

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L<sup>2</sup>-π-MOS<sup>2</sup>V)

## 2SK1542

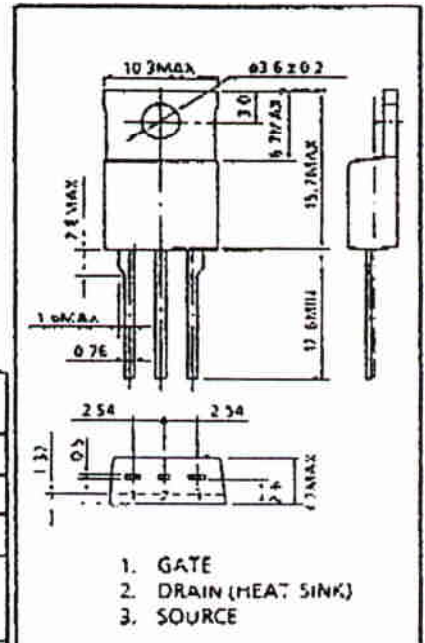
HIGH SPEED SWITCHING APPLICATIONS.  
RELAY DRIVE, MOTOR DRIVE AND DC-DC CONVERTER APPLICATIONS.

INDUSTRIAL APPLICATIONS  
Unit in mm

- 4-Volt Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 15m\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 26S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100\mu A$  (Max.) @  $V_{DS} = 60V$
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0V$  @  $V_{DS} = 10V, I_D = 1mA$

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DS}$	60	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )	$V_{DGR}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	45
	Pulse	$I_{DP}$	180
Drain Power Dissipation ( $T_c = 25^\circ C$ )	$P_D$	125	W
Channel Temperature	$T_{ch}$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55-150	$^\circ C$



JEDEC	TO-220AB
EIAJ	SC-46
TOSHIBA	2-10P1B

Weight : 2.0g

### THERMAL 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 ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	—	—	$\pm 100$	nA	
Drain Cut-off Current	$I_{DSS}$	$V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$	—	—	100	$\mu\text{A}$	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 10\text{mA}, V_{GS} = 0\text{V}$	60	—	—	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	$R_{DS(ON)}$	$V_{GS} = 4\text{V}, I_D = 20\text{A}$	—	22	35	m $\Omega$	
		$V_{GS} = 10\text{V}, I_D = 20\text{A}$	—	15	20		
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 10\text{V}, I_D = 20\text{A}$	18	26	—	S	
Input Capacitance	$C_{iss}$	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	—	2750	3500	pF	
Reverse Transfer Capacitance	$C_{rss}$		—	600	1000		
Output Capacitance	$C_{oss}$		—	1500	2200		
Switching Time	Rise Time	$t_r$	<p><math>I_D = 20\text{A}</math> <math>V_{GS0}</math> <math>V_{OUT}</math> <math>R_L = 1.5\Omega</math> <math>V_{DD} = 30\text{V}</math> <math>V_{IN} : t_r, t_f &lt; 5\text{ns}</math> Duty <math>\leq 1\%</math>, <math>t_w = 10\mu\text{s}</math></p>	—	20	40	ns
	Furn-on Time	$t_{on}$		—	60	120	
	Fall Time	$t_f$		—	50	160	
	Turn-off Time	$t_{off}$		—	210	400	
Total Gate Charge (Gate-Source Plus Gate-Drain)	$Q_g$	$V_{DD} = 48\text{V}, V_{GS} = 10\text{V}, I_D = 45\text{A}$	—	200	400	nC	
Gate-Source Charge	$Q_{gs}$		—	65	—		
Gate-Drain ("Miller") Charge	$Q_{gd}$		—	135	—		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	45	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	130	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = 45\text{A}, V_{GS} = 0\text{V}$	—	—	-2.0	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = 45\text{A}, V_{GS} = 0\text{V}$ $dI_{DR}/dt = 50\text{A}/\mu\text{s}$	—	160	—	ns
Reverse Recovered Charge	$Q_{rr}$		—	0.2	—	$\mu\text{C}$

