

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE ( $\pi$ -MOSV)

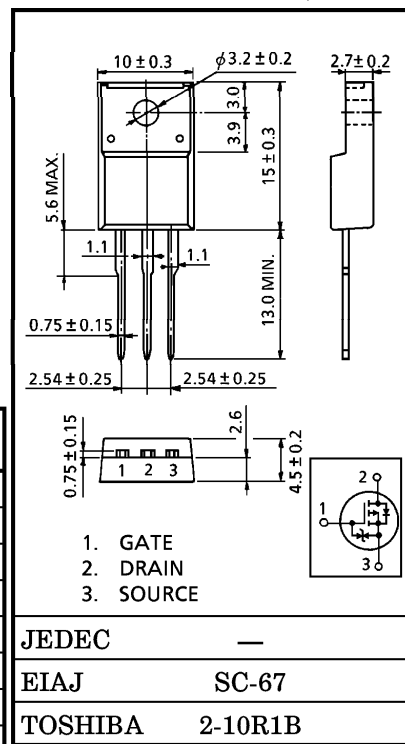
# 2SJ407

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 :  $R_{DS(ON)} = 0.8\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 4.0S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = -100\mu A$  (Max.) ( $V_{DS} = -200V$ )
- 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                           |       | $V_{DSS}$ | -200     | V          |
| Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )    |       | $V_{DGR}$ | -200     | V          |
| Gate-Source Voltage                            |       | $V_{GSS}$ | $\pm 20$ | V          |
| Drain Current                                  | DC    | $I_D$     | -5       | A          |
|  | Pulse | $I_{DP}$  | -20      | A          |
| Drain Power Dissipation ( $T_c = 25^\circ C$ ) |       | $P_D$     | 30       | W          |
| Single Pulse Avalanche Energy**                |       | $E_{AS}$  | 195      | mJ         |
| Avalanche Current                              |       | $I_{AR}$  | -5       | A          |
| Repetitive Avalanche Energy*                   |       | $E_{AR}$  | 3.0      | mJ         |
| Chanel Temperature                             |       | $T_{ch}$  | 150      | $^\circ C$ |
| Storage Temperature Range                      |       | $T_{stg}$ | -55~150  | $^\circ C$ |

Weight : 1.9g

THERMAL CHARACTERISTICS

| CHARACTERISTIC                        | SYMBOL         | MAX. | UNIT         |
|---------------------------------------|----------------|------|--------------|
| Thermal Resistance, Chanel To Case    | $R_{th(ch-c)}$ | 4.16 | $^\circ C/W$ |
| Thermal Resistance, Chanel to Ambient | $R_{th(ch-a)}$ | 62.5 | $^\circ C/W$ |

Note ;

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

\*\*  $V_{DD} = -50V$ , Starting  $T_{ch} = 25^\circ C$ ,  $L = 12.6mH$ ,  $R_G = 25\Omega$ ,  $I_{AR} = -5A$

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

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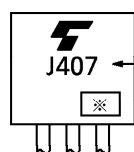
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                                  |               | SYMBOL        | TEST CONDITION  | MIN.  | TYP. | MAX.     | UNIT     |
|---|---------------|---------------|---|---|------|----------|----------|
| Gate Leakage Current                            |               | $I_{GSS}$     | $V_{GS} = \pm 16V, V_{DS} = 0V$   | —   | —    | $\pm 10$ | $\mu A$  |
| Drain Cut-off Current                           |               | $I_{DSS}$     | $V_{DS} = -200V, V_{GS} = 0V$   | —   | —    | -100     | $\mu A$  |
| Drain-Source Breakdown Voltage                  |               | $V_{(BR)DSS}$ | $I_D = -10mA, V_{GS} = 0V$  | -200  | —    | —        | V        |
| Gate Threshold Voltage                          |               | $V_{th}$      | $V_{DS} = -10V, I_D = -1mA$   | -1.5  | —    | -3.5     | V        |
| Drain-Source ON Resistance                      |               | $R_{DS(ON)}$  | $V_{GS} = -10V, I_D = -2.5A$  | —   | 0.8  | 1.0      | $\Omega$ |
| Forward Transfer Admittance                     |               | $ Y_{fs} $    | $V_{DS} = -10V, I_D = -2.5A$  | 2.0   | 4.0  | —        | S        |
| Input Capacitance                               |               | $C_{iss}$     | $V_{DS} = -10V, V_{GS} = 0V$<br>$f = 1MHz$  | —   | 800  | —        | pF       |
| Reverse Transfer Capacitance                    |               | $C_{rss}$     |   | —   | 80   | —        |          |
| Output Capacitance                              |               | $C_{oss}$     |   | —   | 270  | —        |          |
| Switching Time                                  | Rise Time     | $t_r$         | <p><math>I_D = -2.5A</math><br/><math>V_{GS} = 0V, -10V</math><br/><math>V_{out}</math><br/><math>R_L = 40\Omega</math><br/><math>50\Omega</math><br/><math>V_{DD} = -100V</math></p> | —   | 15   | —        | ns       |
|   | Turn-on Time  | $t_{on}$      |   | —   | 30   | —        |          |
|   | Fall Time     | $t_f$         |   | —   | 6    | —        |          |
|   | Turn-off Time | $t_{off}$     |   | $V_{IN} : t_r, t_f < 5ns$<br>$Duty \leq 1\%, t_w = 10\mu s$ | —    | 65       |          |
| Total Gate Charge (Gate-Source Plus Gate-Drain) |               | $Q_g$         | $V_{DD} = -160V$<br>$V_{GS} = -10V$<br>$I_D = -5A$  | —   | 20   | —        | nC       |
| Gate-Source Charge                              |               | $Q_{gs}$      |   | —   | 13   | —        |          |
| Gate-Drain ("Miller") Charge                    |               | $Q_{gd}$      |   | —   | 7    | —        |          |

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

| CHARACTERISTIC                   | SYMBOL    | TEST CONDITION   | MIN. | TYP. | MAX. | UNIT    |
|----------------------------------|-----------|--|------|------|------|---------|
| Continuous Drain Reverse Current | $I_{DR}$  | —  | —    | —    | -5   | A       |
| Pulse Drain Reverse Current      | $I_{DRP}$ | —  | —    | —    | -20  | A       |
| Diode Forward Voltage            | $V_{DSF}$ | $I_{DR} = -5A, V_{GS} = 0V$                              | —    | —    | 2.0  | V       |
| Reverse Recovery Time            | $t_{rr}$  | $I_{DR} = -5A, V_{GS} = 0V$<br>$dI_{DR}/dt = 100A/\mu s$ | —    | 210  | —    | ns      |
| Reverse Recovery Charge          | $Q_{rr}$  |  | —    | 1.2  | —    | $\mu C$ |

MARKING

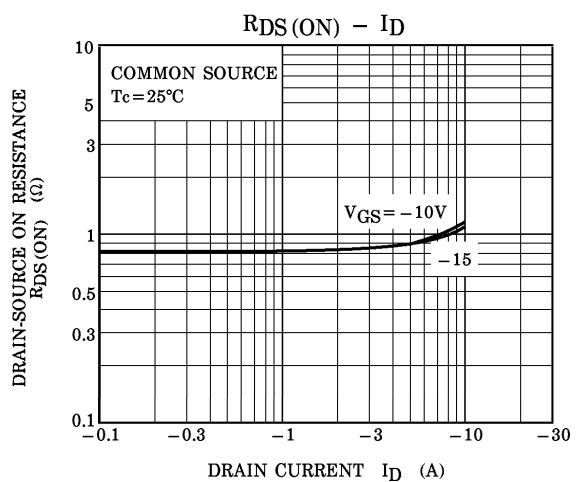
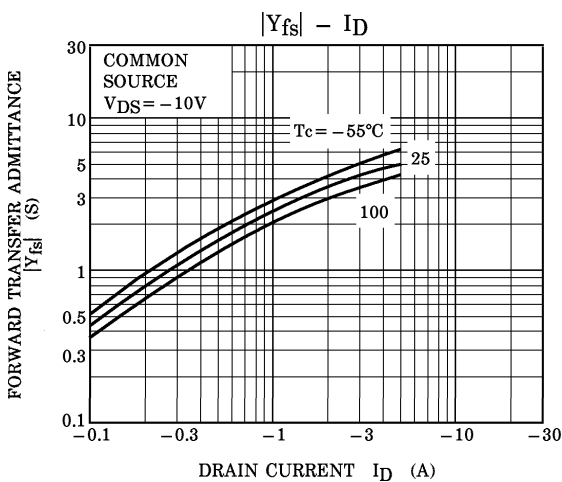
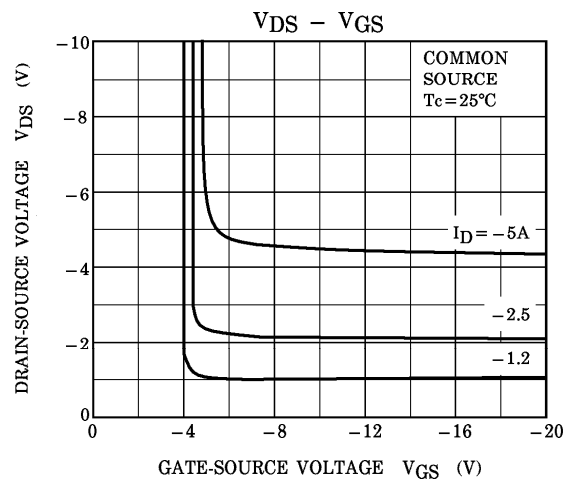
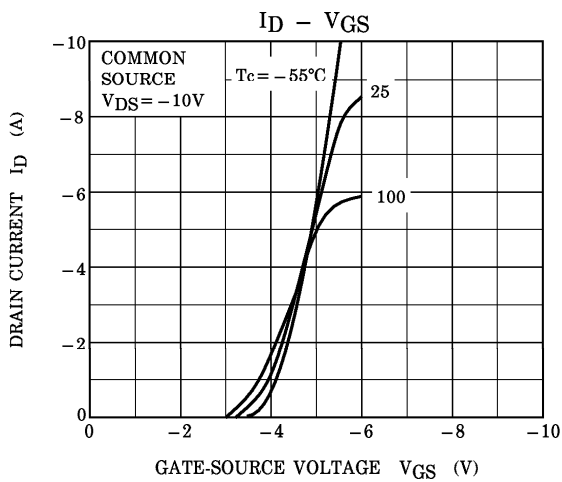
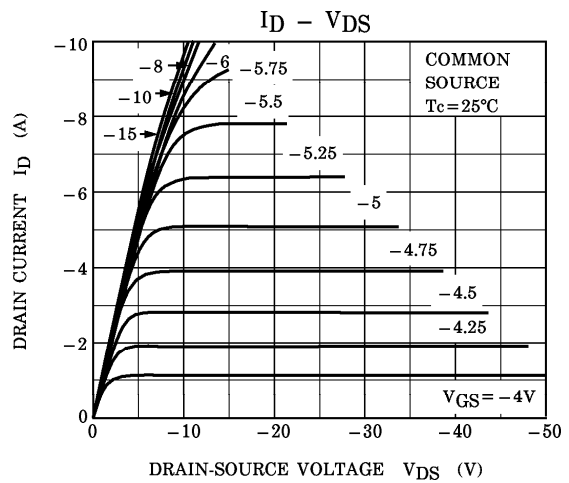
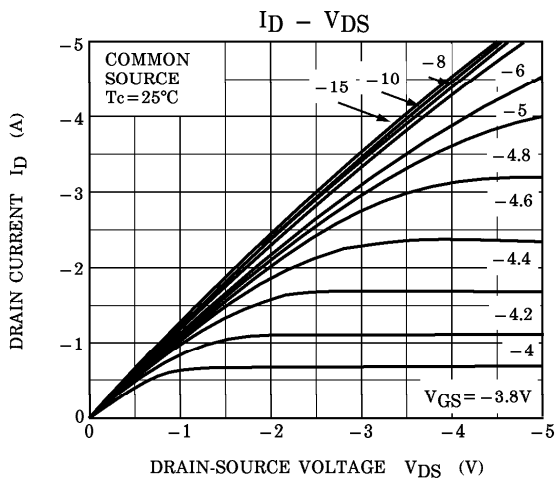


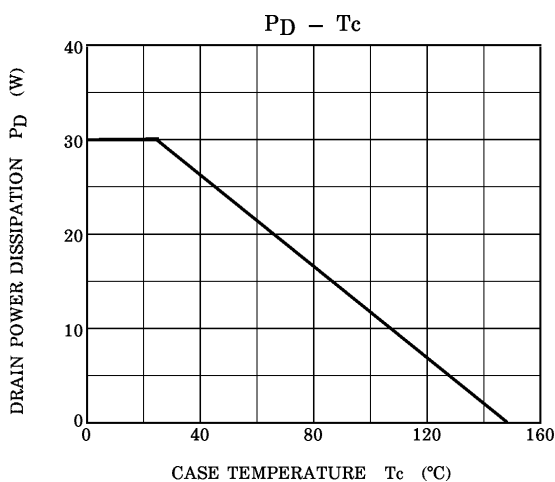
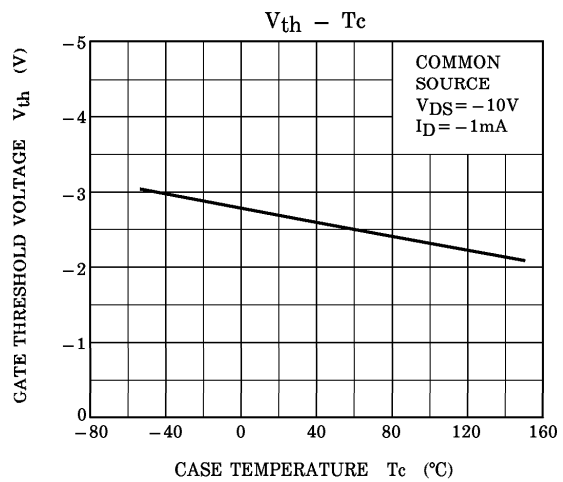
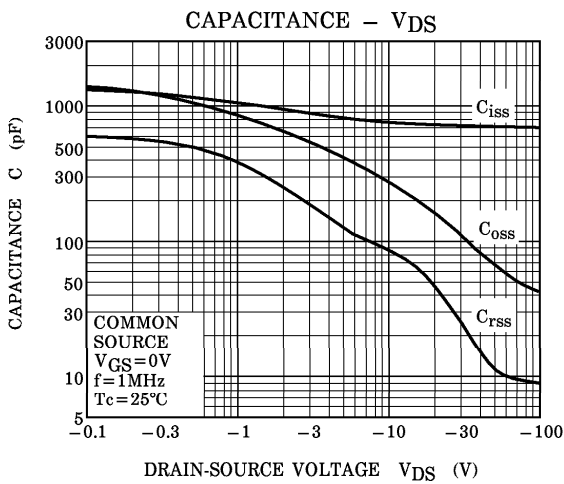
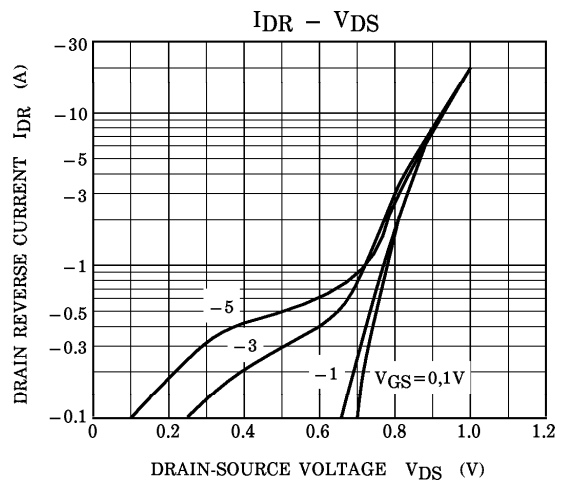
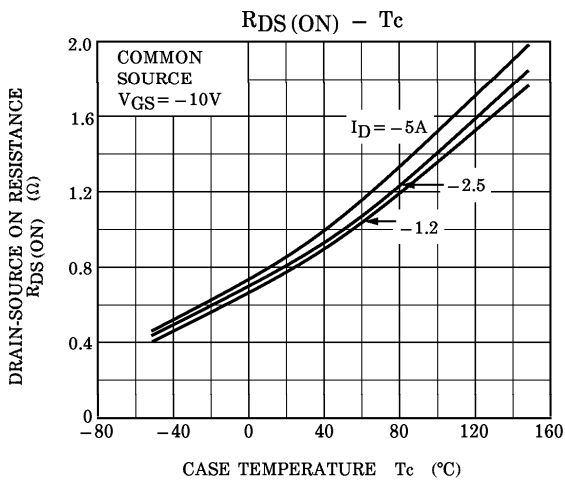
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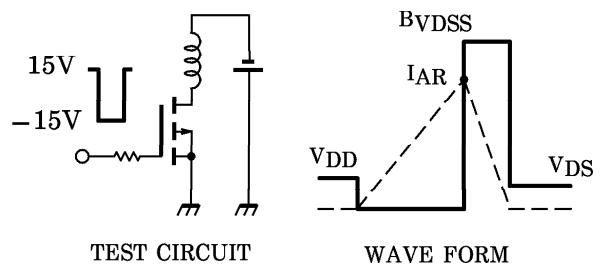
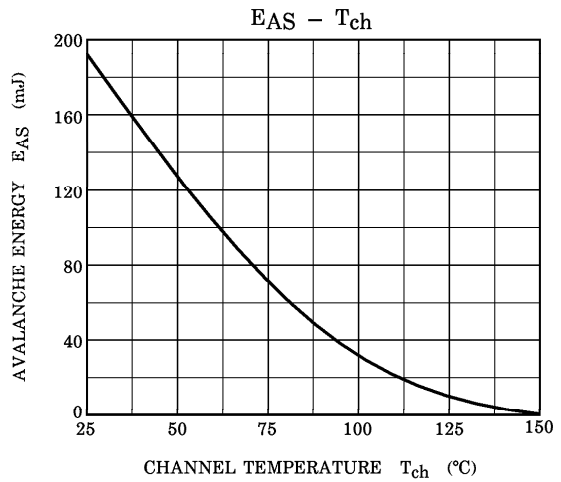
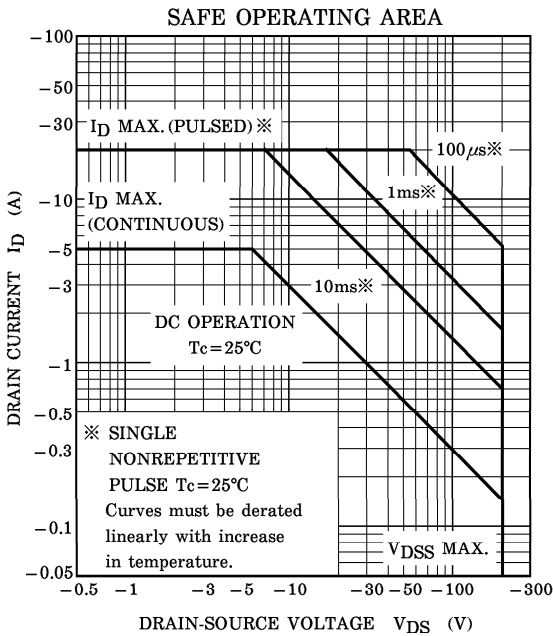
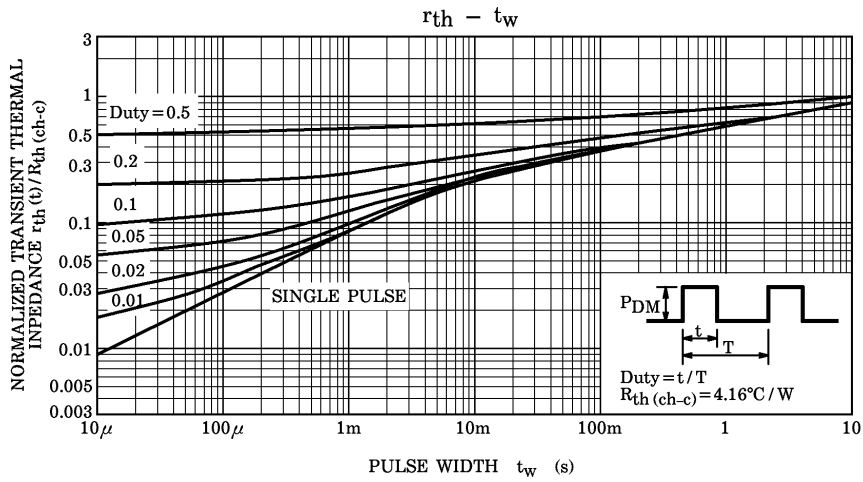
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = -5A$ ,  $R_G = 25\Omega$   
 $V_{DD} = -50V$ ,  $L = 12.6mH$        $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left( \frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$