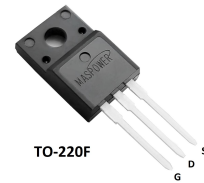
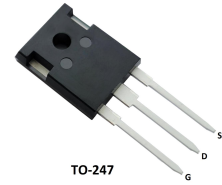
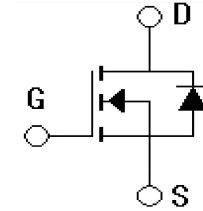


## Features

- $V_{DS}=1200V, I_D=10A$   
 $R_{DS(on),type}=2\Omega @ V_{GS}=10V$
- High density cell design for ultra low  $R_{ds(on)}$
- Low gate charge
- Improved dv/dt capability
- RoHS product

## Applications

- High Voltage Switched-mode and resonant-mode power supplies
- High Voltage Pulse Power Applications
- High Voltage Discharge circuits in Lasers Pulsers, Spark Igniters, RF Generators
- High Voltage DC-DC converters
- High Voltage DC-AC inverters



## Absolute Ratings ( $T_c=25^\circ C$ )

| Parameter                                       | Symbol         | Limit    | Unit       |
|-------------------------------------------------|----------------|----------|------------|
| Drain-Source Voltage                            | $V_{DSS}$      | 1200     | V          |
| Transient Gate-Source Voltage                   | $V_{GSS}$      | $\pm 30$ | V          |
| Continuous Gate-Source Voltage                  | $V_{GSS}$      | $\pm 20$ | V          |
| Drain Current-continuous                        | $I_D$          | 10       | A          |
| Drain Current-pulse(note1)                      | $I_{DM}$       | 15       | A          |
| Single Pulsed Avalanche Energy (note2)          | $E_{AS}$       | 30       | mJ         |
| Maximum Power Dissipation (TO-247/TO-263)       | PD             | 357      | W          |
| Maximum Power Dissipation (TO-220F)             | PD             | 67       |            |
| Operating and Storage Temperature Range         | $T_J, T_{STG}$ | -55~+150 | $^\circ C$ |
| Maximum lead temperature for soldering purposes | $T_L$          | 300      | $^\circ C$ |

**Electrical Characteristics**( $T_{CASE}=25^{\circ}C$  unless otherwise specified)

| Parameter                         | Symbol       | Tests conditions                       | Min  | Typ  | Max       | Units    |
|-----------------------------------|--------------|----------------------------------------|------|------|-----------|----------|
| Drain-Source Voltage              | $BV_{DSS}$   | $I_D=250\mu A, V_{GS}=0V$              | 1200 | -    | -         | V        |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{DS}=V_{DSS}, V_{GS}=0V$            | -    | -    | 1         | $\mu A$  |
| Gate-Body Leakage Current         | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$            | -    | -    | $\pm 100$ | nA       |
| <b>On-Characteristics</b>         |              |                                        |      |      |           |          |
| Gate Threshold Voltage            | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$          | 2.5  | -    | 5.5       | V        |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=1A$<br>(note3)        | -    | 2    | 2.5       | $\Omega$ |
| Forward Transconductance          | $g_{fs}$     | $V_{DS}=20V, I_D=5A$<br>(note3)        | -    | 13   | -         | S        |
| <b>Dynamic Characteristics</b>    |              |                                        |      |      |           |          |
| Input capacitance                 | $C_{iss}$    | $V_{DS}=25V, V_{GS}=0V,$<br>$f=1.0MHz$ | -    | 1871 | -         | pF       |
| Output capacitance                | $C_{oss}$    |                                        | -    | 153  | -         | pF       |
| Reverse transfer capacitance      | $C_{rss}$    |                                        | -    | 9    | -         | pF       |

**Electrical Characteristics**( $T_{CASE}=25^{\circ}C$  unless otherwise specified)

| Parameter                                              | Symbol       | Tests conditions                               | Min | Typ | Max | Units |
|--------------------------------------------------------|--------------|------------------------------------------------|-----|-----|-----|-------|
| Switching-Characteristics                              |              |                                                |     |     |     |       |
| Turn-On delay time                                     | $t_{d(on)}$  | $V_{DS}=600V, I_D=5A,$<br>$V_{GS}=10V$         | -   | 25  | -   | ns    |
| Turn-On rise time                                      | $t_r$        |                                                | -   | 33  | -   | ns    |
| Turn-Off delay time                                    | $t_{d(Off)}$ |                                                | -   | 150 | -   | ns    |
| Turn-Off rise time                                     | $t_f$        |                                                | -   | 50  | -   | ns    |
| Total Gate Charge                                      | $Q_g$        | $V_{DS}=600V, I_D=5A,$<br>$V_{GS}=10V$ (note4) | -   | 41  | -   | nC    |
| Gate-Source charge                                     | $Q_{gs}$     |                                                | -   | 11  | -   | nC    |
| Gate-Drain charge                                      | $Q_{gd}$     |                                                | -   | 13  | -   | nC    |
| Drain-Source Diode Characteristics and Maximum Ratings |              |                                                |     |     |     |       |
| Maximum Continuous Drain-Source Diode Forward Current  | $V_{SD}$     | $V_{GS}=0V, I_S=1A$<br>(note3)                 | -   | -   | 1.2 | V     |

|                         |          |                            |   |      |    |         |
|-------------------------|----------|----------------------------|---|------|----|---------|
| Diode Forward Current   | $I_S$    | $TC=25^{\circ}C$           | - | -    | 10 | A       |
| Reverse recovery time   | $T_{rr}$ | $I_S=5A, di/dt=100A/\mu s$ | - | 530  | -  | ns      |
| Reverse recovery charge | $Q_{rr}$ | $V_R=100V, V_{GS}=0V$      | - | 3.53 | -  | $\mu C$ |

## Thermal Characteristics

| Parameter                               | Symbol        | Value  |        |         | Unit          |
|-----------------------------------------|---------------|--------|--------|---------|---------------|
|                                         |               | TO-263 | TO-247 | TO-220F |               |
| Thermal Resistance, junction to Case    | $R_{th(j-C)}$ | 0.35   | 0.35   | 1.84    | $^{\circ}C/W$ |
| Thermal Resistance, junction to Ambient | $R_{th(j-A)}$ | 40     | 36     | 62.5    | $^{\circ}C/W$ |

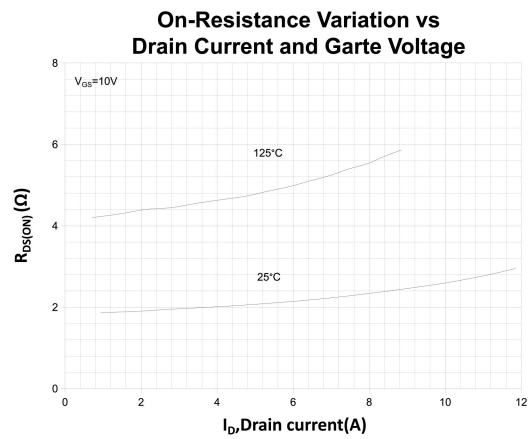
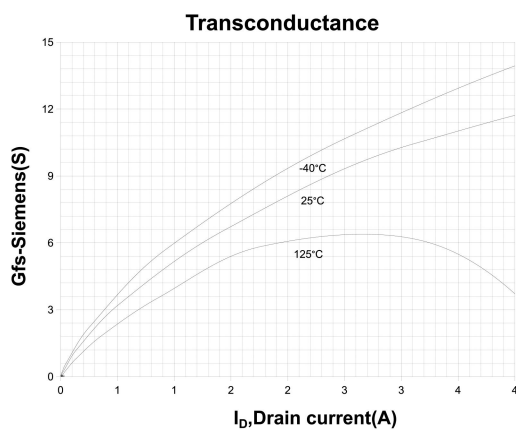
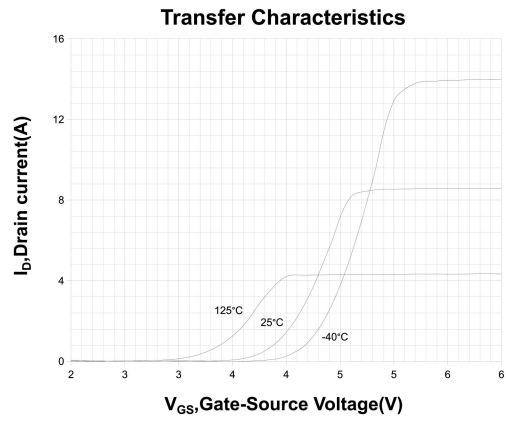
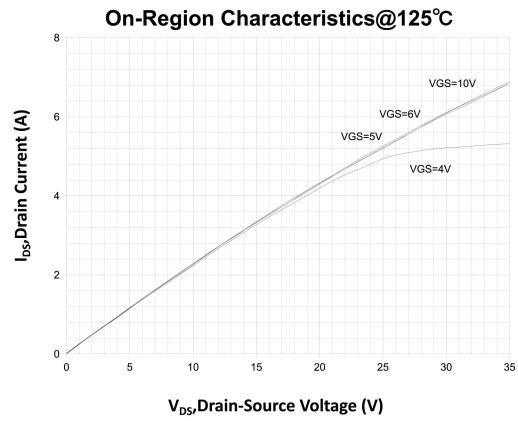
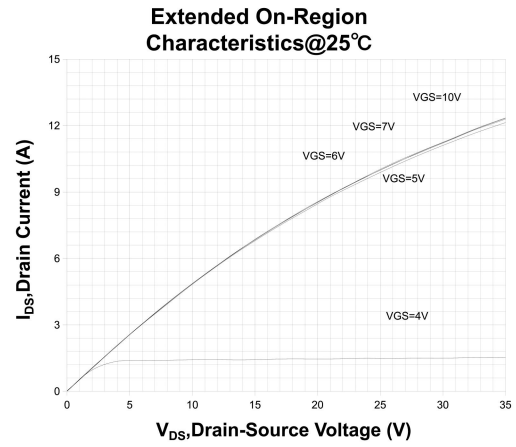
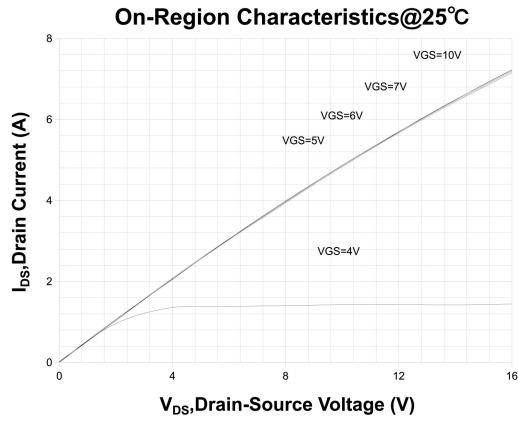
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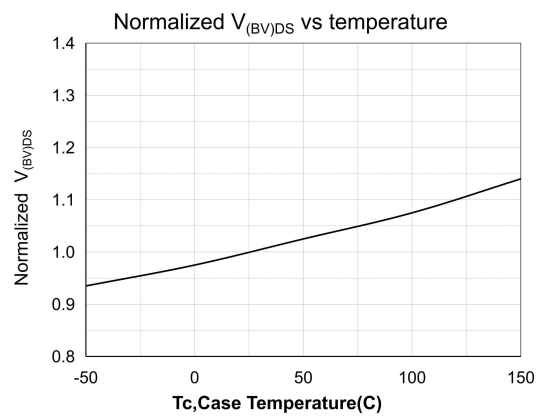
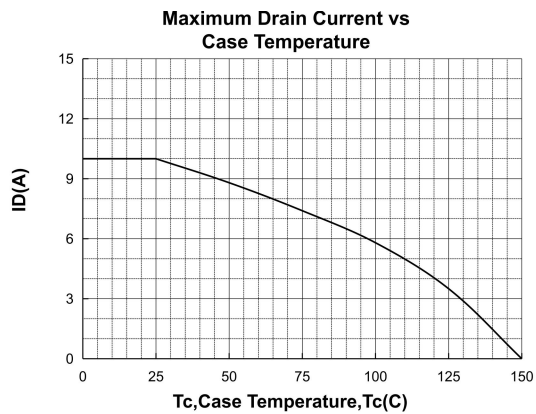
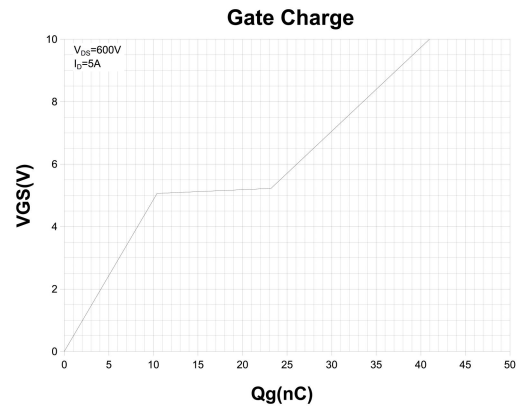
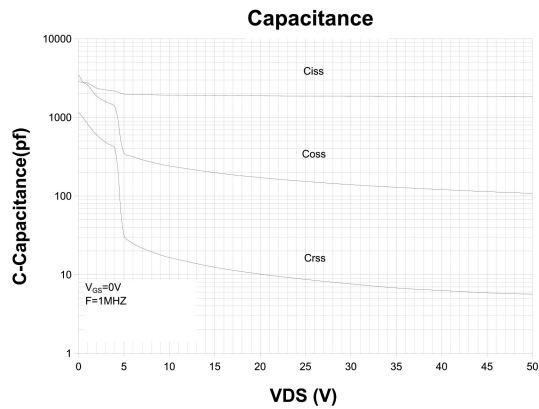
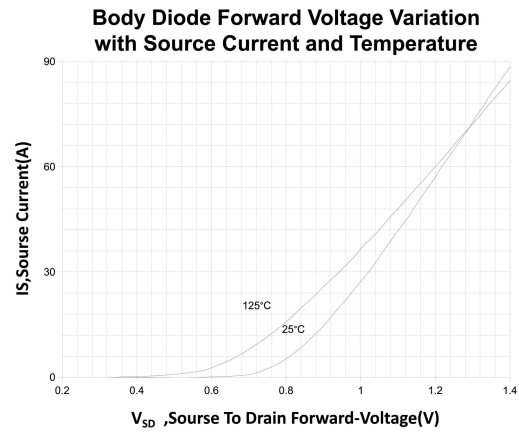
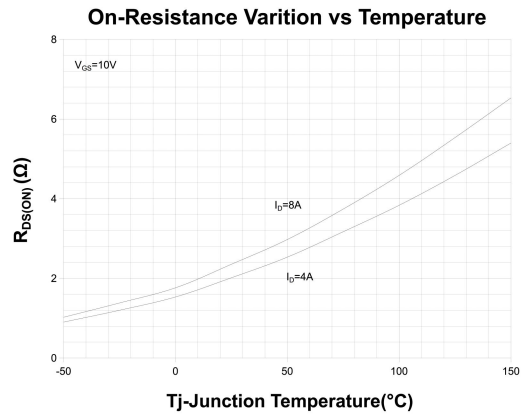
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2.  $L = 15\text{ mH}$ ,  $I_{AS} = 2\text{ A}$ ,  $V_{DD} = 50V$ ,  $R_G = 25\ \Omega$ , Starting  $T_J = 25^{\circ}C$
3. Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
4. Essentially independent of operating temperature

## Order information

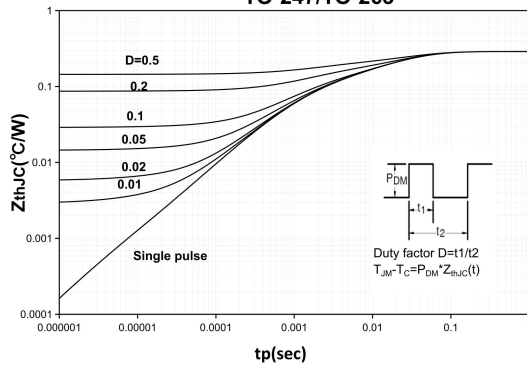
| Order codes  | Package | Packaging |
|--------------|---------|-----------|
| MS10N120HGC0 | TO-247  | Tube      |
| MS10N120HGT1 | TO-220F | Tube      |
| MS10N120HGE0 | TO-263  | Tube      |

## Electrical Characteristics

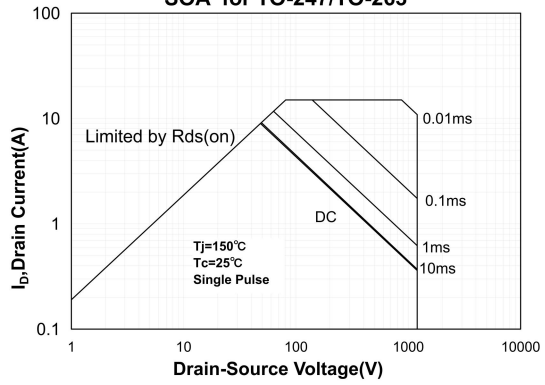




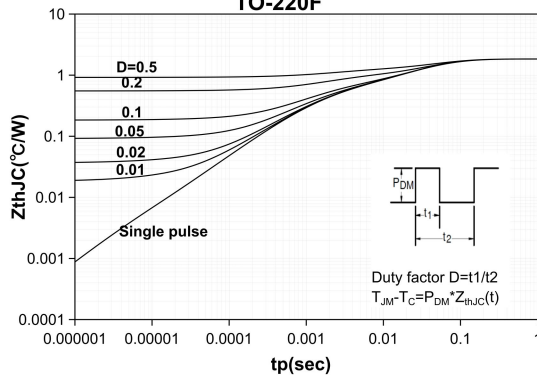
Transient Thermal Response Curve for TO-247/TO-263



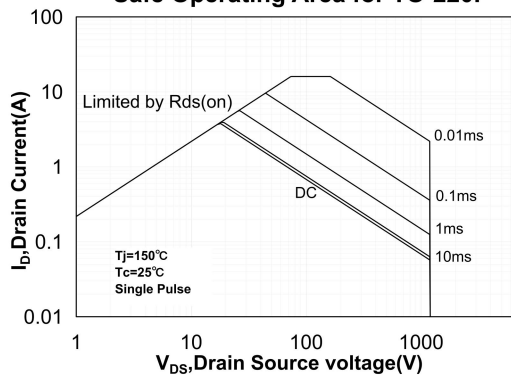
SOA for TO-247/TO-263



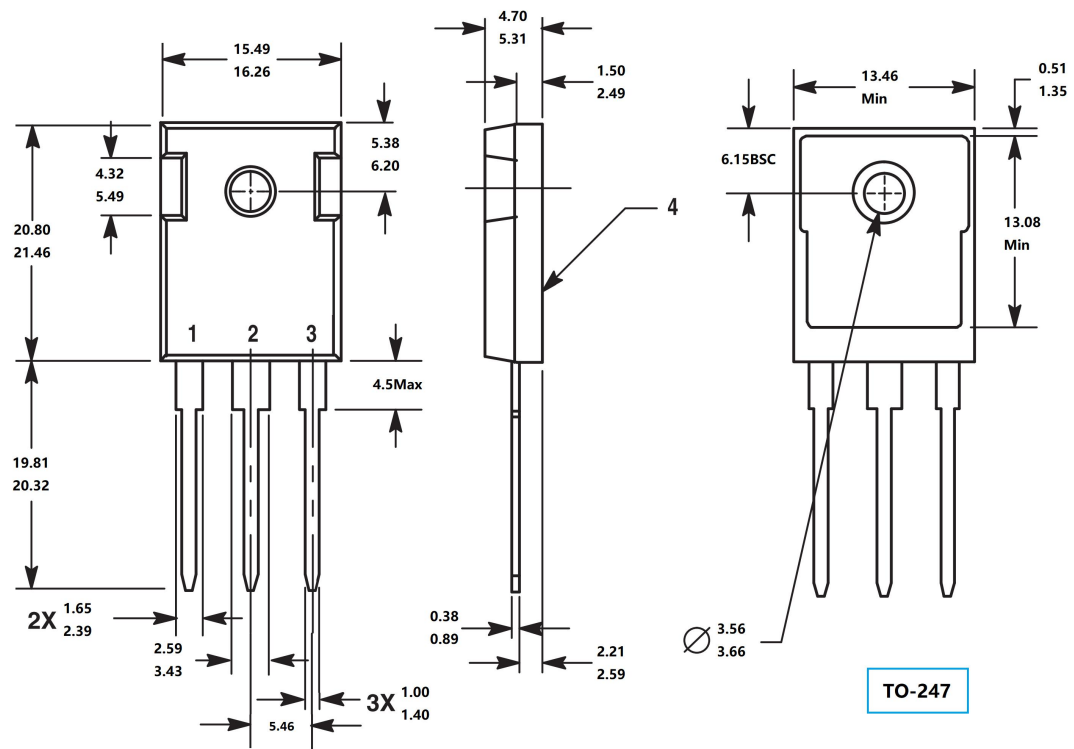
Transient Thermal Response Curve for TO-220F

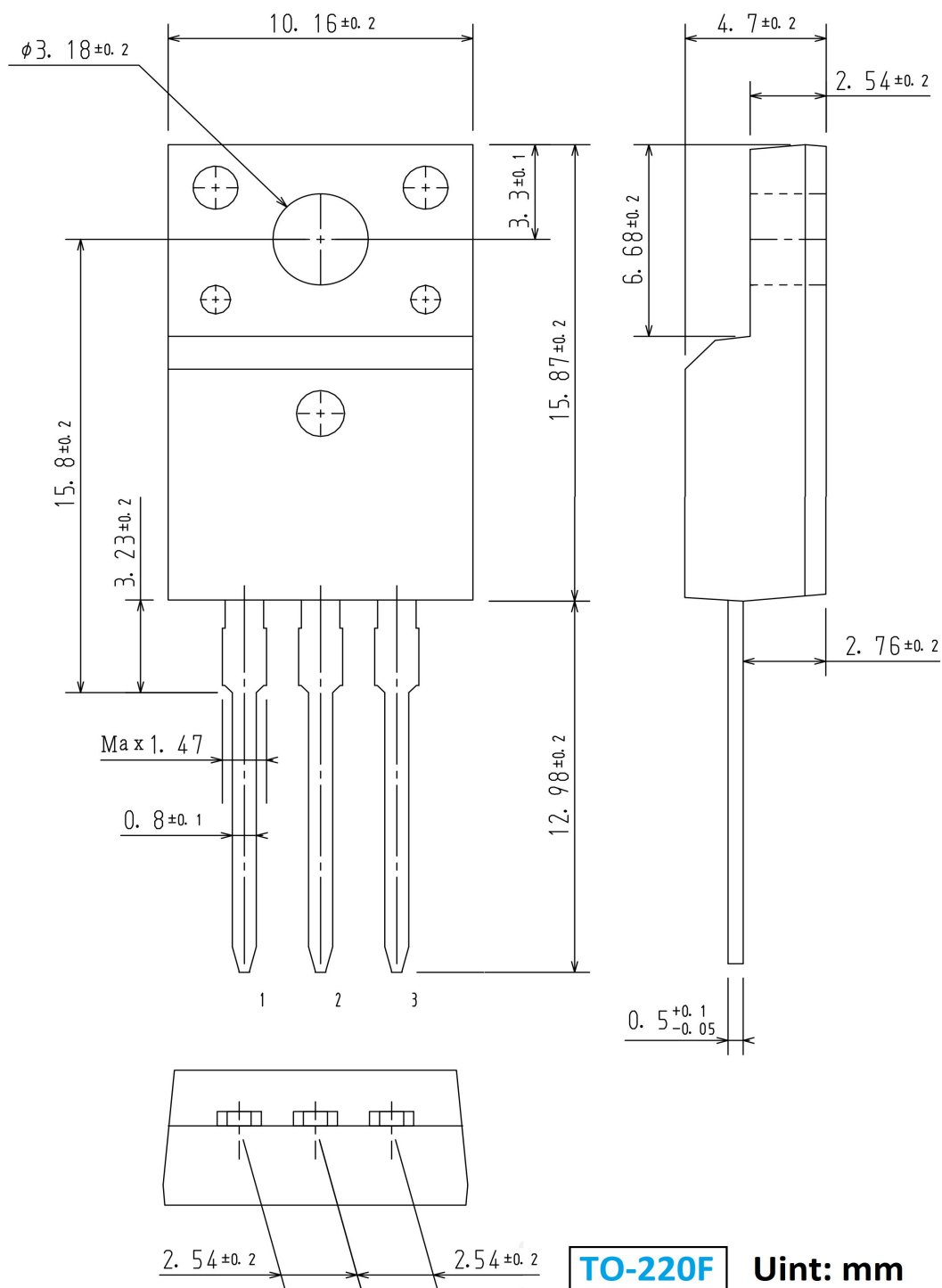


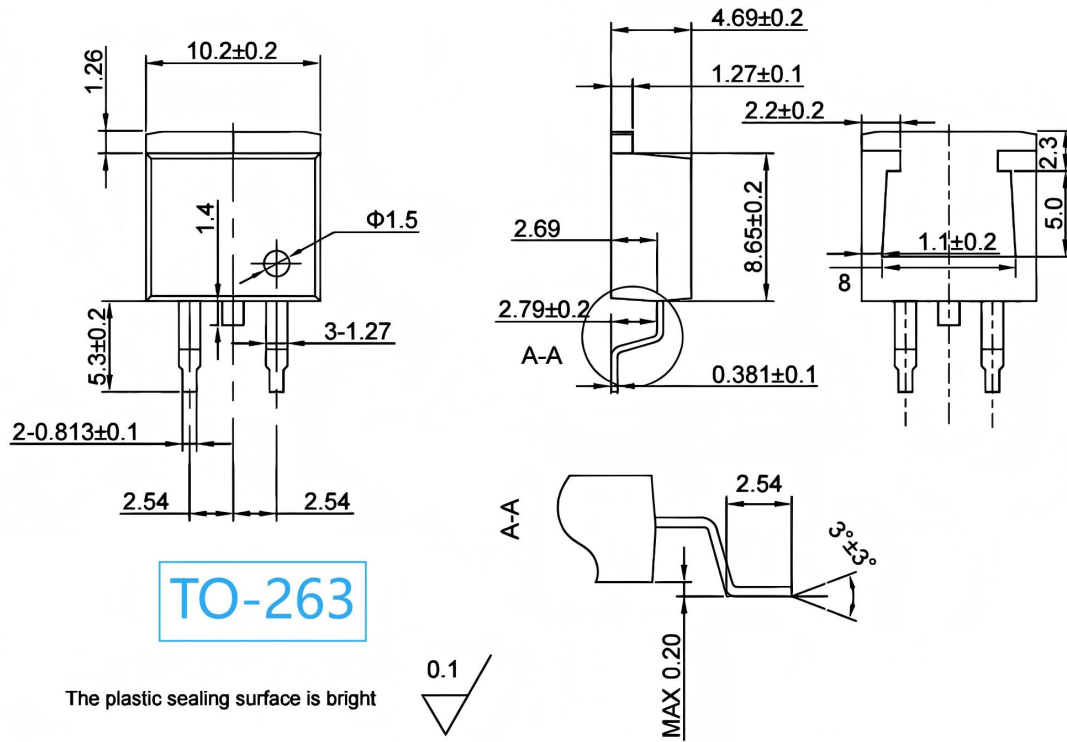
Safe Operating Area for TO-220F



**Package Mechanical DATA**







#### Notes:

1. Unmarked tolerance  $\pm 0.15\text{mm}$ ; unmarked  $R < 0.15\text{mm}$
2. The resin body is not allowed to have defects, shrinkage holes, cracks, bubbles and other harmful defects
3. The drawing indicates that the leg has reinforcement
4. Unit : mm