

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

2SJ509

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE
APPLICATIONS

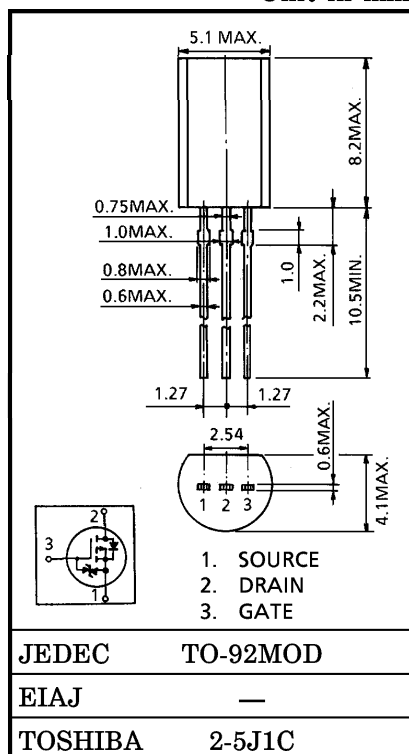
INDUSTRIAL APPLICATIONS

Unit in mm

- 4 V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 1.35 \Omega$ (Typ.)
- High Forward Transfer Admittance: $|Y_{fs}| = 0.7 S$ (Typ.)
- Low Leakage Current
: $I_{DSS} = -100 \mu A$ ($V_{DS} = -100 V$)
- Enhancement-Mode
: $V_{th} = -0.8 \sim -2.0 V$ ($V_{DS} = -10 V$, $I_D = -1 mA$)

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

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	I_D	-1	A
	Pulse	I_{DP}	-3	A
Drain Power Dissipation ($T_a = 25^\circ C$)		P_D	0.9	W
Single Pulse Avalanche Energy**		E_{AS}	136.5	mJ
Avalanche Current		I_{AR}	-1	A
Repetitive Avalanche Energy*		E_{AR}	0.09	mJ
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	-55~150	$^\circ C$



Weight : 0.36 g (Typ.)

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	138	$^\circ C/W$

Note ;

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

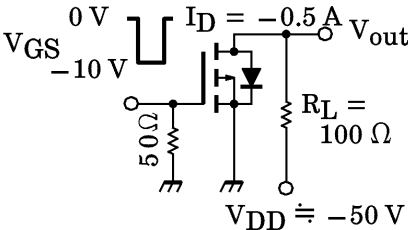
** $V_{DD} = -50 V$, $T_{ch} = 25^\circ C$ (initial), $L = 168 mH$, $R_G = 25 \Omega$, $I_{AR} = -1 A$

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

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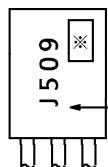
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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}	$V_{DS} = -100 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	-100	μA
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -10 \text{ mA}, V_{GS} = 0 \text{ V}$	-100	—	—	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	$R_{DS(ON)}$	$V_{GS} = -4 \text{ V}, I_D = -0.5 \text{ A}$	—	1.68	2.5	Ω
		$V_{GS} = -10 \text{ V}, I_D = -0.5 \text{ A}$	—	1.34	1.9	
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = -10 \text{ V}, I_D = -0.5 \text{ A}$	0.3	0.7	—	S
Input Capacitance	C_{iss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	135	—	pF
Reverse Transfer Capacitance	C_{rss}		—	22	—	
Output Capacitance	C_{oss}		—	48	—	
Switching Time	Rise Time	 $V_{IN} : t_r, t_f < 5 \text{ ns},$ Duty $\leq 1\%, t_w = 10 \mu\text{s}$	—	20	—	ns
	Turn-on Time		—	32	—	
	Fall Time		—	25	—	
	Turn-off Time		—	130	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	$V_{DD} \approx -80 \text{ V}, V_{GS} = -10 \text{ V}, I_D = -1 \text{ A}$	—	6.3	—	nC
Gate-Source Charge	Q_{gs}		—	4.1	—	
Gate-Drain ("Miller") Charge	Q_{gd}		—	2.2	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	-1	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	-3	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -1 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.5	V
Reverse Recovery Time	t_{rr}	$I_{DR} = -1 \text{ A}, V_{GS} = 0 \text{ V}$	—	90	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	180	—	nC

MARKING



※ Lot Number



— Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)