

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSII-5)**2SK1643**

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

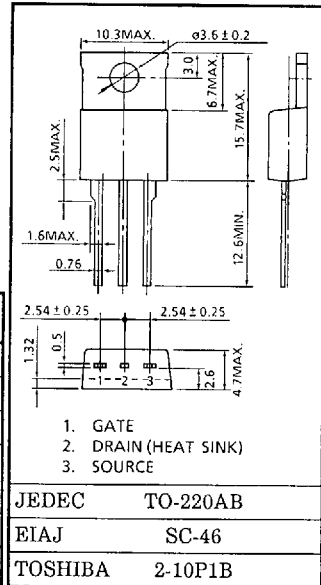
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 2.5\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 2.0S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 300\mu A$  (Max.) @  $V_{DS} = 720V$
- Enhancement-Mode :  $V_{th} = 1.5 \sim 3.5V$  @  $V_{DS} = 10V, I_D = 1mA$

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

| CHARACTERISTIC                                 |       | SYMBOL    | RATING         | UNIT       |
|--|-------|-----------|----------------|------------|
| Drain-Source Voltage                           |       | $V_{DSS}$ | 900            | V          |
| Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )    |       | $V_{DGR}$ | 900            | V          |
| Gate-Source Voltage                            |       | $V_{GSS}$ | $\pm 30$       | V          |
| Drain Current                                  | DC    | $I_D$     | 5              | A          |
|  | Pulse | $I_{DP}$  | 15             |            |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) |       | $P_D$     | 125            | W          |
| Channel Temperature                            |       | $T_{ch}$  | 150            | $^\circ C$ |
| Storage Temperature Range                      |       | $T_{stg}$ | $-55 \sim 150$ | $^\circ C$ |



JEDEC TO-220AB

EIAJ SC-46

TOSHIBA 2-10P1B

Weight : 2.0g

## THERMAL CHARACTERISTICS

| CHARACTERISTIC                         | SYMBOL         | MAX. | UNIT         |
|--|----------------|------|--------------|
| Thermal Resistance, Channel to Case    | $R_{th(ch-c)}$ | 1.0  | $^\circ C/W$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 83.3 | $^\circ C/W$ |

THIS TRANSISTOR IS AN ELECTROSTATIC SENSITIVE DEVICE. PLEASE HANDLE WITH CAUTION.

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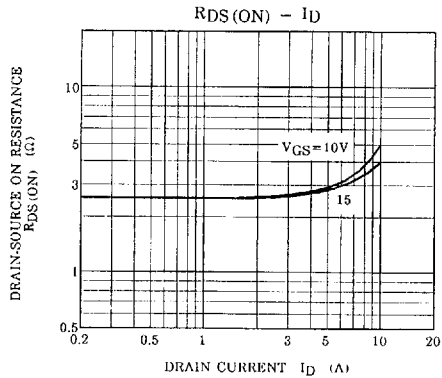
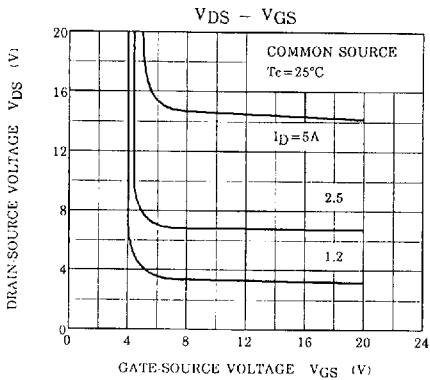
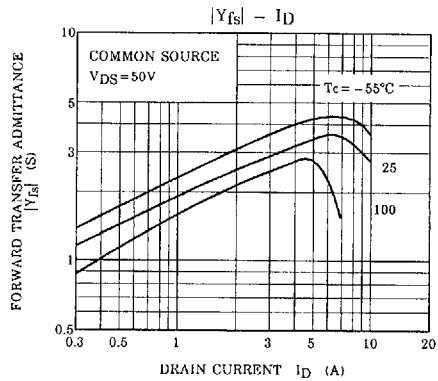
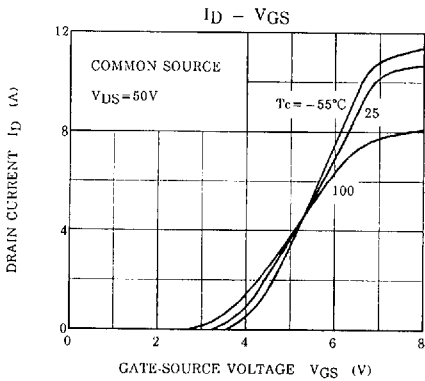
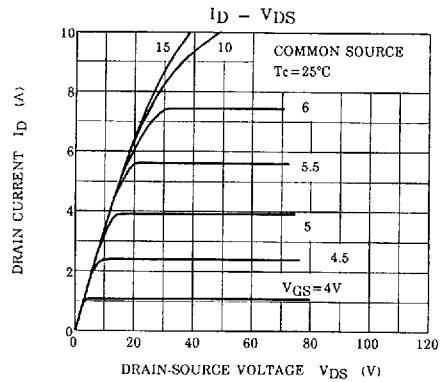
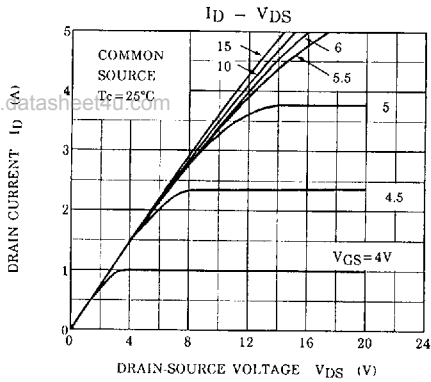
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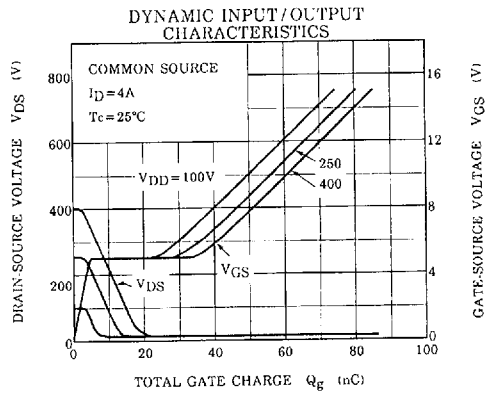
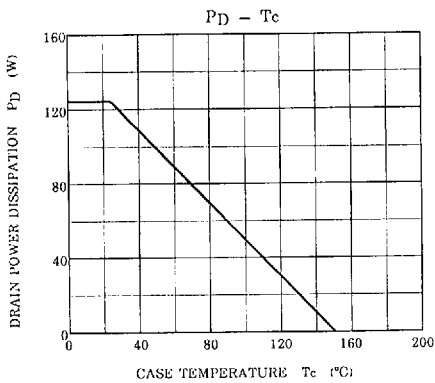
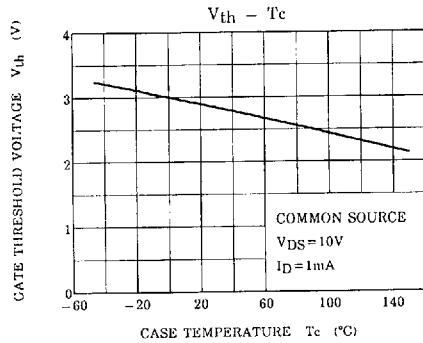
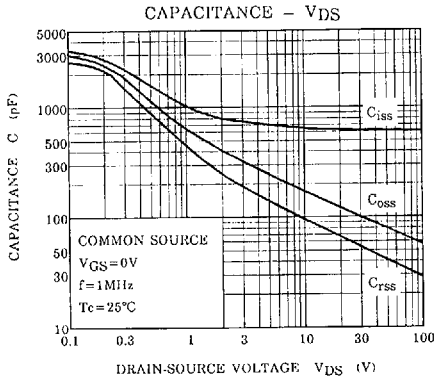
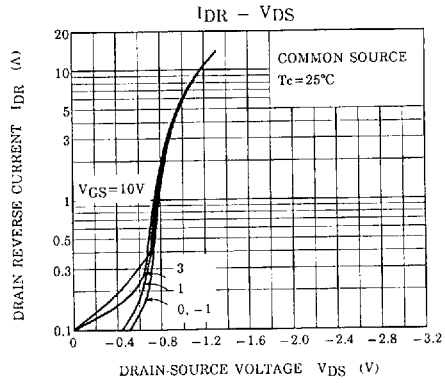
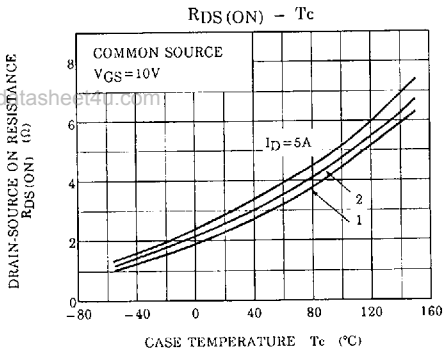
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

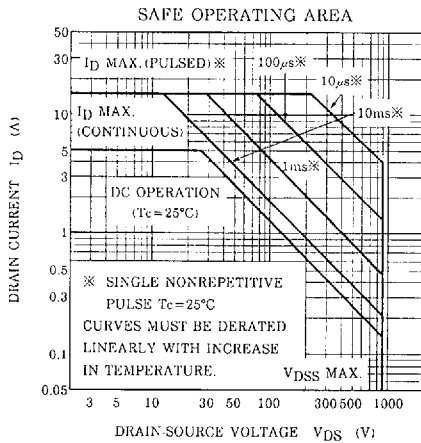
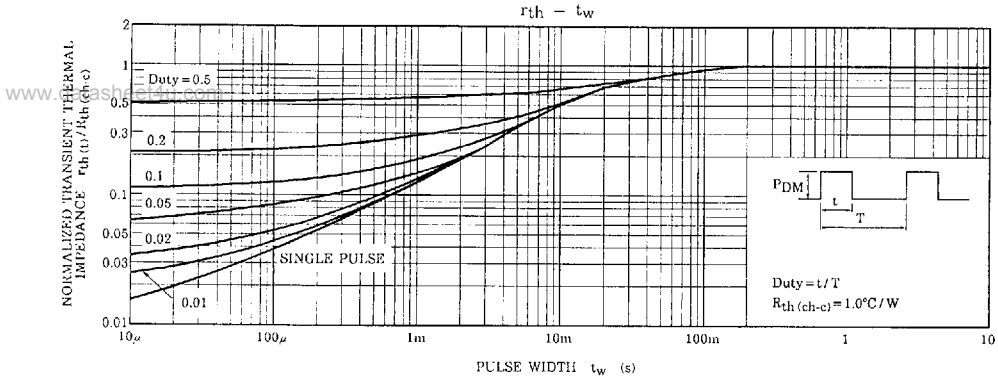
| CHARACTERISTIC                                  |               | SYMBOL   | TEST CONDITION  | MIN. | TYP. | MAX. | UNIT |
|---|---------------|----------|---|------|------|------|------|
| Gate Leakage Current                            |               | IGSS     | VGS = ±25V, VDS = 0V  | —    | —    | ±100 | nA   |
| Drain Cut-off Current                           |               | IDSS     | VDS = 720V, VGS = 0V  | —    | —    | 300  | μA   |
| Drain-Source Breakdown Voltage                  |               | V(BR)DSS | ID = 10mA, VGS = 0V   | 900  | —    | —    | V    |
| Gate Threshold Voltage                          |               | Vth      | VDS = 10V, ID = 1mA   | 1.5  | —    | 3.5  | V    |
| Drain-Source ON Resistance                      |               | RDS(ON)  | VGS = 10V, ID = 2A  | —    | 2.5  | 2.8  | Ω    |
| Forward Transfer Admittance                     |               | Yfs      | VDS = 20V, ID = 2A  | 1.0  | 2.0  | —    | S    |
| Input Capacitance                               |               | Ciss     | VDS = 25V, VGS = 0V, f = 1MHz   | —    | 700  | 1000 | pF   |
| Reverse Transfer Capacitance                    |               | Crss     |   | —    | 55   | 90   |      |
| Output Capacitance                              |               | Coss     |   | —    | 100  | 150  |      |
| Switching Time                                  | Rise Time     | tr       | <p>                     ID = 2A, VOUT<br/>                     VGS 10V, 7Ω, RL = 200Ω<br/>                     VIN : tr, tf &lt; 5ns, VDD ≐ 400V<br/>                     Duty ≦ 1%, tw = 10μs                 </p> | —    | 18   | 35   | ns   |
|   | Turn-on Time  | ton      |   | —    | 30   | 60   |      |
|   | Fall Time     | tf       |   | —    | 12   | 25   |      |
|   | Turn-off Time | toff     |   | —    | 70   | 140  |      |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | Qg       | VDD ≐ 400V, VGS = 10V, ID = 4A  | —    | 60   | 120  | nC   |
| Gate-Source Charge                              |               | Qgs      |   | —    | 35   | —    |      |
| Gate-Drain ("Miller") Charge                    |               | Qgd      |   | —    | 25   | —    |      |

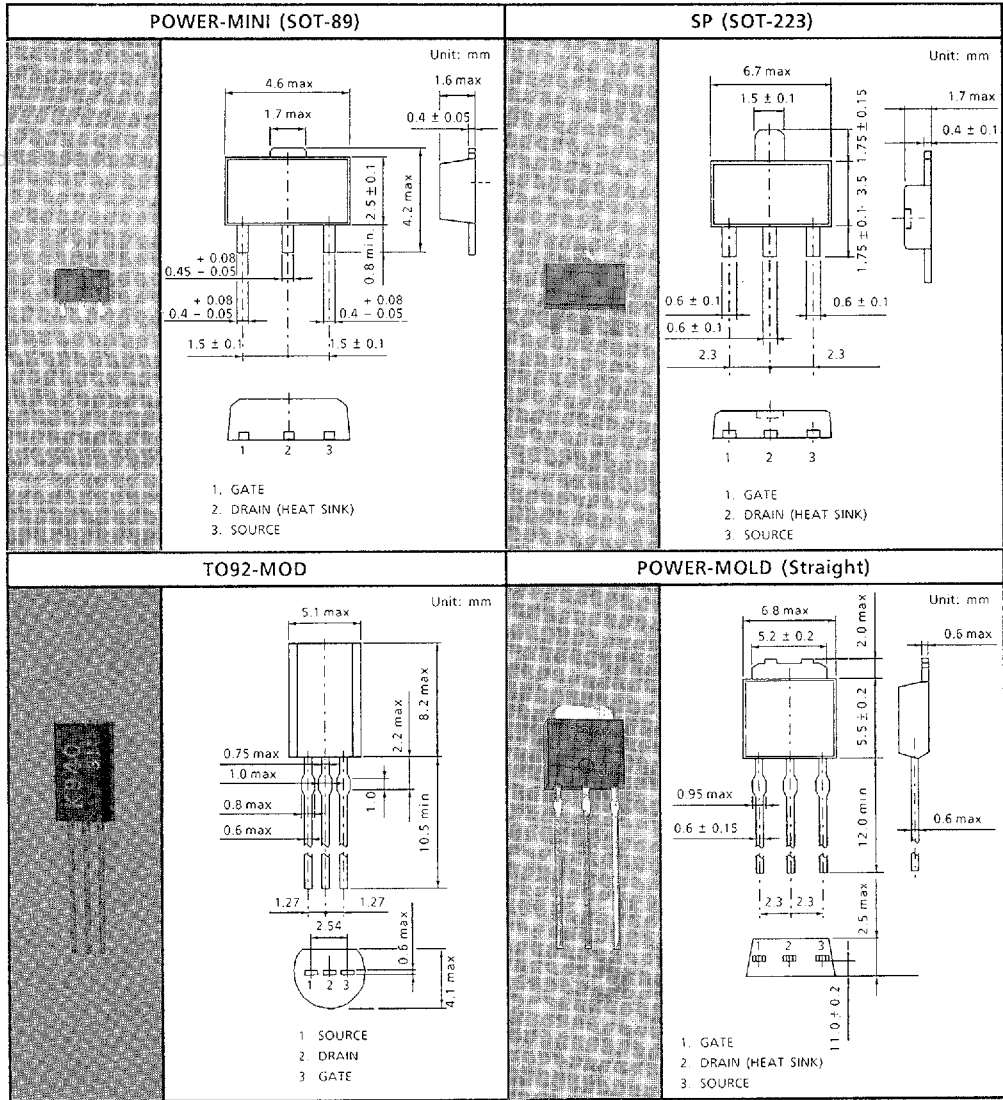
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                   | SYMBOL | TEST CONDITION        | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|--------|-----------------------|------|------|------|------|
| Continuous Drain Reverse Current | IDR    | —                     | —    | —    | 5    | A    |
| Pulse Drain Reverse Current      | IDRP   | —                     | —    | —    | 15   | A    |
| Diode Forward Voltage            | VDSF   | IDR = 4A, VGS = 0V    | —    | —    | -1.9 | V    |
| Reverse Recovery Time            | trr    | IDR = 4A, VGS = 0V    | —    | 1000 | —    | ns   |
| Reverse Recovered Charge         | Qrr    | dIDR / dt = 100A / μs | —    | 0.13 | —    | μC   |









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