

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE ( $\pi$ -MOSV)

# 2SJ439

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

INDUSTRIAL APPLICATIONS  
 Unit in mm

- 2.5 V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.18 \Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 6.0 S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = -100 \mu A$  (Max.) ( $V_{DS} = -16 V$ )
- Enhancement-Mode :  $V_{th} = -0.5 \sim -1.1 V$   
 $(V_{DS} = -10 V, I_D = -1 mA)$

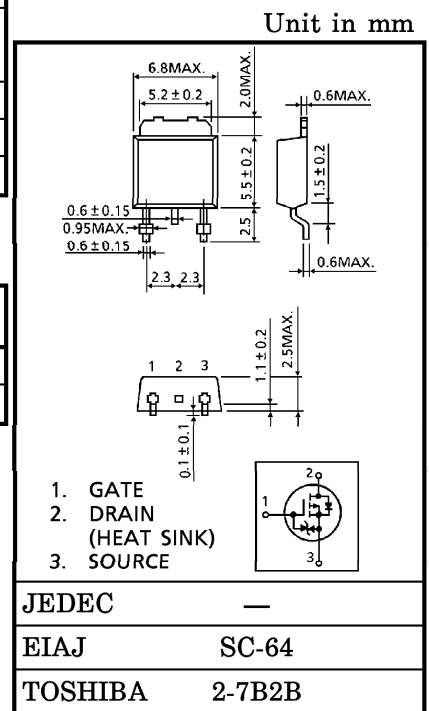
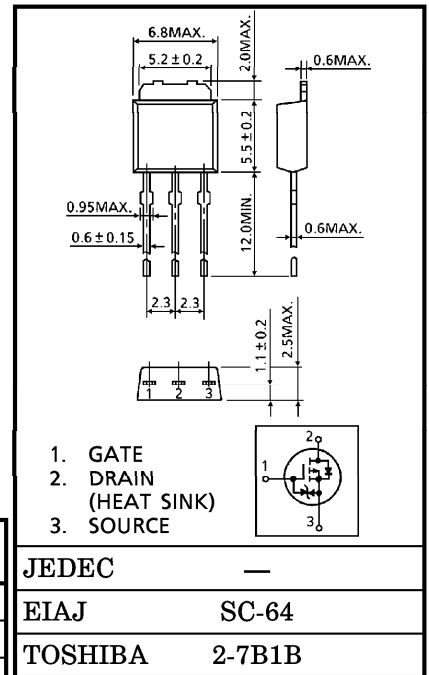
MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	-16	V
Drain-Gate Voltage ( $R_{GS} = 20 k\Omega$ )		$V_{DGR}$	-16	V
Gate-Source Voltage		$V_{GSS}$	$\pm 8$	V
Drain Current	DC	$I_D$	-5	A
	Pulse	$I_{DP}$	-20	
Drain Power Dissipation ( $T_c = 25^\circ C$ )		$P_D$	20	W
Channel Temperature		$T_{ch}$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	-55~150	$^\circ C$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	6.25	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	125	$^\circ C/W$

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



Weight : 0.36 g

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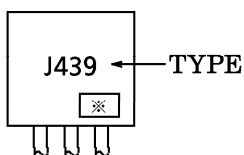
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 6.5 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	$\pm 10$	$\mu\text{A}$	
Drain Cut-off Current	$I_{DSS}$	$V_{DS} = -16 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	-100	$\mu\text{A}$	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -10 \text{ mA}, V_{GS} = 0 \text{ V}$	-16	—	—	V	
Gate Threshold Voltage	$V_{th}$	$V_{DS} = -10 \text{ V}, I_D = -1 \text{ mA}$	-0.5	—	-1.1	V	
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = -2.5 \text{ V}, I_D = -2.5 \text{ A}$	—	0.18	0.28	$\Omega$	
		$V_{GS} = -4 \text{ V}, I_D = -2.5 \text{ A}$	—	0.14	0.2		
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = -10 \text{ V}, I_D = -2.5 \text{ A}$	3.0	6.0	—	S	
Input Capacitance	$C_{iss}$	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1 \text{ MHz}$	—	1050	—	pF	
Reverse Transfer Capacitance	$C_{rss}$		—	120	—		
Output Capacitance	$C_{oss}$		—	460	—		
Switching Time	Rise Time	$t_r$		—	80	—	ns
	Turn-on Time	$t_{on}$		—	100	—	
	Fall Time	$t_f$		—	250	—	
	Turn-off Time	$t_{off}$		$V_{IN} : t_r, t_f < 5 \text{ ns},$ $\text{Duty} \leq 1\%, t_w = 10 \mu\text{s}$	—	550	
Total Gate Charge (Gate-Source Plus Gate-Drain)	$Q_g$	$V_{DD} \doteq -16 \text{ V}, V_{GS} = -5 \text{ V},$ $I_D = -5 \text{ A}$	—	24	—	nC	
Gate-Source Charge	$Q_{gs}$		—	16	—		
Gate-Drain ("Miller") Charge	$Q_{gd}$		—	8	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	-5	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	-20	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = -5 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = -5 \text{ A}, V_{GS} = 0 \text{ V}$	—	120	—	ns
Reverse Recovered Charge	$Q_{rr}$		$dI_{DR}/dt = 50 \text{ A}/\mu\text{s}$	—	0.12	—

MARKING



※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

