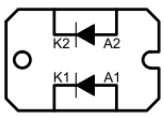
High Performance Schottky Rectifier
2x120A/45V

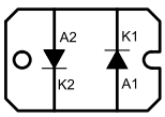
FEATURES

- 150°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
NST240S45



Anti-Parallel
NST240S45-A

DESCRIPTION

The NST240S45 Schottky rectifier module has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature.

TYPICAL APPLICATIONS

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

PRODUCT SUMMARY	
$I_{F(AV)}$	120Ax2
V_R	45V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNIT
$I_{F(AV)}$	Rectangular waveform, per diode	120	A
V_{RRM}		45	V
I_{FSM}	t_p = 10 ms (50Hz), half-sine wave, T_J = 25°C	1650	A
V_F	120 Apk, T_J = 125°C	0.60	V
T_J	Range	-40 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VALUES	UNIT
Maximum DC reverse voltage	V_R	45	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 =100°C, rectangular waveform		120	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	1650	
Non- repetitive avalanche energy	E_{AS}	T_J = 25°C, I_{AS} = 10A, L = 1.0mH		50	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1μs f = 10 KHz, V_A = 1.5xV_R typical		1.0	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum forward voltage drop per leg	V_{FM} (1)	120A	T_J = 25°C	0.64	V
		240A		0.90	
		120A	T_J = 125°C	0.60	
		240A		0.90	
Maximum reverse leakage current per leg	I_{RM} (1)	T_J = 25°C	V_R = Rated V_R	20	μA
		T_J = 125°C		20	mA
Typical junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25°C		2500	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		10000	V/μs
Maximum RMS insulation voltage	V_{INS}	50/60Hz, I_{INS} < 1mA		2500 (1 min) 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}	-40	-	150	°C
Thermal resistance, junction to case		R_{thJC}	-	-	0.4	°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	240	S	45	–	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, 240 = 240A (120Ax2)
4 - S = Schottky family
5 - Voltage rating (45 = 45V)
6 - Circuit configuration, A for Anti-Parallel type
Blank for Parallel type

Fig.1 Maximum forward voltage drop characteristics

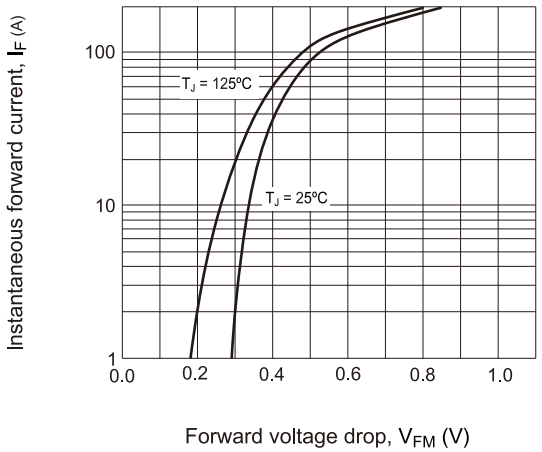


Fig.2 Typical values of reverse current vs. reverse voltage

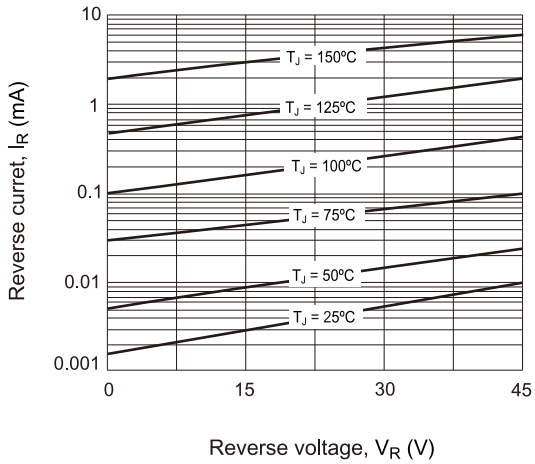


Fig.3 Maximum thermal impedance $R_{th(j-c)}$ characteristics

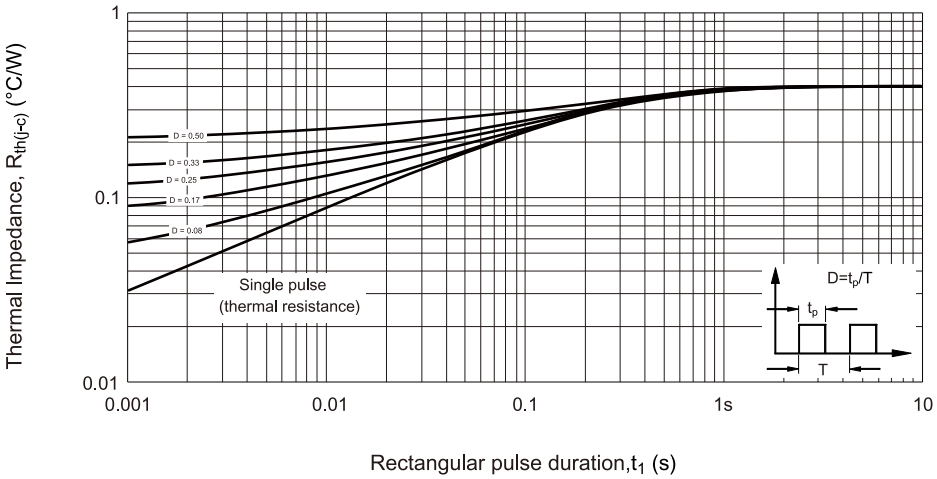


Fig.4 Typical junction capacitance vs. reverse voltage

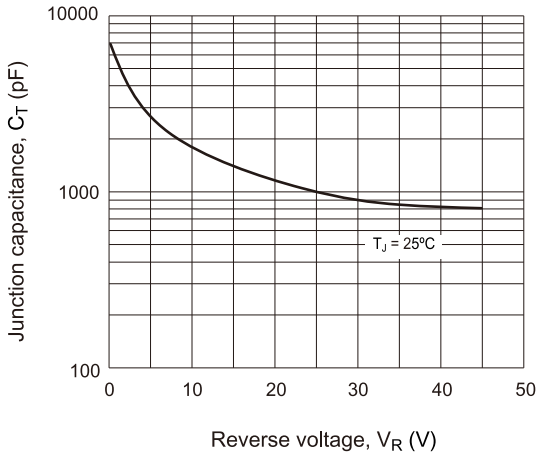


Fig.5 Maximum allowable case temperature vs. Average forward current

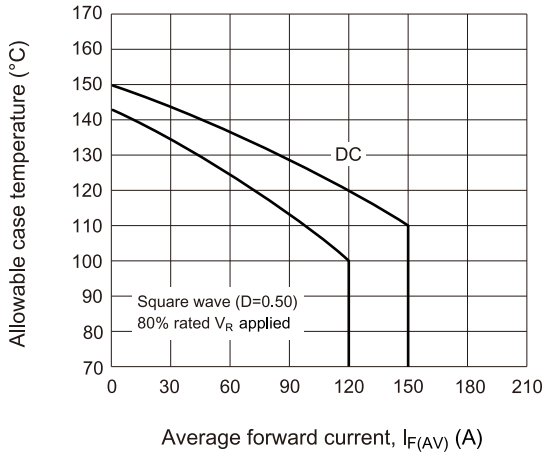


Fig.6 Forward power loss characteristics

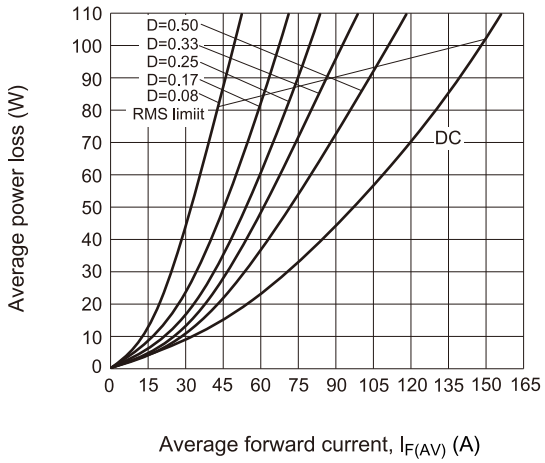
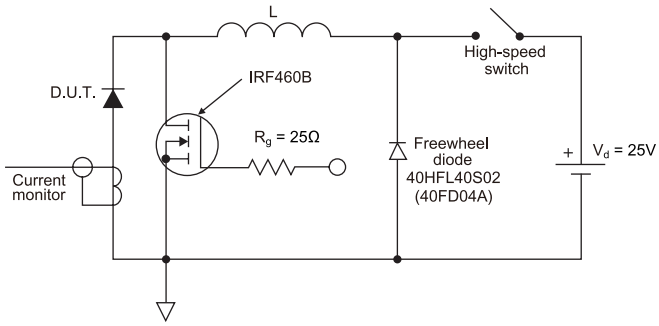


Fig.7 Unclamped Inductive test circuit



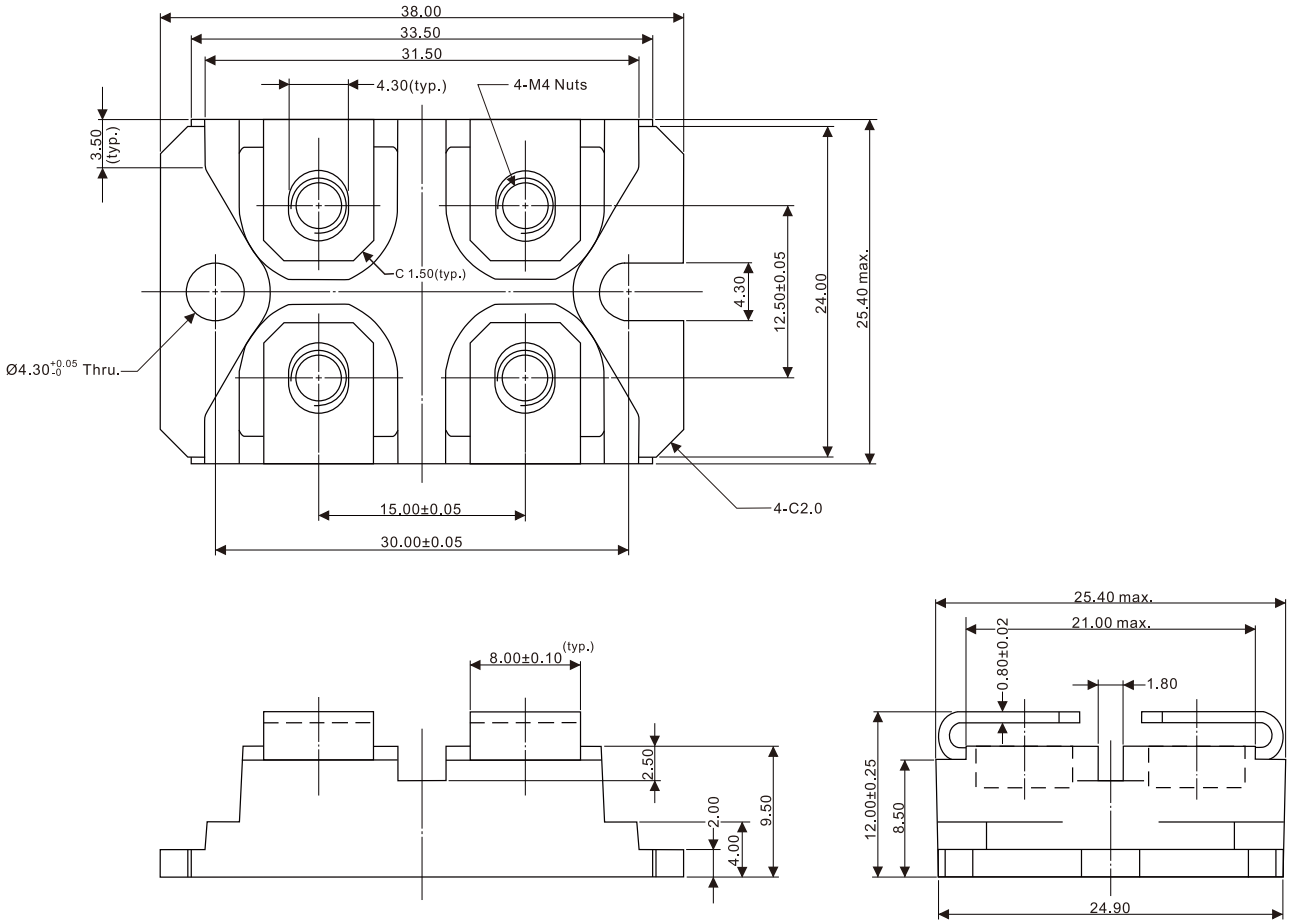
Note

(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 Module



All dimensions in millimeters (inches)

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