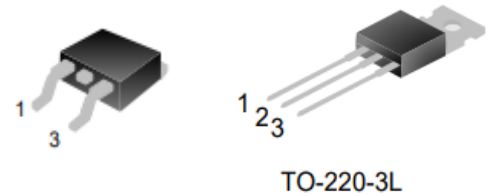


100A,200V N-CHANNEL POWER MOSFET

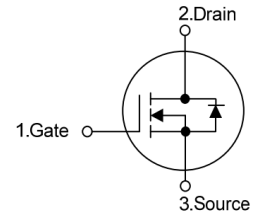
Features

- $R_{DS(on)}=6.2m\Omega$ (Typ.) @ $V_{GS}=10V, I_D=100A$
- New technology for high voltage device
- Low on-resistance
- Fast switching



Applications

- Power factor correction (PFC)
- Switched mode power supplies (SMPS)
- Uninterruptible Power Supply (UPS)



Key Performance and Package Parameters

| Order codes | V_{DS} | I_D | $R_{DS(ON)}$, Typ | T_{vjmax} | Marking | Package |
|----------------|----------|-------|--------------------|-----------------|------------|----------|
| XD6R2S015AK1L3 | 150V | 100A | 6.2m Ω | 175 $^{\circ}C$ | D6R2S15AK1 | TO220-3L |
| XD6R2S015AK1R3 | 150V | 100A | 6.2m Ω | 175 $^{\circ}C$ | D6R2S15AK1 | TO263-2L |

Absolute Maximum Ratings ($T_c=25^{\circ}C$ unless otherwise noted.)

| Symbol | Parameter | Value | Units |
|-----------|---|------------|-------------|
| V_{DSS} | Drain-Source Voltage | 150 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current ($T_c=25^{\circ}C$) | 100 | A |
| I_{DM} | Pulsed Drain Current | 400 | A |
| P_D | Maximum Power Dissipation ($T_c=25^{\circ}C$) | 313 | W |
| E_{AS} | Avalanche Energy, Single Pulse (note1) | 825 | mJ |
| T_J | Operating Junction Temperature Range | -55 to 175 | $^{\circ}C$ |
| T_{STG} | Storage Temperature Range | -55 to 175 | $^{\circ}C$ |

Thermal Data

| Symbol | Parameter | Conditions | Max. | Units |
|-----------------|---|------------|------|---------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case (Steady State) | TO220-3L | 0.48 | $^{\circ}C/W$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case (Steady State) | TO263-2L | 0.48 | $^{\circ}C/W$ |

Electrical Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted.)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|--------------|----------------------------------|--|------|------|------|-----------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 150 | --- | --- | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=150V, V_{GS}=0V$ | --- | --- | 1 | μA |
| I_{GSS} | Gate Leakage Current, Forward | $V_{GS}=20V, V_{DS}=0V$ | --- | --- | 100 | nA |
| | Gate Leakage Current, Reverse | $V_{GS}=-20V, V_{DS}=0V$ | --- | --- | -100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 2 | --- | 4 | V |
| $R_{DS(ON)}$ | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=100A$ | -- | 6.2 | 7.2 | $m\Omega$ |
| Q_g | Total Gate Charge | $V_{DD}=75V$ | --- | 74 | --- | nC |
| Q_{gs} | Gate-Source Charge | $V_{GS}=10V$ | --- | 34 | --- | nC |
| Q_{gd} | Gate-Drain Charge | $I_D=100A$ | --- | 13 | --- | nC |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}=75V, V_{GS}=10V$ $I_D=50A, R_G=1.6\Omega$ | --- | 23 | --- | ns |
| t_r | Turn-on Rise Time | | -- | 48 | -- | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | --- | 61 | --- | ns |
| t_f | Turn-off Fall Time | | --- | 22 | --- | ns |
| C_{iss} | Input Capacitance | $V_{DS}=75V$ | --- | 5223 | --- | pF |
| C_{oss} | Output Capacitance | $V_{GS}=0V$ | --- | 689 | --- | pF |
| C_{rss} | Reverse Transfer Capacitance | $f=1\text{MHz}$ | --- | 14 | --- | pF |

Diode Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|----------|-------------------------------|-------------------------------------|------|------|------|-------|
| V_{SD} | Diode Forward Voltage | $I_S=100A, V_{GS}=0V$ | --- | --- | 1.4 | V |
| t_{rr} | Diode Reverse Recovery Time | $I_S=100A,$ $di_f/dt=100A/\mu s$ | --- | 119 | --- | ns |
| Q_{rr} | Diode Reverse Recovery Charge | | --- | 421 | --- | nC |

Notes:

1. $V_{DD}=100V, L=0.5mH, R_G=25\Omega,$ starting, $T_J=25^\circ\text{C}.$

Typical Characteristics

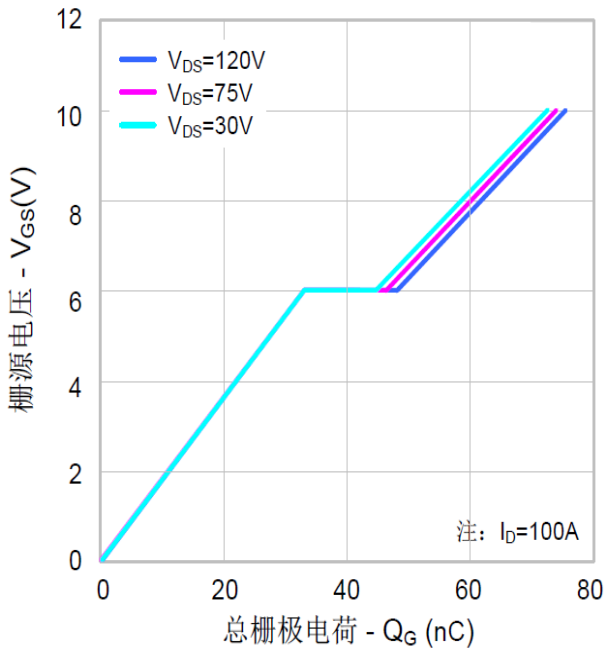


Fig.1 Gate Charge

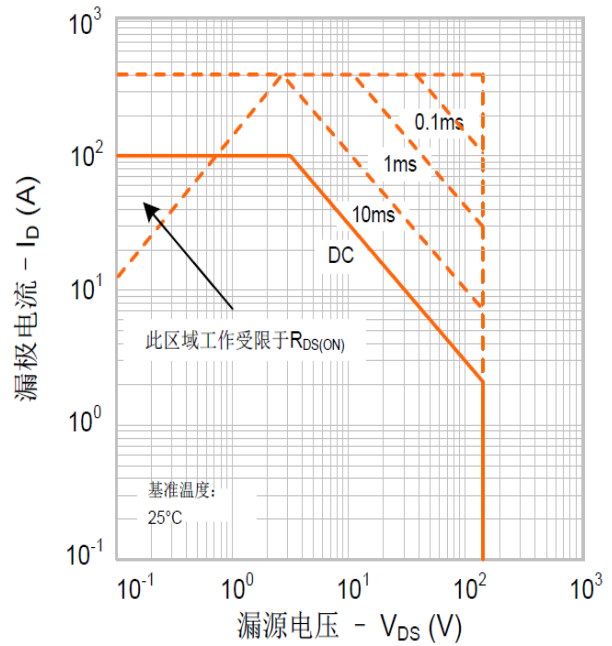


Fig.2 Safe Operation Area

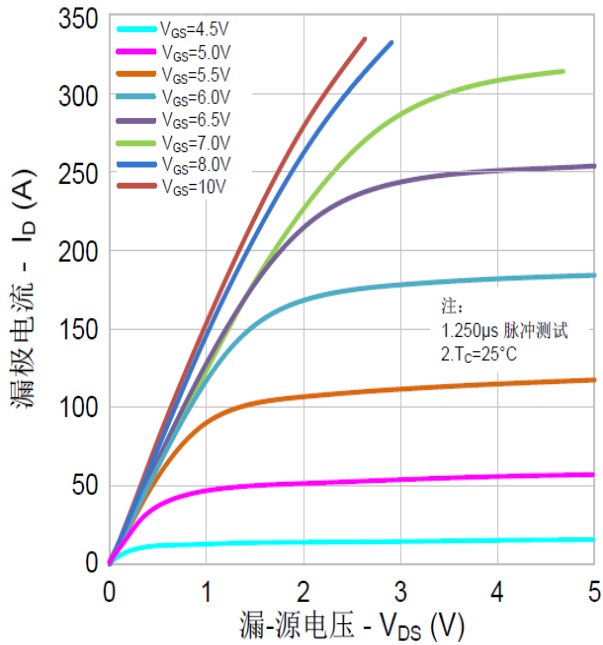


Fig.3 Output Characteristics

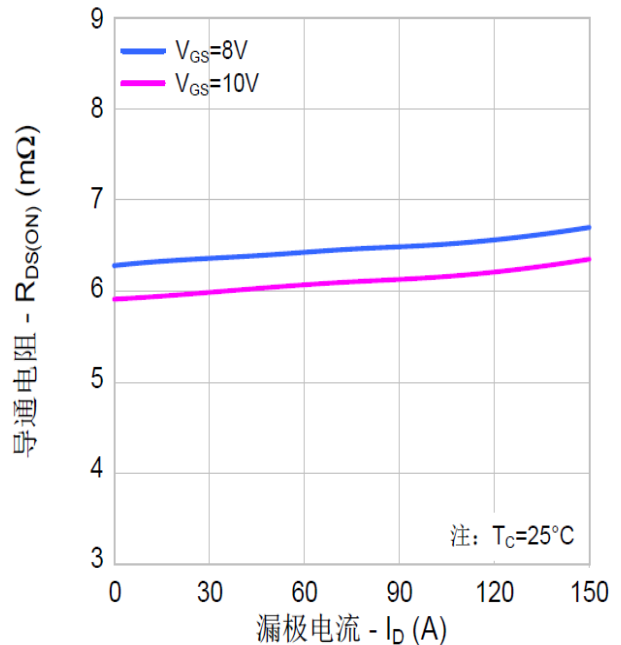


Fig.4 Drain-Source On Resistance

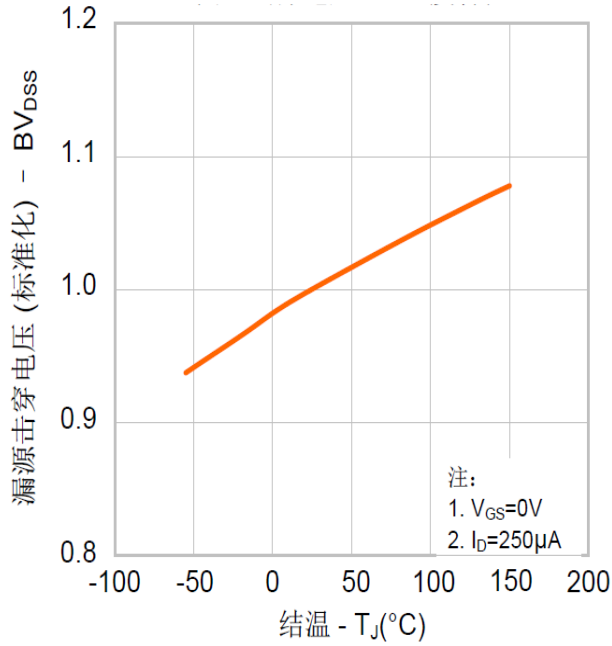


Fig.5 Drain-Source Breakdown Voltage

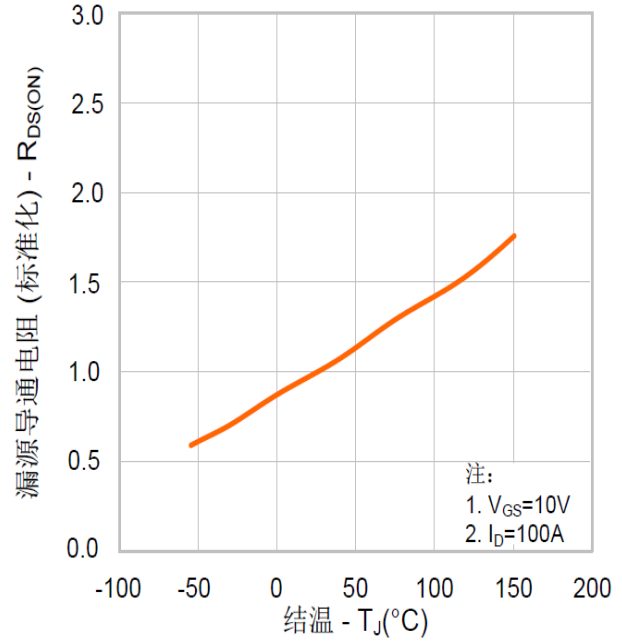


Fig.6 Drain-Source On Resistance

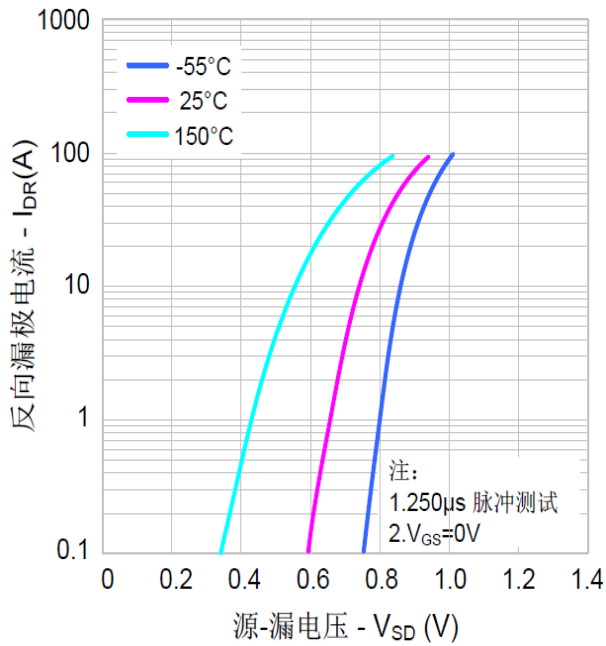


Fig.7 Source-Drain Diode Forward Current

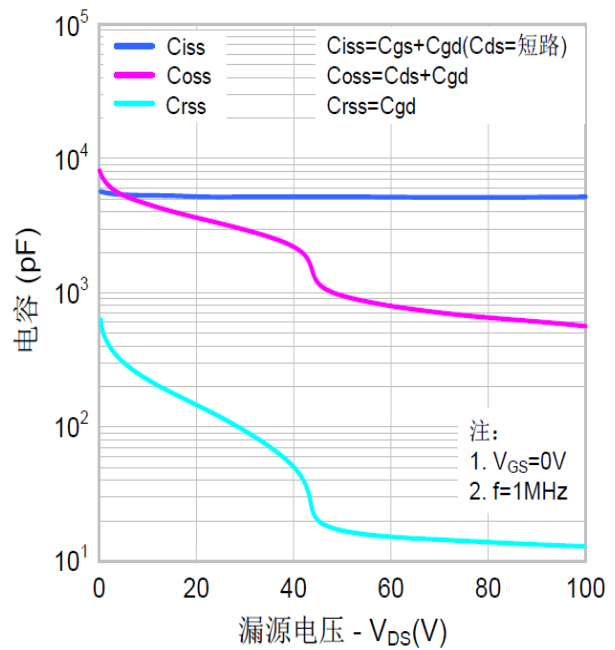
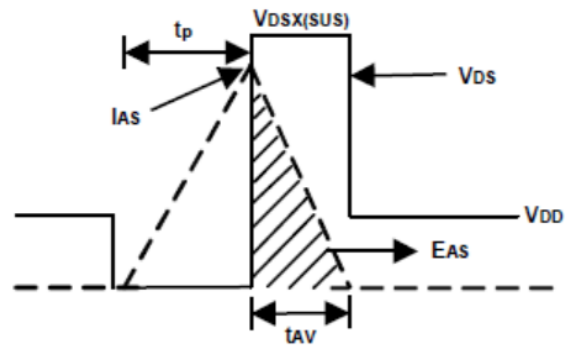
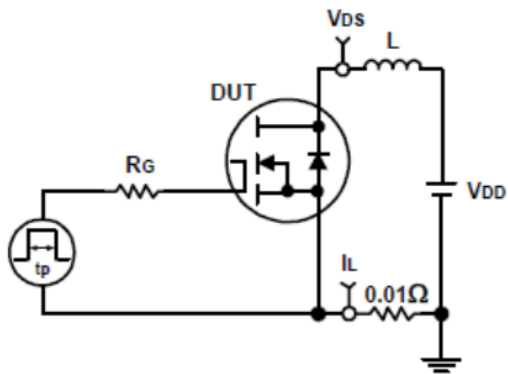
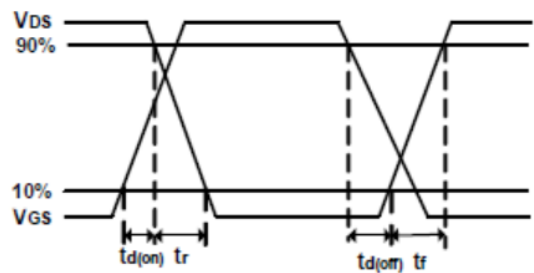
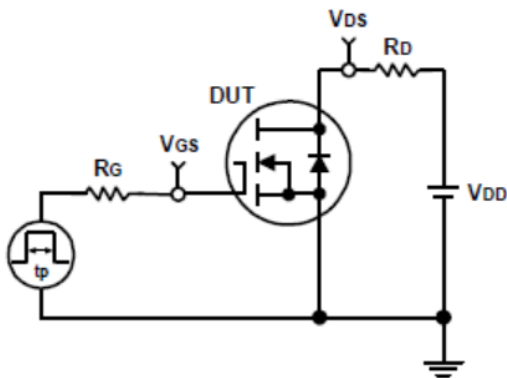


Fig.8 Capacitance

Avalanche Test Circuit and Waveforms

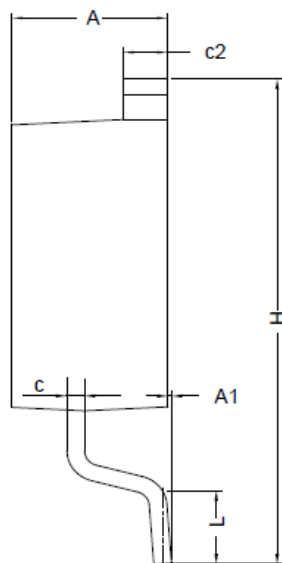
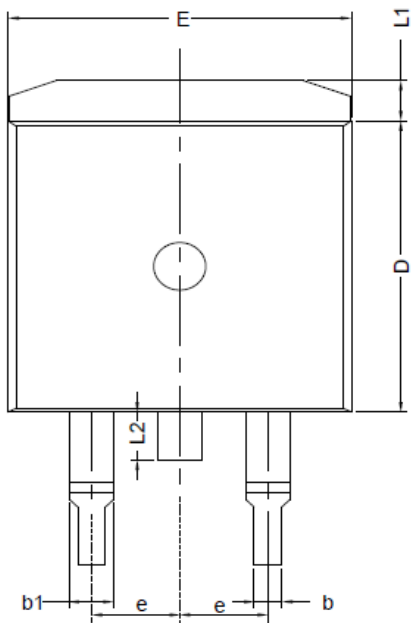


Switching Time Test Circuit and Waveforms

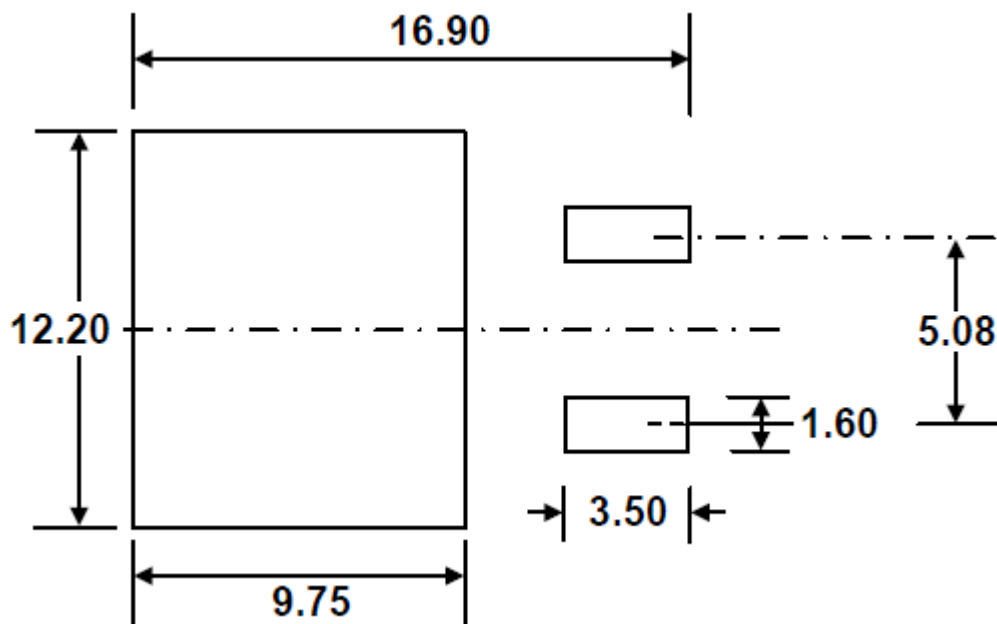


Package Information

TO-263-2L

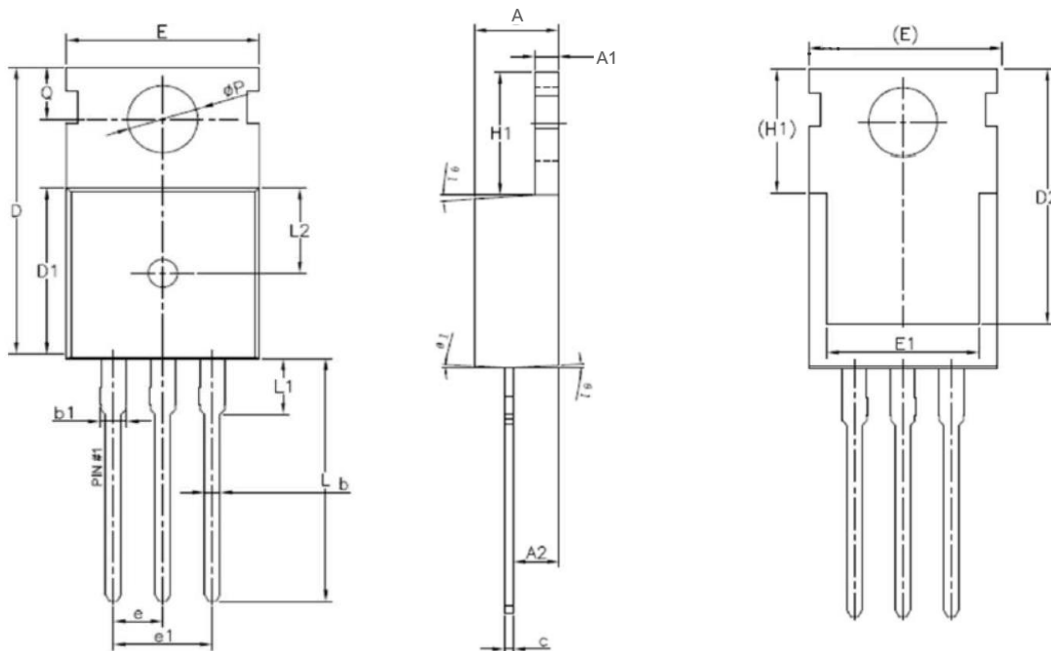


| SYMBOL | MILLIMETER | | |
|--------|------------|------|-------|
| | MIN | NOM | MAX |
| A | 4.30 | 4.57 | 4.72 |
| A1 | 0 | 0.10 | 0.25 |
| b | 0.71 | 0.81 | 0.91 |
| b1 | 1.17 | — | 1.50 |
| c | 0.30 | — | 0.60 |
| c2 | 1.17 | 1.27 | 1.37 |
| D | 8.50 | — | 9.35 |
| E | 9.80 | — | 10.45 |
| e | 2.54BSC | | |
| H | 14.70 | — | 15.75 |
| L | 2.00 | 2.30 | 2.74 |
| L1 | 1.12 | 1.27 | 1.42 |
| L2 | — | — | 1.75 |



Package Information

TO-220-3L



| SYMBOL | MIN | NOM | MAX |
|--------|---------|-------|-------|
| A | 4.40 | 4.50 | 4.60 |
| A1 | 1.27 | 1.30 | 1.33 |
| A2 | 2.30 | 2.40 | 2.50 |
| b | 0.70 | — | 0.90 |
| b1 | 1.27 | — | 1.40 |
| c | 0.45 | 0.50 | 0.60 |
| D | 15.30 | 15.70 | 16.10 |
| D1 | 9.10 | 9.20 | 9.30 |
| D2 | 13.10 | — | 13.70 |
| E | 9.70 | 9.90 | 10.20 |
| E1 | 7.80 | 8.00 | 8.20 |
| e | 2.54BSC | | |
| e1 | 5.08BSC | | |
| H1 | 6.30 | 6.50 | 6.70 |
| L | 12.78 | 13.08 | 13.38 |
| L1 | — | — | 3.50 |
| L2 | 4.60REF | | |
| φP | 3.55 | 3.60 | 3.65 |
| Q | 2.73 | — | 2.87 |
| θ1 | 1° | 3° | 5° |