

| | |
|-------|---------------|
| V_R | 1200V |
| I_F | 5A/10A* |
| Q_C | 17nC(Per leg) |

(*Per leg/ Both legs)

●Features

- 1) AEC-Q101 qualified
- 2) Low forward voltage
- 3) Negligible recovery time/current
- 4) Temperature independent switching behavior

●Applications

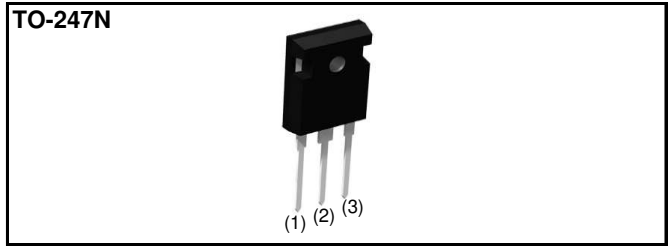
- On Board Charger
- DC/DC Converter
- Wireless Charger
- EV Charger

●Absolute maximum ratings ($T_{vj} = 25^{\circ}\text{C}$)

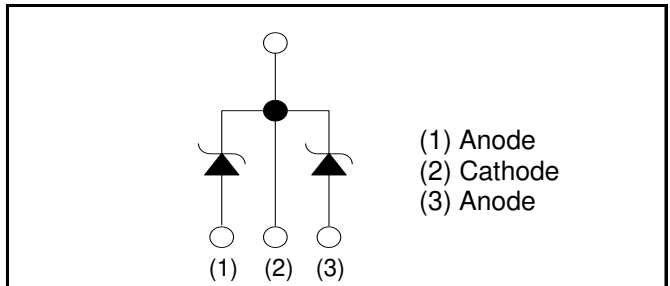
| Parameter | Symbol | Value | Unit | |
|---|---------------|--|--------------------|----------------------|
| Reverse voltage (repetitive peak) | V_{RM} | 1200 | V | |
| Reverse voltage (DC) | V_R | 1200 | V | |
| Continuous forward current *3 ($T_c = 148^{\circ}\text{C}$) | I_F | 5/10 | A | |
| Surge non-repetitive forward current *3 | I_{FSM} | PW=10ms sinusoidal, $T_{vj}=25^{\circ}\text{C}$ | 22/45 | A |
| | | PW=10ms sinusoidal, $T_{vj}=150^{\circ}\text{C}$ | 17/34 | A |
| | | PW=10μs square, $T_{vj}=25^{\circ}\text{C}$ | 89/170 | A |
| Repetitive peak forward current *3 | I_{FRM} | 26/52*1 | A | |
| i^2t value*3 | $\int i^2 dt$ | PW=10ms, $T_{vj}=25^{\circ}\text{C}$ | 2.5/10 | A^2s |
| | | PW=10ms, $T_{vj}=150^{\circ}\text{C}$ | 1.4/5 | A^2s |
| Total power dissipation *3 | P_D | 83/160 *2 | W | |
| Virtual Junction temperature | T_{vj} | 175 | $^{\circ}\text{C}$ | |
| Range of storage temperature | T_{stg} | -55 to +175 | $^{\circ}\text{C}$ | |

*1 $T_c=100^{\circ}\text{C}$, $T_{vj}=150^{\circ}\text{C}$, Duty cycle=10% *2 $T_c=25^{\circ}\text{C}$ *3 Per leg/ Both legs

●Outline



●Inner circuit



●Packaging specifications

| Package | TO-247N | |
|---------|---------------------------|-----------|
| Type | Packing | Tube |
| | Reel size (mm) | - |
| | Tape width (mm) | - |
| | Basic ordering unit (pcs) | 30 |
| | Packing code | C11 |
| | Marking | SCS210KE2 |

●Electrical characteristics ($T_{vj} = 25^{\circ}\text{C}$) (Per Leg)

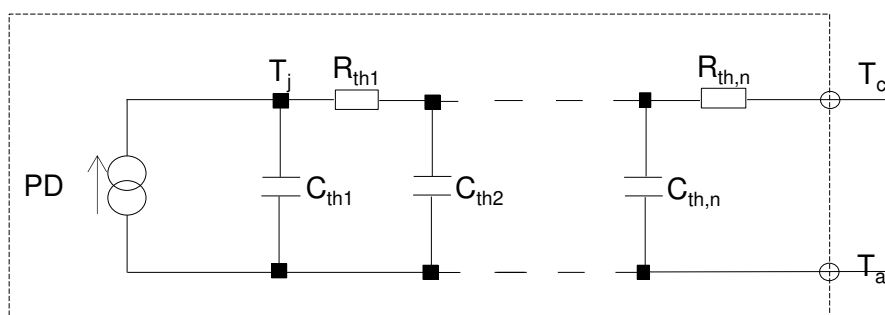
| Parameter | Symbol | Conditions | Values | | | Unit |
|-------------------------|----------|--|--------|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| DC blocking voltage | V_{DC} | $I_R=0.1\text{mA}$ | 1200 | - | - | V |
| Forward voltage | V_F | $I_F=5\text{A}, T_{vj}=25^{\circ}\text{C}$ | - | 1.4 | 1.6 | V |
| | | $I_F=5\text{A}, T_{vj}=150^{\circ}\text{C}$ | - | 1.8 | - | V |
| | | $I_F=5\text{A}, T_{vj}=175^{\circ}\text{C}$ | - | 1.9 | - | V |
| Reverse current | I_R | $V_R=1200\text{V}, T_{vj}=25^{\circ}\text{C}$ | - | 5 | 100 | μA |
| | | $V_R=1200\text{V}, T_{vj}=150^{\circ}\text{C}$ | - | 40 | - | μA |
| | | $V_R=1200\text{V}, T_{vj}=175^{\circ}\text{C}$ | - | 65 | - | μA |
| Total capacitance | C | $V_R=1\text{V}, f=1\text{MHz}$ | - | 260 | - | pF |
| | | $V_R=800\text{V}, f=1\text{MHz}$ | - | 21 | - | pF |
| Total capacitive charge | Q_C | $V_R=800\text{V}, di/dt=500\text{A}/\mu\text{s}$ | - | 17 | - | nC |
| Switching time | t_C | $V_R=800\text{V}, di/dt=500\text{A}/\mu\text{s}$ | - | 15 | - | ns |

●Thermal characteristics

| Parameter | Symbol | Conditions | Values | | | Unit |
|--------------------|------------|------------|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Thermal resistance | R_{thJC} | Per Leg | - | 1.5 | 1.8 | K/W |
| | | Both Legs | - | 0.75 | 0.90 | K/W |

●Typical Transient Thermal Characteristics (Per Leg)

| Symbol | Value | Unit | Symbol | Value | Unit |
|-----------|-----------------------|------|-----------|-----------------------|------|
| R_{th1} | 4.22×10^{-1} | K/W | C_{th1} | 2.40×10^{-3} | Ws/K |
| R_{th2} | 9.58×10^{-1} | | C_{th2} | 5.95×10^{-3} | |
| R_{th3} | 1.19×10^{-1} | | C_{th3} | 1.40×10^{-1} | |



●Electrical characteristic curves

Fig.1 $V_F - I_F$ Characteristics (Per Leg)

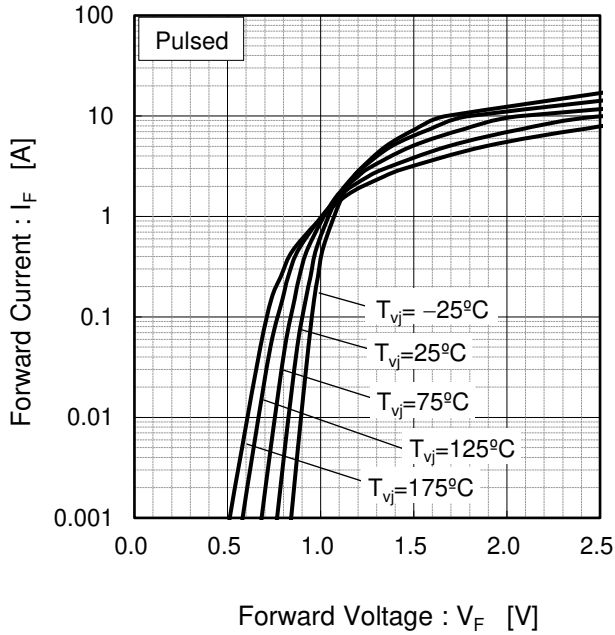


Fig.2 $V_F - I_F$ Characteristics (Per Leg)

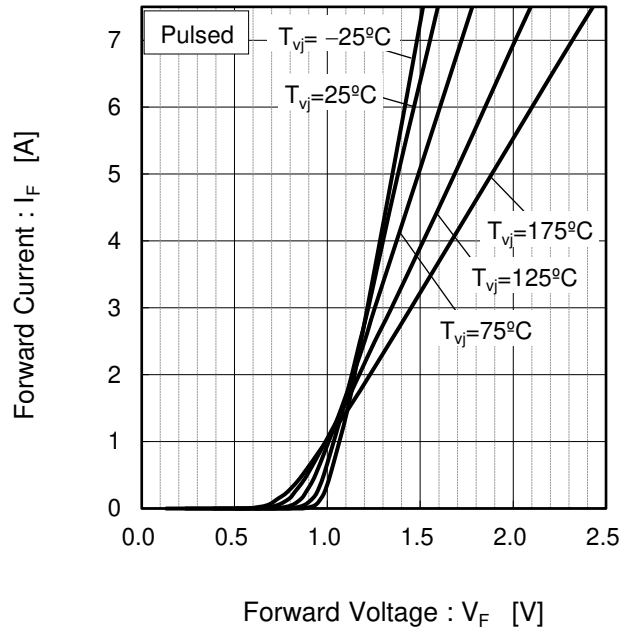


Fig.3 $V_R - I_R$ Characteristics (Per Leg)

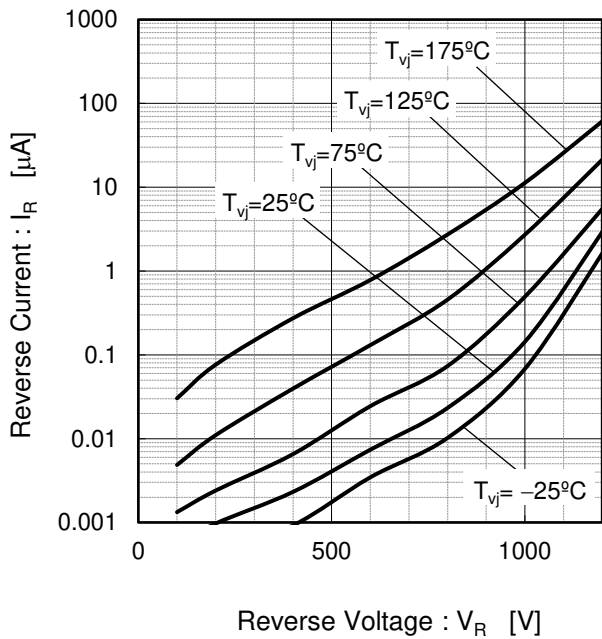
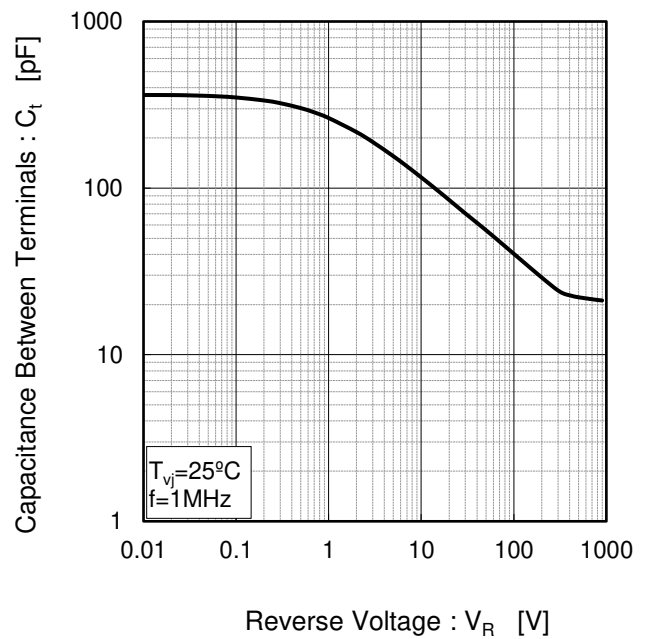


Fig.4 $V_R - C_t$ Characteristics (Per Leg)



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width (Per Leg)

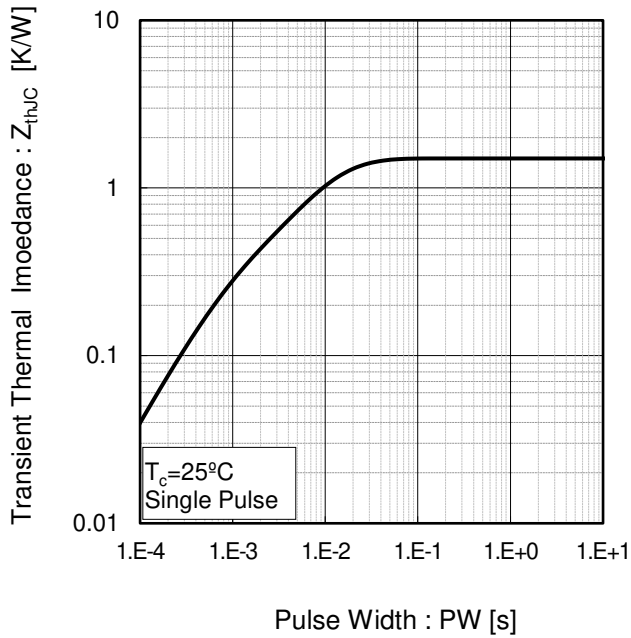


Fig.6 Power Dissipation (Per Leg)

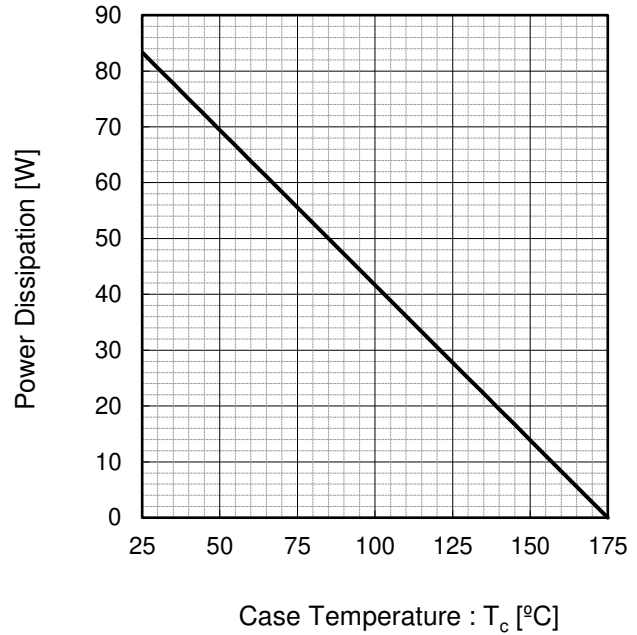
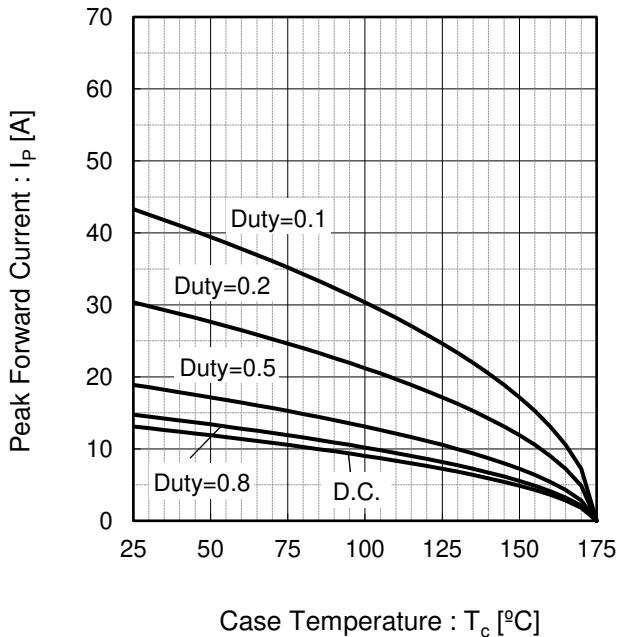
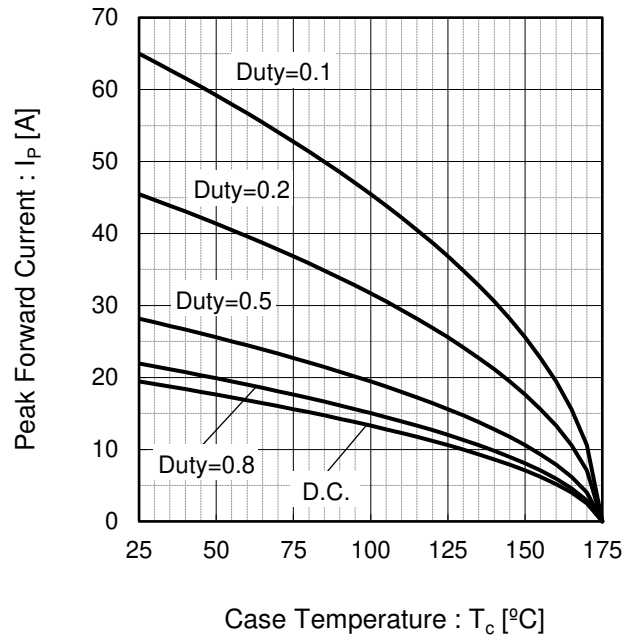


Fig.7*5 Maximum peak forward current derating curve $I_P - T_C$ (Per Leg)



Case Temperature : T_C [°C]
 *5 Based on max V_f , max R_{thJC}
 Valid for switching of above 10kHz,
 excluding D.C. curve.

Fig.8*6 Typical peak forward current derating curve $I_P - T_C$ (Per Leg, Not guaranteed)



Case Temperature : T_C [°C]
 *6 Based on typ V_f , typ R_{thJC}
 Typical value, not guaranteed
 Valid for switching of above 10kHz,
 excluding D.C. curve

●Electrical characteristic curves

Fig.9 Surge non-repetitive forward current vs. Pulse width (Sinusoidal waveform) (Per Leg)

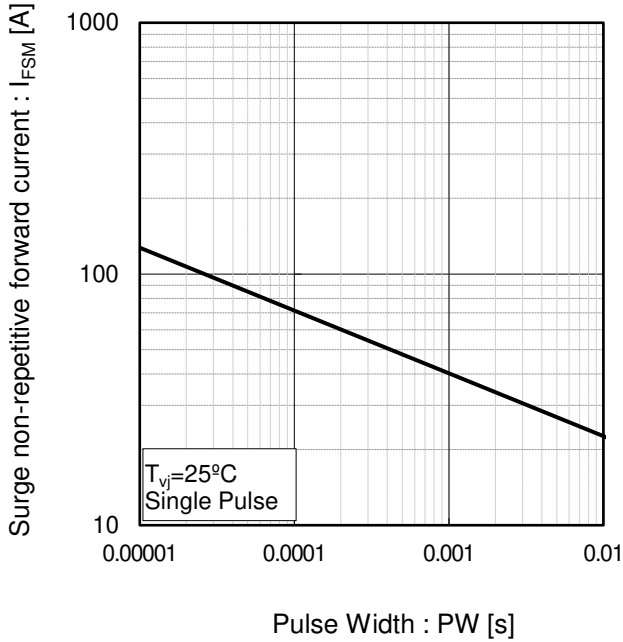
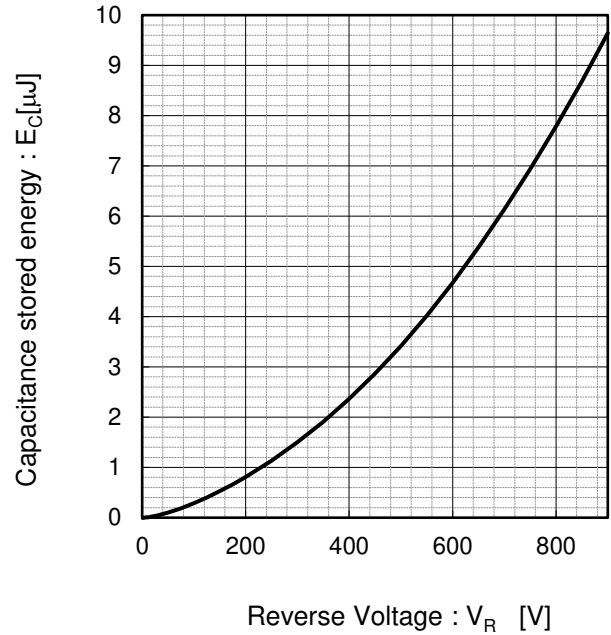
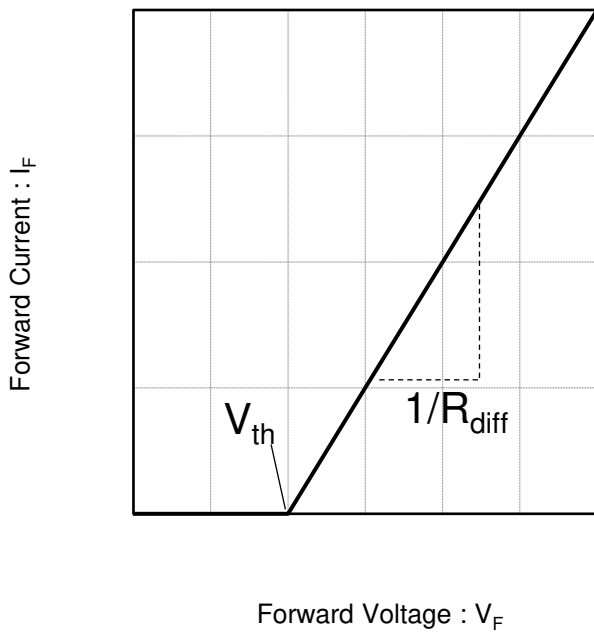


Fig.10 Typical capacitance store energy (Per Leg)



●Simplified forward characteristic model (Per Leg)

Fig.11 Equivalent forward current curve



$$V_F = V_{th} + R_{diff} I_F$$

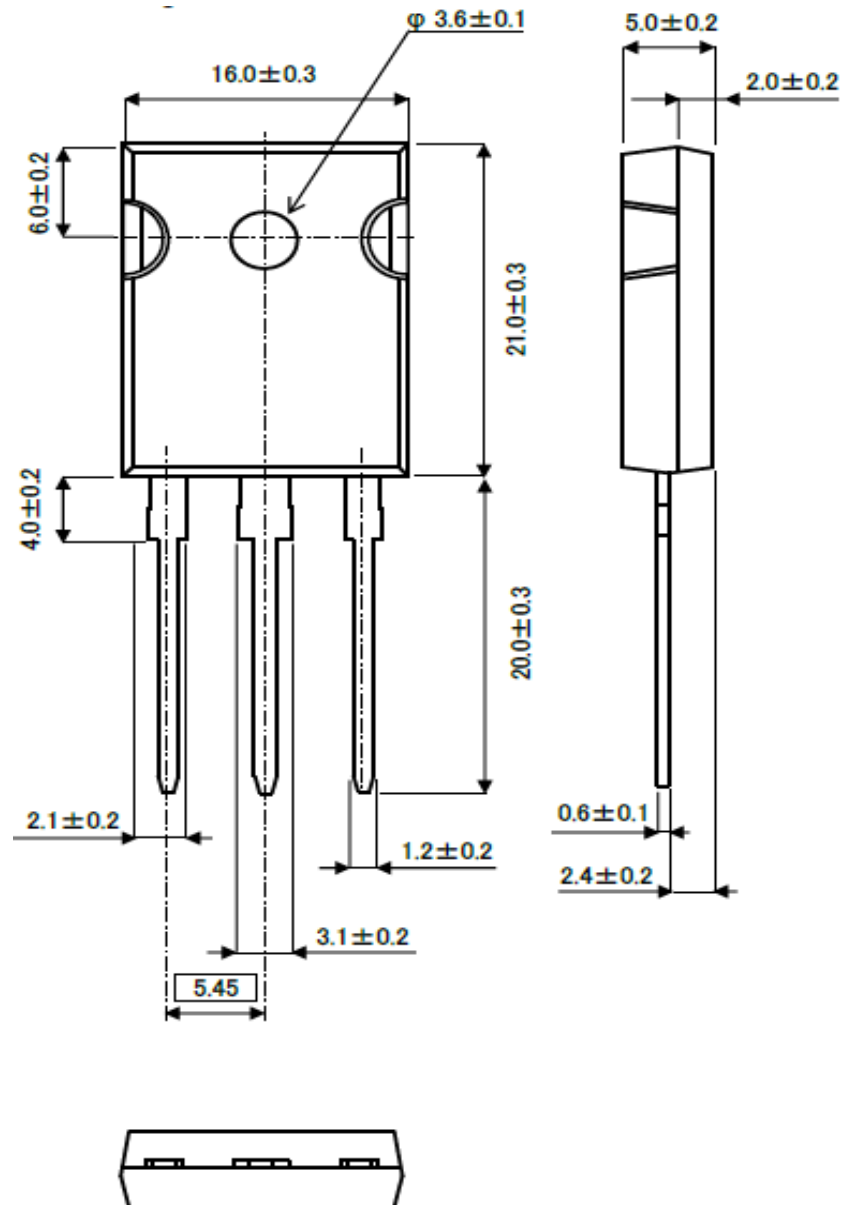
$$V_{th} (T_{vj}) = a_0 + a_1 T_{vj}$$

$$R_{diff} (T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

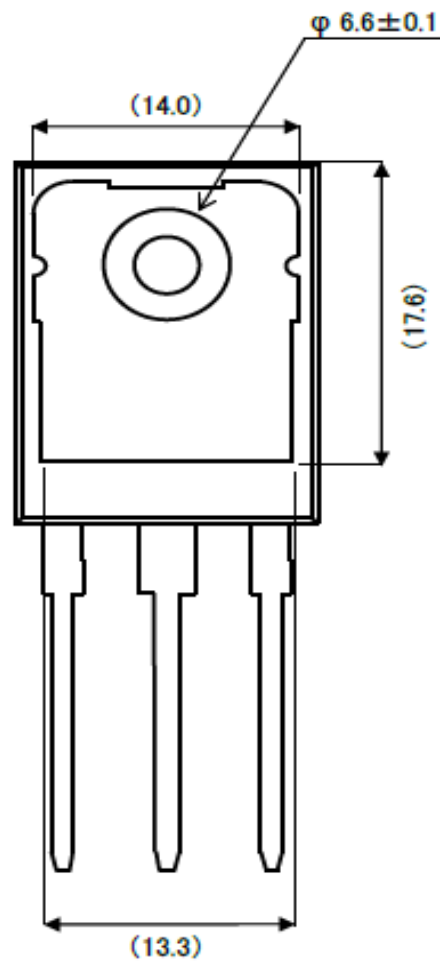
| Symbol | Typical Value | Unit |
|--------|------------------------|-------------------|
| a_0 | 9.93×10^{-1} | V |
| a_1 | -1.27×10^{-3} | V/°C |
| b_0 | 7.30×10^{-2} | Ω |
| b_1 | 4.12×10^{-4} | Ω/°C |
| b_2 | 2.66×10^{-6} | Ω/°C ² |

T_{vj} in °C; $-55\text{ °C} < T_{vj} < 175\text{ °C}$; $I_F < 10\text{ A}$

● Package Dimensions

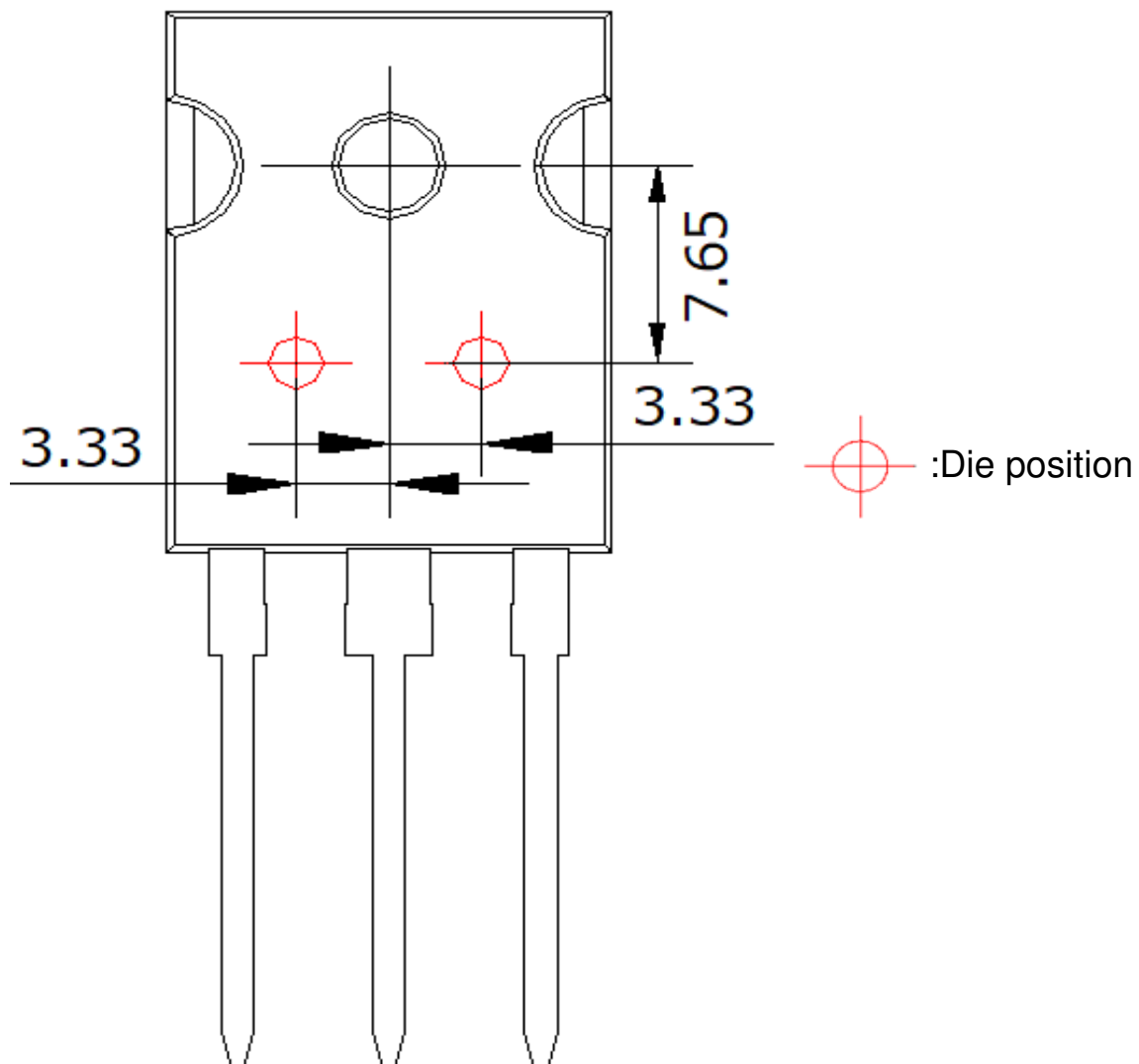


Unit: mm



Unit: mm

●Die Bonding Layout



- Front view of the packaging.
- Dimensions are design values.
- If the heat sink is to be installed, it should be in contact with the die bonding point.

Unit: mm

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