

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSVI)

# 2SK2989

HIGH SPEED SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

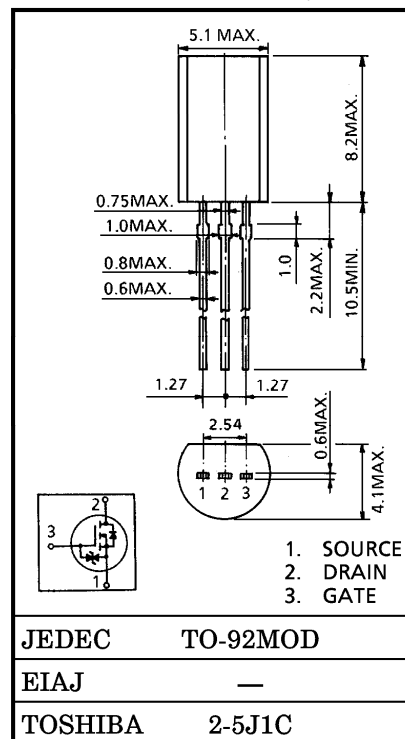
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 120 \text{ m}\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 2.6 \text{ S}$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100 \mu\text{A}$  ( $V_{DS} = 50 \text{ V}$ )
- Enhancement-Mode :  $V_{th} = 1.0 \sim 2.2 \text{ V}$  ( $V_{DS} = 10 \text{ V}$ ,  $I_D = 1 \text{ mA}$ )

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	50	V
Drain-Gate Voltage ( $R_{GS} = 20 \text{ k}\Omega$ )		$V_{DGR}$	50	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	5	A
	Pulse	$I_{DP}$	15	
Drain Power Dissipation ( $T_a = 25^\circ\text{C}$ )		$P_D$	0.9	W
Channel Temperature		$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ\text{C}$



THERMAL CHARACTERISTICS

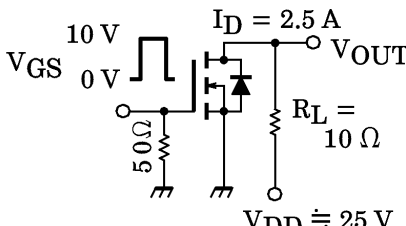
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	138	$^\circ\text{C}/\text{W}$

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

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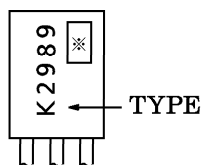
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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 = 50 V, VGS = 0 V	—	—	100	μA	
Drain-Source Breakdown Voltage	V(BR)DSS	ID = 10 mA, VGS = 0 V	50	—	—	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 = 1.3 A	—	240	330	mΩ	
		VGS = 10 V, ID = 2.5 A	—	120	150		
Forward Transfer Admittance	Yfs	VDS = 10 V, ID = 2.5 A	1.3	2.6	—	S	
Input Capacitance	Ciss	VDS = 10 V, VGS = 0 V f = 1 MHz	—	145	—	pF	
Reverse Transfer Capacitance	Crss		—	25	—		
Output Capacitance	Coss		—	75	—		
Switching Time	Rise Time	tr		—	16	—	ns
	Turn-on Time	ton		—	23	—	
	Fall Time	tf		—	27	—	
	Turn-off Time	t <sub>off</sub>		VIN : tr, tf < 5 ns, Duty ≤ 1%, tw = 10 μs	—	110	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Qg	VDD ≐ 40 V, VGS = 10 V	—	6.5	—	nC	
Gate-Source Charge	Qgs	ID = 5 A	—	5	—		
Gate-Drain ("Miller") Charge	Qgd		—	1.5	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	5	A
Pulse Drain Reverse Current	IDRP	—	—	—	15	A
Diode Forward Voltage	VDSF	IDR = 5 A, VGS = 0 V	—	—	-1.5	V

MARKING



※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)