

## 100A, 30V N-CHANNEL MOSFET

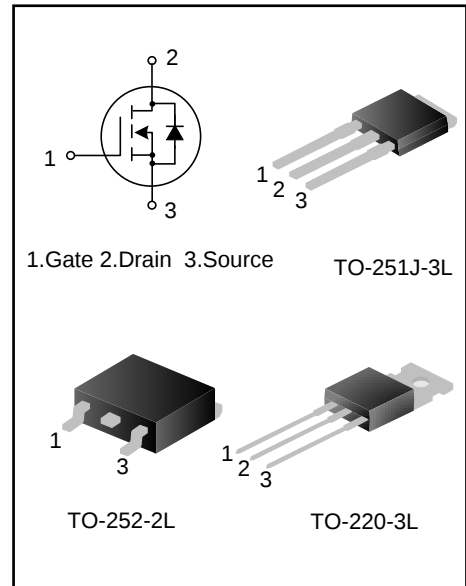
### DESCRIPTION

The SVT035R5ND(MJ)(T) is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan's LVMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance.

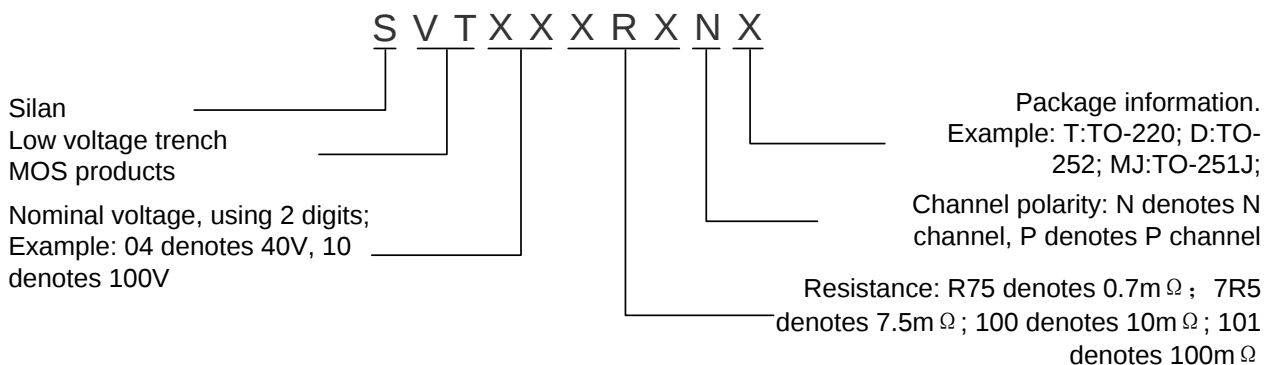
This device is widely used in the fields of uninterruptible power supplies and power management of inverter systems.

### FEATURES

- ◆ 100A, 30V,  $R_{DS(on)(typ.)}=4.0m\Omega@V_{GS}=10V$
- ◆ Low gate charge
- ◆ Low  $C_{rss}$
- ◆ Fast switching
- ◆ Improved dv/dt capability



### NOMENCLATURE



### ORDERING INFORMATION

| Part No.     | Package    | Marking  | Hazardous Substance Control | Packing   |
|--------------|------------|----------|-----------------------------|-----------|
| SVT035R5NDTR | TO-252-2L  | 035R5ND  | Halogen free                | Tape&Reel |
| SVT035R5NMJ  | TO-251J-3L | 035R5NMJ | Halogen free                | Tape      |
| SVT035R5NT   | TO-220-3L  | 035R5NT  | Pb free                     | Tape      |

**ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, T<sub>C</sub>=25°C)**

| Characteristics                                                |                       | Symbol           | Ratings       |            | Unit |
|----------------------------------------------------------------|-----------------------|------------------|---------------|------------|------|
|                                                                |                       |                  | SVT035R5ND/MJ | SVT035R5NT |      |
| Drain-Source Voltage                                           |                       | V <sub>DS</sub>  | 30            |            | V    |
| Gate-Source Voltage                                            |                       | V <sub>GS</sub>  | ±20           |            | V    |
| Drain Current                                                  | T <sub>C</sub> =25°C  | I <sub>D</sub>   | 100           |            | A    |
|                                                                | T <sub>C</sub> =100°C |                  | 63            |            |      |
| Drain Current Pulsed                                           |                       | I <sub>DM</sub>  | 400           |            | A    |
| Power Dissipation (T <sub>C</sub> =25°C)<br>-Derate above 25°C |                       | P <sub>D</sub>   | 83            | 104        | W    |
|                                                                |                       |                  | 0.7           | 0.8        | W/°C |
| Single Pulsed Avalanche Energy (Note 1)                        |                       | E <sub>AS</sub>  | 200           |            | mJ   |
| Operation Junction Temperature Range                           |                       | T <sub>J</sub>   | -55~+150      |            | °C   |
| Storage Temperature Range                                      |                       | T <sub>stg</sub> | -55~+150      |            | °C   |

**THERMAL CHARACTERISTICS**

| Characteristics                         | Symbol           | Ratings       |            | Unit |
|-----------------------------------------|------------------|---------------|------------|------|
|                                         |                  | SVT035R5ND/MJ | SVT035R5NT |      |
| Thermal Resistance, Junction-to-Case    | R <sub>θJC</sub> | 1.52          | 1.2        | °C/W |
| Thermal Resistance, Junction-to-Ambient | R <sub>θJA</sub> | 62            | 62.5       | °C/W |

## ELECTRICAL CHARACTERISTICS (Unless otherwise noted, $T_c=25^\circ\text{C}$ )

| Characteristics                | Symbol       | Test conditions                                                  | Min. | Typ. | Max.      | Unit      |
|--------------------------------|--------------|------------------------------------------------------------------|------|------|-----------|-----------|
| Drain-Source Breakdown Voltage | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                                        | 30   | --   | --        | V         |
| Drain-Source Leakage Current   | $I_{DSS}$    | $V_{DS}=30V, V_{GS}=0V$                                          | --   | --   | 1.0       | $\mu A$   |
| Gate-Source Leakage Current    | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                                      | --   | --   | $\pm 100$ | nA        |
| Gate Threshold Voltage         | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$                                    | 1    | 1.6  | 2.5       | V         |
| Static Drain- Source           | $R_{DS(on)}$ | $V_{GS}=10V, I_D=20A$                                            | --   | 4.0  | 5.5       | $m\Omega$ |
| On State Resistance            |              | $V_{GS}=4.5V, I_D=15A$                                           | --   | 5.2  | 7.2       | $m\Omega$ |
| Gate Resistance                | $R_G$        | $f=1MHz$                                                         | --   | 4.9  | --        | $\Omega$  |
| Input Capacitance              | $C_{iss}$    | $f=1MHz, V_{GS}=0V, V_{DS}=25V$                                  | --   | 2190 | --        | pF        |
| Output Capacitance             | $C_{oss}$    |                                                                  | --   | 268  | --        |           |
| Reverse Transfer Capacitance   | $C_{rss}$    |                                                                  | --   | 206  | --        |           |
| Turn-on Delay Time             | $t_{d(on)}$  | $V_{DD}=20V, V_{GS}=4.5V, R_G=1.8\Omega, I_D=60A$<br>(Notes 2,3) | --   | 12.  | --        | ns        |
| Turn-on Rise Time              | $t_r$        |                                                                  | --   | 88   | --        |           |
| Turn-off Delay Time            | $t_{d(off)}$ |                                                                  | --   | 140  | --        |           |
| Turn-off Fall Time             | $t_f$        |                                                                  | --   | 83   | --        |           |
| Total Gate Charge              | $Q_g$        | $V_{DD}=24V, V_{GS}=10V, I_D=30A$<br>(Notes 2,3)                 | --   | 47   | --        | nC        |
| Gate-Source Charge             | $Q_{gs}$     |                                                                  | --   | 8.5  | --        |           |
| Gate-Drain Charge              | $Q_{gd}$     |                                                                  | --   | 9.9  | --        |           |

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Characteristics           | Symbol   | Test conditions                                        | Min. | Typ. | Max. | Unit    |
|---------------------------|----------|--------------------------------------------------------|------|------|------|---------|
| Continuous Source Current | $I_S$    | Integral Reverse P-N Junction<br>Diode in the MOSFET   | --   | --   | 100  | A       |
| Pulsed Source Current     | $I_{SM}$ |                                                        | --   | --   | 400  |         |
| Diode Forward Voltage     | $V_{SD}$ | $I_S=20A, V_{GS}=0V$                                   | --   | --   | 1.4  | V       |
| Reverse Recovery Time     | $T_{rr}$ | $I_S=30A, V_{GS}=0V,$<br>$dI_F/dt=100A/\mu s$ (Note 2) | --   | 16   | --   | ns      |
| Reverse Recovery Charge   | $Q_{rr}$ |                                                        | --   | 6.9  | --   | $\mu C$ |

Notes:

1.  $L=0.5mH, V_{DD}=15V, V_G=10V, R_G=25\Omega$ , starting  $T_J=25^\circ\text{C}$ ;
2. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ ;
3. Essentially independent of operating temperature.

## TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

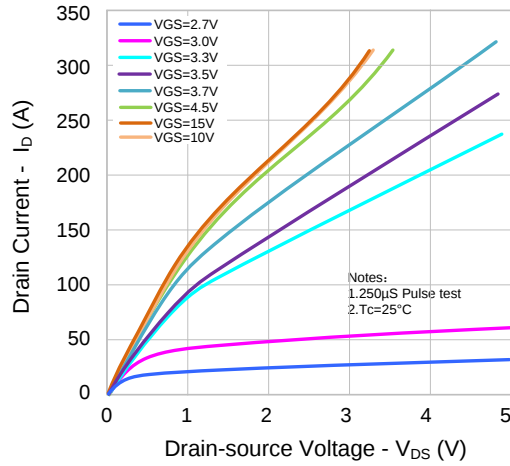


Figure 2. Transfer Characteristics

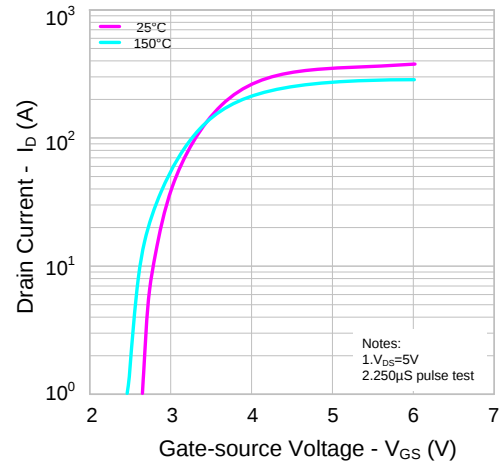


Figure 3. On-Resistance vs. Drain Current

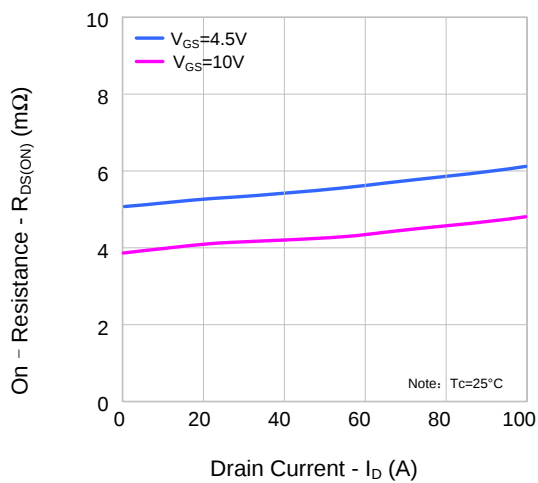


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

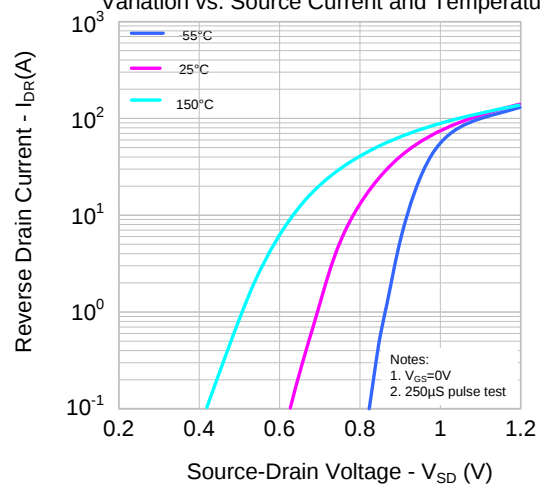


Figure 5. Capacitance Characteristics

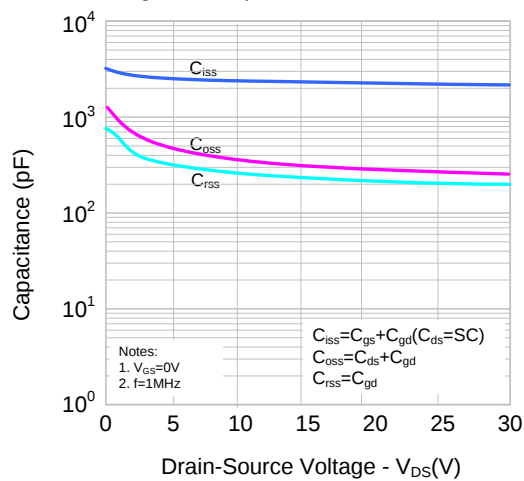
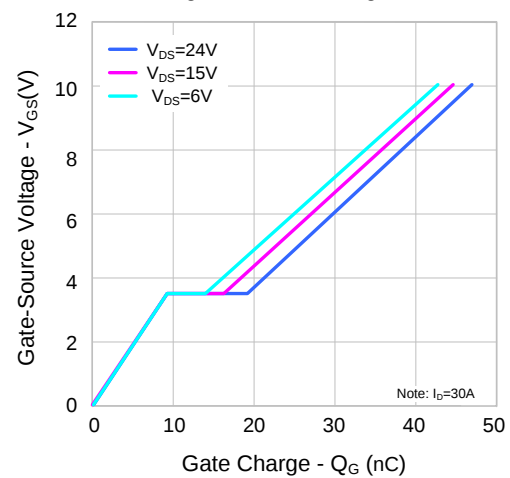
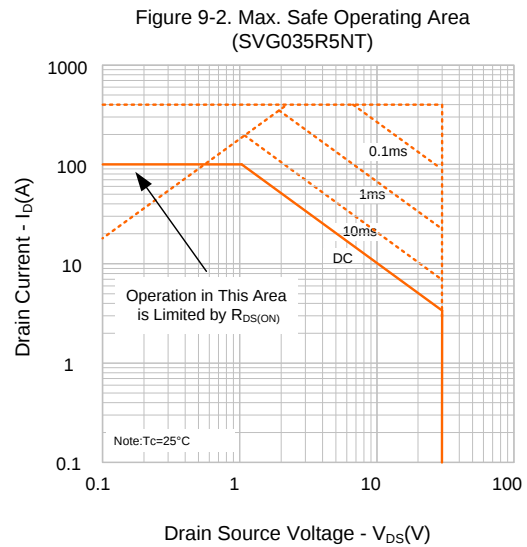
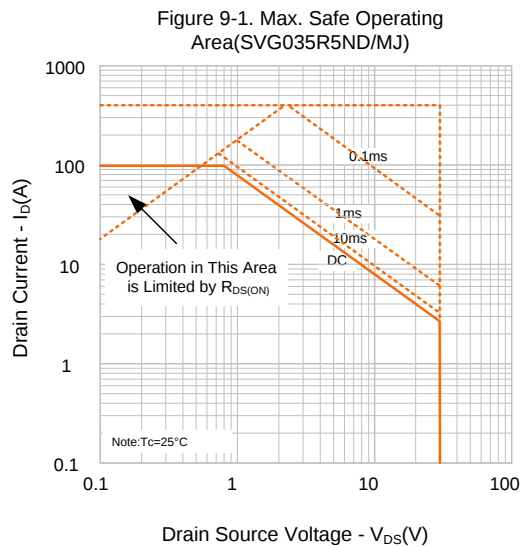
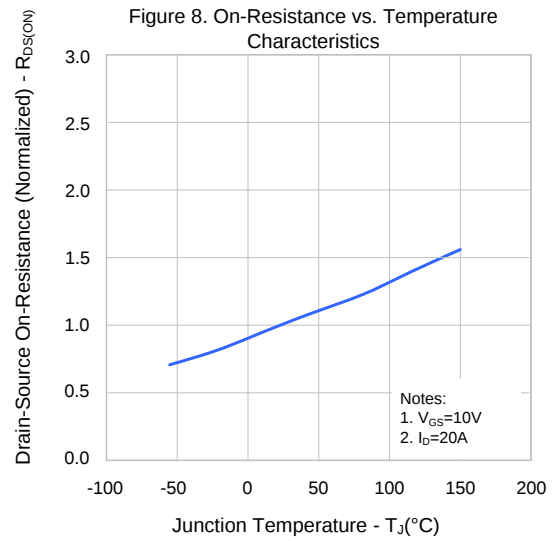
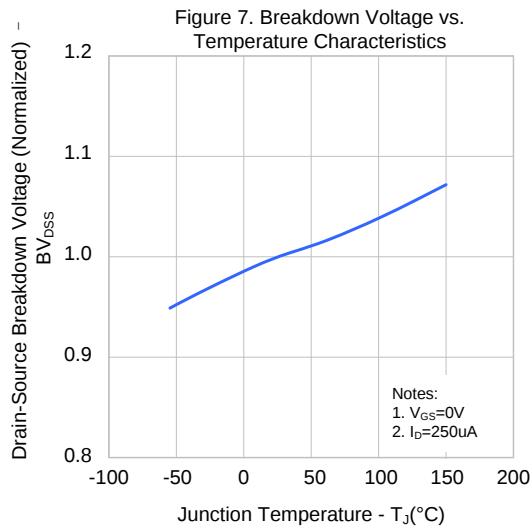


Figure 6. Gate Charge

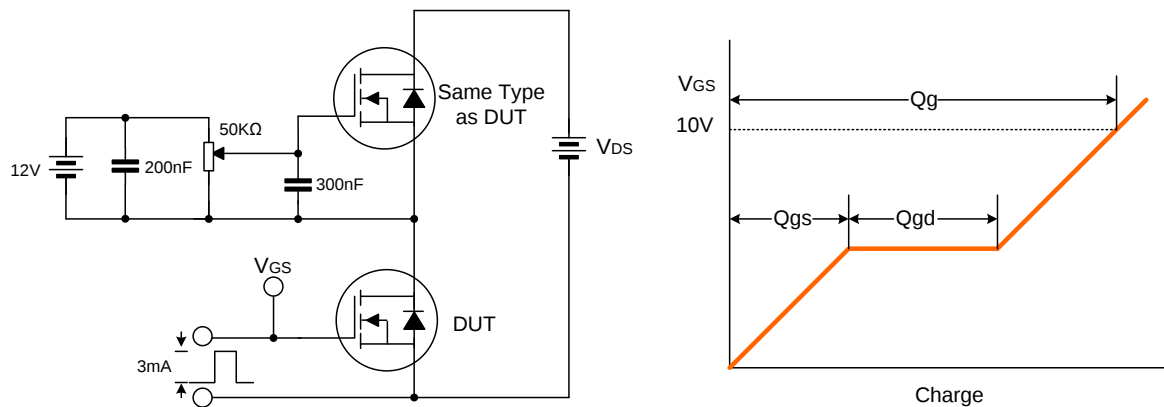


## TYPICAL CHARACTERISTICS (continued)

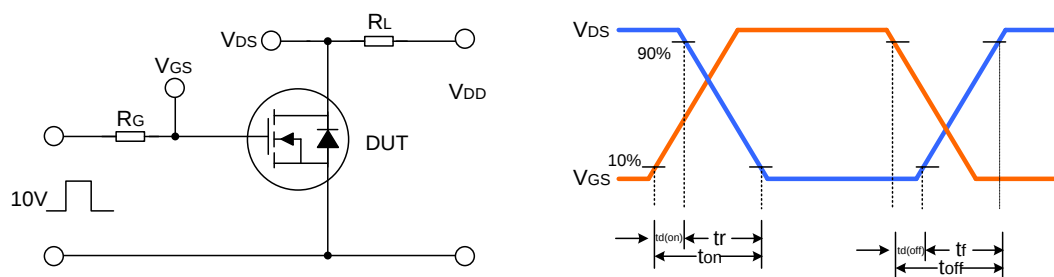


## TYPICAL TEST CIRCUIT

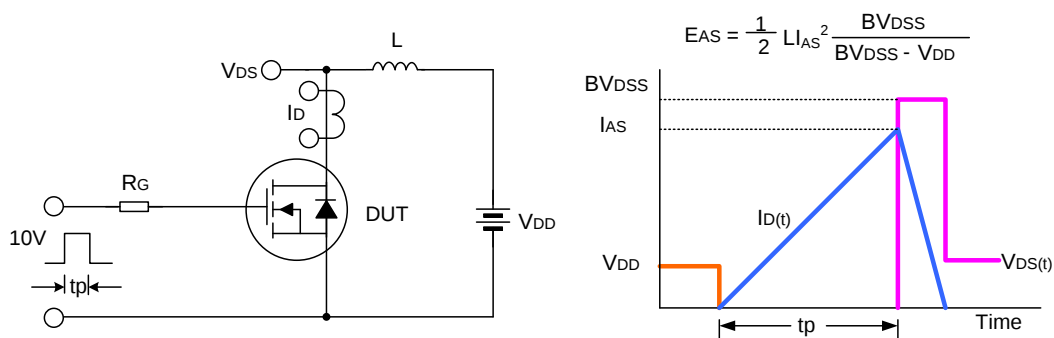
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



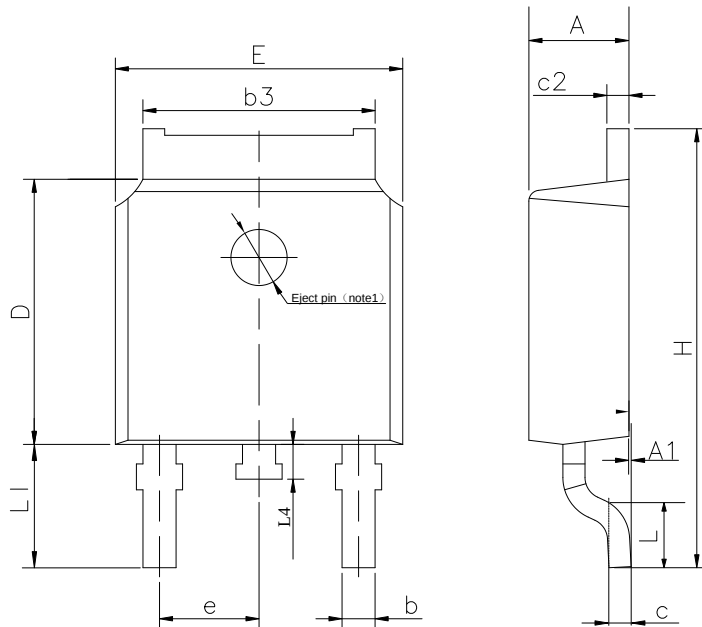
Unclamped Inductive Switching Test Circuit & Waveform



## PACKAGE OUTLINE

### TO-252-2L

UNIT: mm

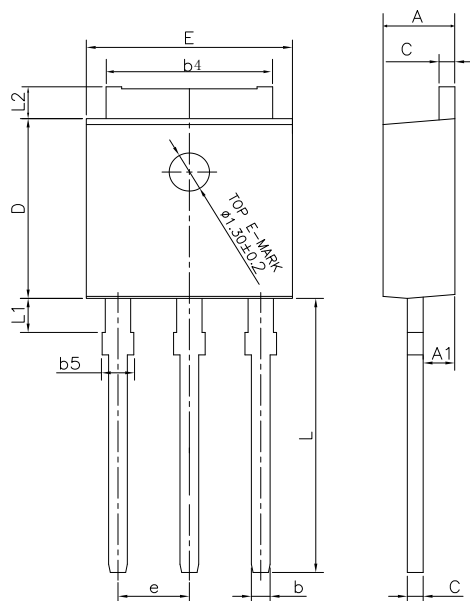


| SYMBOL | MIN     | NOM   | MAX   |
|--------|---------|-------|-------|
| A      | 2.10    | 2.30  | 2.50  |
| A1     | 0       | ---   | 0.127 |
| b      | 0.66    | 0.76  | 0.89  |
| b3     | 5.10    | 5.33  | 5.46  |
| c      | 0.45    | ---   | 0.65  |
| c2     | 0.45    | ---   | 0.65  |
| D      | 5.80    | 6.10  | 6.40  |
| E      | 6.30    | 6.60  | 6.90  |
| e      | 2.30TYP |       |       |
| H      | 9.60    | 10.10 | 10.60 |
| L      | 1.40    | 1.50  | 1.70  |
| L1     | 2.90REF |       |       |
| L4     | 0.60    | 0.80  | 1.00  |

NOTE1 : There are two conditions for this position:has an eject pin or has no eject pin.

### TO-251J-3L

UNIT: mm

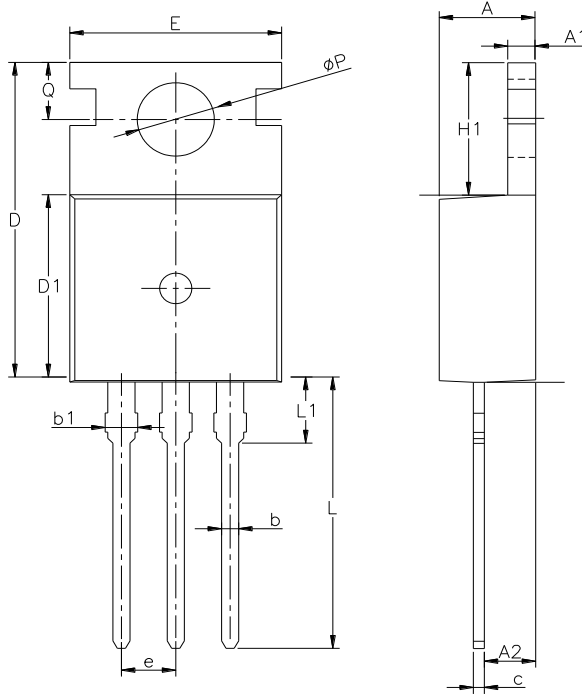


| SYMBOL | MIN      | NOM  | MAX  |
|--------|----------|------|------|
| A      | 2.18     | 2.30 | 2.39 |
| A1     | 0.89     | 1.00 | 1.14 |
| b      | 0.56     | ---  | 0.89 |
| b4     | 4.95     | 5.33 | 5.46 |
| b5     | ---      | ---  | 1.05 |
| c      | 0.46     | ---  | 0.61 |
| D      | 5.97     | 6.10 | 6.27 |
| E      | 6.35     | 6.60 | 6.73 |
| e      | 2.29 BCS |      |      |
| L      | 8.89     | 9.30 | 9.65 |
| L1     | 0.95     | ---  | 1.50 |
| L2     | 0.89     | ---  | 1.27 |

## PACKAGE OUTLINE

TO-220-3L

UNIT: mm



| SYMBOL   | MIN     | NOM   | MAX   |
|----------|---------|-------|-------|
| A        | 4.30    | 4.50  | 4.70  |
| A1       | 1.00    | 1.30  | 1.50  |
| A2       | 1.80    | 2.40  | 2.80  |
| b        | 0.60    | 0.80  | 1.00  |
| b1       | 1.00    | —     | 1.60  |
| c        | 0.30    | —     | 0.70  |
| D        | 15.10   | 15.70 | 16.10 |
| D1       | 8.10    | 9.20  | 10.00 |
| E        | 9.60    | 9.90  | 10.40 |
| e        | 2.54BSC |       |       |
| H1       | 6.10    | 6.50  | 7.00  |
| L        | 12.60   | 13.08 | 13.60 |
| L1       | —       | —     | 3.95  |
| $\phi P$ | 3.40    | 3.70  | 3.90  |
| Q        | 2.60    | —     | 3.20  |

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|            |                                         |                |                                                               |
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Rev.: 1.1

Revision History:

1. Add SVT035R5NMJ(TO-251J-3L and SVT035R5NT(TO-220-3L)
- 

Rev.: 1.0

Revision History:

1. First release
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