NELL SEMICONDUCTOR

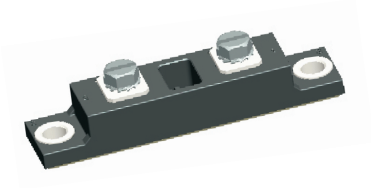
NKSD400-100 Series RoHS

Vishay High Power Products

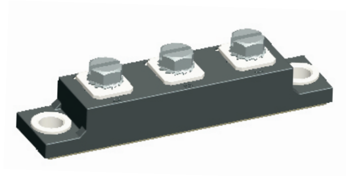
Schottky Rectifier, 400 A

FEATURES

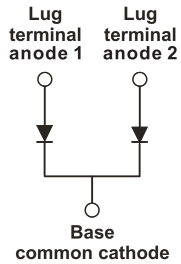
- 175°C T_J operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pd)-free
- Designed and qualified for industrial level

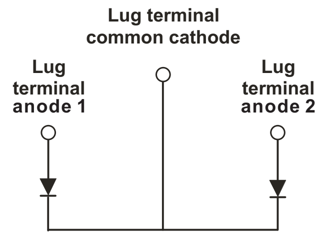


TO-244 (non-insulated)



TO-244 (insulated)





DESCRIPTION

The NKSD400... 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 are in high current switching power supplies, plating power supplies, UPS systems, converters, freewheeling diodes, welding, and reverse battery protection.

PRODUCT SUMMARY	
$I_{F(AV)}$	400A
V_R	100 V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNIT
$I_{F(AV)}$	Rectangular waveform	400	A
V_{RRM}		100	V
I_{FSM}	t_p = 5 µs sine	25500	A
V_F	200 Apk, TJ = 125°C (per leg)	0.69	V
T_J	Range	-55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	NKSD400-100	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 See fig.5	per leg	$I_{F(AV)}$	50% duty cycle at T_C = 141°C, rectangular waveform		200	A
	per device				400	
Maximum peak one cycle non-repetitive surge current per leg See fig.7		I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	25500	
			10 ms sine or 6 ms rect. pulse		3300	
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=1.5xV_R typical		1	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum forward voltage drop per leg See fig.1	V_{FM}(1)	200A	T_J = 25°C	0.84	V
		400A		1.07	
		200A	T_J = 125°C	0.69	
		400A		0.82	
Maximum reverse leakage current per leg See fig.2	I_{RM}(1)	T_J = 25°C	V_R = Rated V_R	6	mA
		T_J = 125°C		80	
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25°C		5500	pF
Typical series inductance per leg	L_S	From top of terminal hole to mounting plane		5	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10000	V/μs
Maximum RMS insulation voltage	V_{INS}	50 Hz		3000 (1min)	V
				3600 (1s)	

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}	-	-	0.19	°C/W
	TO-244 (insulated)		-	-	0.26	
Thermal resistance, junction to case per module	TO-244 (non-insulated)	R_{thCS}	-	-	0.095	
	TO-244 (insulated)		-	-	0.13	
Thermal resistance, case to heatsink			-	0.1	-	
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 Tabel

Device code	NK	S	D	400	–	100	I
	1	2	3	4		5	6

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 non-insulated type
"I" for insulated type

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

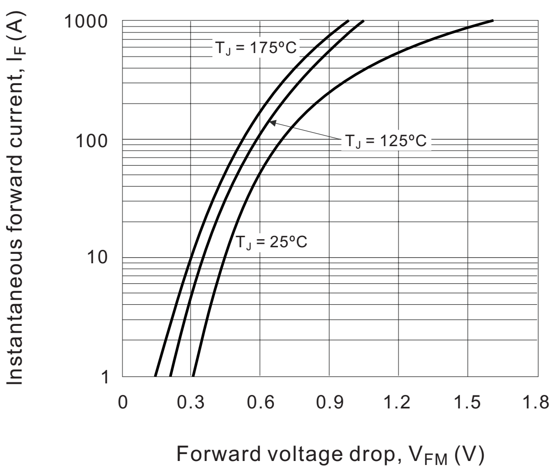


Fig.2 Typical values of reverse current vs. Reverse voltage (Per Leg)

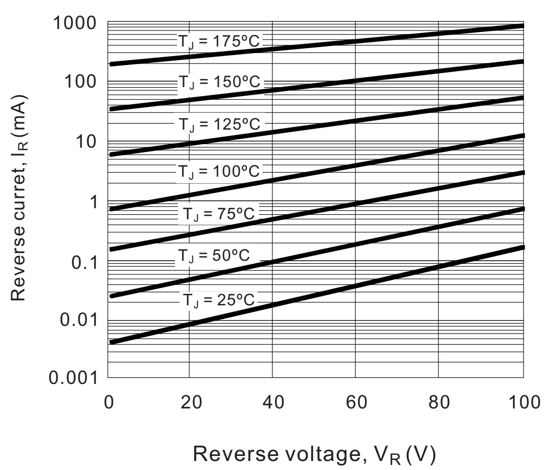


Fig.3-1 Maximum thermal impedance $R_{th(j-c)}$ characteristics (Per Leg, for TO-244 non-insulated)

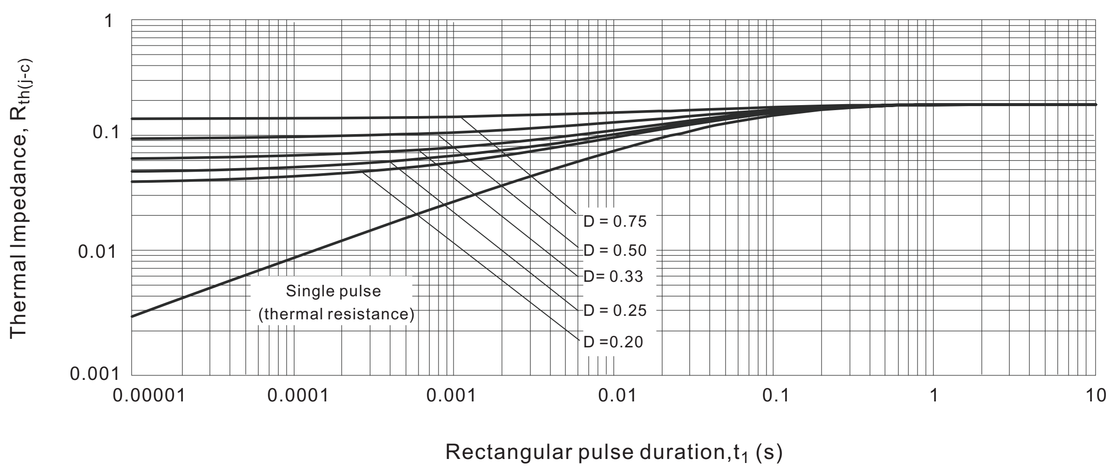


Fig.3-2 Maximum thermal impedance $R_{th(j-c)}$ characteristics (Per Leg, for TO-244 insulated)

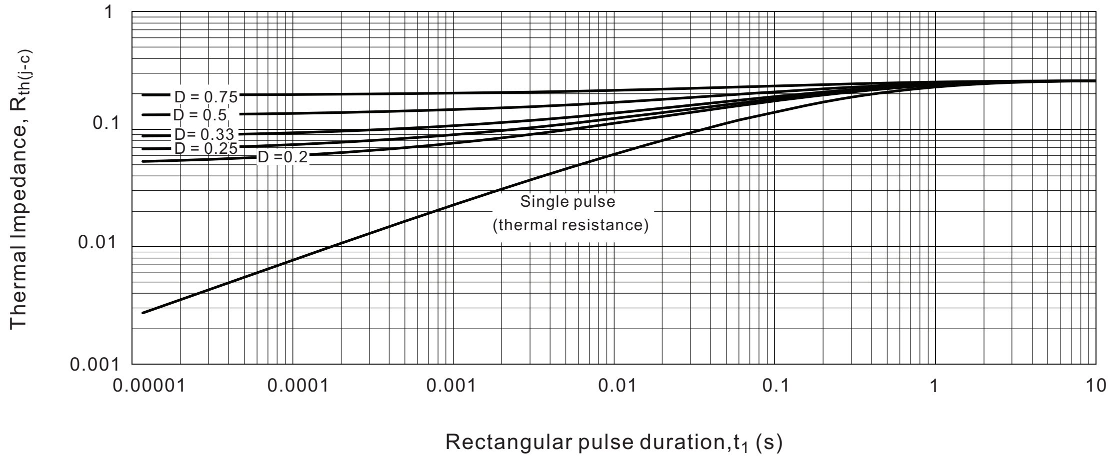


Fig.4 Typical junction capacitance vs. Reverse voltage (Per Leg)

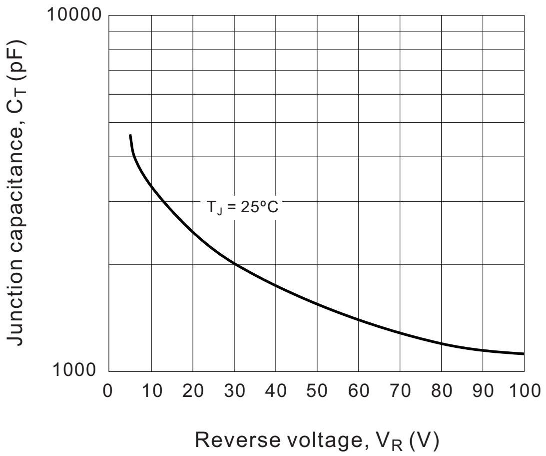


Fig.5 Maximum allowable case temperature vs. Average forward current (Per Leg)

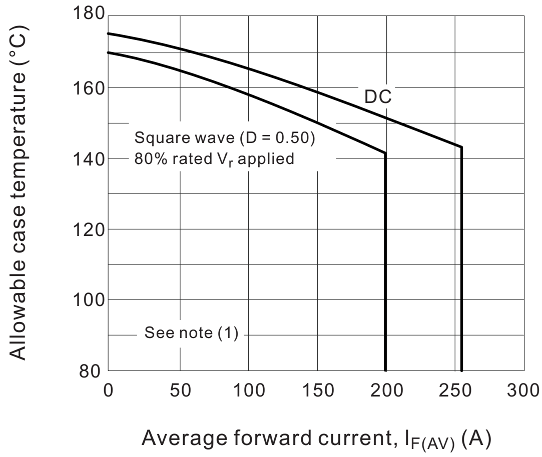


Fig.6 Forward power loss characteristics (Per Leg)

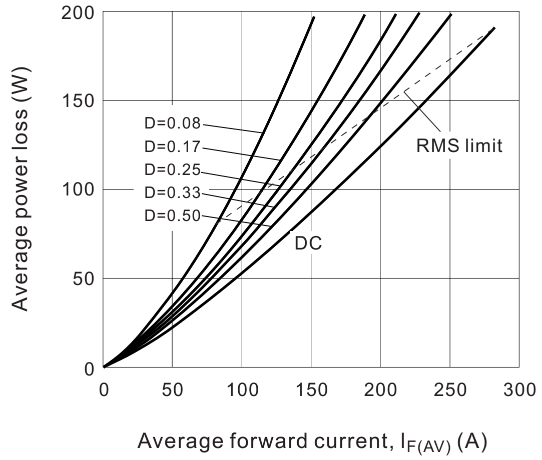


Fig.7 Maximum non-repetitive surge current (Per Leg)

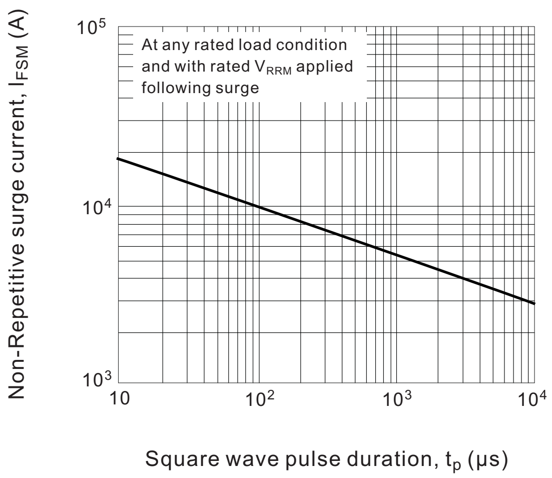
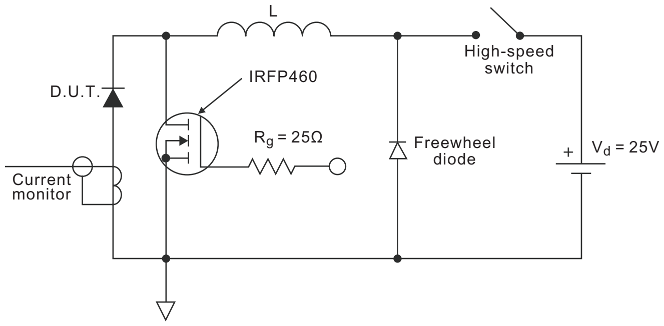
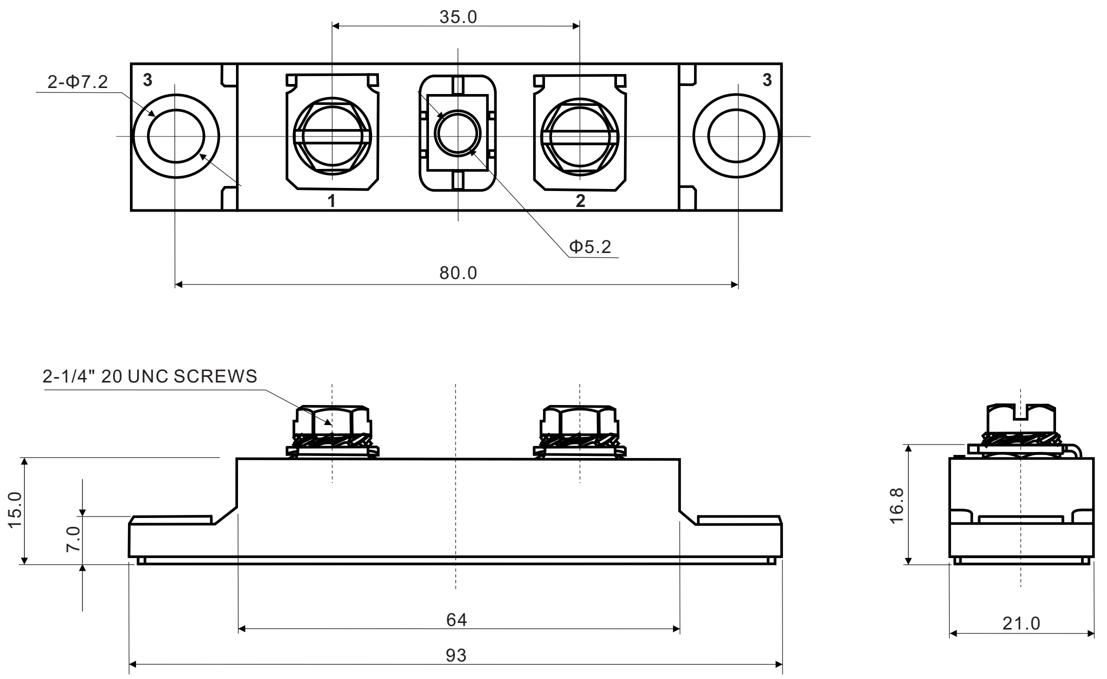


Fig.8 Unclamped Inductive test circuit



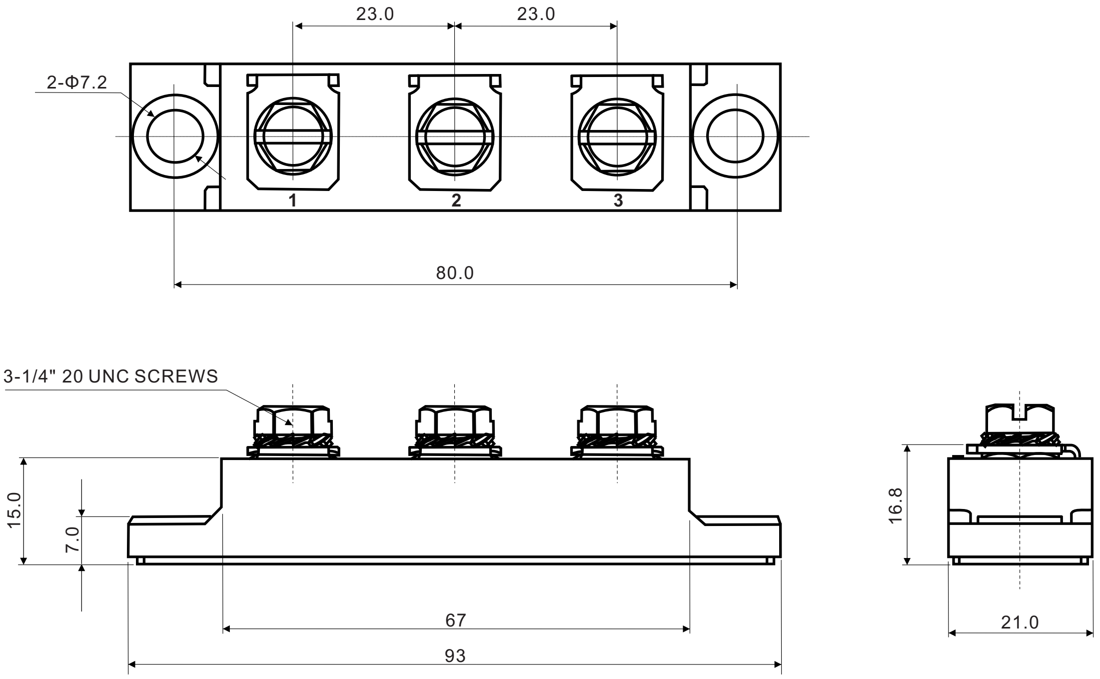
Note
(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at($I_{F(AV)}$/D)(see fig.6)
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1-D); I_R at V_{R1} = 80% rated V_R

TO-244 (Non-Insulated)



All dimensions in millimeters

TO-244 (Insulated)



All dimensions in millimeters