

$V_R$	1200V
$I_F$	10 / 20A*
$Q_C$	36nC(Per leg)

(\*Per leg/Both legs)

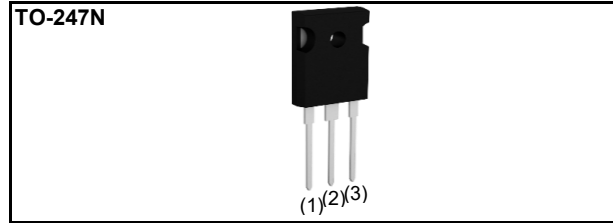
### ●Features

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

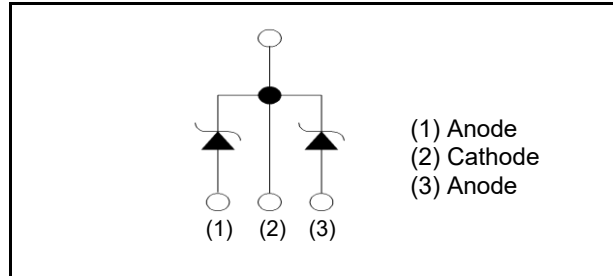
### ●Applications

- PV Power Conditioner
- Motor Drive
- Factory Automation
- EV Charger Station

### ●Outline



### ●Inner circuit



### ●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	30
	Packing code	C11
	Marking	SCS320KE2

### ●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 <sup>*4</sup> ( $T_c=144^{\circ}\text{C}$ )	$I_F$	10 / 20 <sup>*1</sup>	A	
Surge non-repetitive forward current <sup>*4</sup>	$I_{FSM}$	PW=10ms sinusoidal, $T_{vj}=25^{\circ}\text{C}$	106 / 212	A
		PW=10ms sinusoidal, $T_{vj}=150^{\circ}\text{C}$	79 / 158	A
		PW=10ms square, $T_{vj}=25^{\circ}\text{C}$	420 / 840	A
Repetitive peak forward current <sup>*4</sup>	$I_{FRM}$	48 / 96 <sup>*2</sup>	A	
$i^2t$ value <sup>*4</sup>	$\int i^2 dt$	$1 \leq PW \leq 10\text{ms}$ , $T_{vj}=25^{\circ}\text{C}$	56 / 224	$\text{A}^2\text{s}$
		$1 \leq PW \leq 10\text{ms}$ , $T_{vj}=150^{\circ}\text{C}$	31 / 124	$\text{A}^2\text{s}$
Total power dissipation <sup>*4</sup>	$P_D$	125 / 250 <sup>*3</sup>	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  $T_c=25^{\circ}\text{C}$

\*4 Per leg/Both legs

**●Electrical characteristics** ( $T_{vj}=25^{\circ}\text{C}$  unless otherwise specified) (Per Leg)

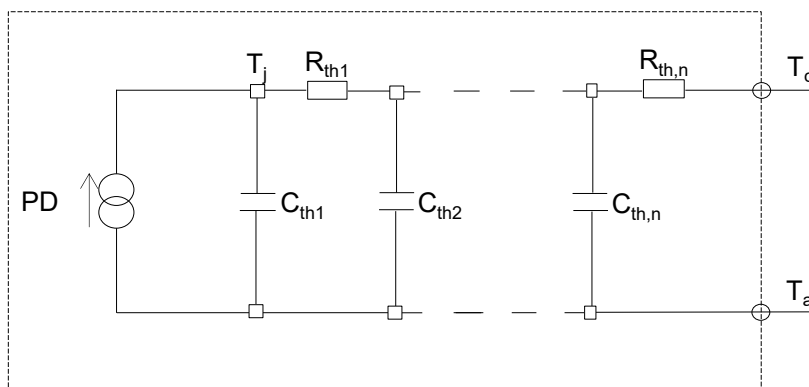
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R = 40\mu\text{A}$	1200	-	-	V
Forward voltage	$V_F$	$I_F = 10\text{A}$ $T_{vj} = 25^{\circ}\text{C}$	-	1.4	1.6	V
		$I_F = 10\text{A}$ $T_{vj} = 150^{\circ}\text{C}$	-	1.8	-	V
		$I_F = 10\text{A}$ $T_{vj} = 175^{\circ}\text{C}$	-	2.0	-	V
Reverse current	$I_R$	$V_R = 1200\text{V}$ , $T_{vj} = 25^{\circ}\text{C}$	-	0.1	40	$\mu\text{A}$
		$V_R = 1200\text{V}$ , $T_{vj} = 150^{\circ}\text{C}$	-	7	100	$\mu\text{A}$
		$V_R = 1200\text{V}$ , $T_{vj} = 175^{\circ}\text{C}$	-	20	-	$\mu\text{A}$
Total capacitance	C	$V_R = 1\text{V}$ , $f = 1\text{MHz}$	-	520	-	pF
		$V_R = 800\text{V}$ , $f = 1\text{MHz}$	-	37	-	pF
Total capacitive charge	$Q_C$	$V_R = 800\text{V}$ , $di/dt = 500\text{A}/\mu\text{s}$	-	36	-	nC
Switching time	$t_C$	$V_R = 800\text{V}$ , $di/dt = 500\text{A}/\mu\text{s}$	-	17	-	ns

**●Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{thJC}$	Per Leg	-	0.91	1.2	K/W
		Both Legs	-	0.50	0.66	K/W

**●Typical Transient Thermal Characteristics** (Per Leg)

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	$5.2 \times 10^{-1}$	K/W	$C_{th1}$	$1.9 \times 10^{-3}$	Ws/K
$R_{th2}$	$3.4 \times 10^{-1}$		$C_{th2}$	$8.2 \times 10^{-3}$	
$R_{th3}$	$5.3 \times 10^{-2}$		$C_{th3}$	$3.7 \times 10^{-2}$	



●Electrical characteristic curves (Per Leg)

Fig.1  $V_F - I_F$  Characteristics

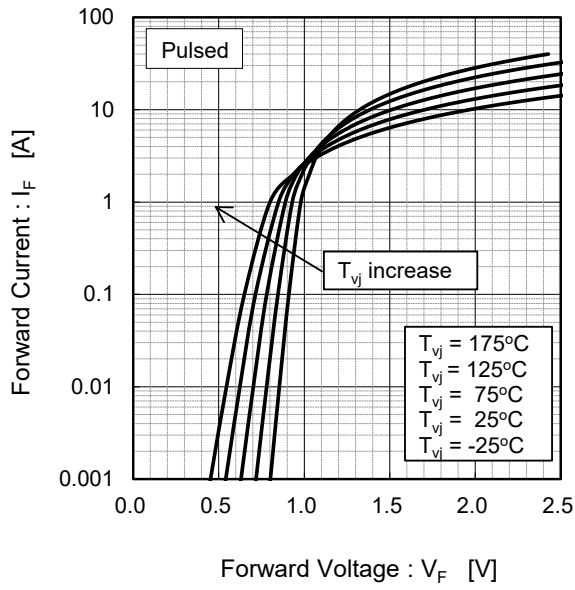


Fig.2  $V_F - I_F$  Characteristics

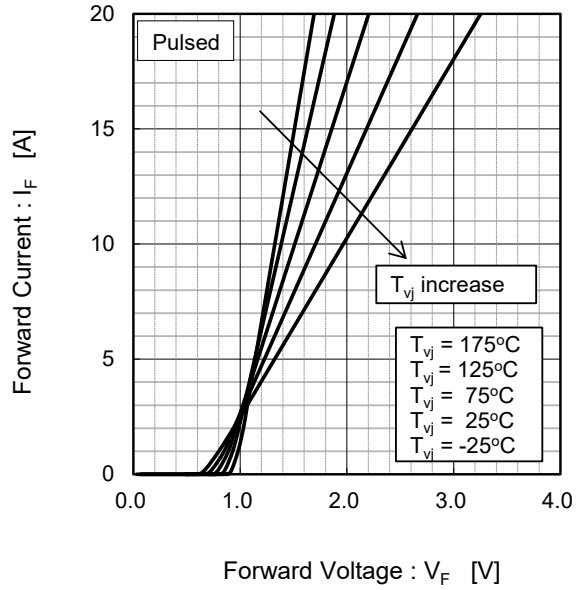


Fig.3  $V_R - I_R$  Characteristics

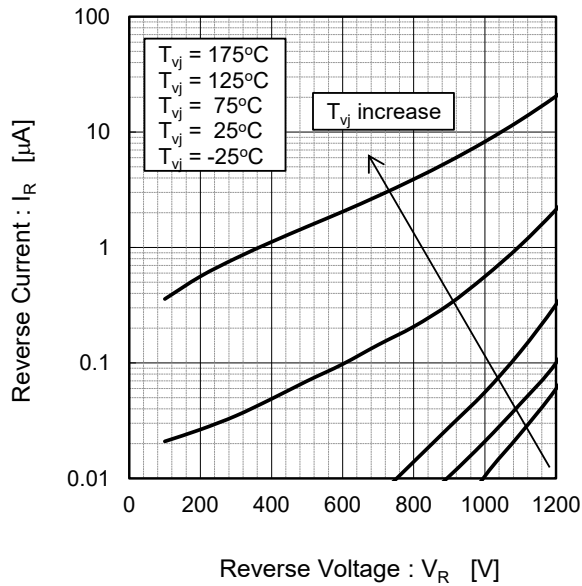
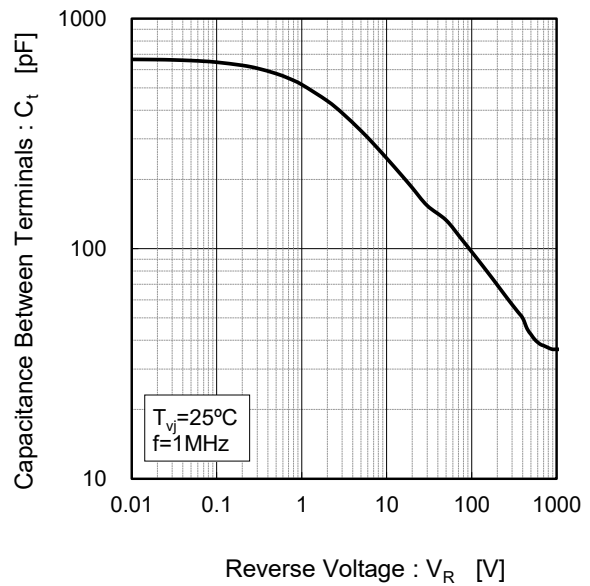


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves (Per Leg)

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

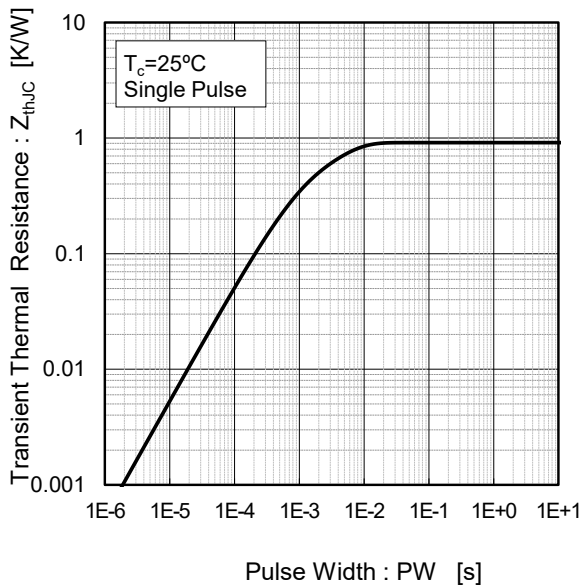


Fig.6 Power Dissipation

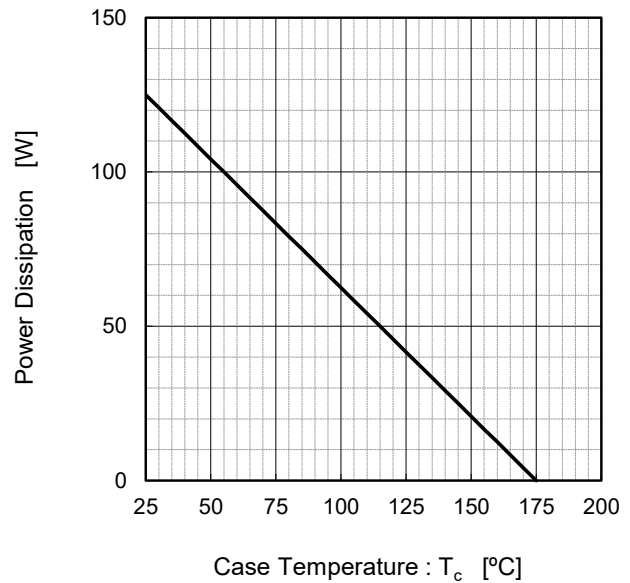
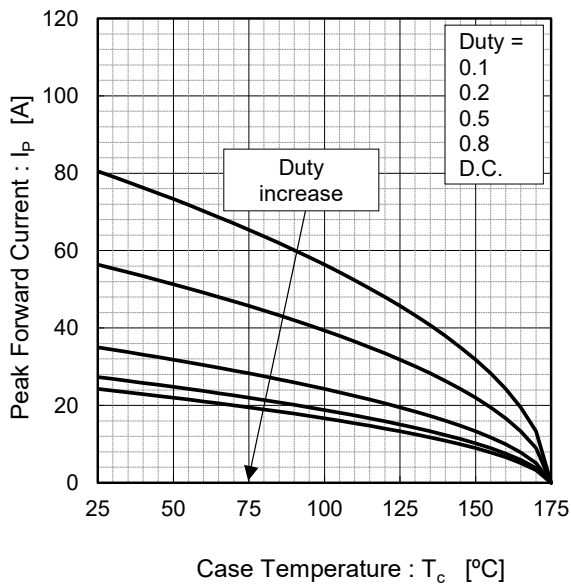
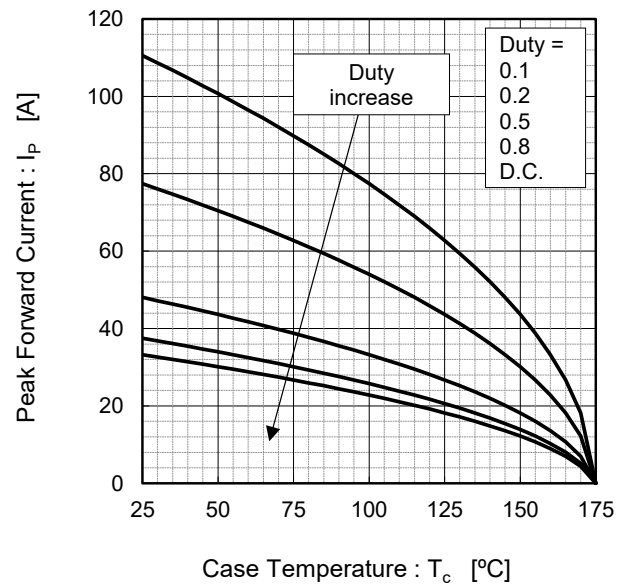


Fig.7\*4 Maximum peak forward current derating curve  $I_p - T_c$



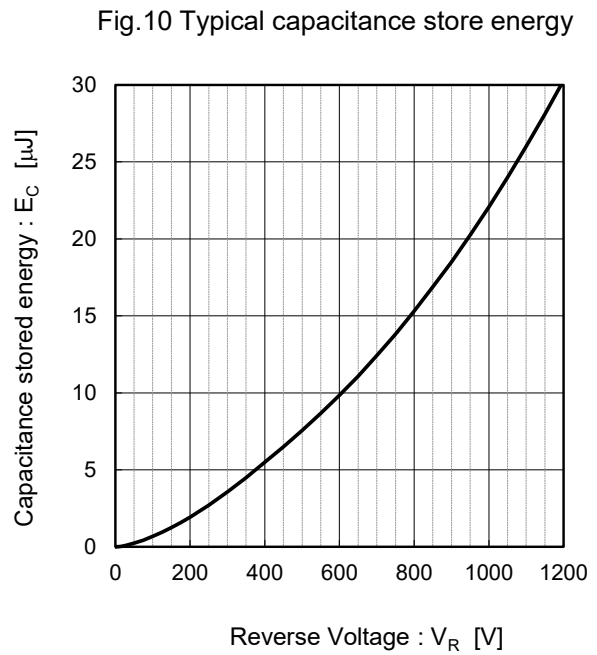
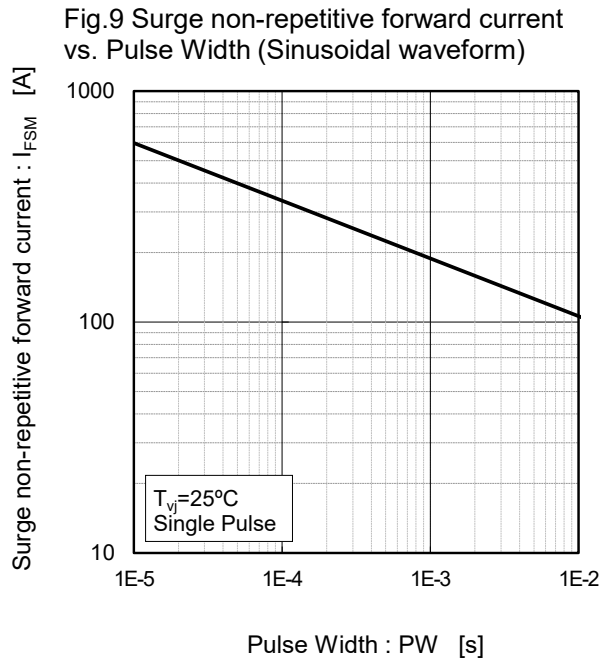
\*4 Based on max Vf, max  $R_{thJC}$   
Valid for switching of above 10kHz,  
excluding D.C. curve.

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



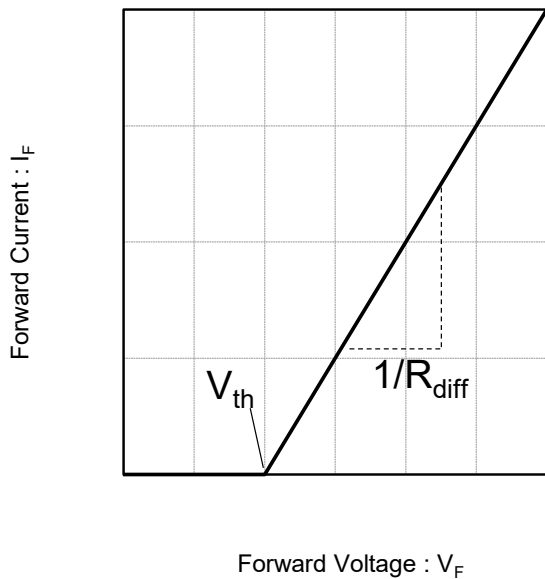
\*5 Based on typ Vf, typ  $R_{thJC}$   
Typical value, not guaranteed  
Valid for switching of above 10kHz,  
excluding D.C. curve

●Electrical characteristic curves (Per Leg)



●Simplified forward characteristic model (Per Leg)

Fig.11 Equivalent forward current curve



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

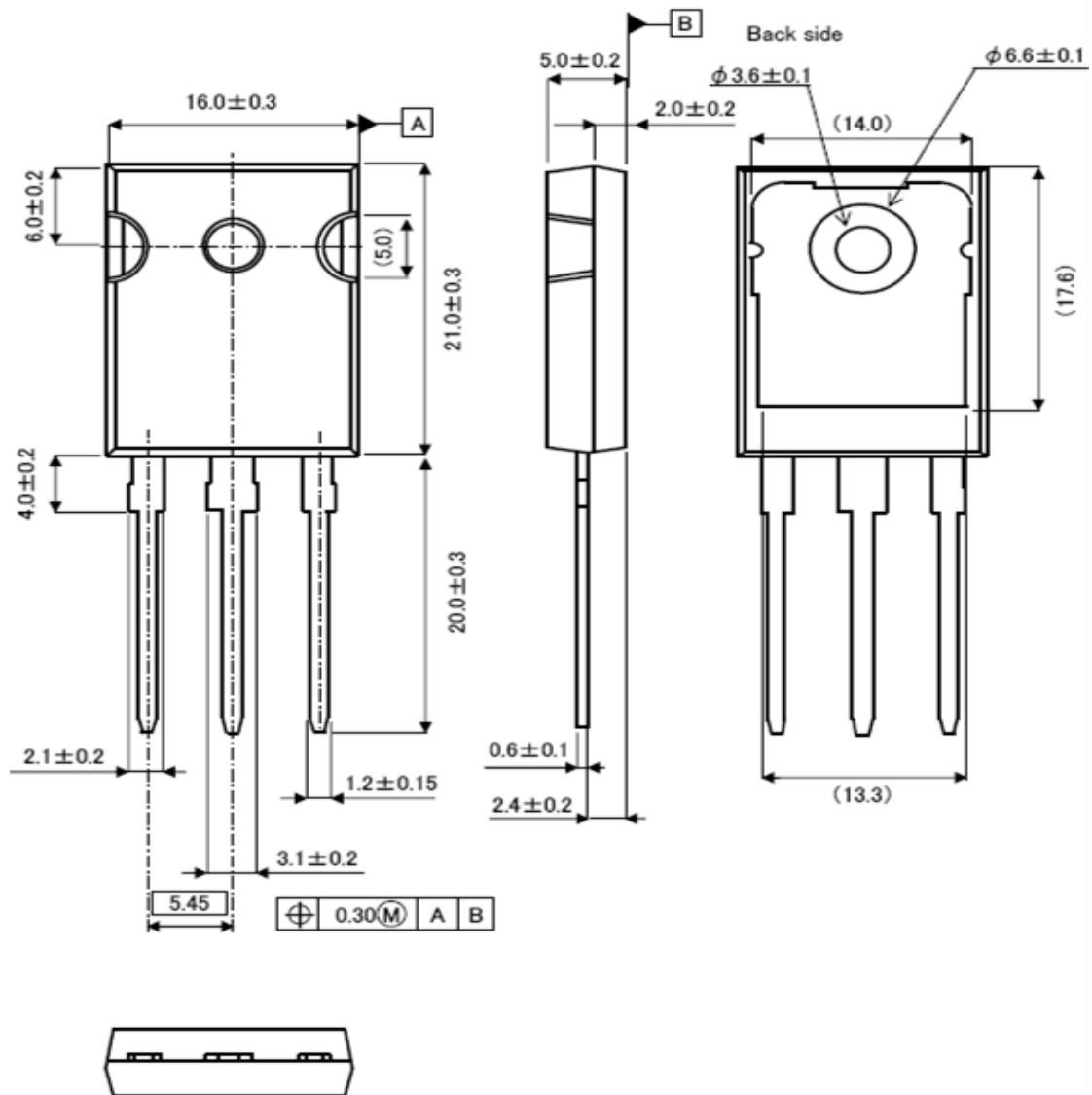
$$V_{th} ( T_{vj} ) = a_0 + a_1 T_{vj}$$

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

Symbol	Typical Value	Unit
a <sub>0</sub>	0.922	V
a <sub>1</sub>	-1.388	mV/°C
b <sub>0</sub>	42.40	mΩ
b <sub>1</sub>	0.259	mΩ/°C
b <sub>2</sub>	1.341	μΩ/°C <sup>2</sup>

T<sub>vj</sub> in °C; -55 °C < T<sub>vj</sub> < 175°C ; I<sub>F</sub> < 20 A

## ●Package Dimensions



•Dimensions do not include mold flash, protrusion or gate burrs.

Unit: mm

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