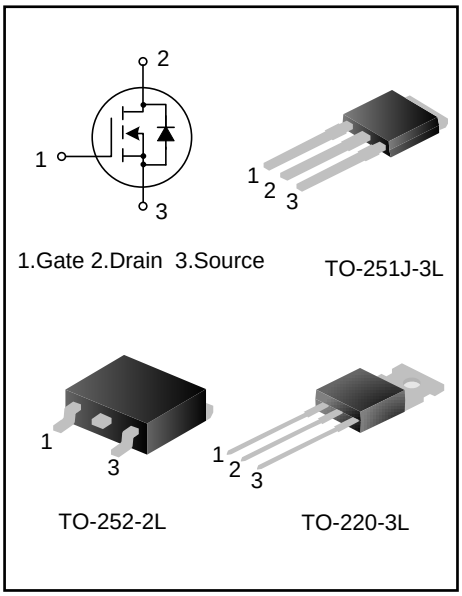
# 100A, 30V N-CHANNEL MOSFET

## 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, $R_{DS(on)(typ.)}$=4.0mΩ@$V_{GS}$=10V
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability

## NOMENCLATURE

S V T X X X R X N X

Silan

Low voltage trench MOS products

Nominal voltage, using 2 digits; Example: 04 denotes 40V, 10 denotes 100V

Package information. Example: T:TO-220; D:TO-252; MJ:TO-251J;

Channel polarity: N denotes N channel, P denotes P channel

Resistance: R75 denotes 0.7mΩ; 7R5 denotes 7.5mΩ; 100 denotes 10mΩ; 101 denotes 100mΩ

## 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, $T_C$=25°C)

| Characteristics | | Symbol | Ratings | | Unit |
|---|---|---|---|---|---|
| | | | SVT035R5ND/MJ | SVT035R5NT | |
| Drain-Source Voltage | | $V_{DS}$ | 30 | | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | | V |
| Drain Current | $T_C$=25°C | $I_D$ | 100 | | A |
| | $T_C$=100°C | | 63 | | |
| Drain Current Pulsed | | $I_{DM}$ | 400 | | A |
| Power Dissipation ($T_C$=25°C) | | $P_D$ | 83 | 104 | W |
| -Derate above 25°C | | | 0.7 | 0.8 | W/°C |
| Single Pulsed Avalanche Energy (Note 1) | | $E_{AS}$ | 200 | | mJ |
| Operation Junction Temperature Range | | $T_J$ | -55～+150 | | °C |
| Storage Temperature Range | | $T_{stg}$ | -55～+150 | | °C |

## THERMAL CHARACTERISTICS

| Characteristics | Symbol | Ratings | | Unit |
|---|---|---|---|---|
| | | SVT035R5ND/MJ | SVT035R5NT | |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.52 | 1.2 | °C/W |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62 | 62.5 | °C/W |

## ELECTRICAL CHARACTERISTICS (Unless otherwise noted, $T_C$=25°C)

| Characteristics | Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 30 | -- | -- | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=30V, $V_{GS}$=0V | -- | -- | 1.0 | μA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | -- | -- | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$= $V_{DS}$, $I_D$=250μA | 1 | 1.6 | 2.5 | V |
| Static Drain- Source On State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=20A | -- | 4.0 | 5.5 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=15A | -- | 5.2 | 7.2 | mΩ |
| Gate Resistance | $R_G$ | f=1MHz | -- | 4.9 | -- | Ω |
| 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, $R_G$=1.8Ω, $I_D$=60A (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 (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 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, dIF/dt=100A/μs (Note 2) | -- | 16 | -- | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | -- | 6.9 | -- | μC |

Notes:

1.L=0.5mH, $V_{DD}$=15V, $V_G$=10V, $R_G$=25Ω,starting $T_J$=25°C;

2.Pulse Test: Pulse width ≤300μs,Duty cycle≤2%;

3.Essentially independent of operating temperature.

## TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

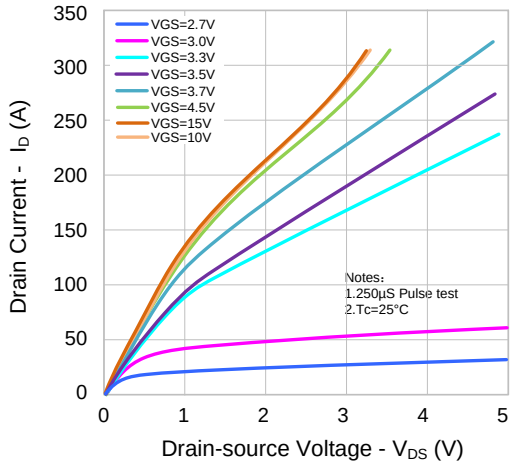



Figure 2. Transfer Characteristics

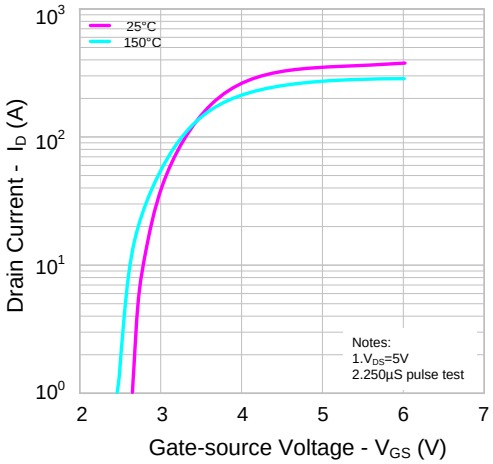



Figure 3. On-Resistance vs. Drain Current

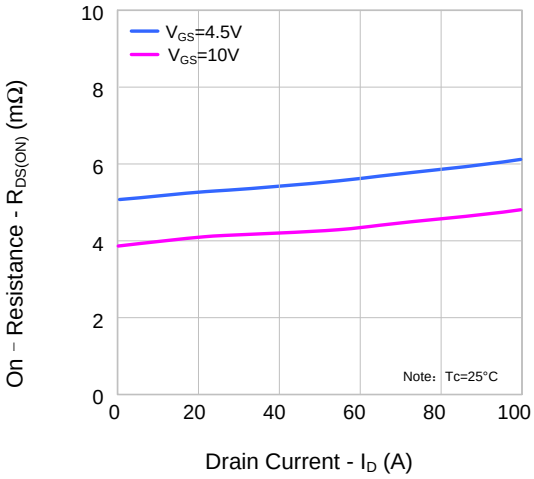



Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

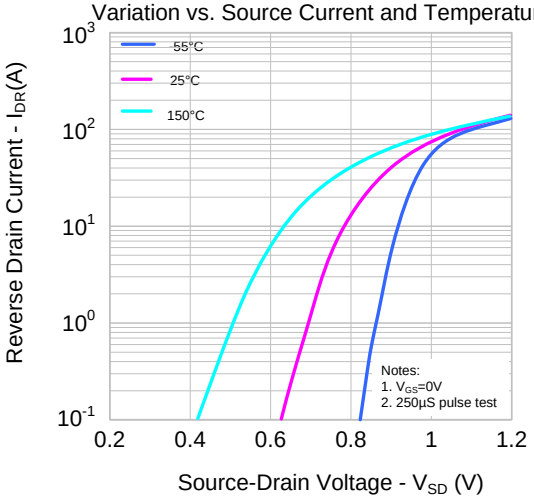



Figure 5. Capacitance Characteristics

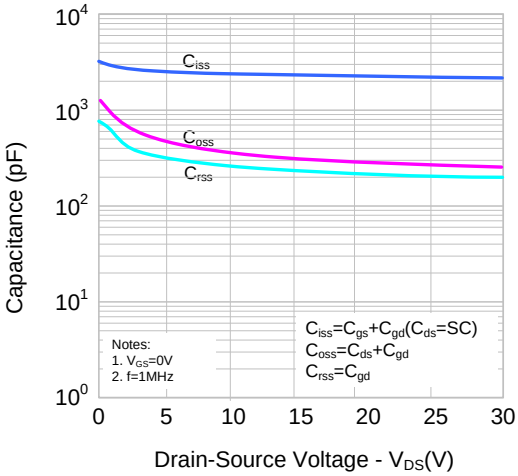
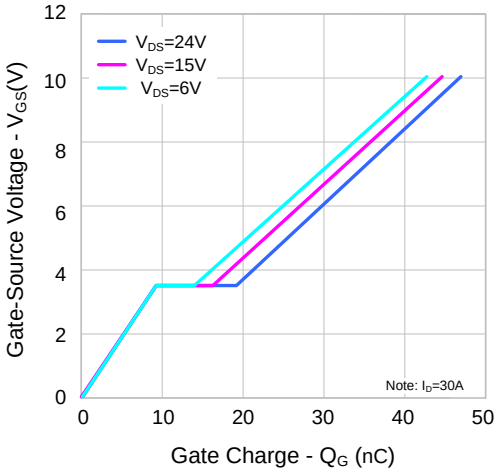



Figure 6. Gate Charge



## TYPICAL CHARACTERISTICS (continued)

Figure 7. Breakdown Voltage vs. Temperature Characteristics

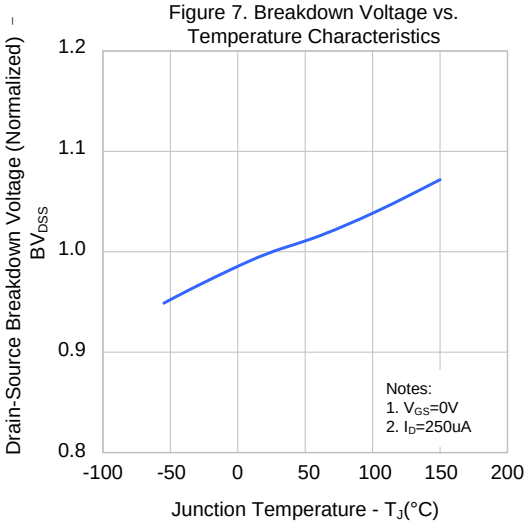



Figure 8. On-Resistance vs. Temperature Characteristics

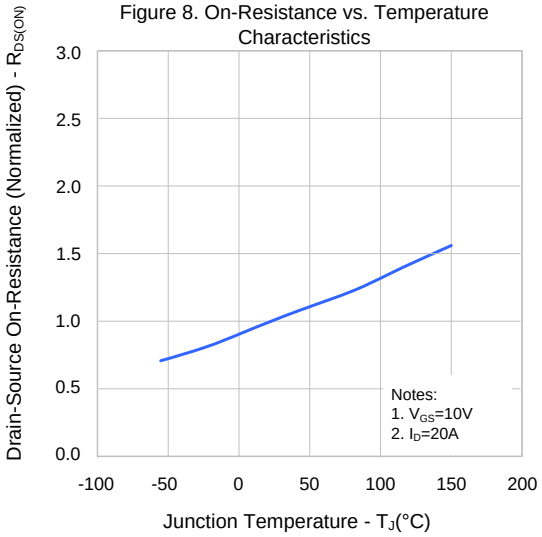



Figure 9-1. Max. Safe Operating Area(SVG035R5ND/MJ)

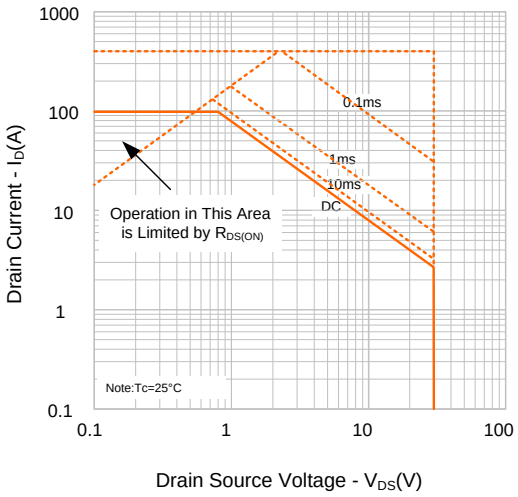
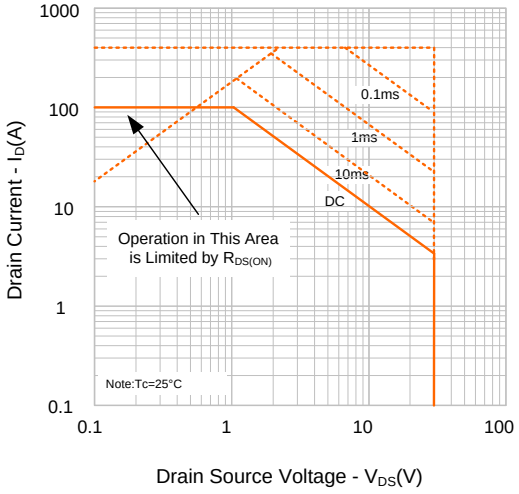
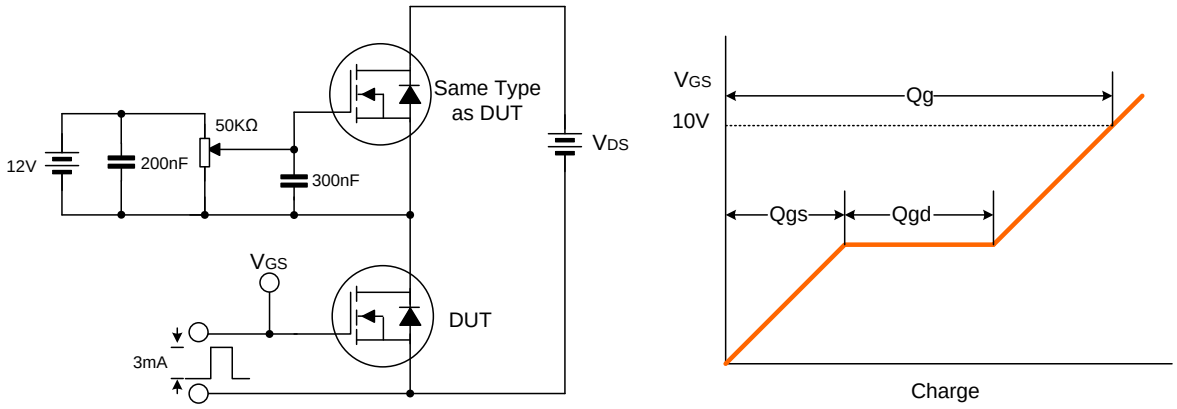



Figure 9-2. Max. Safe Operating Area (SVG035R5NT)

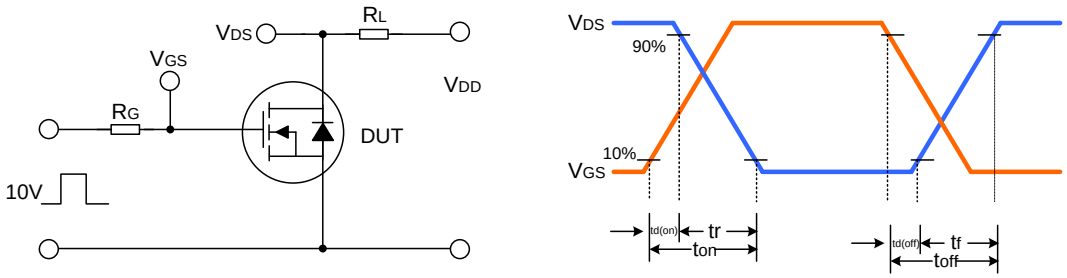


## TYPICAL TEST CIRCUIT

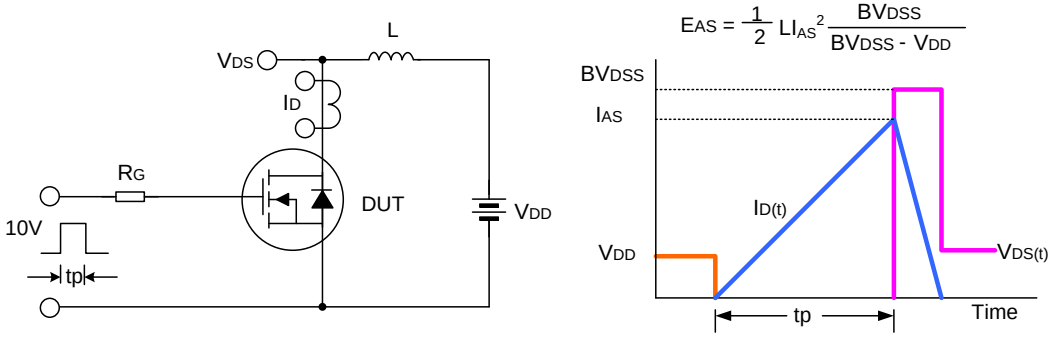
Gate Charge Test Circuit & Waveform




Resistive Switching Test Circuit & Waveform



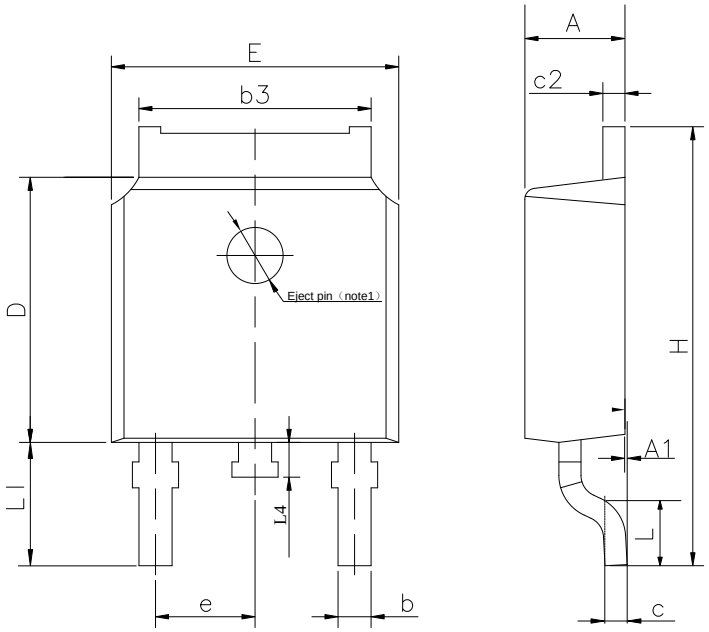

Unclamped Inductive Switching Test Circuit & Waveform



## PACKAGE OUTLINE

### TO-252-2L

UNIT: mm

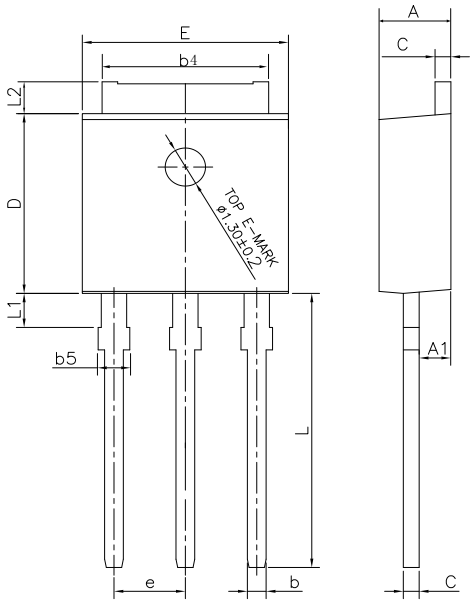



| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | 2.10 | 2.30 | 2.50 |
| A1 | 0 | --- | 0.127 |
| b | 0.66 | 0.76 | 0.89 |
| b3 | 5.10 | 5.33 | 5.46 |
| c | 0.45 | --- | 0.65 |
| c2 | 0.45 | --- | 0.65 |
| D | 5.80 | 6.10 | 6.40 |
| E | 6.30 | 6.60 | 6.90 |
| e | | 2.30TYP | |
| H | 9.60 | 10.10 | 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

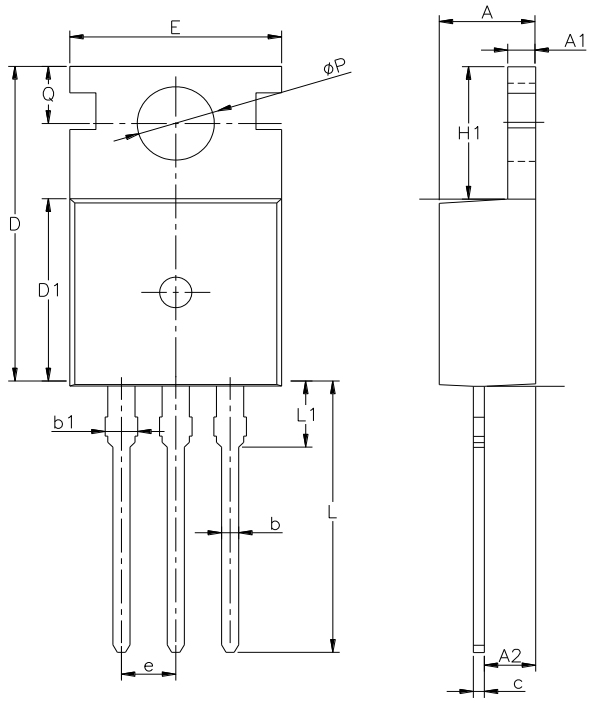
UNIT: mm




| 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 |
| ϕP | 3.40 | 3.70 | 3.90 |
| Q | 2.60 | — | 3.20 |

| | | | |
|---|---|---|---|
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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