

V_R	1200V
I_F	20A
Q_C	68nC

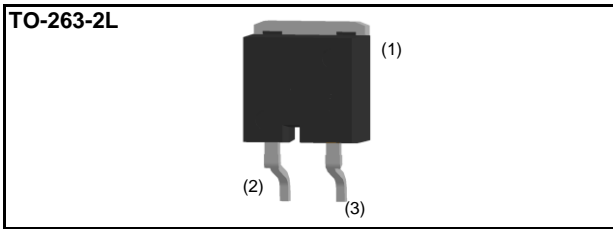
●Features

- 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

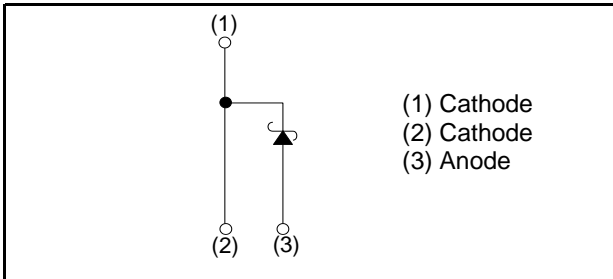
●Applications

- 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	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 ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

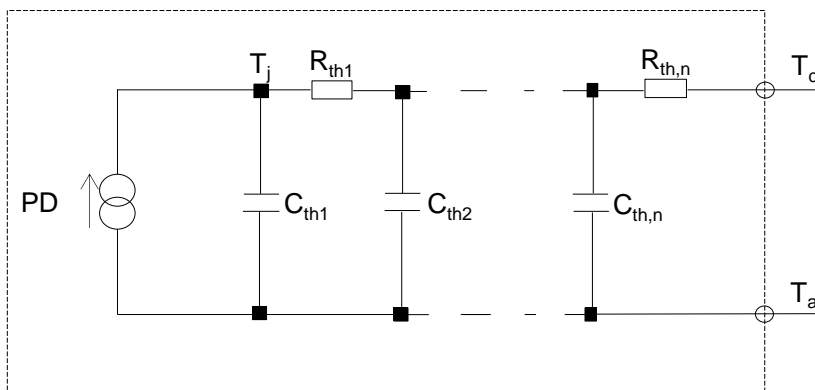
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R = 0.4\text{mA}$	1200	-	-	V
Forward voltage	V_F	$I_F = 20\text{A}, T_{vj} = 25^{\circ}\text{C}$	-	1.4	1.6	V
		$I_F = 20\text{A}, T_{vj} = 150^{\circ}\text{C}$	-	1.8	-	V
		$I_F = 20\text{A}, T_{vj} = 175^{\circ}\text{C}$	-	1.9	-	V
Reverse current	I_R	$V_R = 1200\text{V}, T_{vj} = 25^{\circ}\text{C}$	-	10	400	μA
		$V_R = 1200\text{V}, T_{vj} = 150^{\circ}\text{C}$	-	160	-	μA
		$V_R = 1200\text{V}, T_{vj} = 175^{\circ}\text{C}$	-	260	-	μA
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$	-	1050	-	pF
		$V_R = 800\text{V}, f = 1\text{MHz}$	-	85	-	pF
Total capacitive charge	Q_C	$V_R = 800\text{V}, di/dt = 500\text{A}/\mu\text{s}$	-	68	-	nC
Switching time	t_C	$V_R = 800\text{V}, di/dt = 500\text{A}/\mu\text{s}$	-	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

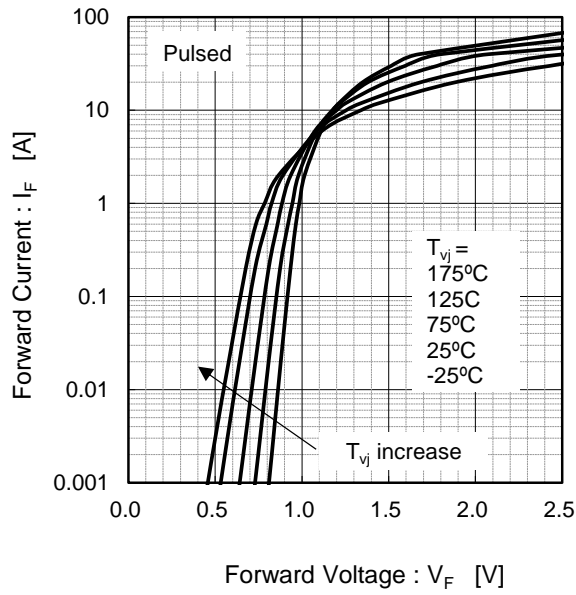


Fig.2 $V_F - I_F$ Characteristics

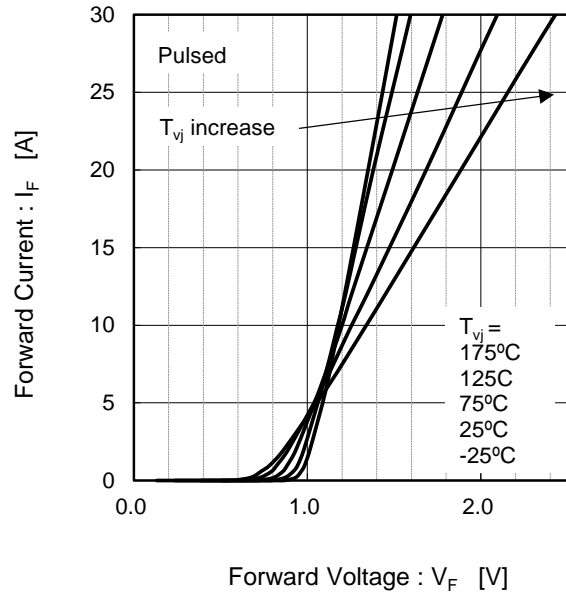


Fig.3 $V_R - I_R$ Characteristics

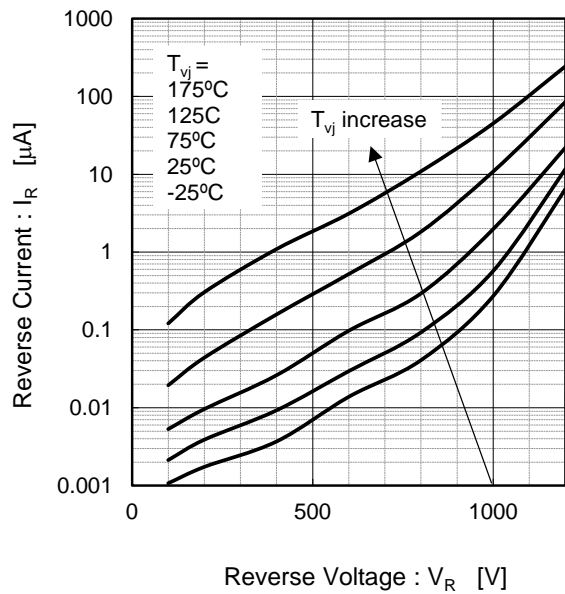
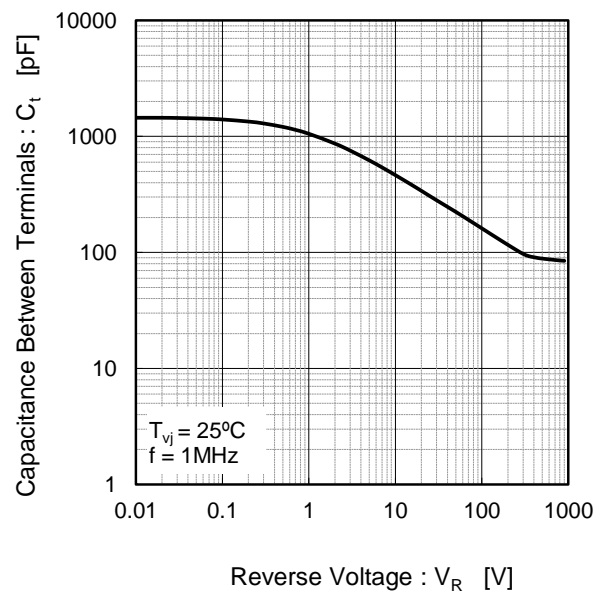


Fig.4 $V_R - C_t$ Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

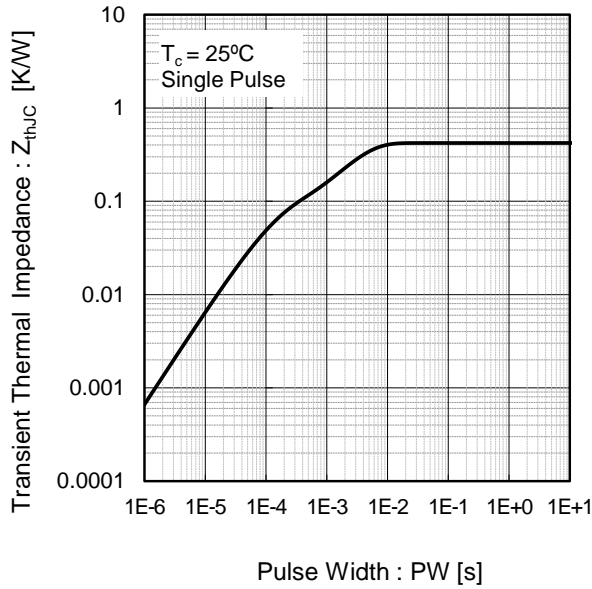


Fig.6 Power Dissipation

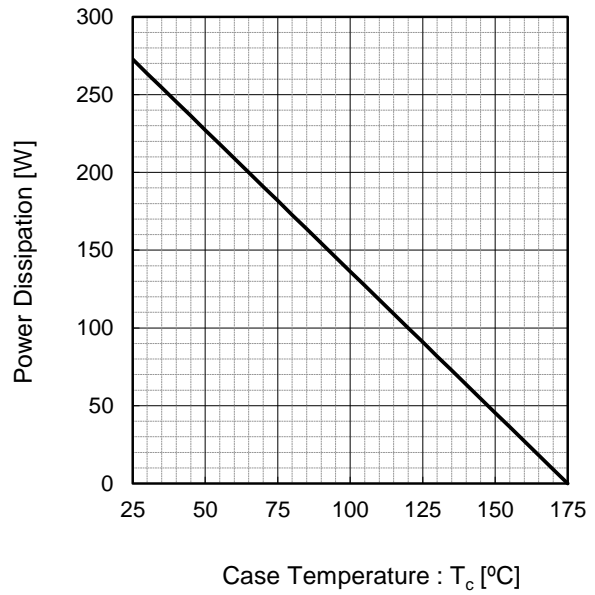
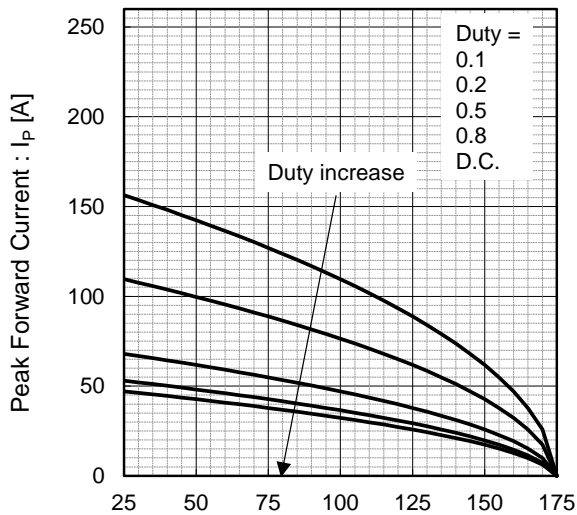
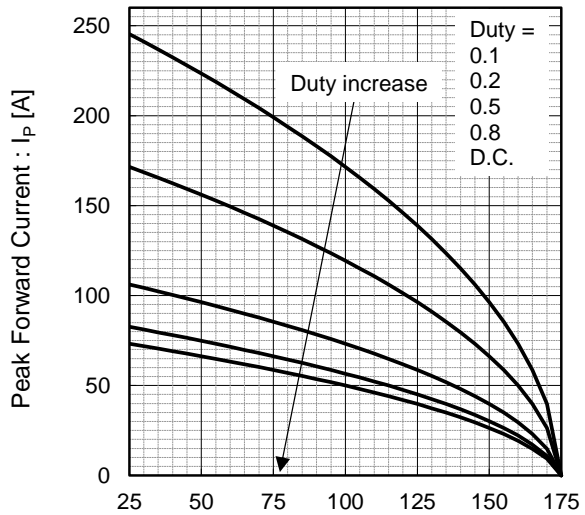


Fig.7*4 Maximum peak forward current derating curve $I_p - T_c$



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)

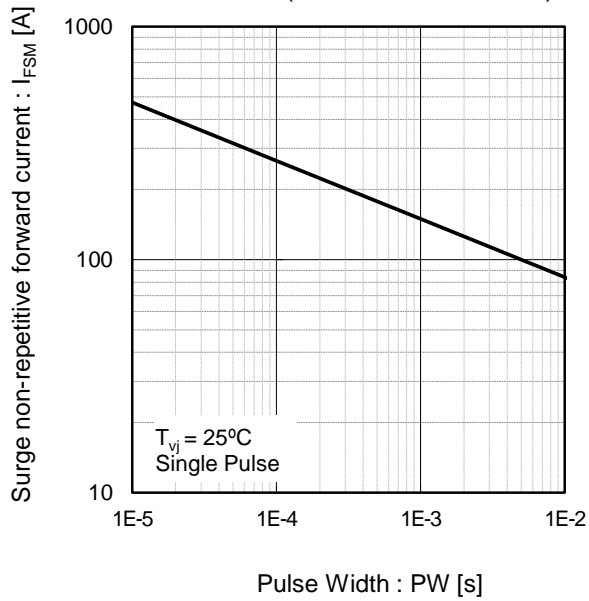
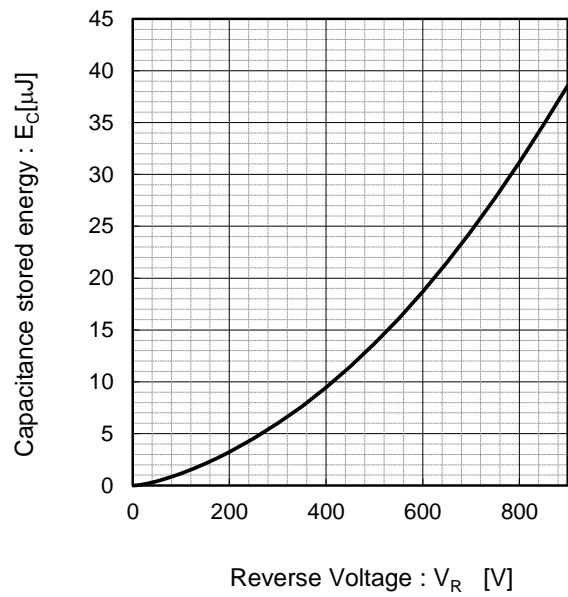
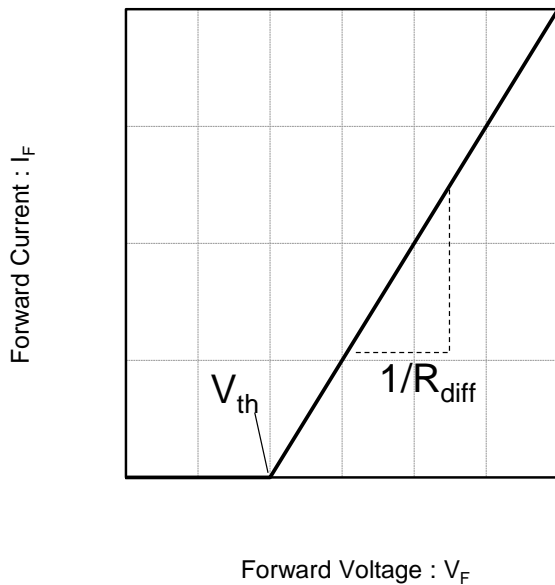


Fig.10 Typical capacitance stored energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

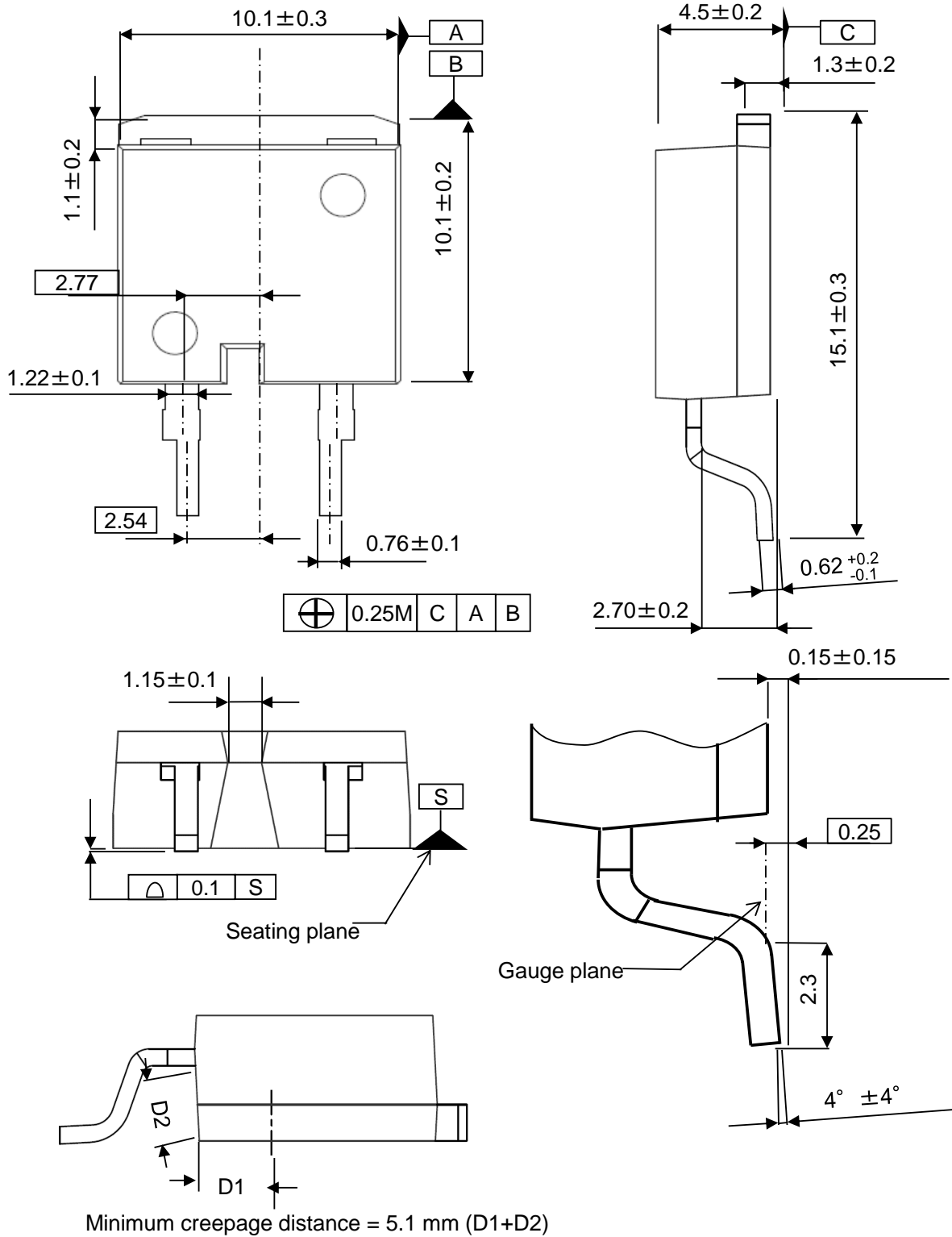
$$R_{diff}(T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

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

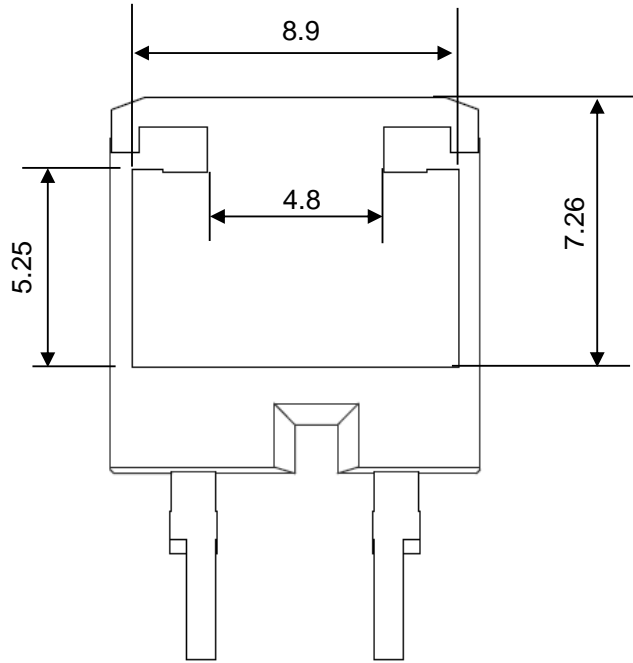
●Dimensions (Unit : mm)

Marking Side

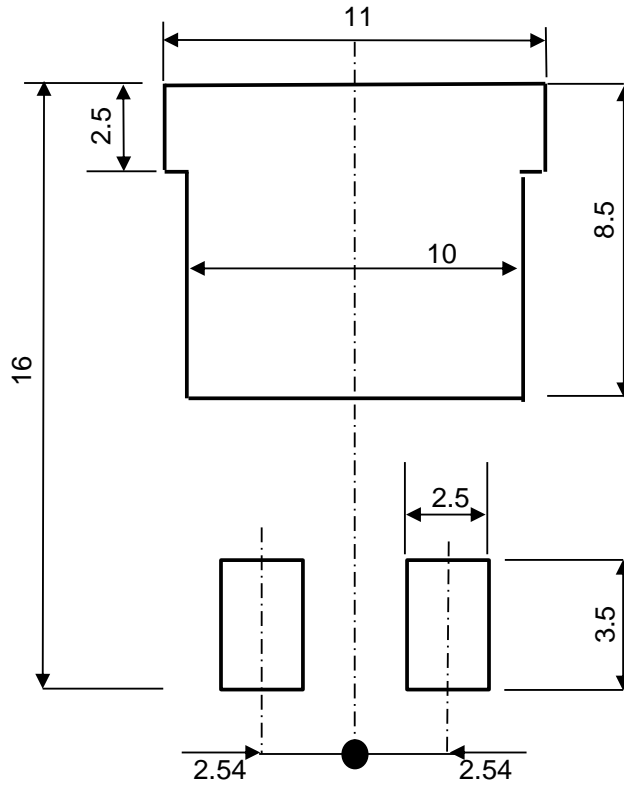


●Dimensions (Unit : mm)

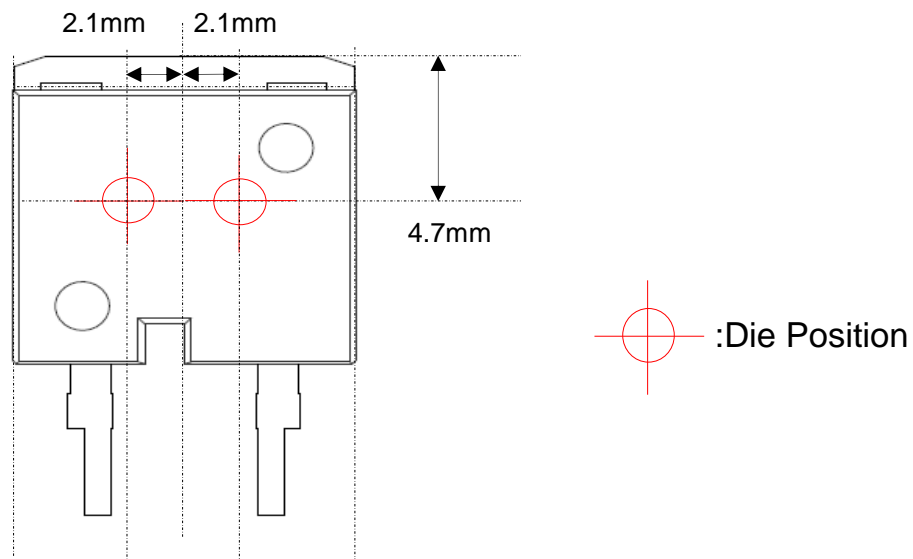
Back Side



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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