

V_R	1200V
I_F	20A
Q_C	63nC

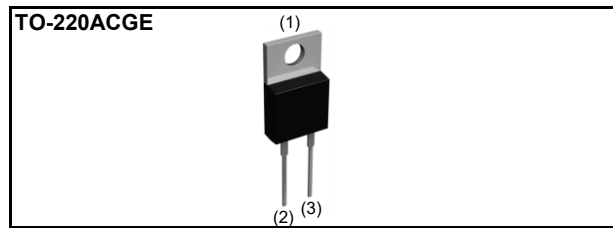
●Features

- 1) High surge current capability
- 2) Low leakage current
- 3) Reduced temperature dependence
- 4) High-speed switching possible
- 5) Shorter recovery time

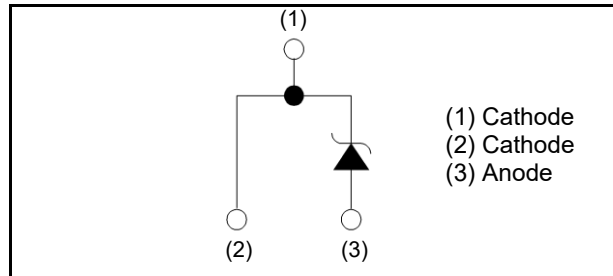
●Applications

- Factory Automation
- PV Power Conditioner
- Wireless Charger
- EV Charger Station

●Outline



●Inner circuit



●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	50
	Packing code	C16
	Marking	SCS320KG

●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 ($T_c=141^{\circ}\text{C}$)	I_F	20 *1	A	
Surge non-repetitive forward current	I_{FSM}	PW=10ms sinusoidal, $T_{vj}=25^{\circ}\text{C}$	155	A
		PW=10ms sinusoidal, $T_{vj}=150^{\circ}\text{C}$	116	A
		PW=10 μs square, $T_{vj}=25^{\circ}\text{C}$	610	A
Repetitive peak forward current	I_{FRM}	92 *2	A	
i^2t value	$\int i^2 dt$	$1 \leq PW \leq 10\text{ms}$, $T_{vj}=25^{\circ}\text{C}$	120	A^2s
		$1 \leq PW \leq 10\text{ms}$, $T_{vj}=150^{\circ}\text{C}$	67	A^2s
Total power dissipation	P_D	223 *3	W	
Virtual junction temperature	T_{vj}	175	$^{\circ}\text{C}$	
Range of storage temperature	T_{stg}	-55 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)

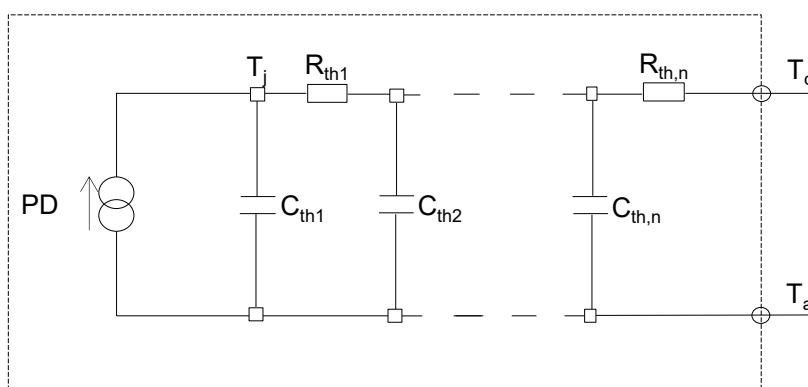
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R = 40\mu\text{A}$	1200	-	-	V
Forward voltage	V_F	$I_F = 20\text{A}$ $T_{vj} = 25^{\circ}\text{C}$	-	1.4	1.6	V
		$I_F = 20\text{A}$ $T_{vj} = 150^{\circ}\text{C}$	-	1.8	-	V
		$I_F = 20\text{A}$ $T_{vj} = 175^{\circ}\text{C}$	-	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}	-	-	0.49	0.67	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	2.8×10^{-1}	K/W	C_{th1}	7.7×10^{-3}	Ws/K
R_{th2}	2.1×10^{-1}		C_{th2}	8.4×10^{-2}	
R_{th3}	2.0×10^{-3}		C_{th3}	9.8×10^{-1}	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ Characteristics

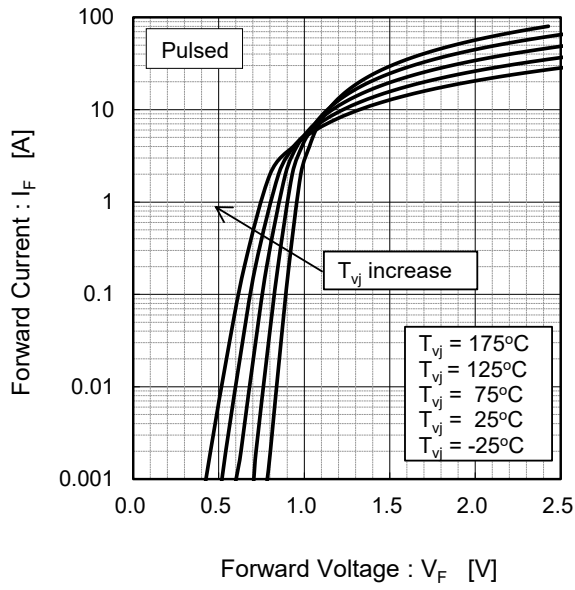


Fig.2 $V_F - I_F$ Characteristics

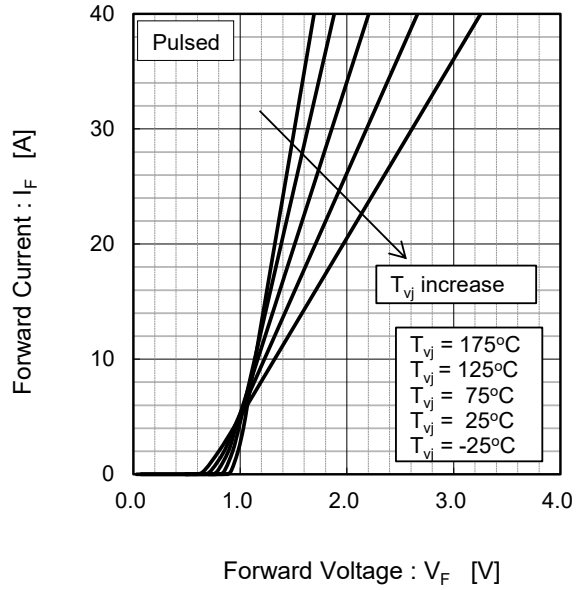


Fig.3 $V_R - I_R$ Characteristics

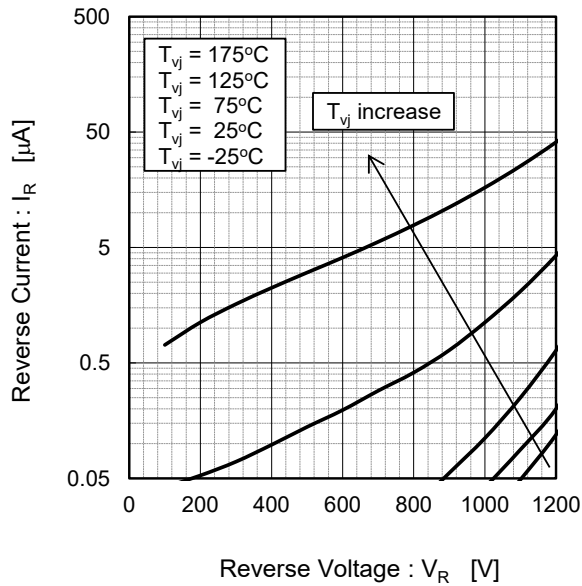
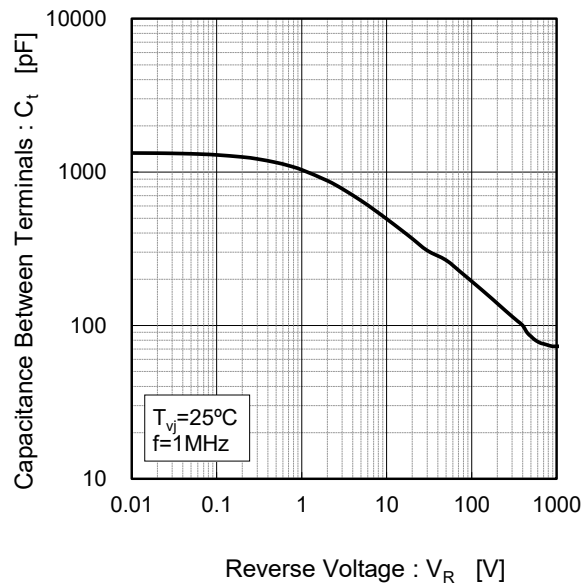


Fig.4 $V_R - C_t$ Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

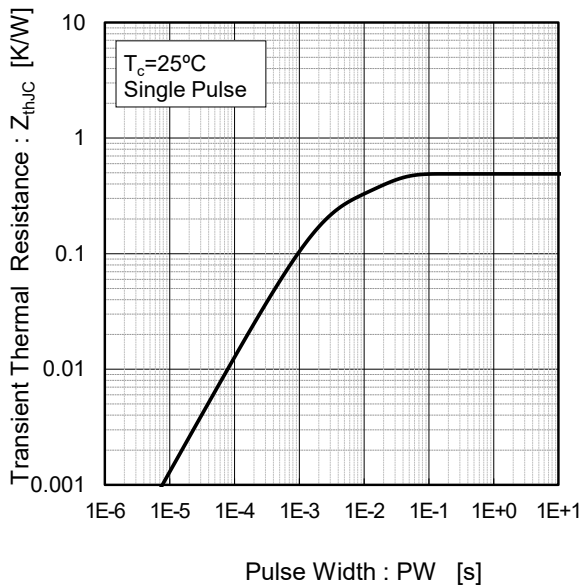


Fig.6 Power Dissipation

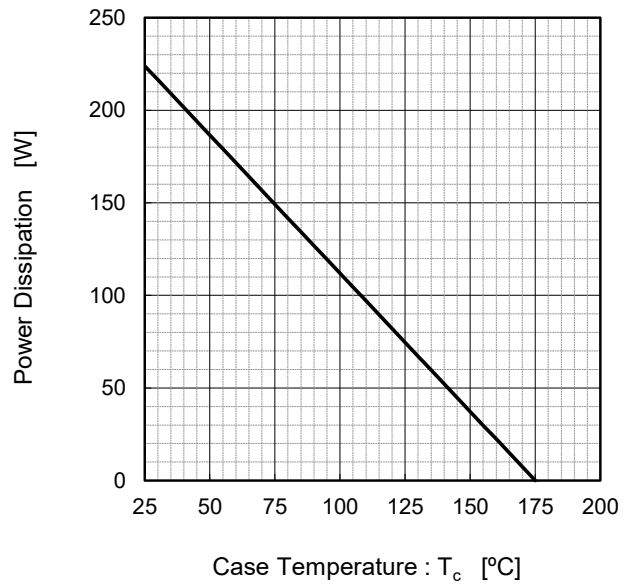
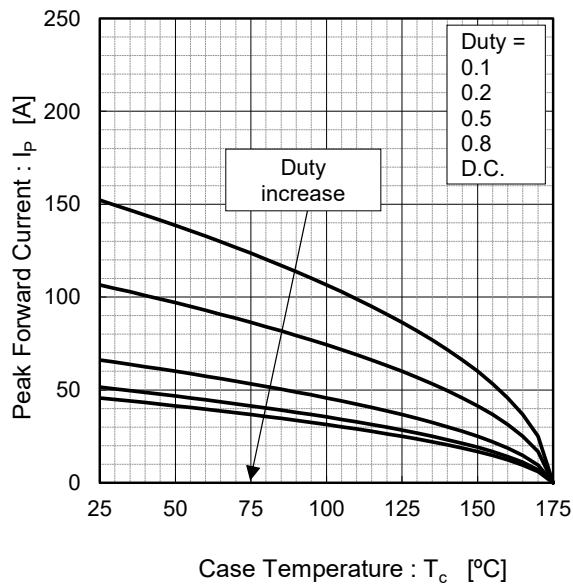
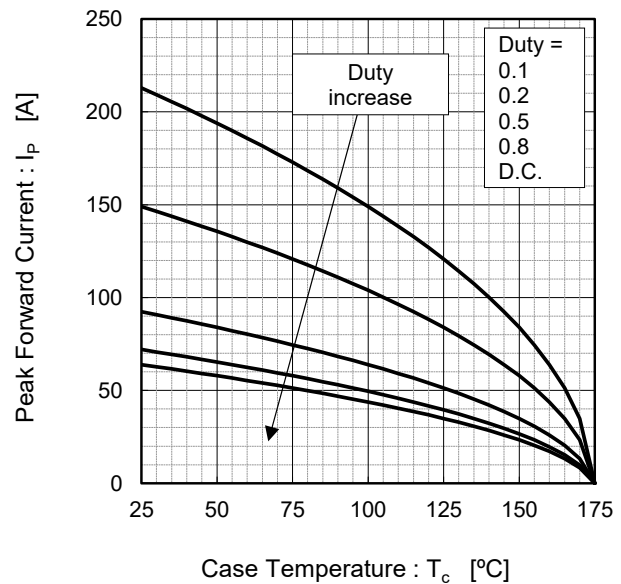


Fig.7*4 Maximum peak forward current derating curve $I_p - T_c$



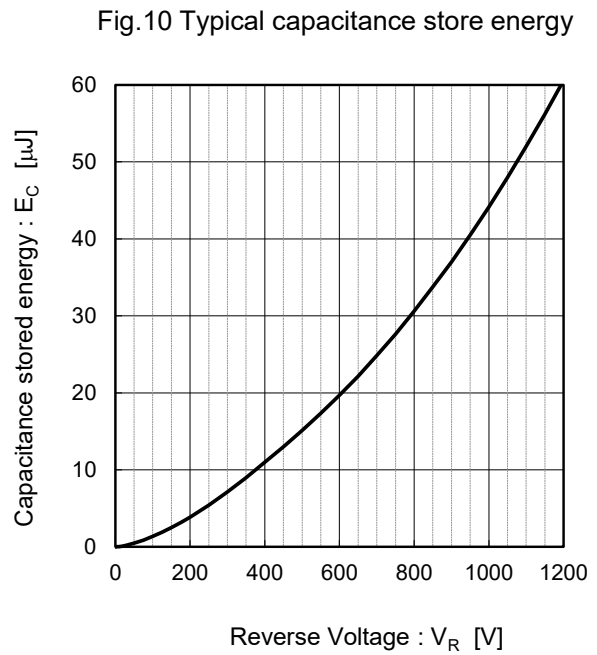
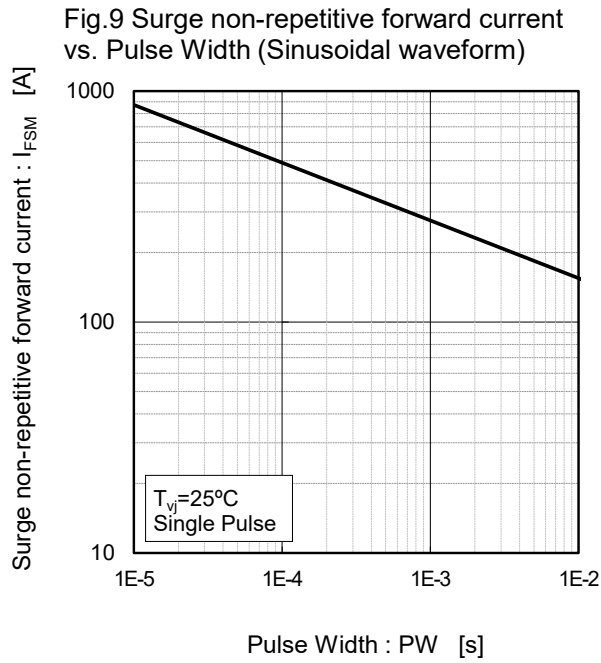
*4 Based on max Vf, max R_{thJC}
Valid for switching of above 10kHz,
excluding D.C. curve.

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



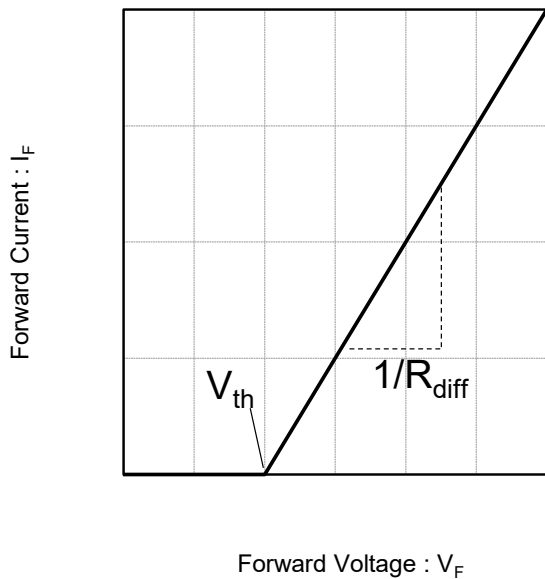
*5 Based on typ Vf, typ R_{thJC}
Typical value, not guaranteed
Valid for switching of above 10kHz,
excluding D.C. curve

●Electrical characteristic curves



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

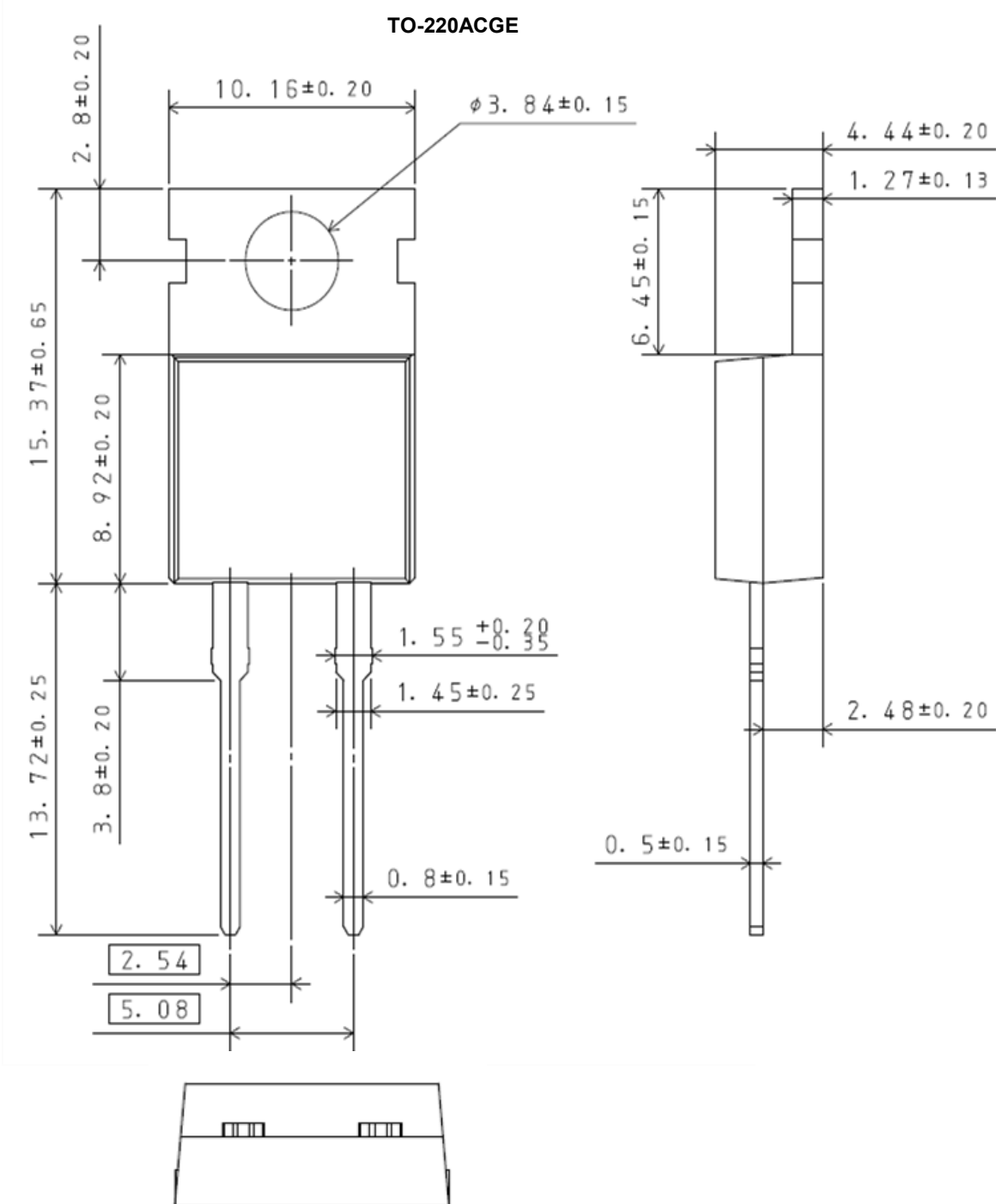
$$V_{th} (T_{vj}) = a_0 + a_1 T_{vj}$$

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

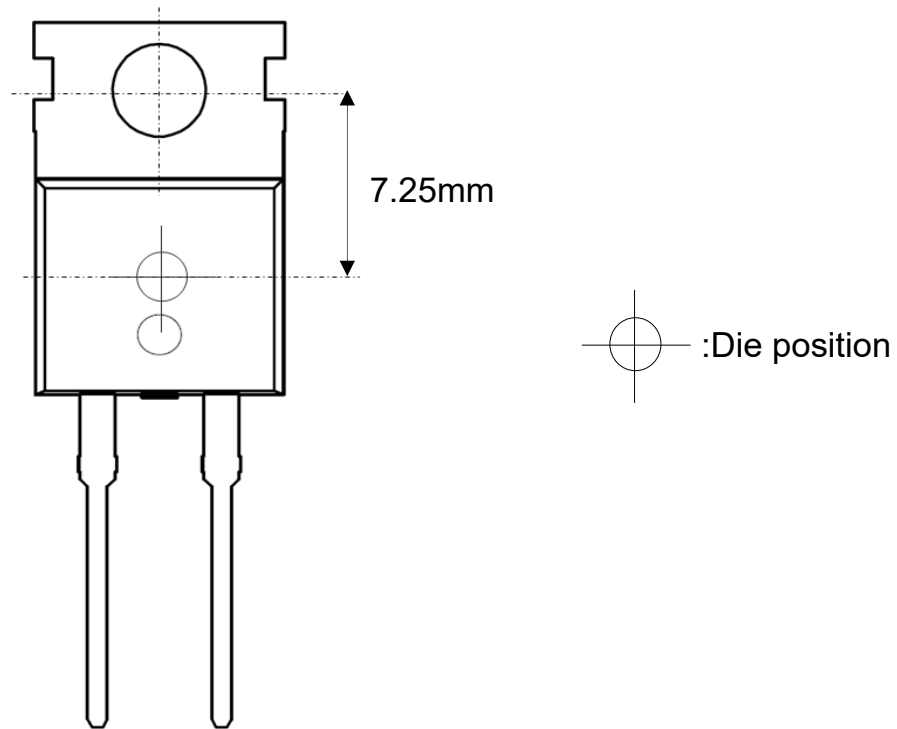
Symbol	Typical Value	Unit
a ₀	0.922	V
a ₁	-1.388	mV/°C
b ₀	21.20	mΩ
b ₁	0.129	mΩ/°C
b ₂	0.671	μΩ/°C ²

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.



●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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