

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSII-5)

# 2SK1643

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

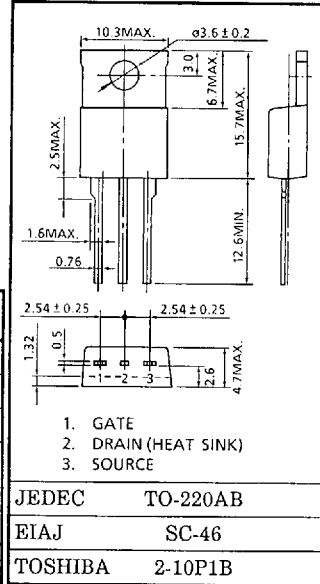
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 2.5\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 2.0S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 300\mu A$  (Max.) @  $V_{DS} = 720V$
- 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		$V_{DSS}$	900	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	900	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	DC	$I_D$	5	A
	Pulse	$I_{DP}$	15	
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	125	W
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ C$



Weight : 2.0g

HERMAL CHARACTERISTICS

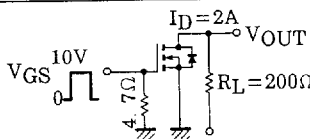
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.0	$^\circ C / W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ C / W$

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 = ±25V, VDS = 0V	—	—	±100	nA
Drain Cut-off Current		IDSS	VDS = 720V, VGS = 0V	—	—	300	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = 10mA, VGS = 0V	900	—	—	V
Gate Threshold Voltage		Vth	VDS = 10V, ID = 1mA	1.5	—	3.5	V
Drain-Source ON Resistance		RDS(ON)	VGS = 10V, ID = 2A	—	2.5	2.8	Ω
Forward Transfer Admittance		Yfs	VDS = 20V, ID = 2A	1.0	2.0	—	S
Input Capacitance		Ciss	VDS = 25V, VGS = 0V, f = 1MHz	—	700	1000	pF
Reverse Transfer Capacitance		Crss		—	55	90	
Output Capacitance		Coss		—	100	150	
Switching Time	Rise Time	tr	 <p> <math>I_D = 2A</math>, <math>V_{OUT}</math>  <math>V_{GS} = 10V</math>, <math>7\Omega</math>, <math>R_L = 200\Omega</math>  <math>V_{IN} : t_r, t_f &lt; 5ns, V_{DD} \doteq 400V</math>                      Duty <math>\leq 1\%</math>, <math>t_w = 10\mu s</math> </p>	—	18	35	ns
	Turn-on Time	ton		—	30	60	
	Fall Time	tf		—	12	25	
	Turn-off Time	toff		—	70	140	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD $\doteq$ 400V, VGS = 10V, ID = 4A	—	60	120	nC
Gate-Source Charge		Qgs		—	35	—	
Gate-Drain ("Miller") Charge		Qgd		—	25	—	

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 = 4A, VGS = 0V	—	—	-1.9	V
Reverse Recovery Time	trr	IDR = 4A, VGS = 0V	—	1000	—	ns
Reverse Recovered Charge	Qrr	dIDR / dt = 100A / μs	—	0.13	—	μC

