

$V_R$	650V
$I_F$	15A
$Q_C$	23nC

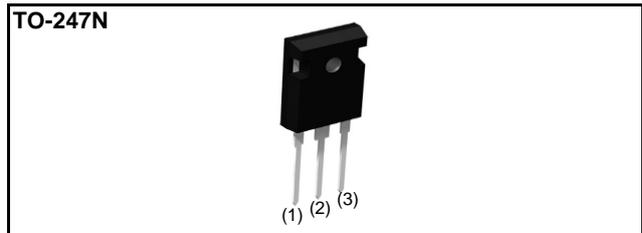
### ●Features

- 1) Shorter recovery time
- 2) Reduced temperature dependence
- 3) High-speed switching possible

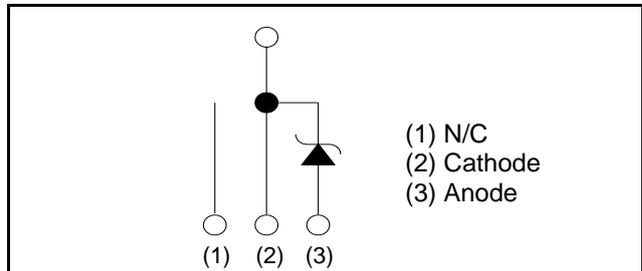
### ●Applications

- PFC Boost Topology
- Secondary Side Rectification
- Data Center
- PV Power Conditioners

### ●Outline



### ●Inner circuit



### ●Packaging specifications

Package		TO-247N
Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	30
	Packing code	C11
	Marking	SCS215AE

### ●Absolute maximum ratings ( $T_{vj} = 25^\circ\text{C}$ unless otherwise specified.)

Parameter	Symbol	Value	Unit
Reverse voltage (repetitive peak)	$V_{RM}$	650	V
Reverse voltage (DC)	$V_R$	650	V
Continuous forward current ( $T_c = 134^\circ\text{C}$ )	$I_F$	15 <sup>*1</sup>	A
Surge non-repetitive forward current	$I_{FSM}$	PW=10ms sinusoidal, $T_{vj}=25^\circ\text{C}$	52 A
		PW=10ms sinusoidal, $T_{vj}=150^\circ\text{C}$	41 A
		PW=10 $\mu\text{s}$ square, $T_{vj}=25^\circ\text{C}$	200 A
Repetitive peak forward current	$I_{FRM}$	65 <sup>*2</sup>	A
$i^2t$ value	$\int i^2 dt$	PW=10ms, $T_{vj}=25^\circ\text{C}$	13 $\text{A}^2\text{s}$
		PW=10ms, $T_{vj}=150^\circ\text{C}$	8.4 $\text{A}^2\text{s}$
Total power dissipation	$P_D$	110 <sup>*3</sup>	W
Virtual Junction temperature	$T_{vj}$	175	$^\circ\text{C}$
Range of storage temperature	$T_{stg}$	-55 to +175	$^\circ\text{C}$

\*1 Limited by maximum  $T_{vj}$  and for Max.  $R_{thJC}$ .

\*2  $T_c=100^\circ\text{C}$ ,  $T_{vj}=150^\circ\text{C}$ , Duty cycle=10% \*3  $T_c=25^\circ\text{C}$

**●Electrical characteristics** ( $T_{vj} = 25^{\circ}\text{C}$  unless otherwise specified.)

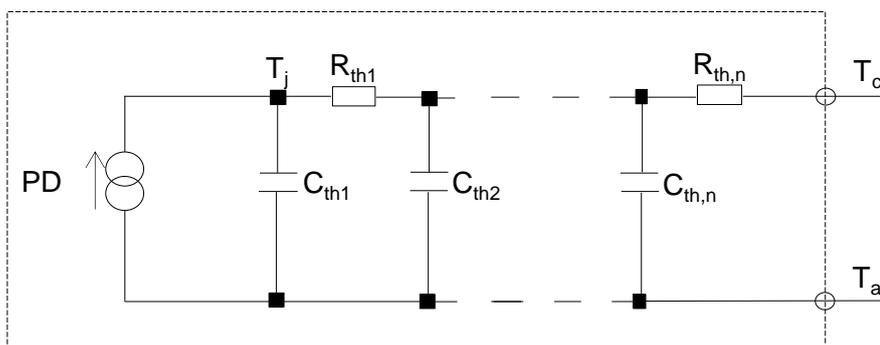
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R=3.0\text{mA}$	650	-	-	V
Forward voltage	$V_F$	$I_F=15\text{A}, T_{vj}=25^{\circ}\text{C}$	-	1.35	1.55	V
		$I_F=15\text{A}, T_{vj}=150^{\circ}\text{C}$	-	1.55	-	V
		$I_F=15\text{A}, T_{vj}=175^{\circ}\text{C}$	-	1.63	-	V
Reverse current	$I_R$	$V_R=600\text{V}, T_{vj}=25^{\circ}\text{C}$	-	3	300	$\mu\text{A}$
		$V_R=600\text{V}, T_{vj}=150^{\circ}\text{C}$	-	45	-	$\mu\text{A}$
		$V_R=600\text{V}, T_{vj}=175^{\circ}\text{C}$	-	105	-	$\mu\text{A}$
Total capacitance	C	$V_R=1\text{V}, f=1\text{MHz}$	-	550	-	pF
		$V_R=600\text{V}, f=1\text{MHz}$	-	56	-	pF
Total capacitive charge	$Q_C$	$V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$	-	23	-	nC
Switching time	$t_C$	$V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$	-	18	-	ns

**●Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{thJC}$	-	-	1.1	1.3	K/W

**●Typical Transient Thermal Characteristics**

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	$2.90 \times 10^{-1}$	K/W	$C_{th1}$	$2.33 \times 10^{-3}$	Ws/K
$R_{th2}$	$8.03 \times 10^{-1}$		$C_{th2}$	$8.15 \times 10^{-3}$	
$R_{th3}$	$8.54 \times 10^{-3}$		$C_{th3}$	$5.82 \times 10^{-1}$	



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics

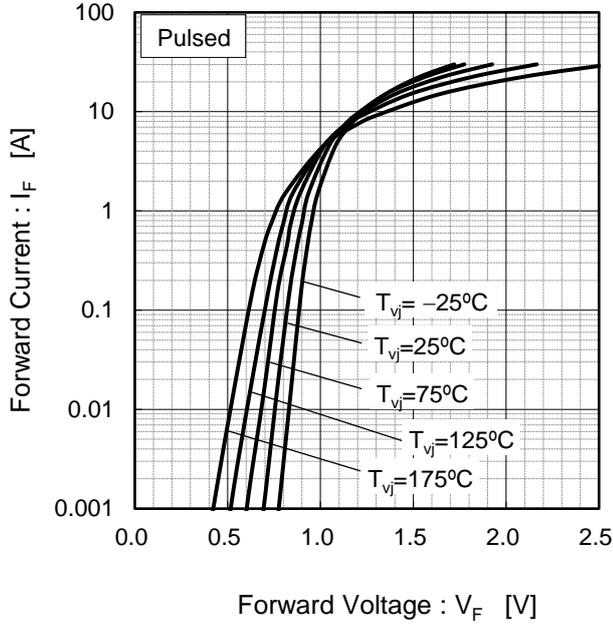


Fig.2  $V_F - I_F$  Characteristics

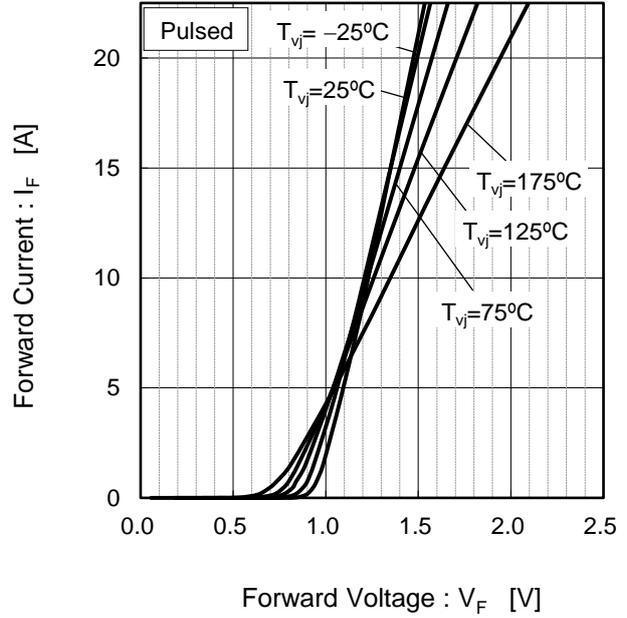


Fig.3  $V_R - I_R$  Characteristics

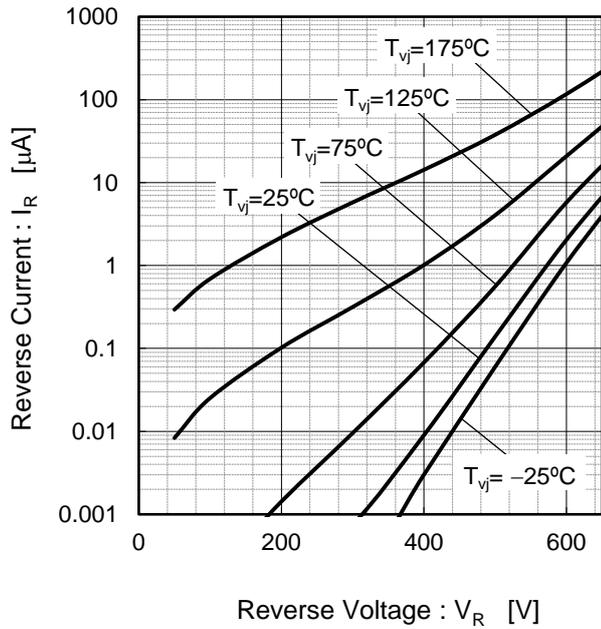
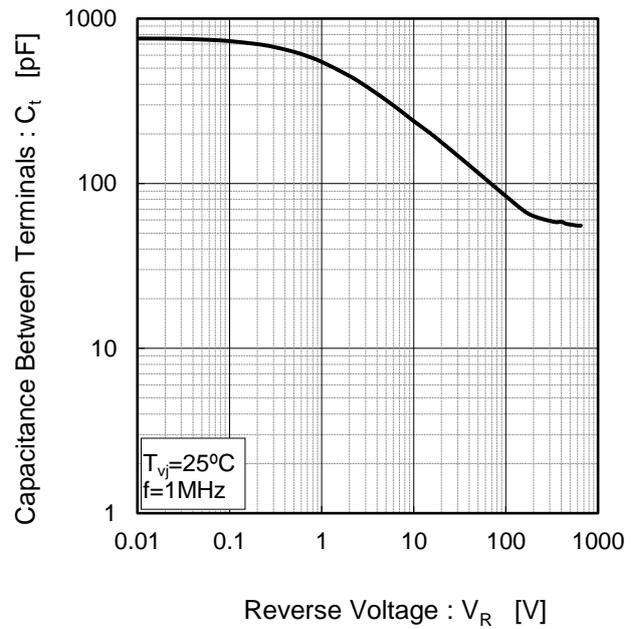


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

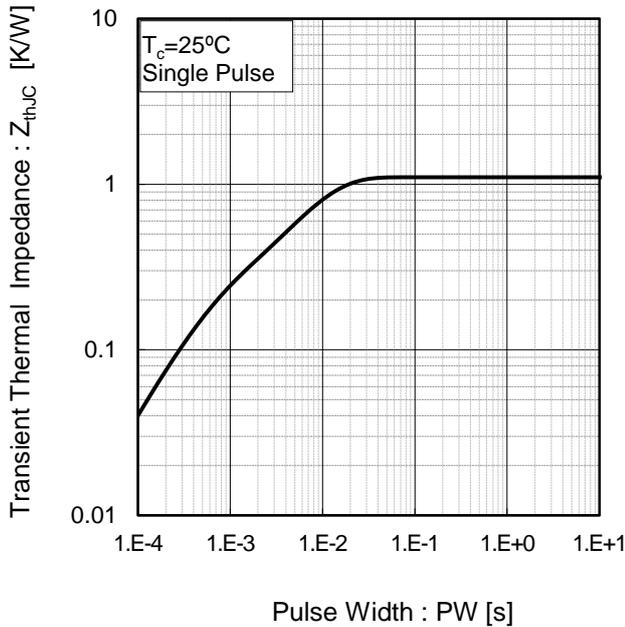


Fig.6 Power Dissipation

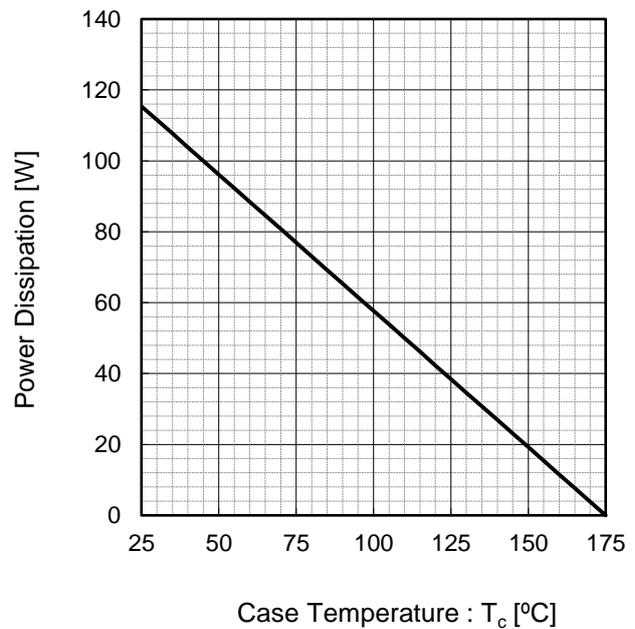
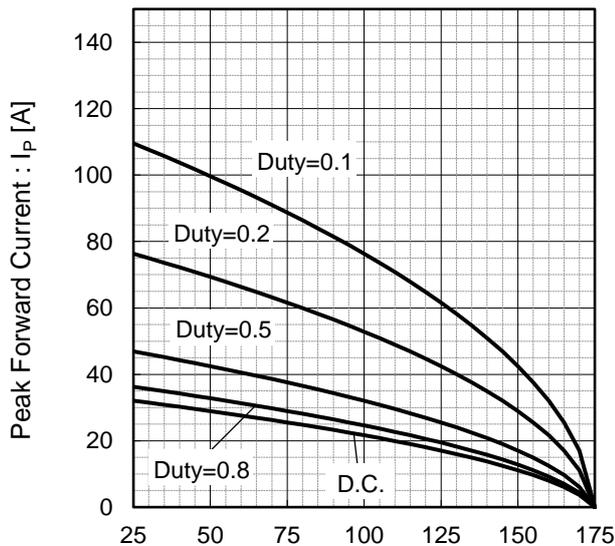
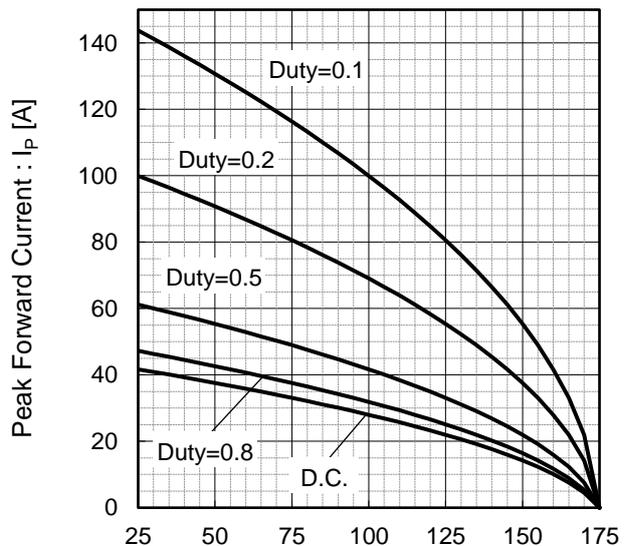


Fig.7\*4 Maximum peak forward current derating curve  $I_P - T_c$



Case Temperature :  $T_c$  [°C]  
 \*4 Based on max Vf, max  $Z_{thJC}$   
 Valid for switching of above 10kHz,  
 excluding D.C. curve.

Fig.8\*5 Typical peak forward current derating curve  $I_P - T_c$  (Not guaranteed)



Case Temperature :  $T_c$  [°C]  
 \*5 Based on typ Vf, typ  $Z_{thJC}$   
 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)

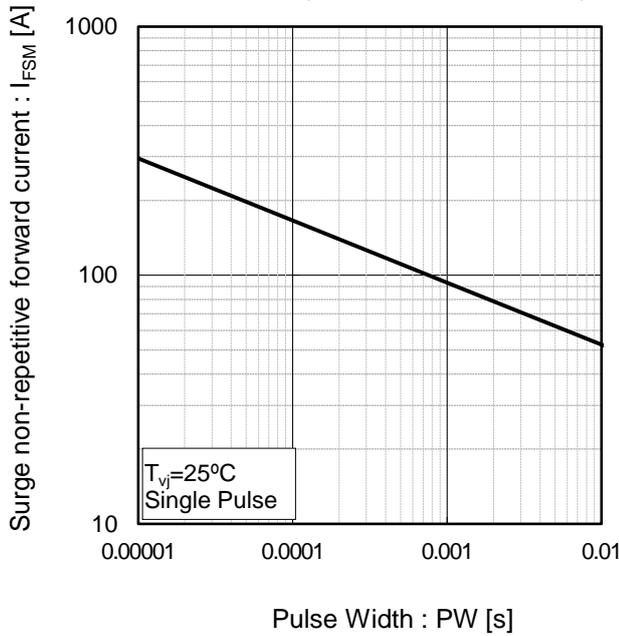
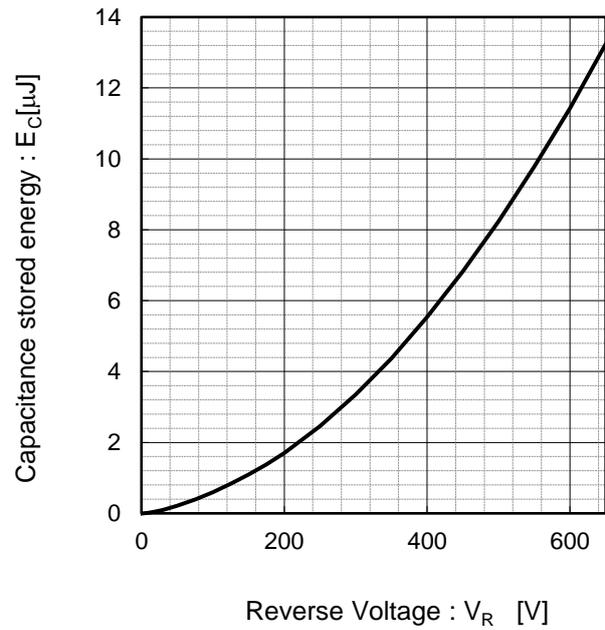
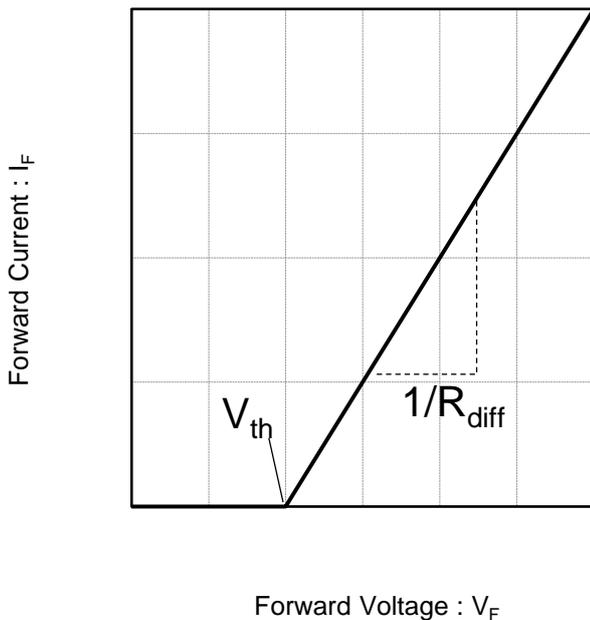


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

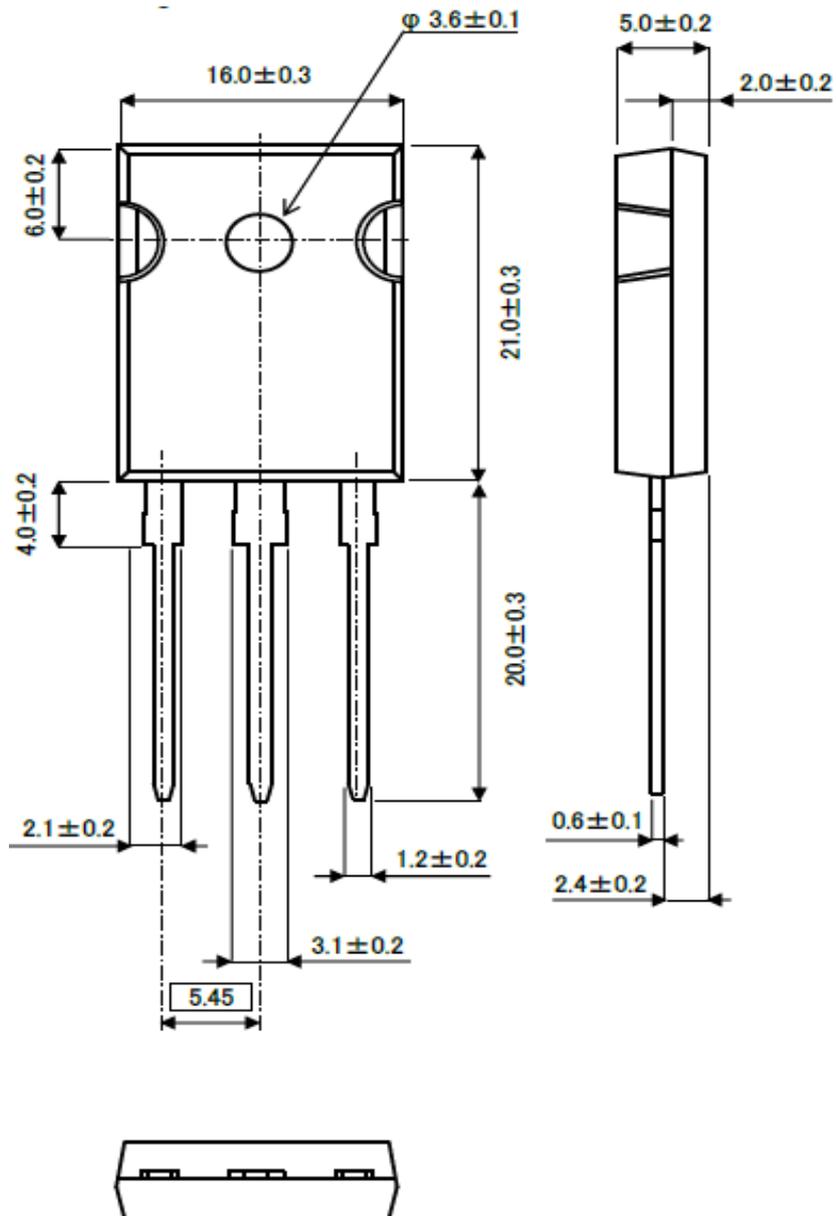
$$V_{th} ( T_{vj} ) = a_0 + a_1 T_{vj}$$

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

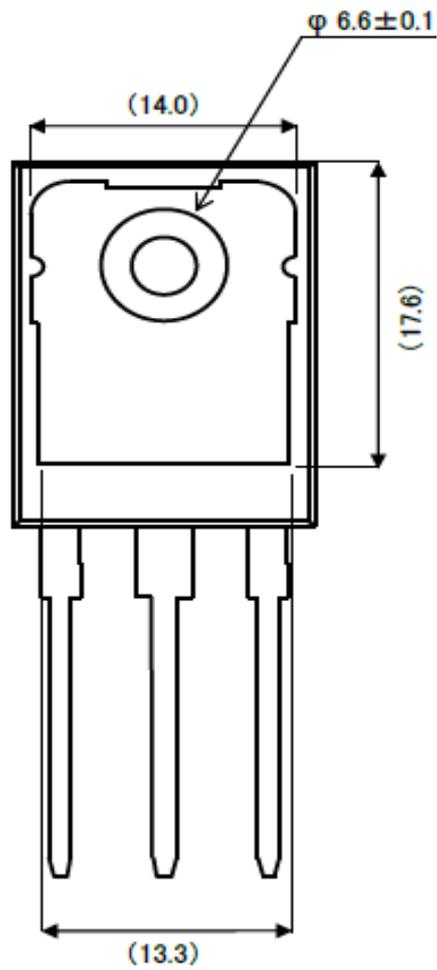
Symbol	Typical Value	Unit
$a_0$	$9.35 \times 10^{-1}$	V
$a_1$	$-1.12 \times 10^{-3}$	V/°C
$b_0$	$2.65 \times 10^{-2}$	$\Omega$
$b_1$	$6.80 \times 10^{-5}$	$\Omega/^\circ\text{C}$
$b_2$	$7.20 \times 10^{-7}$	$\Omega/^\circ\text{C}^2$

$T_{vj}$  in °C;  $-55\text{ °C} < T_{vj} < 175\text{ °C}$ ;  $I_F < 30\text{ A}$

## ●Package Dimensions

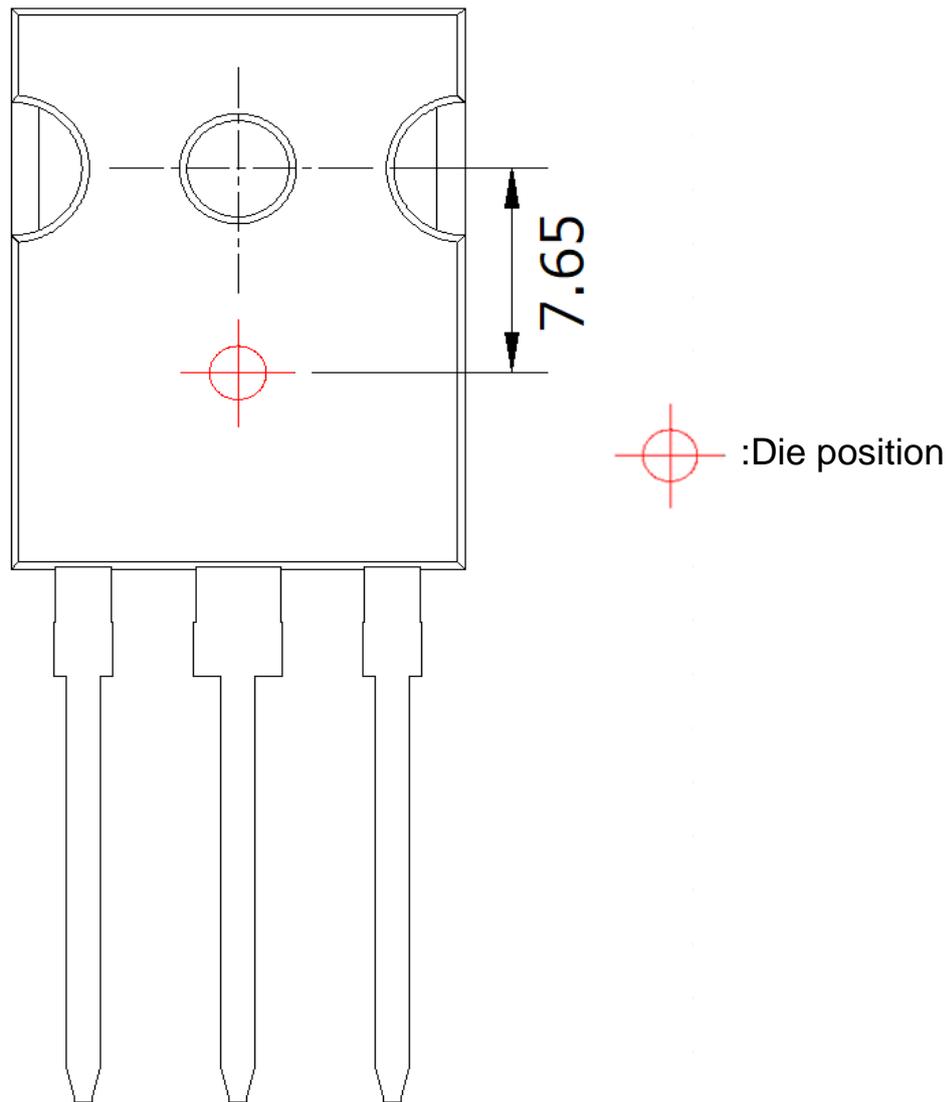


Unit: mm



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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