

V_R	650V
I_F	10A
Q_C	11nC

●Features

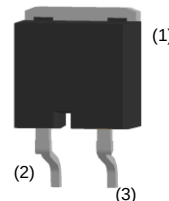
- 1) Low forward voltage
- 2) Negligible recovery time/current
- 3) Temperature independent switching behavior
- 4) Wide creepage distance = min. 5.10mm

●Applications

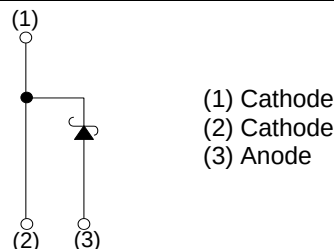
- Factory Automation
- PV Power Conditioner
- Wireless Charger
- EV Charger Station

●Outline

TO-263-2L



●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 ($T_c = 135^\circ\text{C}$)		I_F	10 ^{*1}	A
Surge non-repetitive forward current	PW = 10ms sinusoidal, $T_{vj} = 25^\circ\text{C}$	I_{FSM}	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}	44 ^{*2}	A
i^2t value	PW = 10ms, $T_{vj} = 25^\circ\text{C}$	$\int i^2 dt$	7.2	A ² s
	PW = 10ms, $T_{vj} = 150^\circ\text{C}$		4.5	A ² s
Total power dissipation		P_D	78 ^{*3}	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)

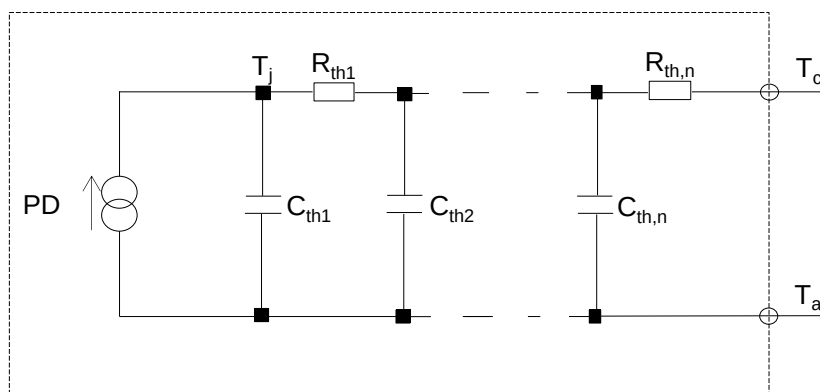
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R = 2.0\text{mA}$	650	-	-	V
Forward voltage	V_F	$I_F = 10\text{A}, T_{vj} = 25^{\circ}\text{C}$	-	1.35	1.55	V
		$I_F = 10\text{A}, T_{vj} = 150^{\circ}\text{C}$	-	1.55	-	V
		$I_F = 10\text{A}, T_{vj} = 175^{\circ}\text{C}$	-	1.63	-	V
Reverse current	I_R	$V_R = 600\text{V}, T_{vj} = 25^{\circ}\text{C}$	-	2	200	μA
		$V_R = 600\text{V}, T_{vj} = 150^{\circ}\text{C}$	-	30	-	μA
		$V_R = 600\text{V}, T_{vj} = 175^{\circ}\text{C}$	-	70	-	μA
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_{thJC}	-	-	1.4	1.9	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	4.01×10^{-1}	K/W	C_{th1}	4.91×10^{-4}	Ws/K
R_{th2}	8.48×10^{-1}		C_{th2}	1.80×10^{-3}	
R_{th3}	1.27×10^{-1}		C_{th3}	1.38×10^{-3}	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ Characteristics

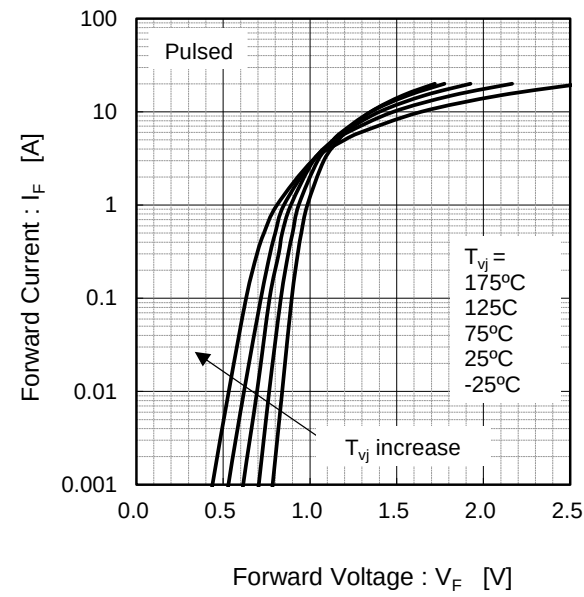


Fig.2 $V_F - I_F$ Characteristics

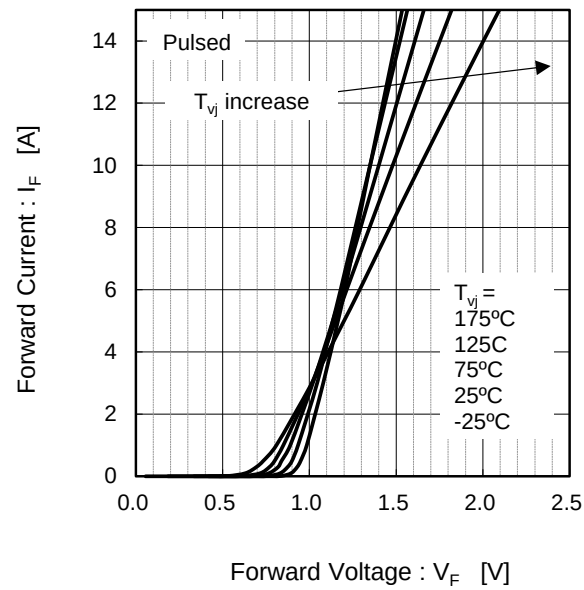


Fig.3 $V_R - I_R$ Characteristics

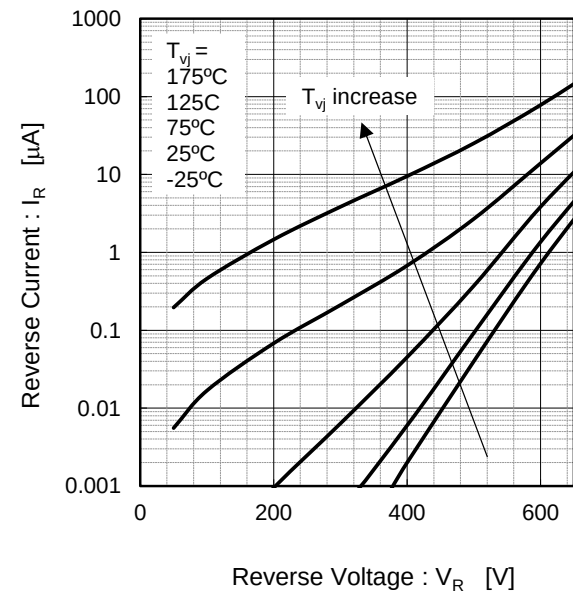
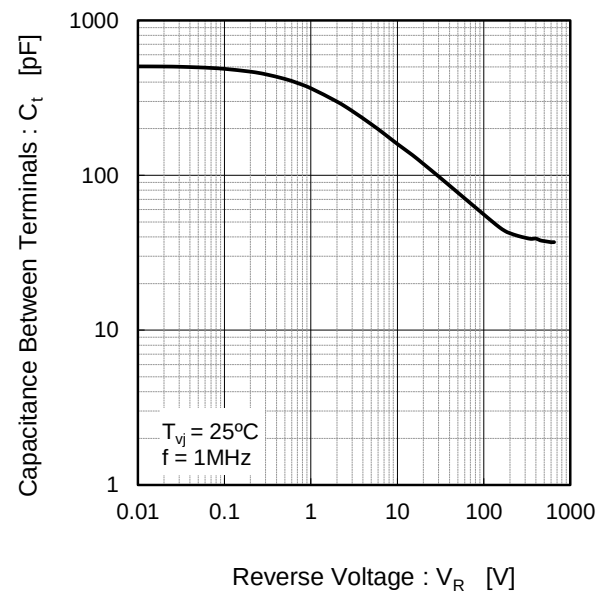


Fig.4 $V_R - C_t$ Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

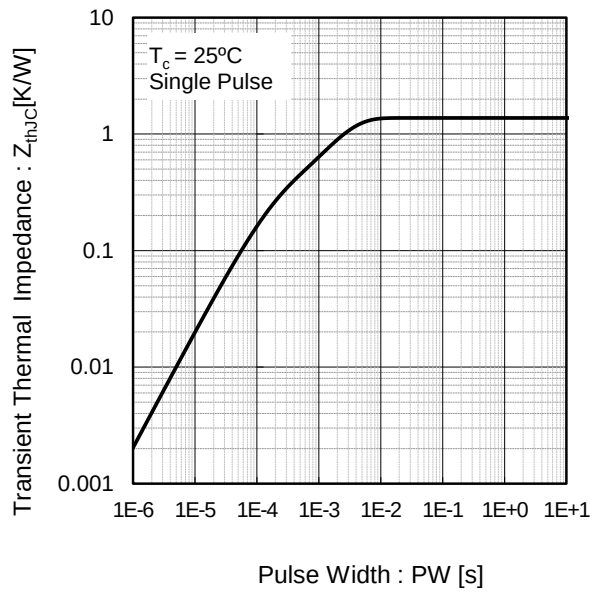


Fig.6 Power Dissipation

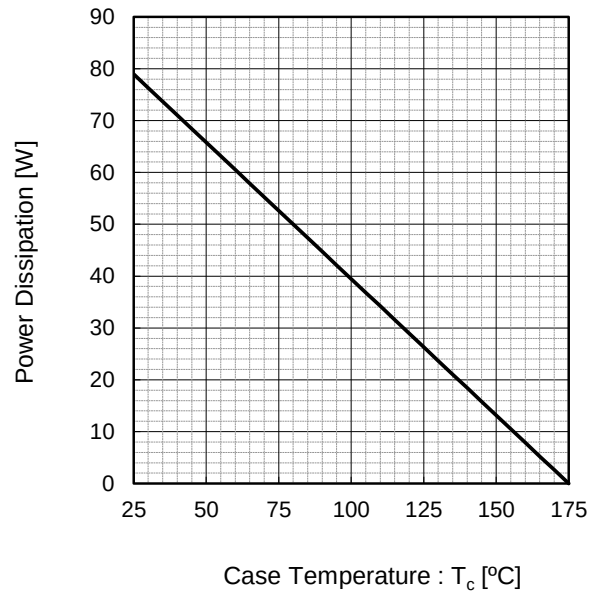
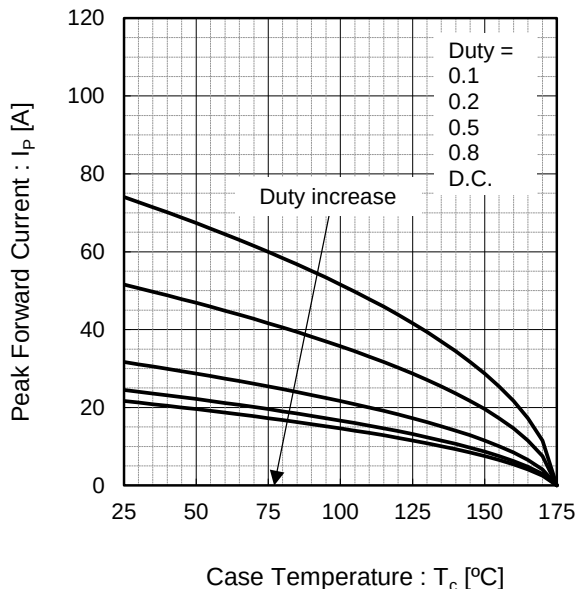
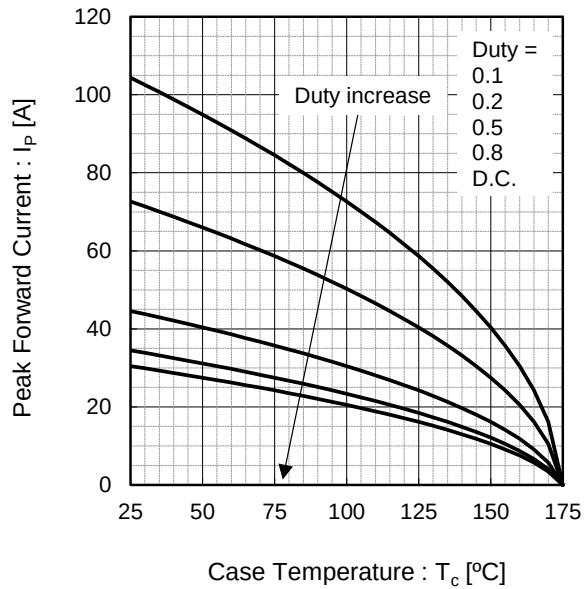


Fig.7*4 Maximum peak forward current derating curve $I_P - T_c$



Case Temperature : T_c [$^\circ\text{C}$]
 *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 [$^\circ\text{C}$]
 *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)

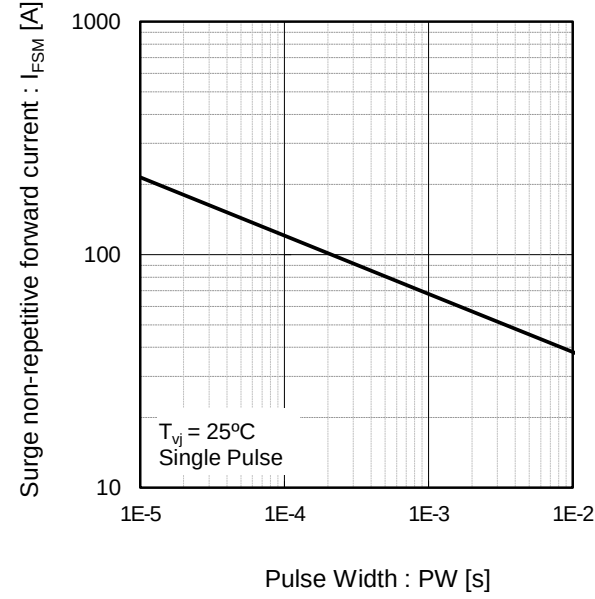
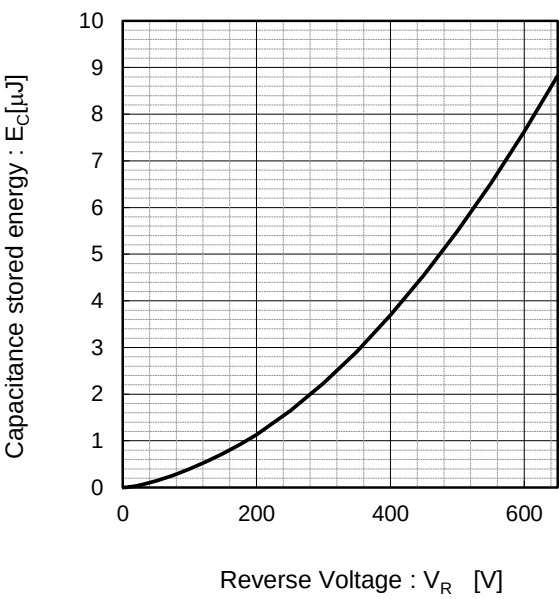
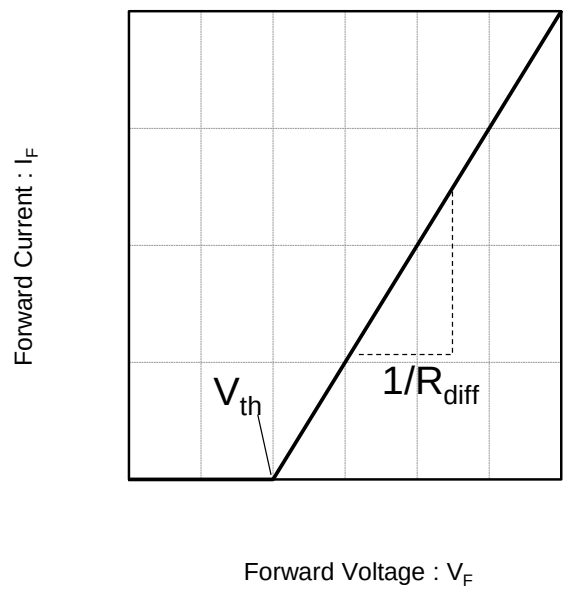


Fig.10 Typical capacitance stored energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

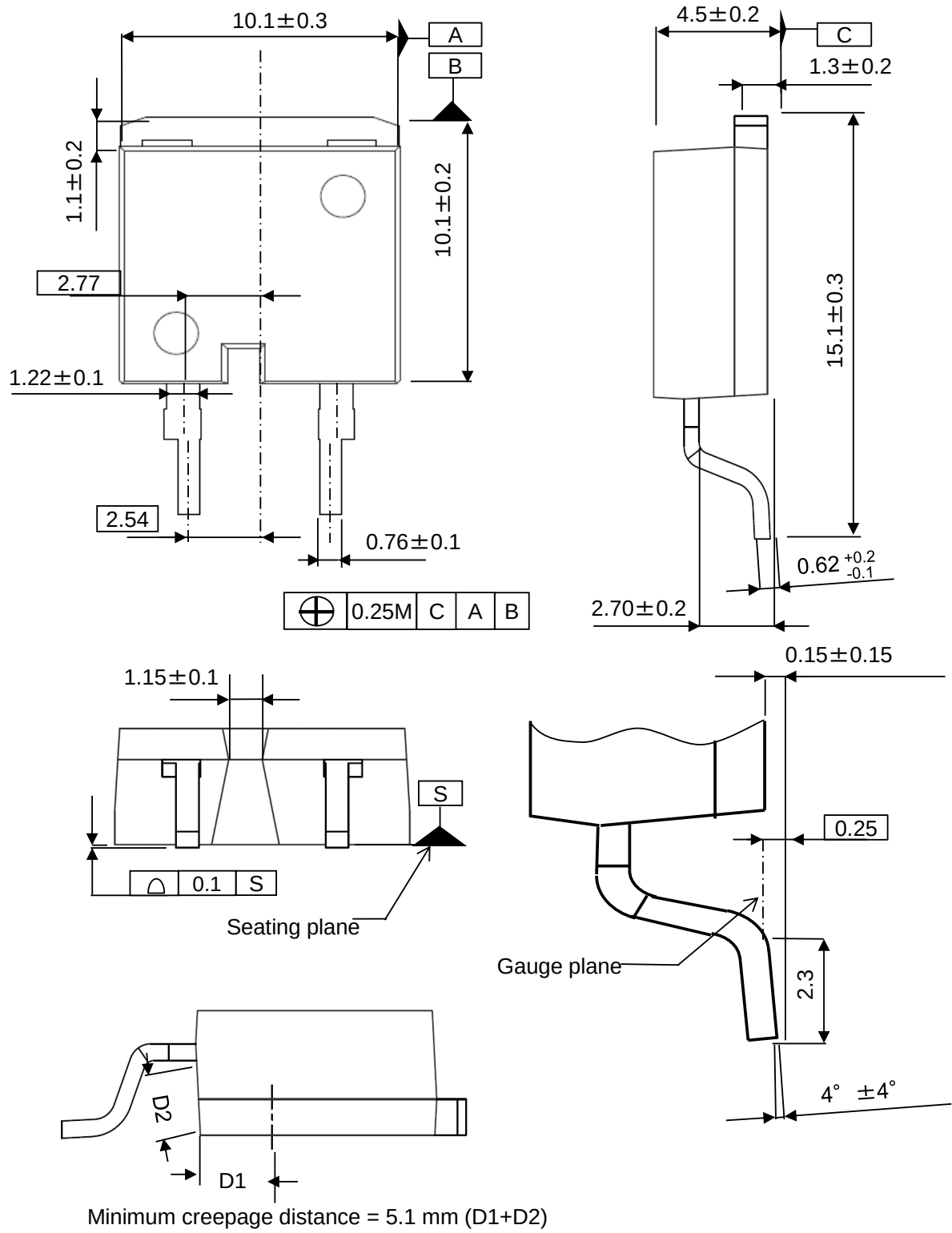
$$V_{th} (T_{vj}) = a_0 + a_1 T_{vj}$$
$$R_{diff} (T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a ₀	9.35 × 10 ⁻¹	V
a ₁	-1.12 × 10 ⁻³	V/°C
b ₀	3.98 × 10 ⁻²	Ω
b ₁	1.02 × 10 ⁻⁴	Ω/°C
b ₂	1.08 × 10 ⁻⁶	Ω/°C ²

T_{vj} in °C; -40 °C < T_{vj} < 175 °C ; I_F < 20 A

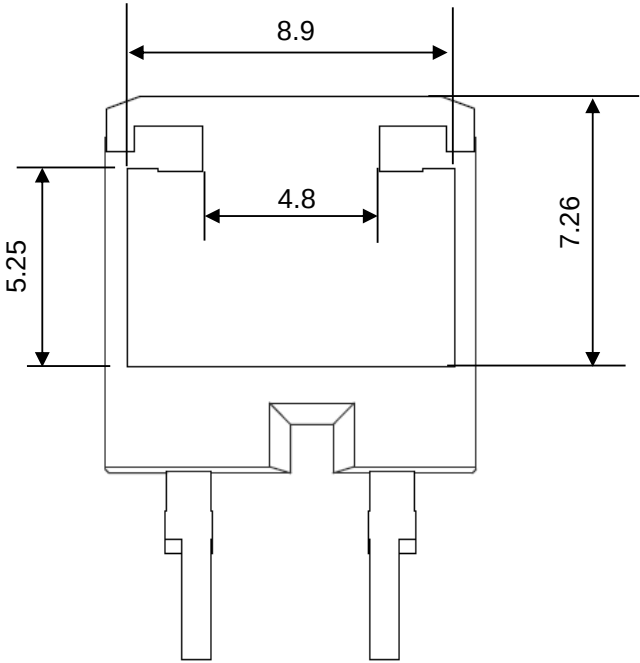
●Dimensions (Unit : mm)

Marking Side

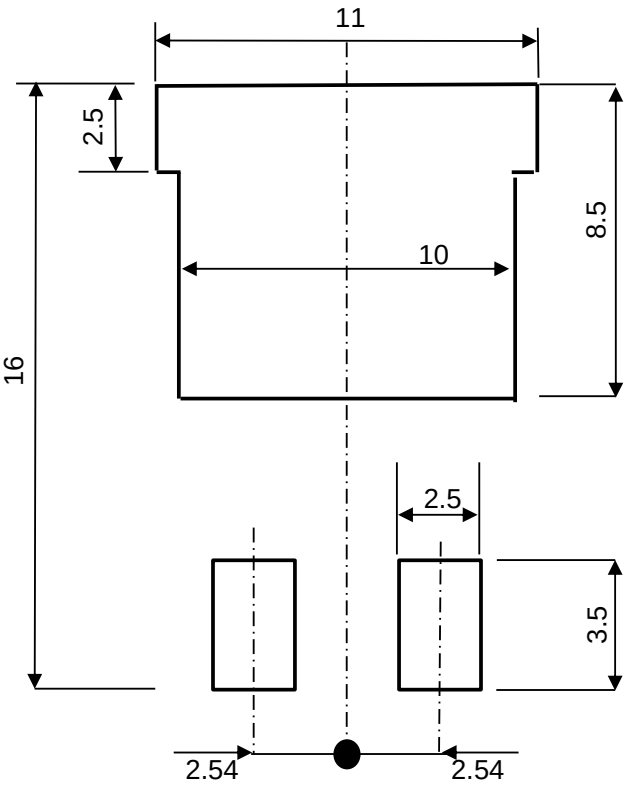


●Dimensions (Unit : mm)

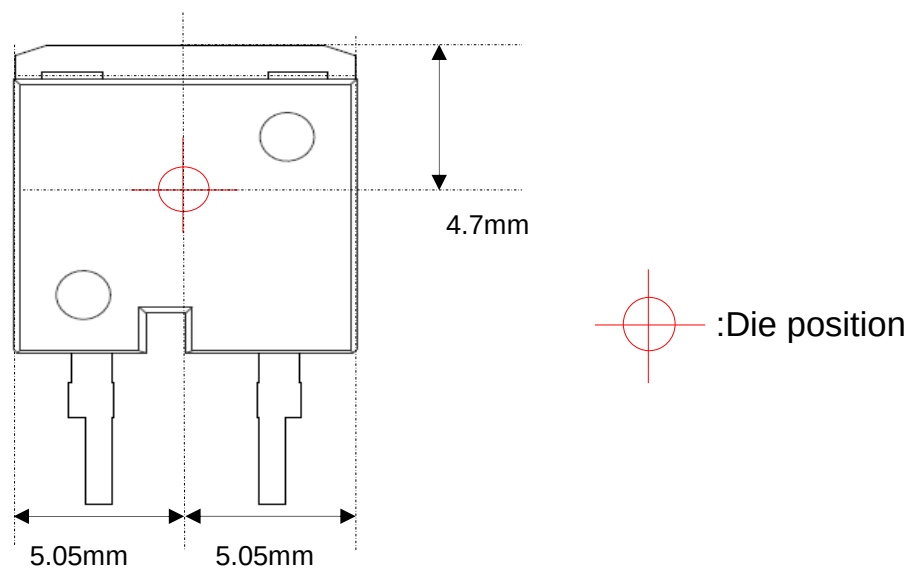
Back Side



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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