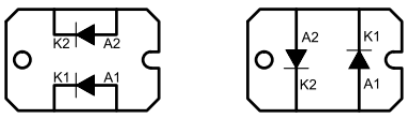
# High Performance Schottky Rectifier
# 2x60A/100V

## FEATURES

- 175°C $T_J$ operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- 2 independent Schottky diodes in 1 package
- Designed and qualified for industrial level
- International standard package SOT-227
- Low $I_{RM}$ values
- UL approved file E320098

**CIRCUIT CONFIGURATION**




**Parallel**
**NST120S100**

**Anti-Parallel**
**NST120S100-A**

## DESCRIPTION

The NST120S100 Schottky rectifier module has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature.

## TYPICAL APPLICATIONS

- High current switching mode power supplies (SMPS)
- Freewheeling diode in low voltage converters
- Reverse battery protection.

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 60Ax2 |
| $V_R$ | 100V |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNIT |
| $I_{F(AV)}$ | Rectangular waveform, per diode | 60 | A |
| $V_{RRM}$ | | 100 | V |
| $I_{FSM}$ | $t_p$ = 10 ms (50Hz), half-sine wave, $T_J$ = 25°C | 700 | A |
| $V_F$ | 60 Apk, $T_J$ = 125°C | 0.75 | V |
| $T_J$ | Range | -55 to 175 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | VALUES | UNIT |
| Maximum DC reverse voltage | $V_R$ | 100 | V |
| Maximum working peak reverse voltage | $V_{RWM}$ | | |

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNIT |
|---|---|---|---|---|---|
| Maximum average forward current per leg | $I_{F(AV)}$ | 50% duty cycle at $T_C$ = 110°C, rectangular waveform | | 60 | A |
| Maximum peak one cycle non-repetitive surge current | $I_{FSM}$ | 10 ms sine | Following any rated load condition and with rated $V_{RRM}$ applied | 700 | A |
| Non- repetitive avalanche energy | $E_{AS}$ | $T_J$ = 25°C, $I_{AS}$ = 10A, L = 0.1mH | | 5 | mJ |
| Repetitive avalanche current | $I_{AR}$ | Current decaying linearly to zero in 1µs<br>f = 10 KHz, $V_A$ = 1.5x$V_R$ typical | | 1.0 | A |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNIT |
|---|---|---|---|---|---|
| Maximum forward voltage drop per leg | $V_{FM}$ (1) | 60A | $T_J$ = 25°C | 0.87 | V |
| | | 120A | | 1.10 | |
| | | 60A | $T_J$ = 125°C | 0.75 | |
| | | 120A | | 0.95 | |
| Maximum reverse leakage current per leg | $I_{RM}$ (1) | $T_J$ = 25°C | $V_R$ = Rated $V_R$ | 20 | µA |
| | | $T_J$ = 125°C | | 10 | mA |
| Typical junction capacitance per leg | $C_T$ | $V_R$ = 10 $V_{DC}$ (test signal range 100 kHz to 1 MHz) 25°C | | 900 | pF |
| Typical series inductance per leg | $L_S$ | From top of terminal hole to mounting plane | | 7 | nH |
| Maximum voltage rate of change | dV/dt | Rated $V_R$ | | 5000 | V/µs |
| Maximum RMS insulation voltage | $V_{INS}$ | 50/60Hz, $I_{INS}$ < 1mA | | 2500 (1 min)<br>3000 (1 s) | V |

**Note**
(1) Pulse width < 500 µs, duty cycle < 2%

## THERMAL-MECHANICAL SPECIFICATIONS

| PARAMETER | | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Maximum junction and storage temperature range | | $T_J$, $T_{Stg}$ | -55 | - | 175 | °C |
| Thermal resistance, junction to case | | $R_{thJC}$ | - | - | 0.8 | °C/W |
| Thermal resistance, case to heatsink | | $R_{thCS}$ | - | 0.10 | - | |
| Weight | | | - | 30 (1.06) | - | g(oz.) |
| Mounting torque, ± 10% | to heatsink, M4 | | - | 1.1 (9.7) | - | N·m (lbf · in) |
| | busbar, M4 | | - | 1.1 (9.7) | - | |
| Case style | | | JEDEC SOT-227 module (insulated) | | | |

## Ordering Information Tabel

Device code

| N | ST | 120 | S | 100 | – | A |
|---|---|---|---|---|---|---|
| ① | ② | ③ | ④ | ⑤ | | ⑥ |

1 - Nell's high power module
2 - Package indicator, "ST" for SOT-227
3 - Maximum average forward current, 120 = 120A (60Ax2)
4 - S = Schottky family
5 - Voltage rating (100 = 100V)
6 - Circuit configuration, A for Anti-Parallel type
Blank for Parallel type

**Fig.1 Maximum forward voltage drop characteristics**

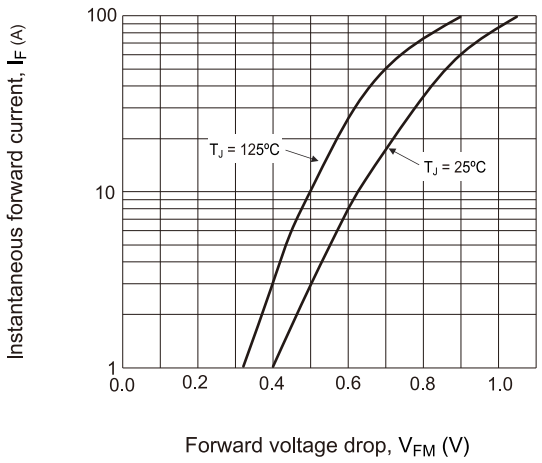



**Fig.2 Typical values of reverse current vs. reverse voltage**

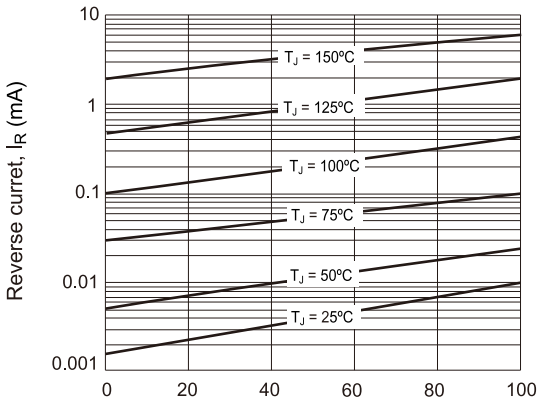



**Fig.3 Maximum thermal impedance $R_{th(j-c)}$ characteristics**

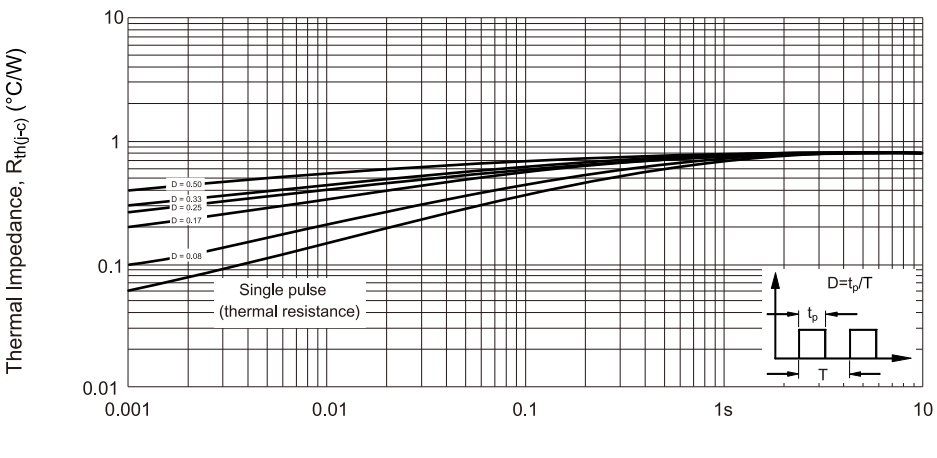


**Fig.4 Typical junction capacitance vs. reverse voltage**

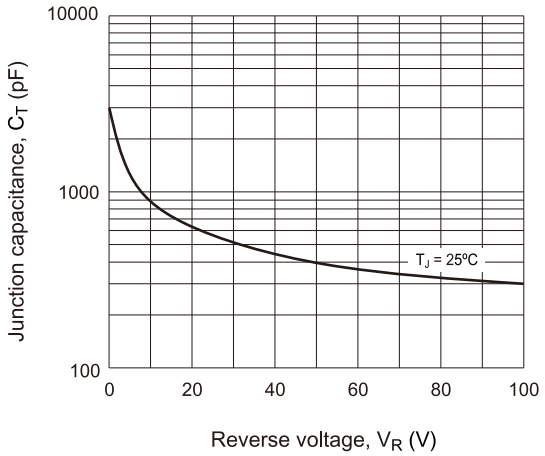



**Fig.5 Maximum allowable case temperature vs. Average forward current**

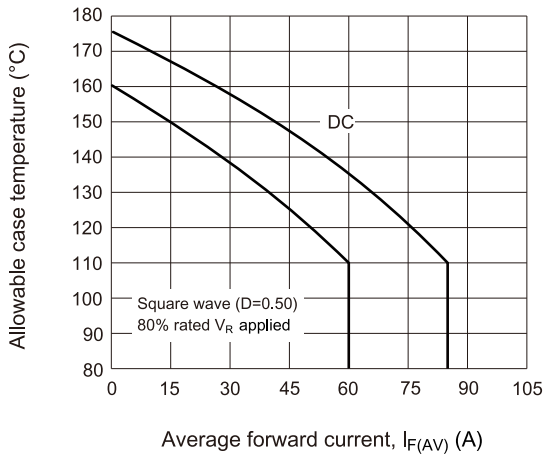



**Fig.6 Forward power loss characteristics**

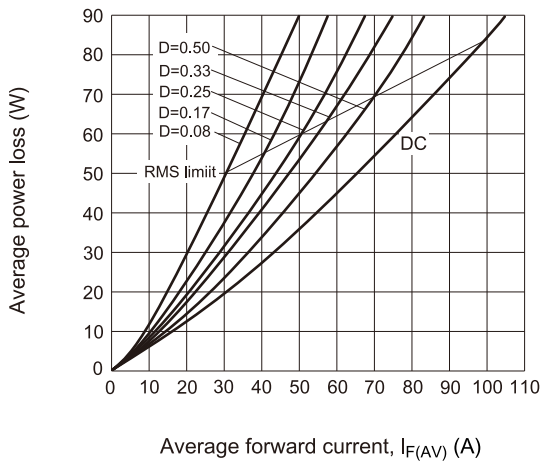
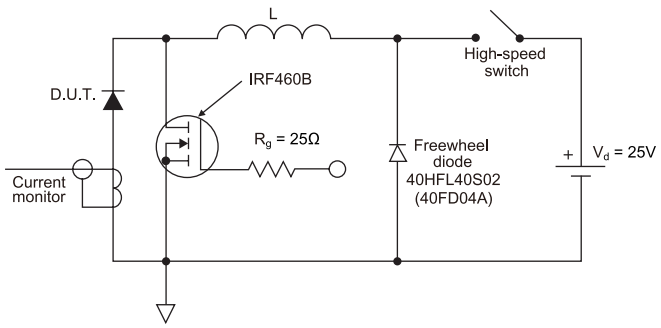



**Fig.7 Unclamped Inductive test circuit**



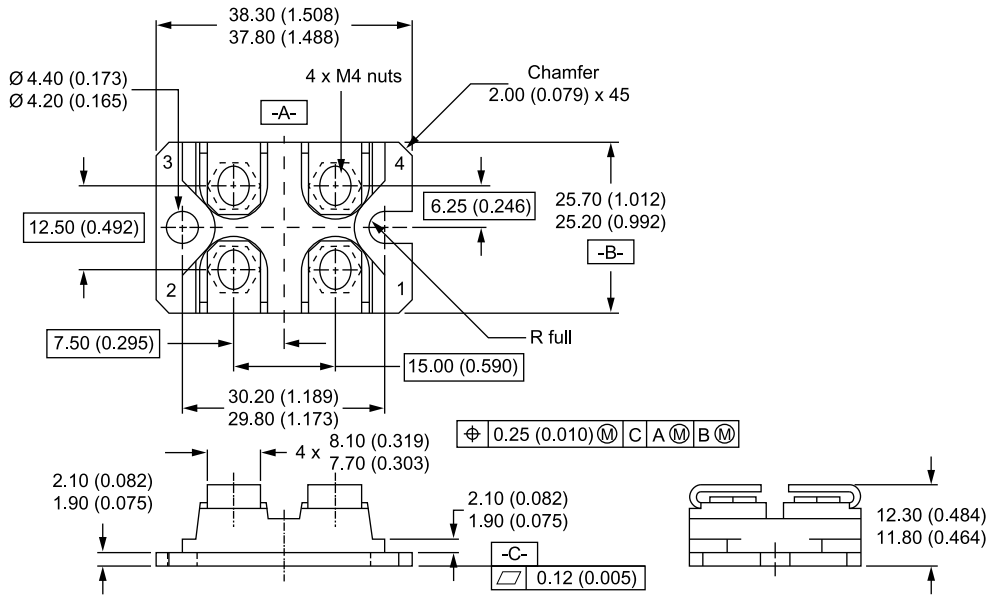

**Note**

(1) Formula used:$T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;

Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D)(dee fig.6)

$Pd_{REV}$ = Inverse power loss = $V_{R1} \times I_R$ (1-D); $I_R$ at $V_{R1}$ = rated $V_R$

## SOT-227




All dimensions in millimeters (inches)

Notes

- Dimensioning and tolerancing per ANSI Y14.5M-1982
- Controlling dimension: millimeter