

$V_R$	650V
$I_F$	10A
$Q_C$	11nC

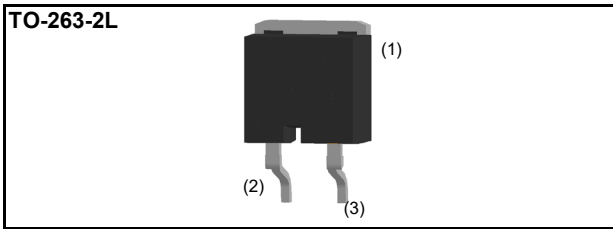
### ●Features

- 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

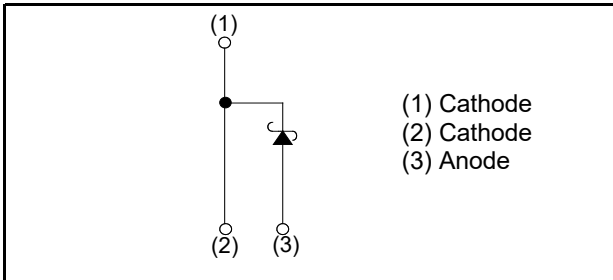
### ●Applications

- 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	SCS210AN	

### ●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 ( $T_c = 137^\circ\text{C}$ )	$I_F$	10 *1	A
Surge non-repetitive forward current	$I_{FSM}$	PW=10ms sinusoidal, $T_{vj}=25^\circ\text{C}$	38 A
		PW=10ms sinusoidal, $T_{vj}=150^\circ\text{C}$	30 A
		PW=10μs square, $T_{vj}=25^\circ\text{C}$	150 A
Repetitive peak forward current	$I_{FRM}$	45 *2	A
$i^2t$ value	$\int i^2 dt$	PW=10ms, $T_{vj}=25^\circ\text{C}$	7.2 $\text{A}^2\text{s}$
		PW=10ms, $T_{vj}=150^\circ\text{C}$	4.5 $\text{A}^2\text{s}$
Total power dissipation	$P_D$	83 *3	W
Virtual Junction temperature	$T_{vj}$	175	$^\circ\text{C}$
Range of storage temperature	$T_{stg}$	-40 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)

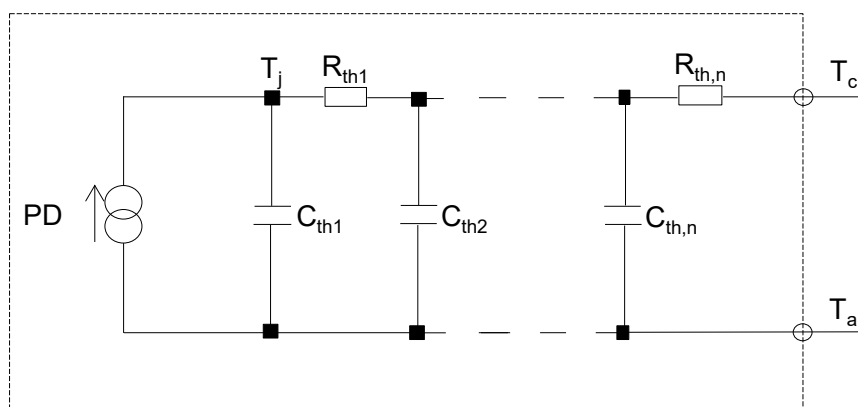
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R = 2.0\text{mA}$	650	-	-	V
Forward voltage	$V_F$	$I_F = 10\text{A}, T_{vj} = 25^{\circ}\text{C}$	-	1.35	1.55	V
		$I_F = 10\text{A}, T_{vj} = 150^{\circ}\text{C}$	-	1.55	-	V
		$I_F = 10\text{A}, T_{vj} = 175^{\circ}\text{C}$	-	1.63	-	V
Reverse current	$I_R$	$V_R = 600\text{V}, T_{vj} = 25^{\circ}\text{C}$	-	2	200	$\mu\text{A}$
		$V_R = 600\text{V}, T_{vj} = 150^{\circ}\text{C}$	-	30	-	$\mu\text{A}$
		$V_R = 600\text{V}, T_{vj} = 175^{\circ}\text{C}$	-	70	-	$\mu\text{A}$
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$	-	360	-	pF
		$V_R = 600\text{V}, f = 1\text{MHz}$	-	37	-	pF
Total capacitive charge	$Q_C$	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	11	-	nC
Switching time	$t_C$	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	10	-	ns

**●Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	-	-	1.5	1.8	K/W

**●Typical Transient Thermal Characteristics**

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	$5.01 \times 10^{-2}$	K/W	$C_{th1}$	$1.43 \times 10^{-3}$	Ws/K
$R_{th2}$	$1.14 \times 10^0$		$C_{th2}$	$8.50 \times 10^{-4}$	
$R_{th3}$	$3.10 \times 10^{-1}$		$C_{th3}$	$1.14 \times 10^{-1}$	



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics

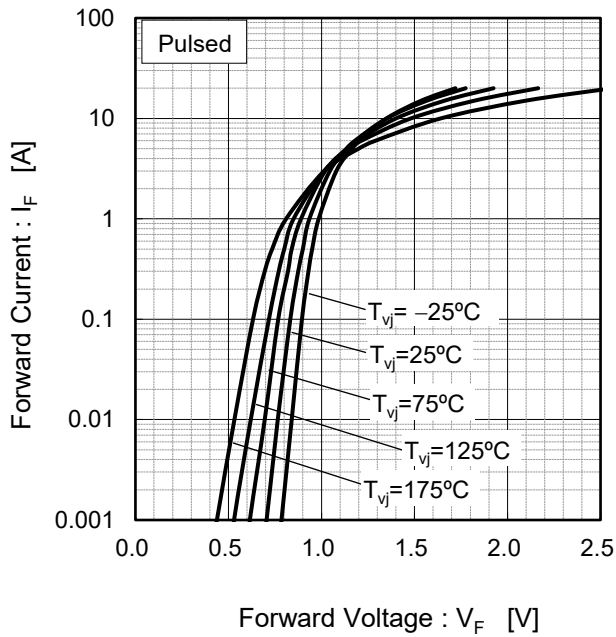


Fig.2  $V_F - I_F$  Characteristics

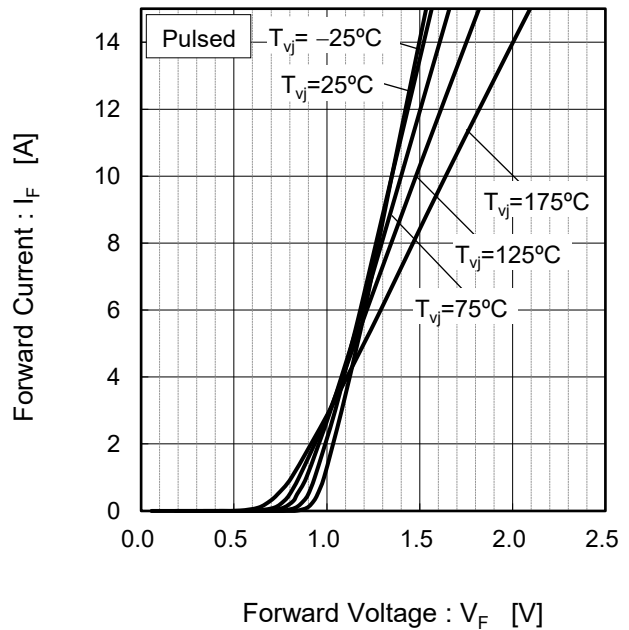


Fig.3  $V_R - I_R$  Characteristics

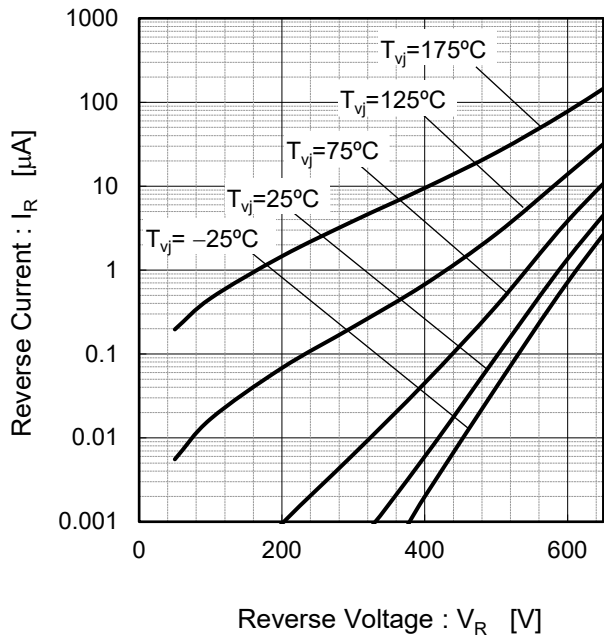
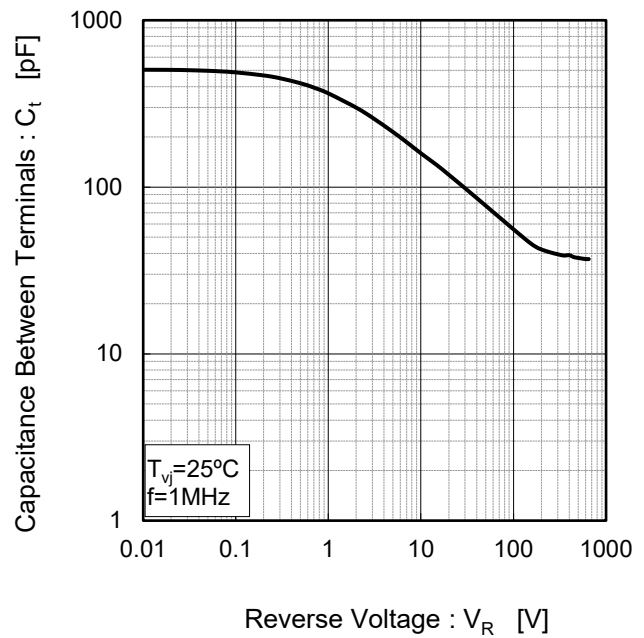


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

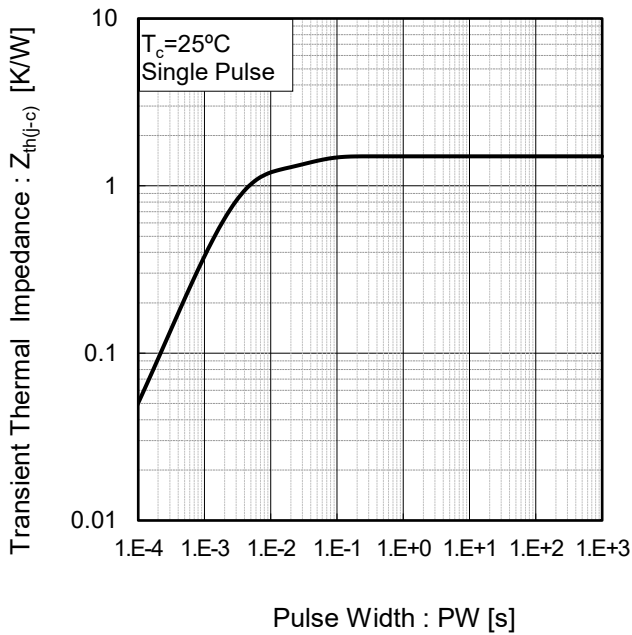


Fig.6 Power Dissipation

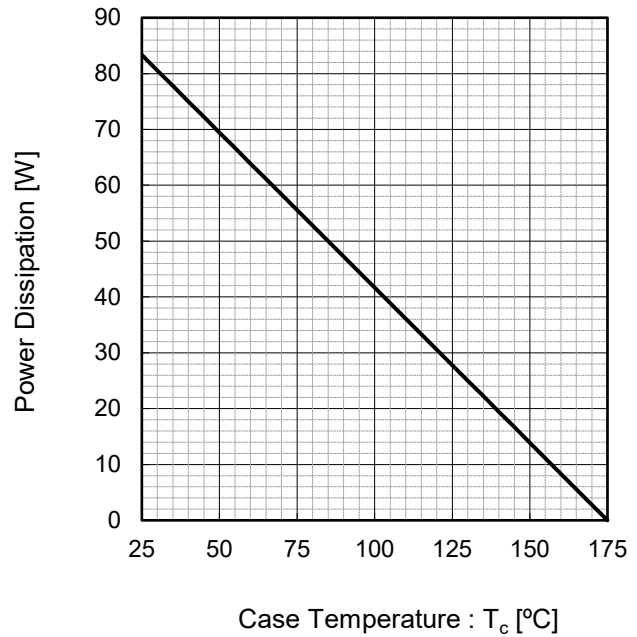
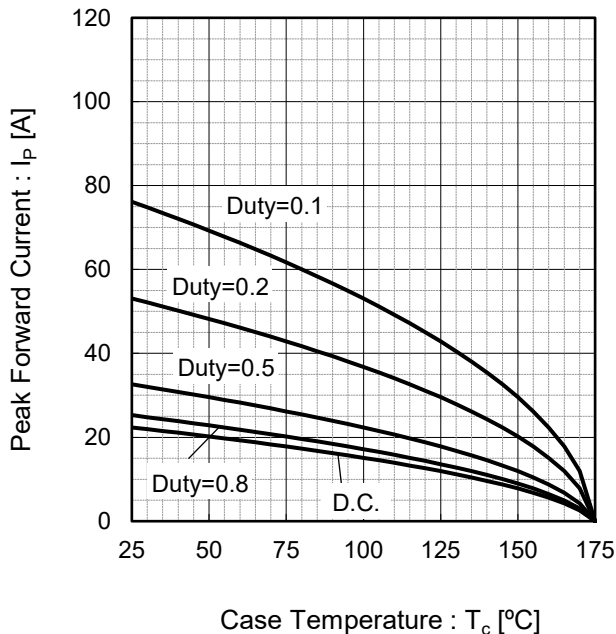
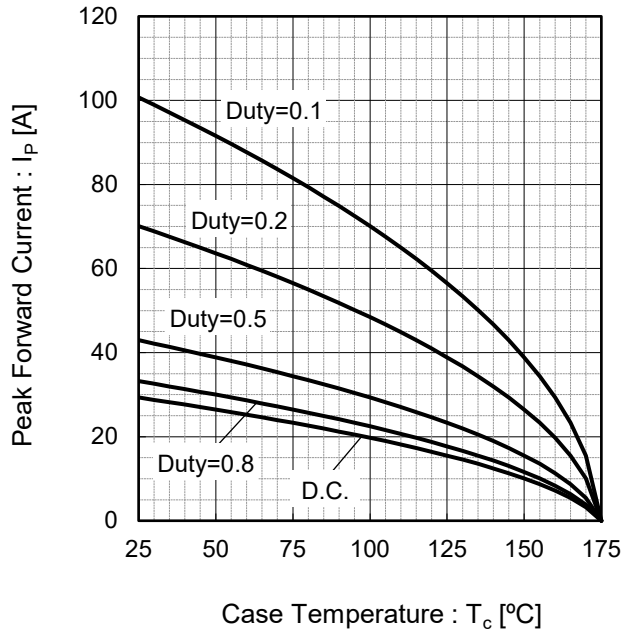


Fig.7\*4 Maximum peak forward current derating curve  $I_P - T_c$



Case Temperature :  $T_c$  [°C]  
 \*4 Based on max Vf, max  $Z_{th(j-c)}$   
 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)



Case Temperature :  $T_c$  [°C]  
 \*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)

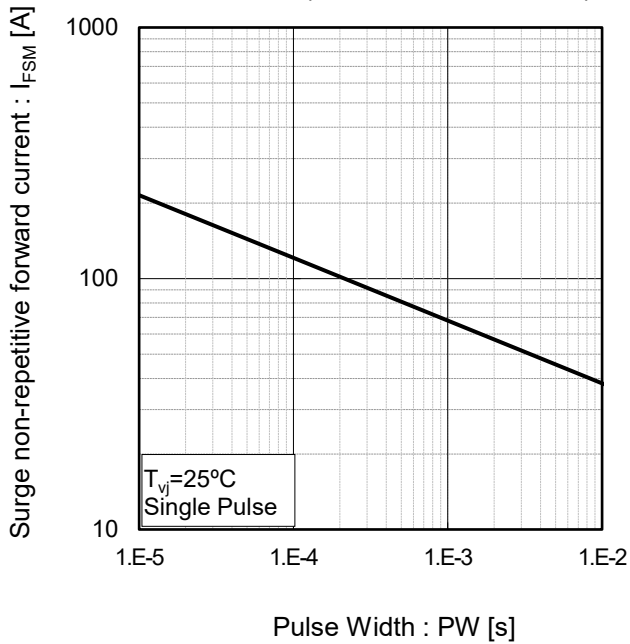
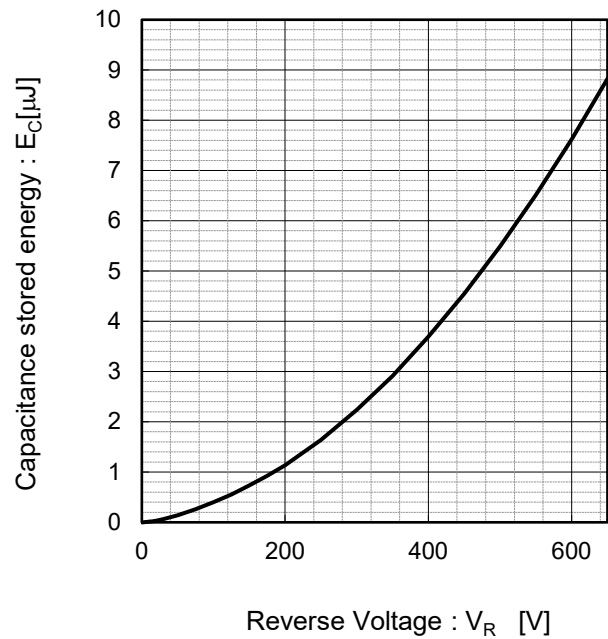
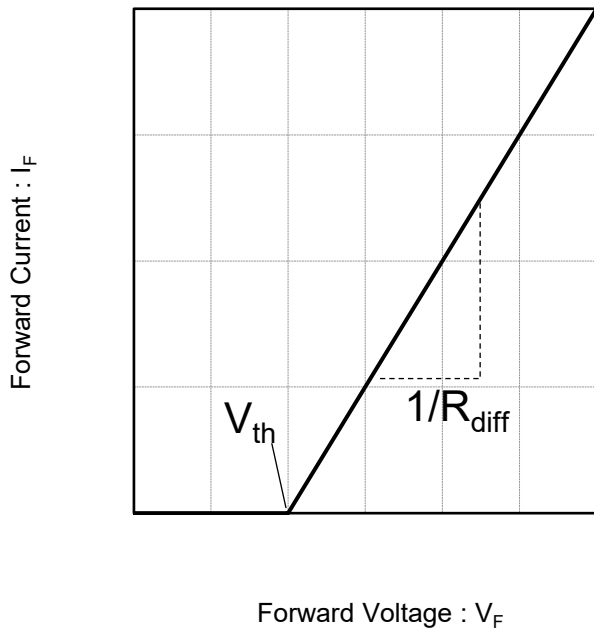


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

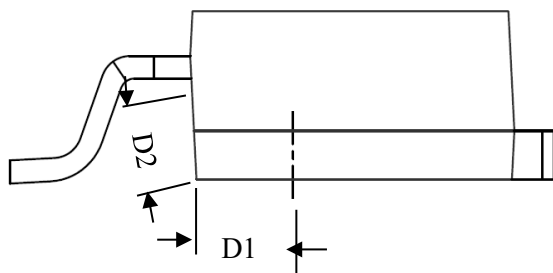
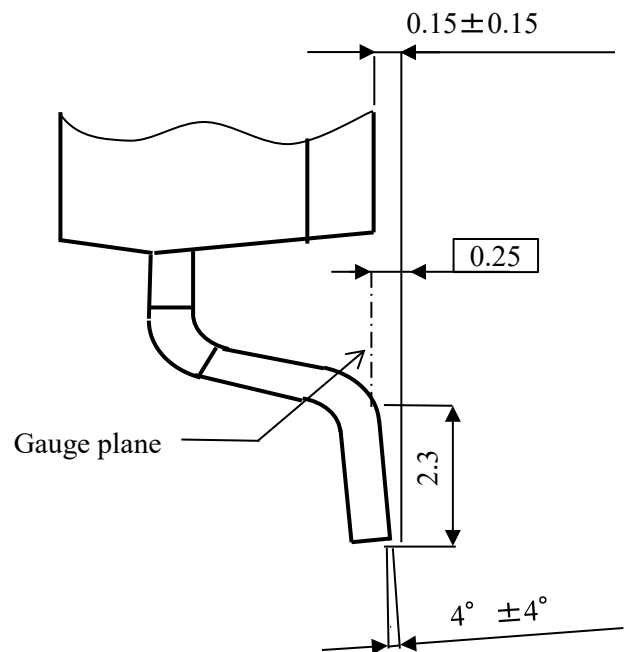
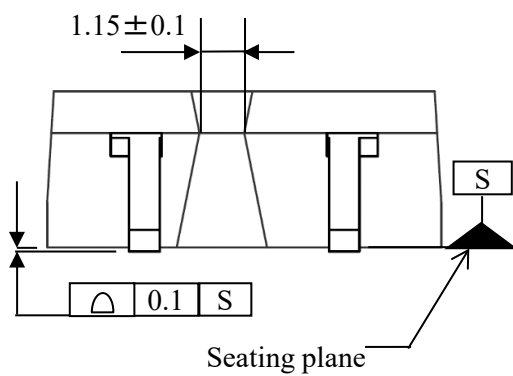
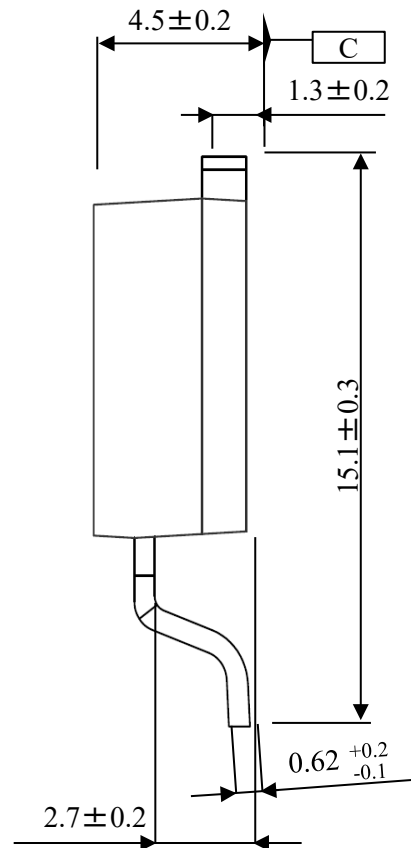
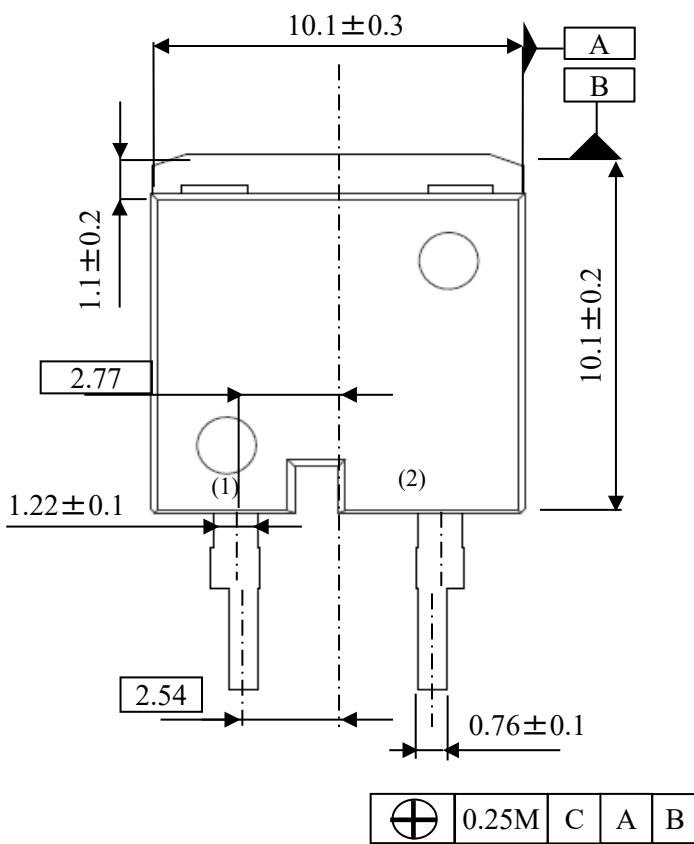
$$R_{diff}(T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
$a_0$	$9.35 \times 10^{-1}$	V
$a_1$	$-1.12 \times 10^{-3}$	V/°C
$b_0$	$3.98 \times 10^{-2}$	$\Omega$
$b_1$	$1.02 \times 10^{-4}$	$\Omega/^\circ\text{C}$
$b_2$	$1.08 \times 10^{-6}$	$\Omega/^\circ\text{C}^2$

$T_{vj}$  in °C;  $-40^\circ\text{C} < T_{vj} < 175^\circ\text{C}$ ;  $I_F < 20\text{ A}$

●Dimensions (Unit : mm)

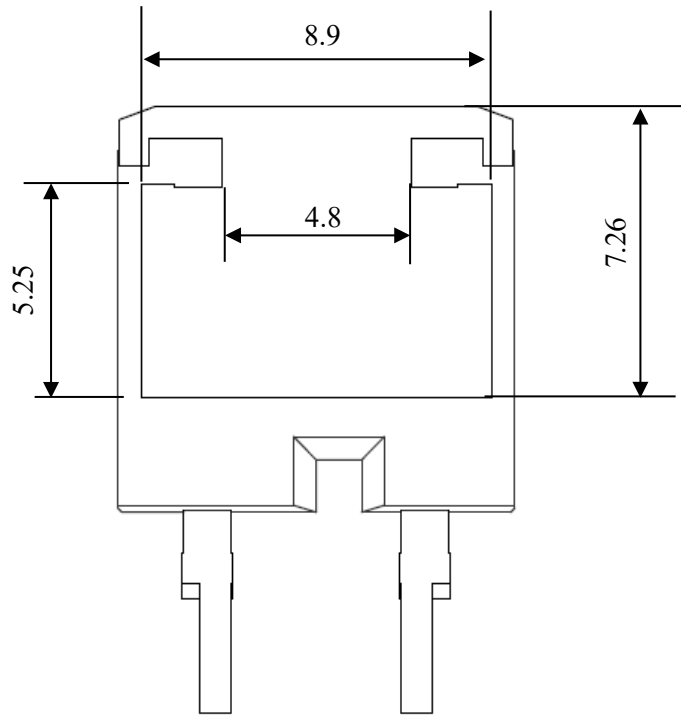
Marking Side



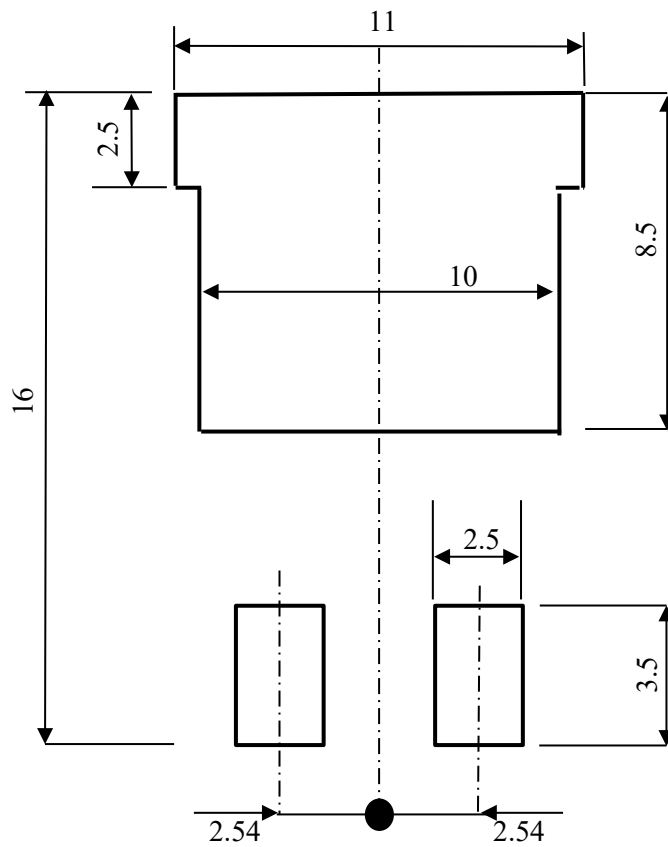
Minimum creepage distance = 5.1mm (D1+D2)

## ●Dimensions (Unit : mm)

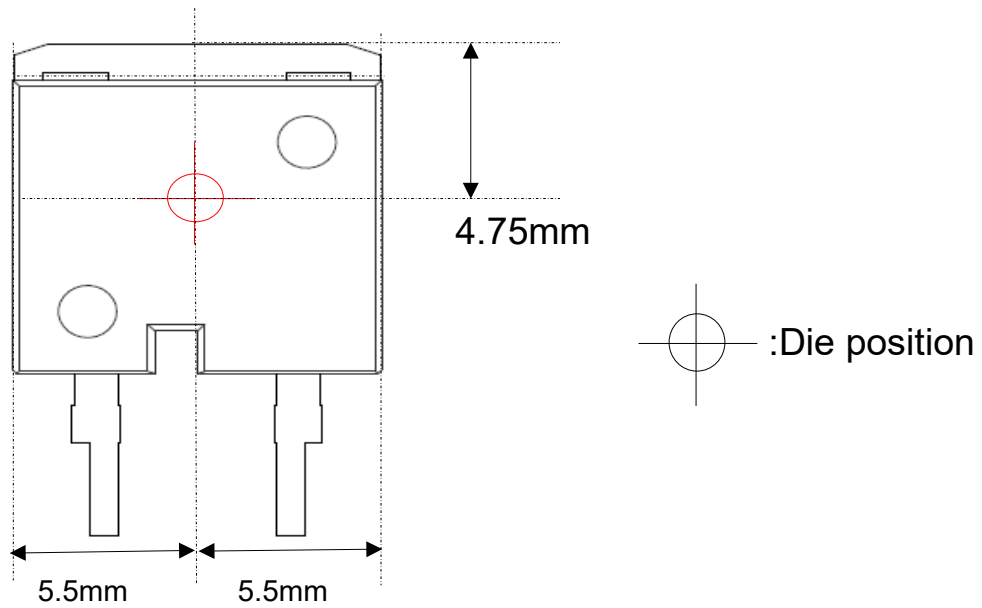
Back Side



## 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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