

|       |       |
|-------|-------|
| $V_R$ | 1200V |
| $I_F$ | 5A    |
| $Q_C$ | 17nC  |

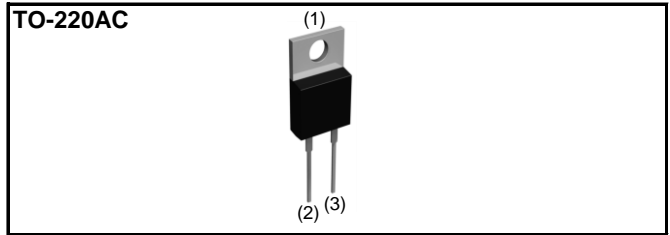
### ●Features

- 1) AEC-Q101 qualified
- 2) Low forward voltage
- 3) Negligible recovery time/current
- 4) Temperature independent switching behavior

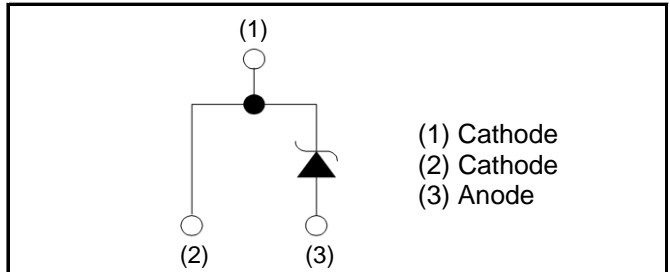
### ●Applications

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

### ●Outline



### ●Inner circuit



### ●Packaging specifications

| Type | Packaging                 | Tube     |
|------|---------------------------|----------|
|      | Reel size (mm)            | -        |
|      | Tape width (mm)           | -        |
|      | Basic ordering unit (pcs) | 50       |
|      | Packing code              | C        |
|      | Marking                   | SCS205KG |

### ●Absolute maximum ratings ( $T_j = 25^\circ\text{C}$ )

| Parameter  | Symbol        | Value  | Unit             |                      |
|--|---------------|--|------------------|----------------------|
| Reverse voltage (repetitive peak)                        | $V_{RM}$      | 1200   | V                |                      |
| Reverse voltage (DC)                                     | $V_R$         | 1200   | V                |                      |
| Continuous forward current ( $T_c = 150^\circ\text{C}$ ) | $I_F$         | 5  | A                |                      |
| Surge non-repetitive forward current                     | $I_{FSM}$     | PW=10ms sinusoidal, $T_j=25^\circ\text{C}$         | 23               | A                    |
|  |               | PW=10ms sinusoidal, $T_j=150^\circ\text{C}$        | 17               | A                    |
|  |               | PW=10 $\mu\text{s}$ square, $T_j=25^\circ\text{C}$ | 80               | A                    |
| Repetitive peak forward current                          | $I_{FRM}$     | 27 *1  | A                |                      |
| $i^2t$ value   | $\int i^2 dt$ | PW=10ms, $T_j=25^\circ\text{C}$                    | 2.5              | $\text{A}^2\text{s}$ |
|  |               | PW=10ms, $T_j=150^\circ\text{C}$                   | 1.4              | $\text{A}^2\text{s}$ |
| Total power dissipation                                  | $P_D$         | 88 *2  | W                |                      |
| Junction temperature                                     | $T_j$         | 175  | $^\circ\text{C}$ |                      |
| Range of storage temperature                             | $T_{stg}$     | -55 to +175  | $^\circ\text{C}$ |                      |

\*1  $T_c=100^\circ\text{C}$ ,  $T_j=150^\circ\text{C}$ , Duty cycle=10% \*2  $T_c=25^\circ\text{C}$

### ●Electrical characteristics ( $T_j = 25^\circ\text{C}$ )

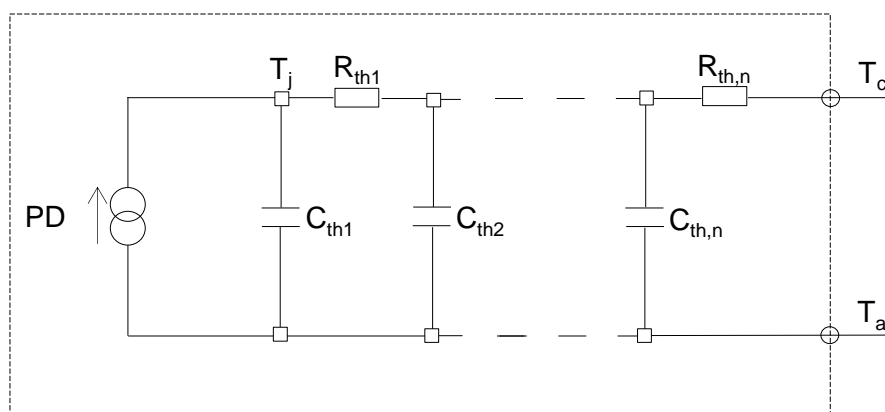
| Parameter               | Symbol   | Conditions                                       | Values |      |      | Unit          |
|-------------------------|----------|--|--------|------|------|---------------|
|                         |          |  | Min.   | Typ. | Max. |               |
| DC blocking voltage     | $V_{DC}$ | $I_R=0.1\text{mA}$                               | 1200   | -    | -    | V             |
| Forward voltage         | $V_F$    | $I_F=5\text{A}, T_j=25^\circ\text{C}$            | -      | 1.4  | 1.6  | V             |
|                         |          | $I_F=5\text{A}, T_j=150^\circ\text{C}$           | -      | 1.8  | -    | V             |
|                         |          | $I_F=5\text{A}, T_j=175^\circ\text{C}$           | -      | 1.9  | -    | V             |
| Reverse current         | $I_R$    | $V_R=1200\text{V}, T_j=25^\circ\text{C}$         | -      | 5    | 100  | $\mu\text{A}$ |
|                         |          | $V_R=1200\text{V}, T_j=150^\circ\text{C}$        | -      | 40   | -    | $\mu\text{A}$ |
|                         |          | $V_R=1200\text{V}, T_j=175^\circ\text{C}$        | -      | 65   | -    | $\mu\text{A}$ |
| Total capacitance       | C        | $V_R=1\text{V}, f=1\text{MHz}$                   | -      | 260  | -    | pF            |
|                         |          | $V_R=800\text{V}, f=1\text{MHz}$                 | -      | 21   | -    | pF            |
| Total capacitive charge | $Q_C$    | $V_R=800\text{V}, di/dt=500\text{A}/\mu\text{s}$ | -      | 17   | -    | nC            |
| Switching time          | $t_C$    | $V_R=800\text{V}, di/dt=500\text{A}/\mu\text{s}$ | -      | 15   | -    | ns            |

### ●Thermal characteristics

| Parameter          | Symbol        | Conditions | Values |      |      | Unit                      |
|--------------------|---------------|------------|--------|------|------|---------------------------|
|                    |               |            | Min.   | Typ. | Max. |                           |
| Thermal resistance | $R_{th(j-c)}$ | -          | -      | 1.5  | 1.7  | $^\circ\text{C}/\text{W}$ |

### ●Typical Transient Thermal Characteristics

| Symbol    | Value    | Unit | Symbol     | Value    | Unit |
|-----------|----------|------|------------|----------|------|
| $R_{th1}$ | 3.06E-01 | K/W  | $C_{th1}$  | 2.49E-03 | Ws/K |
| $R_{th2}$ | 9.33E-01 |      | $C_{th2}$  | 4.92E-03 |      |
| $R_{th3}$ | 2.62E-01 |      | $C_{th,n}$ | 9.57E-02 |      |



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics

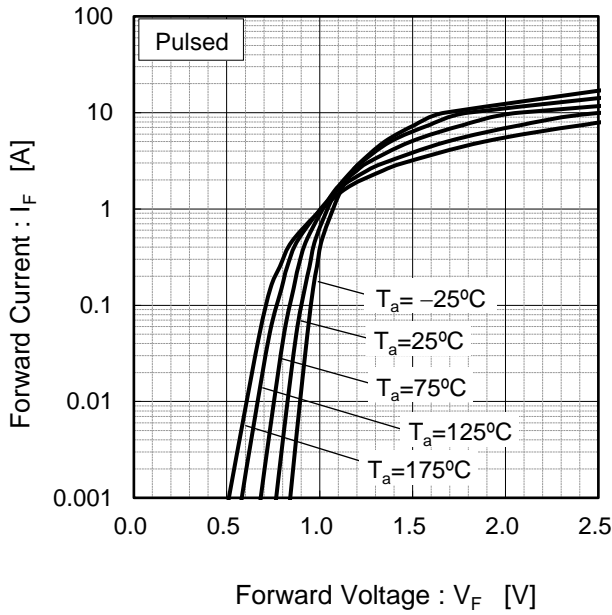


Fig.2  $V_F - I_F$  Characteristics

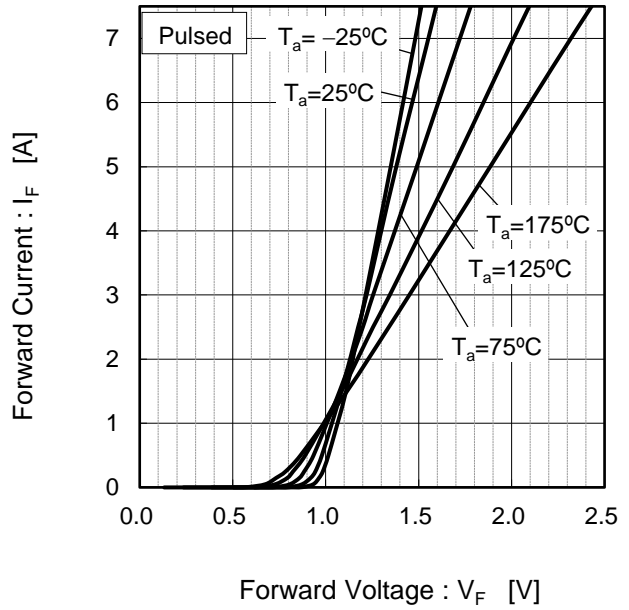


Fig.3  $V_R - I_R$  Characteristics

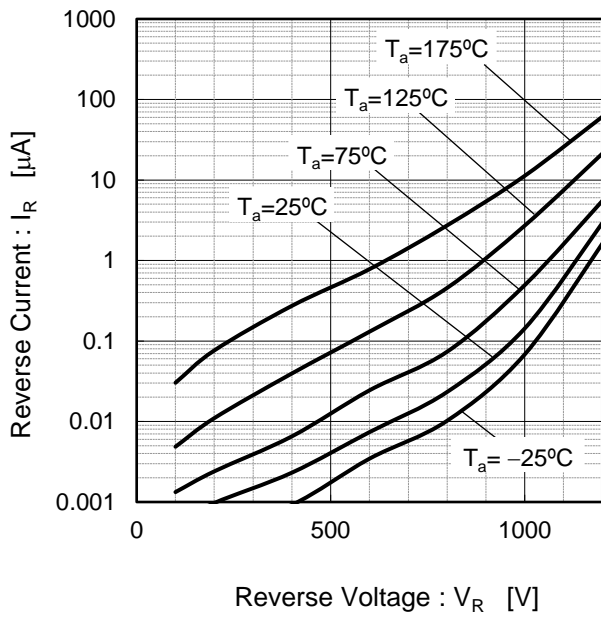
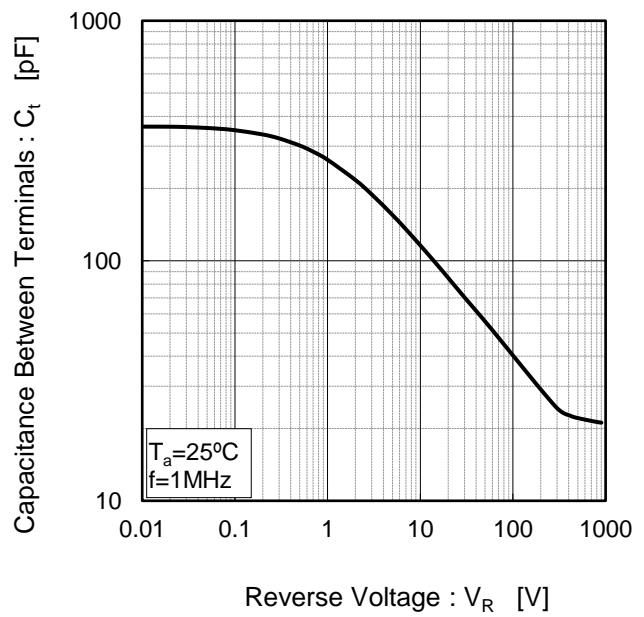


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

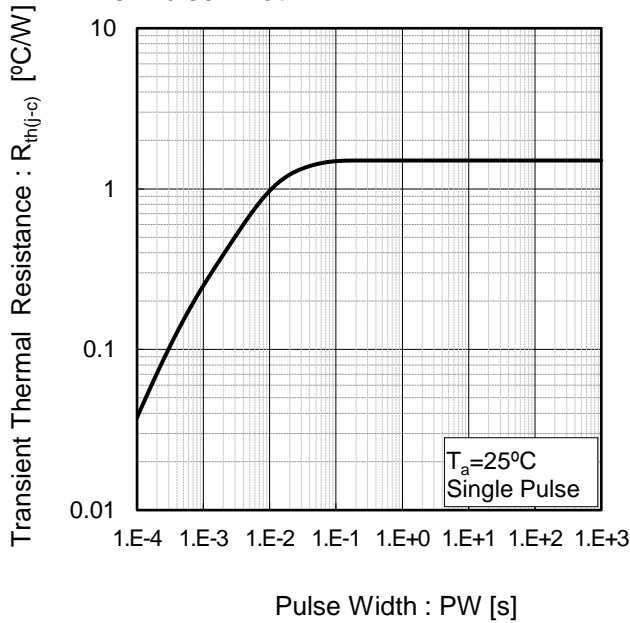


Fig.6 Power Dissipation

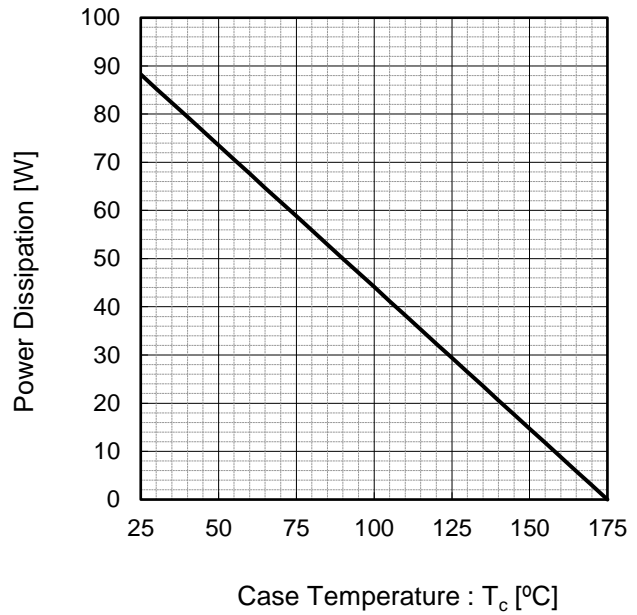
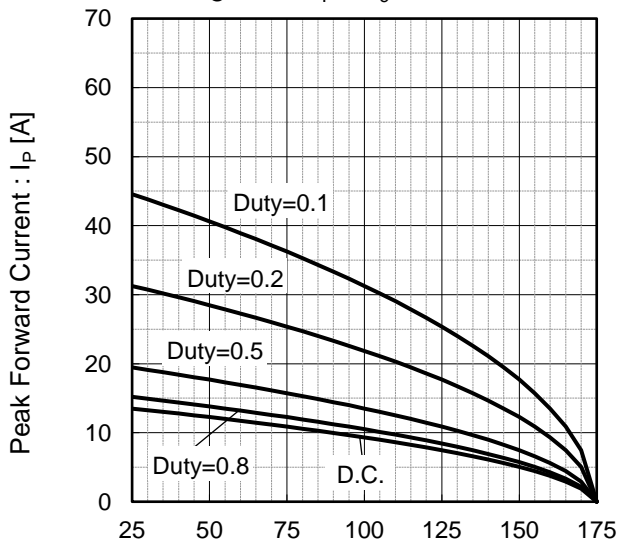
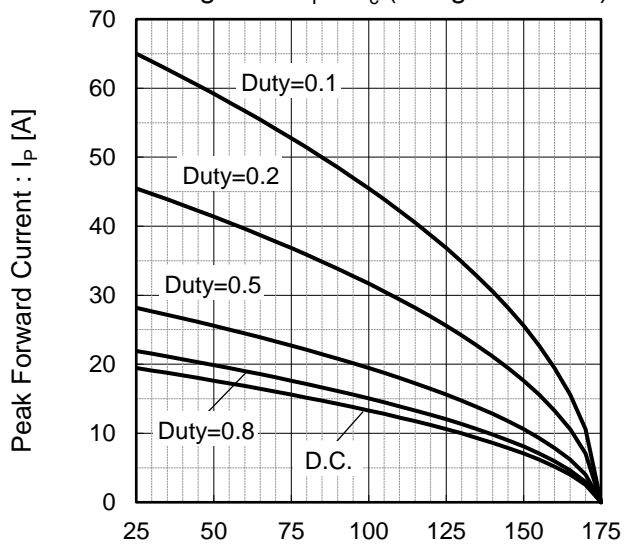


Fig.7\*3 Maximum peak forward current derating curve  $I_P - T_c$



Case Temperature :  $T_c$  [°C]  
 \*3 Based on max Vf, max  $R_{th(j-c)}$   
 Valid for switching of above 10kHz,  
 excluding D.C. curve.

Fig.8\*4 Typical peak forward current derating curve  $I_P - T_c$  (Not guaranteed)



Case Temperature :  $T_c$  [°C]  
 \*4 Based on typ Vf, typ  $R_{th(j-c)}$   
 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)

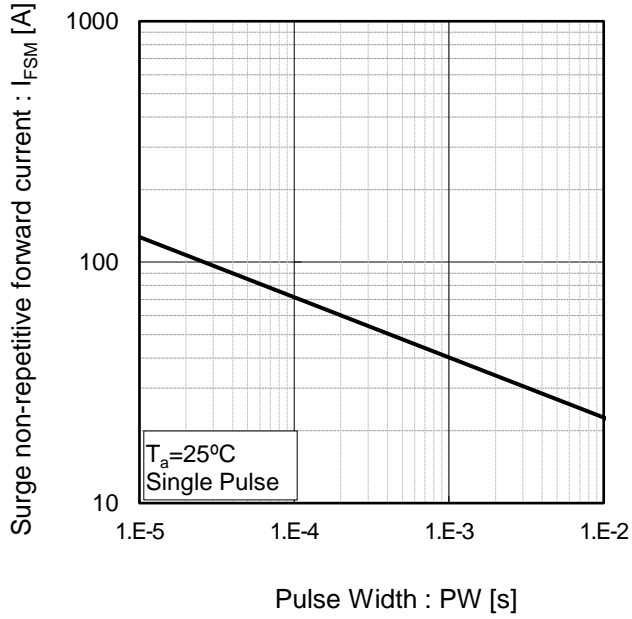
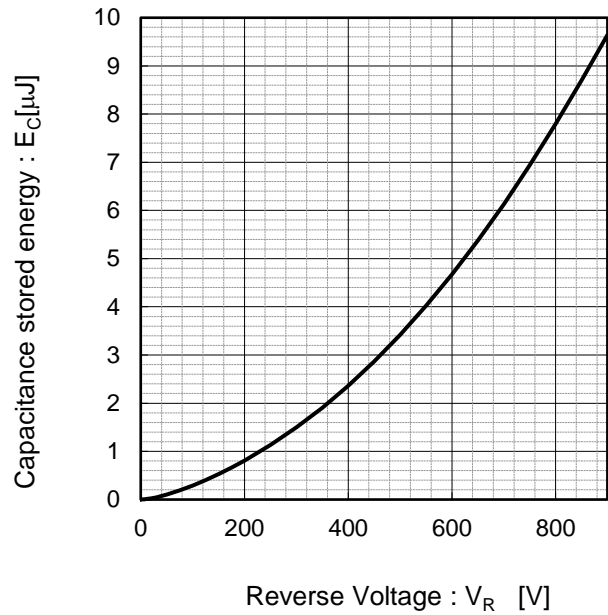
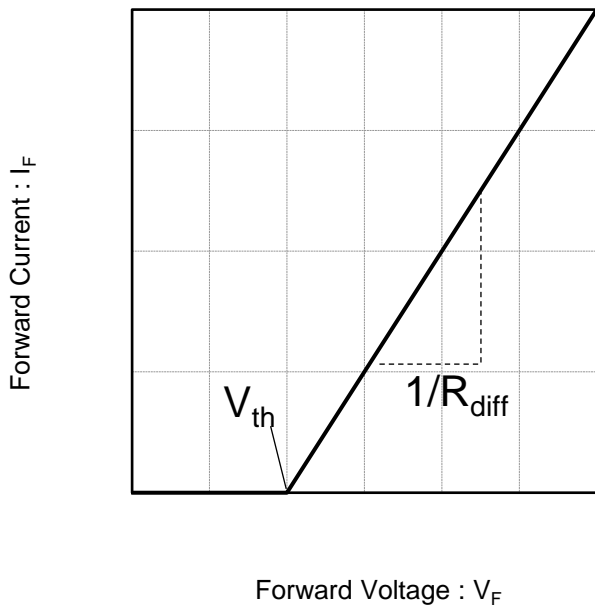


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

$$V_{th} (T_j) = a_0 + a_1 T_j$$

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

| Symbol         | Typical Value | Unit              |
|----------------|---------------|-------------------|
| a <sub>0</sub> | 9.93E-01      | V                 |
| a <sub>1</sub> | -1.27E-03     | V/°C              |
| b <sub>0</sub> | 7.30E-02      | Ω                 |
| b <sub>1</sub> | 4.12E-04      | Ω/°C              |
| b <sub>2</sub> | 2.66E-06      | Ω/°C <sup>2</sup> |

T<sub>j</sub> in °C; -55 °C < T<sub>j</sub> < °C ; I<sub>F</sub> < 10 A

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