

$V_R$	1200V
$I_F$	20A
$Q_C$	63nC

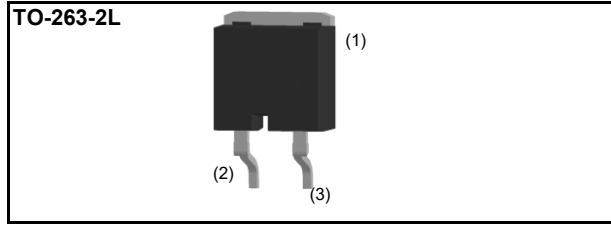
### ●Features

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

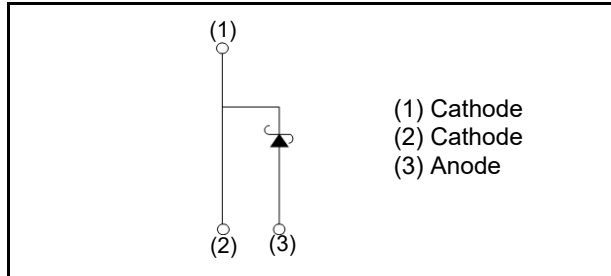
### ●Applications

- 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	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	PW=10ms sinusoidal, $T_{vj}=25^{\circ}\text{C}$	$I_{FSM}$	157	A
	PW=10ms sinusoidal, $T_{vj}=150^{\circ}\text{C}$		118	A
	PW=10 $\mu\text{s}$ square, $T_{vj}=25^{\circ}\text{C}$		620	A
Repetitive peak forward current		$I_{FRM}$	91 *2	A
$i^2t$ value	$1 \leq PW \leq 10\text{ms}$ , $T_{vj}=25^{\circ}\text{C}$	$\int i^2 dt$	123	$\text{A}^2\text{s}$
	$1 \leq PW \leq 10\text{ms}$ , $T_{vj}=150^{\circ}\text{C}$		69	$\text{A}^2\text{s}$
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)

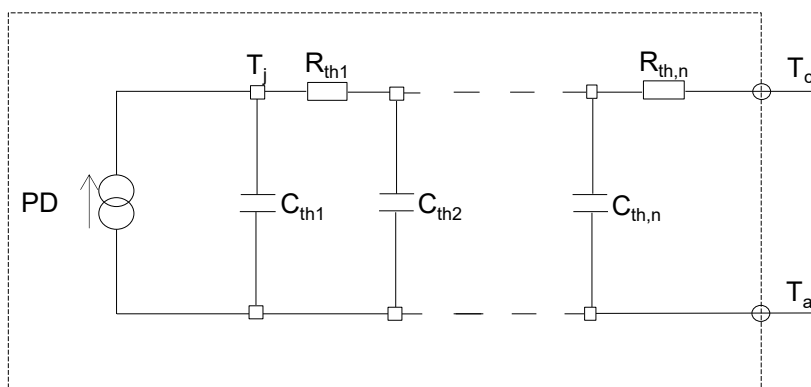
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R = 40\mu\text{A}$	1200	-	-	V
Forward voltage	$V_F$	$I_F = 20\text{A}$ $T_{vj} = 25^{\circ}\text{C}$	-	1.4	1.6	V
		$I_F = 20\text{A}$ $T_{vj} = 150^{\circ}\text{C}$	-	1.8	-	V
		$I_F = 20\text{A}$ $T_{vj} = 175^{\circ}\text{C}$	-	2.0	-	V
Reverse current	$I_R$	$V_R = 1200\text{V}$ , $T_{vj} = 25^{\circ}\text{C}$	-	0.2	80	$\mu\text{A}$
		$V_R = 1200\text{V}$ , $T_{vj} = 150^{\circ}\text{C}$	-	14	200	$\mu\text{A}$
		$V_R = 1200\text{V}$ , $T_{vj} = 175^{\circ}\text{C}$	-	40	-	$\mu\text{A}$
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
$R_{th1}$	$1.5 \times 10^{-1}$	K/W	$C_{th1}$	$4.4 \times 10^{-3}$	Ws/K
$R_{th2}$	$1.6 \times 10^{-1}$		$C_{th2}$	$2.2 \times 10^{-2}$	
$R_{th3}$	$1.8 \times 10^{-1}$		$C_{th3}$	$1.9 \times 10^{-1}$	



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics

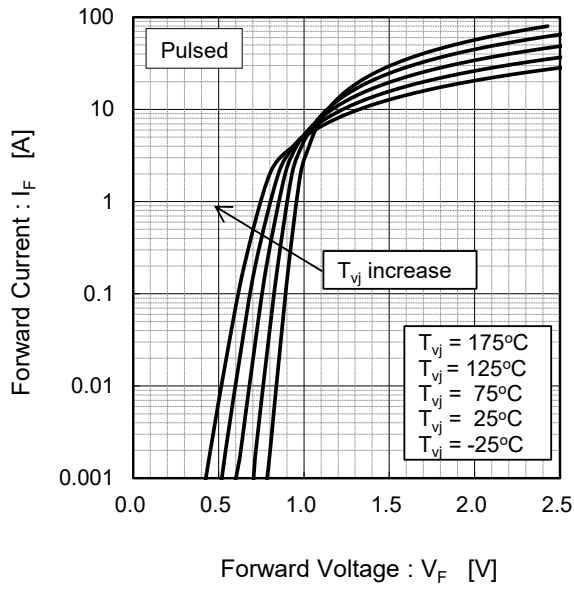


Fig.2  $V_F - I_F$  Characteristics

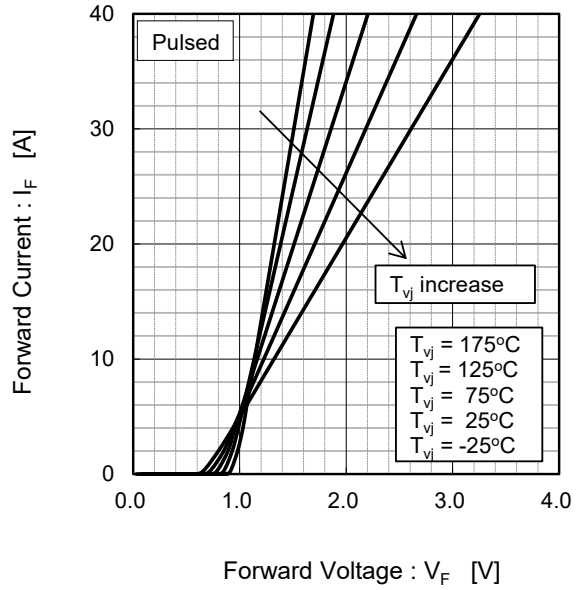


Fig.3  $V_R - I_R$  Characteristics

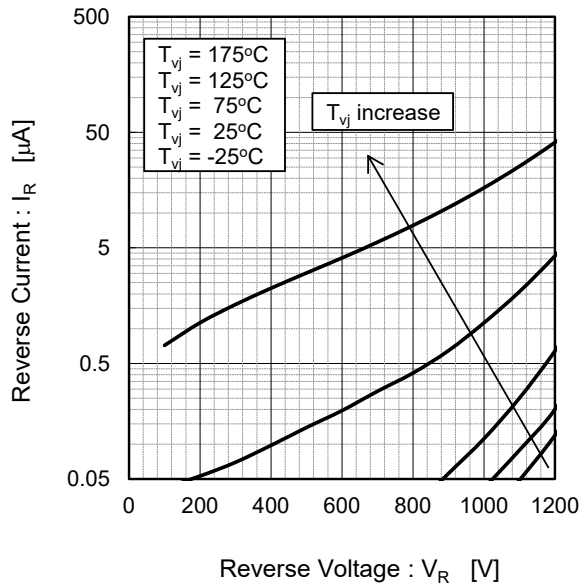
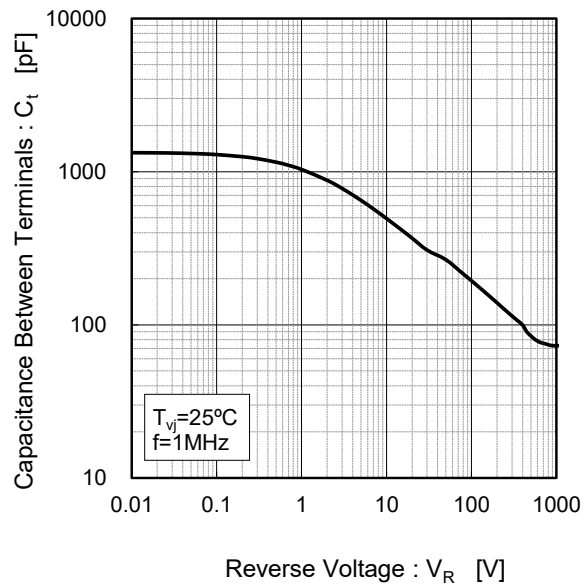


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

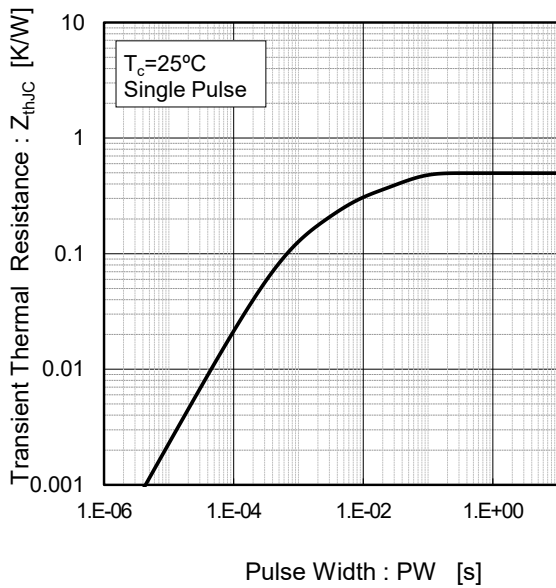


Fig.6 Power Dissipation

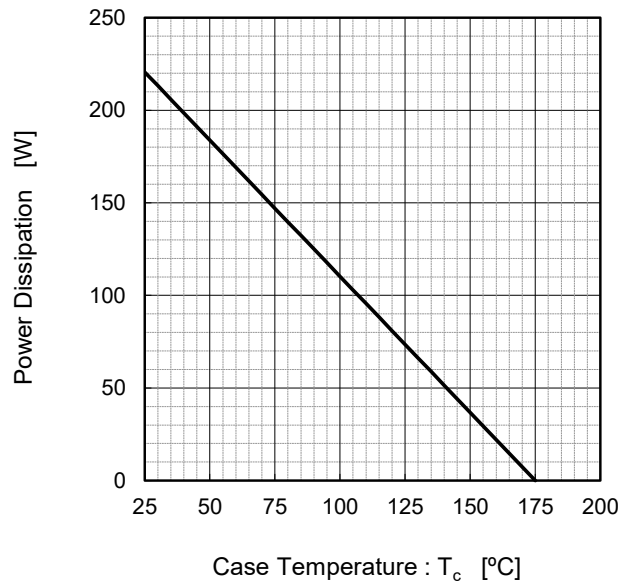
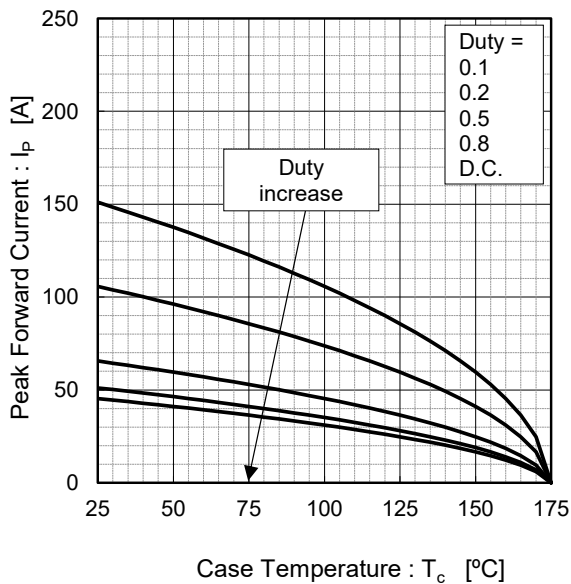
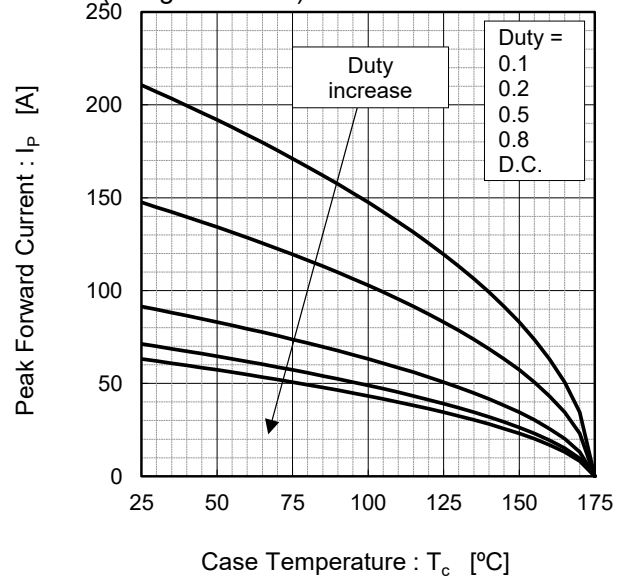


Fig.7\*4 Maximum peak forward current derating curve  $I_p - T_c$



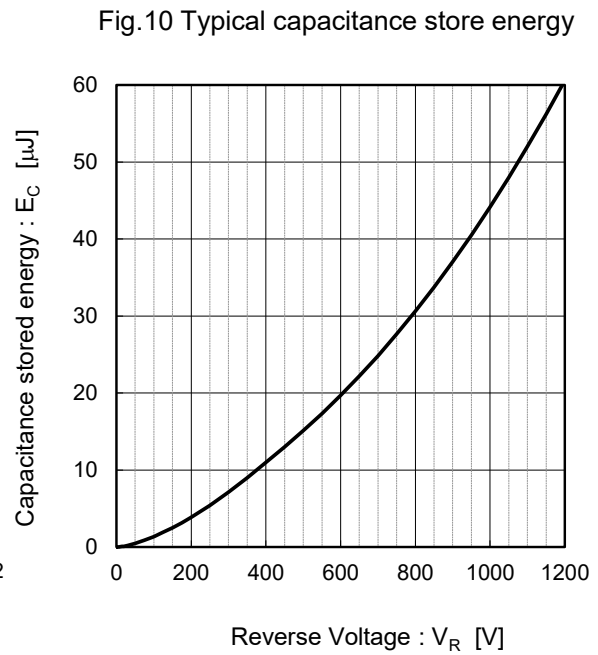
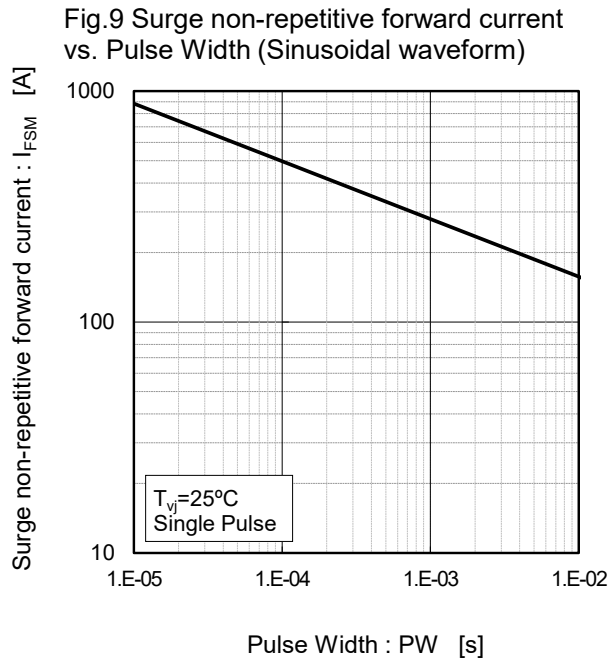
\*4 Based on max Vf, max  $R_{thJC}$   
Valid for switching of above 10kHz,  
excluding D.C. curve.

Fig.8\*5 Typical peak forward current derating curve  $I_p - T_c$   
(Not guaranteed)



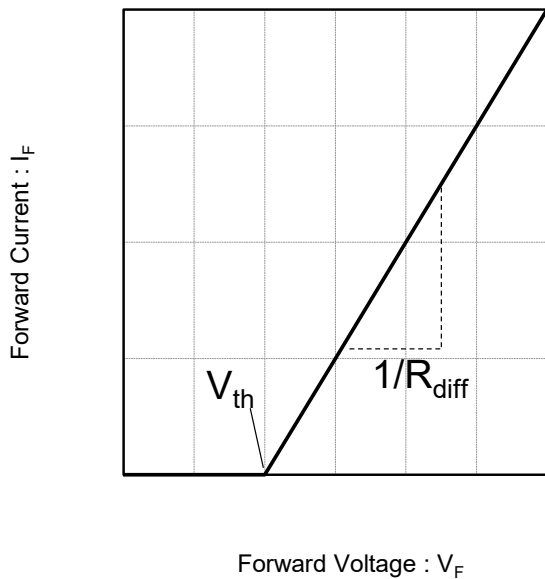
\*5 Based on typ Vf, typ  $R_{thJC}$   
Typical value, not guaranteed  
Valid for switching of above 10kHz,  
excluding D.C. curve

●Electrical characteristic curves



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

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

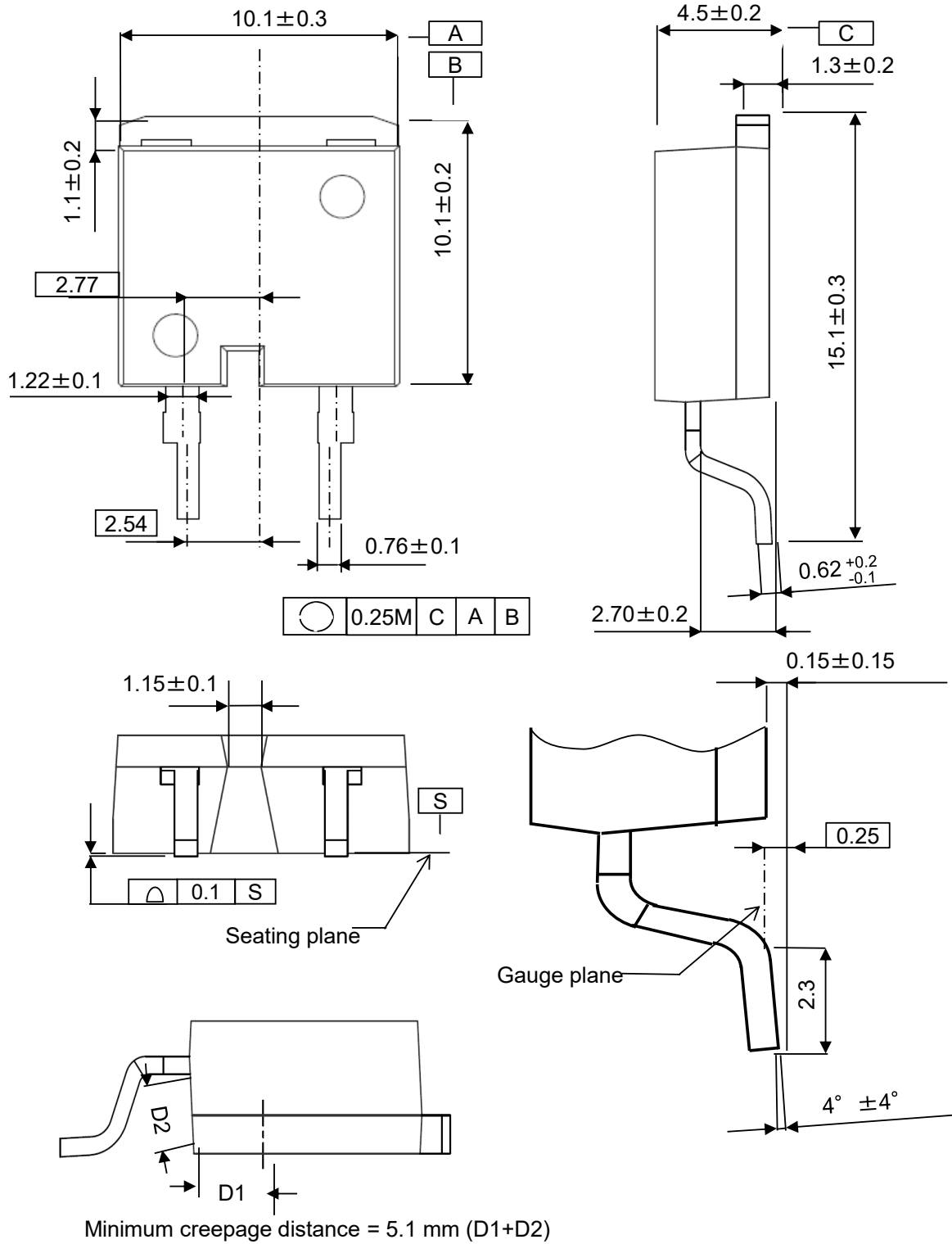
$$R_{diff} (T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

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

T<sub>vj</sub> in °C; -55 °C < T<sub>vj</sub> < 175°C ; I<sub>F</sub> < 40 A

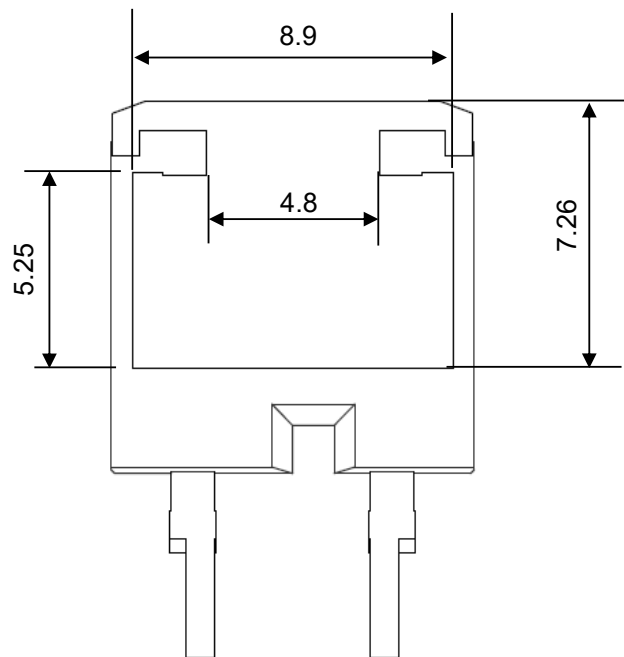
●Dimensions\* (Unit : mm) \*Dimensions do not include mold flash, protrusion or gate burrs.

Marking Side

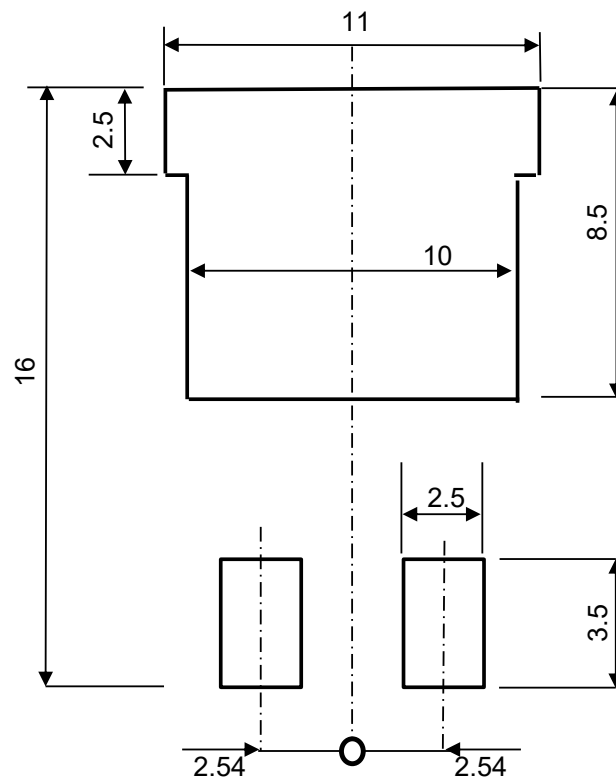


●Dimensions\* (Unit : mm) \*Dimensions do not include mold flash, protrusion or gate burrs.

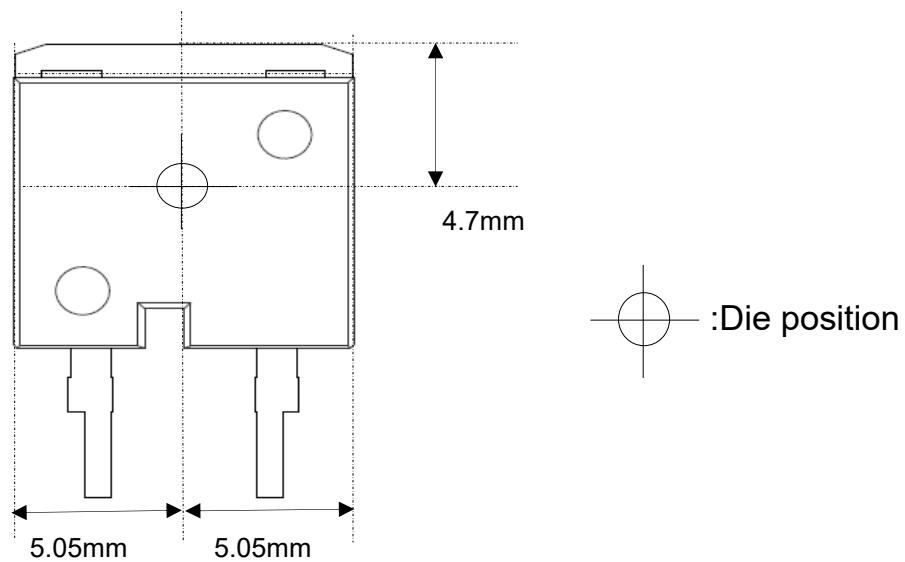
Back Side



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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