Technical Data
Data Sheet N2463, REV.A

# S5D10170H S5D10170A
# 1700V SIC POWER SCHOTTKY RECTIFIERS

## Description

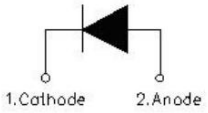
S5D10170H/S5D10170A are SiC Schottky rectifiers packaged in TO-247AC(TO-247-2) and TO-220AC(TO-220-2) case. The device is high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S5D10170H/S5D10170A are ideal for energy sensitive, high frequency applications in challenging environments.

## Features

- 175°C $T_J$ operation
- Ultra-low switching loss
- Switching speeds independent of operating temperature
- Low total conduction losses
- High forward surge current capability
- High package isolation voltage
- Terminals finish: 100% Pure Tin
- Pb − Free Device
- All SMC parts are traceable to the wafer lot
- Additional electrical and life testing can be performed upon request

## Applications

- Alternative energy inverters
- Power Factor Correction (PFC)
- Free-Wheeling diodes
- Switching supply output rectification
- Reverse polarity protection

| S5D10170A | S5D10170H |
|---|---|
|  |  |
| TO-220AC<br>(TO-220-2) | TO-247AC<br>(TO-247-2) |
|  |  |

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## Maximum Ratings

| Characteristics | Symbol | Condition | Max. | Units |
|---|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | - | 1700 | V |
| Average Rectified Forward Current | $I_{F\ (AV)1}$ | Tc=25°C | 44 | A |
| | $I_{F\ (AV)2}$ | Tc=161°C | 10 | A |
| Peak One Cycle Non-Repetitive Surge Current | $I_{FSM1}$ | 10ms, Half Sine pulse, Tc =25°C | 230 | A |
| | $I_{FSM2}$ | 10ms, Half Sine pulse, Tc =110°C | 210 | A |
| Repetitive Peak Forward Surge Current | $I_{FRM1}$ | 10 ms, Half Sine pulse , Tc =25°C | 138 | A |
| | $I_{FRM2}$ | 10 ms, Half Sine pulse , Tc =110°C | 126 | A |
| Non-Repetitive Peak Forward Surge Current | $I_{F,Max1}$ | 10μs. Pulse, Tc =25℃ | 400 | A |
| | $I_{F,Max2}$ | 10μs. Pulse, Tc =110℃ | 320 | A |
| Power Dissipation | $P_{tot1}$ | Tc =25℃ | 333.4 | W |
| | $P_{tot2}$ | Tc =110℃ | 144.4 | W |

## Electrical Characteristics:

| Characteristics | Symbol | Condition | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Forward Voltage Drop* | $V_{F1}$ | @ 10A, Pulse, $T_J$ = 25 °C | 1.5 | 1.8 | V |
| | $V_{F2}$ | @ 10A, Pulse, $T_J$ = 175 °C | 2.4 | 2.6 | V |
| Reverse Current* | $I_{R1}$ | @$V_R$ = rated $V_R$, $T_J$ = 25 °C | 2 | 20 | uA |
| | $I_{R2}$ | @$V_R$ = rated $V_R$, $T_J$ = 175 °C | 20 | 200 | uA |
| Junction Capacitance | $C_{T1}$ | VR=0V, f=1MHz, Tj=25℃, | 994 | - | pF |
| | $C_{T2}$ | VR=1700V, f=1MHz, Tj=25℃, | 42 | - | pF |
| Reverse Recovery Charge | $Q_c$ | $I_F$ = 10A, di/dt = 200A/μs<br>$V_R$ = 1700 V, $T_J$ =25°C | 123.14 | - | nC |
| Capacitance Stored Energy | $E_C$ | $V_R$ = 1700 V, $T_J$ =25°C | 133.86 | - | μJ |

* Pulse width < 300 μs, duty cycle < 2%

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RoHS

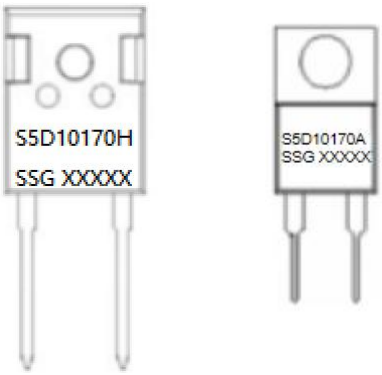
## Thermal-Mechanical Specifications:

| Characteristics | Symbol | S5D10170H | S5D10170A | Units |
|---|---|---|---|---|
| Junction Temperature | $T_J$ | --55 to +175 | | °C |
| Storage Temperature | $T_{stg}$ | --55 to +175 | | °C |
| Typical Thermal Resistance Junction to Case | $R_{\theta JC}$ | 0.8 | 0.9 | °C/W |

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| S5D10170H | TO-247AC(TO-247-2) | 25pcs / tube |
| S5D10170A | TO-220AC(TO-220-2) | 50pcs / tube |

## Marking Diagram

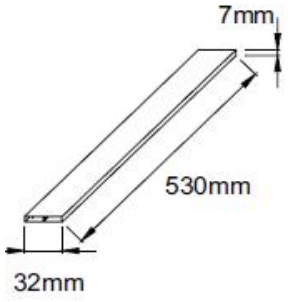



Where XXXXX is YYWWL

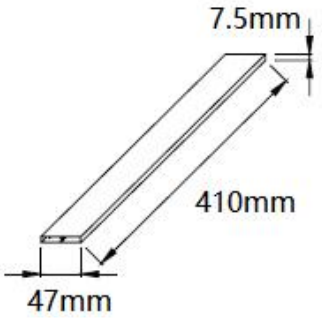
S5D = Device Type
H/A = Package type
10 = Forward Current (5A)
170 = Reverse Voltage (1700V)
SSG = SSG
YY = Year
WW = Week
L = Lot Number

**Cautions:** Molding resin
Epoxy resin UL:94V-0

## Tube Specification




**TO-220AC(TO-220-2)**




**TO-247AC(TO-247-2)**

## Ratings and Characteristics Curves

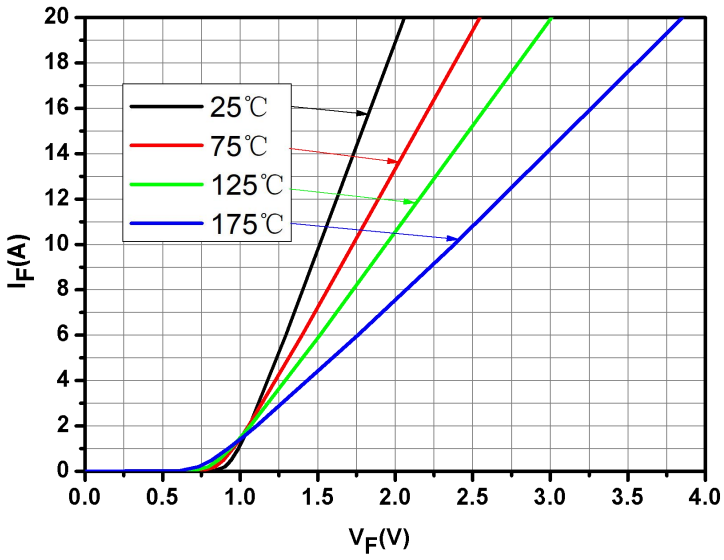



Fig.1-Typical Forward Voltage Characteristics

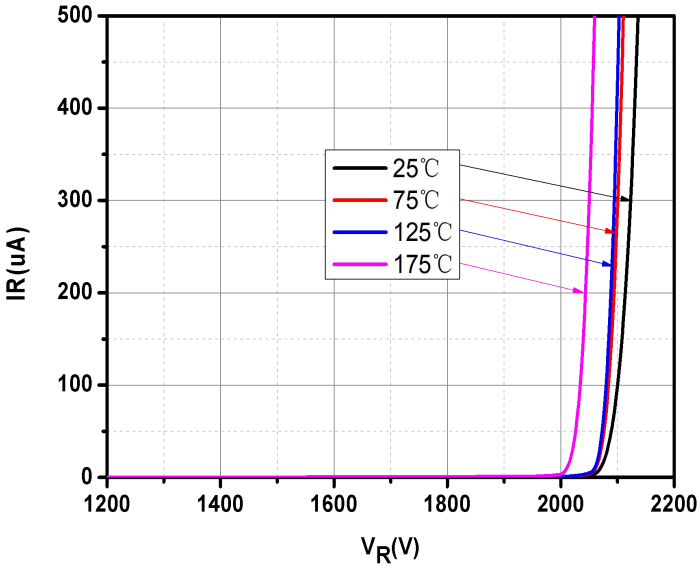



Fig.2-Typical Reverse Characteristics

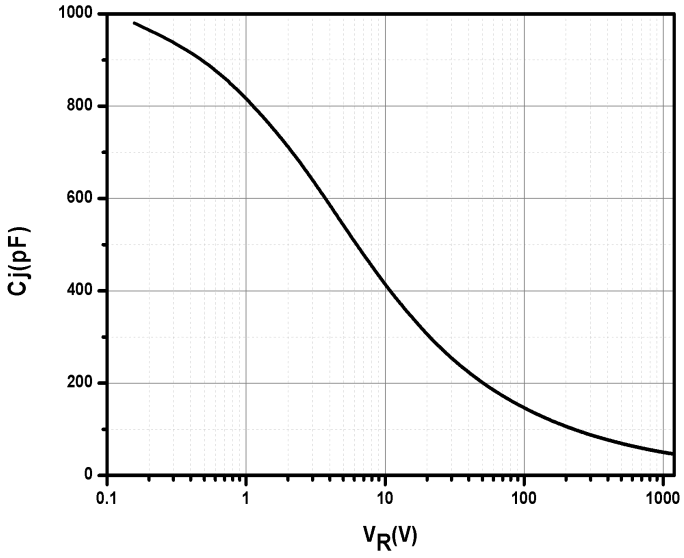



Fig.3-Capacitance vs. Reverse Voltage

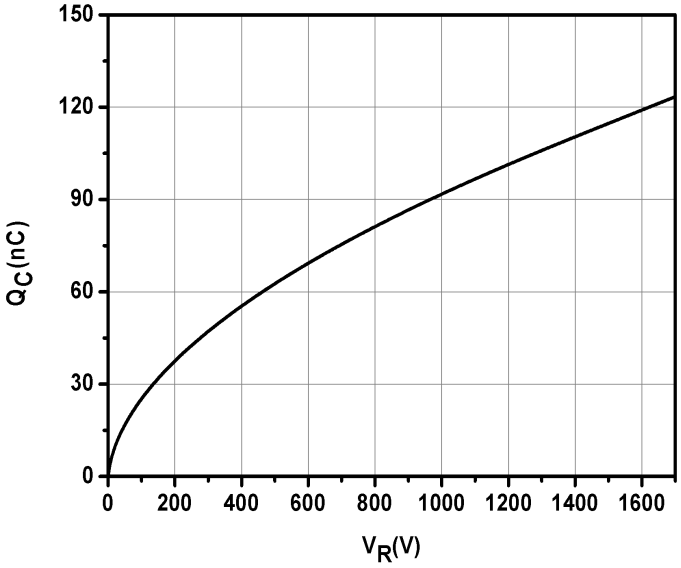



Fig.4-Total Capacitance Charge vs. Reverse Voltage

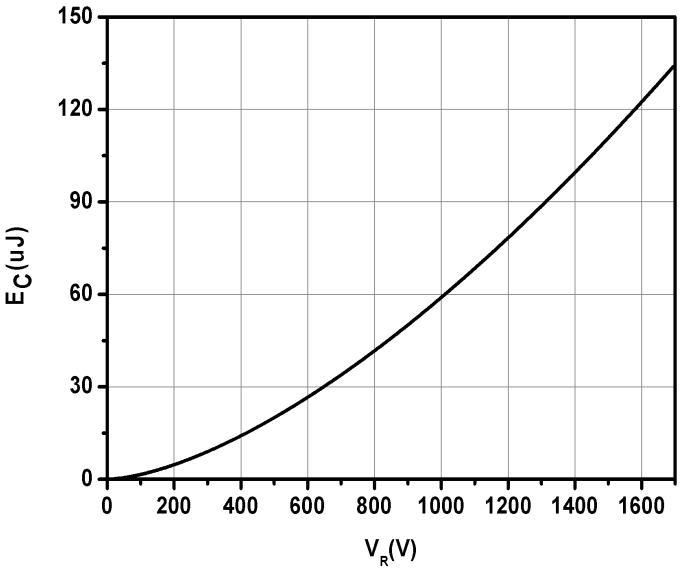



Fig.5-Capacitance Stored Energy

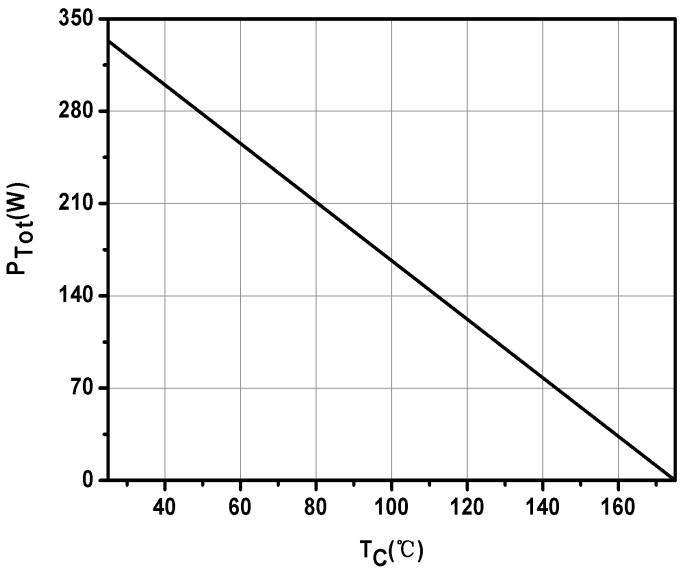



Fig.7-Power Derating

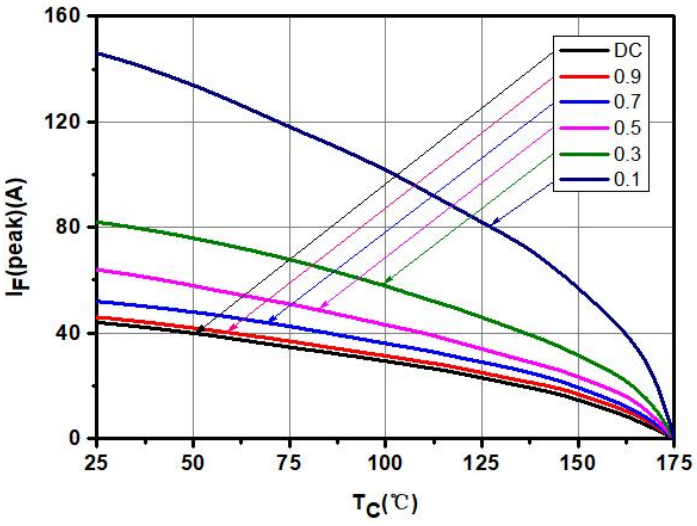
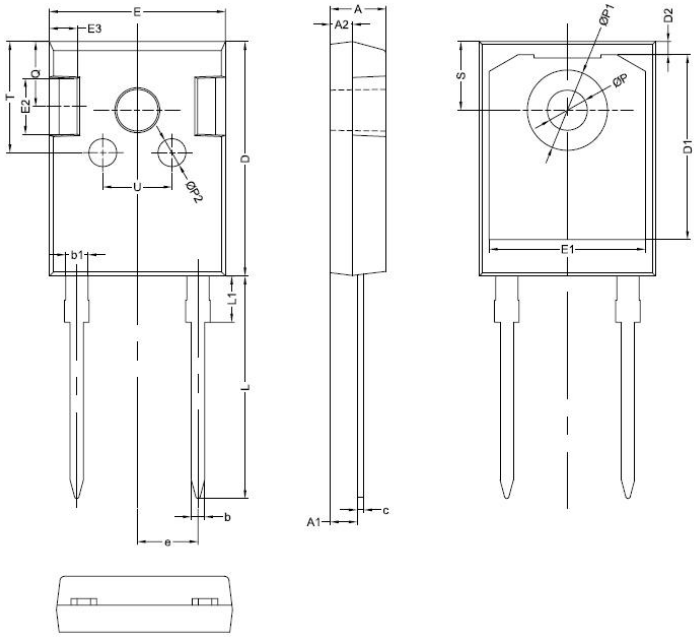


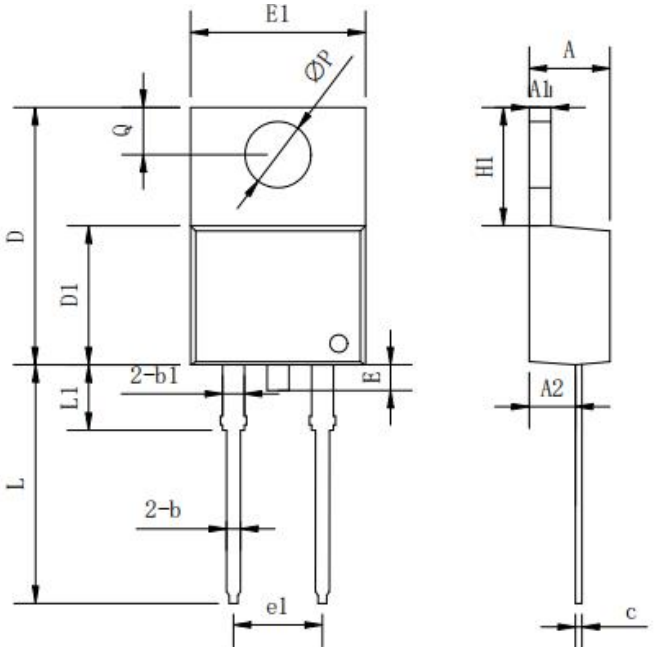

Fig.8-Current Derating

## Mechanical Dimensions TO-247AC(TO-247-2)




| SYMBOL | Millimeters | | |
|---|---|---|---|
| | MIN. | TYP. | MAX. |
| A | 4.80 | 5.00 | 5.20 |
| A1 | 2.20 | 2.41 | 2.61 |
| A2 | 1.90 | 2.00 | 2.10 |
| b | 1.10 | 1.20 | 1.35 |
| b1 | 1.80 | 2.00 | 2.20 |
| c | 0.50 | 0.60 | 0.75 |
| D | 20.30 | 21.00 | 21.20 |
| D1 | | 16.58 | |
| D2 | | 1.17 | |
| E | 15.60 | 15.80 | 16.00 |
| E1 | | 14.02 | |
| E2 | | 5.00 | |
| E3 | | 2.50 | |
| e | | 5.44 | |
| L | 19.42 | 19.92 | 20.42 |
| L1 | | 4.13 | |
| P | 3.50 | 3.60 | 3.70 |
| P1 | 7.1 | 7.19 | 7.40 |
| P2 | | 2.50 | |
| Q | | 5.80 | |
| S | 6.05 | 6.15 | 6.25 |
| T | | 10.00 | |
| U | | 6.20 | |

## Mechanical Dimensions TO-220AC(TO-220-2)




| Symbol | Dimensions in millimeters | | |
|---|---|---|---|
| | Min. | Typical | Max. |
| A | 3.56 | - | 4.83 |
| A1 | 0.51 | - | 1.40 |
| A2 | 2.03 | - | 2.92 |
| b | 0.38 | - | 1.02 |
| b1 | 1.14 | - | 1.78 |
| c | 0.31 | - | 0.61 |
| D | 14.22 | - | 16.51 |
| D1 | 8.38 | - | 9.42 |
| E | - | - | 1.78 |
| E1 | 9.65 | 10.16 | 10.67 |
| e1 | - | 5.08 | - |
| H1 | 5.84 | - | 6.86 |
| L | 12.70 | - | 14.73 |
| L1 | - | - | 6.35 |
| ΦP | - | 3.56 | - |
| Q | 2.54 | - | 3.43 |

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