

Schottky Rectifier, 200Ax2 / 100V

FEATURES

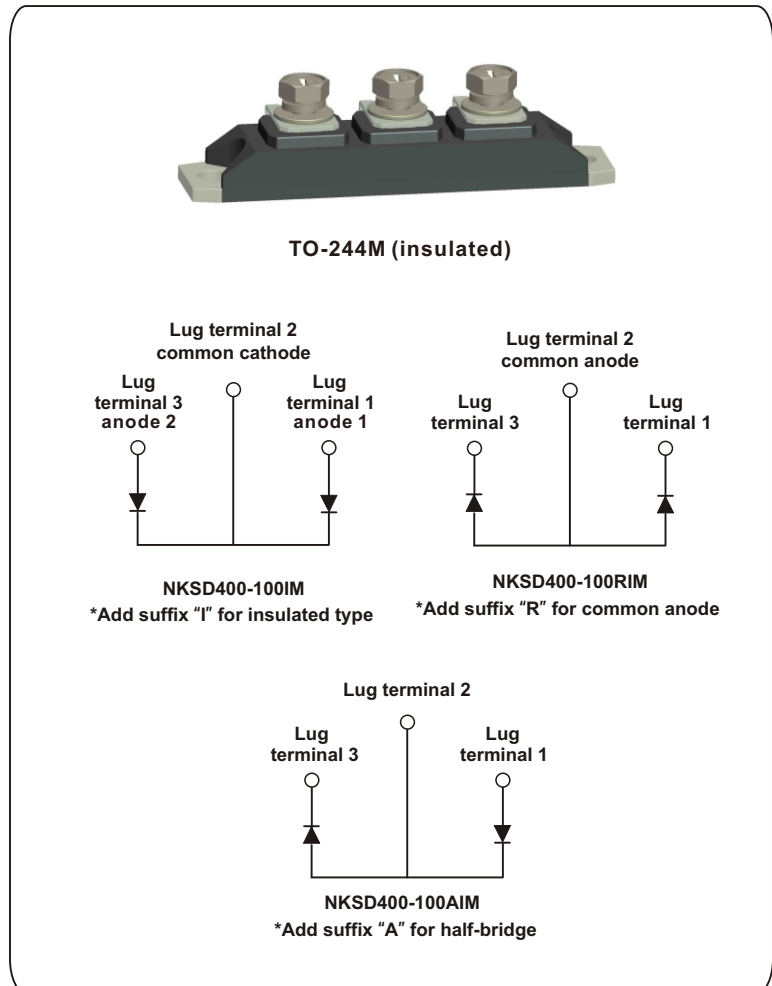
- 175°C T_J operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free
- Designed and qualified for industrial level

DESCRIPTION

The NKSD400IM Schottky rectifier 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 _{F(AV)}	400A
V _R	100V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNIT
I _{F(AV)}	Rectangular waveform	400	A
V _{R(RM)}		100	V
I _{FSM}	t _p = 5 μs sine	25500	A
V _F	200 Apk, T _J = 125°C (per leg)	0.70	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 _{R(WM)}		

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum average forward current See fig.5 <small>per leg per device</small>	$I_{F(AV)}$	50% duty cycle at $T_C = 110^\circ\text{C}$, rectangular waveform		200	A
				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}	$T_J = 25^\circ\text{C}$, $I_{AS} = 5.5\text{A}$, $L = 1.0\text{mH}$		15	mJ
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical		1	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNIT
Maximum forward voltage drop per leg See fig.1	$V_{FM(1)}$	200A	$T_J = 25^\circ\text{C}$	0.84	V
		400A		1.07	
		200A	$T_J = 125^\circ\text{C}$	0.70	
		400A		0.82	
Maximum reverse leakage current per leg See fig.2	$I_{RM(1)}$	$T_J = 25^\circ\text{C}$	$V_R = \text{Rated } V_R$	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		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}			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	$^\circ\text{C}$
Thermal resistance, junction to case per leg	R_{thJC}	-	-	0.26	$^\circ\text{C}/\text{W}$
Thermal resistance, junction to case per module	R_{thJC}	-	-	0.13	
Thermal resistance, case to heatsink	R_{thCS}	-	0.10	-	
Weight		-	95 (3.35)	-	g(oz.)
Mounting torque, M6		30 (3.4)	-	40 (4.6)	lbf • in (N•m)
Terminal torque, M6		30 (3.4)	-	40 (4.6)	
vertical pull		-	-	80	lbf • in
2" lever pull		-	-	35	

Ordering Information Table

Device code	NK	S	D	400	—	100	R	I	M
	①	②	③	④		⑤	⑥	⑦	⑧

- 1** - NPS 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, "A" for half-bridge configuration
- 7** - "I" for insulated type
- 8** - "M" for TO-224M Package (Molding type TO-244)

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

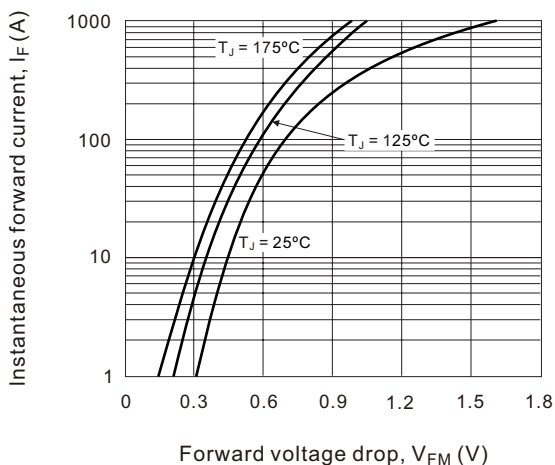


Fig.2 Typical values of reverse current vs. Reverse voltage (Per Leg)

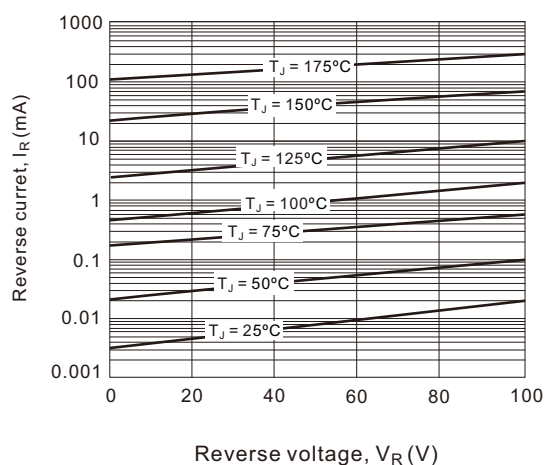


Fig.3 Maximum thermal impedance $R_{th(j-c)}$ characteristics (Per Leg)

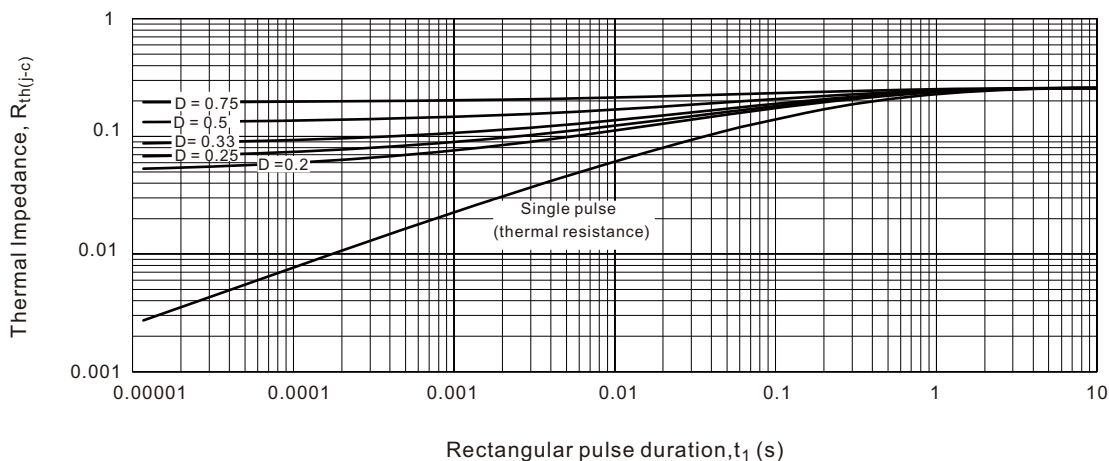


Fig.4 Typical junction capacitance vs. Reverse voltage (Per Leg)

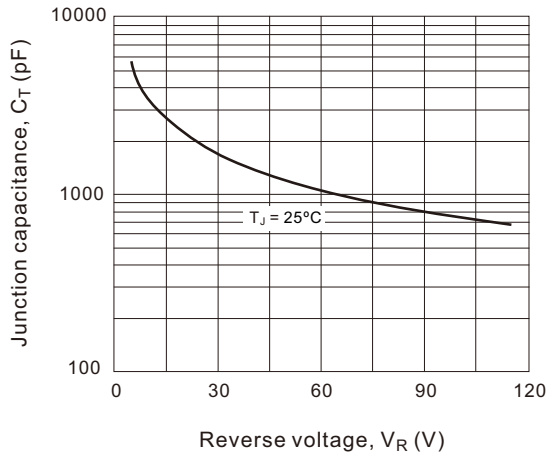


Fig.5 Maximum allowable case temperature vs. Average forward current (Per Leg)

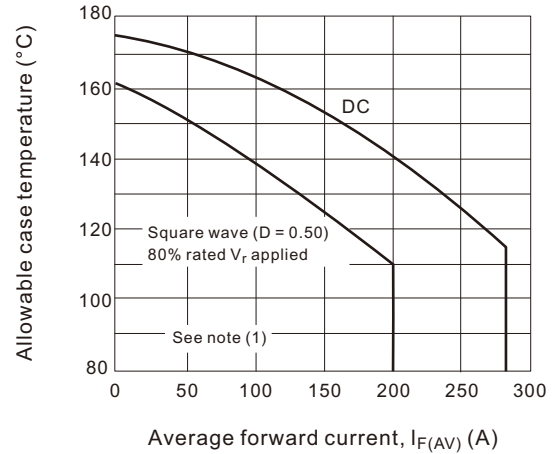


Fig.6 Forward power loss characteristics (Per Leg)

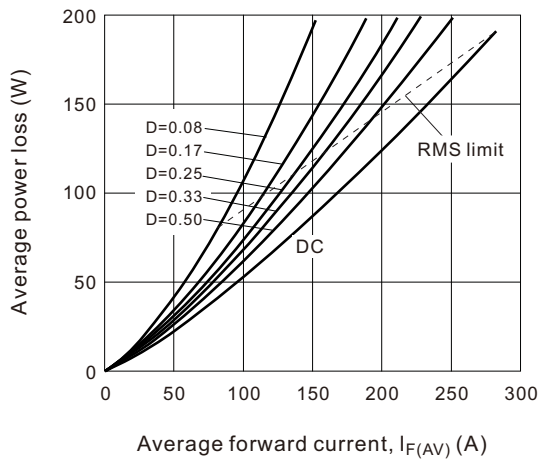


Fig.7 Maximum non-repetitive surge current (Per Leg)

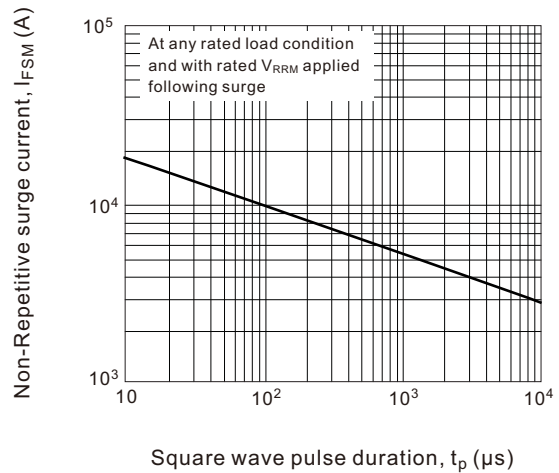
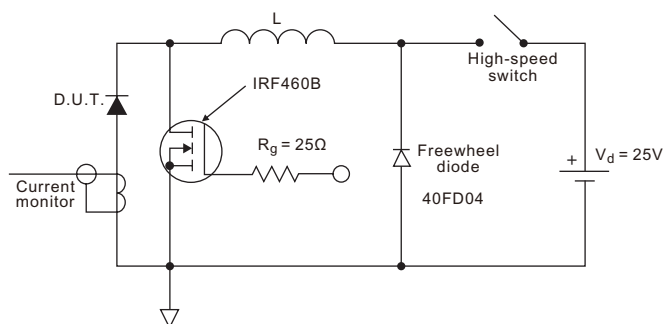


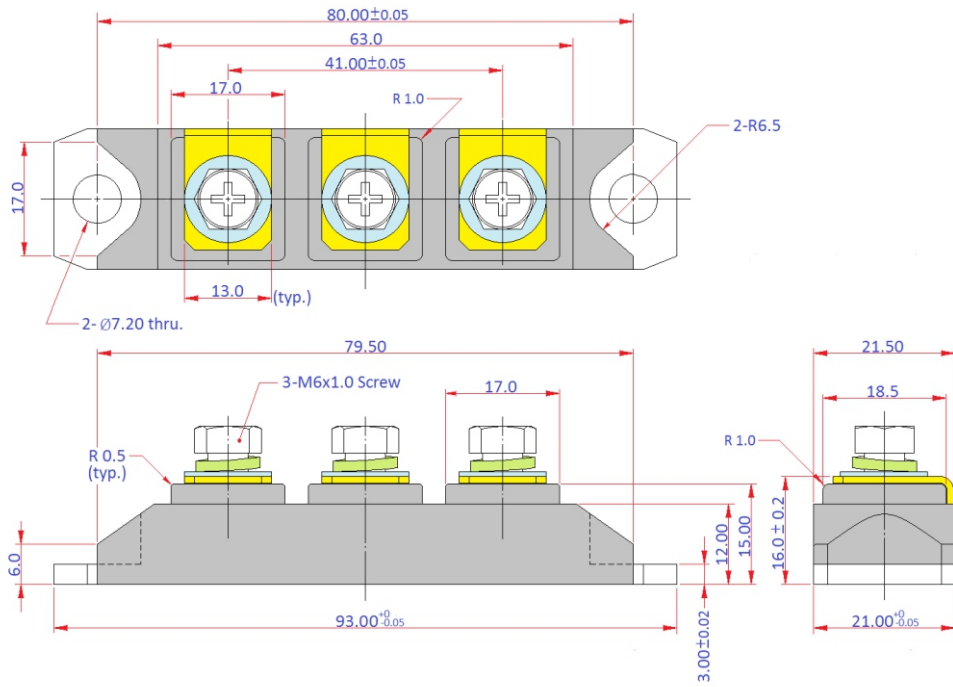
Fig.8 Unclamped Inductive test circuit



Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 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-244M (Insulated)



All dimensions in millimeters