

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $L^2$ - $\pi$ -MOSV)

## 2SK2266

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- 4 V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 22 \text{ m}\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 27 \text{ S}$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 100 \mu\text{A}$  (Max.) ( $V_{DS} = 60 \text{ V}$ )
- Enhancement-Mode :  $V_{th} = 0.8 \sim 2.0 \text{ V}$   
( $V_{DS} = 10 \text{ V}$ ,  $I_D = 1 \text{ mA}$ )

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

| CHARACTERISTIC                                       |       | SYMBOL    | RATING         | UNIT             |
|------------------------------------------------------|-------|-----------|----------------|------------------|
| Drain-Source Voltage                                 |       | $V_{DSS}$ | 60             | V                |
| Drain-Gate Voltage ( $R_{GS} = 20 \text{ k}\Omega$ ) |       | $V_{DGR}$ | 60             | V                |
| Gate-Source Voltage                                  |       | $V_{GSS}$ | $\pm 20$       | V                |
| Drain Current                                        | DC    | $I_D$     | 45             | A                |
|                                                      | Pulse | $I_{DP}$  | 180            |                  |
| Drain Power Dissipation ( $T_c = 25^\circ\text{C}$ ) |       | $P_D$     | 65             | W                |
| Single Pulse Avalanche Energy**                      |       | $E_{AS}$  | 246            | mJ               |
| Avalanche Current                                    |       | $I_{AR}$  | 45             | A                |
| Repetitive Avalanche Energy*                         |       | $E_{AR}$  | 6.5            | mJ               |
| Channel Temperature                                  |       | $T_{ch}$  | 150            | $^\circ\text{C}$ |
| Storage Temperature Range                            |       | $T_{stg}$ | $-55 \sim 150$ | $^\circ\text{C}$ |

## THERMAL CHARACTERISTICS

| CHARACTERISTIC                         | SYMBOL         | MAX. | UNIT               |
|----------------------------------------|----------------|------|--------------------|
| Thermal Resistance, Channel to Case    | $R_{th(ch-c)}$ | 1.92 | $^\circ\text{C/W}$ |
| Thermal Resistance, Channel to Ambient | $R_{th(ch-a)}$ | 83.3 | $^\circ\text{C/W}$ |

Note ;

\* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

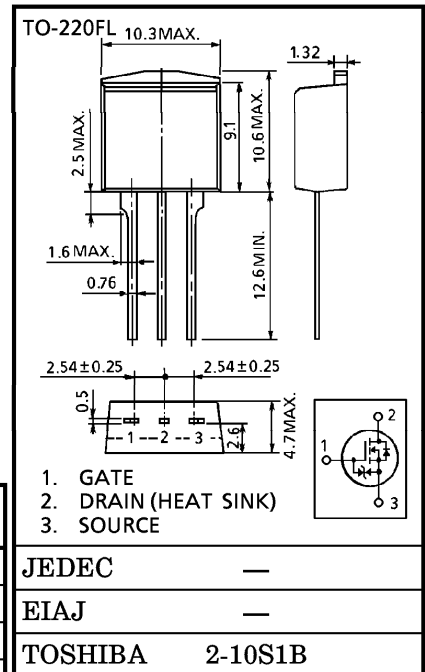
\*\*  $V_{DD} = 90 \text{ V}$ ,  $T_{ch} = 25^\circ\text{C}$  (initial),  $L = 165 \mu\text{H}$ ,  
 $R_G = 25 \Omega$ ,  $I_{AR} = 45 \text{ A}$ 

This transistor is an electrostatic sensitive device.

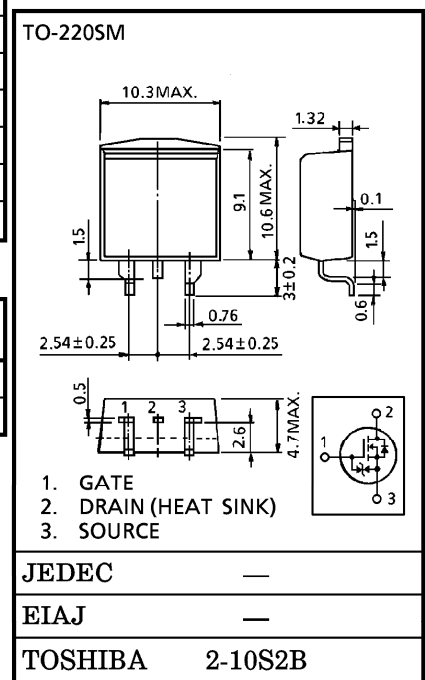
Please handle with caution.

INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 1.5g (Typ.)

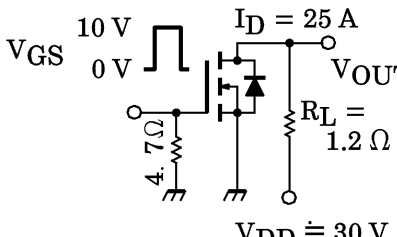


Weight : 1.5 g (Typ.)

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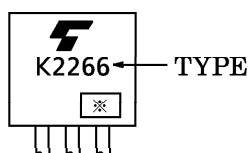
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  |               | SYMBOL                | TEST CONDITION                                                                      | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------------------|---------------|-----------------------|-------------------------------------------------------------------------------------|------|------|------|------|
| Gate Leakage Current                            |               | I <sub>GSS</sub>      | V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0 V                                      | —    | —    | ±10  | μA   |
| Drain Cut-off Current                           |               | I <sub>DSS</sub>      | V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V                                       | —    | —    | 100  | μA   |
| Drain-Source Breakdown Voltage                  |               | V <sub>(BR)</sub> DSS | I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0 V                                       | 60   | —    | —    | V    |
| Gate Threshold Voltage                          |               | V <sub>th</sub>       | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA                                       | 0.8  | —    | 2.0  | V    |
| Drain-Source ON Resistance                      |               | R <sub>DS</sub> (ON)  | V <sub>GS</sub> = 4 V, I <sub>D</sub> = 15 A                                        | —    | 40   | 55   | mΩ   |
|                                                 |               |                       | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A                                       | —    | 22   | 30   |      |
| Forward Transfer Admittance                     |               | Y <sub>fs</sub>       | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 25 A                                       | 15   | 27   | —    | S    |
| Input Capacitance                               |               | C <sub>iss</sub>      | V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V,<br>f = 1 MHz                         | —    | 1800 | —    | pF   |
| Reverse Transfer Capacitance                    |               | C <sub>rss</sub>      |                                                                                     | —    | 350  | —    |      |
| Output Capacitance                              |               | C <sub>oss</sub>      |                                                                                     | —    | 900  | —    |      |
| Switching Time                                  | Rise Time     | t <sub>r</sub>        |  | —    | 20   | —    | ns   |
|                                                 | Turn-on Time  | t <sub>on</sub>       |                                                                                     | —    | 30   | —    |      |
|                                                 | Fall Time     | t <sub>f</sub>        |                                                                                     | —    | 40   | —    |      |
|                                                 | Turn-off Time | t <sub>off</sub>      |                                                                                     | —    | 130  | —    |      |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | Q <sub>g</sub>        | V <sub>DD</sub> ≐ 48 V, V <sub>GS</sub> = 10 V<br>I <sub>D</sub> = 45 A             | —    | 60   | —    | nC   |
| Gate-Source Charge                              |               | Q <sub>gs</sub>       |                                                                                     | —    | 40   | —    |      |
| Gate-Drain ("Miller") Charge                    |               | Q <sub>gd</sub>       |                                                                                     | —    | 20   | —    |      |

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

| CHARACTERISTIC                   | SYMBOL           | TEST CONDITION                                | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|------------------|-----------------------------------------------|------|------|------|------|
| Continuous Drain Reverse Current | I <sub>DR</sub>  | —                                             | —    | —    | 45   | A    |
| Pulse Drain Reverse Current      | I <sub>DRP</sub> | —                                             | —    | —    | 180  | A    |
| Diode Forward Voltage            | V <sub>DSF</sub> | I <sub>DR</sub> = 45 A, V <sub>GS</sub> = 0 V | —    | —    | −1.8 | V    |
| Reverse Recovery Time            | t <sub>rr</sub>  | I <sub>DR</sub> = 45 A, V <sub>GS</sub> = 0 V | —    | 90   | —    | ns   |
| Reverse Recovery Charge          | Q <sub>rr</sub>  | dI <sub>DR</sub> / dt = 50 A / μs             | —    | 0.1  | —    | μC   |

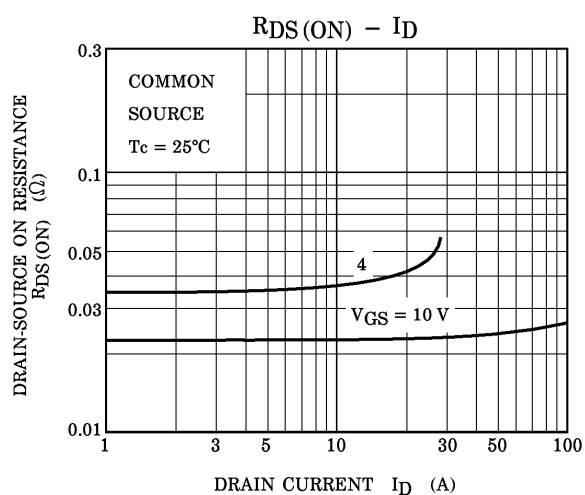
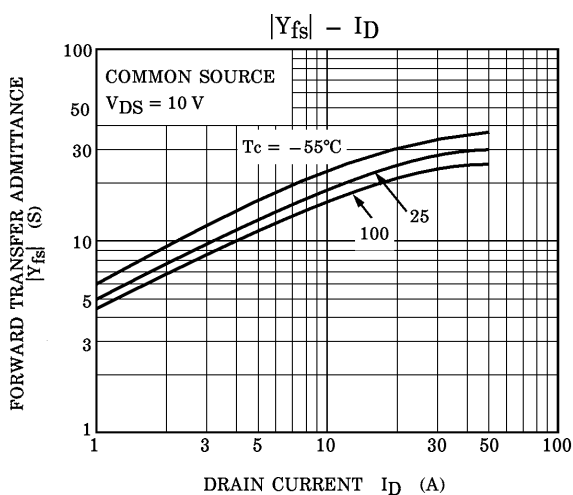
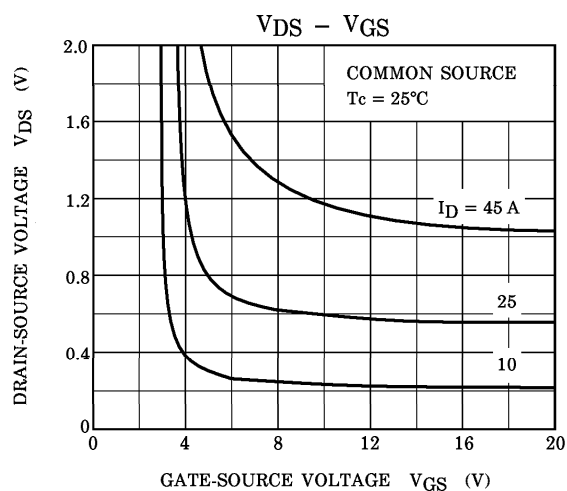
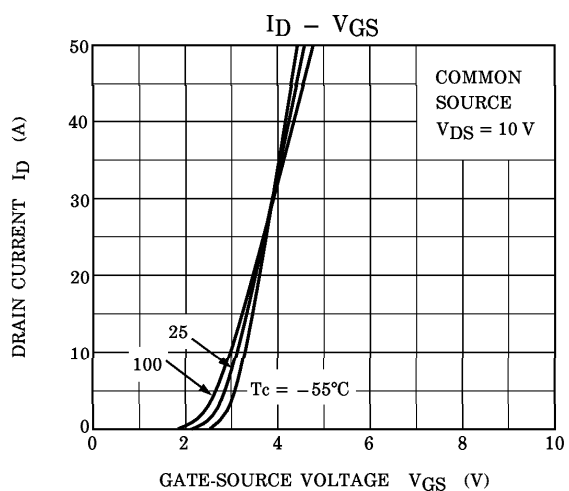
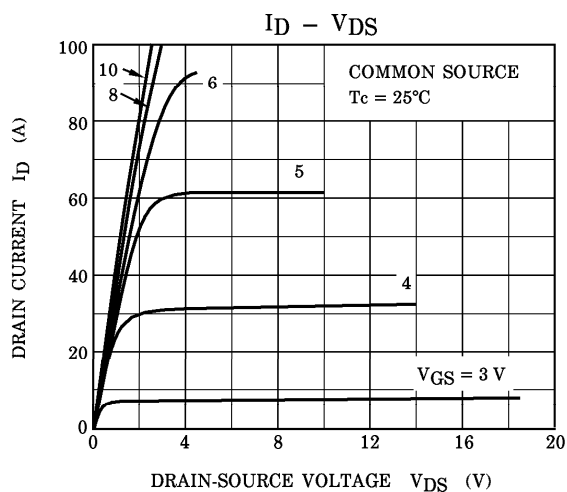
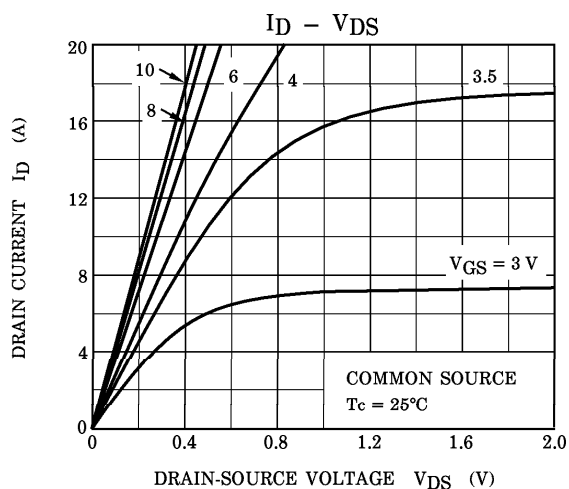
## MARKING

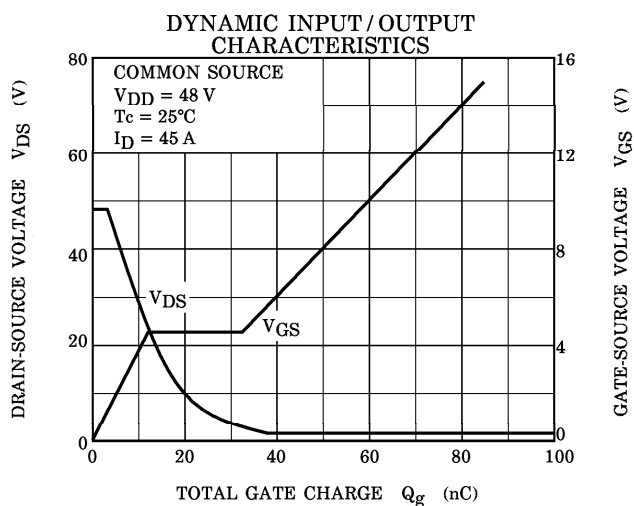
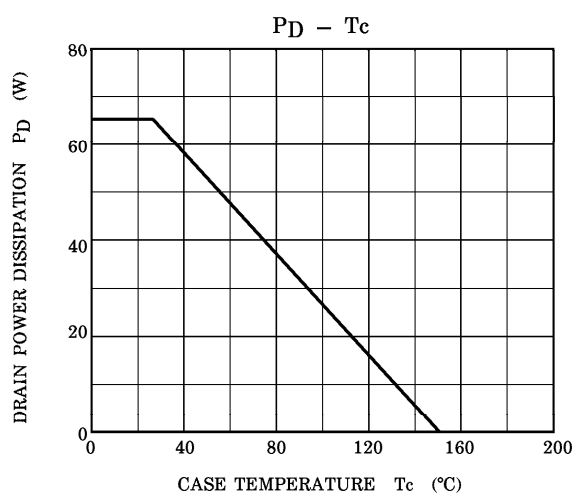
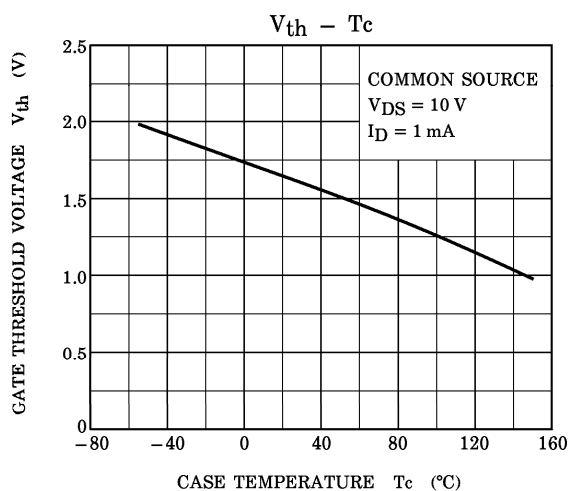
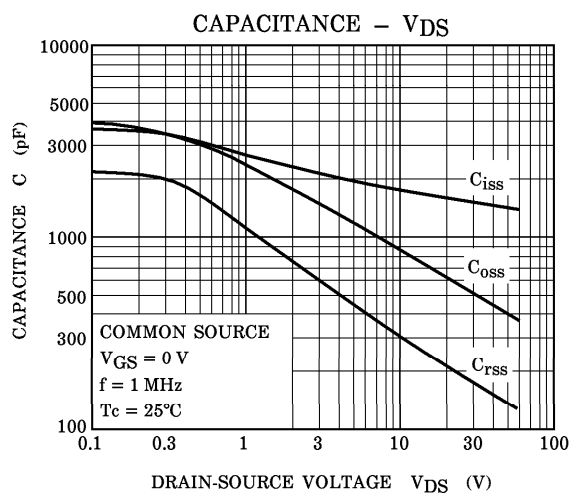
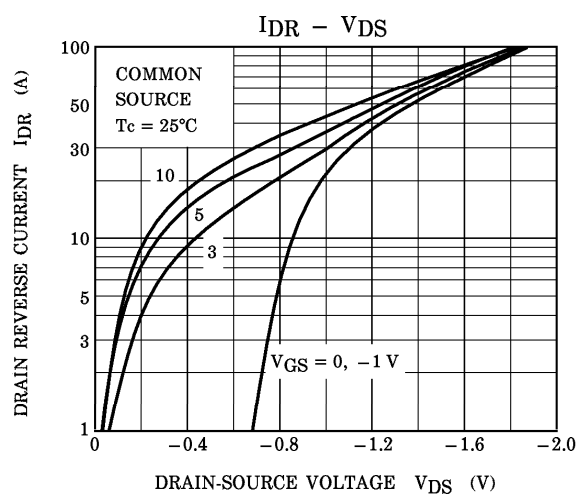
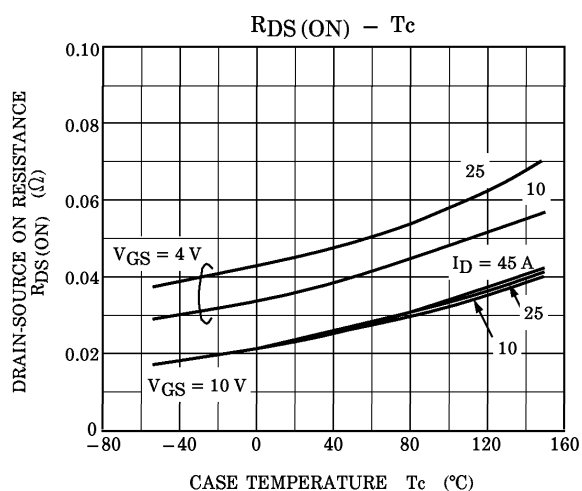


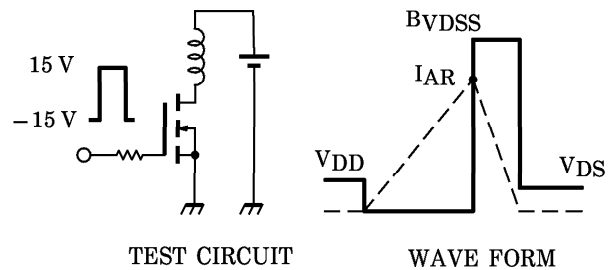
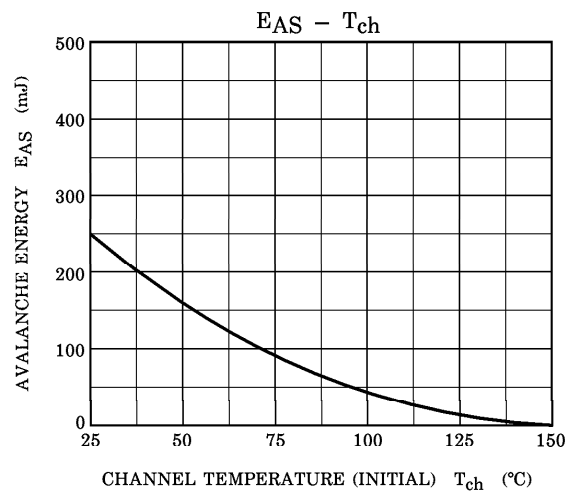
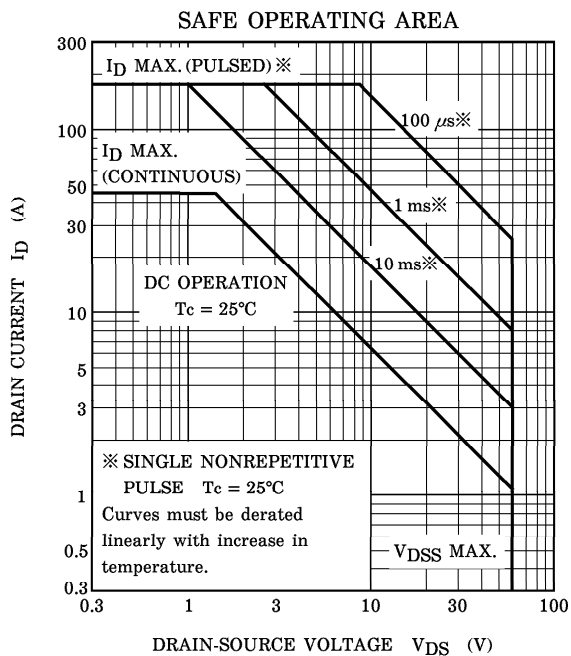
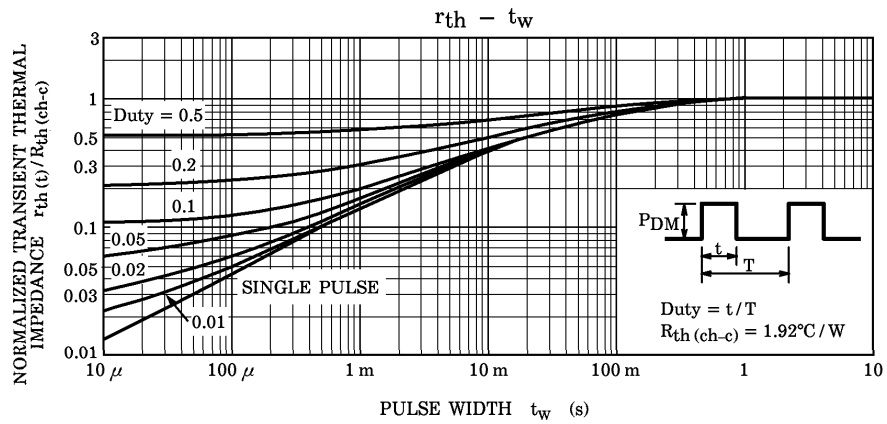
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$$\begin{aligned} \text{Peak } I_{AR} &= 45 \text{ A, } R_G = 25 \, \Omega \\ V_{DD} &= 25 \text{ V, } L = 165 \, \mu\text{H} \end{aligned} \quad E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left( \frac{BVDSS}{BVDSS - V_{DD}} \right)$$