

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (L<sup>2</sup>-π-MOS V)

# 2SJ509

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

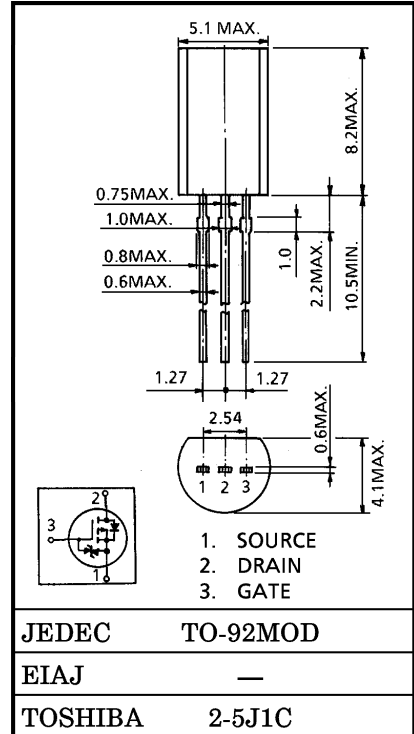
INDUSTRIAL APPLICATIONS

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		$V_{GSS}$	$\pm 20$	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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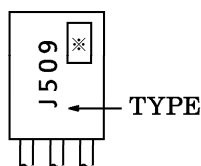
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	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 = -0.5 A	—	1.68	2.5	Ω	
		VGS = -10 V, ID = -0.5 A	—	1.34	1.9		
Forward Transfer Admittance	Yfs	VDS = -10 V, ID = -0.5 A	0.3	0.7	—	S	
Input Capacitance	Ciss	VDS = -10 V, VGS = 0 V, f = 1 MHz	—	135	—	pF	
Reverse Transfer Capacitance	Crss		—	22	—		
Output Capacitance	Coss		—	48	—		
Switching Time	Rise Time	tr		—	20	—	ns
	Turn-on Time	ton		—	32	—	
	Fall Time	tf		—	25	—	
	Turn-off Time	t <sub>off</sub>		—	130	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Qg	VDD ≐ -80 V, VGS = -10 V, ID = -1 A	—	6.3	—	nC	
Gate-Source Charge	Qgs		—	4.1	—		
Gate-Drain (“Miller”) Charge	Qgd		—	2.2	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	-1	A
Pulse Drain Reverse Current	IDRP	—	—	—	-3	A
Diode Forward Voltage	VDSF	IDR = -1 A, VGS = 0 V	—	—	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	IDR = -1 A, VGS = 0 V	—	90	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dIDR/dt = 50 A/μs	—	180	—	nC

MARKING



※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)