

### General Description

The 100P03 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ . This device is suitable for use as a load switch or in PWM applications.

### Features

- Low On-Resistance
- 100% avalanche tested
- RoHS Compliant

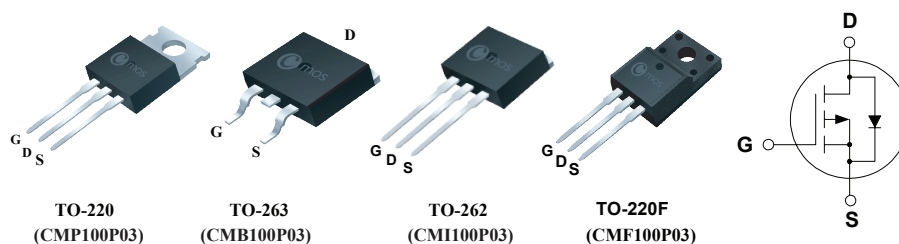
### Product Summary

| BVDSS | $R_{DS(on)}$ max. | ID    |
|-------|-------------------|-------|
| -30V  | 8.8mΩ             | -100A |

### Applications

- DC-DC Converters
- Switching Application

### TO-220/263/262/220F Pin Configuration



### Absolute Maximum Ratings

| Symbol                 | Parameter                              | 220/263/262 | 220F  | Units |
|------------------------|----------------------------------------|-------------|-------|-------|
| $V_{DS}$               | Drain-Source Voltage                   | -30         |       |       |
| $V_{GS}$               | Gate-Source Voltage                    | ±20         |       | V     |
| $I_D@T_C=25^{\circ}C$  | Continuous Drain Current               | -100        | -100* | A     |
| $I_D@T_C=100^{\circ}C$ | Continuous Drain Current               | -65         | -65*  | A     |
| $I_{DM}$               | Pulsed Drain Current                   | -400        | -400* | A     |
| EAS                    | Single Pulse Avalanche Energy (Note 1) | 312         |       | mJ    |
| $P_D@T_C=25^{\circ}C$  | Total Power Dissipation                | 100         | 35    | W     |
| $T_{STG}$              | Storage Temperature Range              | -55 to 150  |       | °C    |
| $T_J$                  | Operating Junction Temperature Range   | -55 to 150  |       | °C    |

\* Drain current limited by maximum junction temperature.

### Thermal Data

| Symbol          | Parameter                                | 220/263/262 | 220F | Unit |
|-----------------|------------------------------------------|-------------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient Max. | 62          | 62   | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-case Max.    | 1.25        | 3.57 | °C/W |

### Electrical Characteristics (T<sub>J</sub>=25°C , unless otherwise noted)

| Symbol              | Parameter                         | Conditions                                                                                    | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|-----------------------------------------------------------------------------------------------|------|------|------|------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage    | V <sub>GS</sub> =0V , I <sub>D</sub> =-250μA                                                  | -30  | ---  | ---  | V    |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance | V <sub>GS</sub> =-10V , I <sub>D</sub> =-20A                                                  | ---  | 7.7  | 8.8  | mΩ   |
|                     |                                   | V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-15A                                                 | ---  | 11   | 15   |      |
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> = -250μA                                    | -1   | ---  | -2.5 | V    |
| I <sub>DSS</sub>    | Drain-Source Leakage Current      | V <sub>DS</sub> =-30V , V <sub>GS</sub> =0V                                                   | ---  | ---  | -1   | μA   |
| I <sub>GSS</sub>    | Gate-Source Leakage Current       | V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V                                                  | ---  | ---  | ±100 | nA   |
| g <sub>fs</sub>     | Forward Transconductance          | V <sub>DS</sub> =-10V , I <sub>D</sub> =-20A                                                  | ---  | 21   | ---  | S    |
| R <sub>g</sub>      | Gate Resistance                   | V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz                                            | ---  | 20   | ---  | Ω    |
| Q <sub>g</sub>      | Total Gate Charge                 | V <sub>DS</sub> =-24V , I <sub>D</sub> =-20A<br>V <sub>GS</sub> =-10V                         | ---  | 58   | ---  | nC   |
| Q <sub>gs</sub>     | Gate-Source Charge                |                                                                                               | ---  | 7    | ---  |      |
| Q <sub>gd</sub>     | Gate-Drain Charge                 |                                                                                               | ---  | 16   | ---  |      |
| T <sub>d(on)</sub>  | Turn-On Delay Time                | V <sub>DD</sub> =-15V , V <sub>GEN</sub> =-10V , I <sub>D</sub> =-10A<br>R <sub>G</sub> =4.7Ω | ---  | 7    | ---  | ns   |
| T <sub>r</sub>      | Rise Time                         |                                                                                               | ---  | 14   | ---  |      |
| T <sub>d(off)</sub> | Turn-Off Delay Time               |                                                                                               | ---  | 86   | ---  |      |
| T <sub>f</sub>      | Fall Time                         |                                                                                               | ---  | 252  | ---  |      |
| C <sub>iss</sub>    | Input Capacitance                 | V <sub>DS</sub> =-25V , V <sub>GS</sub> =0V , f=1MHz                                          | ---  | 2300 | ---  | pF   |
| C <sub>oss</sub>    | Output Capacitance                |                                                                                               | ---  | 270  | ---  |      |
| C <sub>rss</sub>    | Reverse Transfer Capacitance      |                                                                                               | ---  | 200  | ---  |      |

### Diode Characteristics

| Symbol          | Parameter                 | Conditions                                                        | Min. | Typ.  | Max. | Unit |
|-----------------|---------------------------|-------------------------------------------------------------------|------|-------|------|------|
| I <sub>S</sub>  | Continuous Source Current | V <sub>G</sub> =V <sub>D</sub> =0V , Force Current                | ---  | ---   | -100 | A    |
| I <sub>SM</sub> | Pulsed Source Current     |                                                                   | ---  | ---   | -400 | A    |
| V <sub>SD</sub> | Diode Forward Voltage     | V <sub>GS</sub> =0V , I <sub>S</sub> =-20A , T <sub>J</sub> =25°C | ---  | -0.86 | -1.3 | V    |

Note :

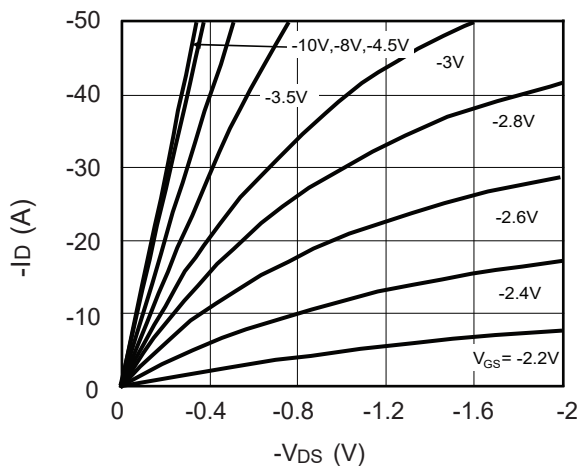
1.The EAS data shows Max. rating .The test condition is V<sub>bs</sub>=-25V , V<sub>GS</sub>=-10V , L=1mH , I<sub>AS</sub>=-25A.

This product has been designed and qualified for the consumer market.

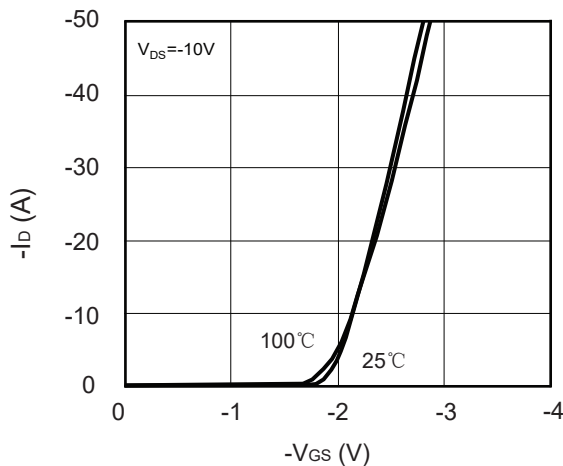
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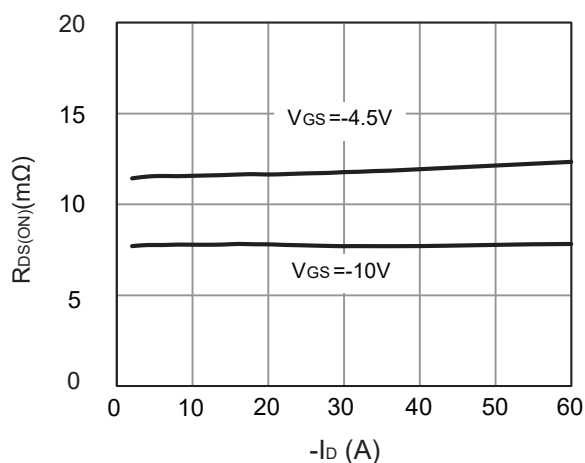
## Typical Characteristics



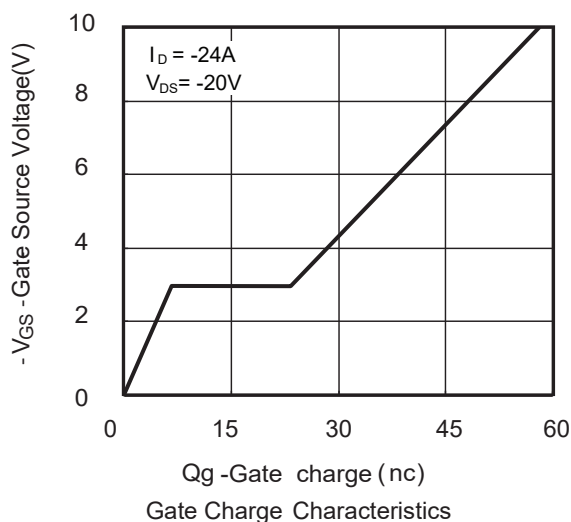
On-Region Characteristics



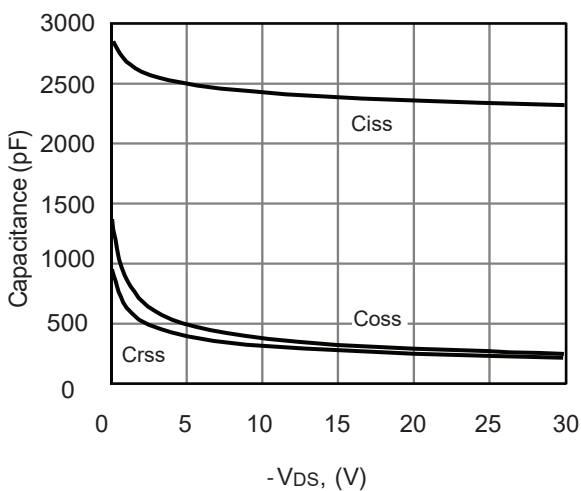
transfer characteristics



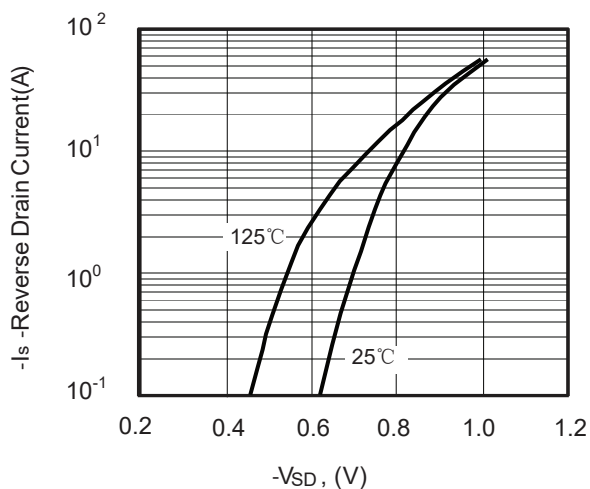
On-Resistance vs. Drain Current



Gate Charge Characteristics



Capacitance Characteristics

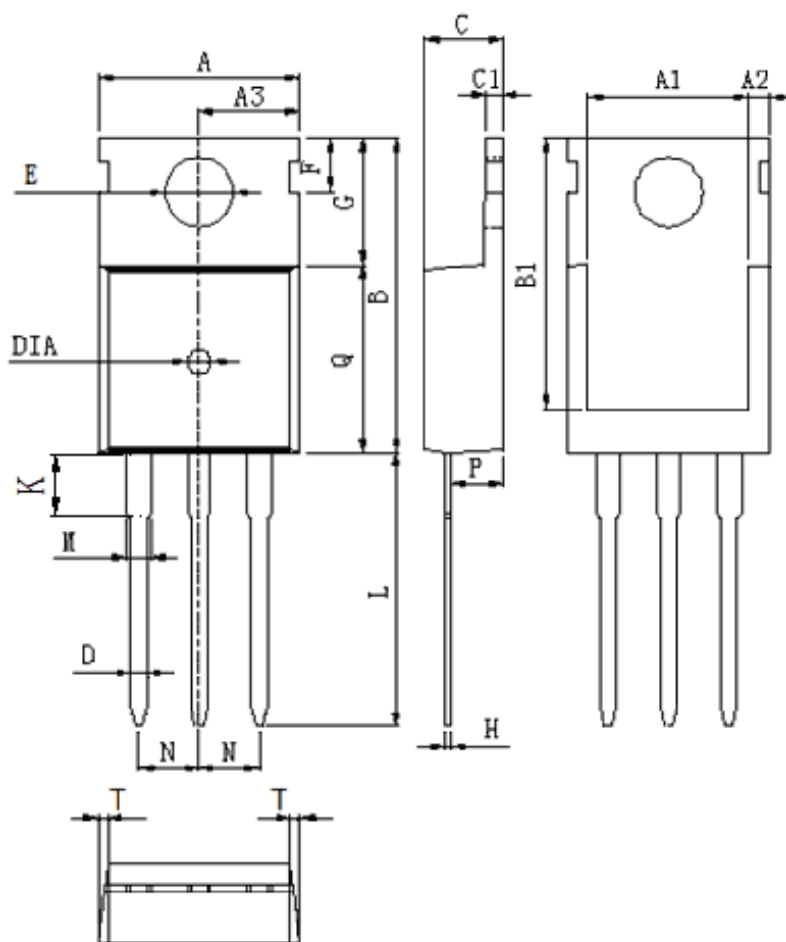


Body Diode Forward Voltage Variation with Source Current and Temperature

## Package Dimension

TO-220

Unit :mm

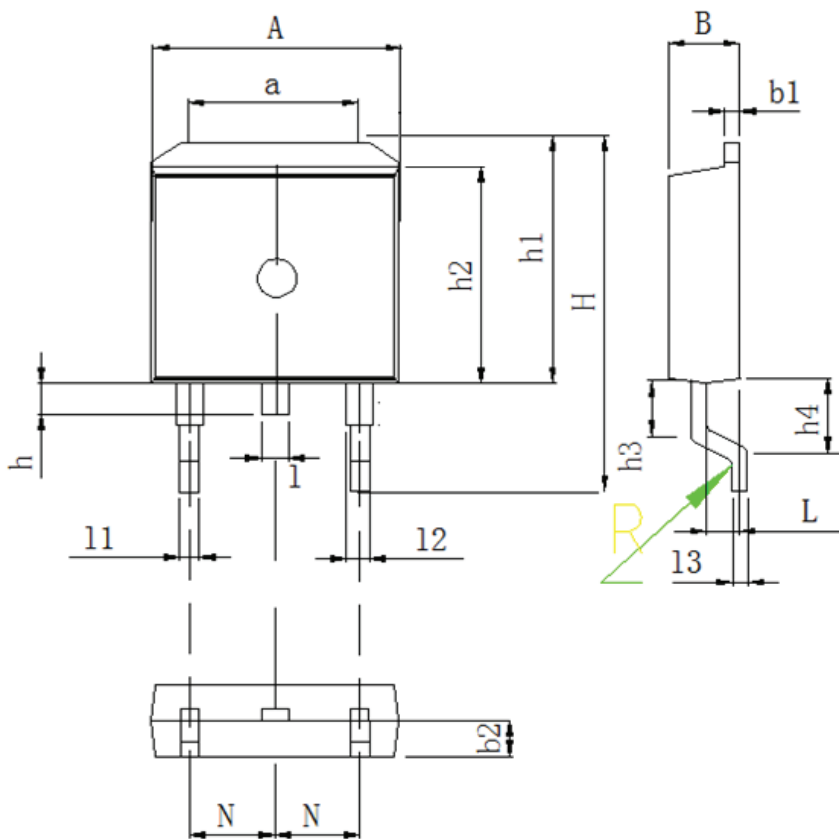


| DIM | MILLIMETERS            |
|-----|------------------------|
| A   | $10.0 \pm 0.3$         |
| A1  | $8.64 \pm 0.2$         |
| A2  | $1.15 \pm 0.1$         |
| A3  | $5.0 \pm 0.2$          |
| B   | $15.8 \pm 0.4$         |
| B1  | $13.2 \pm 0.3$         |
| C   | $4.56 \pm 0.1$         |
| C1  | $1.3 \pm 0.2$          |
| D   | $0.8 \pm 0.2$          |
| E   | $3.6 \pm 0.2$          |
| F   | $2.95 \pm 0.3$         |
| G   | $6.5 \pm 0.3$          |
| H   | $0.5 \pm 0.1$          |
| K   | $3.1 \pm 0.2$          |
| L   | $13.2 \pm 0.4$         |
| M   | $1.25 \pm 0.1$         |
| N   | $2.54 \pm 0.1$         |
| P   | $2.4 \pm 0.3$          |
| Q   | $9.0 \pm 0.3$          |
| T   | W:0.35                 |
| DIA | $\odot 1.5$ (deep 0.2) |

Package Dimension

TO-263

Unit :mm

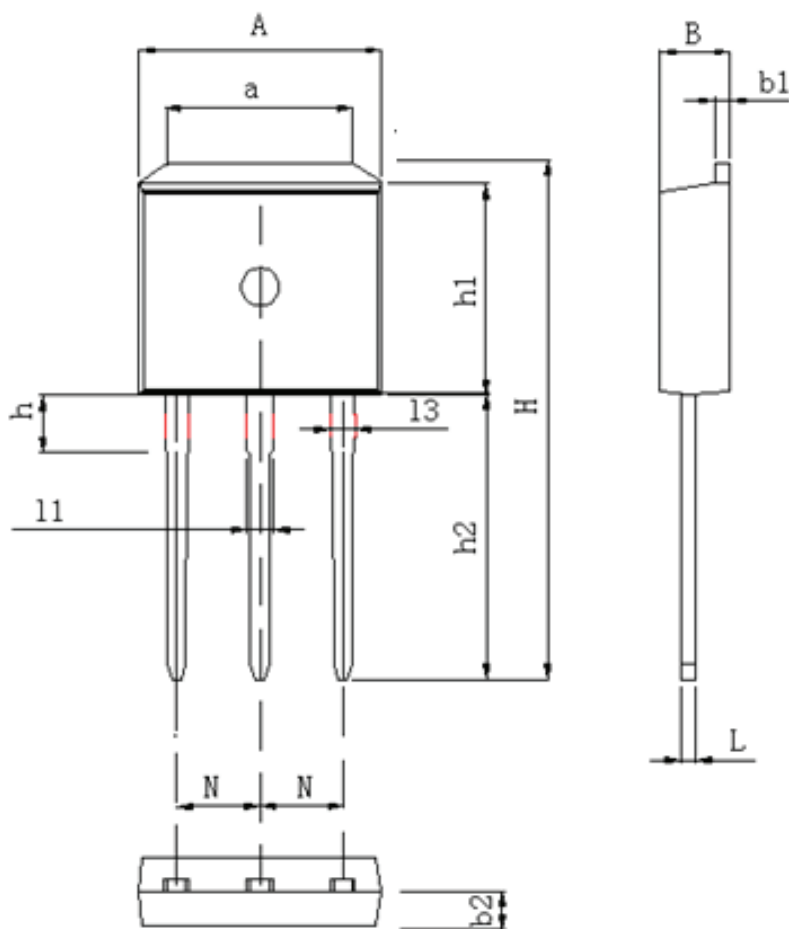


| DIM | MILLIMETERS     |
|-----|-----------------|
| A   | $9.8 \pm 0.2$   |
| a   | $7.4 \pm 0.4$   |
| B   | $4.5 \pm 0.2$   |
| b1  | $1.3 \pm 0.05$  |
| b2  | $2.4 \pm 0.2$   |
| H   | $15.5 \pm 0.3$  |
| h   | $1.54 \pm 0.2$  |
| h1  | $10.5 \pm 0.2$  |
| h2  | $9.2 \pm 0.1$   |
| h3  | $1.54 \pm 0.2$  |
| h4  | $2.7 \pm 0.2$   |
| L   | $2.4 \pm 0.2$   |
| l   | $1.3 \pm 0.1$   |
| l1  | $0.8 \pm 0.1$   |
| l2  | $1.3 \pm 0.1$   |
| l3  | $0.5 \pm 0.1$   |
| N   | $2.54 \pm 0.1$  |
| R   | $0.5R \pm 0.05$ |

## Package Dimension

TO-262

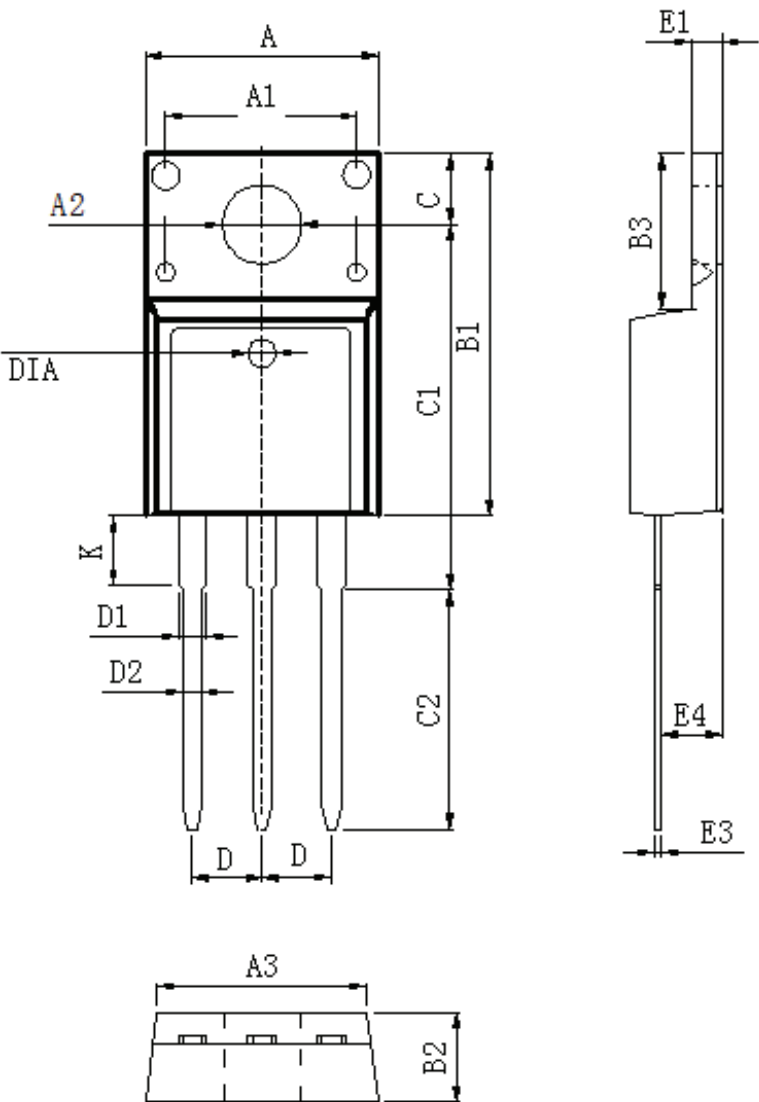
Unit :mm



| DIM | MILLIMETERS    |
|-----|----------------|
| A   | $9.98 \pm 0.2$ |
| a   | $7.4 \pm 0.4$  |
| B   | $4.5 \pm 0.2$  |
| b1  | $1.3 \pm 0.05$ |
| b2  | $2.4 \pm 0.2$  |
| H   | $23.9 \pm 0.3$ |
| h   | $3.1 \pm 0.2$  |
| h1  | $9.16 \pm 0.2$ |
| h2  | $13.2 \pm 0.2$ |
| L   | $0.5 \pm 0.1$  |
| l1  | $1.3 \pm 0.1$  |
| l2  | $0.8 \pm 0.1$  |
| N   | $2.45 \pm 0.1$ |

Package Dimension

TO-220F                      Unit :mm



| DIM | MILLIMETERS     |
|-----|-----------------|
| A   | 10.16±0.3       |
| A1  | 7.00±0.1        |
| A2  | 3.3±0.2         |
| A3  | 9.5±0.2         |
| B1  | 15.87±0.3       |
| B2  | 4.7±0.2         |
| B3  | 6.68±0.4        |
| C   | 3.3±0.2         |
| C1  | 12.57±0.3       |
| C2  | 10.02±0.5       |
| D   | 2.54±0.05       |
| D1  | 1.28±0.2        |
| D2  | 0.8±0.1         |
| K   | 3.1±0.3         |
| E1  | 2.54±0.1        |
| E3  | 0.5±0.1         |
| E4  | 2.76±0.2        |
| DIA | ⌀1.5 (deep 0.2) |