

Schottky Rectifier, 300A/100V

FEATURES

- 175°C T_J 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

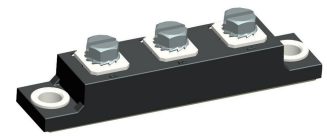
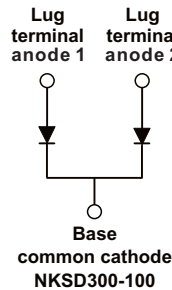
The NKSD300... Schottky rectifier common cathode module series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature.

TYPICAL APPLICATIONS

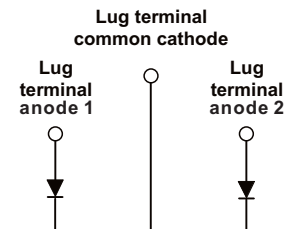
- High current switching power supplies
- Plating power supplies
- UPS system
- Converters
- Freewheeling
- Welder
- Reverse battery protection.



TO-244 (non-insulated)

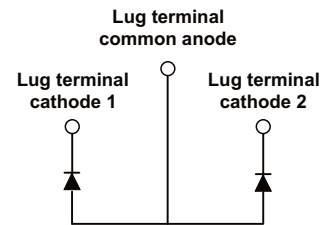


TO-244 (insulated)



NKSD300-100I

*Add suffix "I" for insulated type



NKSD300-100RI

*Add suffix "R" for common anode

PRODUCT SUMMARY

I _{F(AV)}	300A
V _R	100 V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNIT
I _{F(AV)}	Rectangular waveform	300	A
V _{RRM}		100	V
I _{FSM}	t _p = 5 μs sine	22000	A
V _F	150 Apk, T _J = 125°C (per leg)	0.72	V
T _J	Range	-55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	NKSD300-100	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 per device	I _{F(AV)}	50% duty cycle at T _C = 138°C, rectangular waveform		150	A
				300	
Maximum peak one cycle non-repetitive surge current per leg	I _{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V _{RRM} applied	22000	
		10 ms sine or 6 ms rect. pulse		2500	
Non- repetitive avalanche energy per leg	E _{AS}	T _J =25°C, I _{AS} =13A, L=0.2mH		15	mJ
Repetitive avalanche current per leg	I _{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T _J maximum V _A =1.5V _R typical		1	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum forward voltage drop per leg	$V_{FM}^{(1)}$	150A	$T_J = 25^{\circ}\text{C}$	0.91	V
		300A		1.09	
		150A	$T_J = 125^{\circ}\text{C}$	0.72	
		300A		0.85	
Maximum reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 25^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	100	μA
		$T_J = 125^{\circ}\text{C}$		50	mA
Maximum junction capacitance per leg	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) 25°C		4150	pF
Typical series inductance per leg	L_S	From top of terminal hole to mounting plane		6	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10000	V/ μs
Maximum RMS insulation voltage (for insulated type)	V_{INS}			1000 (1min)	V

Note

(1) Pulse width < 300 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 per leg	TO-244 (non-insulated)	R _{thJC}	-	-	0.28	°C/W
	TO-244 (insulated)		-	-	0.40	
Thermal resistance, junction to case per module	TO-244 (non-insulated)	R _{thJC}	-	-	0.14	
	TO-244 (insulated)		-	-	0.20	
Thermal resistance, case to heatsink		R _{thCS}	-	0.10	-	
Weight	TO-244 (non-insulated)		-	85 (3)	-	
	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	NK	S	D	300	—	100	R	I
	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)

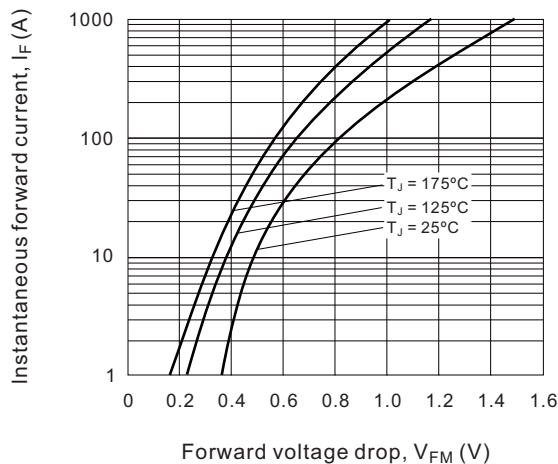
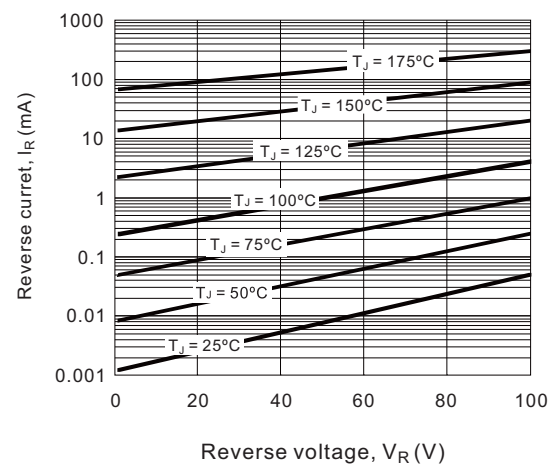
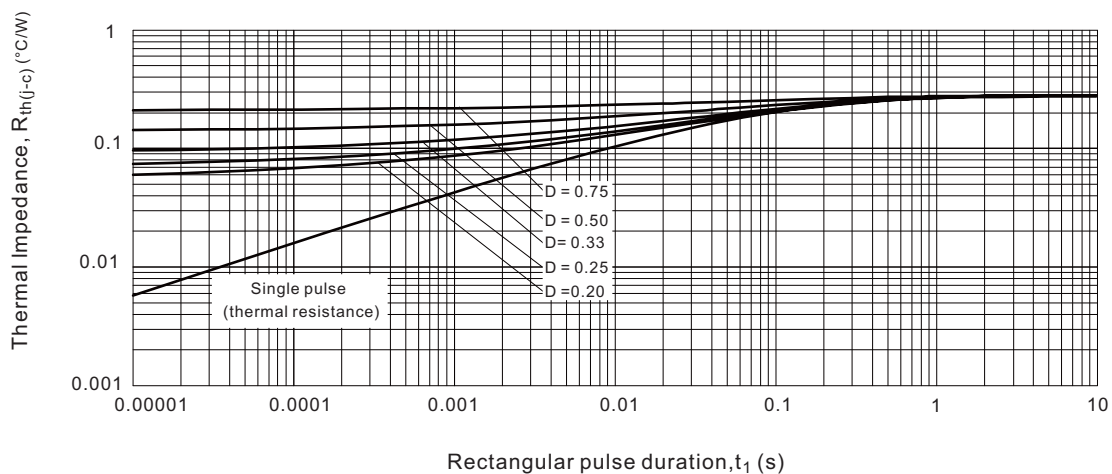


Fig.2 Typical values of reverse current vs. Reverse voltage (Per Leg)



**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)**

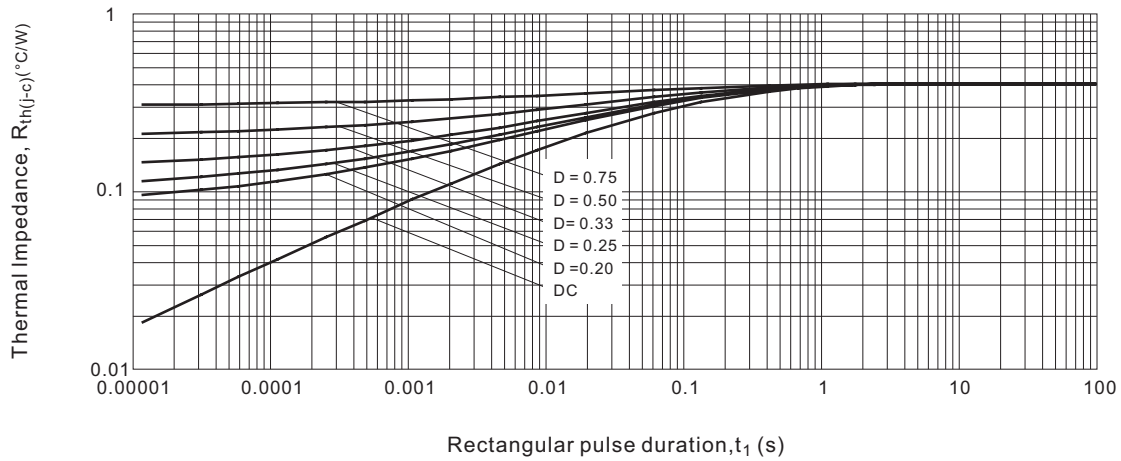


Fig.4 Typical junction capacitance vs. Reverse voltage

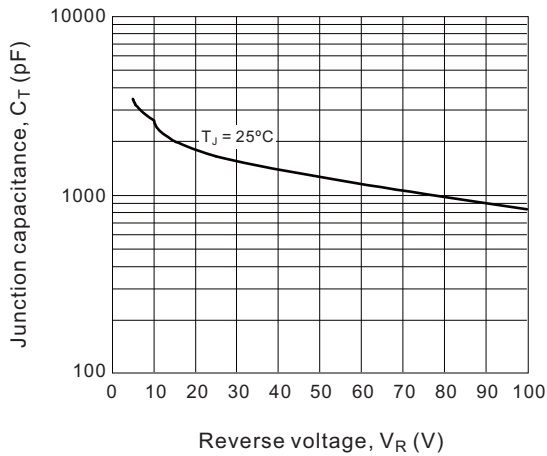


Fig.5 Maximum allowable case temperature vs. Average forward current (Per Leg)

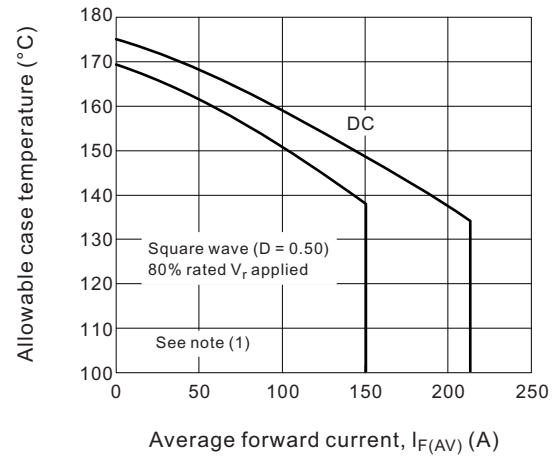


Fig.6 Forward power loss characteristics (Per Leg)

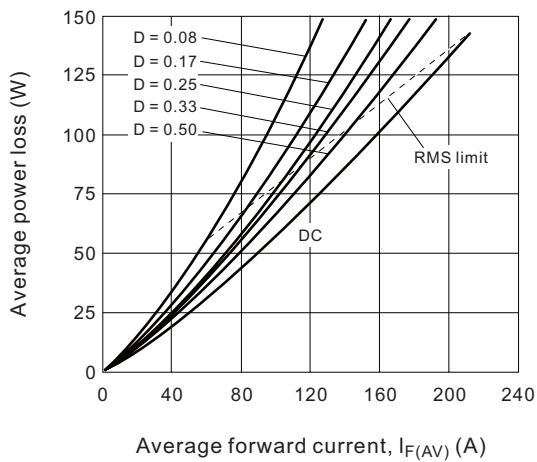


Fig.7 Maximum non-repetitive surge current (Per Leg)

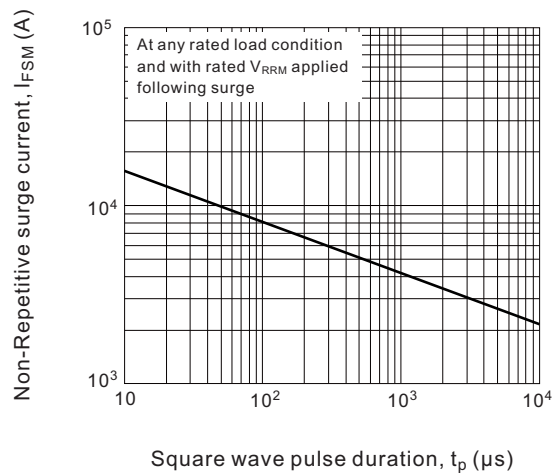
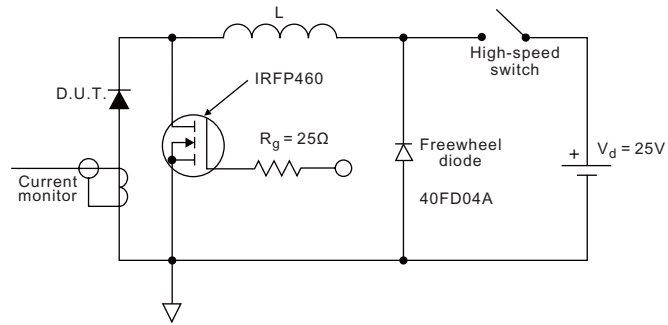


Fig.8 Unclamped Inductive test circuit



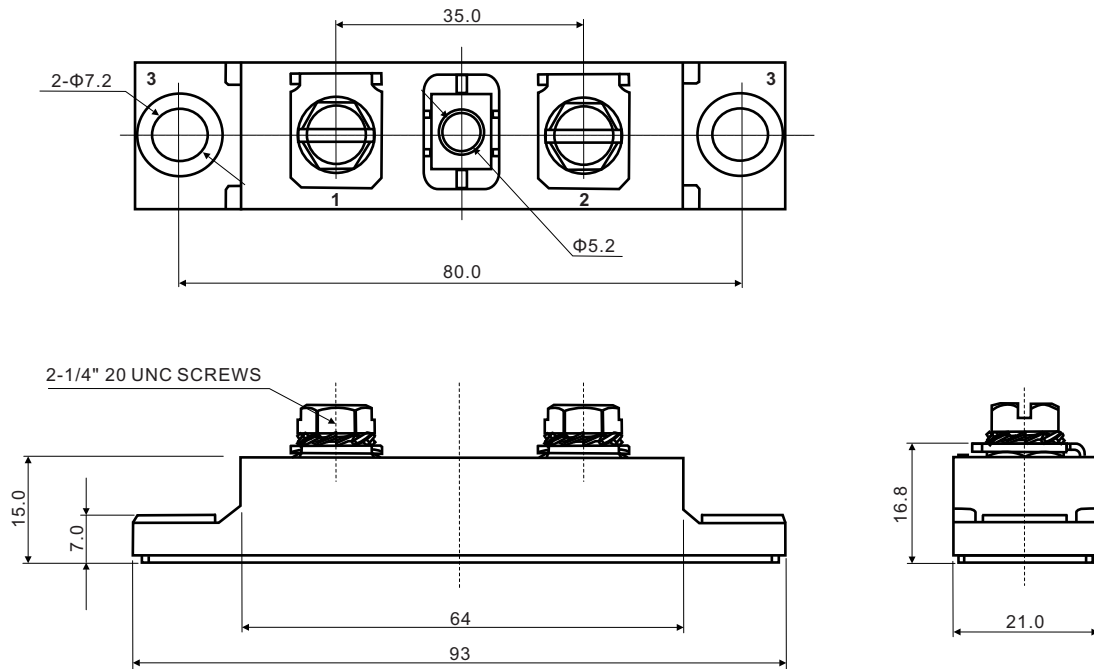
Note

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

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

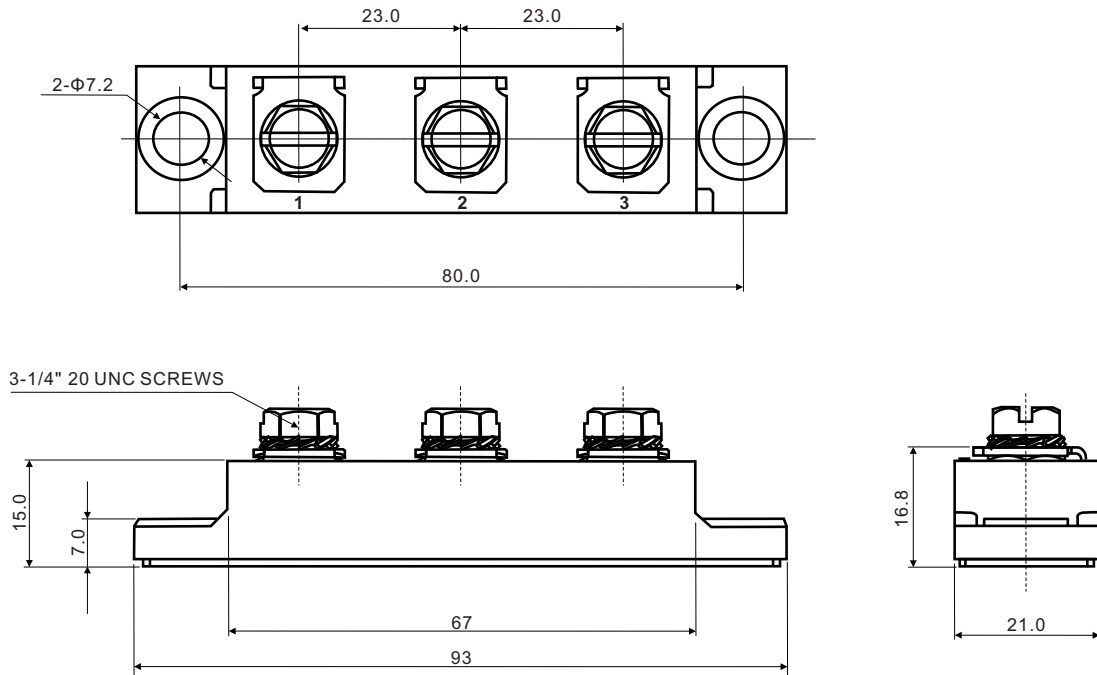
P_{dREV} = Inverse power loss = $V_{R1} \times I_R (1-D)$; I_R at $V_{R1} = 80\%$ rated V_R

TO-244 (Non-Insulated)



All dimensions in millimeters

TO-244 (Insulated)



All dimensions in millimeters