

## Schottky Rectifier, 200A/100V

### FEATURES

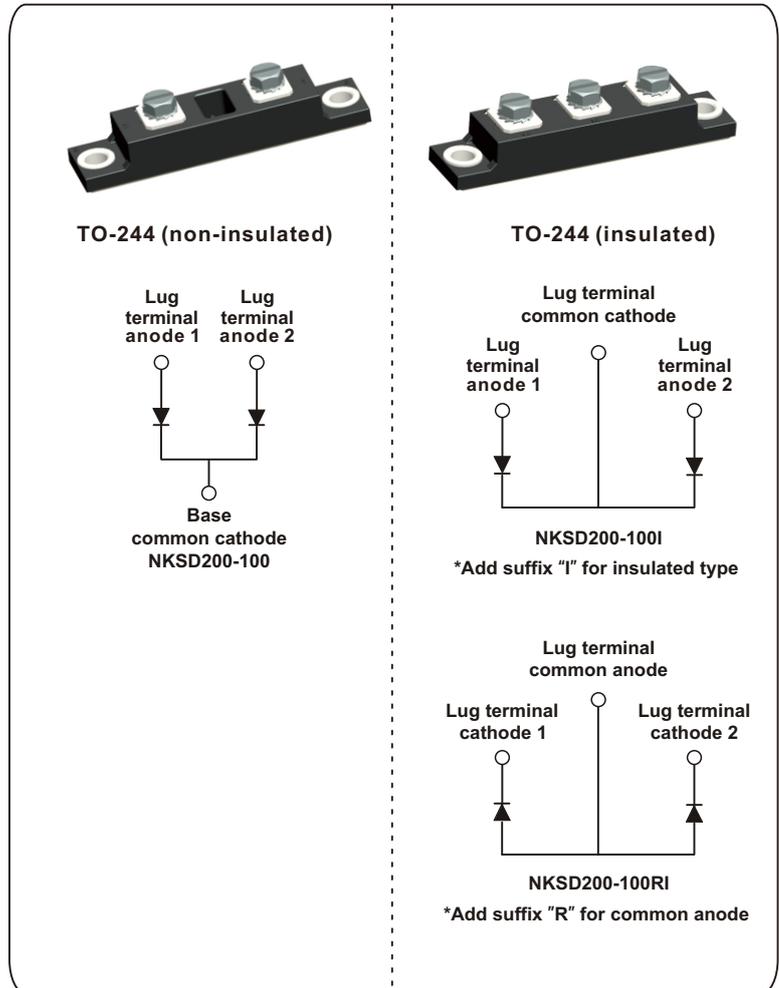
- 175°C T<sub>J</sub> operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free
- Designed and qualified for industrial level

### DESCRIPTION

The NKSD200... Schottky rectifier common cathode module series 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 power supplies
- Plating power supplies
- UPS system
- Converters
- Freewheeling
- Welder
- Reverse battery protection.



### PRODUCT SUMMARY

I <sub>F(AV)</sub>	200A
V <sub>R</sub>	100 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNIT
I <sub>F(AV)</sub>	Rectangular waveform	200	A
V <sub>RRM</sub>		100	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	12800	A
V <sub>F</sub>	100 Apk, T <sub>J</sub> = 125°C (per leg)	0.70	V
T <sub>J</sub>	Range	-55 to 175	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	NKSD200-100	UNIT
Maximum DC reverse voltage	V <sub>R</sub>	100	V
Maximum working peak reverse voltage	V <sub>RWM</sub>		

## Nell High Power Products

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum average forward current <small>per leg</small> / <small>per device</small>	$I_{F(AV)}$	50% duty cycle at $T_C = 142^\circ\text{C}$ , rectangular waveform		100	A
				200	
Maximum peak one cycle non-repetitive surge current per leg	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	12800	
		10 ms sine or 6 ms rect. pulse		1700	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25^\circ\text{C}$ , $I_{AS} = 13\text{A}$ , $L = 0.2\text{mH}$		15	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical		1	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum forward voltage drop per leg	$V_{FM(1)}$	100A	$T_J = 25^\circ\text{C}$	0.86	V
		200A		1.03	
		100A	$T_J = 125^\circ\text{C}$	0.70	
		200A		0.85	
Maximum reverse leakage current per leg	$I_{RM(1)}$	$T_J = 25^\circ\text{C}$	$V_R = \text{Rated } V_R$	100	$\mu\text{A}$
		$T_J = 125^\circ\text{C}$		20	mA
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.50	V
Forward slope resistance	$r_t$			1.08	m $\Omega$
Maximum junction capacitance per leg	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25^\circ\text{C}$		2650	pF
Typical series inductance per leg	$L_S$	From top of terminal hole to mounting plane		7.0	nH
Maximum voltage rate of change	dV/dt	Rated $V_R$		10000	V/ $\mu\text{s}$
Maximum RMS insulation voltage (for insulated type)	$V_{INS}$			1000 (1min)	V

**Note:** (1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2%

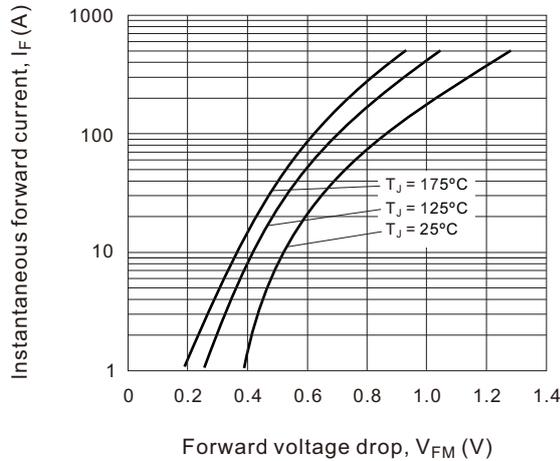
THERMAL-MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT
Maximum junction and storage temperature range		$T_J, T_{Stg}$	-55	-	175	$^\circ\text{C}$
Thermal resistance, junction to case per leg	TO-244 (non-insulated)	$R_{thJC}$	-	-	0.38	$^\circ\text{C/W}$
	TO-244 (insulated)		-	-	0.54	
Thermal resistance, junction to case per module	TO-244 (non-insulated)	$R_{thJC}$	-	-	0.19	
	TO-244 (insulated)		-	-	0.27	
Thermal resistance, case to heatsink		$R_{thCS}$	-	0.10	-	
Weight	TO-244 (non-insulated)		-	85 (3)	-	g(oz.)
	TO-244 (insulated)		-	100 (3.53)	-	
Mounting torque			35.4 (4)	-	53.1 (6)	lbf • in (N•m)
Mounting torque center hole			30 (3.4)	-	40 (4.6)	
Terminal torque			30 (3.4)	-	44.2 (5)	
vertical pull			-	-	80	lbf • in
2" lever pull			-	-	35	
Case style			JEDEC		TO-244AA compatible	

## Ordering Information Table

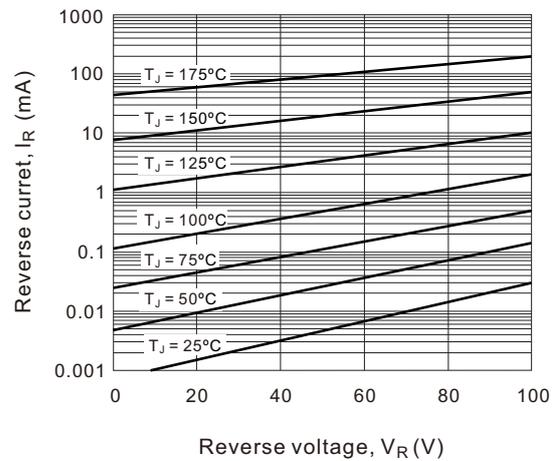
Device code	<b>NK</b>	<b>S</b>	<b>D</b>	<b>200</b>	<b>—</b>	<b>100</b>	<b>R</b>	<b>I</b>
	①	②	③	④		⑤	⑥	⑦

- ① - Nell's power module
- ② - S for Schottky Barrier Diode
- ③ - D for Dual Diodes, TO-244 Package
- ④ - Maximum average forward current, A
- ⑤ - Voltage rating (100 = 100V)
- ⑥ - None for common cathode configuration  
"R" for common anode configuration
- ⑦ - None for non-insulated type  
"I" for insulated type

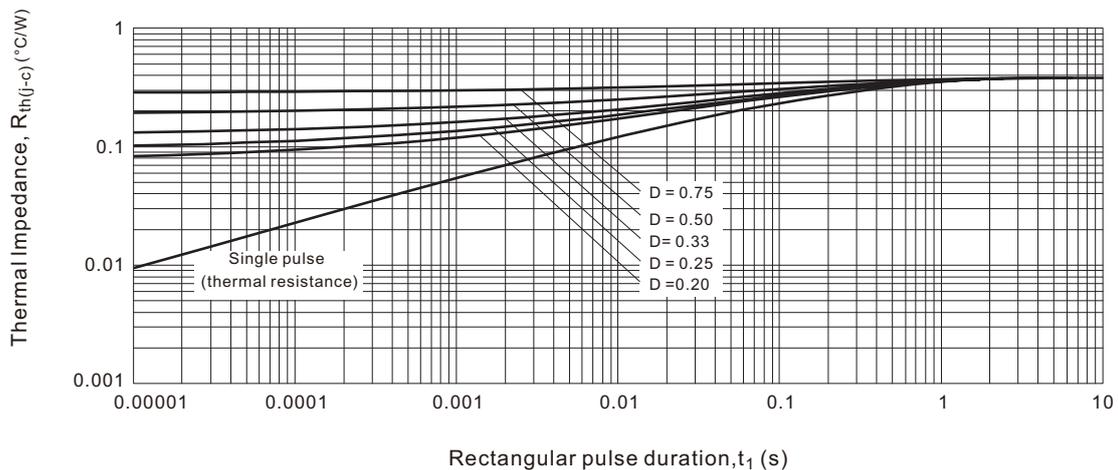
**Fig.1 Maximum forward voltage drop characteristics (Per Leg)**



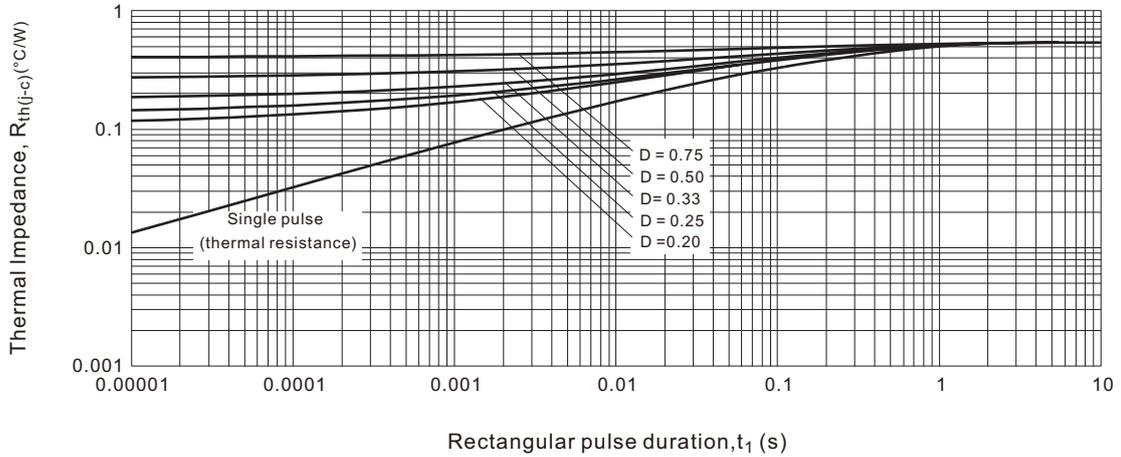
**Fig.2 Typical values of reverse current vs. Reverse voltage (Per Leg)**



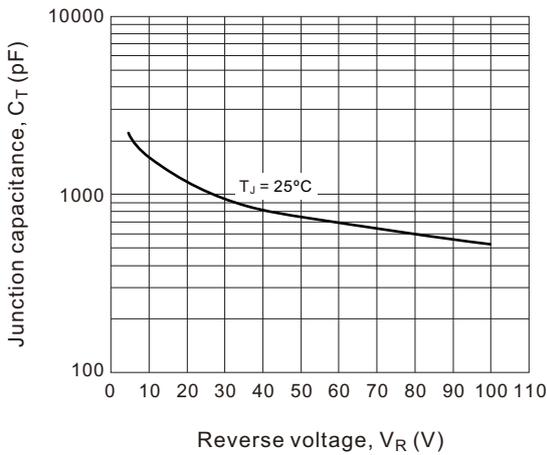
**Fig.3-1 Maximum thermal impedance  $R_{th(j-c)}$  characteristics (Per Leg, for TO-244 non-insulated)**



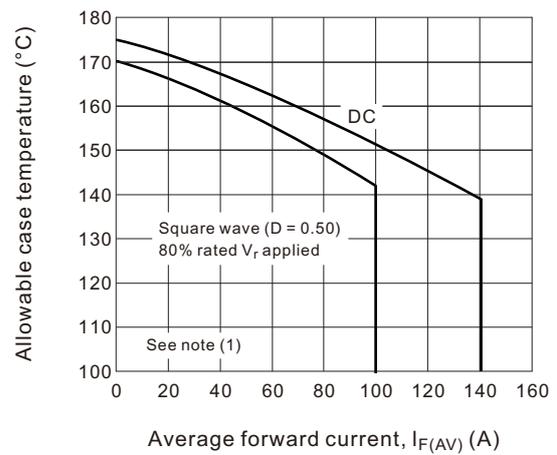
**Fig.3-2 Maximum thermal impedance  $R_{th(j-c)}$  characteristics (Per Leg, for TO-244 insulated)**



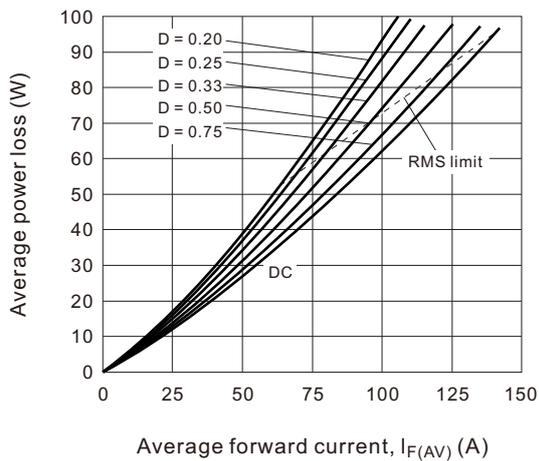
**Fig.4 Typical junction capacitance vs. Reverse voltage**



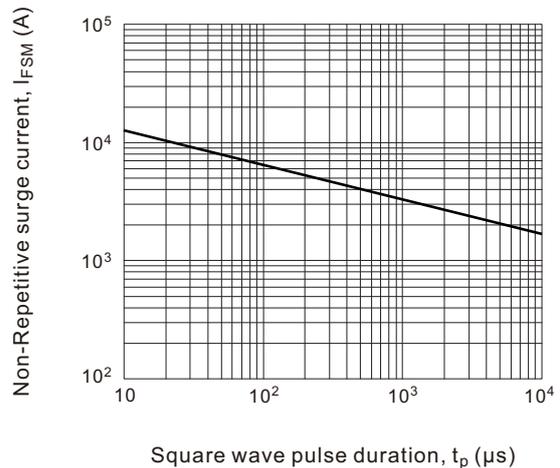
**Fig.5 Maximum allowable case temperature vs. Average forward current (Per Leg)**



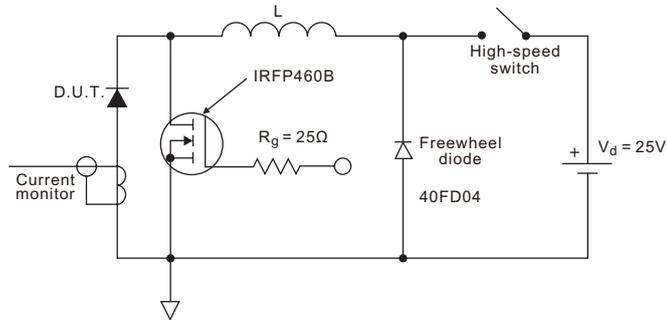
**Fig.6 Forward power loss characteristics (Per Leg)**



**Fig.7 Maximum non-repetitive surge current (Per Leg)**



**Fig.8 Unclamped Inductive test circuit**



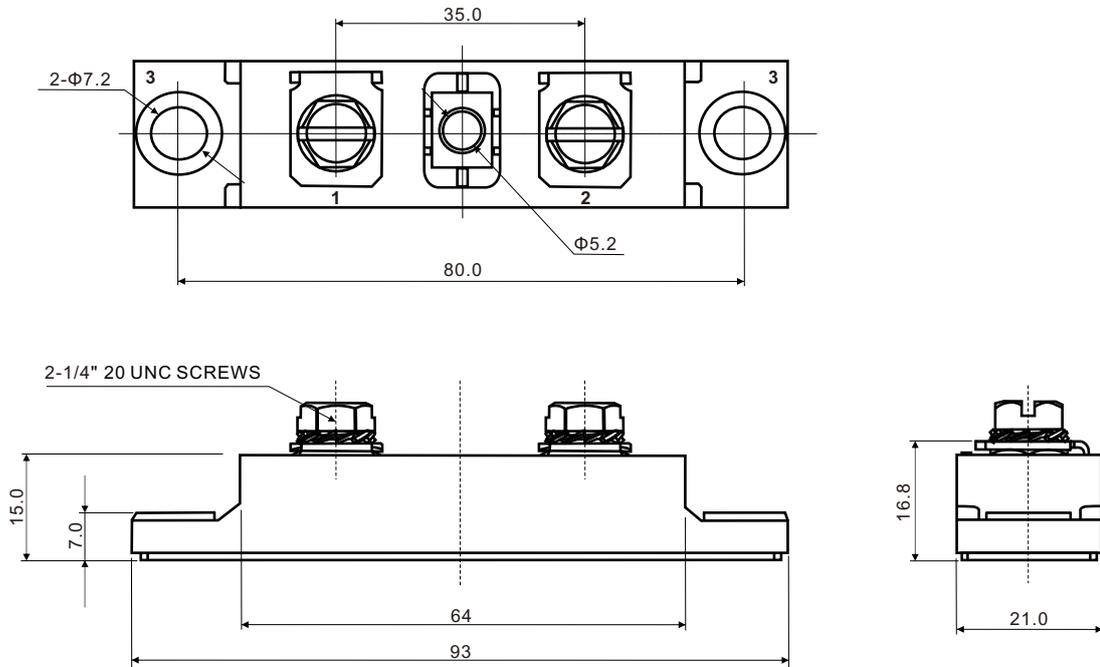
**Note**

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

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

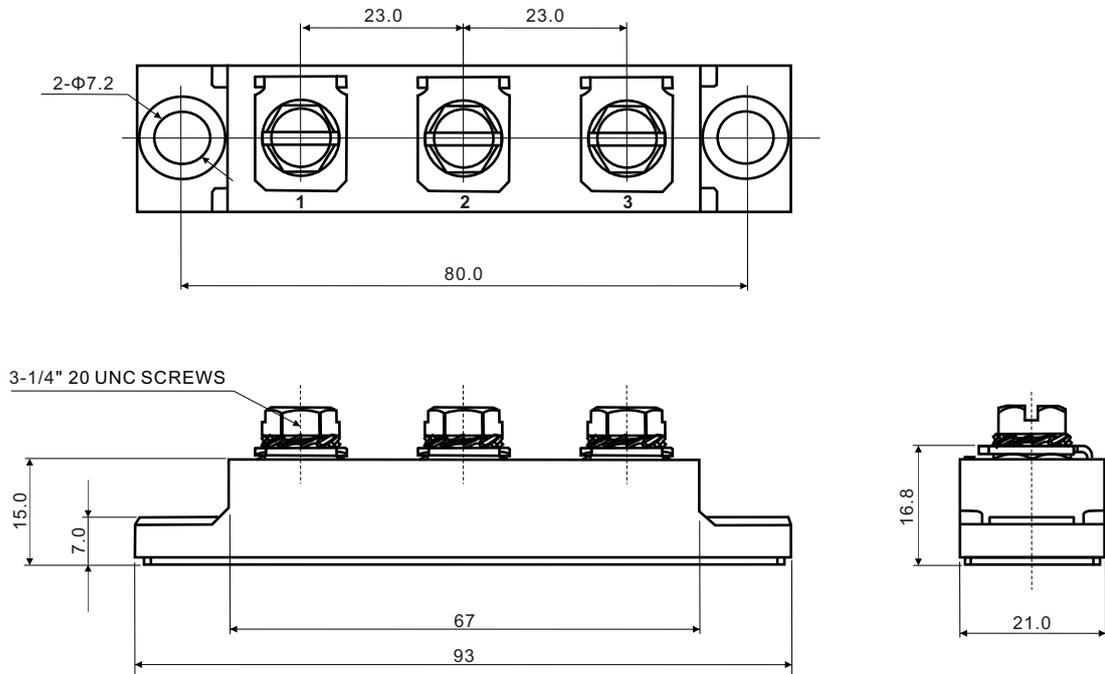
$P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1-D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

**TO-244 (Non-Insulated)**



All dimensions in millimeters

**TO-244 (Insulated)**



All dimensions in millimeters