

V_R	1200V
I_F	20A
Q_C	63nC

●Features

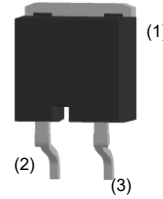
- 1) AEC-Q101 qualified
- 2) High surge current capability
- 3) Low leakage current
- 4) Reduced temperature dependence
- 5) High-speed switching possible
- 6) Shorter recovery time
- 7) Wide creepage distance = min. 5.10mm

●Applications

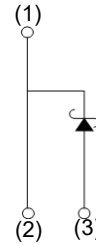
- On Board Charger
- DC/DC Converter
- Wireless Charger
- EV Charger

●Outline

TO-263-2L



●Inner circuit



(1) Cathode
(2) Cathode
(3) Anode

●Packaging specifications

Type	Packaging	Embossed tape
	Reel size (mm)	330
	Tape width (mm)	24
	Basic ordering unit (pcs)	1000
	Packing code	TRL
	Marking	SCS320KN

●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 ($T_c=140^{\circ}\text{C}$)	I_F	20 *1	A	
Surge non-repetitive forward current	I_{FSM}	PW=10ms sinusoidal, $T_{vj}=25^{\circ}\text{C}$	157	A
		PW=10ms sinusoidal, $T_{vj}=150^{\circ}\text{C}$	118	A
		PW=10 μs square, $T_{vj}=25^{\circ}\text{C}$	620	A
Repetitive peak forward current	I_{FRM}	91 *2	A	
i^2t value	$\int i^2 dt$	$1 \leq PW \leq 10\text{ms}$, $T_{vj}=25^{\circ}\text{C}$	123	A^2s
		$1 \leq PW \leq 10\text{ms}$, $T_{vj}=150^{\circ}\text{C}$	69	A^2s
Total power dissipation	P_D	220 *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)

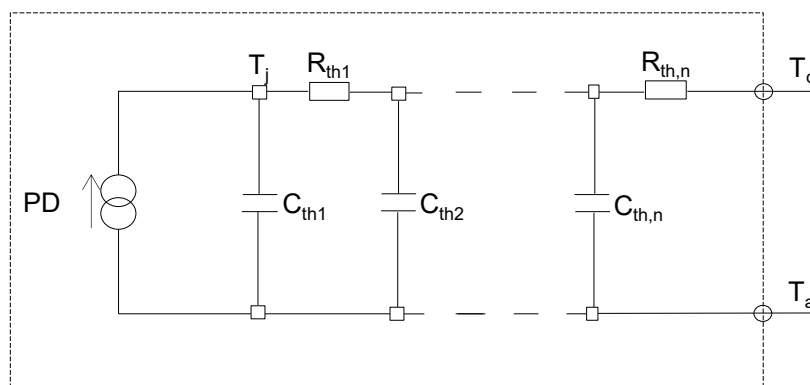
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R = 40\mu\text{A}$	1200	-	-	V
Forward voltage	V_F	$I_F = 20\text{A}$ $T_{vj} = 25^{\circ}\text{C}$	-	1.4	1.6	V
		$I_F = 20\text{A}$ $T_{vj} = 150^{\circ}\text{C}$	-	1.8	-	V
		$I_F = 20\text{A}$ $T_{vj} = 175^{\circ}\text{C}$	-	2.0	-	V
Reverse current	I_R	$V_R = 1200\text{V}$, $T_{vj} = 25^{\circ}\text{C}$	-	0.2	80	μA
		$V_R = 1200\text{V}$, $T_{vj} = 150^{\circ}\text{C}$	-	14	200	μA
		$V_R = 1200\text{V}$, $T_{vj} = 175^{\circ}\text{C}$	-	40	-	μA
Total capacitance	C	$V_R = 1\text{V}$, $f = 1\text{MHz}$	-	1030	-	pF
		$V_R = 800\text{V}$, $f = 1\text{MHz}$	-	74	-	pF
Total capacitive charge	Q_C	$V_R = 800\text{V}$, $di/dt = 500\text{A}/\mu\text{s}$	-	63	-	nC
Switching time	t_C	$V_R = 800\text{V}$, $di/dt = 500\text{A}/\mu\text{s}$	-	23	-	ns

●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R_{thJC}	-	-	0.50	0.68	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	1.5×10^{-1}	K/W	C_{th1}	4.4×10^{-3}	Ws/K
R_{th2}	1.6×10^{-1}		C_{th2}	2.2×10^{-2}	
R_{th3}	1.8×10^{-1}		C_{th3}	1.9×10^{-1}	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ Characteristics

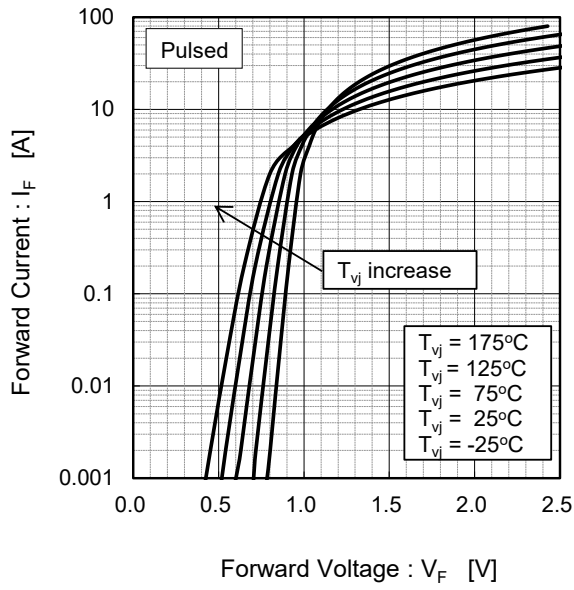


Fig.2 $V_F - I_F$ Characteristics

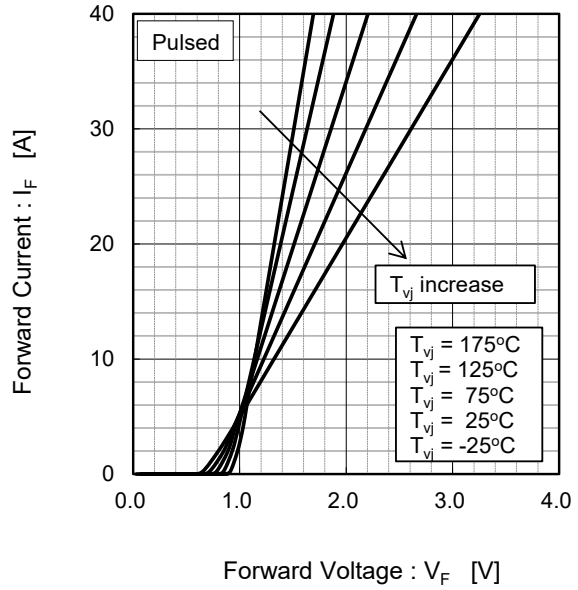


Fig.3 $V_R - I_R$ Characteristics

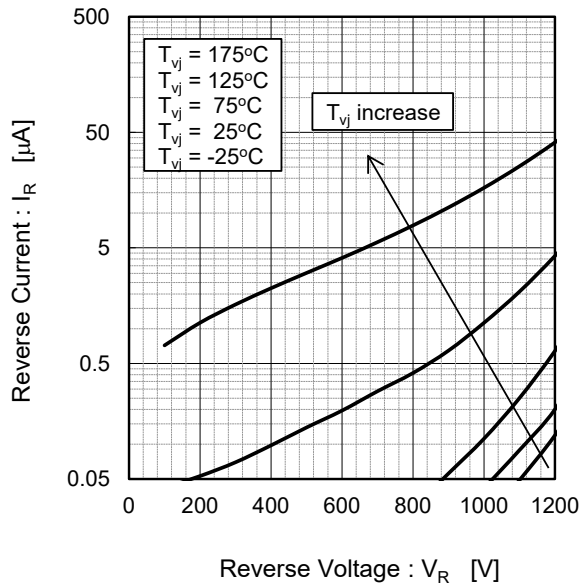
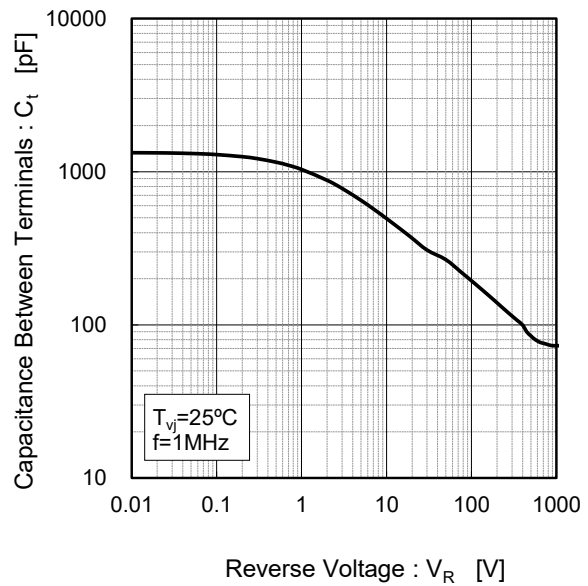


Fig.4 $V_R - C_t$ Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

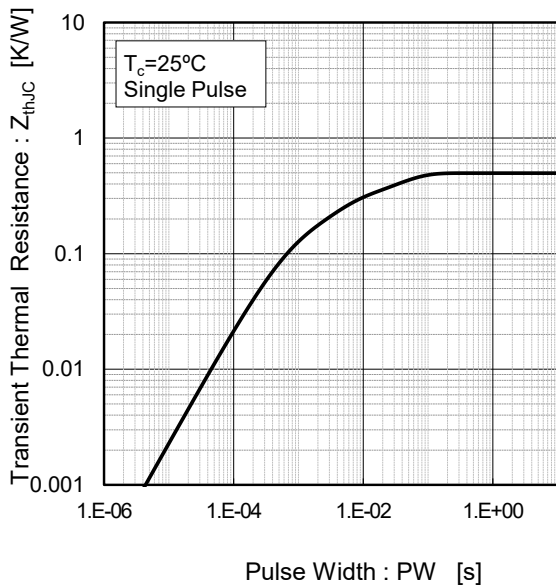


Fig.6 Power Dissipation

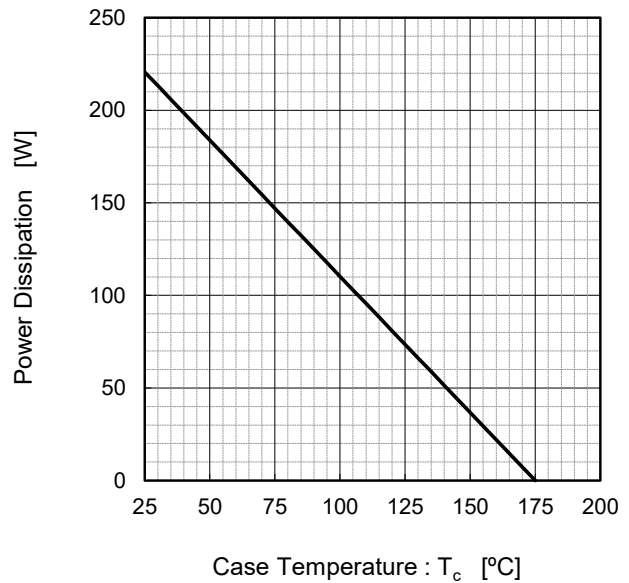
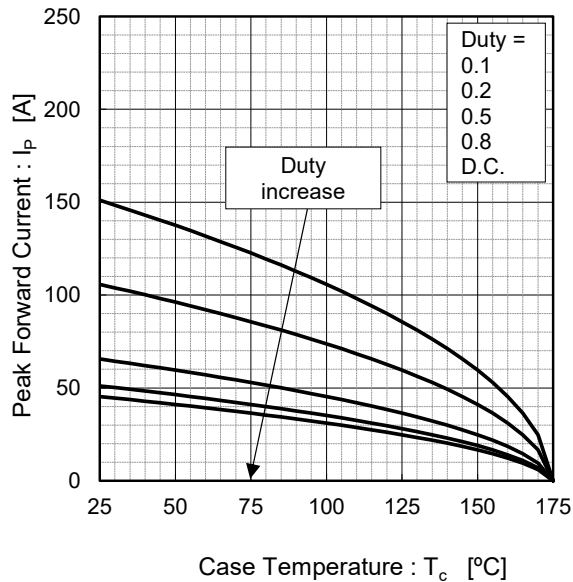
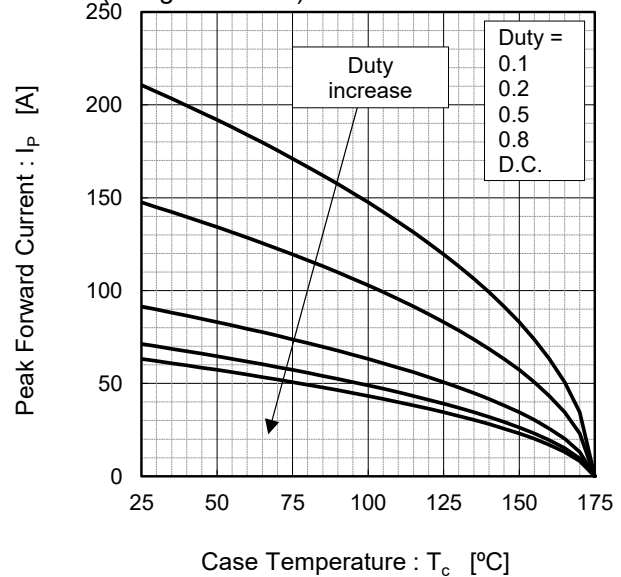


Fig.7*4 Maximum peak forward current derating curve $I_p - T_c$



*4 Based on max Vf, max R_{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)



*5 Based on typ Vf, typ R_{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)

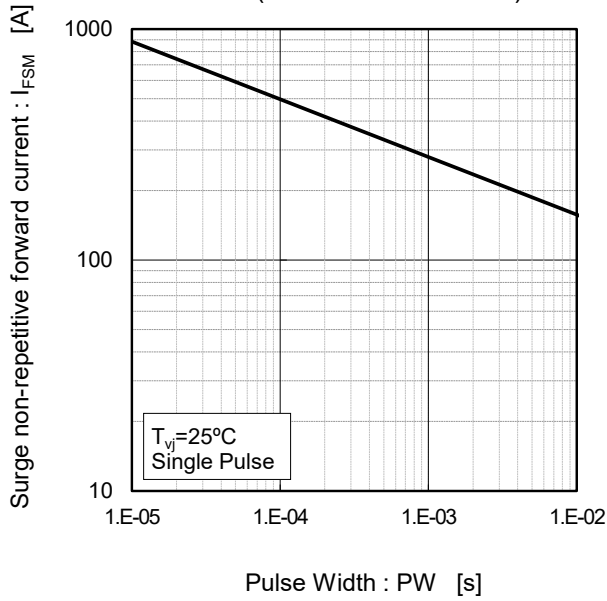
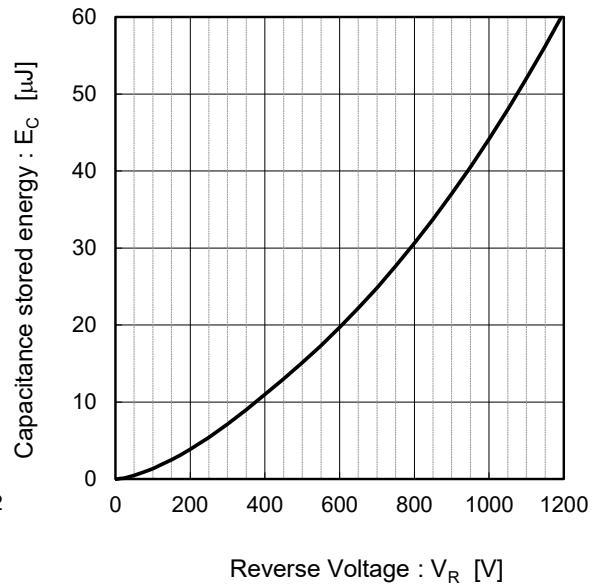
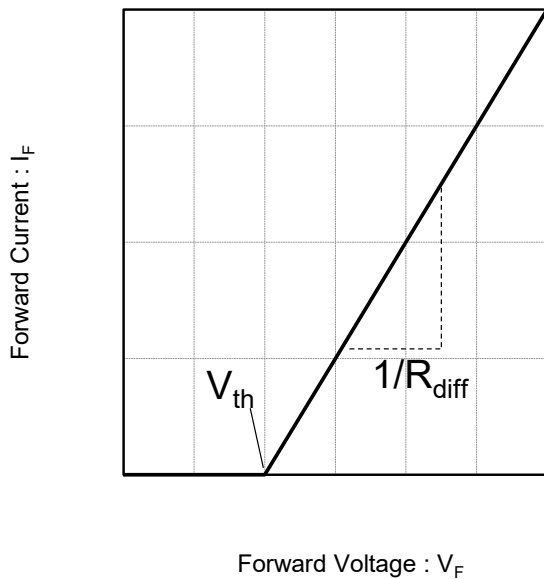


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

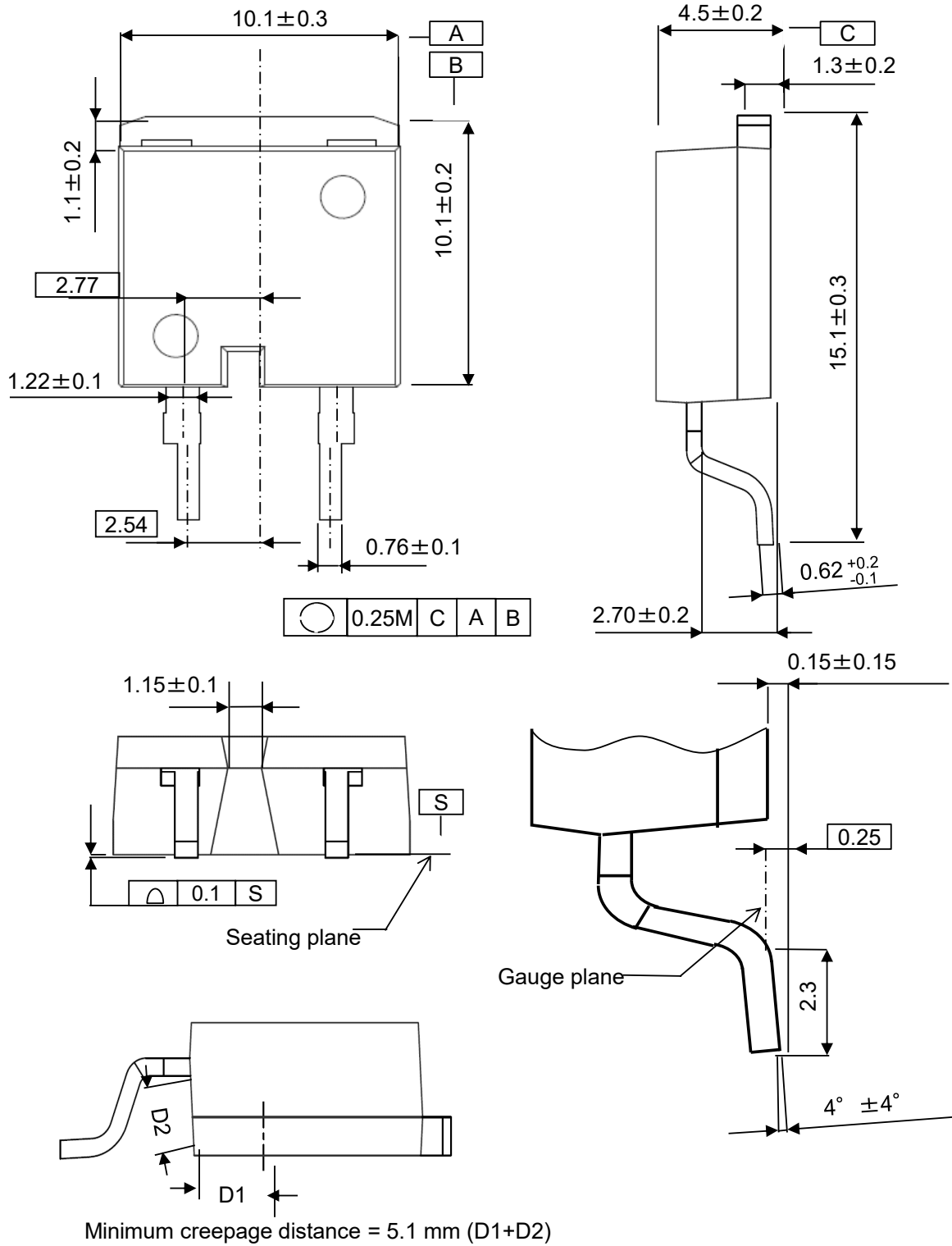
$$R_{diff}(T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a ₀	0.922	V
a ₁	-1.388	mV/°C
b ₀	21.20	mΩ
b ₁	0.129	mΩ/°C
b ₂	0.671	μΩ/°C ²

T_{vj} in °C; -55 °C < T_{vj} < 175°C ; I_F < 40 A

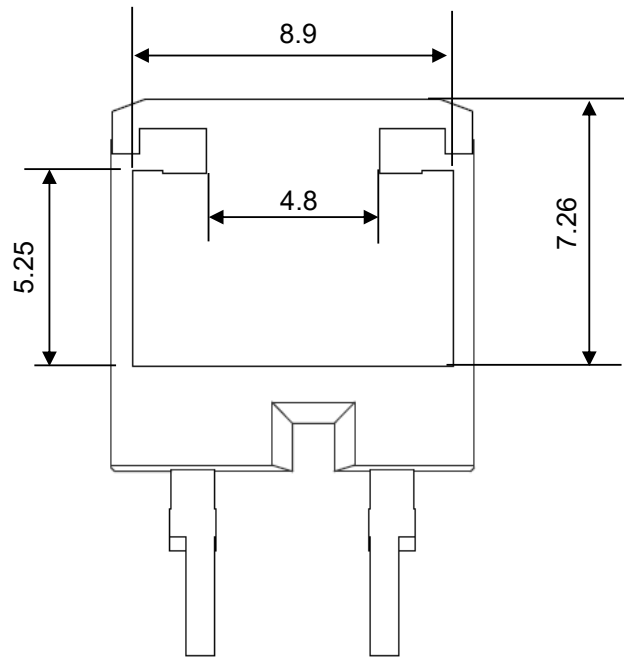
●Dimensions* (Unit : mm) *Dimensions do not include mold flash, protrusion or gate burrs.

Marking Side

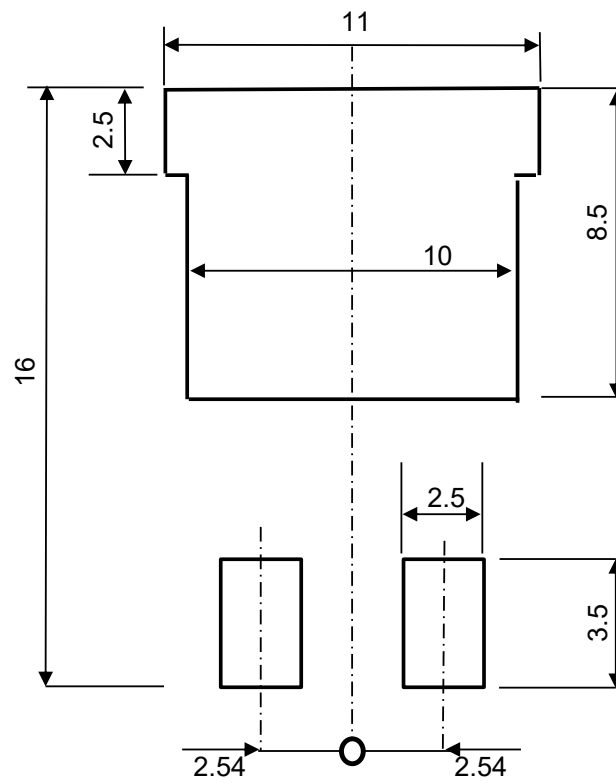


● **Dimensions*** (Unit : mm) *Dimensions do not include mold flash, protrusion or gate burrs.

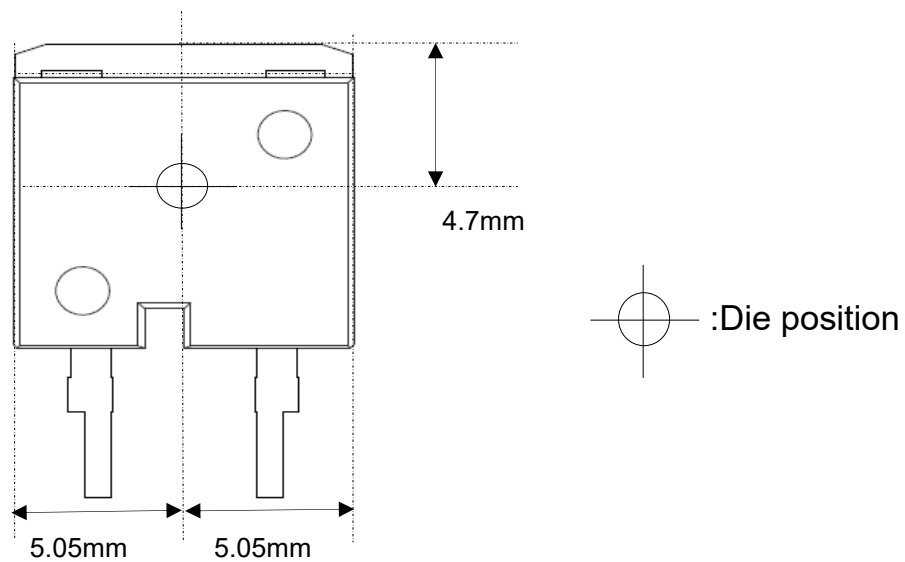
Back Side



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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