

9097250 TOSHIBA (DISCRETE/OPTO)

99D 16786 DT-39-11



SEMICONDUCTOR

## TECHNICAL DATA

TOSHIBA FIELD EFFECT TRANSISTOR

YTF223

SILICON N CHANNEL MOS TYPE

(π-MOS II)

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

## FEATURES:

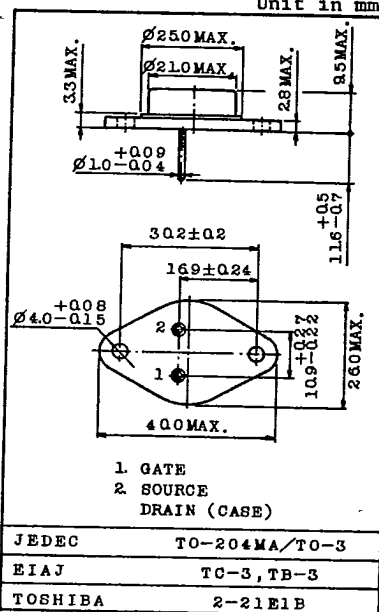
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.8\Omega$  (typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 2.5S$  (typ.)
- Low Leakage Current :  $I_{GSS} = \pm 100nA$  (Max.) @  $V_{GS} = \pm 20V$   
 $I_{DSS} = 250\mu A$  (Max.) @  $V_{DS} = 150V$
- Enhancement-Mode :  $V_{th} = 2.0 \sim 4.0V$  @  $V_{DS} = V_{GS}$ ,  $I_D = 250\mu A$

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

| CHARACTERISTIC                                 |                            | SYMBOL    | RATING         | UNIT       |
|------------------------------------------------|----------------------------|-----------|----------------|------------|
| Drain-Source Voltage                           |                            | $V_{DSX}$ | 150            | V          |
| Drain-Gate Voltage ( $R_{GS} = 1M\Omega$ )     |                            | $V_{DGR}$ | 150            | V          |
| Gate-Source Voltage                            |                            | $V_{GSS}$ | $\pm 20$       | V          |
| Drain Current                                  | DC ( $T_c = 25^\circ C$ )  | $I_D$     | 4              | A          |
|                                                | DC ( $T_c = 100^\circ C$ ) | $I_D$     | 2.5            |            |
|                                                | Pulse                      | $I_{DP}$  | 16             |            |
| Inductive Current (Clamped)                    |                            | $I_{LP}$  | 16             | A          |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) |                            | $P_D$     | 40             | W          |
| Channel Temperature                            |                            | $T_{ch}$  | 150            | $^\circ C$ |
| Storage Temperature Range                      |                            | $T_{stg}$ | $-55 \sim 150$ | $^\circ C$ |

## INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 15.8g

## THERMAL CHARACTERISTICS

| CHARACTERISTIC                                                                   | SYMBOL        | MAX. | UNIT         |
|----------------------------------------------------------------------------------|---------------|------|--------------|
| Thermal Resistance, Junction to Case                                             | $R_{th(j-c)}$ | 3.12 | $^\circ C/W$ |
| Thermal Resistance, Junction to Ambient                                          | $R_{th(j-a)}$ | 30   | $^\circ C/W$ |
| Maximum Lead Temperature for Soldering Purposes (1.6mm from case for 10 seconds) | $T_L$         | 300  | $^\circ C$   |

TOSHIBA CORPORATION

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## ELECTRICAL CHARACTERISTICS (Ta=25°C)

| CHARACTERISTIC                                  | SYMBOL        | TEST CONDITION                           | MIN. | TYP. | MAX.      | UNIT     |
|-------------------------------------------------|---------------|------------------------------------------|------|------|-----------|----------|
| Gate Leakage Current                            | $I_{GSS}$     | $V_{GS}=\pm 20V, V_{DS}=0V$              | -    | -    | $\pm 100$ | nA       |
| Drain Cut-off Current                           | $I_{DSS}$     | $V_{DS}=150V, V_{GS}=0V, T_c=25^\circ C$ | -    | -    | 250       | $\mu A$  |
| Drain-Source Breakdown Voltage                  | $V_{(BR)DSS}$ | $I_D=250\mu A, V_{GS}=0V$                | 150  | -    | -         | V        |
| Gate Threshold Voltage                          | $V_{th}$      | $V_{DS}=V_{GS}, I_D=250\mu A$            | 2.0  | -    | 4.0       | V        |
| Forward Transfer Admittance                     | $ Y_{fs} $    | $V_{DS}=10V, I_D=2.5A$                   | 1.3  | 2.5  | -         | S        |
| On-State Drain Current                          | $I_{D(ON)}$   | $V_{DS}=10V, V_{GS}=10V$                 | 4    | -    | -         | A        |
| Drain-Source ON Resistance                      | $R_{DS(ON)}$  | $I_D=2.5A, V_{GS}=10V$                   | -    | 0.8  | 1.2       | $\Omega$ |
| Drain-Source ON Voltage                         | $V_{DS(ON)}$  | $I_D=4A, V_{GS}=10V$                     | -    | 3.5  | 5.3       | V        |
| Input Capacitance                               | $C_{iss}$     | $V_{DS}=25V, V_{GS}=0V, f=1MHz$          | -    | 460  | 600       | pF       |
| Reverse Transfer Capacitance                    | $C_{rss}$     |                                          | -    | 50   | 80        | pF       |
| Output Capacitance                              | $C_{oss}$     |                                          | -    | 230  | 300       | pF       |
| Switching Time                                  | Rise Time     |                                          | -    | 30   | 60        | ns       |
|                                                 | Turn-on Time  |                                          | -    | 50   | 100       | ns       |
|                                                 | Fall Time     |                                          | -    | 30   | 60        | ns       |
|                                                 | Turn-off Time |                                          | -    | 80   | 160       | ns       |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | $Q_g$         | $V_{GS}=10V, I_D=6A,$                    | -    | 11   | 15        | nC       |
| Gate Source Charge                              | $Q_{gs}$      | $V_{DS}=120V$                            | -    | 5    | -         | nC       |
| Gate-Drain ("Miller") Charge                    | $Q_{gd}$      |                                          | -    | 6    | -         | nC       |

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

| CHARACTERISTIC            | SYMBOL   | TEST CONDITION                      | MIN. | TYP. | MAX. | UNIT    |
|---------------------------|----------|-------------------------------------|------|------|------|---------|
| Continuous Source Current | $I_S$    | —                                   | -    | -    | 4    | A       |
| Pulse Source Current      | $I_{SP}$ | —                                   | -    | -    | 16   | A       |
| Diode Forward Voltage     | $V_{SD}$ | $I_S=4A, V_{GS}=0V, T_c=25^\circ C$ | -    | -    | 1.8  | V       |
| Reverse Recovery Time     | $t_{rr}$ | $T_j=150^\circ C, I_F=5A,$          | -    | 350  | -    | ns      |
| Reverse Recovered Charge  | $Q_{rr}$ | $dI_F/dt=100A/\mu s$                | -    | 2.3  | -    | $\mu C$ |

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