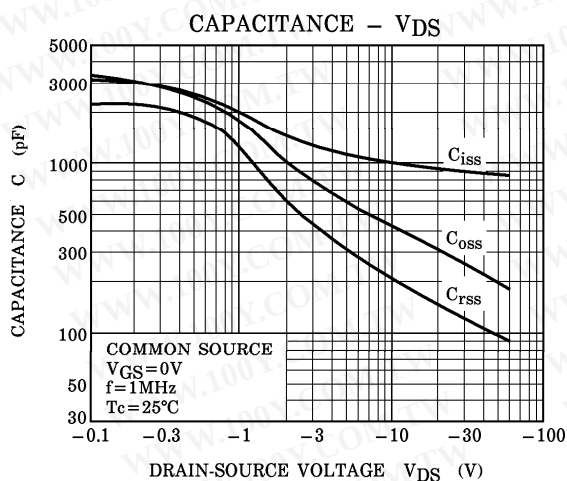
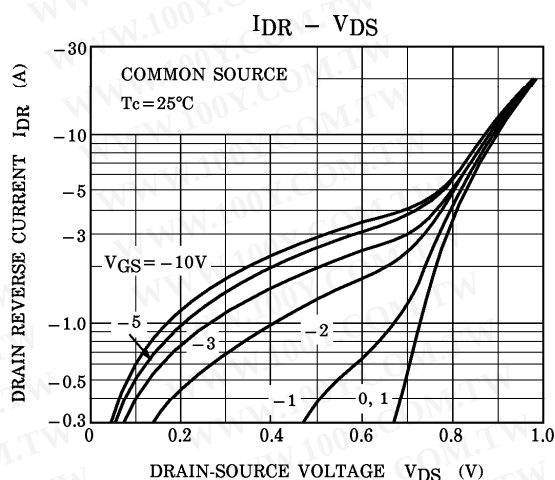
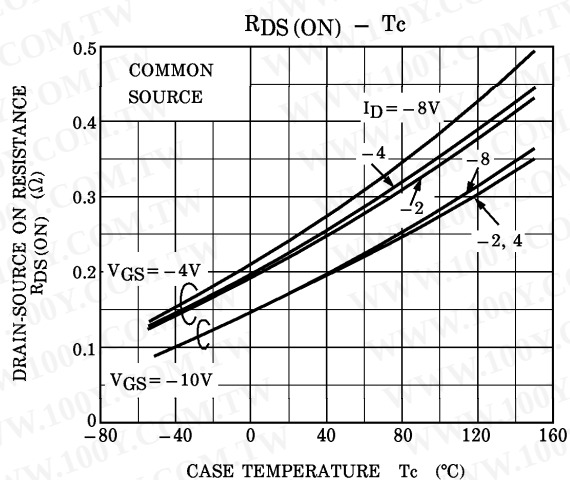


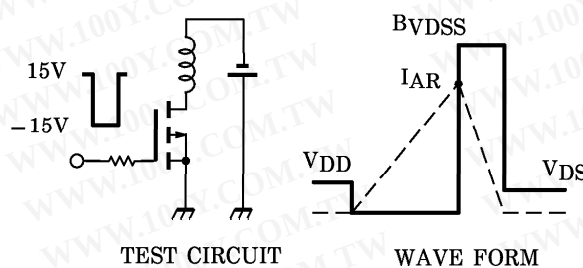
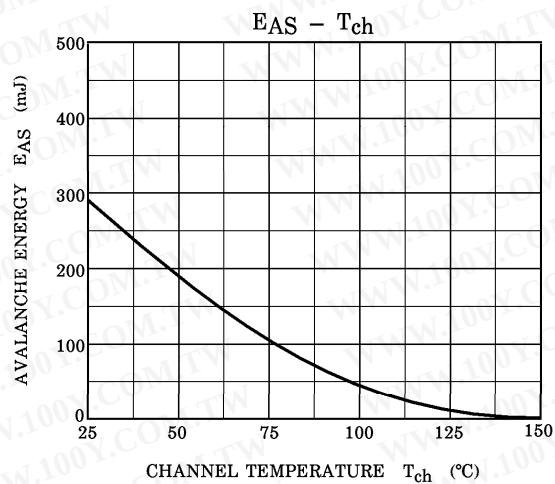
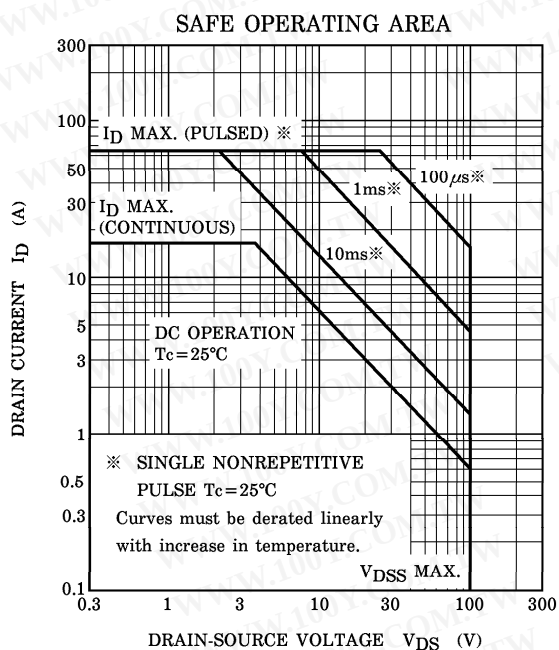
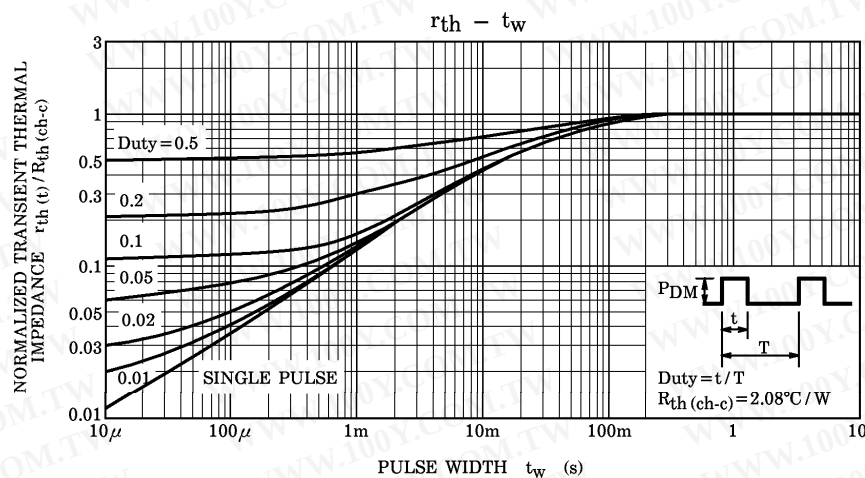
Month (Starting from Alphabet A)



Year (Last Number of the Christian Era)







Peak $I_{AR} = -16A$, $R_G = 25\Omega$
 $V_{DD} = -25V$, $L = 1.84mH$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$