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# High-voltage Switching Transistor (Telephone power supply) (−400V, −0.5A)

2SA1812 / 2SA1727 / 2SA1776

**●Features**

- 1) High breakdown voltage,  $BV_{CEO} = -400V$ .
- 2) Low saturation voltage, typically  $V_{CE(sat)} = -0.3V$  at  $I_C / I_B = -100mA / -10mA$ .
- 3) High switching speed, typically  $t_f = 1 \mu s$  at  $I_C = -100mA$ .
- 4) Wide SOA (safe operating area).

**●Packaging specifications and hFE**

| Type                         | 2SA1812 | 2SA1727 | 2SA1776 |
|------------------------------|---------|---------|---------|
| Package                      | MPT3    | CPT3    | ATV     |
| hFE                          | PQ      | PQ      | PQ      |
| Marking                      | AJ*     | —       | —       |
| Code                         | T100    | TL      | TV2     |
| Basic ordering unit (pieces) | 3000    | 3000    | 2500    |

\* Denotes hFE

**●Electrical characteristics (Ta=25°C)**

| Parameter                            | Symbol        | Min. | Typ. | Max. | Unit    | Conditions                           |
|--------------------------------------|---------------|------|------|------|---------|--------------------------------------|
| Collector-base breakdown voltage     | $BV_{CBO}$    | −400 | —    | —    | V       | $I_C = -50 \mu A$                    |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | −400 | —    | —    | V       | $I_C = -1mA$                         |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | −7   | —    | —    | V       | $I_E = -50 \mu A$                    |
| Collector cutoff current             | $I_{CBO}$     | —    | —    | −1   | $\mu A$ | $V_{CB} = -400V$                     |
| Emitter cutoff current               | $I_{EBO}$     | —    | —    | −1   | $\mu A$ | $V_{EE} = -6V$                       |
| DC current transfer ratio            | hFE           | 82   | 150  | 270  | —       | $V_{CE} = -5V, I_C = -50mA$          |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | —    | —    | −1   | V       | $I_C / I_B = -100mA / -10mA$         |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | —    | —    | −1.2 | V       | $I_C / I_B = -100mA / -10mA$         |
| Transition frequency                 | $f_T$         | —    | 12   | —    | MHz     | $V_{CB} = -5V, I_E = 50mA, f = 5MHz$ |
| Output capacitance                   | $C_{ob}$      | —    | 18   | —    | pF      | $V_{CE} = -10V, I_E = 0A, f = 1MHz$  |
| Turn-on time                         | $t_{on}$      | —    | 0.6  | —    | $\mu s$ | $I_C = -100mA, R_L = 1.5k\Omega$     |
| Storage time                         | $t_{stg}$     | —    | 2.7  | —    | $\mu s$ | $I_{B1} = -I_{B2} = -10mA$           |
| Fall time                            | $t_f$         | —    | 1    | —    | $\mu s$ | $V_{CC} = -150V$                     |

**●Absolute maximum ratings (Ta=25°C)**

| Parameter                   | Symbol    | Limits   | Unit         |
|-----------------------------|-----------|----------|--------------|
| Collector-base voltage      | $V_{CBO}$ | −400     | V            |
| Collector-emitter voltage   | $V_{CEO}$ | −400     | V            |
| Emitter-base voltage        | $V_{EBO}$ | −7       | V            |
| Collector current           | $I_C$     | −0.5     | A (DC)       |
|                             |           | −1.0     | A (Pulse) *1 |
| Collector power dissipation | $P_C$     | 0.5      | W            |
|                             |           | 2        | W *2         |
|                             |           | 1        | W            |
|                             |           | 10       | W (Tc=25°C)  |
| Junction temperature        | $T_J$     | 150      | °C           |
|                             |           | −55~+150 | °C           |
| Storage temperature         | $T_{stg}$ | −55~+150 | °C           |

\*1 Single pulse \*2 When mounted on a 40×40×0.7mm ceramic board.

 \*3 When  $t = 1.7mm$  and the foil collector area on the PC board is 1cm<sup>2</sup> or greater.

(96-609-A313)