

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (U-MOS)

## 2SK3084

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- 4 V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 40 \text{ m}\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 27 \text{ S}$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100 \text{ }\mu\text{A}$  (Max.) ( $V_{DS} = 100 \text{ V}$ )
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0 \text{ V}$   
( $V_{DS} = 10 \text{ V}$ ,  $I_D = 1 \text{ mA}$ )

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	100	V
Drain-Gate Voltage ( $R_{GS} = 20 \text{ k}\Omega$ )	$V_{DGR}$	100	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
DC Drain Current	DC	$I_D$	30
	Pulse	$I_{DP}$	120
Drain Power Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_D$	65	W
Single Pulse Avalanche Energy**	$E_{AS}$	293	mJ
Avalanche Current	$I_{AR}$	30	A
Repetitive Avalanche Energy*	$E_{AR}$	6.5	mJ
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 Case	$R_{th(ch-c)}$	1.92	$^\circ\text{C/W}$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ\text{C/W}$

Note ;

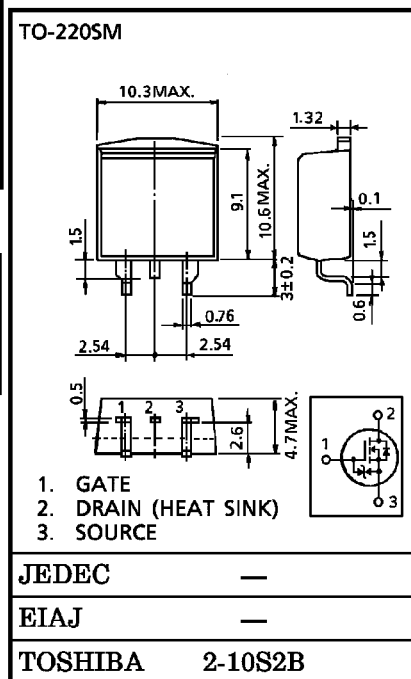
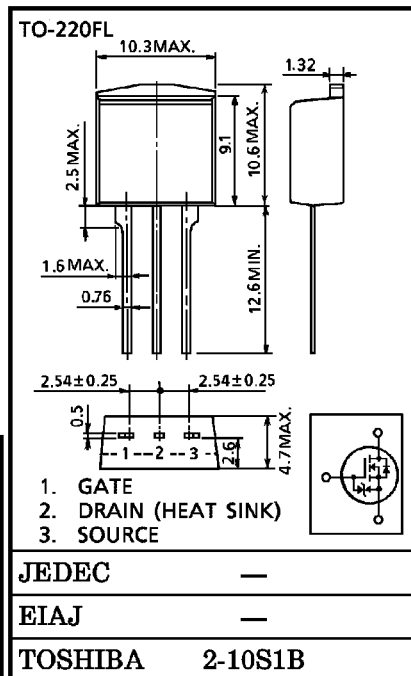
\* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

\*\*  $V_{DD} = 25 \text{ V}$ ,  $T_{ch} = 25^\circ\text{C}$  (initial),  $L = 525 \text{ }\mu\text{H}$   
 $R_G = 25 \text{ }\Omega$ ,  $I_{AR} = 30 \text{ A}$ 

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

## INDUSTRIAL APPLICATIONS

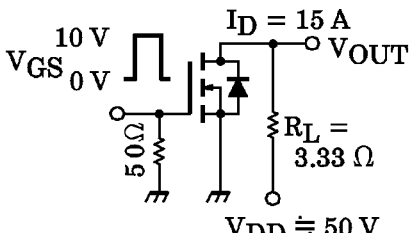
Unit in mm



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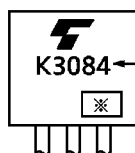
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		$I_{GSS}$	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	$\pm 20$	$\mu\text{A}$
Drain Cut-off Current		$I_{DSS}$	$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	$\mu\text{A}$
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		$R_{DS(ON)}$	$V_{GS} = 4 \text{ V}, I_D = 15 \text{ A}$	—	46	70	$\text{m}\Omega$
			$V_{GS} = 10 \text{ V}, I_D = 15 \text{ A}$	—	40	46	
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 15 \text{ A}$	13	27	—	S
Input Capacitance		$C_{iss}$	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1 \text{ MHz}$	—	3250	—	$\text{pF}$
Reverse Transfer Capacitance		$C_{rss}$		—	230	—	
Output Capacitance		$C_{oss}$		—	520	—	
Switching Time	Rise Time	$t_r$	 <p><math>V_{GS} = 10 \text{ V}, 0 \text{ V}</math> <math>I_D = 15 \text{ A}</math> <math>R_L = 3.33 \Omega</math> <math>V_{DD} \approx 50 \text{ V}</math></p>	—	33	—	$\text{ns}$
	Turn-on Time	$t_{on}$		—	60	—	
	Fall Time	$t_f$		—	95	—	
	Turn-off Time	$t_{off}$		—	230	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		$Q_g$	$V_{DD} \approx 80 \text{ V}, V_{GS} = 10 \text{ V},$ $I_D = 30 \text{ A}$	—	68	—	$\text{nC}$
Gate-Source Charge		$Q_{gs}$		—	46	—	
Gate-Drain ("Miller") Charge		$Q_{gd}$		—	22	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	30	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	120	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = 30 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = 30 \text{ A}, V_{GS} = 0 \text{ V}$	—	140	—	ns
Reverse Recovery Charge	$Q_{rr}$	$dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	370	—	nC

## MARKING



TYPE

※ Lot Number



Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)