

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

# 2SK3051

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

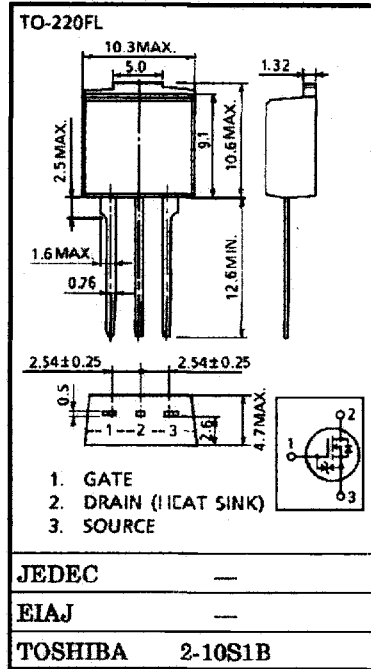
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 24m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 27S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) ( $V_{DS} = 50V$ )
- Enhancement-Mode :  $V_{th} = 1.5 \sim 3.5V$  ( $V_{DS} = 10V, I_D = 1mA$ )

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	50	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )	$V_{DGR}$	50	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	45 A
	Pulse	$I_{DP}$	135 A
Drain Power Dissipation ( $T_c = 25^\circ C$ )	$P_D$	40	W
Single Pulse Avalanche Energy**	EAS	115	mJ
Avalanche Current	$I_{AR}$	45	A
Repetitive Avalanche Energy*	EAR	4	mJ
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 1.5g (Typ.)

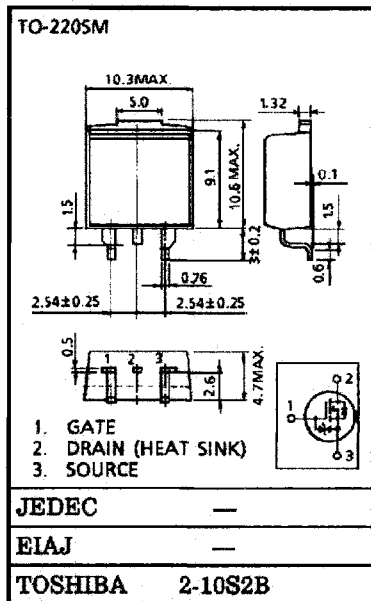
THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	3.125	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ C/W$

Note ;

- \* Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- \*\*  $V_{DD} = 25V, T_{ch} = 25^\circ C, L = 71\mu H, R_G = 25\Omega, I_{AR} = 45A$

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



Weight : 1.5g (Typ.)

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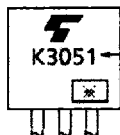
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	$\pm 10$	$\mu A$	
Drain Cut-off Current	$I_{DSS}$	$V_{DS} = 50V, V_{GS} = 0V$	—	—	100	$\mu A$	
Drain-Source Breakdown Voltage	$V_{(BR) DSS}$	$I_D = 10mA, V_{GS} = 0V$	50	—	—	V	
Gate Threshold Voltage	$V_{th}$	$V_{DS} = 10V, I_D = 1mA$	1.5	—	3.5	V	
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 25A$	—	24	30	$m\Omega$	
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 10V, I_D = 25A$	15	27	—	S	
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	—	1250	—	pF	
Reverse Transfer Capacitance	$C_{rss}$		—	250	—		
Output Capacitance	$C_{oss}$		—	700	—		
Switching Time	Rise Time	$t_r$		—	20	—	ns
	Turn-on Time	$t_{on}$		—	30	—	
	Fall Time	$t_f$		—	40	—	
	Turn-off Time	$t_{off}$		$V_{IN} : t_r, t_f < 5ns,$ $Duty \leq 1\%, t_w = 10\mu s$	—	120	
Total Gate Charge (Gate-Source Plus Gate-Drain)	$Q_g$	$V_{DD} = 40V, V_{GS} = 10V, I_D = 45A$	—	36	—	nC	
Gate-Source Charge	$Q_{gs}$		—	22	—		
Gate-Drain ("Miller") Charge	$Q_{gd}$		—	14	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	45	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	135	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = 45A, V_{GS} = 0V$	—	—	-1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = 45A, V_{GS} = 0V$	—	75	—	ns
Reverse Recovery Charge	$Q_{rr}$	$dI_{DR} / dt = 50A / \mu s$	—	75	—	nC

MARKING



TYPE \* Lot Number  
□ □ — Month (Starting from Alphabet A)  
— Year (Last Number of the Christian Era)

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