

### Field Effect Transistor

Silicon P Channel MOS Type (L<sup>2</sup>-π-MOS IV)

High Speed, High Current DC-DC Converter,

Relay Drive and Motor Drive Applications

#### Features

- 4-Volt Gate Drive
- Low Drain-Source ON Resistance
  - $R_{DS(ON)} = 0.04\Omega$  (Typ.)
- High Forward Transfer Admittance
  - $Y_{fs} = 20S$  (Typ.)
- Low Leakage Current
  - $I_{DSS} = -100\mu A$  (Max.) @  $V_{DS} = -60V$
- Enhancement-Mode
  - $V_{th} = -0.8 \sim -2.0V$  @  $V_{DS} = -10V, I_D = -1mA$

#### Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	-60	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	-60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	-20	A
	Pulse	$I_{DP}$	-80	
Drain Power Dissipation (Tc = 25°C)		$P_D$	100	W
Channel Temperature		$T_{ch}$	150	°C
Storage Temperature Range		$T_{sig}$	-55 ~ 150	°C

#### Thermal Characteristics

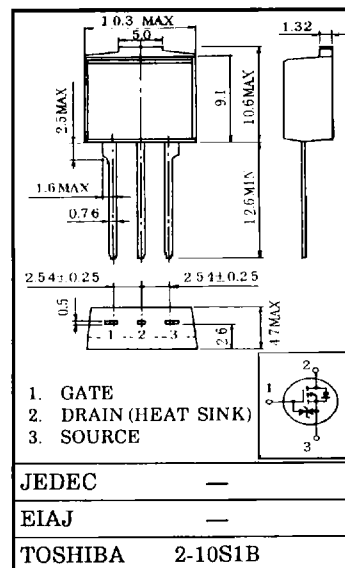
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.25	°C/W
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	°C/W

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

#### Industrial Applications

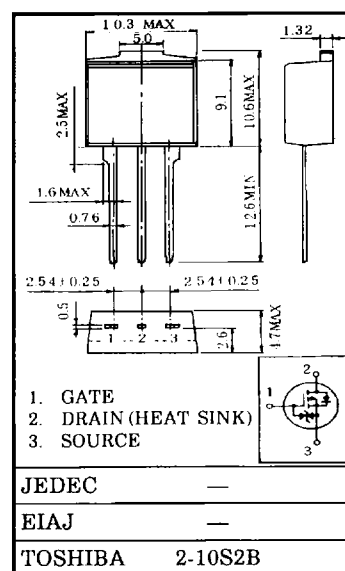
TO-220FL

Unit in mm



TO-220SM

Unit in mm



Weight : 1.5g

## Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		$I_{GSS}$	$V_{GS} = \pm 16V, V_{DS} = 0V$	-	-	$\pm 10$	$\mu A$
Drain Cut-off Current		$I_{DSS}$	$V_{DS} = -60V, V_{GS} = 0V$	-	-	-100	$\mu A$
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D = -10mA, V_{GS} = 0V$	-60	-	-	V
Gate Threshold Voltage		$V_{T1}$	$V_{DS} = -10V, I_D = -1mA$	-0.8	-	-2.0	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = -4V, I_{DS} = -10A$	-	58	90	$\Omega$
			$V_{GS} = -10V, I_{DS} = -10A$	-	35	45	
Forward Transfer Admittance		$Y_{fs}$	$V_{DS} = -10V, I_{DS} = -10A$	12	20	-	S
Input Capacitance		$C_{iss}$	$V_{DS} = -10V, V_{GS} = 0V,$ $f = 1MHz$	-	3000	3800	$\mu F$
Reverse Transfer Capacitance		$C_{rss}$		-	500	900	
Output Capacitance		$C_{oss}$		-	1500	2200	
Switching Time	Rise Time	$t_r$	<p><math>V_{IN} : t_r, t_r &lt; 5ns, V_{DD} = -30V</math> Duty <math>\leq 1\%, t_w = 10\mu s</math></p>	-	20	40	ns
	Turn-on Time	$t_{on}$		-	50	100	
	Fall Time	$t_f$		-	70	140	
	Turn-off Time	$t_{off}$		-	180	360	
Total Gate Charge (Gate-Source Plus Gate-Drain)		$Q_g$	$V_{DD} = -48V, V_{GS} = -10V,$ $I_D = -20A$	-	120	240	nC
Gate-Source Charge		$Q_{gs}$		-	80	-	
Gate-Drain ("Miller") Charge		$Q_{gd}$		-	40	-	

## Source-Drain Diode Ratings and Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	-	-	-	-20	A
Pulse Drain Reverse Current	$I_{DRP}$	-	-	-	-80	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = -20A, V_{GS} = 0V$	-	-	1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = -20A, V_{GS} = 0V$	-	120	-	ns
Reverse Recovered Charge	$Q_{rr}$	$dI_{DR}/dt = 100A/\mu s$	-	0.36	-	$\mu C$

