

V_R	650V
I_F	12A
Q_C	17nC

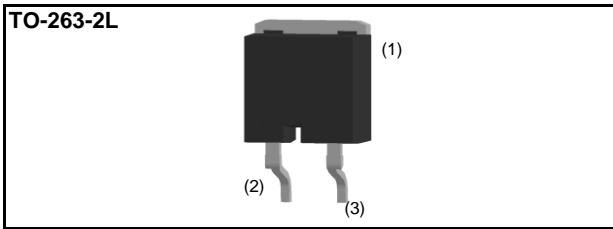
●Features

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

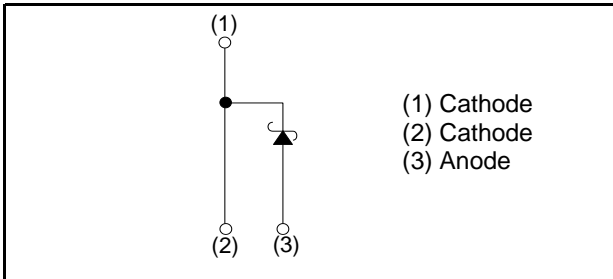
●Applications

- Factory Automation
- PV Power Conditioner
- Wireless Charger
- EV Charger Station

●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	SCS212AN

●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 ($T_c = 135^\circ\text{C}$)	I_F	12 ^{*1}	A
Surge non-repetitive forward current	I_{FSM}	PW = 10ms sinusoidal, $T_{vj} = 25^\circ\text{C}$	43 A
		PW = 10ms sinusoidal, $T_{vj} = 150^\circ\text{C}$	34 A
		PW = 10 μs square, $T_{vj} = 25^\circ\text{C}$	170 A
Repetitive peak forward current	I_{FRM}	52 ^{*2}	A
i^2t value	$\int i^2 dt$	PW = 10ms, $T_{vj} = 25^\circ\text{C}$	9.2 A^2s
		PW = 10ms, $T_{vj} = 150^\circ\text{C}$	5.7 A^2s
Total power dissipation	P_D	93 ^{*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)

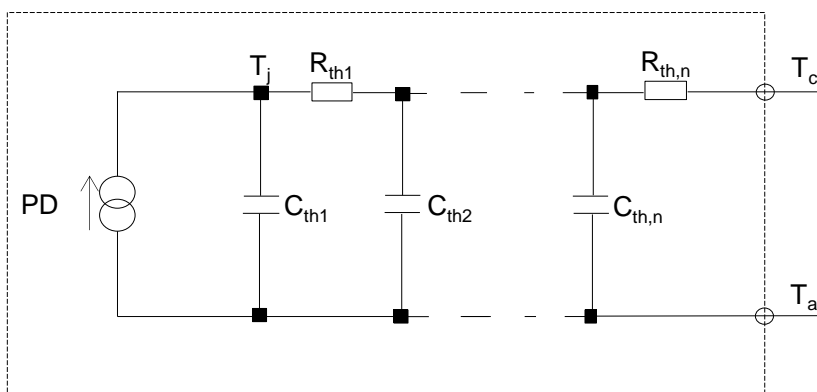
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R = 2.4\text{mA}$	650	-	-	V
Forward voltage	V_F	$I_F = 12\text{A}, T_{vj} = 25^{\circ}\text{C}$	-	1.35	1.55	V
		$I_F = 12\text{A}, T_{vj} = 150^{\circ}\text{C}$	-	1.55	-	V
		$I_F = 12\text{A}, T_{vj} = 175^{\circ}\text{C}$	-	1.63	-	V
Reverse current	I_R	$V_R = 600\text{V}, T_{vj} = 25^{\circ}\text{C}$	-	2.4	240	μA
		$V_R = 600\text{V}, T_{vj} = 150^{\circ}\text{C}$	-	36	-	μA
		$V_R = 600\text{V}, T_{vj} = 175^{\circ}\text{C}$	-	84	-	μA
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$	-	440	-	pF
		$V_R = 600\text{V}, f = 1\text{MHz}$	-	44	-	pF
Total capacitive charge	Q_C	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	17	-	nC
Switching time	t_C	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	14	-	ns

● **Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R_{thJC}	-	-	1.2	1.6	K/W

● **Typical Transient Thermal Characteristics**

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	2.75×10^{-1}	K/W	C_{th1}	5.34×10^{-4}	Ws/K
R_{th2}	9.14×10^{-1}		C_{th2}	2.03×10^{-3}	
R_{th3}	4.19×10^{-4}		C_{th3}	5.64×10^0	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ Characteristics

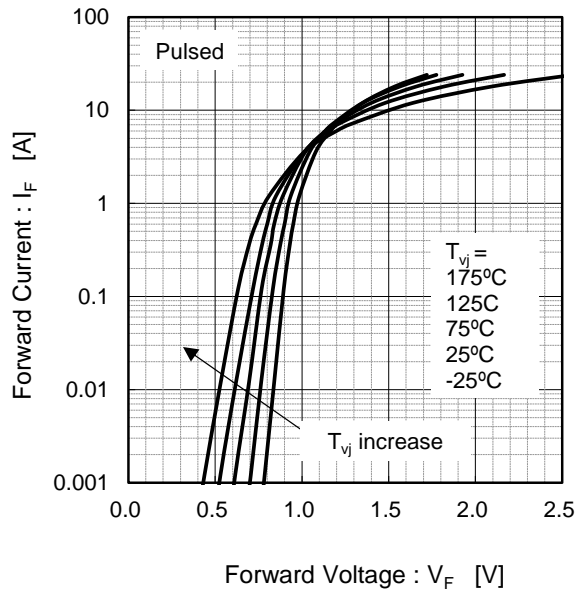


Fig.2 $V_F - I_F$ Characteristics

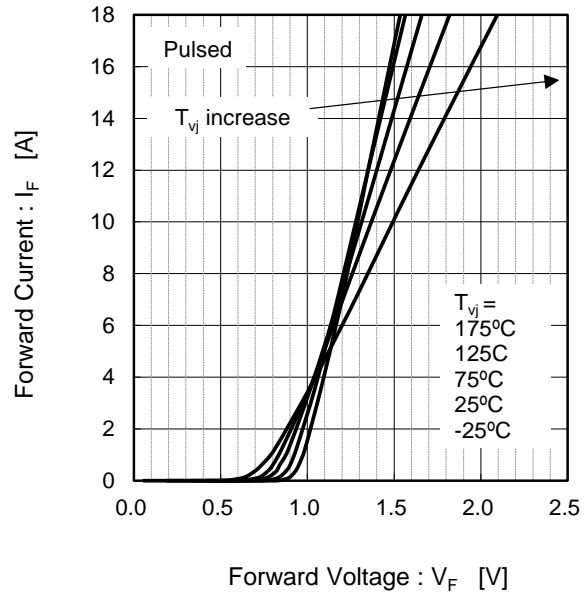


Fig.3 $V_R - I_R$ Characteristics

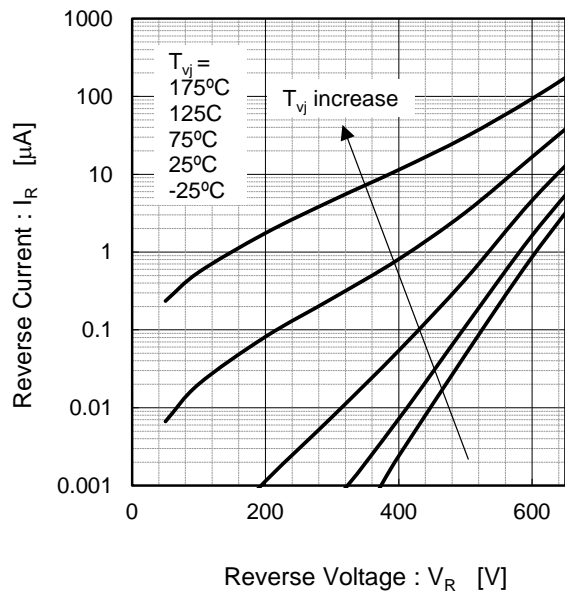
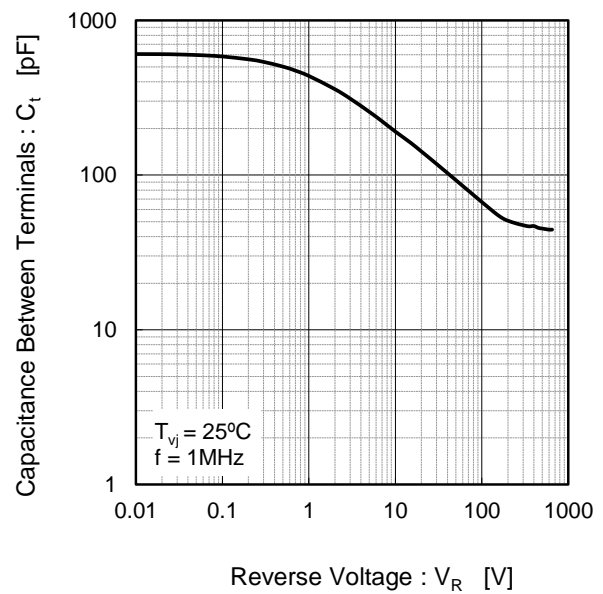


Fig.4 $V_R - C_t$ Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

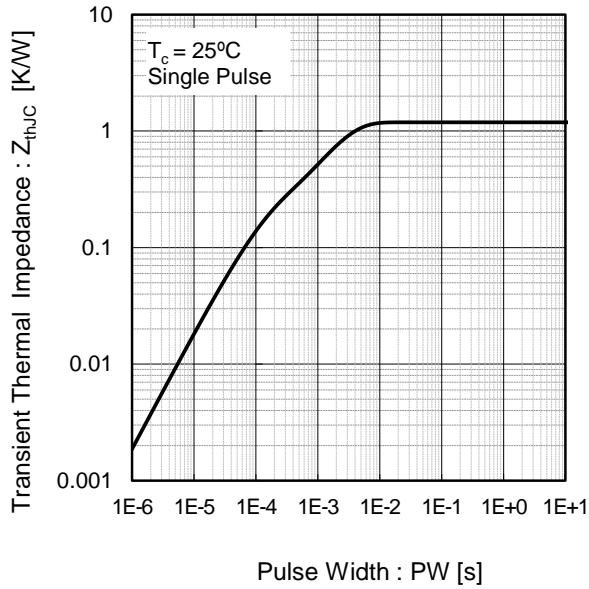


Fig.6 Power Dissipation

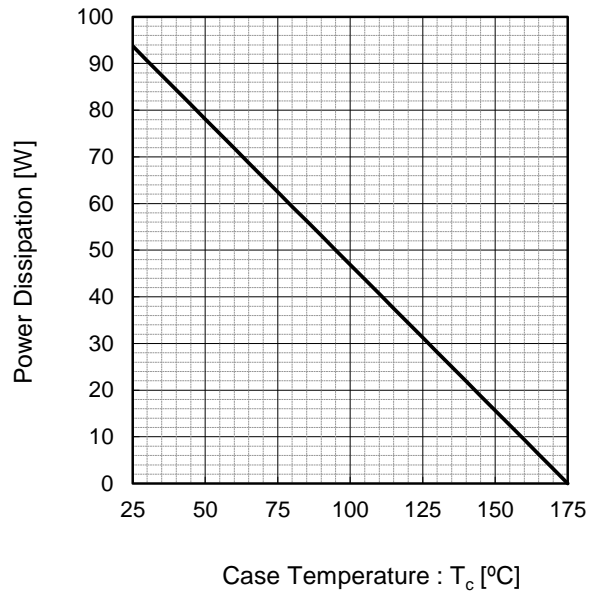
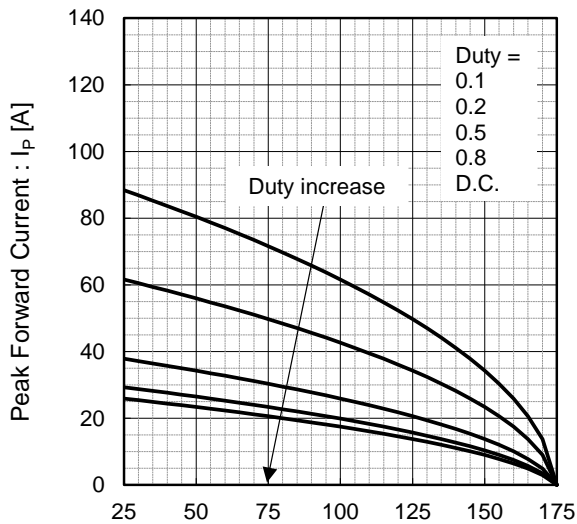
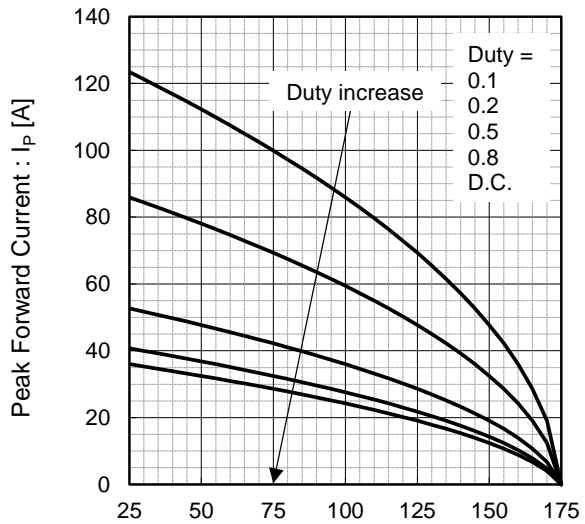


Fig.7*4 Maximum peak forward current derating curve $I_p - T_c$



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)

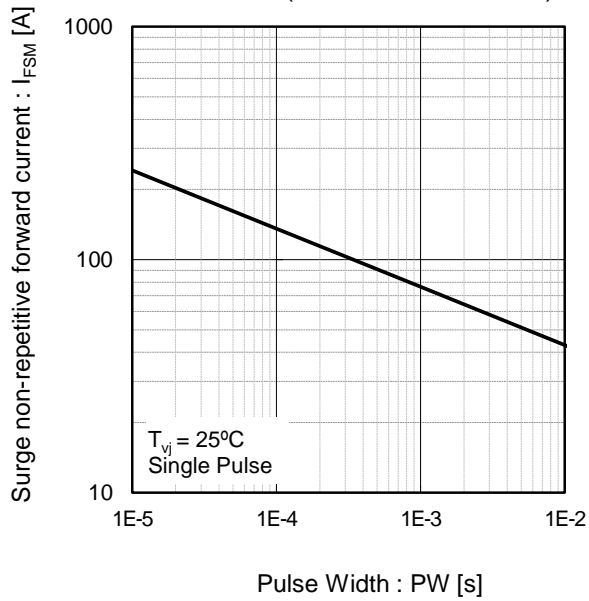
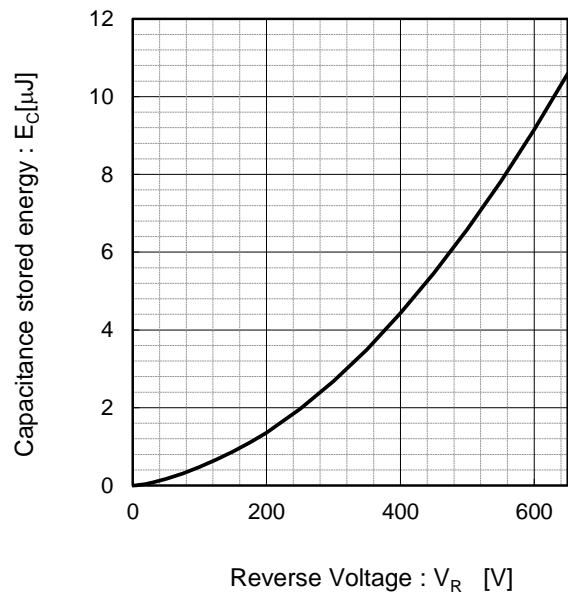
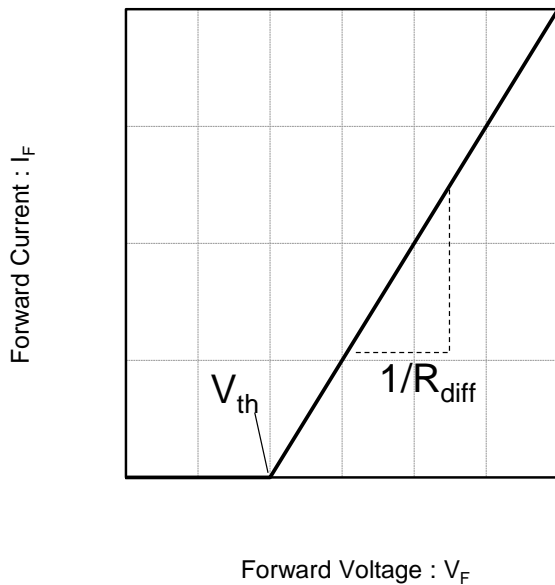


Fig.10 Typical capacitance stored energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

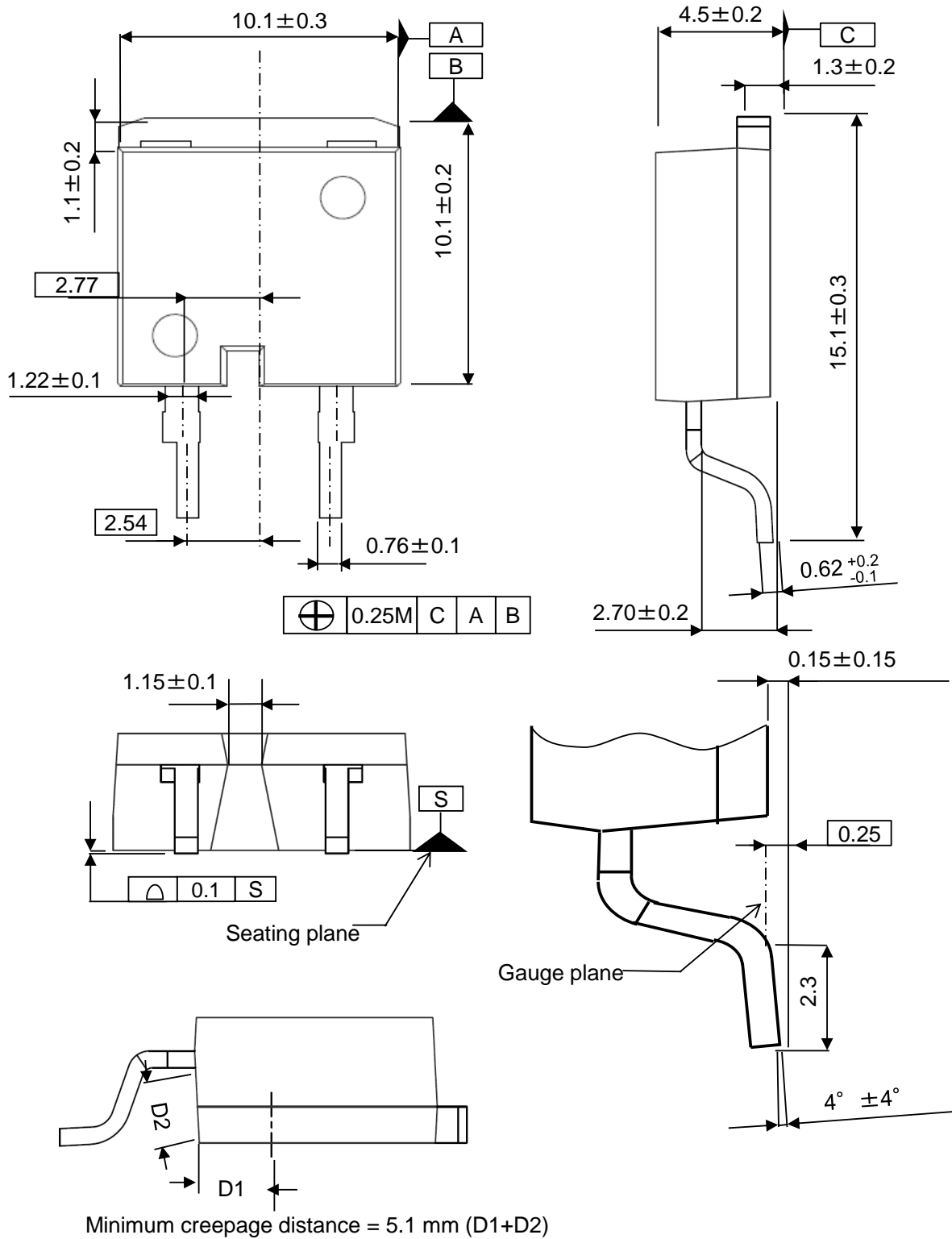
$$R_{diff} (T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a_0	9.35×10^{-1}	V
a_1	-1.12×10^{-3}	V/°C
b_0	3.32×10^{-2}	Ω
b_1	8.50×10^{-5}	Ω/°C
b_2	9.00×10^{-7}	Ω/°C ²

T_{vj} in °C; $-40\text{ °C} < T_{vj} < 175\text{ °C}$; $I_F < 24\text{ A}$

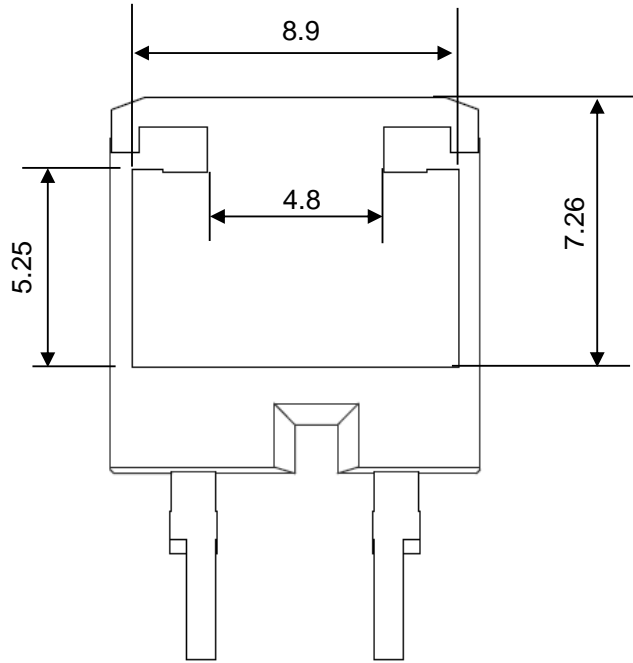
●Dimensions (Unit : mm)

Marking Side

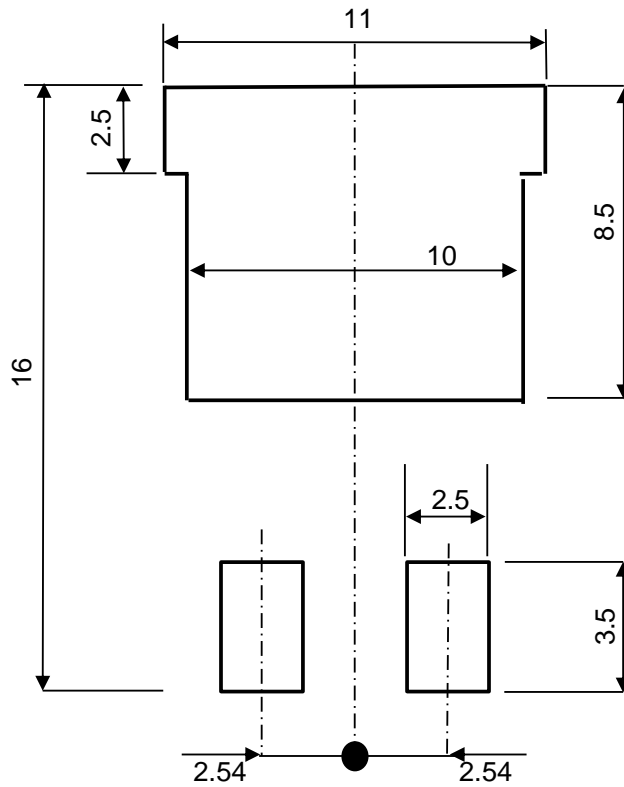


●Dimensions (Unit : mm)

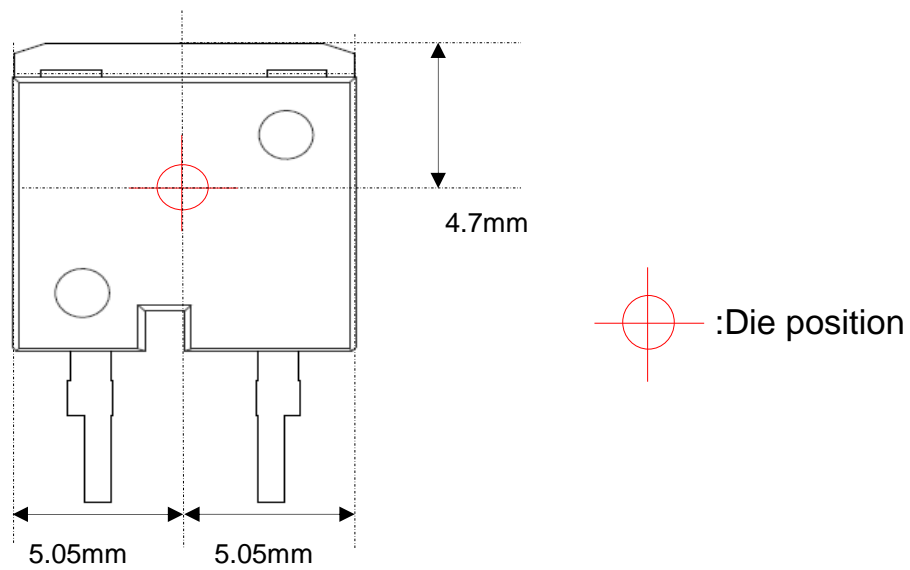
Back Side



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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