Technical Data
Data Sheet N2402, REV.B

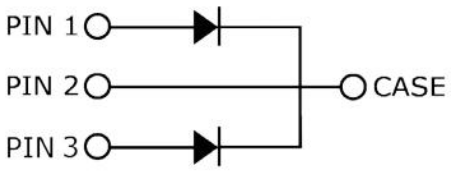
# S3D30065D
# 650V SIC POWER SCHOTTKY RECTIFIER


TO-247AD(TO-247-3)

## Description

S3D30065D is a SiC Schottky rectifier packaged in TO-247AD(TO-247-3) case. The device is a high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D30065D is ideal for energy sensitive, high frequency applications in challenging environments.

## Circuit Diagram




## 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
- "-A" is an AEC-Q101 qualified device
- 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

## Maximum Ratings(per leg)

| Characteristics | Symbol | Condition | Max. | Units |
|---|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_{DC}$ | - | 650 | V |
| Average Rectified Forward Current | $I_{F\ (AV)1}$ | Tc=25°C | 52 | A |
| | $I_{F\ (AV)2}$ | Tc=135°C | 18 | A |
| | $I_{F\ (AV)3}$ | Tc=155°C | 15 | |
| Repetitive Peak Forward Surge Current | $I_{FRM1}$ | 10ms, Half Sine pulse, $T_C$ =25°C | 50 | A |
| | $I_{FRM2}$ | 10ms, Half Sine pulse, $T_C$ =110°C | 35 | A |
| Peak One Cycle Non-Repetitive Surge Current | $I_{FSM1}$ | 10ms, Half Sine pulse, $T_C$ =25°C | 102 | A |
| | $I_{FSM2}$ | 10ms, Half Sine pulse, $T_C$ =110°C | 65 | A |
| Non-Repetitive Peak Forward Surge Current | $I_{F,Max1}$ | 10μs. Pulse, $T_C$ =25℃ | 865 | A |
| | $I_{F,Max2}$ | 10μs. Pulse, $T_C$ =110℃ | 590 | A |
| Power Dissipation | $P_{tot1}$ | $T_C$ =25℃ | 179 | W |
| | $P_{tot2}$ | $T_C$ =110℃ | 78 | W |

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RoHS

## Electrical Characteristics(per leg)

| Characteristics | Symbol | Condition | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Forward Voltage Drop* | $V_{F1}$ | @ 15A, Pulse, $T_J$ = 25 °C | 1.4 | 1.7 | V |
| | $V_{F2}$ | @ 15A, Pulse, $T_J$ = 175 °C | 1.6 | 2.0 | V |
| Reverse Current* | $I_{R1}$ | @$V_R$ = rated $V_R$ $T_J$ = 25 °C | 0.3 | 15 | uA |
| | $I_{R2}$ | @$V_R$ = rated $V_R$ $T_J$ = 175 °C | 3 | 150 | uA |
| Junction Capacitance | $C_T$ | $V_R$=0V, $T_J$=25℃, f=1MHz | 1243 | - | pF |
| Reverse Recovery Charge | $Q_c$ | $I_F$ = 15A, di/dt = 200A/μs $V_R$ = 400 V, $T_J$ =25°C | 77.5 | - | nC |
| Capacitance Stored Energy | $E_C$ | $V_R$ = 400 V, $T_J$ =25°C | 18.99 | - | μJ |

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

## Thermal-Mechanical Specifications:

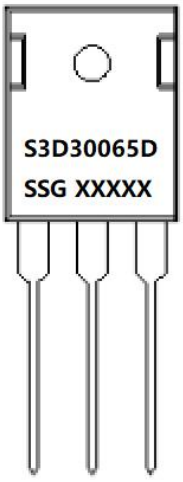
| Characteristics | Symbol | Condition | Specification | Units |
|---|---|---|---|---|
| Junction Temperature | $T_J$ | - | -55 to +175 | °C |
| Storage Temperature | $T_{stg}$ | - | -55 to +175 | °C |
| Typical Thermal Resistance Junction to Case | $R_{\theta JC}$ | DC operation | 0.84(per leg) 0.42(both leg) | °C/W |

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| S3D30065D | TO-247AD(TO-247-3) | 25pcs / tube |

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

## Marking Diagram




Where XXXXX is YYWWL

S3D = Device Type
D = Package type
30 = Forward Current (16A)
065 = Reverse Voltage (650V)
SSG = SSG
YY = Year
WW = Week
L = Lot Number

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

## Ratings and Characteristics Curves (per leg)

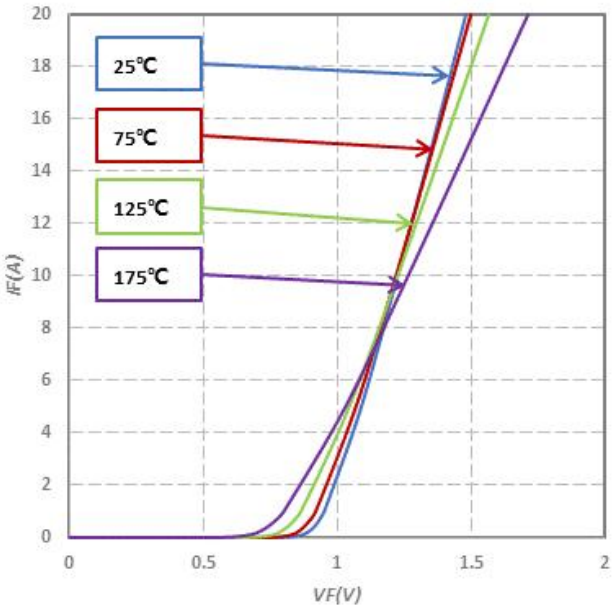



Fig.1-Typical Forward Voltage Characteristics

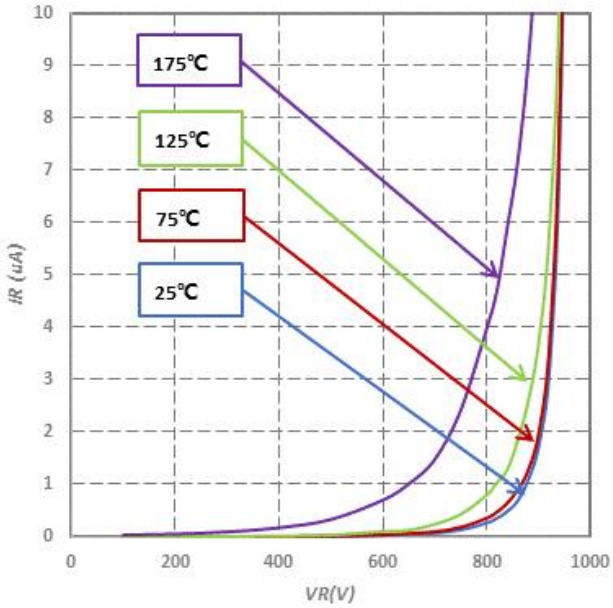



Fig.2-Typical Reverse Characteristics

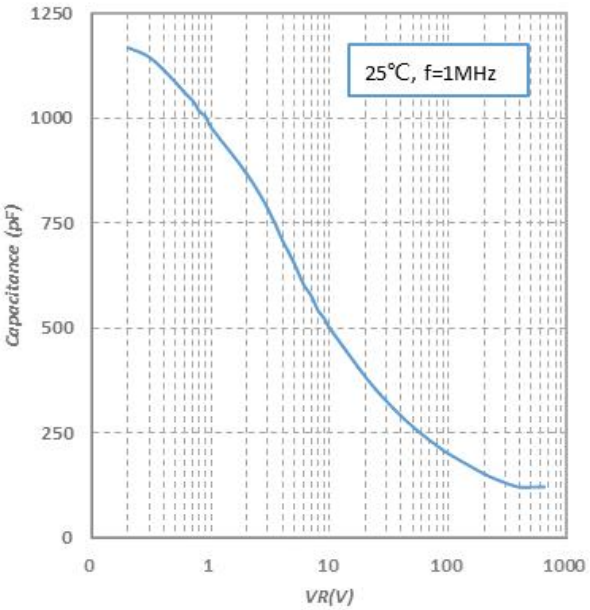



Fig.3-Capacitance vs. Reverse Voltage

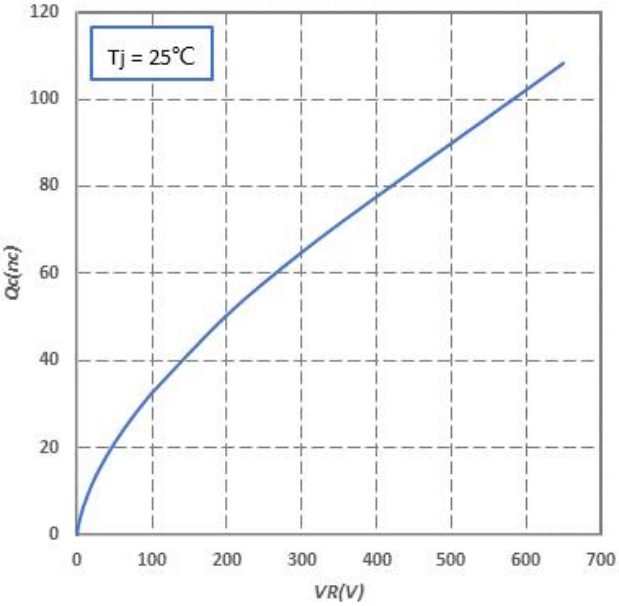



Fig.4-Total Capacitance Charge vs. Reverse Voltage

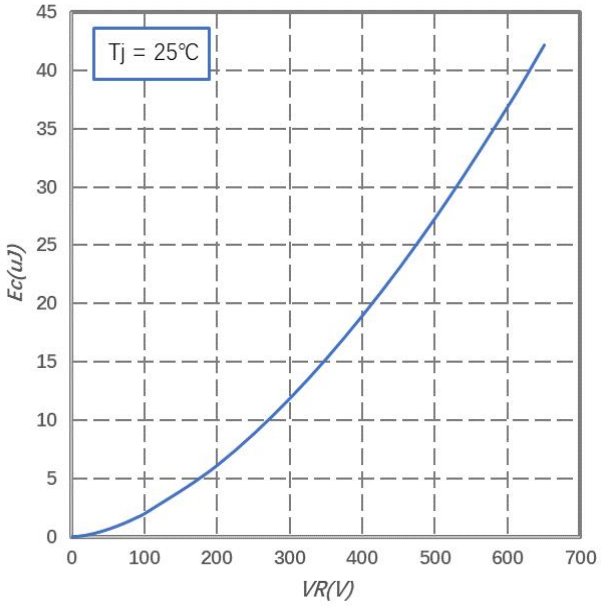



Fig.5-Capacitance Stored Energy

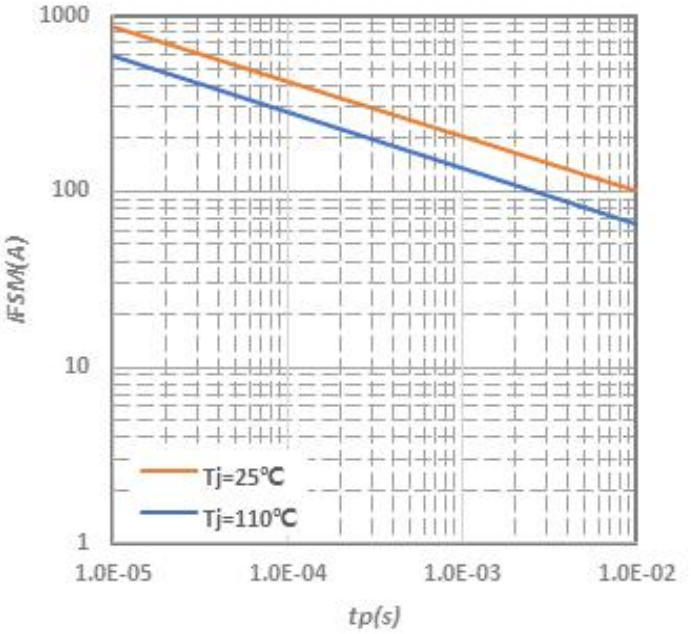



Fig.6-Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

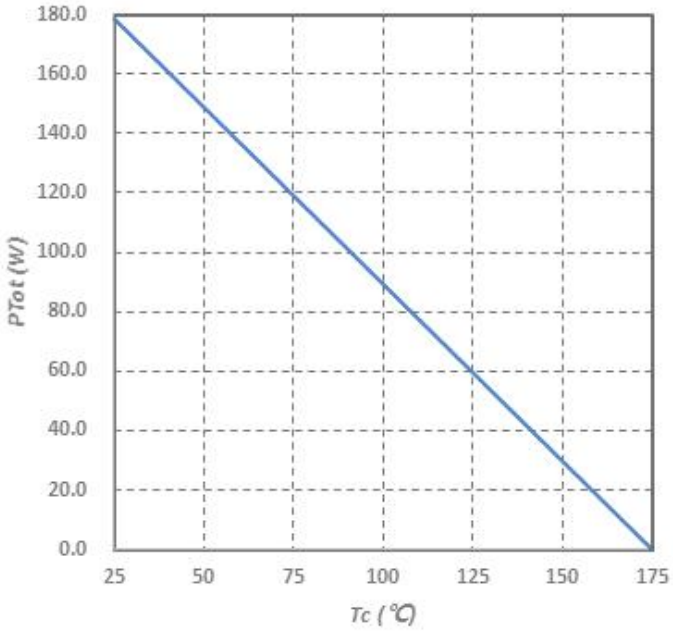



Fig.7-Power Derating

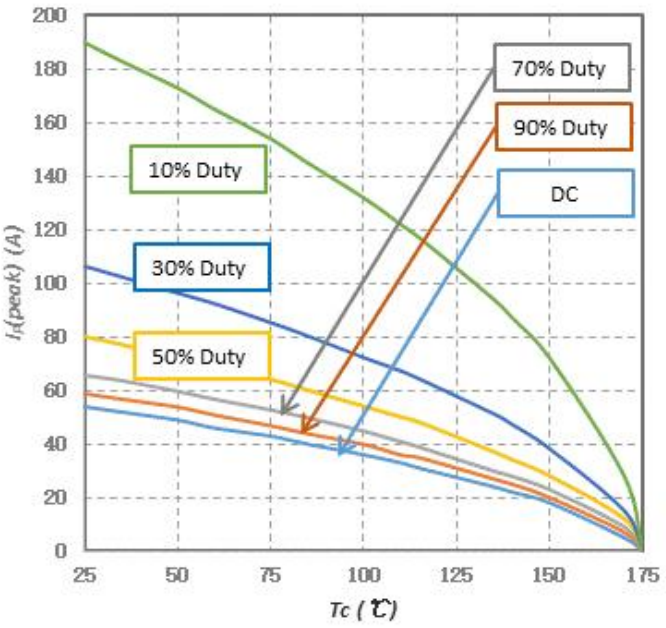
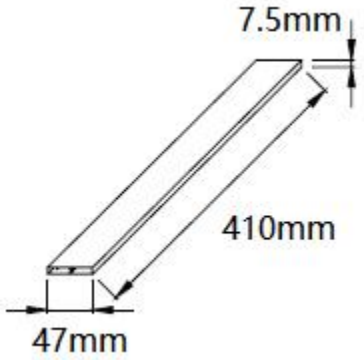
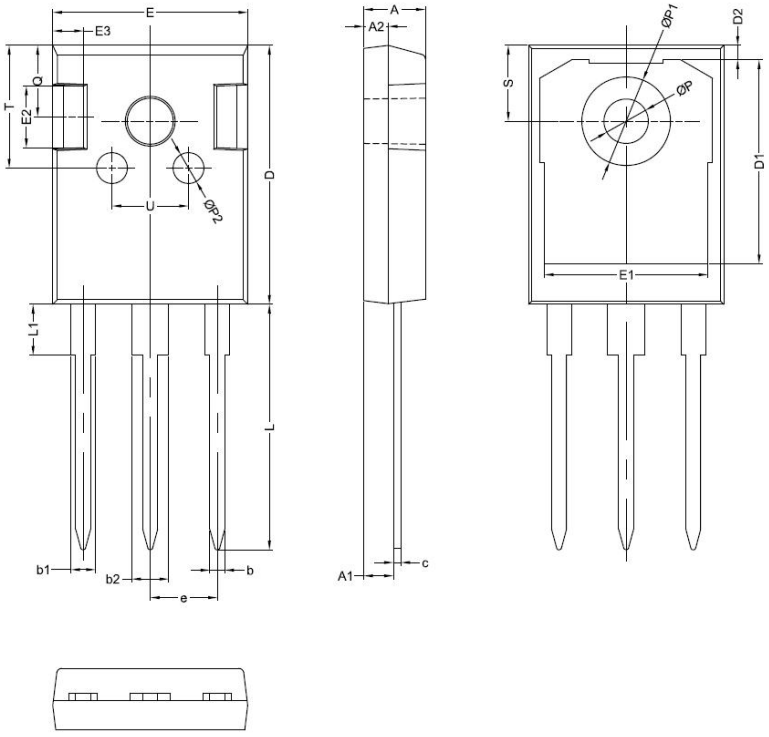



Fig.8-Current Derating

## Tube Specification(TO-247-3)




## Mechanical Dimensions TO-247AD




| SYMBOL | Millimeters | | |
|---|---|---|---|
| | MIN. | TYP. | MAX. |
| A | 4.80 | | 5.20 |
| A1 | 2.00 | | 2.75 |
| A2 | 1.90 | | 2.10 |
| b | 1.00 | | 1.40 |
| b1 | 1.80 | | 2.40 |
| b2 | 2.80 | | 3.40 |
| c | 0.40 | | 0.75 |
| D | 19.80 | | 21.20 |
| D1 | | 16.55 | |
| D2 | | 1.20 | |
| E | 15.20 | | 16.00 |
| E1 | | 13.30 | |
| E2 | | 5.00 | |
| E3 | | 2.50 | |
| e | 5.20 | | 5.70 |
| L | 13.90 | | 20.70 |
| L1 | 3.70 | | 4.30 |
| P | 3.50 | | 3.70 |
| P1 | 7.1 | | 7.40 |
| P2 | | 2.50 | |
| Q | | 5.80 | |
| S | 6.05 | | 6.25 |
| T | | 10.00 | |
| U | | 6.20 | |

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