

V_R	1200V
I_F	20A
Q_C	68nC

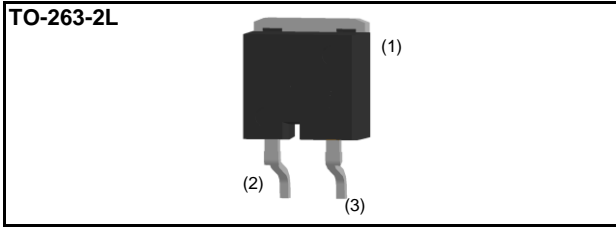
●Features

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

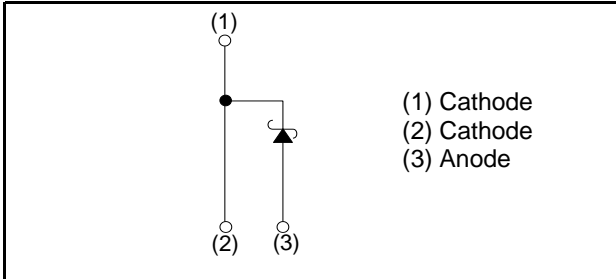
●Applications

- 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	SCS220KN

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

Parameter	Symbol	Value	Unit
Reverse voltage (repetitive peak)	V_{RM}	1200	V
Reverse voltage (DC)	V_R	1200	V
Continuous forward current ($T_c = 143^\circ\text{C}$)	I_F	20 *1	A
Surge non-repetitive forward current	I_{FSM}	PW = 10ms sinusoidal, $T_{vj} = 25^\circ\text{C}$	84 A
		PW = 10ms sinusoidal, $T_{vj} = 150^\circ\text{C}$	63 A
		PW = 10 μs square, $T_{vj} = 25^\circ\text{C}$	330 A
Repetitive peak forward current	I_{FRM}	94 *2	A
i^2t value	$\int i^2 dt$	PW = 10ms, $T_{vj} = 25^\circ\text{C}$	35.2 A^2s
		PW = 10ms, $T_{vj} = 150^\circ\text{C}$	19.8 A^2s
Total power dissipation	P_D	272 *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°C unless otherwise specified)

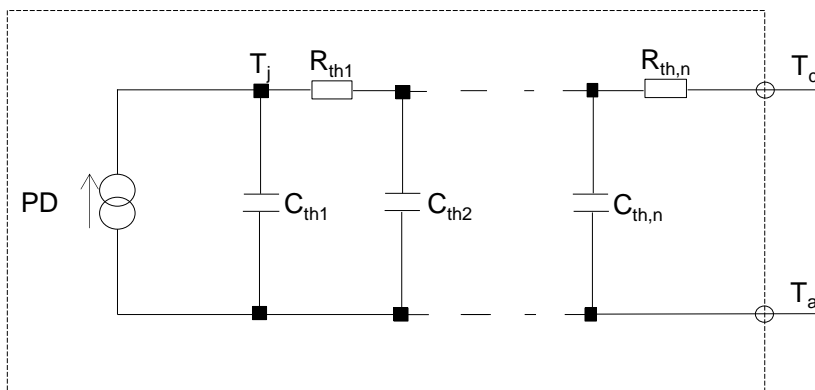
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V _{DC}	I _R = 0.4mA	1200	-	-	V
Forward voltage	V _F	I _F = 20A, T _{vj} = 25°C	-	1.4	1.6	V
		I _F = 20A, T _{vj} = 150°C	-	1.8	-	V
		I _F = 20A, T _{vj} = 175°C	-	1.9	-	V
Reverse current	I _R	V _R = 1200V, T _{vj} = 25°C	-	10	400	μA
		V _R = 1200V, T _{vj} = 150°C	-	160	-	μA
		V _R = 1200V, T _{vj} = 175°C	-	260	-	μA
Total capacitance	C	V _R = 1V, f = 1MHz	-	1050	-	pF
		V _R = 800V, f = 1MHz	-	85	-	pF
Total capacitive charge	Q _C	V _R = 800V, di/dt = 500A/μs	-	68	-	nC
Switching time	t _C	V _R = 800V, di/dt = 500A/μs	-	33	-	ns

●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{thJC}	-	-	0.42	0.55	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R _{th1}	1.58 × 10 ⁻¹	K/W	C _{th1}	1.06 × 10 ⁻³	Ws/K
R _{th2}	1.09 × 10 ⁰		C _{th2}	4.27 × 10 ⁴	
R _{th3}	1.18 × 10 ⁻⁵		C _{th3}	9.09 × 10 ¹	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ Characteristics

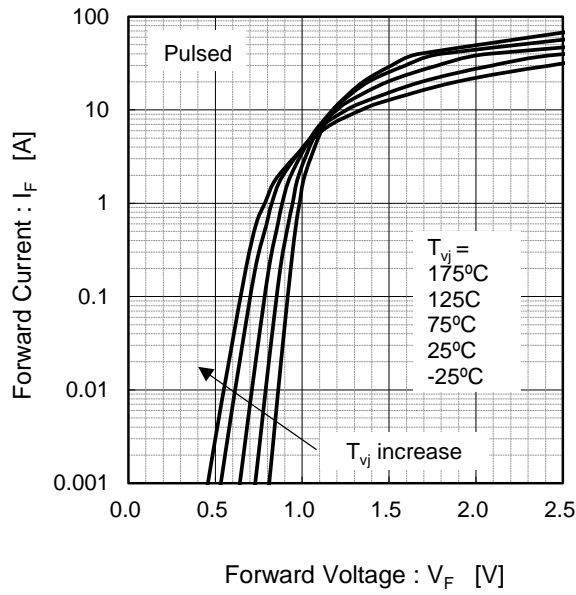


Fig.2 $V_F - I_F$ Characteristics

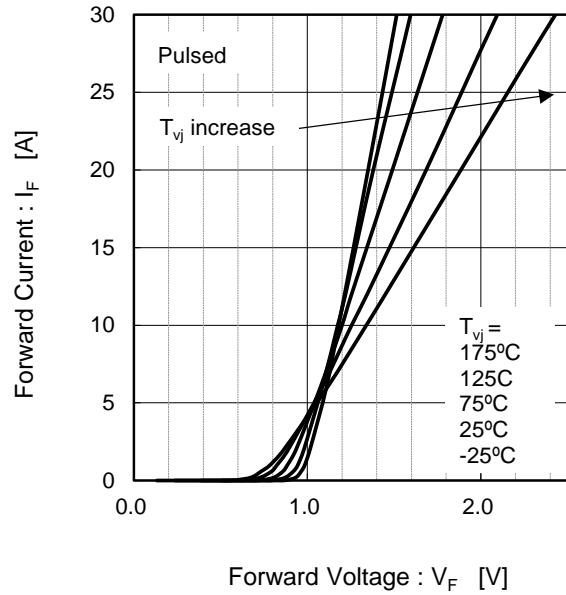


Fig.3 $V_R - I_R$ Characteristics

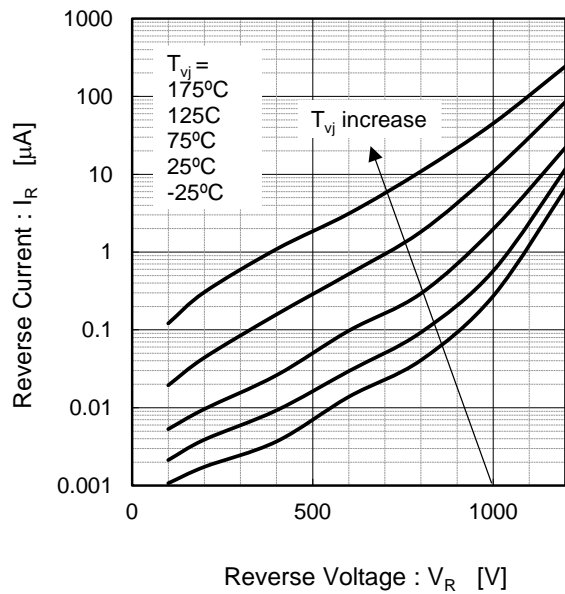
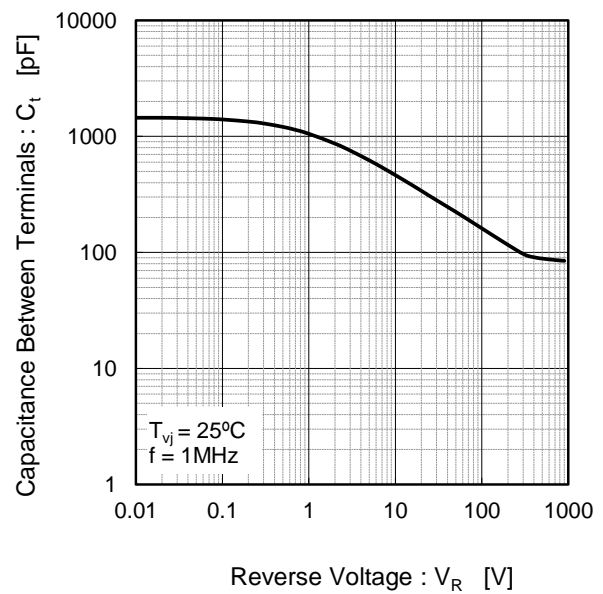


Fig.4 $V_R - C_t$ Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

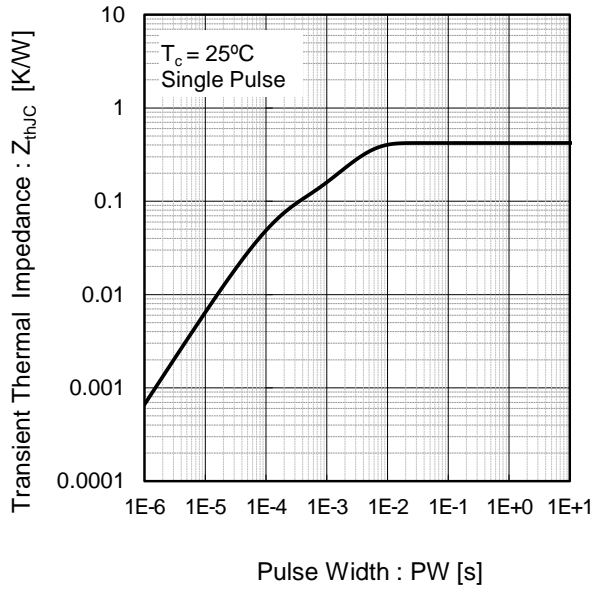


Fig.6 Power Dissipation

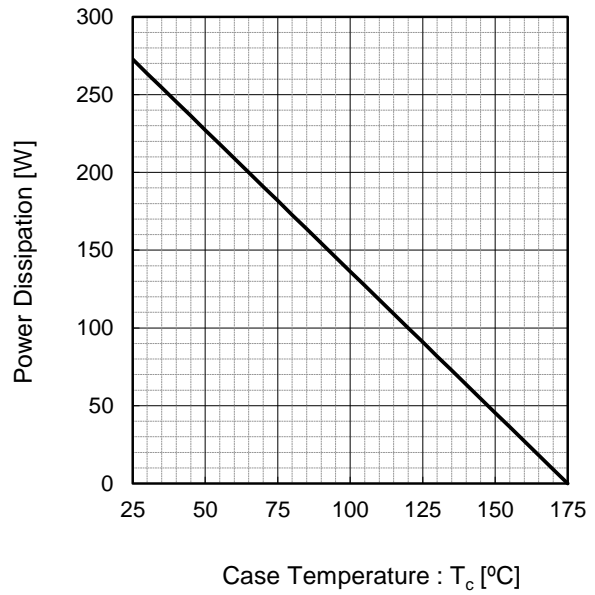
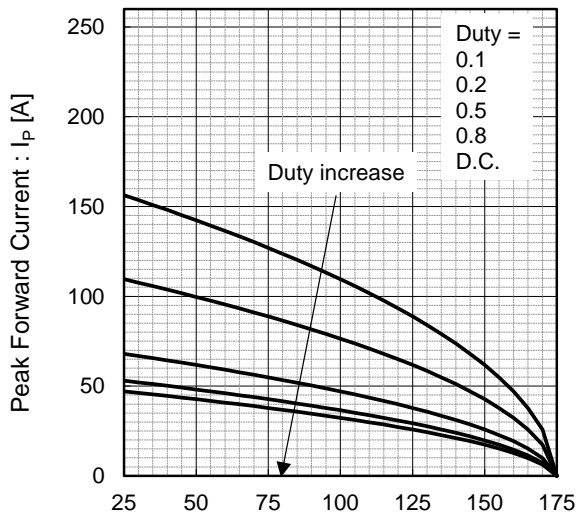
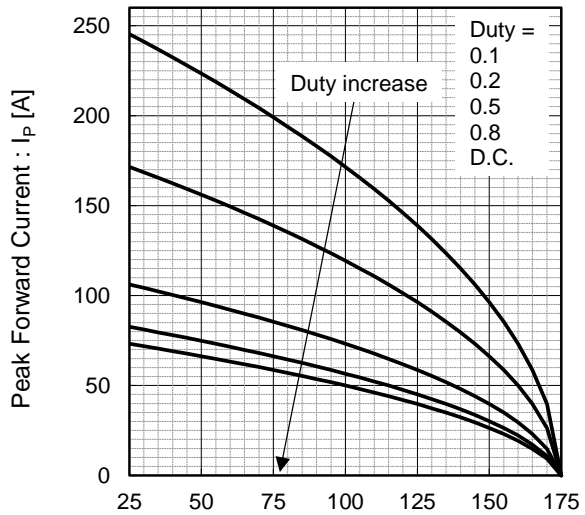


Fig.7*4 Maximum peak forward current derating curve $I_p - T_c$



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)

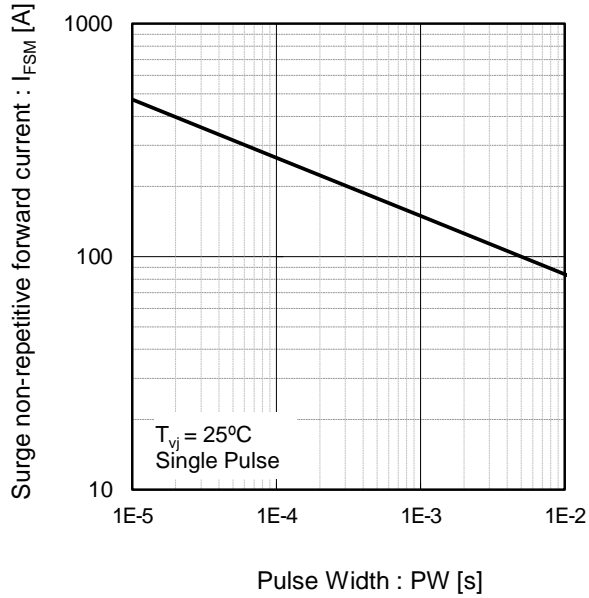
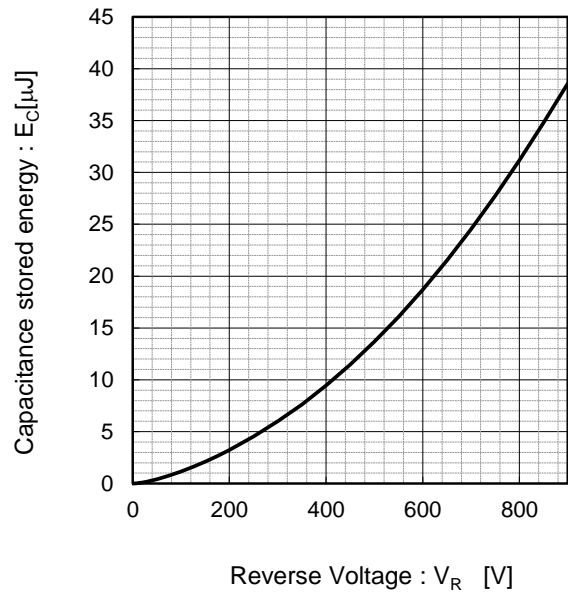
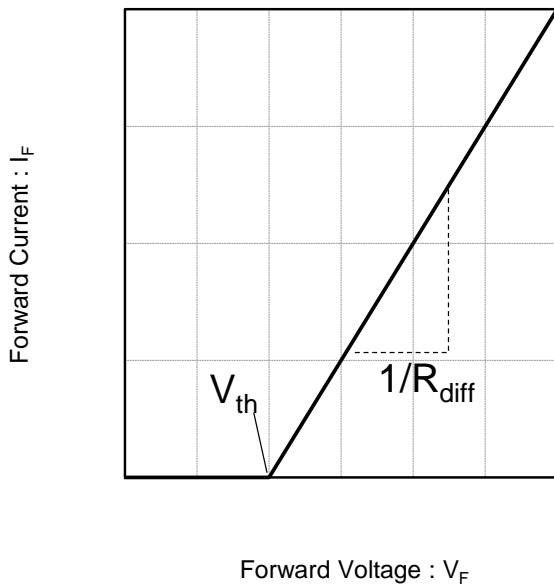


Fig.10 Typical capacitance stored energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

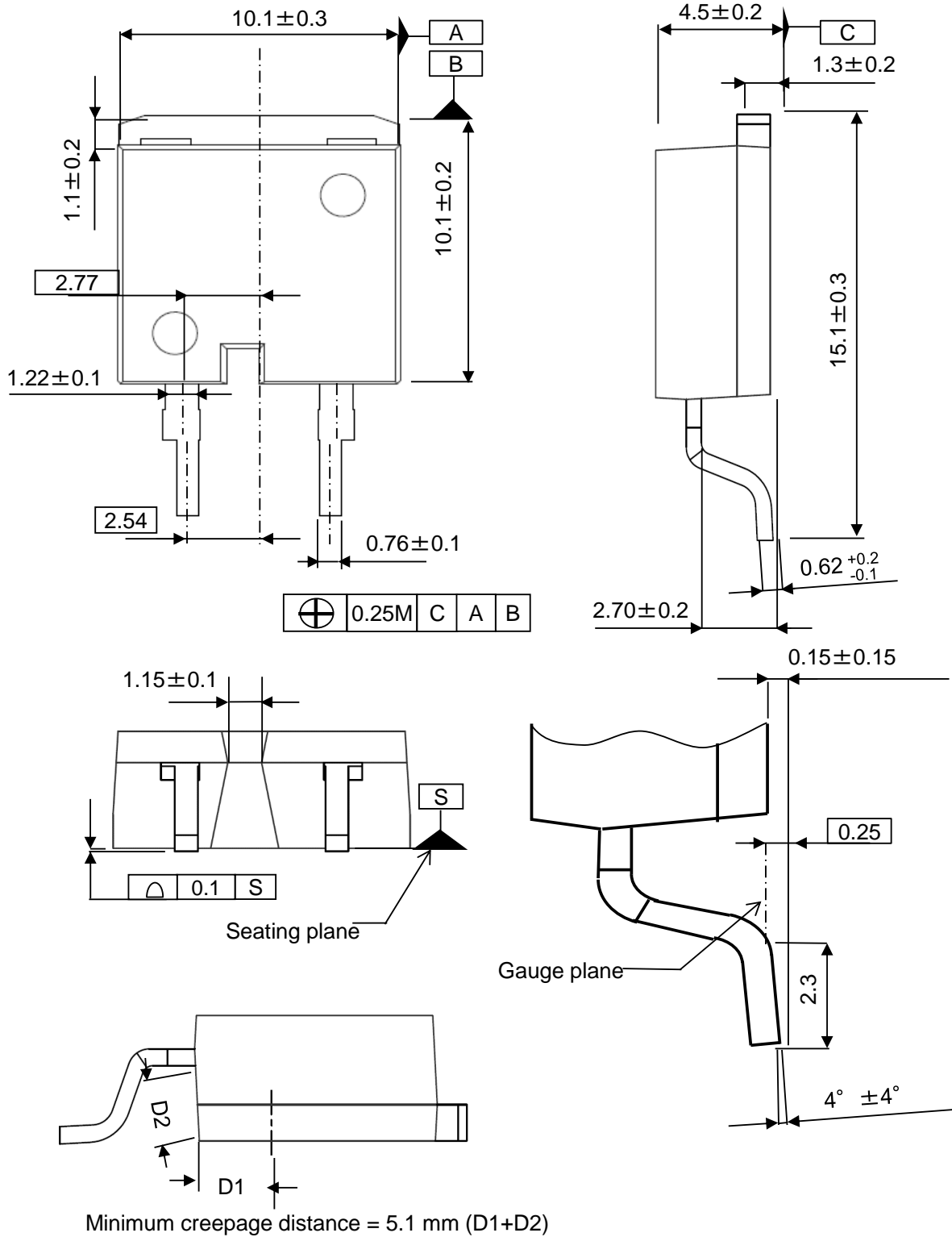
$$R_{diff} (T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a ₀	9.93 × 10 ⁻¹	V
a ₁	-1.27 × 10 ⁻³	V/°C
b ₀	1.83 × 10 ⁻²	Ω
b ₁	1.03 × 10 ⁻⁴	Ω/°C
b ₂	6.65 × 10 ⁻⁷	Ω/°C ²

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

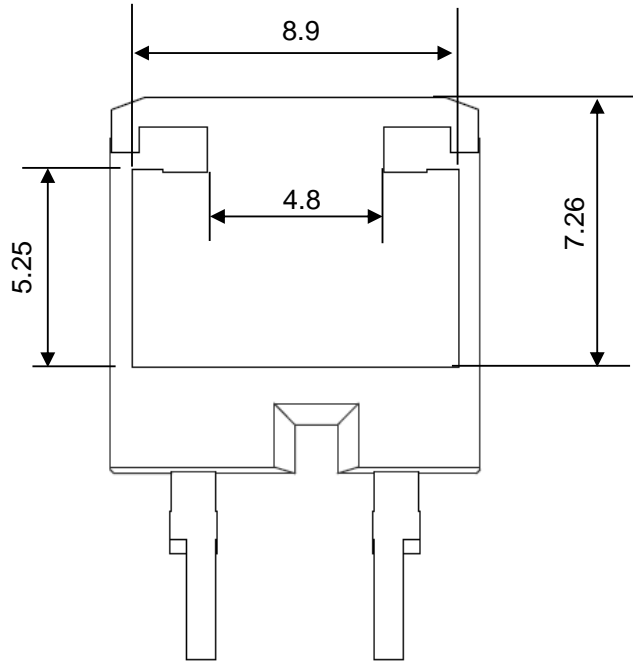
●Dimensions (Unit : mm)

Marking Side

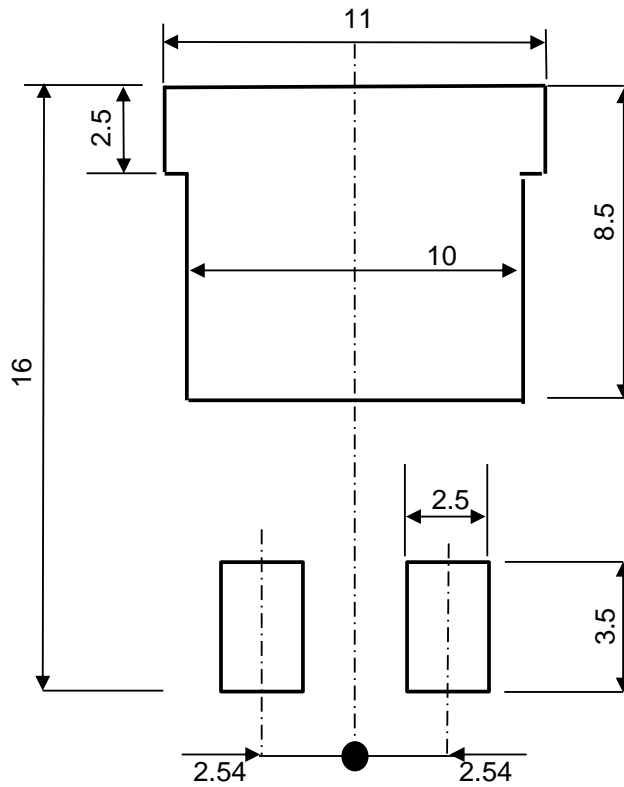


●Dimensions (Unit : mm)

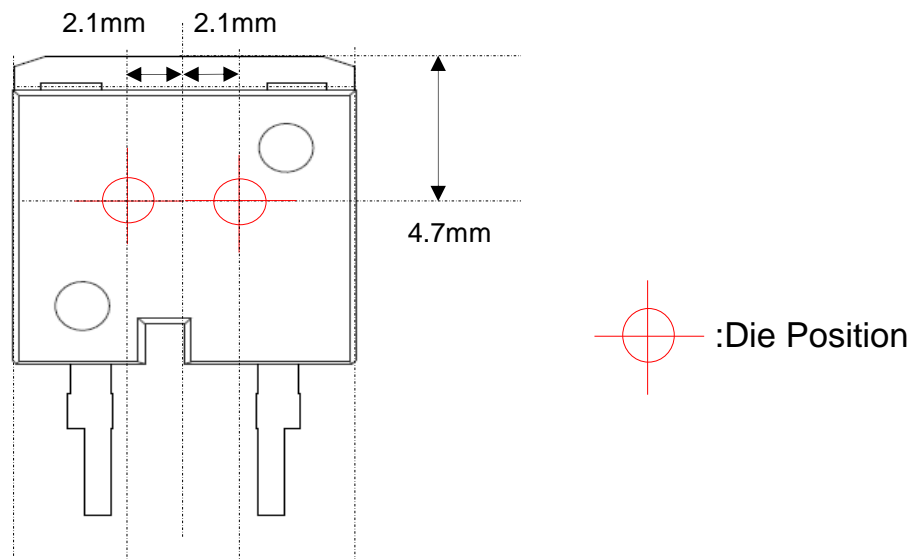
Back Side



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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