

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSIII.5)

2SK1486

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

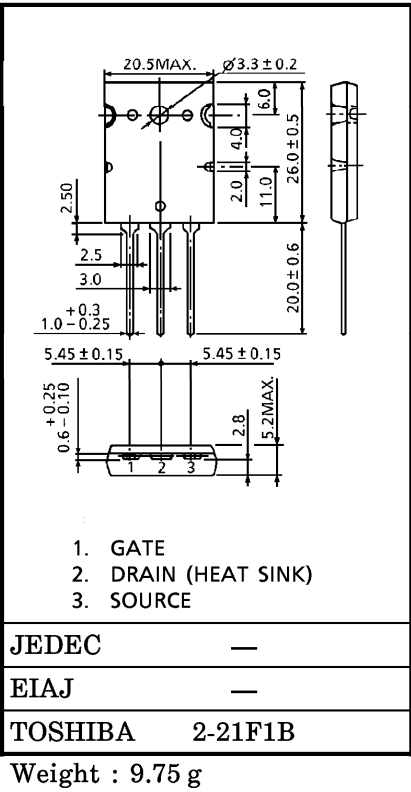
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.08 \Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 14 S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 300 \mu A$  (Max.) ( $V_{DS} = 300 V$ )
- Enhancement-Mode :  $V_{th} = 2.0 \sim 4.0 V$   
( $V_{DS} = 10 V, I_D = 1 mA$ )

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

| CHARACTERISTIC                                 |       | SYMBOL    | RATING         | UNIT       |
|------------------------------------------------|-------|-----------|----------------|------------|
| Drain-Source Voltage                           |       | $V_{DSS}$ | 300            | V          |
| Drain-Gate Voltage ( $R_{GS} = 20 k\Omega$ )   |       | $V_{DGR}$ | 300            | V          |
| Gate-Source Voltage                            |       | $V_{GSS}$ | $\pm 30$       | V          |
| Drain Current                                  | DC    | $I_D$     | 32             | A          |
|                                                | Pulse | $I_{DP}$  | 128            |            |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) |       | $P_D$     | 200            | W          |
| Channel Temperature                            |       | $T_{ch}$  | 150            | $^\circ C$ |
| Storage Temperature Range                      |       | $T_{stg}$ | $-55 \sim 150$ | $^\circ C$ |



THERMAL CHARACTERISTICS

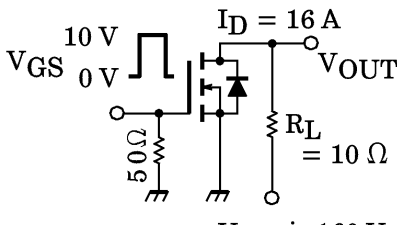
| CHARACTERISTIC                         | SYMBOL         | MAX.  | UNIT           |
|----------------------------------------|----------------|-------|----------------|
| Thermal Resistance, Channel to Case    | $R_{th(ch-c)}$ | 0.625 | $^\circ C / W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 35.7  | $^\circ C / W$ |

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

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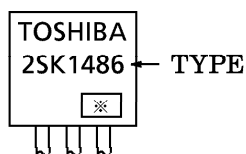
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  |               | SYMBOL        | TEST CONDITION                                                                                                                                                                                                                                          | MIN. | TYP. | MAX.      | UNIT          |
|-------------------------------------------------|---------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-----------|---------------|
| Gate Leakage Current                            |               | $I_{GSS}$     | $V_{GS} = \pm 30 \text{ V}, V_{DS} = 0 \text{ V}$                                                                                                                                                                                                       | —    | —    | $\pm 100$ | nA            |
| Drain Cut-off Current                           |               | $I_{DSS}$     | $V_{DS} = 300 \text{ V}, V_{GS} = 0 \text{ V}$                                                                                                                                                                                                          | —    | —    | 300       | $\mu\text{A}$ |
| Drain-Source Breakdown Voltage                  |               | $V_{(BR)DSS}$ | $I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$                                                                                                                                                                                                             | 300  | —    | —         | V             |
| Gate Threshold Voltage                          |               | $V_{th}$      | $V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$                                                                                                                                                                                                             | 2.0  | —    | 4.0       | V             |
| Drain-Source ON Resistance                      |               | $R_{DS(ON)}$  | $I_D = 16 \text{ A}, V_{GS} = 10 \text{ V}$                                                                                                                                                                                                             | —    | 0.08 | 0.095     | $\Omega$      |
| Forward Transfer Admittance                     |               | $ Y_{fs} $    | $V_{DS} = 10 \text{ V}, I_D = 16 \text{ A}$                                                                                                                                                                                                             | 10   | 14   | —         | S             |
| Input Capacitance                               |               | $C_{iss}$     | $V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$                                                                                                                                                                                        | —    | 3500 | —         | pF            |
| Reverse Transfer Capacitance                    |               | $C_{rss}$     |                                                                                                                                                                                                                                                         | —    | 800  | —         |               |
| Output Capacitance                              |               | $C_{oss}$     |                                                                                                                                                                                                                                                         | —    | 1250 | —         |               |
| Switching Time                                  | Rise Time     | $t_r$         |  <p><math>V_{DD} \doteq 160 \text{ V}</math><br/> <math>V_{IN} : t_r, t_f &lt; 5 \text{ ns},</math><br/> <math>\text{Duty} \leq 1\%, t_w = 10 \mu\text{s}</math></p> | —    | 255  | —         | ns            |
|                                                 | Turn-on Time  | $t_{on}$      |                                                                                                                                                                                                                                                         | —    | 325  | —         |               |
|                                                 | Fall Time     | $t_f$         |                                                                                                                                                                                                                                                         | —    | 280  | —         |               |
|                                                 | Turn-off Time | $t_{off}$     |                                                                                                                                                                                                                                                         | —    | 540  | —         |               |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | $Q_g$         | $V_{DD} \doteq 240 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 32 \text{ A}$                                                                                                                                                                                | —    | 140  | —         | nC            |
| Gate-Source Charge                              |               | $Q_{gs}$      |                                                                                                                                                                                                                                                         | —    | 60   | —         |               |
| Gate-Drain ("Miller") Charge                    |               | $Q_{gd}$      |                                                                                                                                                                                                                                                         | —    | 80   | —         |               |

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

| CHARACTERISTIC                   | SYMBOL    | TEST CONDITION                                | MIN. | TYP. | MAX. | UNIT          |
|----------------------------------|-----------|-----------------------------------------------|------|------|------|---------------|
| Continuous Drain Reverse Current | $I_{DR}$  | —                                             | —    | —    | 32   | A             |
| Pulse Drain Reverse Current      | $I_{DRP}$ | —                                             | —    | —    | 128  | A             |
| Diode Forward Voltage            | $V_{DSF}$ | $I_{DR} = 32 \text{ A}, V_{GS} = 0 \text{ V}$ | —    | —    | —1.8 | V             |
| Reverse Recovery Time            | $t_{rr}$  | $I_{DR} = 32 \text{ A}, V_{GS} = 0 \text{ V}$ | —    | 615  | —    | ns            |
| Reverse Recovered Charge         | $Q_{rr}$  | $dI_{DR}/dt = 100 \text{ A}/\mu\text{s}$      | —    | 6.8  | —    | $\mu\text{C}$ |

## MARKING



※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

