

| | |
|-------|---------------|
| V_R | 650V |
| I_F | 10A/20A* |
| Q_C | 15nC(Per leg) |

(*Per leg/ Both legs)

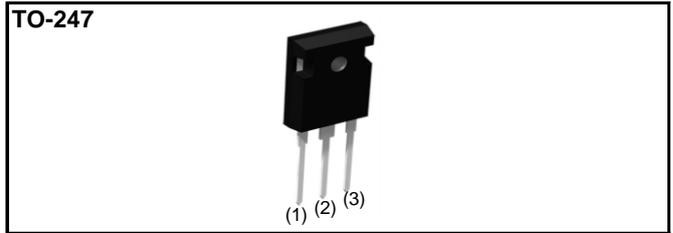
●Features

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

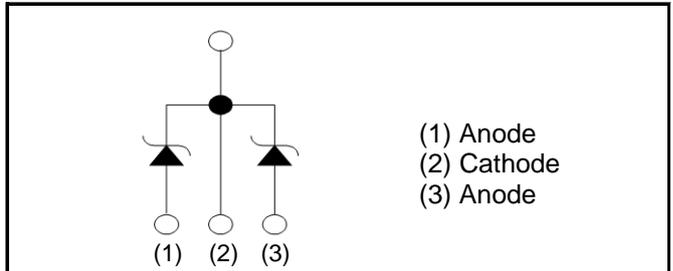
●Applications

- 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) | 30 |
| | Packing code | C |
| | Marking | SCS220AE2 |

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

| Parameter | Symbol | Value | Unit | |
|--|---------------|--|------------------|----------------------|
| Reverse voltage (repetitive peak) | V_{RM} | 650 | V | |
| Reverse voltage (DC) | V_R | 650 | V | |
| Continuous forward current ^{*3} ($T_c = 137^\circ\text{C}$) | I_F | 10/20 | A | |
| Surge non-repetitive forward current ^{*3} | I_{FSM} | PW=10ms sinusoidal, $T_j=25^\circ\text{C}$ | 38/76 | A |
| | | PW=10ms sinusoidal, $T_j=150^\circ\text{C}$ | 30/60 | A |
| | | PW=10 μs square, $T_j=25^\circ\text{C}$ | 150/300 | A |
| Repetitive peak forward current ^{*3} | I_{FRM} | 45/91 ^{*1} | A | |
| i^2t value ^{*3} | $\int i^2 dt$ | PW=10ms, $T_j=25^\circ\text{C}$ | 7.2/29 | A^2s |
| | | PW=10ms, $T_j=150^\circ\text{C}$ | 4.5/18 | A^2s |
| Total power dissipation ^{*3} | P_D | 83/160 ^{*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 $T_c=25^\circ\text{C}$ *3 Per leg/ Both legs

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

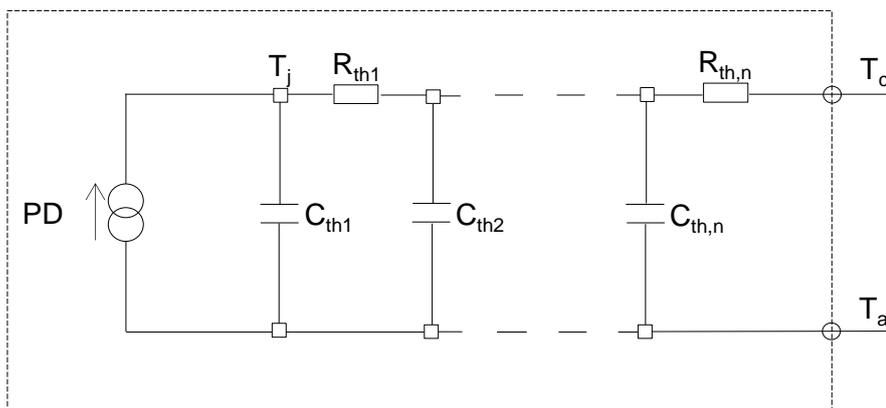
| Parameter | Symbol | Conditions | Values | | | Unit |
|-------------------------|----------|--|--------|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| DC blocking voltage | V_{DC} | $I_R=2.0\text{mA}$ | 650 | - | - | V |
| Forward voltage | V_F | $I_F=10\text{A}, T_j=25^\circ\text{C}$ | - | 1.35 | 1.55 | V |
| | | $I_F=10\text{A}, T_j=150^\circ\text{C}$ | - | 1.55 | - | V |
| | | $I_F=10\text{A}, T_j=175^\circ\text{C}$ | - | 1.63 | - | V |
| Reverse current | I_R | $V_R=600\text{V}, T_j=25^\circ\text{C}$ | - | 2 | 200 | μA |
| | | $V_R=600\text{V}, T_j=150^\circ\text{C}$ | - | 30 | - | μA |
| | | $V_R=600\text{V}, T_j=175^\circ\text{C}$ | - | 70 | - | μA |
| Total capacitance | C | $V_R=1\text{V}, f=1\text{MHz}$ | - | 360 | - | pF |
| | | $V_R=600\text{V}, f=1\text{MHz}$ | - | 37 | - | pF |
| Total capacitive charge | Q_C | $V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$ | - | 15 | - | nC |
| Switching time | t_C | $V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$ | - | 15 | - | ns |

●Thermal characteristics

| Parameter | Symbol | Conditions | Values | | | Unit |
|--------------------|---------------|------------|--------|------|------|---------------------------|
| | | | Min. | Typ. | Max. | |
| Thermal resistance | $R_{th(j-c)}$ | Per Leg | - | 1.6 | 1.8 | $^\circ\text{C}/\text{W}$ |
| | | Both Legs | - | 0.80 | 0.90 | $^\circ\text{C}/\text{W}$ |

●Typical Transient Thermal Characteristics (Per Leg)

| Symbol | Value | Unit | Symbol | Value | Unit |
|-----------|----------|------|-----------|----------|------|
| R_{th1} | 4.16E-01 | K/W | C_{th1} | 1.55E-03 | Ws/K |
| R_{th2} | 9.92E-01 | | C_{th2} | 6.13E-03 | |
| R_{th3} | 1.93E-01 | | C_{th3} | 1.34E-01 | |



●Electrical characteristic curves

Fig.1 $V_F - I_F$ Characteristics (Per Leg)

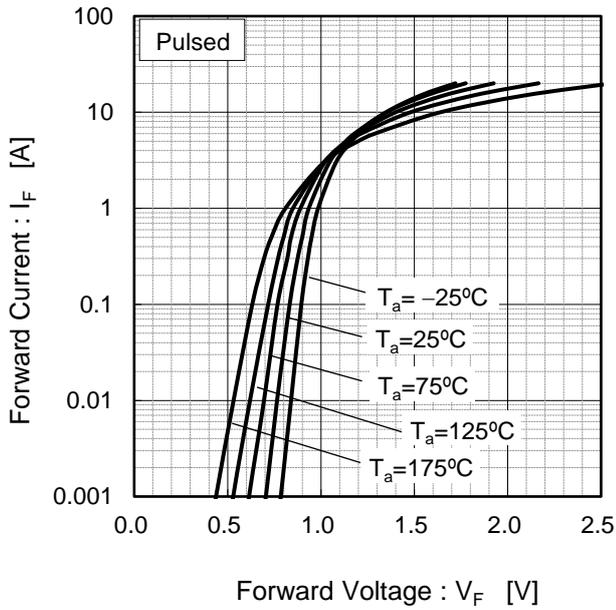


Fig.2 $V_F - I_F$ Characteristics (Per Leg)

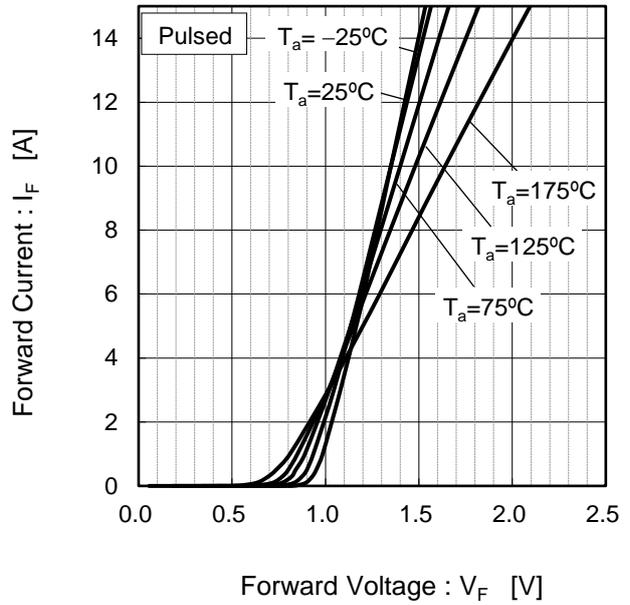


Fig.3 $V_R - I_R$ Characteristics (Per Leg)

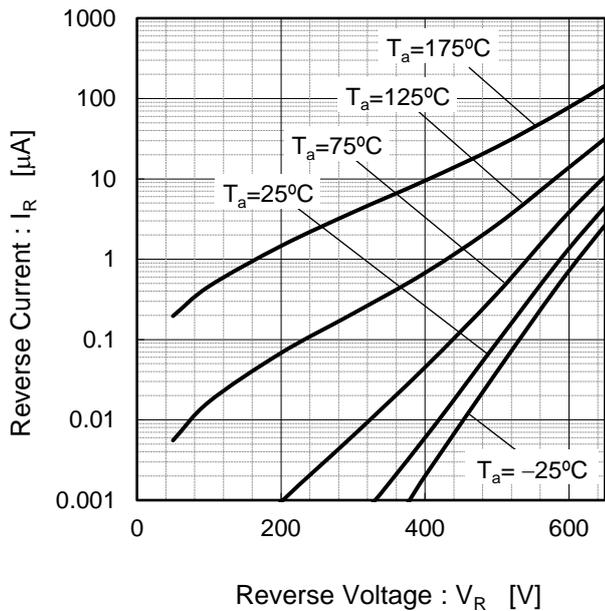
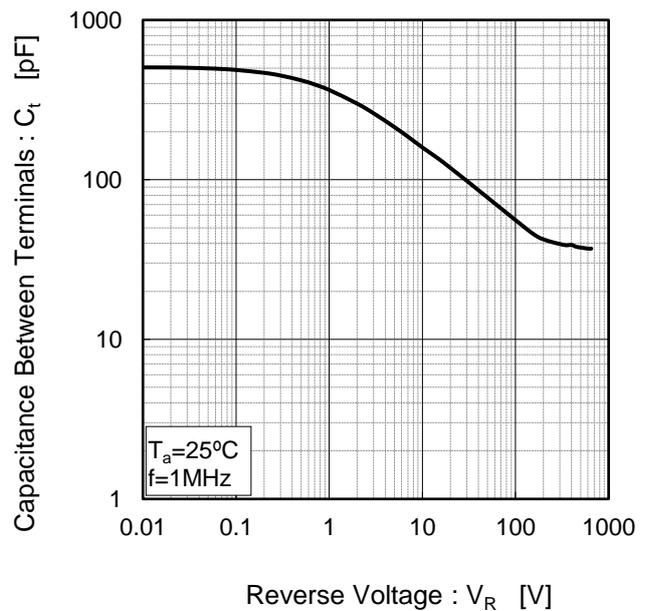


Fig.4 $V_R - C_t$ Characteristics (Per Leg)



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width (Per Leg)

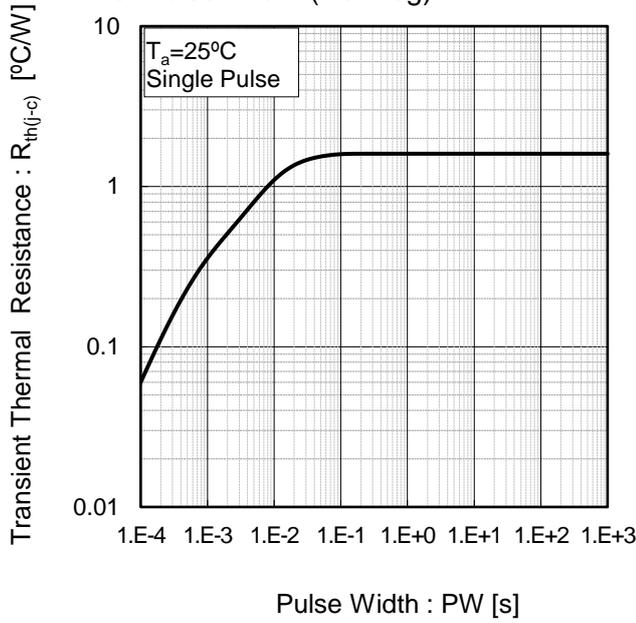


Fig.6 Power Dissipation (Per Leg)

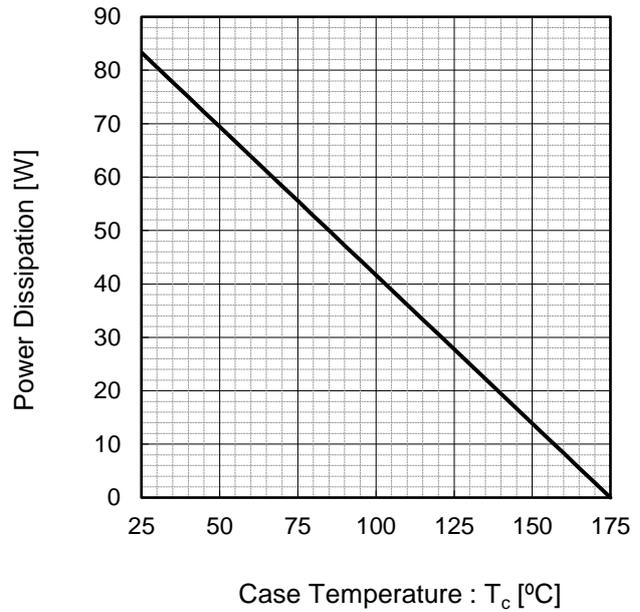
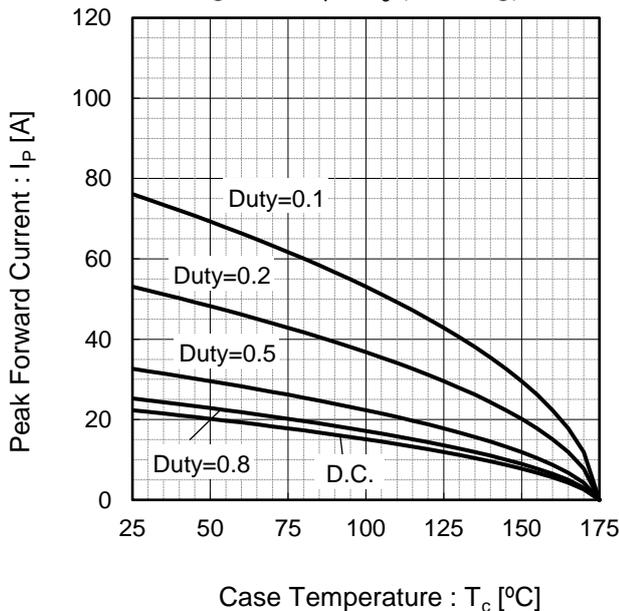
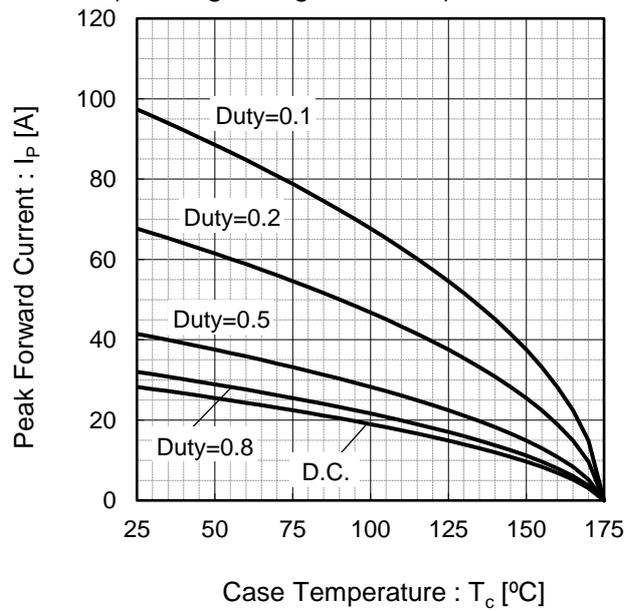


Fig.7*3 Maximum peak forward current derating curve $I_P - T_c$ (Per Leg)



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

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



Case Temperature : T_c [°C]
 *4 Based on typ V_f , 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) (Per Leg)

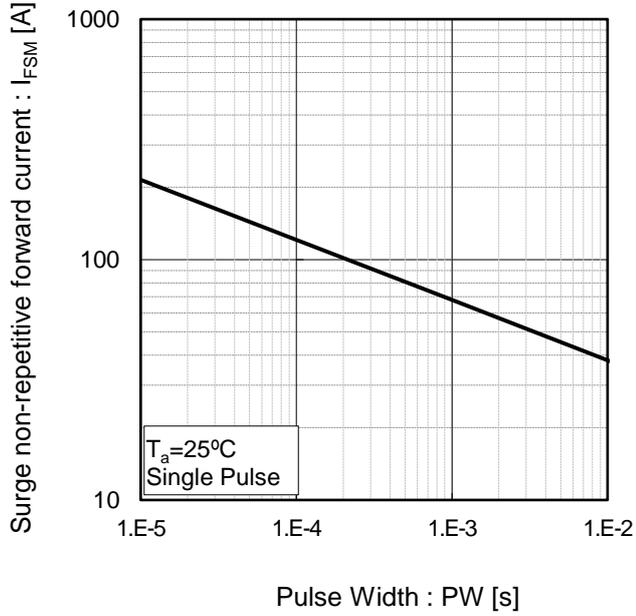
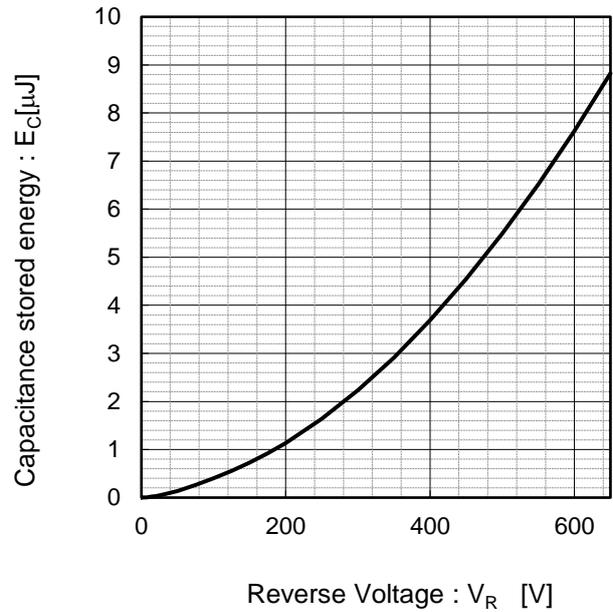
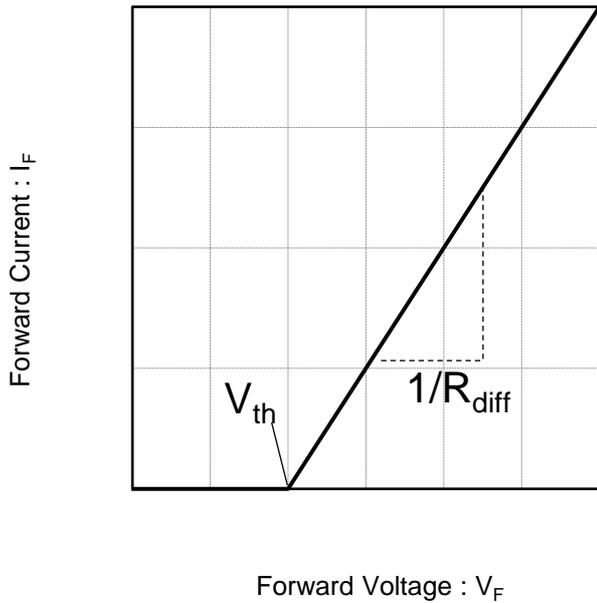


Fig.10 Typical capacitance store energy (Per Leg)



●Simplified forward characteristic model (Per Leg)

Fig.11 Equivalent forward current curve



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

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

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

| Symbol | Typical Value | Unit |
|----------------|---------------|-------------------|
| a ₀ | 9.35E-01 | V |
| a ₁ | -1.12E-03 | V/°C |
| b ₀ | 3.98E-02 | Ω |
| b ₁ | 1.02E-04 | Ω/°C |
| b ₂ | 1.08E-06 | Ω/°C ² |

T_j in °C; -55 °C < T_j < °C ; I_F < 20 A

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