

V_R	650V
I_F	20A
Q_C	31nC

●Features

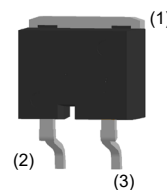
- 1) AEC-Q101 qualified
- 2) Low forward voltage
- 3) Negligible recovery time/current
- 4) Temperature independent switching behavior
- 5) Wide creepage distance = min. 5.10mm

●Applications

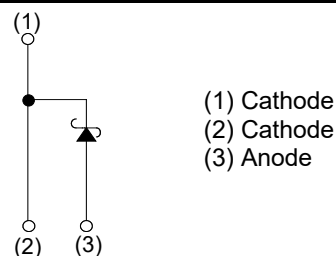
- On Board Charger
- DC/DC Converter
- Wireless Charger
- EV Charger

●Outline

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	SCS220AN

●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 ($T_c = 116^\circ\text{C}$)		I_F	20 ^{*1}	A
Surge non-repetitive forward current	PW=10ms sinusoidal, $T_{vj}=25^\circ\text{C}$	I_{FSM}	68	A
	PW=10ms sinusoidal, $T_{vj}=150^\circ\text{C}$		53	A
	PW=10μs square, $T_{vj}=25^\circ\text{C}$		260	A
Repetitive peak forward current		I_{FRM}	71 ^{*2}	A
i^2t value	PW=10ms, $T_{vj}=25^\circ\text{C}$	$\int i^2 dt$	23	A ² s
	PW=10ms, $T_{vj}=150^\circ\text{C}$		14	A ² s
Total power dissipation		P_D	100 ^{*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)

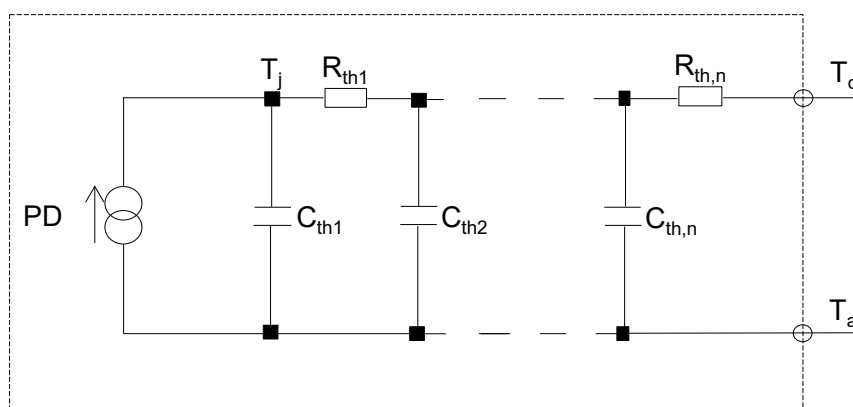
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R = 4.0\text{mA}$	650	-	-	V
Forward voltage	V_F	$I_F = 20\text{A}, T_{vj} = 25^{\circ}\text{C}$	-	1.35	1.55	V
		$I_F = 20\text{A}, T_{vj} = 150^{\circ}\text{C}$	-	1.55	-	V
		$I_F = 20\text{A}, T_{vj} = 175^{\circ}\text{C}$	-	1.63	-	V
Reverse current	I_R	$V_R = 600\text{V}, T_{vj} = 25^{\circ}\text{C}$	-	4	400	μA
		$V_R = 600\text{V}, T_{vj} = 150^{\circ}\text{C}$	-	60	-	μA
		$V_R = 600\text{V}, T_{vj} = 175^{\circ}\text{C}$	-	140	-	μA
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$	-	730	-	pF
		$V_R = 600\text{V}, f = 1\text{MHz}$	-	74	-	pF
Total capacitive charge	Q_C	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	31	-	nC
Switching time	t_C	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	15	-	ns

●Thermal characteristics

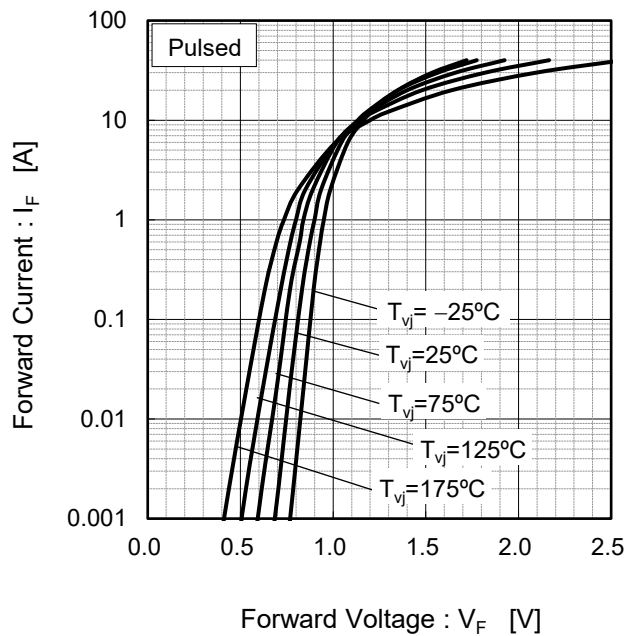
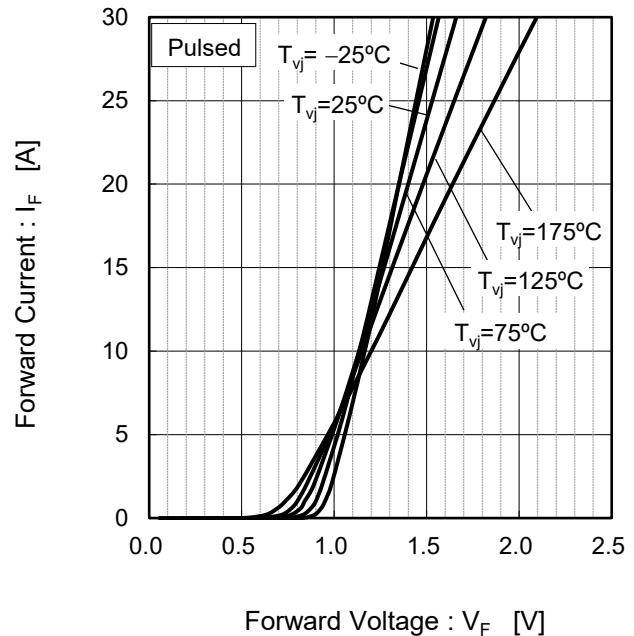
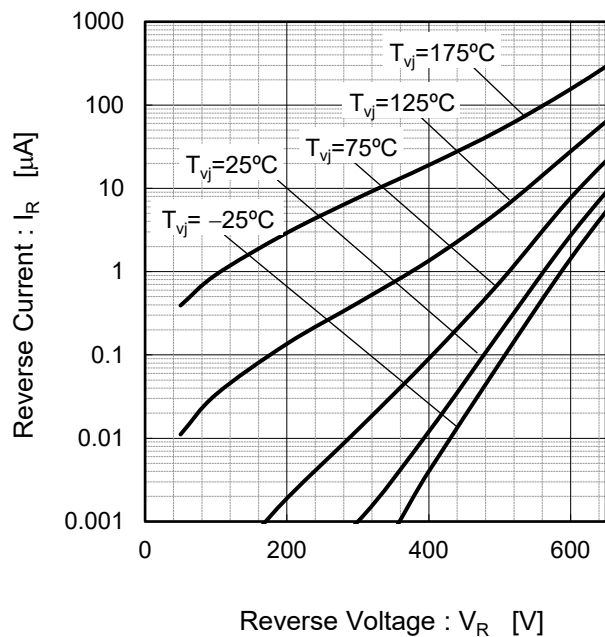
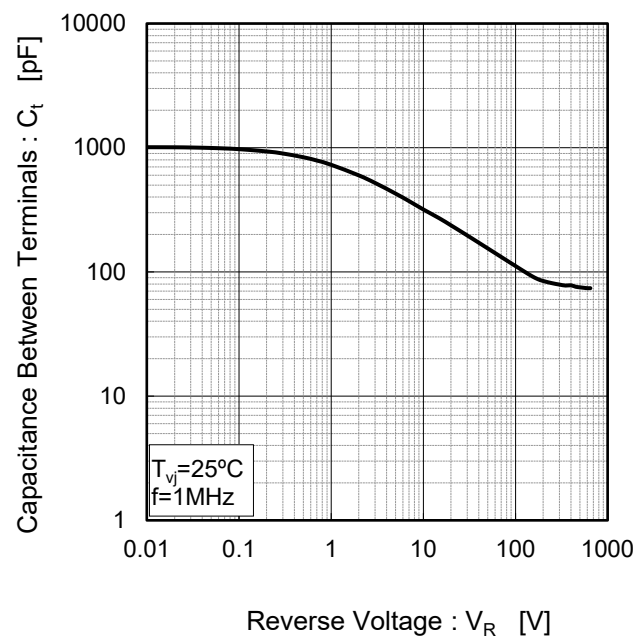
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R_{thJC}	-	-	1.1	1.4	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	2.43×10^{-2}	K/W	C_{th1}	3.11×10^{-3}	Ws/K
R_{th2}	7.53×10^{-1}		C_{th2}	1.03×10^{-3}	
R_{th3}	3.23×10^{-1}		C_{th3}	1.55×10^{-1}	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ CharacteristicsFig.2 $V_F - I_F$ CharacteristicsFig.3 $V_R - I_R$ CharacteristicsFig.4 $V_R - C_t$ Characteristics

●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

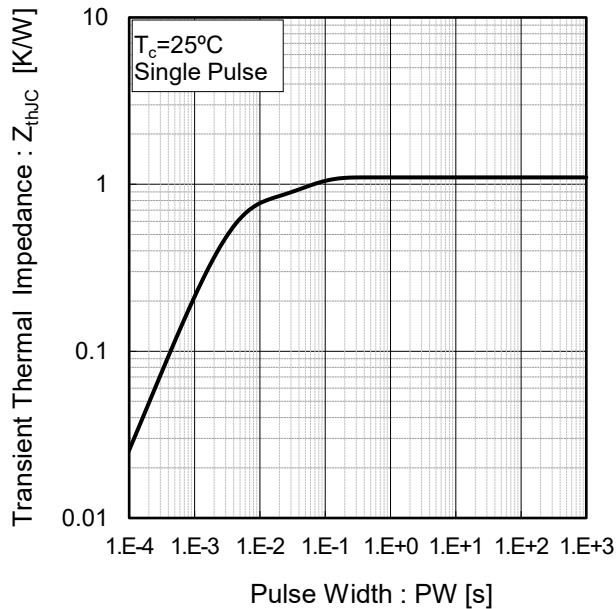


Fig.6 Power Dissipation

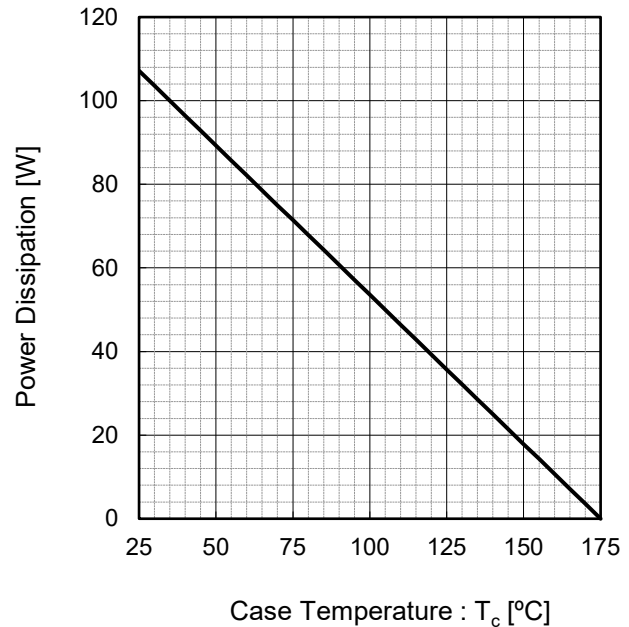
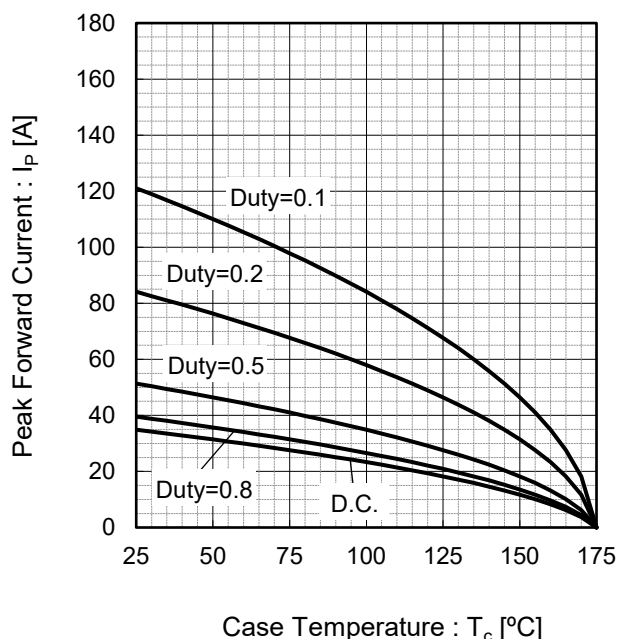
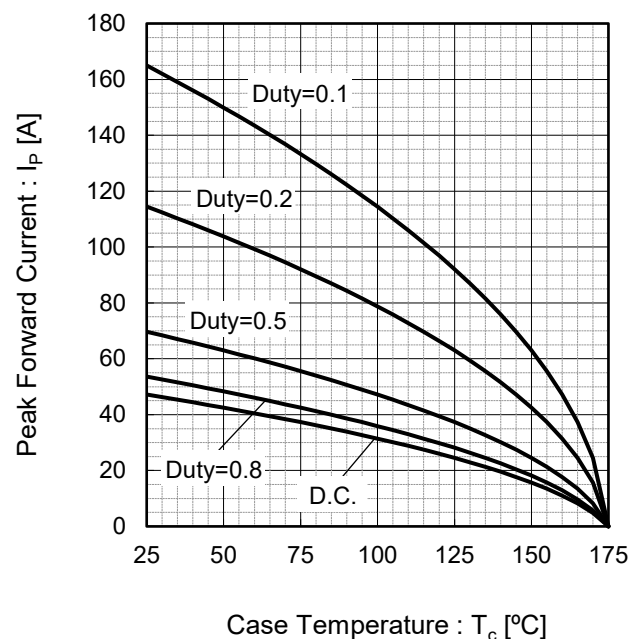


Fig.7*4 Maximum peak forward current derating curve $I_P - T_c$



*4 Based on max V_f , 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)



*5 Based on typ V_f , 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)

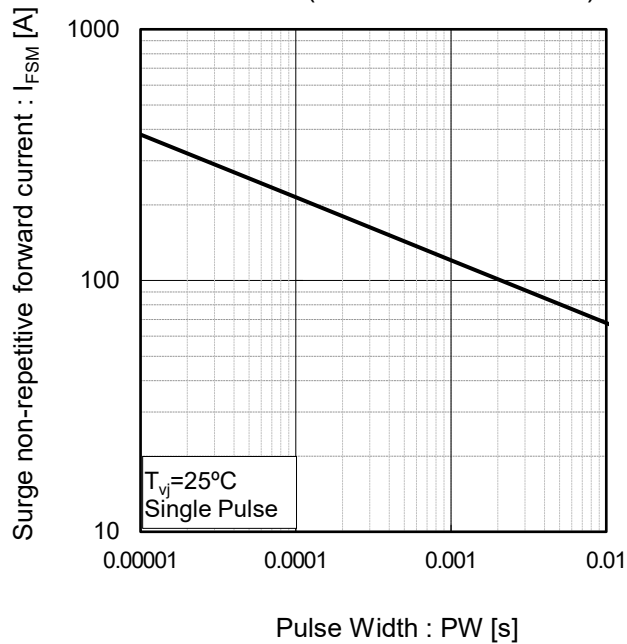
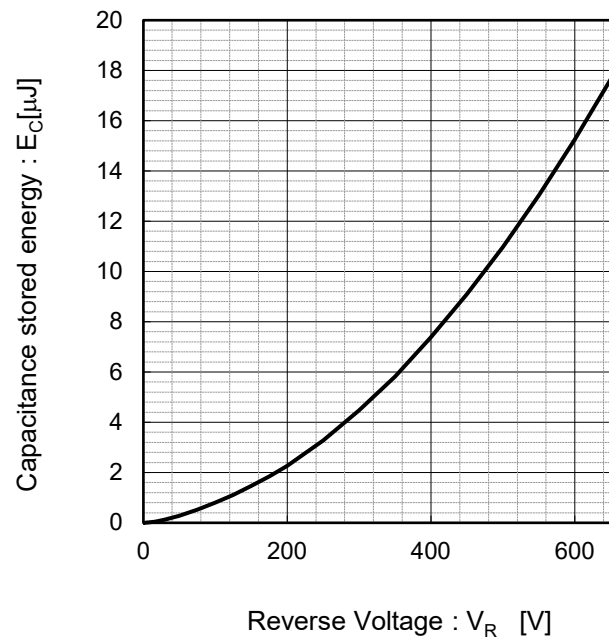
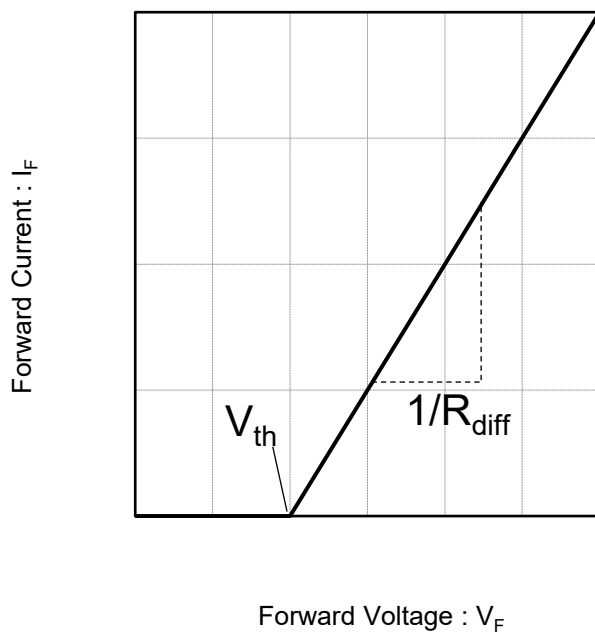


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

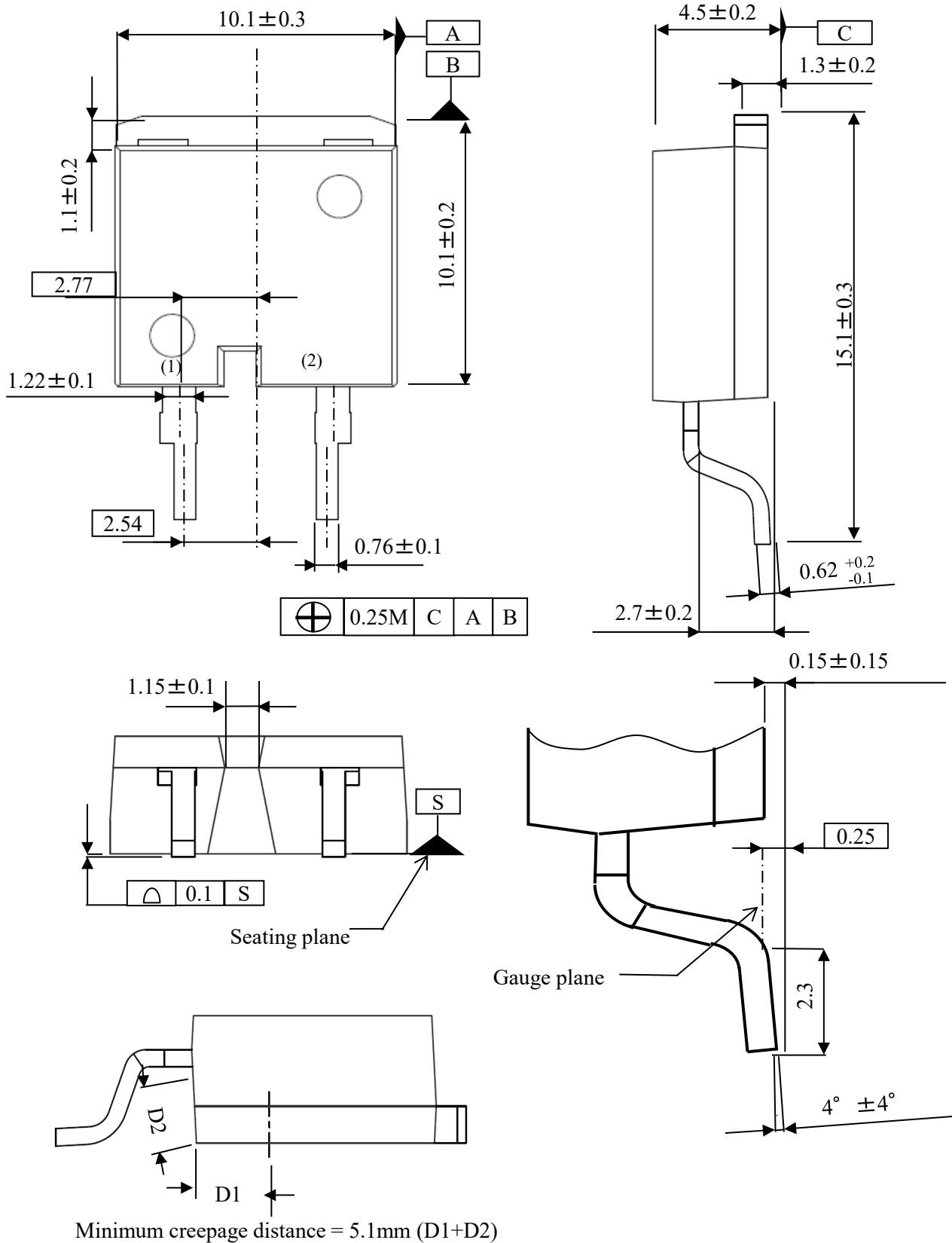
$$R_{diff}(T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a_0	9.35×10^{-1}	V
a_1	-1.12×10^{-3}	V/°C
b_0	1.99×10^{-2}	Ω
b_1	5.10×10^{-5}	Ω/°C
b_2	5.40×10^{-7}	Ω/°C ²

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

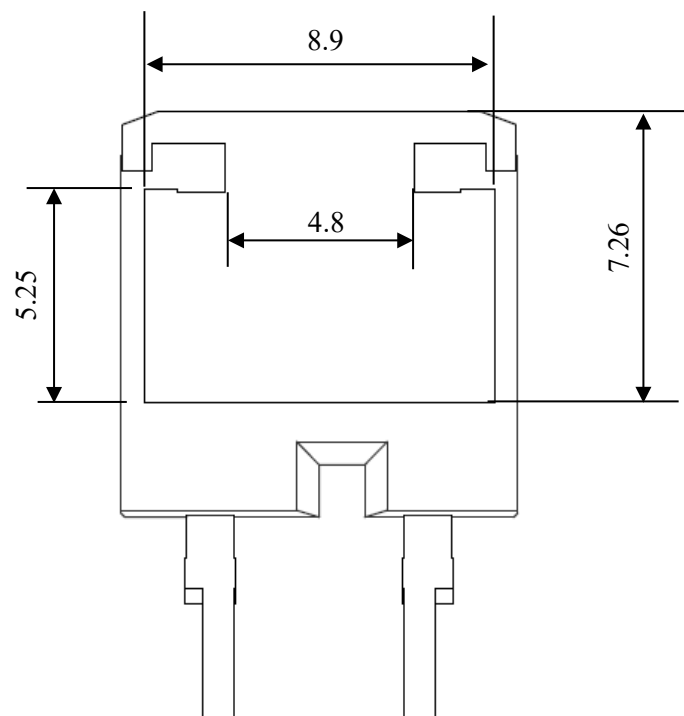
●Dimensions (Unit : mm)

Marking Side

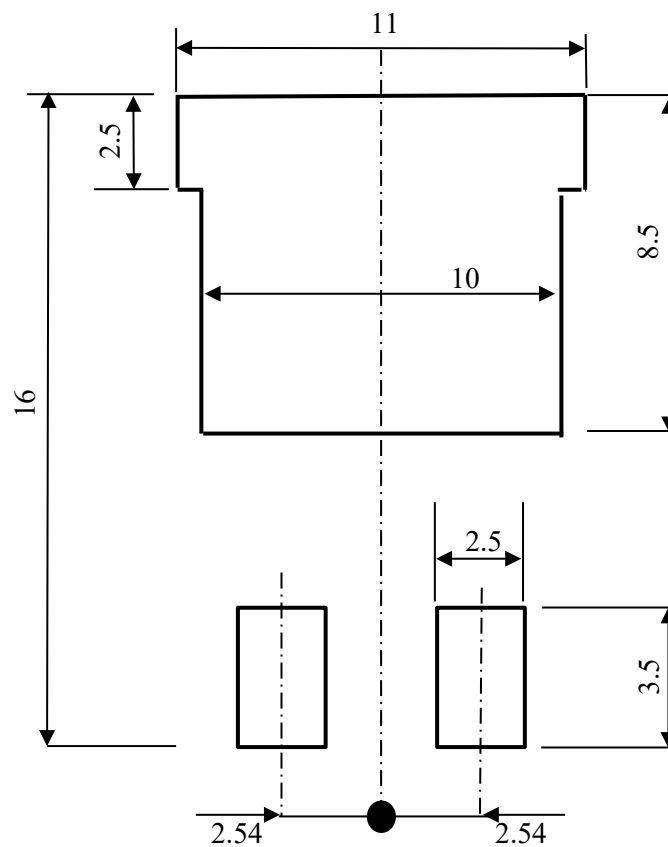


●Dimensions (Unit : mm)

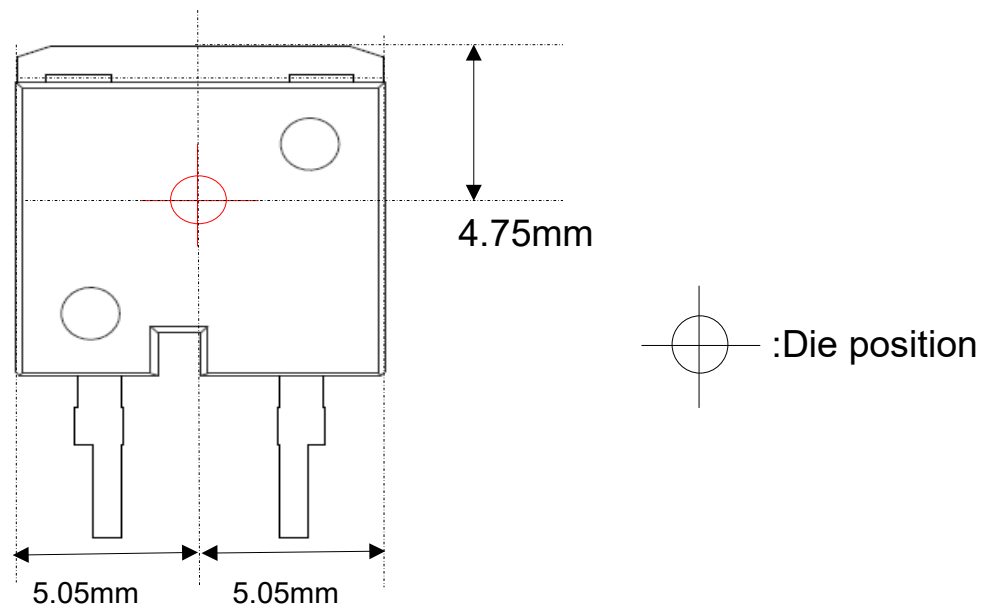
Back Side



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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