

# TOSHIBA FIELD EFFECT TRANSISTOR

## 2SK1717

### SILICON N CHANNEL MOS TYPE (L<sup>2</sup> - π - MOS IV)

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

**INDUSTRIAL  
APPLICATIONS**  
Unit in mm

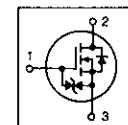
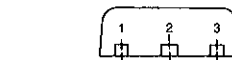
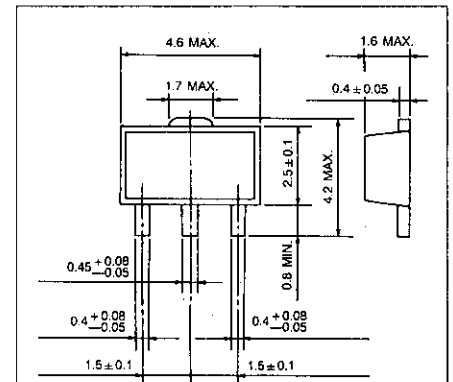
**FEATURES:**

- 4-Volt Gate Drive
- Low Drain-Source ON Resistance:  $R_{DS(ON)} = 0.28 \Omega$  (Typ.)
- High Forward Transfer Admittance:  $|Y_{fs}| = 1.6 \text{ S}$  (Typ.)
- Low Leakage Current:  $I_{DSS} = 100 \mu\text{A}$  (Max.) ( $V_{DS} = 60 \text{ V}$ )
- Enhancement-Mode:  $V_{th} = 0.8 \sim 2.0 \text{ V}$  ( $V_{DS} = 10 \text{ V}$ ,  $I_D = 1 \text{ mA}$ )

**MAXIMUM RATINGS (Ta = 25 °C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Drain-Gate Voltage ( $R_{GS} = 20 \text{ k}\Omega$ )	$V_{DGR}$	60	V
Gate-Source Voltage	$V_{GSS}$	±20	V
Drain Current	DC	$I_D$	2
	Pulse	$I_{DP}$	6
Drain Power Dissipation (Ta = 25 °C)	$P_D$	0.5	W
Drain Power Dissipation	$P_{D^*}$	1.5	W
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature Range	$T_{sig}$	-55 ~ 150	°C

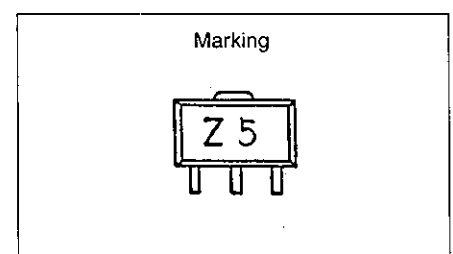
$P_{D^*}$ : mounted on ceramic substrate (600 mm<sup>2</sup>x0.8 t)



1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

JEDEC	—
EIAJ	SC-62
TOSHIBA	2-5K1B

Weight: 0.05 g



**THERMAL CHARACTERISTIC**

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	250	°C/W

THIS TRANSISTOR IS AN ELECTROSTATIC DEVICE. PLEASE HANDLE WITH CAUTION.

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	<b>TOSHIBA CORPORATION</b>

GT1A2(1)-A

## TOSHIBA FIELD EFFECT TRANSISTOR

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### SILICON N CHANNEL MOS TYPE

#### (L<sup>2</sup> - π - MOS IV)

#### ELECTRICAL CHARACTERISTICS (Ta = 25 °C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GSS</sub>	V <sub>GS</sub> = ± 16 V, V <sub>DS</sub> = 0 V	—	—	± 10	μA
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		V <sub>(BR)DSS</sub>	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0 V	60	—	—	V
Gate Threshold Voltage		V <sub>th</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	0.8	—	2.0	V
Drain-Source ON Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> = 4 V, I <sub>D</sub> = 1 A	—	0.39	0.53	Ω
			V <sub>GS</sub> = 10 V, I <sub>D</sub> = 1 A	—	0.28	0.37	
Forward Transfer Admittance		Y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 A	1.0	1.6	—	S
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz	—	125	180	pF
Reverse Transfer Capacitance		C <sub>rss</sub>		—	30	60	
Output Capacitance		C <sub>oss</sub>		—	85	130	
Switching Time	Rise Time	t <sub>r</sub>	<p> <math>I_D = 1\text{ A}</math>  <math>V_{GS}</math> 10V, 50Ω, 30Ω, <math>V_{DD} = 30\text{ V}</math>  <math>V_{IN}</math>: <math>t_I &lt; 5\text{ ns}</math>, Duty <math>\leq 1\%</math>, <math>t_w = 10\ \mu\text{s}</math> </p>	—	30	60	nS
	Turn-on Time	t <sub>on</sub>		—	60	120	
	Fall Time	t <sub>f</sub>		—	40	80	
	Turn-off Time	t <sub>off</sub>		—	135	270	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q <sub>g</sub>	V <sub>DD</sub> = 48 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2 A	—	6.5	13	nC
Gate-Source Charge		Q <sub>gs</sub>		—	4.5	—	
Gate-Drain ("Miller") Charge		Q <sub>gd</sub>		—	2.0	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I <sub>DR</sub>	—	—	—	2	A
Pulse Drain Reverse Current	I <sub>DRP</sub>	—	—	—	6	A
Diode Forward Voltage	V <sub>DSF</sub>	I <sub>DR</sub> = 2 A, V <sub>GS</sub> = 0 V	—	—	-1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = 2 A, V <sub>GS</sub> = 0 V	—	75	—	nS
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>DR</sub> /dt = 50 A/μs	—	75	—	μC

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