

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

2SJ401

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

- 4 V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 33 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 20 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100 \mu\text{A}$ (Max.) ($V_{DS} = -60 \text{ V}$)
- Enhancement-Mode : $V_{th} = -0.8 \sim -2.0 \text{ V}$
($V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$)

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	-60	V
Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	-60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	-20	A
	Pulse	I_{DP}	-80	A
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)		P_D	100	W
Single Pulse Avalanche Energy**		E_{AS}	800	mJ
Avalanche Current		I_{AR}	-20	A
Repetitive Avalanche Energy*		E_{AR}	10	mJ
Channel Temperature		T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55~150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.25	$^\circ\text{C}/\text{W}$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ\text{C}/\text{W}$

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = -50 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.44 \text{ mH}$
 $R_G = 25 \Omega$, $I_{AR} = -20 \text{ A}$

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

INDUSTRIAL APPLICATIONS

TO-220FL

Unit in mm

JEDEC	—
EIAJ	—
TOSHIBA	2-10S1B

TO-220SM

Unit in mm

JEDEC	—
EIAJ	—
TOSHIBA	2-10S2B

Weight : 1.5 g

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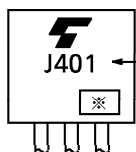
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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 = -60 V, VGS = 0 V	—	—	-100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = -10 mA, VGS = 0 V	-60	—	—	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 = -10 A	—	50	90	mΩ
			VGS = -10 V, ID = -10 A	—	33	45	
Forward Transfer Admittance		Yfs	VDS = -10 V, ID = -10 A	10	20	—	S
Input Capacitance		Ciss	VDS = 10 V, VGS = 0 V, f = 1 MHz	—	2800	—	pF
Reverse Transfer Capacitance		Crss		—	450	—	
Output Capacitance		Coss		—	1300	—	
Switching Time	Rise Time	tr		—	15	—	ns
	Turn-on Time	ton		—	35	—	
	Fall Time	tf		—	25	—	
	Turn-off Time	t _{off}		VIN : tr, tf < 5 ns Duty ≤ 1%, tw = 10 μs	—	120	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD ≐ -48 V, VGS = -10 V ID = -20 A	—	90	—	nC
Gate-Source Charge		Qgs		—	65	—	
Gate-Drain ("Miller") Charge		Qgd		—	25	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	-20	A
Pulse Drain Reverse Current	IDRP	—	—	—	-80	A
Diode Forward Voltage	VDSF	IDR = -20 A, VGS = 0 V	—	—	1.7	V
Reverse Recovery Time	t _{rr}	IDR = -20 A, VGS = 0 V	—	75	—	ns
Reverse Recovery Charge	Q _{rr}	dIDR / dt = 50 A / μs	—	83	—	nC

MARKING



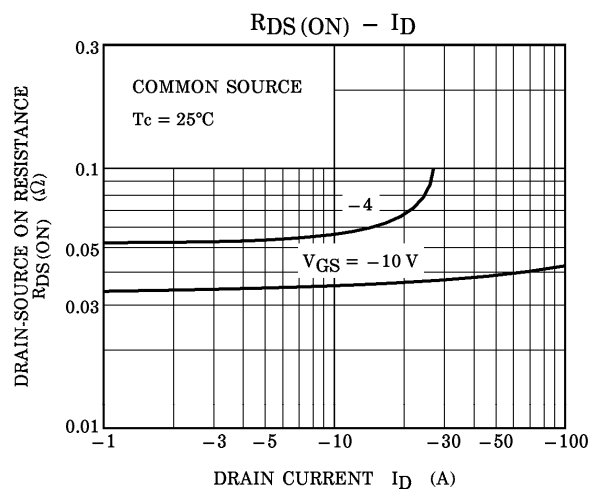
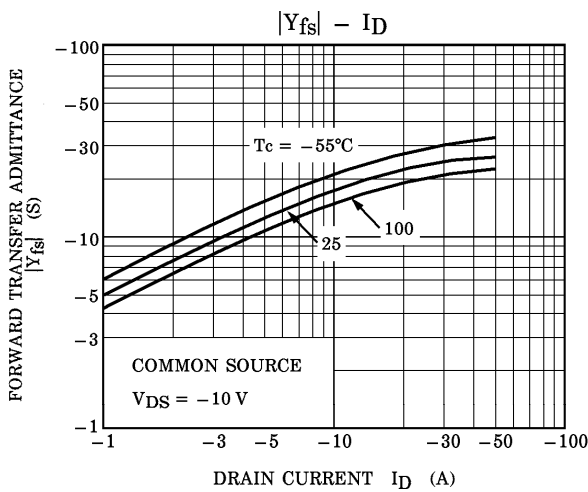
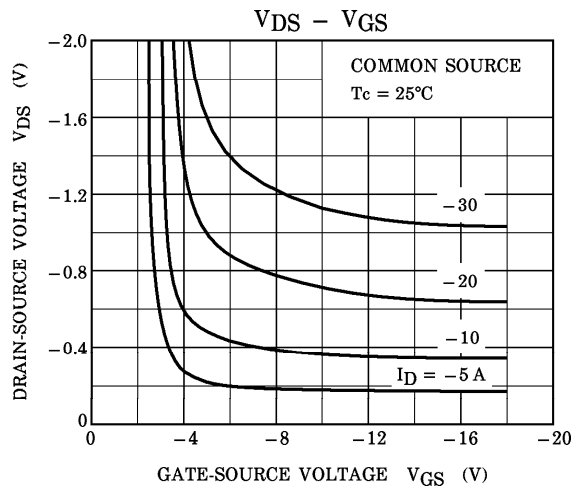
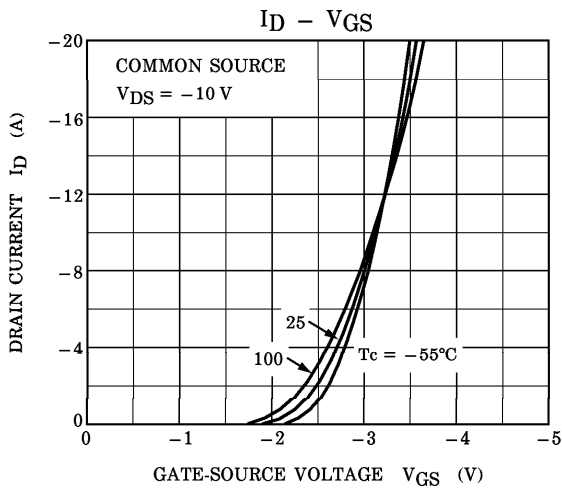
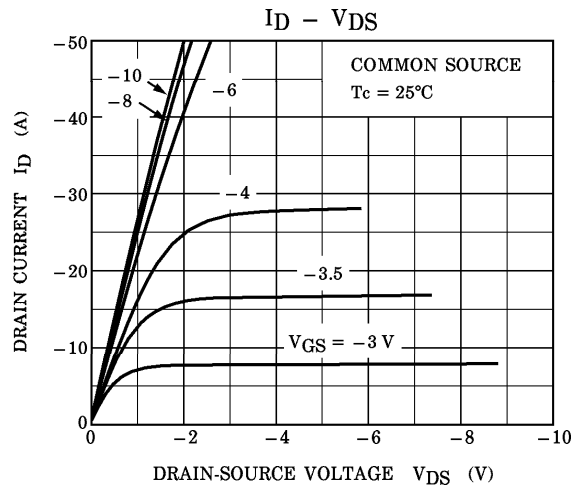
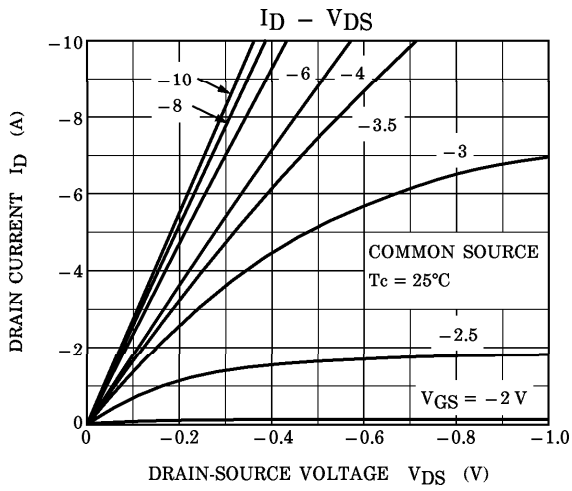
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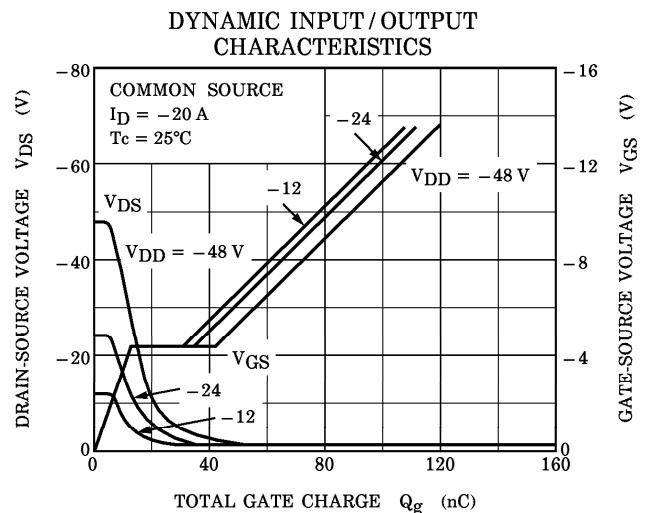
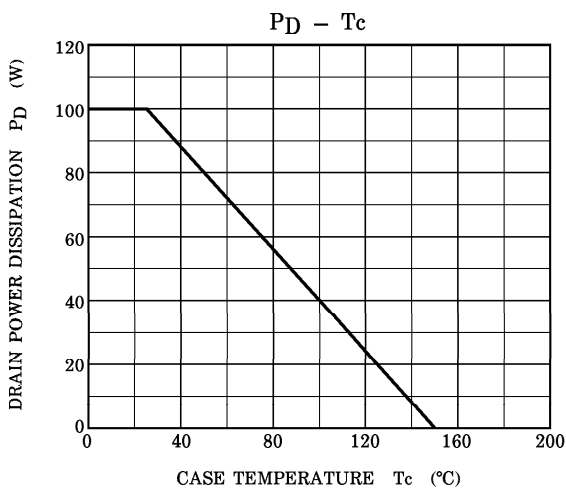
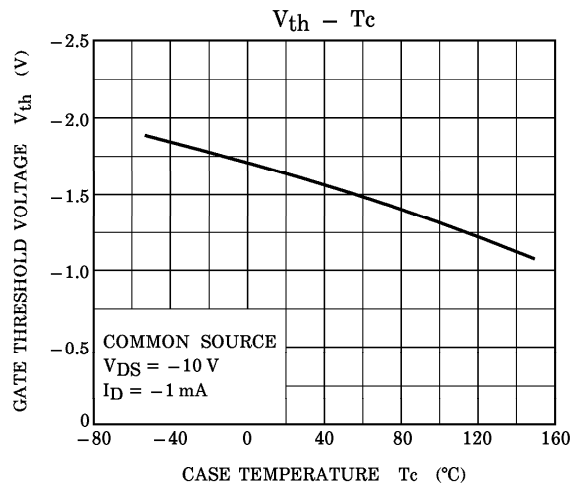
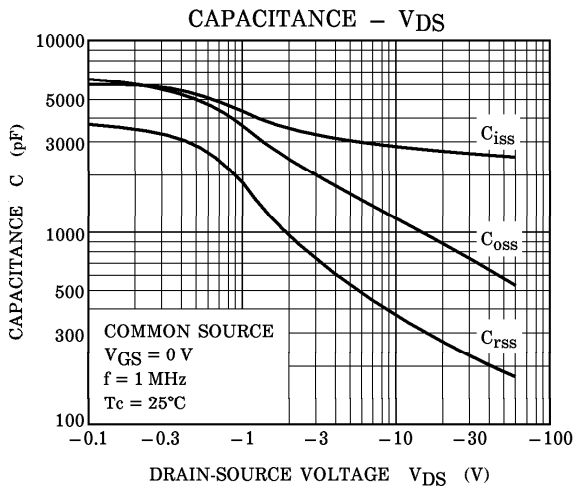
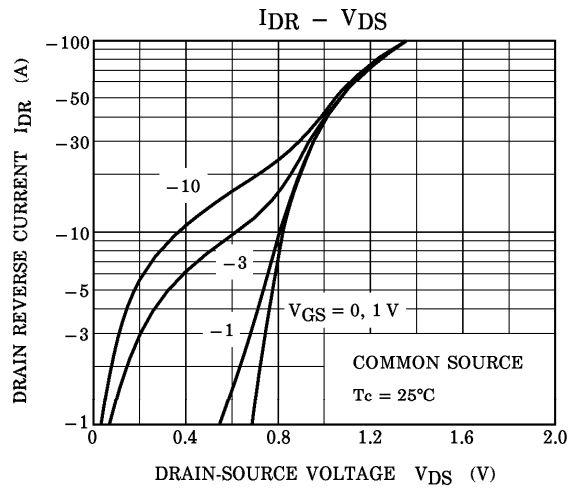
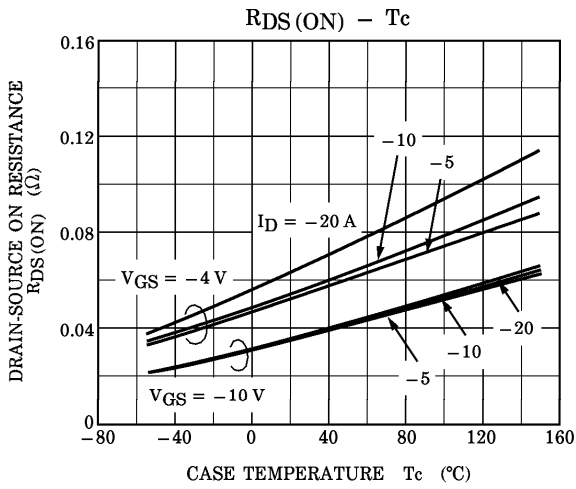


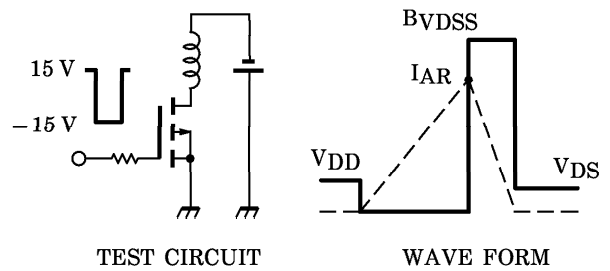
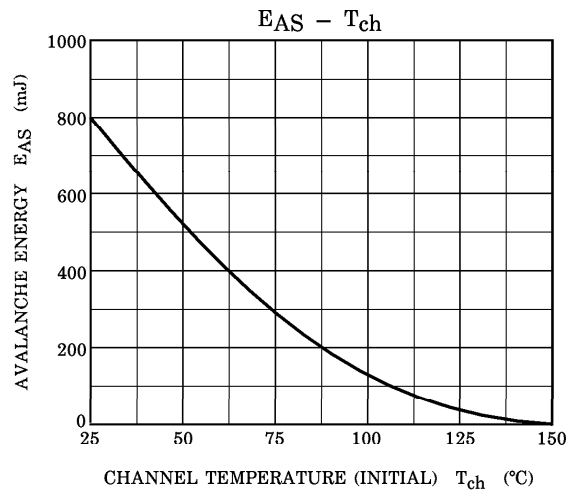
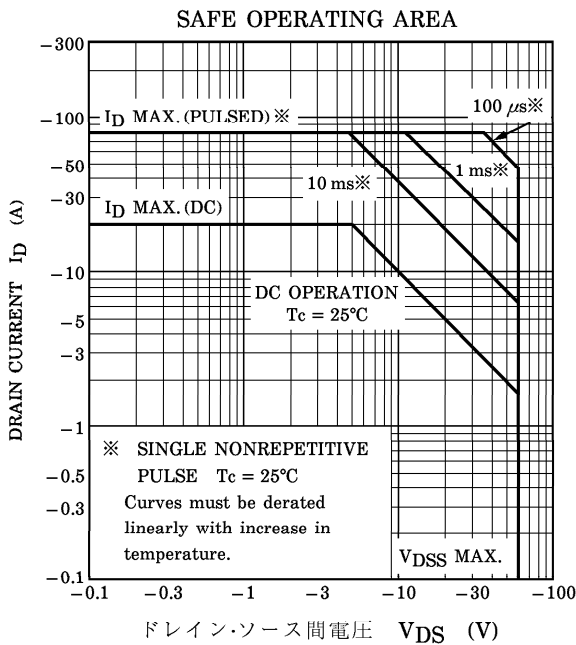
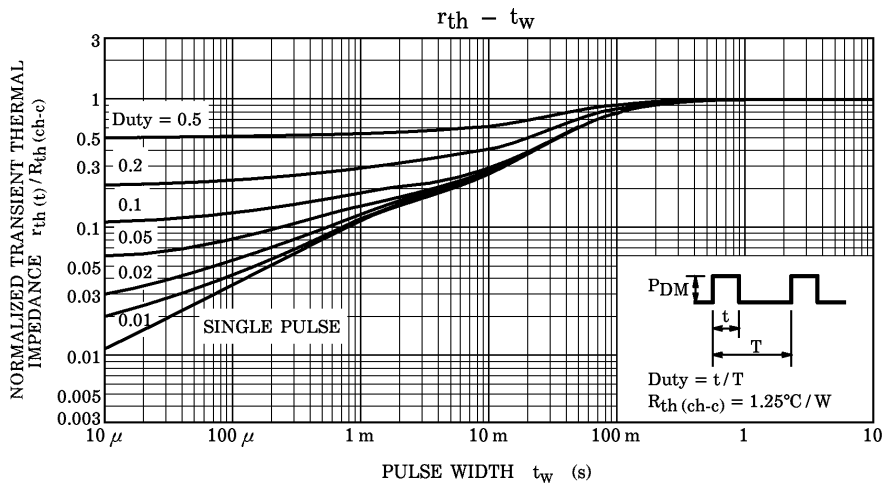
Month (Starting from Alphabet A)



Year (Last Number of the Christian Era)







Peak IAR = -20 A, $R_G = 25 \Omega$
 $V_{DD} = -50 \text{ V}$, $L = 1.44 \text{ mH}$

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