

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (L^2 - π -MOS ∇)

2SJ402

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

- 4 V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 29\text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 23\text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100\text{ }\mu\text{A}$ (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	-30	A
	Pulse	I_{DP}	-120	A
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)		P_D	100	W
Single Pulse Avalanche Energy**		E_{AS}	936	mJ
Avalanche Current		I_{AR}	-30	A
Repetitive Avalanche Energy*		E_{AR}	10	mJ
Channel Temperature		T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

Note ;

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

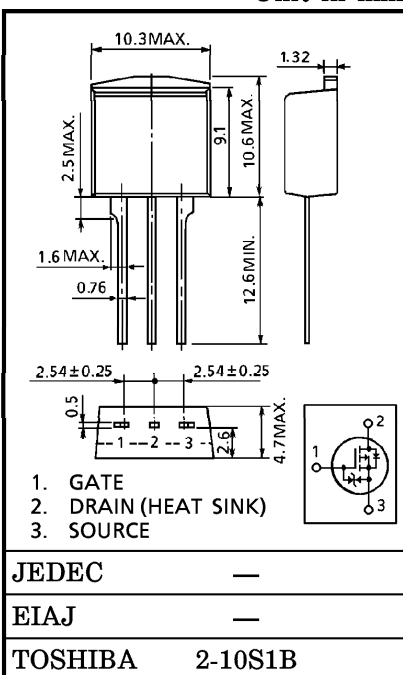
** $V_{DD} = -50\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 747\text{ }\mu\text{H}$,
 $R_G = 25\text{ }\Omega$, $I_{AR} = -30\text{ A}$

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

INDUSTRIAL APPLICATIONS

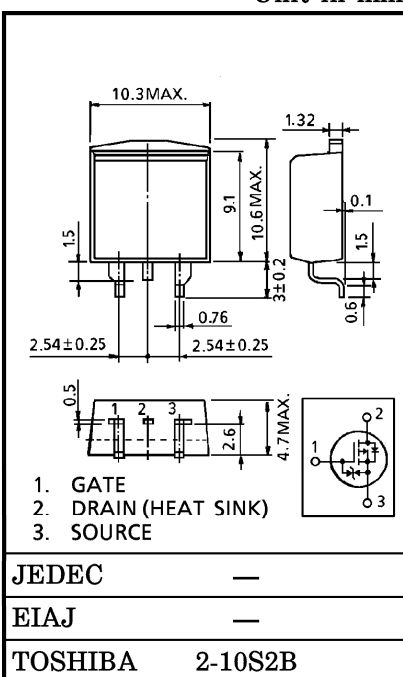
TO-220FL

Unit in mm



TO-220SM

Unit in mm

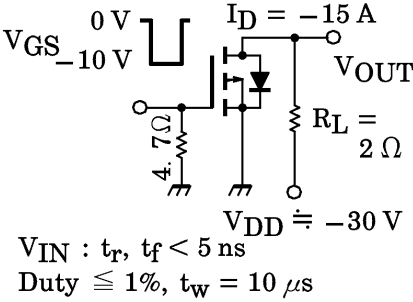


Weight : 1.5 g

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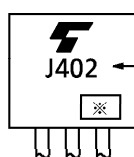
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = -60 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	-100	μA
Drain-Source Breakdown Voltage		$V_{(BR) DSS}$	$I_D = -10 \text{ mA}, V_{GS} = 0 \text{ V}$	-60	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = -10 \text{ V}, I_D = -1 \text{ mA}$	-0.8	—	-2.0	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = -4 \text{ V}, I_D = -15 \text{ A}$	—	46	60	m Ω
			$V_{GS} = -10 \text{ V}, I_D = -15 \text{ A}$	—	29	38	
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = -10 \text{ V}, I_D = -15 \text{ A}$	14	23	—	S
Input Capacitance		C_{iss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	3300	—	pF
Reverse Transfer Capacitance		C_{rss}		—	460	—	
Output Capacitance		C_{oss}		—	1450	—	
Switching Time	Rise Time	t_r		—	20	—	ns
	Turn-on Time	t_{on}		—	25	—	
	Fall Time	t_f		—	35	—	
	Turn-off Time	t_{off}		—	130	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \doteq -48 \text{ V}, V_{GS} = -10 \text{ V}, I_D = -30 \text{ A}$	—	110	—	nC
Gate-Source Charge		Q_{gs}		—	75	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	35	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	-30	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	-120	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -30 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.7	V
Reverse Recovery Time	t_{rr}	$I_{DR} = -30 \text{ A}, V_{GS} = 0 \text{ V}$	—	100	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR}/dt = 50 \text{ A}/\mu\text{s}$	—	0.16	—	μC

MARKING



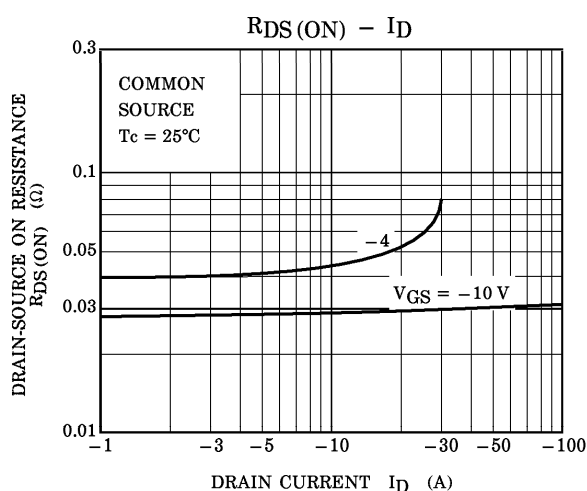
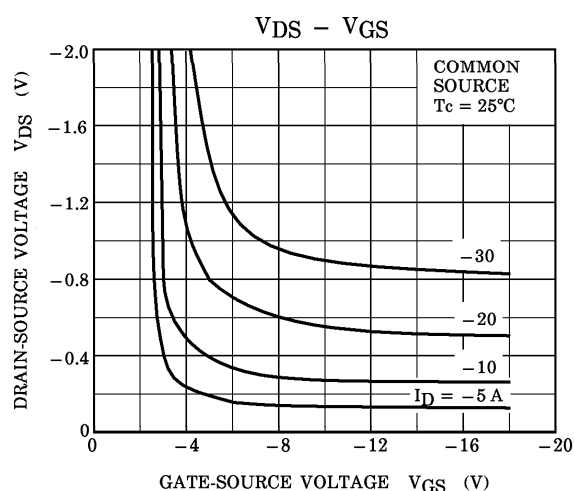
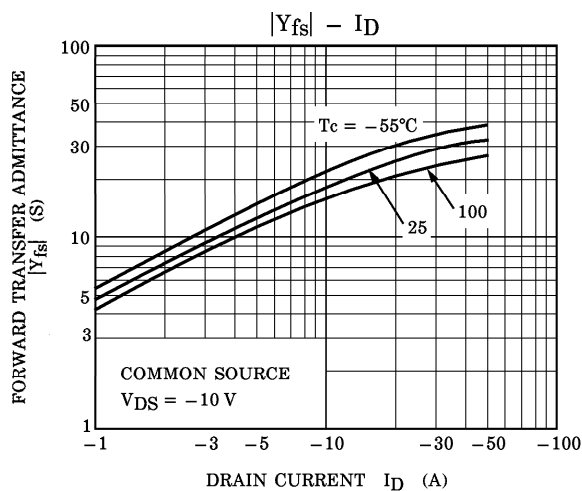
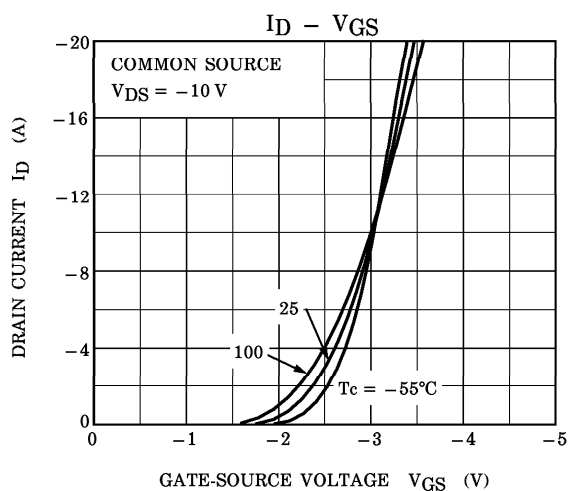
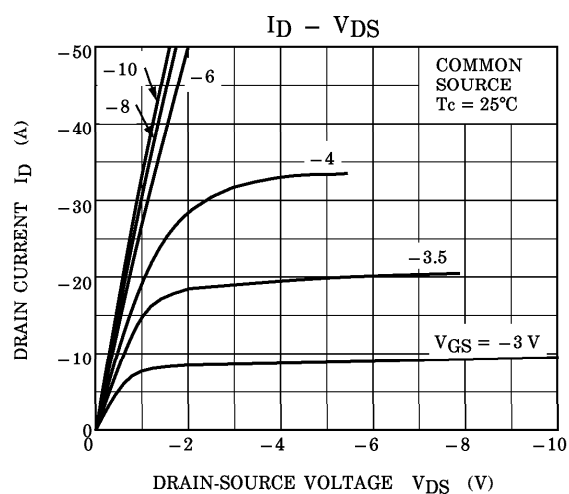
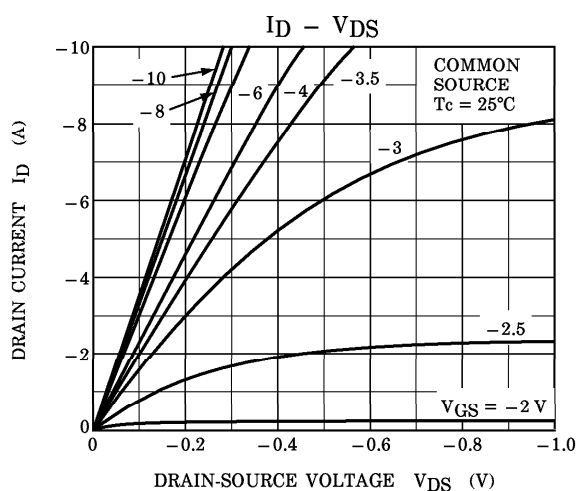
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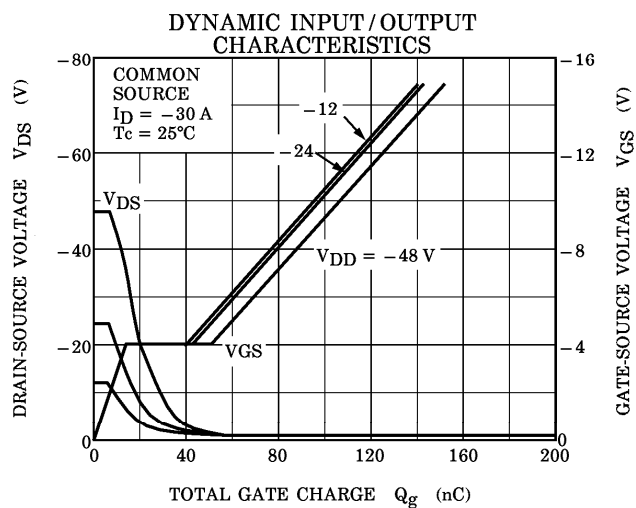
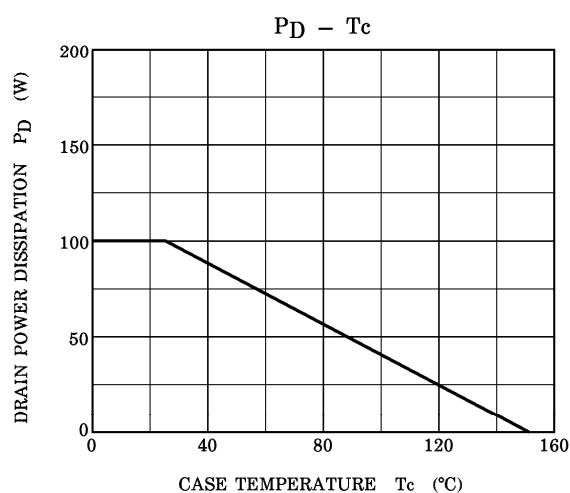
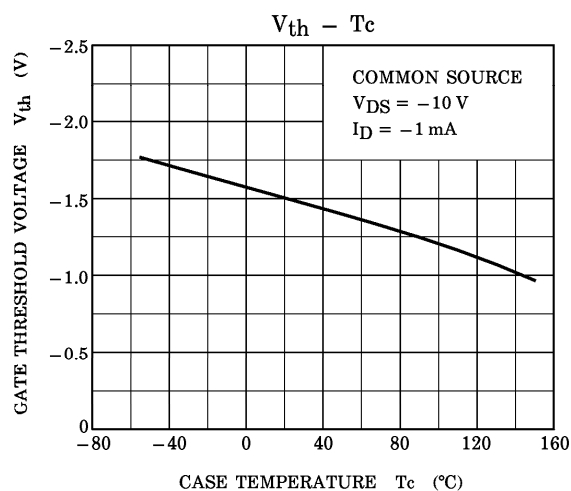
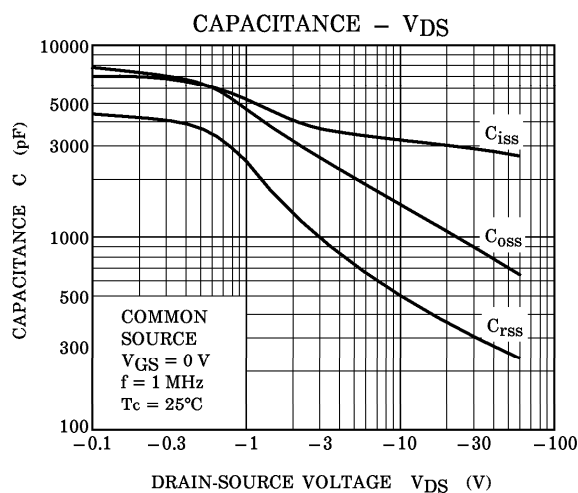
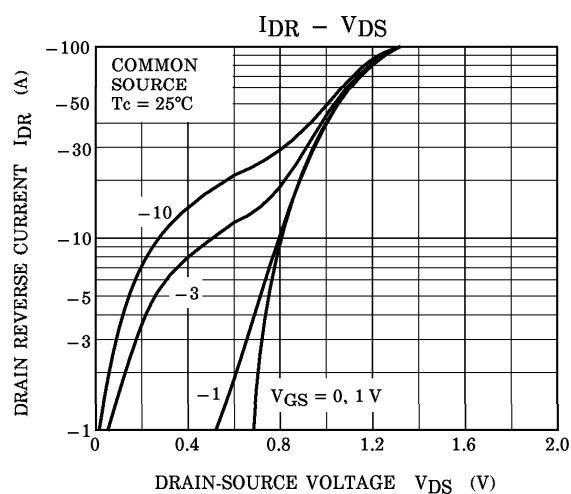
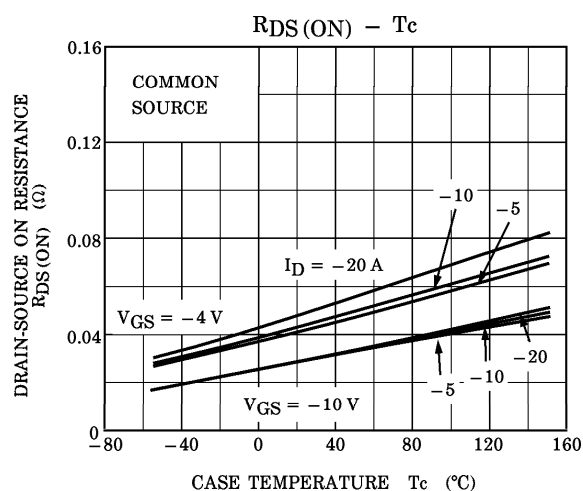
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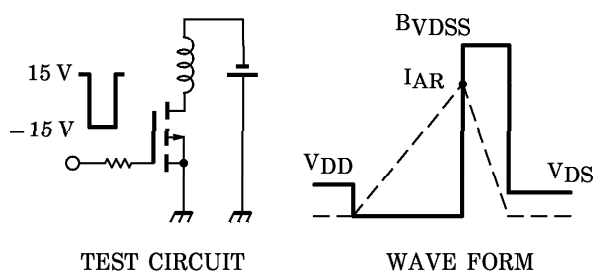
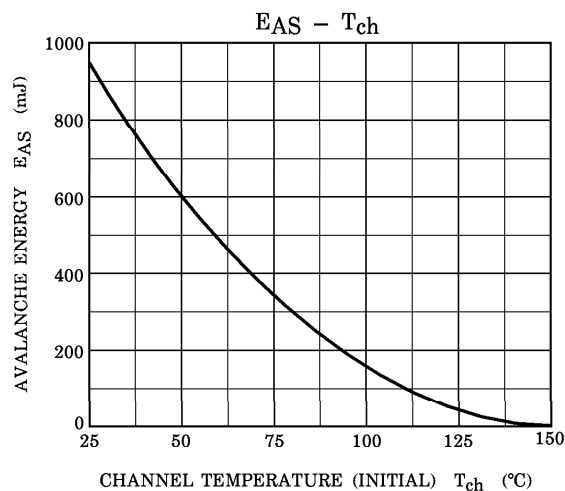
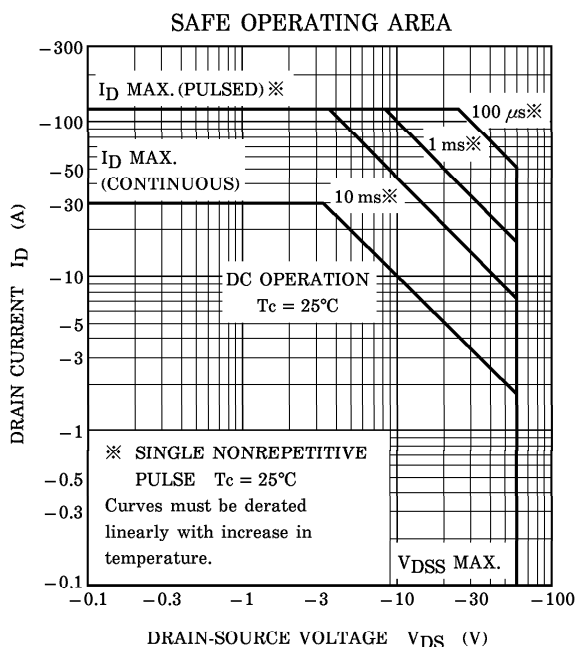
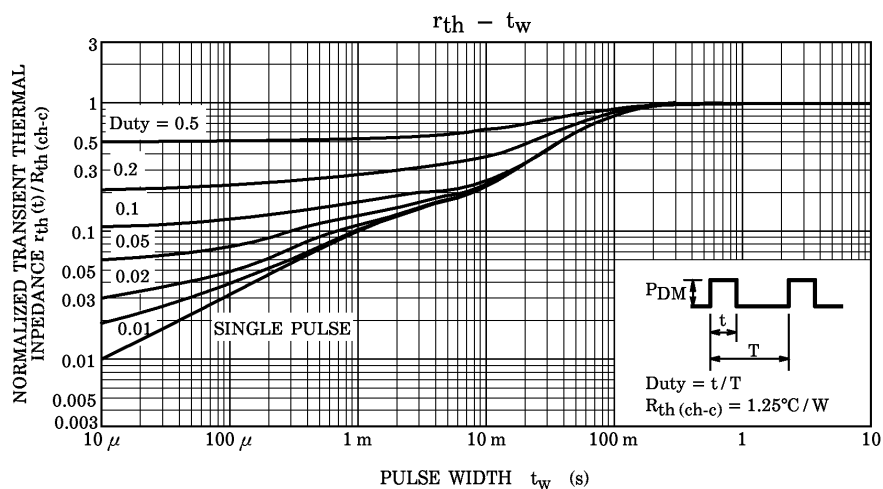


Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)







Peak $I_{AR} = -30$ A, $R_G = 25 \Omega$, $V_{DD} = -50$ V, $L = 747 \mu\text{H}$

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