



# SEMICONDUCTOR

## TECHNICAL DATA

TOSHIBA FIELD EFFECT TRANSISTOR  
 2 S K 6 9 3  
 SILICON N CHANNEL MOS TYPE  
 ( $\pi$ -MOS1)

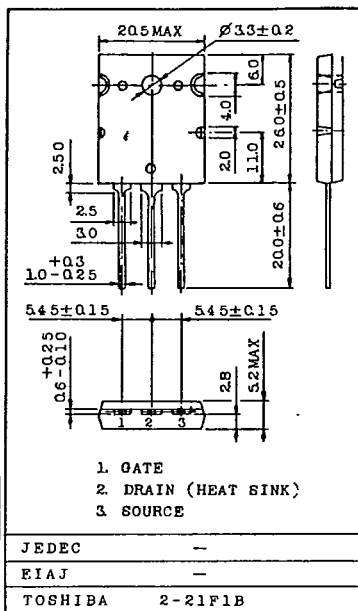
INDUSTRIAL APPLICATIONS

Unit in mm

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

### FEATURES:

- Low Drain-Source ON Resistance :  $R_{DS(ON)}=0.32\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}|=9.0S$  (Typ.)
- Low Leakage Current :  $I_{GSS}=\pm 100nA$  (Max.) @  $V_{GS}=\pm 20V$   
 $I_{DSS}=300\mu A$  (Max.) @  $V_{DS}=450V$
- Enhancement-Mode :  $V_{th}=2.0\sim 4.0V$  @  $V_{DS}=10V, I_D=1mA$



Weight : 9.75g

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSX}$	450	V
Drain-Gate Voltage ( $R_{GS}=20k\Omega$ )		$V_{DGR}$	450	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC ( $T_c=25^\circ C$ )	$I_D$	13	A
	Pulse	$I_{DP}$	52	
Drain Power Dissipation ( $T_c=25^\circ C$ )		$P_D$	150	W
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55\sim 150$	$^\circ C$

### THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.83	$^\circ C/W$
Thermal Resistance, Junction to Ambient	$R_{th(j-a)}$	30	$^\circ C/W$
Maximum Lead Temperature for Soldering Purposes (1.6mm from case for 10 seconds)	$T_L$	300	$^\circ C$

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## ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS=±20V, VDS=0V	-	-	±100	nA
Drain Cut-off Current		IDSS	VDS=450V, VGS=0V	-	-	300	µA
Drain-Source Breakdown Voltage		V(BR)DSS	ID=10mA, VGS=0V	450	-	-	V
Gate Threshold Voltage		Vth	VDS=10V, ID=1mA	2.0	-	4.0	V
Forward Transfer Admittance		Yfs	VDS=10V, ID=7A	6.0	9.0	-	S
Drain-Source ON Resistance		RDS(ON)	ID=7A, VGS=10V	-	0.32	0.40	Ω
Drain-Source ON Voltage		VDS(ON)	ID=13A, VGS=10V	-	4.8	6.3	V
Input Capacitance		Ciss	VDS=10V, VGS=0V, f=1MHz	-	2300	3600	pF
Reverse Transfer Capacitance		Crss		-	450	680	
Output Capacitance		Coss		-	1000	1400	
Switching Time	Rise Time	tr		-	70	140	ns
	Turn-on Time	ton		-	100	200	
	Fall Time	tf		-	75	150	
	Turn-off Time	toff		VIN:tr,tf<5ns Duty≤1%	-	350	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	ID=13A, VGS=10V VDD=360V	-	82	110	nC
Gate-Source Charge		Qgs		-	47	-	
Gate-Drain ("Miller") Charge		Qgd		-	35	-	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	--	-	-	13	A
Pulse Drain Reverse Current	IDRP	--	-	-	52	A
Diode Forward Voltage	VDSF	IDR=13A, VGS=0V	-	-	1.8	V
Reverse Recovery Time	trr	IDR=13A	-	400	-	ns
Reverse Recovered Charge	Qrr	dIDR/dt=100A/µs	-	4.0	-	µC