

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

2SJ412

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

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

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	-100	V
Drain-Gate Voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	-100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC (Note 1)	I_D	-16	A
	Pulse (Note 1)	I_{DP}	-64	A
Drain Power Dissipation ($T_c = 25^\circ C$)		P_D	60	W
Single Pulse Avalanche Energy (Note 2)		E_{AS}	292	mJ
Avalanche Current		I_{AR}	-16	A
Repetitive Avalanche Energy (Note 3)		E_{AR}	6	mJ
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	-55~150	°C

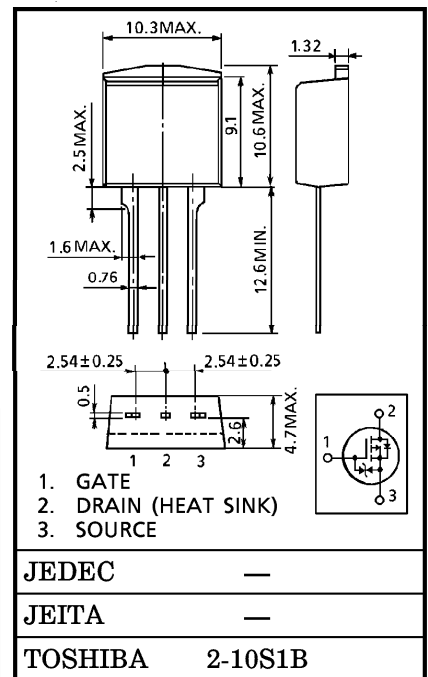
THERMAL CHARACTERISTICS

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

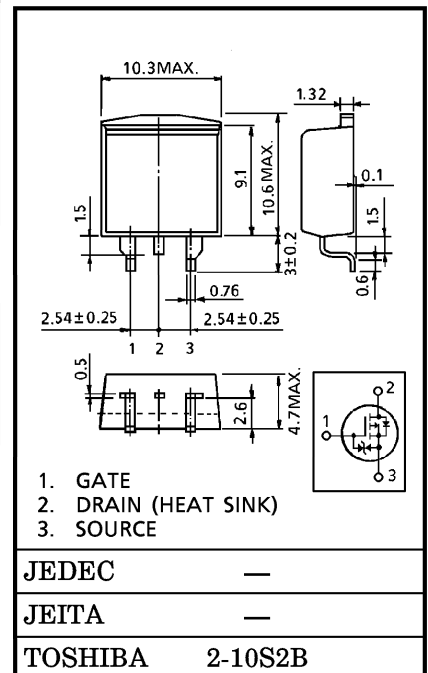
- (Note 1) : Please use devices on condition that the channel temperature is below 150°C.
 (Note 2) : $V_{DD} = -25 V, T_{ch} = 25^\circ C$ (initial), $L = 1.84 mH, R_G = 25 \Omega, I_{AR} = -16 A$
 (Note 3) : Repetitive rating ; Pulse Width Limited by maximum junction temperature.

This transistor is an electrostatic sensitive device. Please handle with caution.

Unit in mm



Weight : 1.5 g (Typ.)



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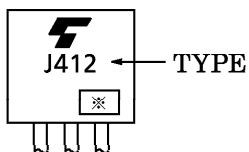
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±16 V, VDS = 0 V	—	—	±10	μA
Drain Cut-off Current		IDSS	VDS = -100 V, VGS = 0 V	—	—	-100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = -10 mA, VGS = 0 V	-100	—	—	V
Gate Threshold Voltage		Vth	VDS = -10 V, ID = -1 mA	-0.8	—	-2.0	V
Drain-Source ON Resistance		RDS(ON)	VGS = -4 V, ID = -6 A	—	0.25	0.32	Ω
			VGS = -10 V, ID = -6 A	—	0.15	0.21	
Forward Transfer Admittance		Yfs	VDS = -10 V, ID = -6 A	4.5	7.7	—	S
Input Capacitance		Ciss	VDS = -10 V, VGS = 0 V, f = 1MHz	—	1100	—	pF
Reverse Transfer Capacitance		Crss		—	210	—	
Output Capacitance		Coss		—	440	—	
Switching Time	Rise Time	tr		—	18	—	ns
	Turn-on Time	ton		—	30	—	
	Fall Time	tf		—	18	—	
	Turn-off Time	toff		Duty ≤ 1%, tw = 10 μs	—	65	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD = -80 V, VGS = -10 V, ID = -16 A	—	48	—	nC
Gate-Source Charge		Qgs		—	29	—	
Gate-Drain ("Miller") Charge		Qgd		—	19	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current (Note 1)	IDR	—	—	—	-16	A
Pulse Drain Reverse Current (Note 1)	IDRP	—	—	—	-64	A
Forward Voltage (Diode)	VDSF	IDR = -16 A, VGS = 0 V	—	—	1.7	V
Reverse Recovery Time	trr	IDR = -16 A, VGS = 0 V	—	160	—	ns
Reverse Recovery Charge	Qrr	dIDR / dt = 50 A / μs	—	0.5	—	μC

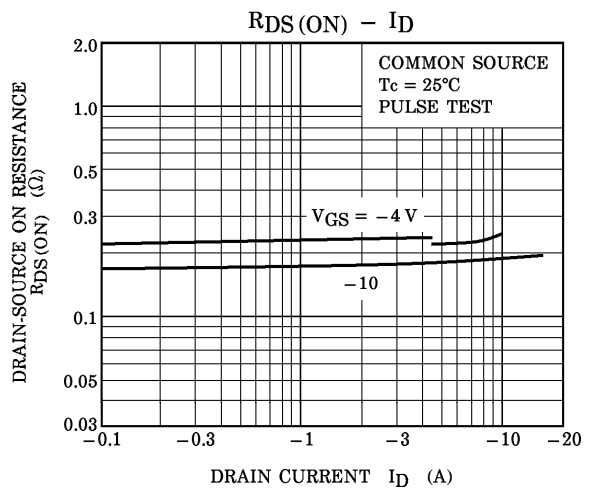
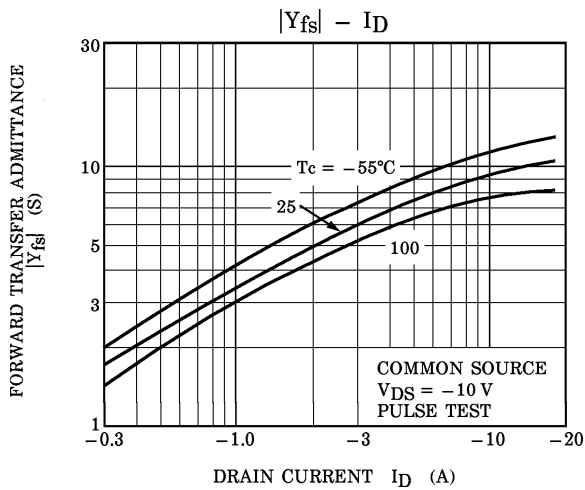
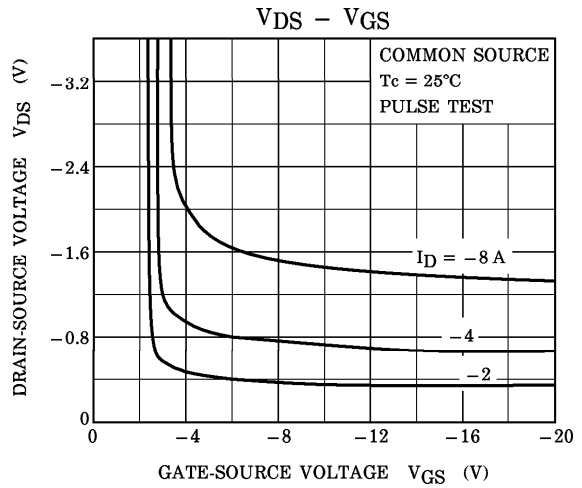
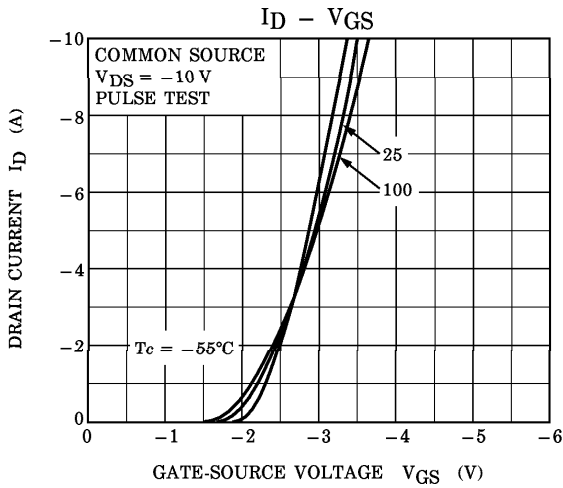
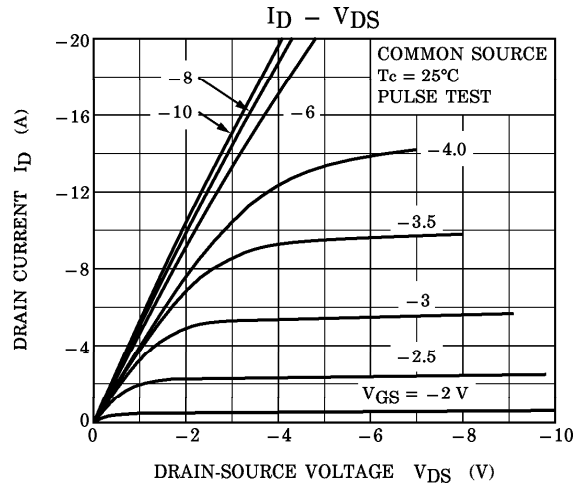
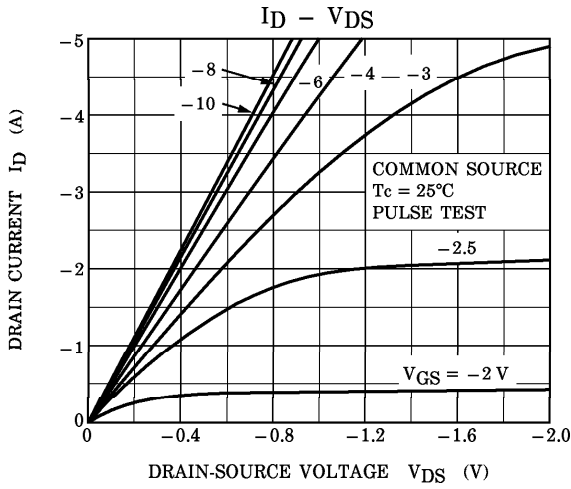
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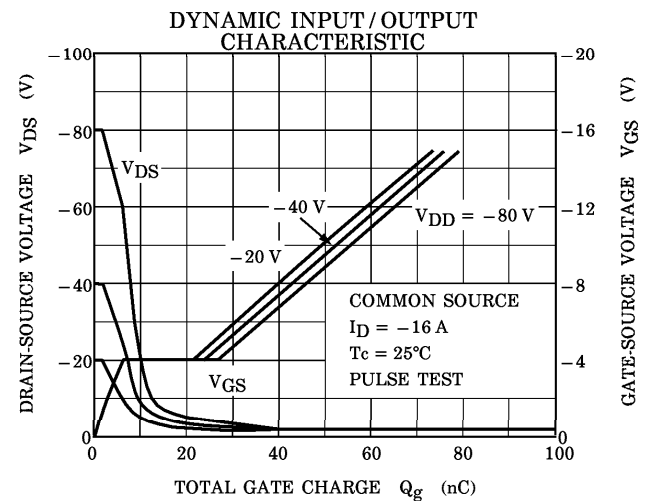
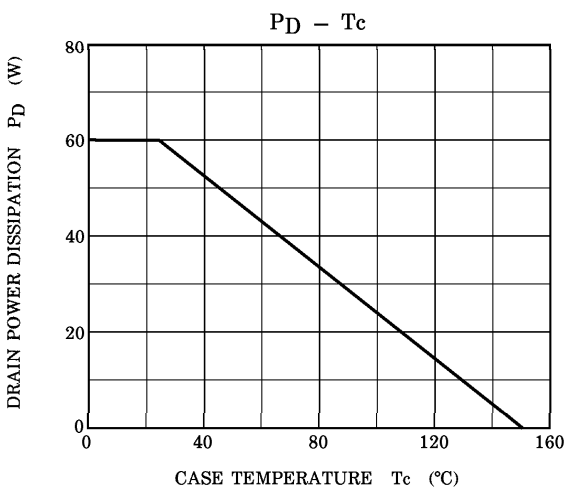
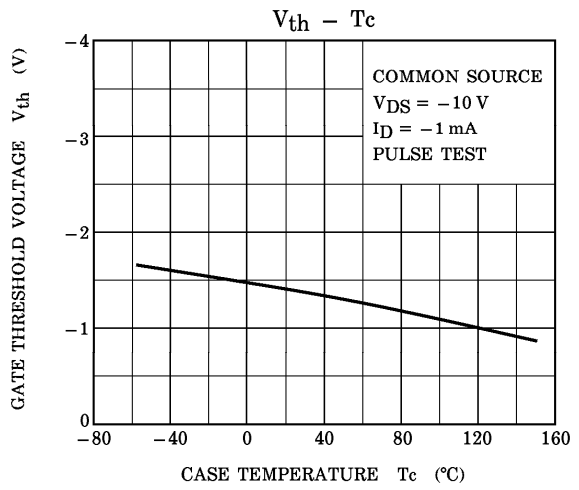
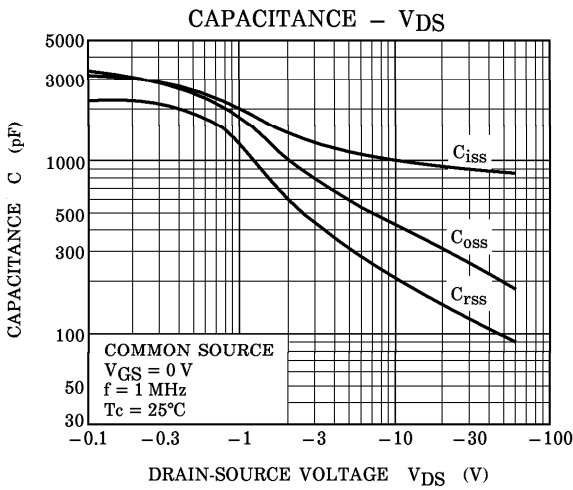
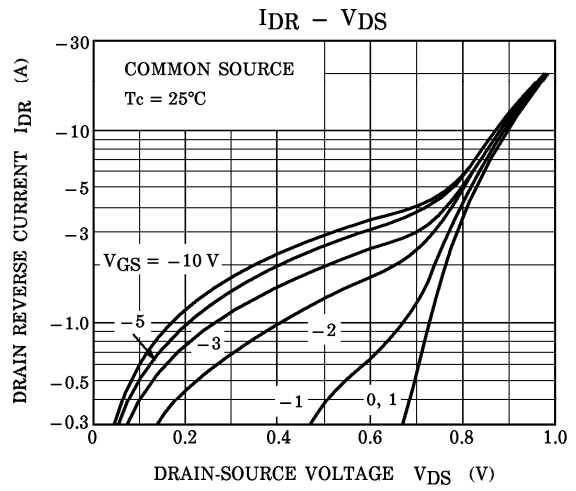
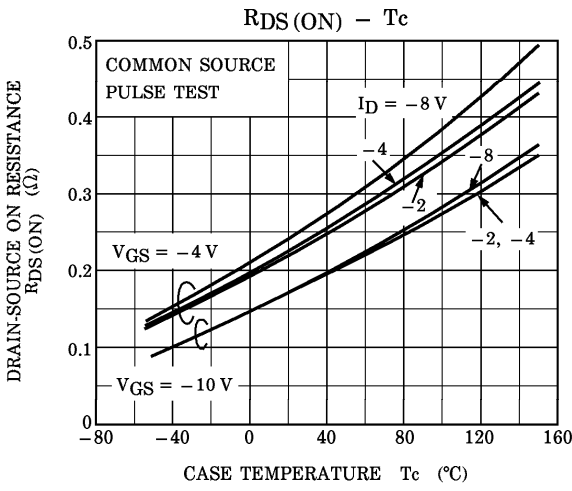


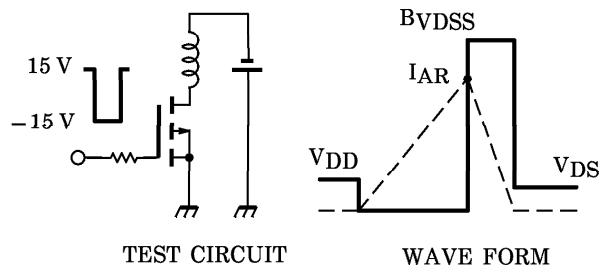
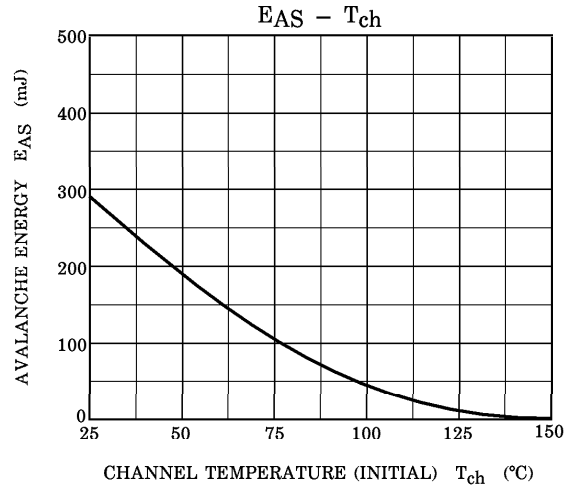
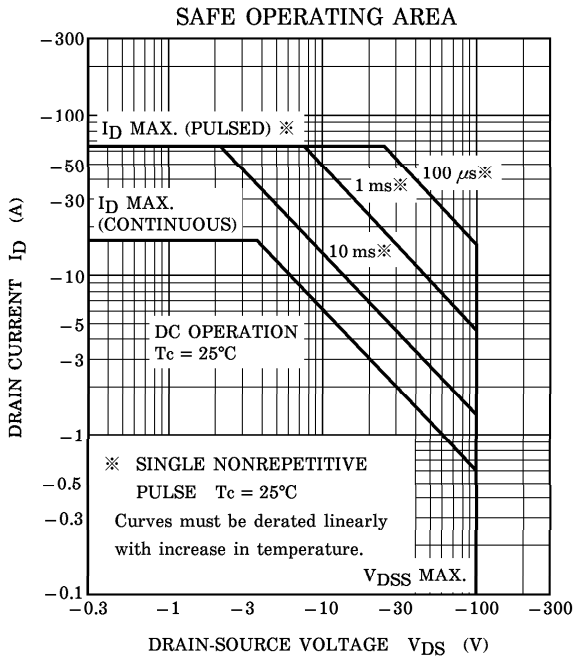
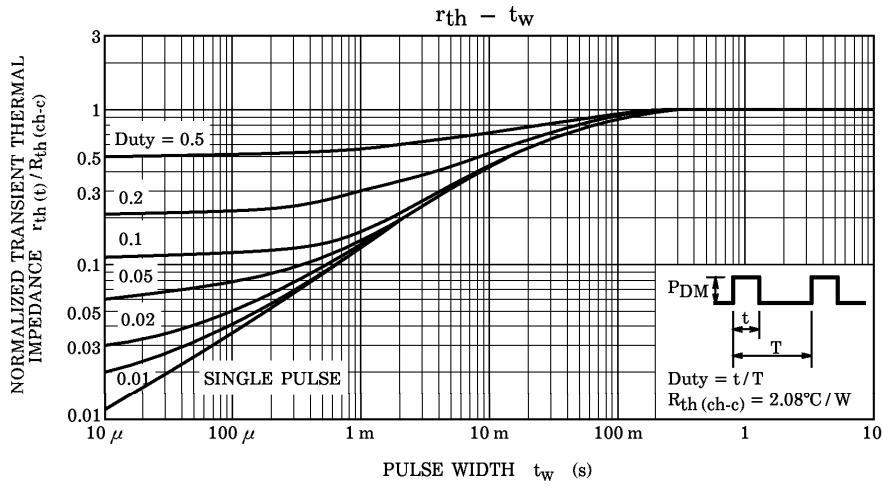
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$R_G = 25\Omega$
 $V_{DD} = -25\text{ V}, L = 1.84\text{ mH}$

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

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