

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

2SJ509

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

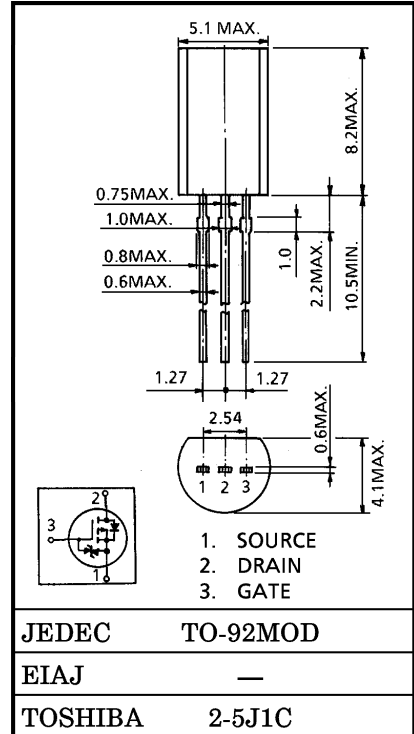
INDUSTRIAL APPLICATIONS

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 (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	I_D	-1	A
	Pulse	I_{DP}	-3	A
Drain Power Dissipation (Ta = 25°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	°C
Storage Temperature Range		T_{stg}	-55~150	°C



Weight : 0.36 g (Typ.)

THERMAL CHARACTERISTICS

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

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = -50 V$, Starting $T_{ch} = 25^\circ C$, $L = 168 mH$, $R_G = 25 \Omega$, $I_{AR} = -1 A$

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

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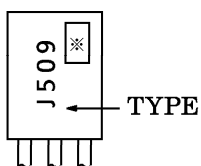
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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	t_r		—	20	—	ns
	Turn-on Time	t_{on}		—	32	—	
	Fall Time	t_f		—	25	—	
	Turn-off Time	t_{off}		$V_{IN} : t_r, t_f < 5\text{ ns},$ $Duty \leq 1\%, t_w = 10\text{ }\mu\text{s}$	—	130	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	$V_{DD} \doteq -80\text{ V}, V_{GS} = -10\text{ V},$ $I_D = -1\text{ A}$	—	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)