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

2SK3051

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)}$ = 24 mΩ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|$ = 27 S (Typ.)
- Low Leakage Current : I_{DSS} = 100 μA (Max.) (V_{DS} = 50 V)
- Enhancement-Mode : V_{th} = 1.5~3.0 V (V_{DS} = 10 V, I_D = 1 mA)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	50	V
Drain-Gate Voltage (R_{GS} = 20 kΩ)		V_{DGR}	50	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	45	A
	Pulse	I_{DP}	135	A
Drain Power Dissipation (Tc = 25°C)		P_D	40	W
Single Pulse Avalanche Energy**		E_{AS}	115	mJ
Avalanche Current		I_{AR}	45	A
Repetitive Avalanche Energy*		E_{AR}	4	mJ
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th\,(ch\text{-}c)}$	3.125	°C / W
Thermal Resistance, Channel to Ambient	$R_{th\,(ch\text{-}a)}$	83.3	°C / W

Note ;

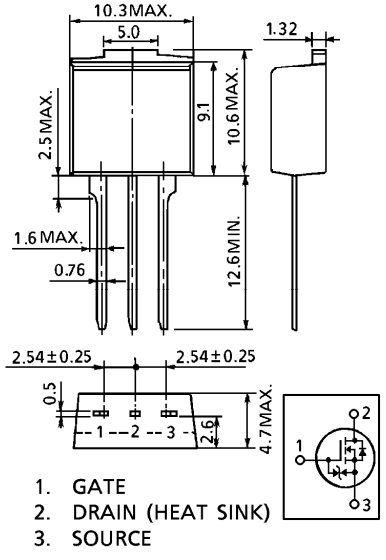
* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** V_{DD} = 25 V, T_{ch} = 25°C, L = 71 μH, R_G = 25 Ω, I_{AR} = 45 A

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

Unit in mm

TO-220FL

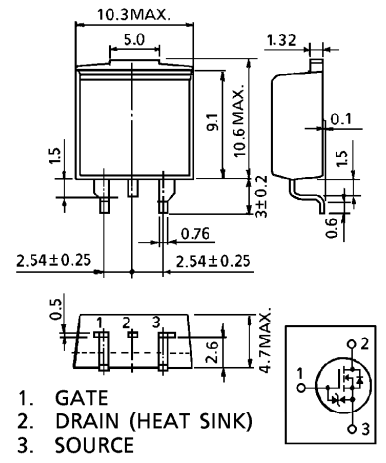


1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

JEDEC	—
EIAJ	—
TOSHIBA	2-10S1B

Weight : 1.5 g (Typ.)

TO-220SM



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

JEDEC	—
EIAJ	—
TOSHIBA	2-10S2B

Weight : 1.5 g (Typ.)

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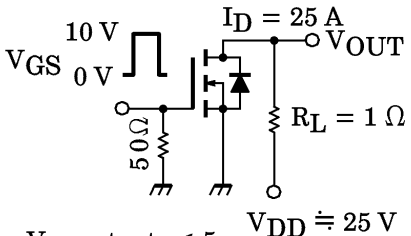
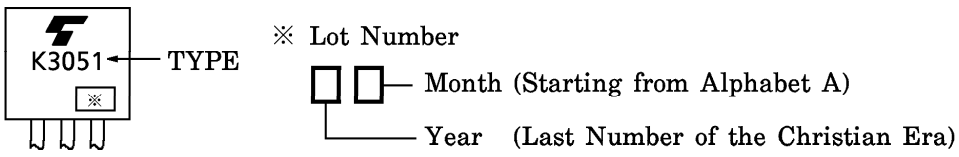
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±16 V, V_{DS} = 0 V	—	—	±10	μA
Drain Cut-off Current		I_{DSS}	V_{DS} = 50 V, V_{GS} = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	I_D = 10 mA, V_{GS} = 0 V	50	—	—	V
Gate Threshold Voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	1.5	—	3.0	V
Drain-Source ON Resistance		$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 25 A	—	24	30	mΩ
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 25 A	15	27	—	S
Input Capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	1250	—	pF
Reverse Transfer Capacitance		C_{rss}		—	250	—	
Output Capacitance		C_{oss}		—	700	—	
Switching Time	Rise Time	t_r	 V_{IN} : t_r, t_f < 5 ns, Duty ≦ 1%, t_w = 10 μs	—	20	—	ns
	Turn-on Time	t_{on}		—	30	—	
	Fall Time	t_f		—	40	—	
	Turn-off Time	t_{off}		—	120	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} ≒ 40 V, V_{GS} = 10 V, I_D = 45 A	—	36	—	nC
Gate-Source Charge		Q_{gs}		—	22	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	14	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	45	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	135	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 45 A, V_{GS} = 0 V	—	—	−1.7	V
Reverse Recovery Time	t_{rr}	I_{DR} = 45 A, V_{GS} = 0 V	—	75	—	ns
Reverse Recovery Charge	Q_{rr}	dI_{DR}/dt = 50 A/μs	—	75	—	nC

MARKING



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