

$V_R$	650V
$I_F$	30A
$Q_C$	38nC

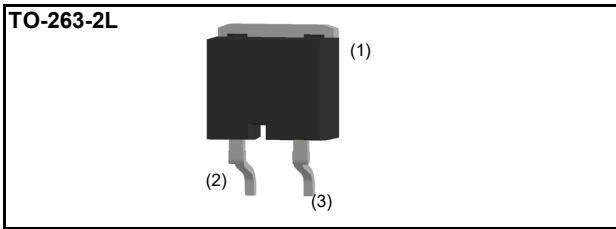
### ●Features

- 1) AEC-Q101 qualified
- 2) Low forward voltage
- 3) Negligible recovery time/current
- 4) Temperature independent switching behavior
- 5) Wide creepage distance = min. 5.10mm

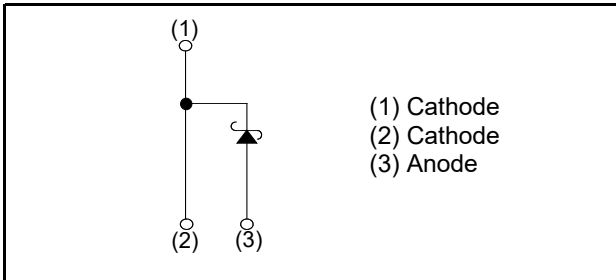
### ●Applications

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

### ●Outline



### ●Inner circuit



### ●Packaging specifications

Type	Packaging	Embossed tape
	Reel size (mm)	330
	Tape width (mm)	24
	Basic ordering unit (pcs)	1000
	Packing code	TRL
	Marking	SCS230AN

### ●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 ( $T_c = 127^\circ\text{C}$ )		$I_F$	30 <sup>*1</sup>	A
Surge non-repetitive forward current	PW=10ms sinusoidal, $T_{vj}=25^\circ\text{C}$	$I_{FSM}$	100	A
	PW=10ms sinusoidal, $T_{vj}=150^\circ\text{C}$		79	A
	PW=10μs square, $T_{vj}=25^\circ\text{C}$		390	A
Repetitive peak forward current		$I_{FRM}$	120 <sup>*2</sup>	A
$i^2t$ value	PW=10ms, $T_{vj}=25^\circ\text{C}$	$\int i^2 dt$	50	A <sup>2</sup> s
	PW=10ms, $T_{vj}=150^\circ\text{C}$		31	A <sup>2</sup> s
Total power dissipation		$P_D$	197 <sup>*3</sup>	W
Virtual Junction temperature		$T_{vj}$	175	°C
Range of storage temperature		$T_{stg}$	-40 to +175	°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)

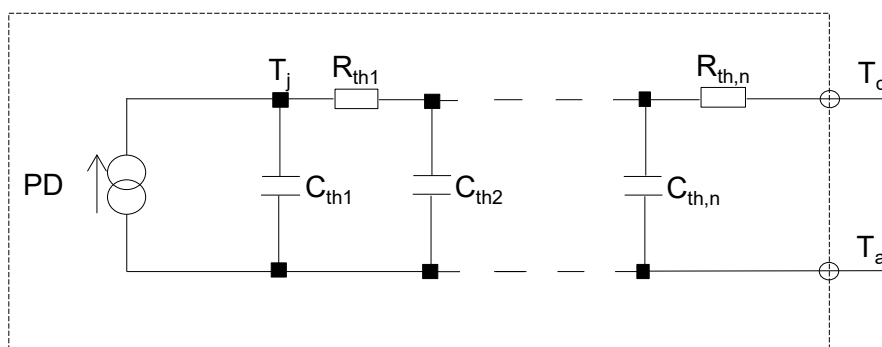
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R = 6.0 \text{ mA}$	650	-	-	V
Forward voltage	$V_F$	$I_F = 30\text{A } T_{vj}=25^{\circ}\text{C}$	-	1.35	1.55	V
		$I_F = 30\text{A } T_{vj}=150^{\circ}\text{C}$	-	1.55	-	V
		$I_F = 30\text{A } T_{vj}=175^{\circ}\text{C}$	-	1.63	-	V
Reverse current	$I_R$	$V_R = 600 \text{ V}, T_{vj}=25^{\circ}\text{C}$	-	6	600	$\mu\text{A}$
		$V_R = 600 \text{ V}, T_{vj}=150^{\circ}\text{C}$	-	90	-	$\mu\text{A}$
		$V_R = 600 \text{ V}, T_{vj}=175^{\circ}\text{C}$	-	210	-	$\mu\text{A}$
Total capacitance	C	$V_R=1\text{V}, f=1\text{MHz}$	-	1090	-	pF
		$V_R=600\text{V}, f=1\text{MHz}$	-	111	-	pF
Total capacitive charge	$Q_C$	$V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$	-	38	-	nC
Switching time	$t_C$	$V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$	-	47	-	ns

**●Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{thJC}$	-	-	0.58	0.76	K/W

**●Typical Transient Thermal Characteristics**

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	$1.13 \times 10^{-1}$	K/W	$C_{th1}$	$1.25 \times 10^{-3}$	Ws/K
$R_{th2}$	$4.67 \times 10^{-1}$		$C_{th2}$	$1.01 \times 10^{-3}$	
$R_{th3}$	$5.70 \times 10^{-4}$		$C_{th3}$	$9.03 \times 10^{-2}$	



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics

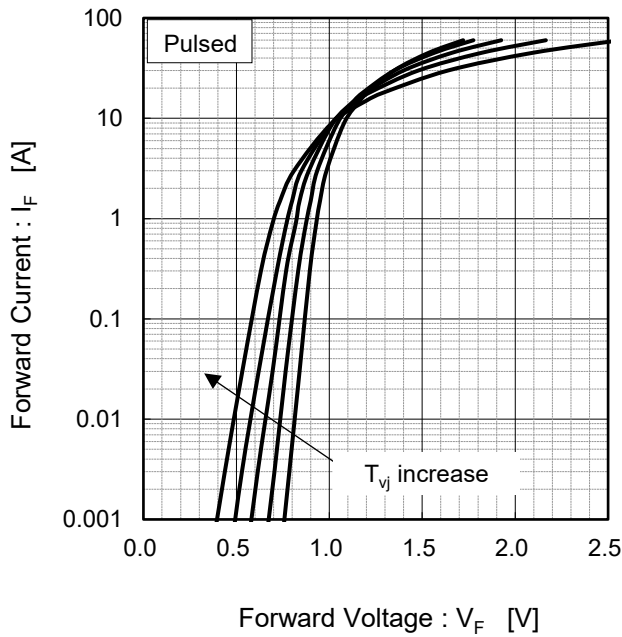


Fig.2  $V_F - I_F$  Characteristics

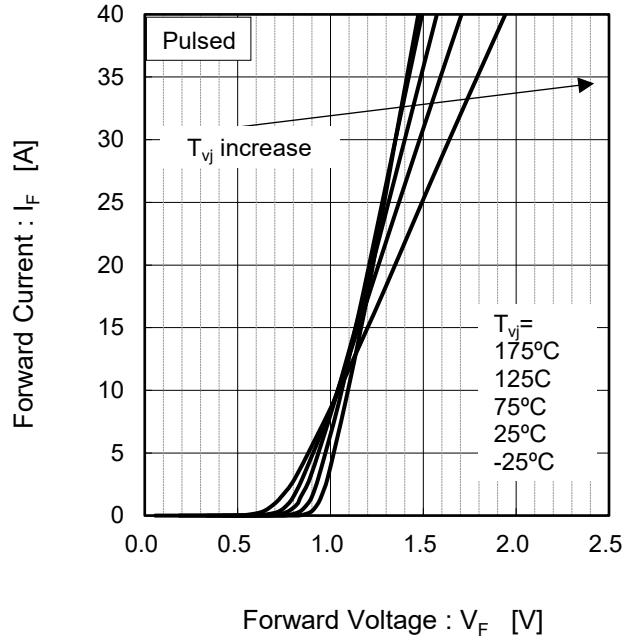


Fig.3  $V_R - I_R$  Characteristics

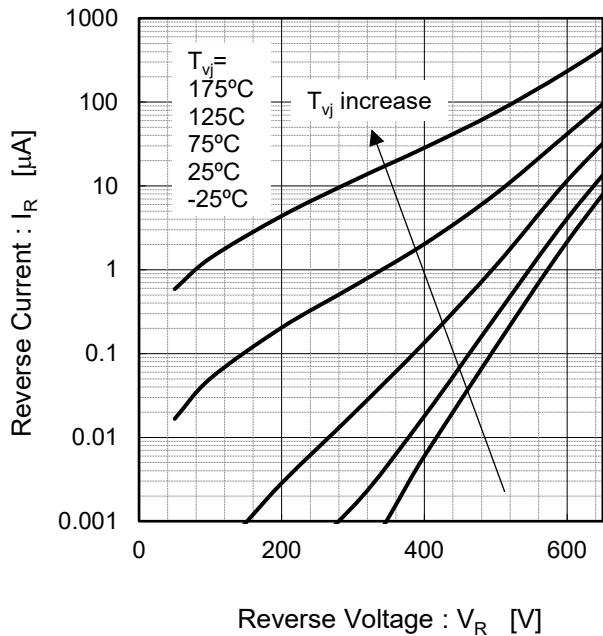
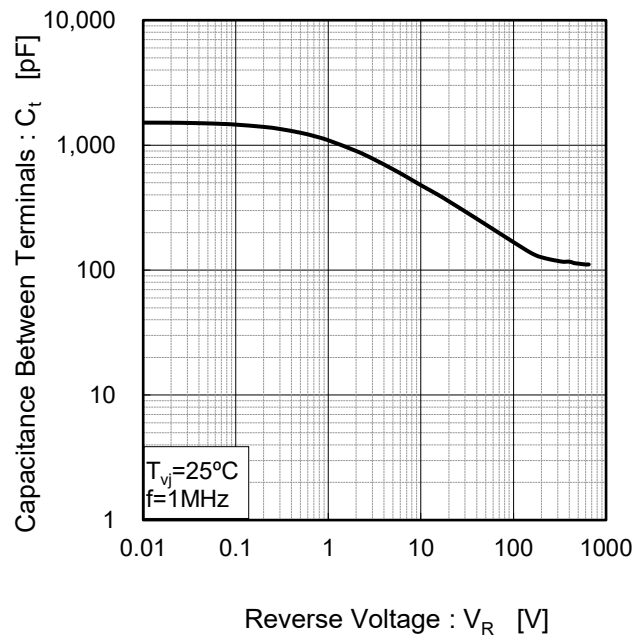


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

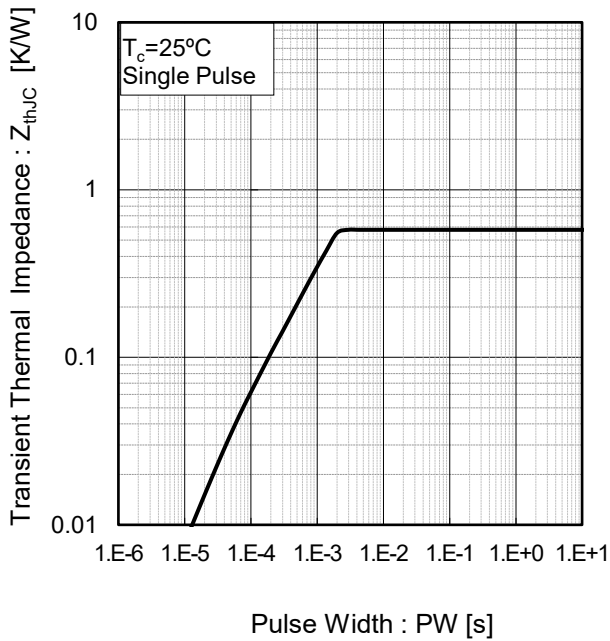


Fig.6 Power Dissipation

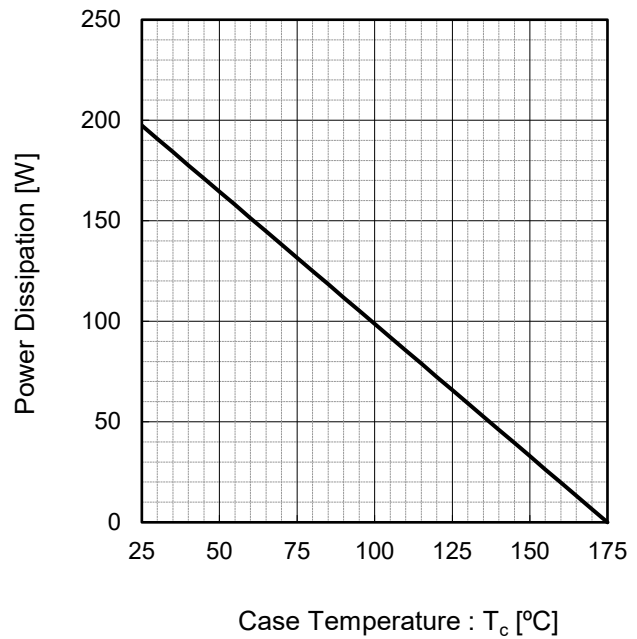
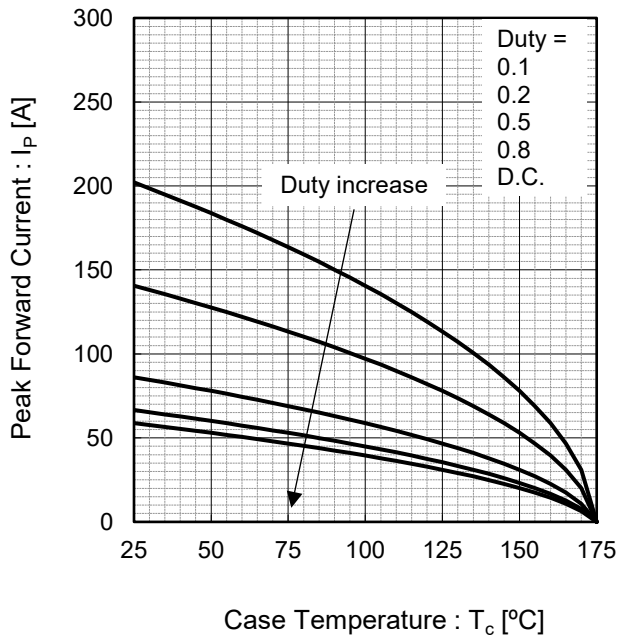
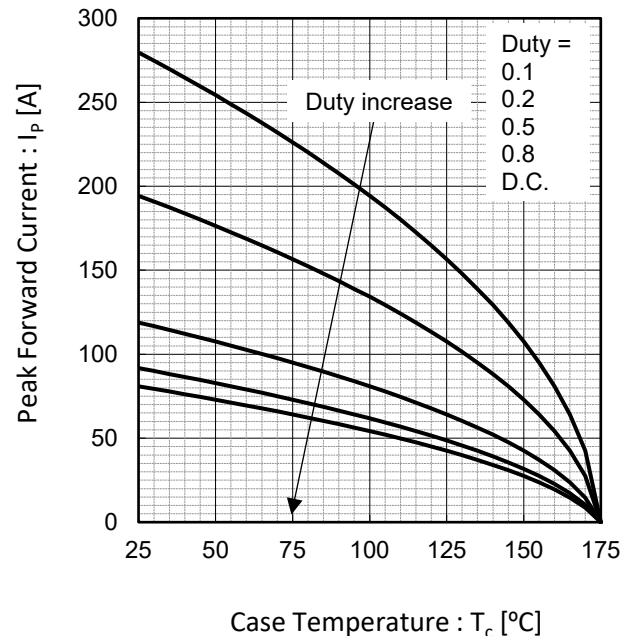


Fig.7\*4 Maximum peak forward current derating curve  $I_p - T_c$



\*4 Based on max Vf, max  $Z_{th(j-c)}$   
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)



\*5 Based on typ Vf, typ  $Z_{th(j-c)}$   
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)

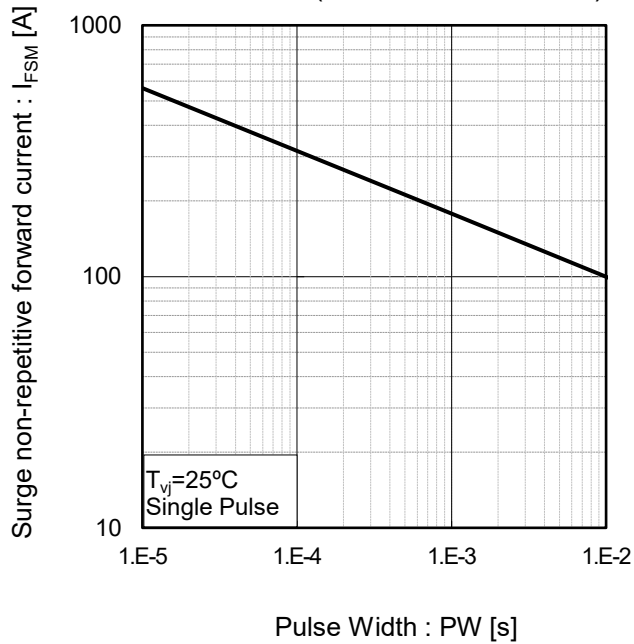
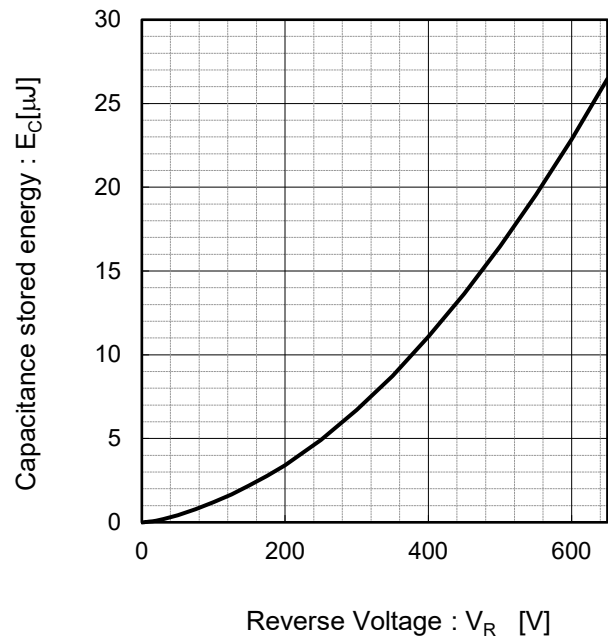
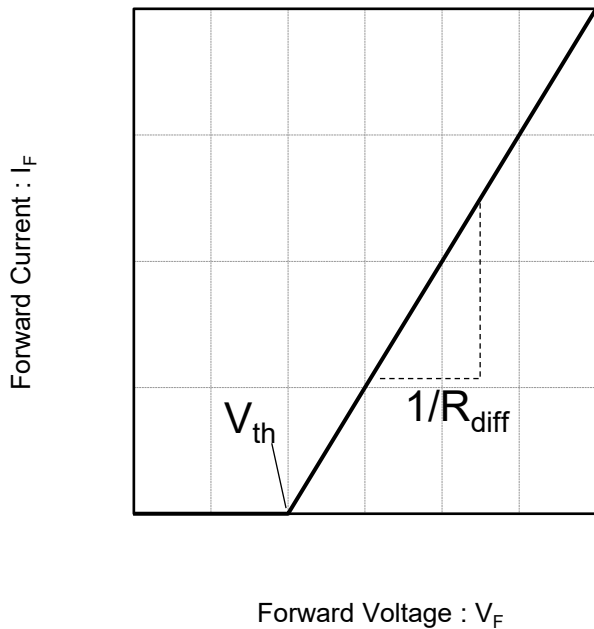


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

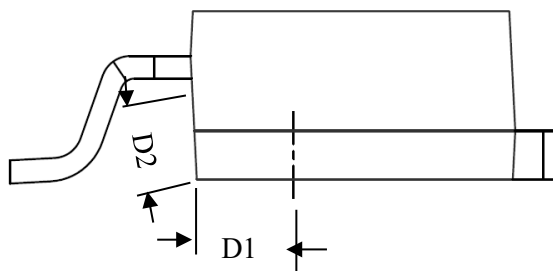
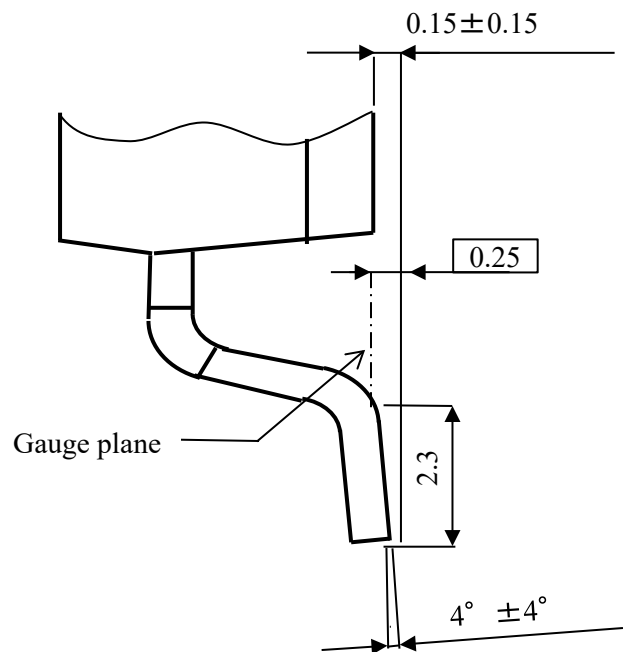
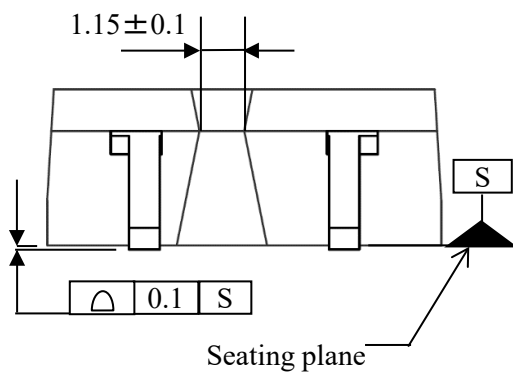
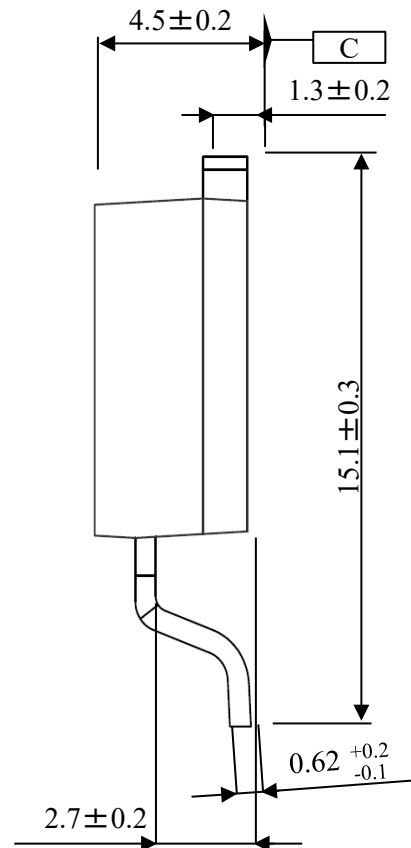
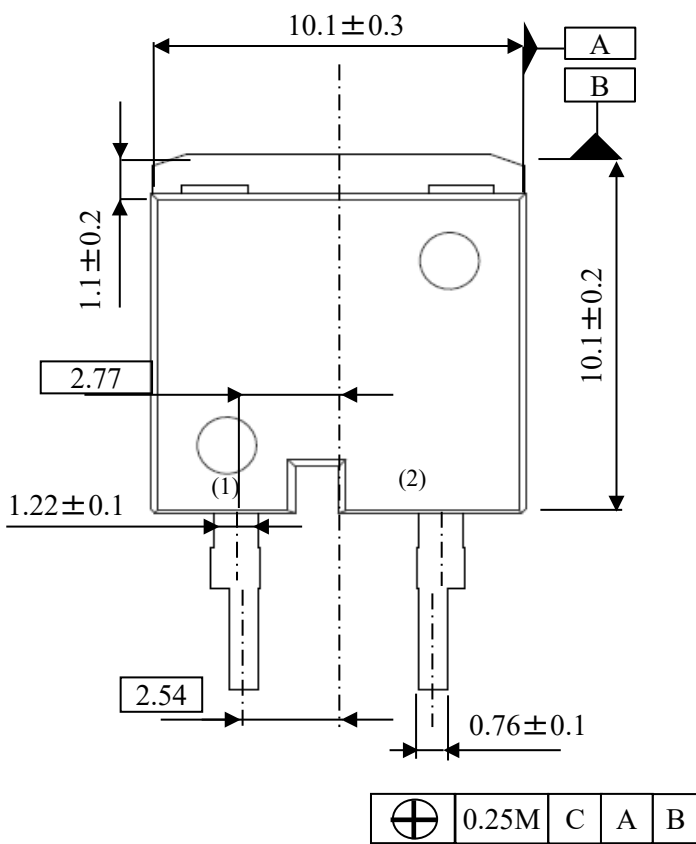
$$R_{diff} (T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a <sub>0</sub>	9.35 × 10 <sup>-1</sup>	V
a <sub>1</sub>	-1.12 × 10 <sup>-3</sup>	V/°C
b <sub>0</sub>	1.33 × 10 <sup>-2</sup>	Ω
b <sub>1</sub>	3.40 × 10 <sup>-5</sup>	Ω/°C
b <sub>2</sub>	3.60 × 10 <sup>-7</sup>	Ω/°C <sup>2</sup>

T<sub>vj</sub> in °C; -40 °C < T<sub>vj</sub> < 175°C ; I<sub>F</sub> < 60 A

●Dimensions (Unit : mm)

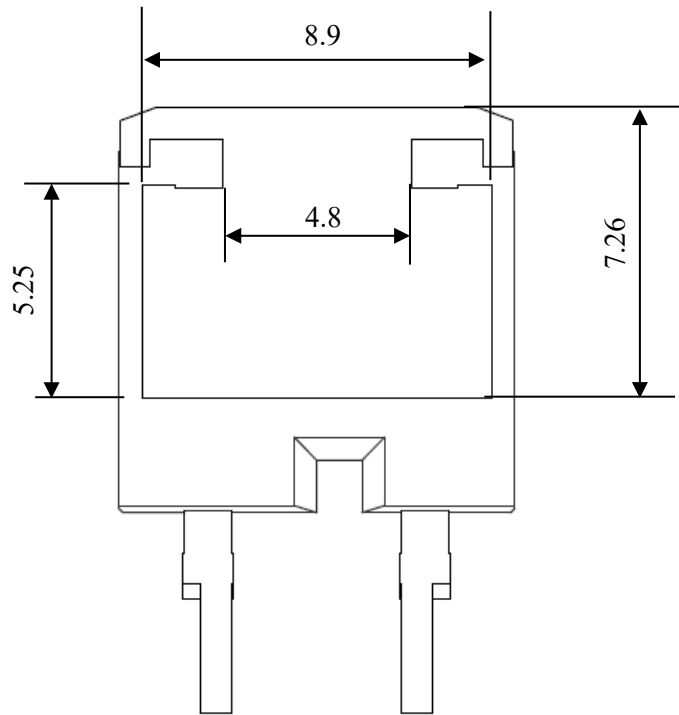
Marking Side



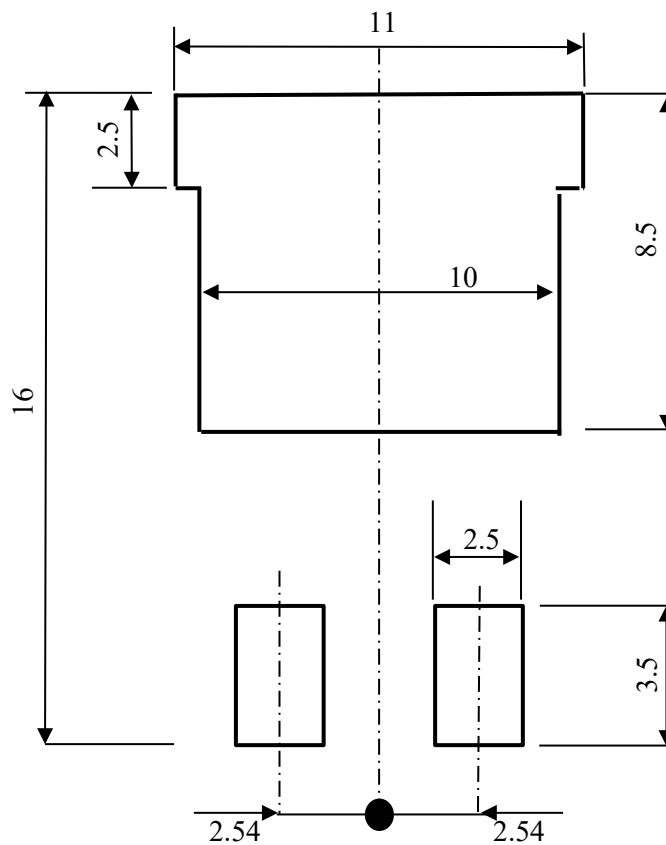
Minimum creepage distance = 5.1mm ( $D1+D2$ )

## ●Dimensions (Unit : mm)

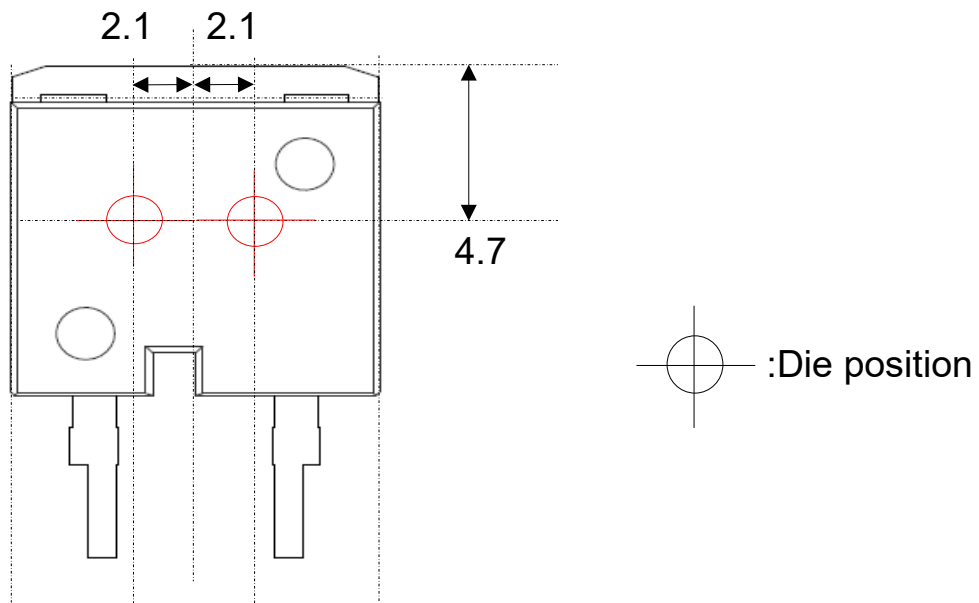
Back Side



## REFERENCE COPPER PLATE AREA DIMENSION



## ●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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