

High Performance Schottky Rectifier 2x80A/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 

DESCRIPTION

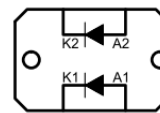
The NST160S45 Schottky rectifier module has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature.

TYPICAL APPLICATIONS

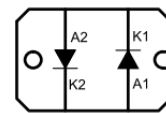
- High current switching mode power supplies (SMPS)
- Freewheeling diode in low voltage converters
- Reverse battery protection.



CIRCUIT CONFIGURATION



Parallel
NST160S45



Anti-Parallel
NST160S45-A

PRODUCT SUMMARY

I _{F(AV)}	80Ax2
V _R	45V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNIT
I _{F(AV)}	Rectangular waveform, per diode	80	A
V _{RRM}		45	V
I _{FSM}	t _p = 10 ms (50Hz), half-sine wave, T _J = 25°C	800	A
V _F	80 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 $T_C = 90^\circ\text{C}$, rectangular waveform		80	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	800	
Non- repetitive avalanche energy	E_{AS}	$T_J = 25^\circ\text{C}$, $I_{AS} = 10\text{A}$, $L = 1.0\text{mH}$		50	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in $1\mu\text{s}$ $f = 10\text{ KHz}$, $V_A = 1.5 \times V_R$ typical		1.0	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum forward voltage drop per leg	$V_{FM}^{(1)}$	80A	$T_J = 25^{\circ}\text{C}$	0.65	V
		160A		0.95	
		80A	$T_J = 125^{\circ}\text{C}$	0.60	
		160A		0.90	
Maximum reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 25^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	10	μA
		$T_J = 125^{\circ}\text{C}$		10	mA
Typical junction capacitance per leg	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) 25°C		2000	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, $I_{INS} < 1\text{mA}$		2500 (1 min) 3000 (1 s)	V

Note

(1) Pulse width $< 500 \mu\text{s}$, 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}	-	-	0.8	°C/W
Thermal resistance, case to heatsink	R _{thCS}	-	0.10	-	
Weight		-	30 (1.06)	-	g(oz.)
Mounting torque, ± 10% to heatsink, M4 busbar, M4		-	1.1 (9.7)	-	N•m (lbf • in)
		-	1.1 (9.7)	-	
Case style		JEDEC SOT-227 module (insulated)			

Ordering Information Tabel

Device code	N	ST	160	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, 160 = 160A (80Ax2)
- 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

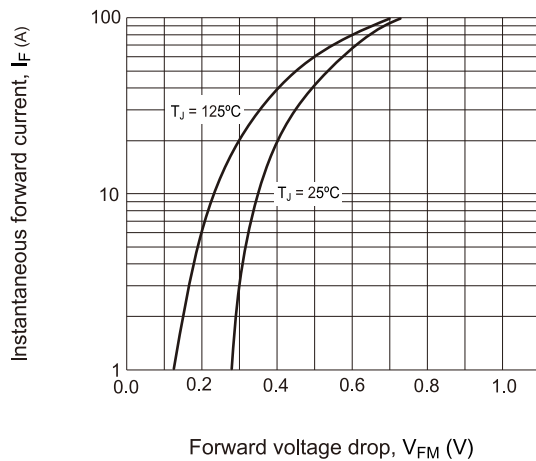


Fig.2 Typical values of reverse current vs. reverse voltage

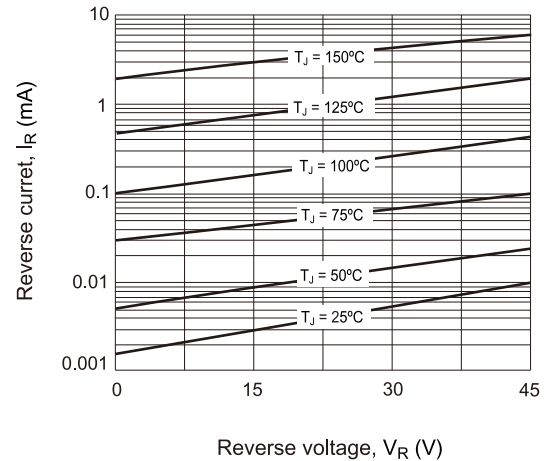


Fig.3 Maximum thermal impedance $R_{th(j-c)}$ characteristics

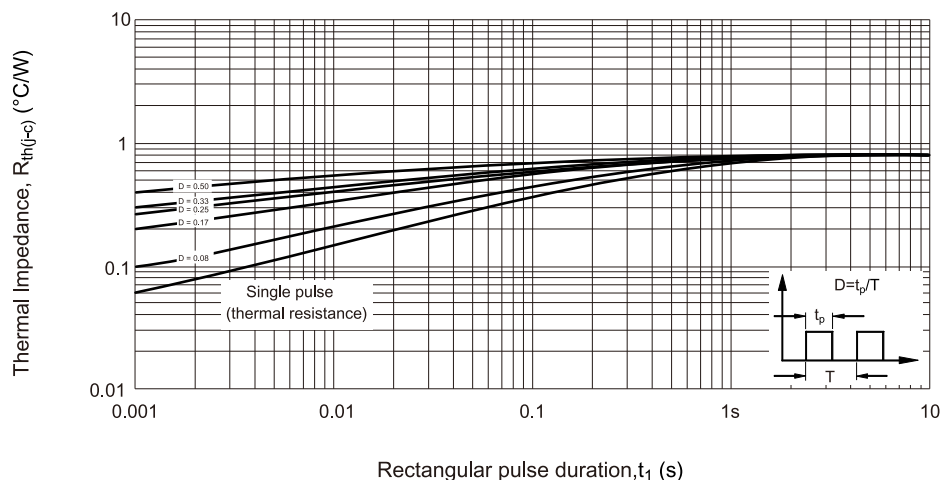


Fig.4 Typical junction capacitance vs. reverse voltage

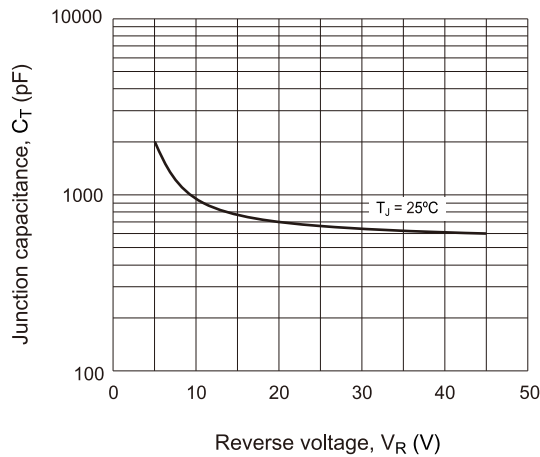


Fig.5 Maximum allowable case temperature vs. Average forward current

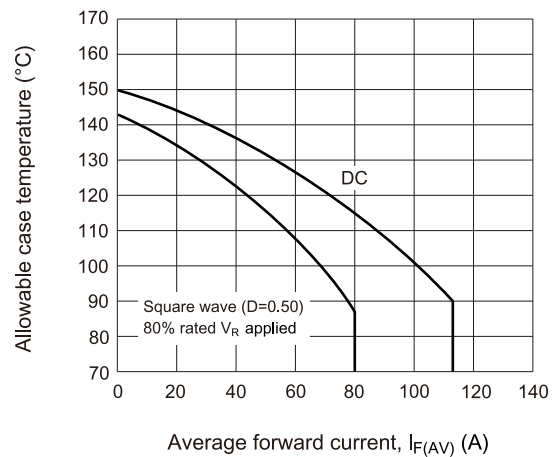


Fig.6 Forward power loss characteristics

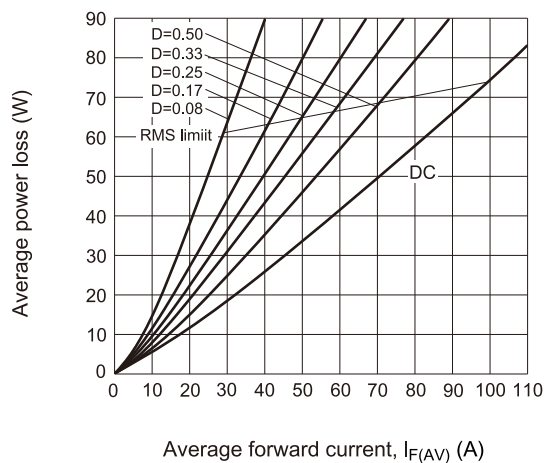
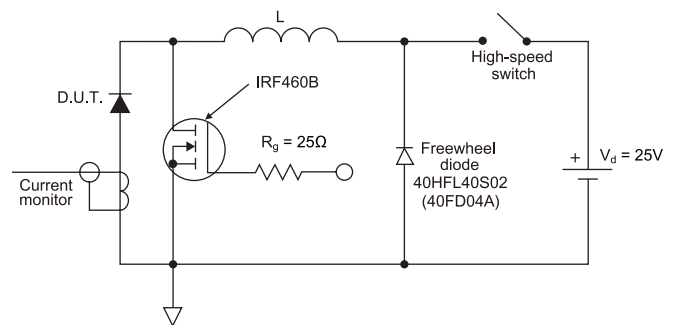


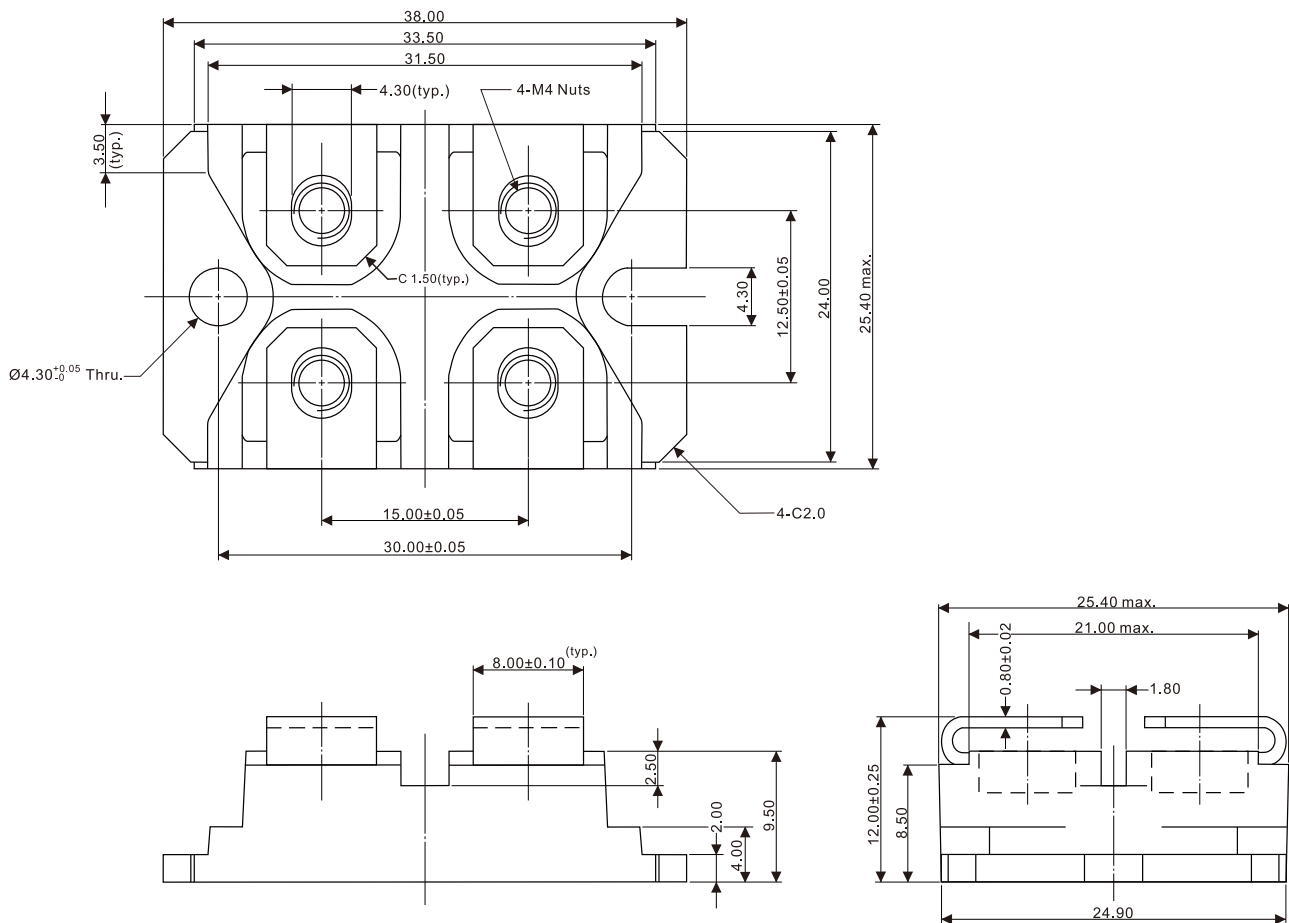
Fig.7 Unclamped Inductive test circuit



Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig.6)
 P_{dREV} = 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