Schottky Rectifier, 600A/200V

FEATURES

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

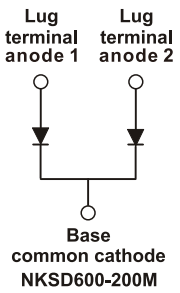
DESCRIPTION

The NKSD600-200M 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-244M (non-insulated)



PRODUCT SUMMARY	
$I_{F(AV)}$	600A
V_R	200V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNIT
$I_{F(AV)}$	Rectangular waveform	600	A
V_{RRM}		200	V
I_{FSM}	t_p = 5 µs sine	30000	A
V_F	300 Apk, T_j = 125°C (per leg)	0.75	V
T_J	Range	-55 to 175	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VALUE	UNIT
Maximum DC reverse voltage	V_R	200	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 See fig.5	$I_{F(AV)}$	50% duty cycle at T_C = 125°C, rectangular waveform		300	A
				600	
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	30000	
		10 ms sine or 6 ms rect. pulse		4500	
Non- repetitive avalanche energy per leg	E_{AS}	T_J=25°C, I_{AS}=5.5A, L=1.0mH		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)	300A	T_J = 25°C	0.90	V
		600A		1.10	
		300A	T_J = 125°C	0.78	
		600A		0.95	
Maximum reverse leakage current per leg See fig.2	I_{RM}(1)	T_J = 25°C	V_R = Rated V_R	100	µA
		T_J = 125°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		7000	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

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-244M (non-insulated)	R_{thJC}	-	-	0.15	°C/W
Thermal resistance, junction to case per module	TO-244M (non-insulated)	R_{thJC}	-	-	0.075	
Thermal resistance, case to heatsink		R_{thCS}	-	0.10	-	
Weight	TO-244M (non-insulated)		-	85 (3)	-	g(oz.)
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	600	–	200	M
①	②	③	④		⑤	⑥

1 - Nell's power module
2 - S for Schottky Barrier Diode
3 - D for Dual Diodes
4 - Maximum average forward current, A
"600" for 600A (300A×2)
5 - Voltage rating (200 = 200V)
6 - "M" for TO-244M molding package

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

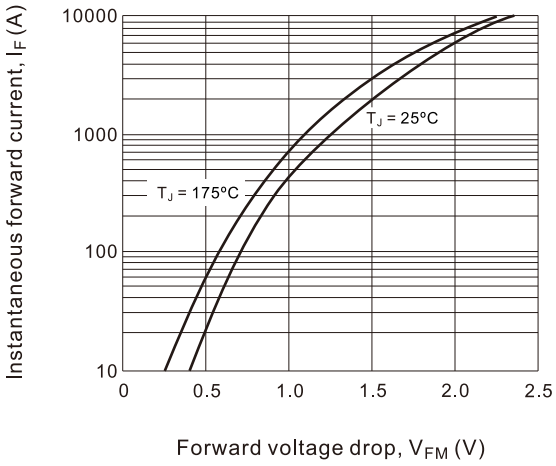


Fig.2 Typical values of reverse current vs. Reverse voltage (Per Leg)

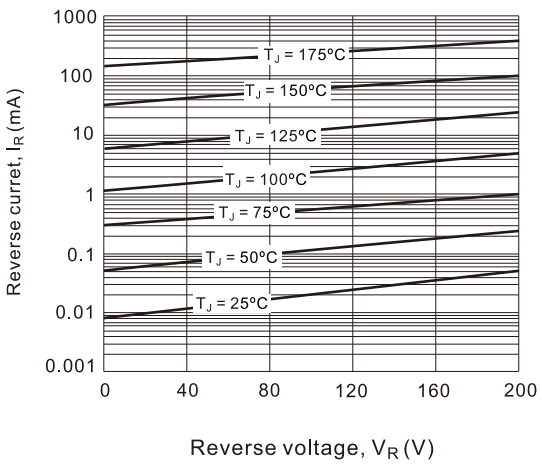


Fig.3 Maximum thermal impedance $R_{th(j-c)}$ characteristics (Per Leg, for TO-244 non-insulated)

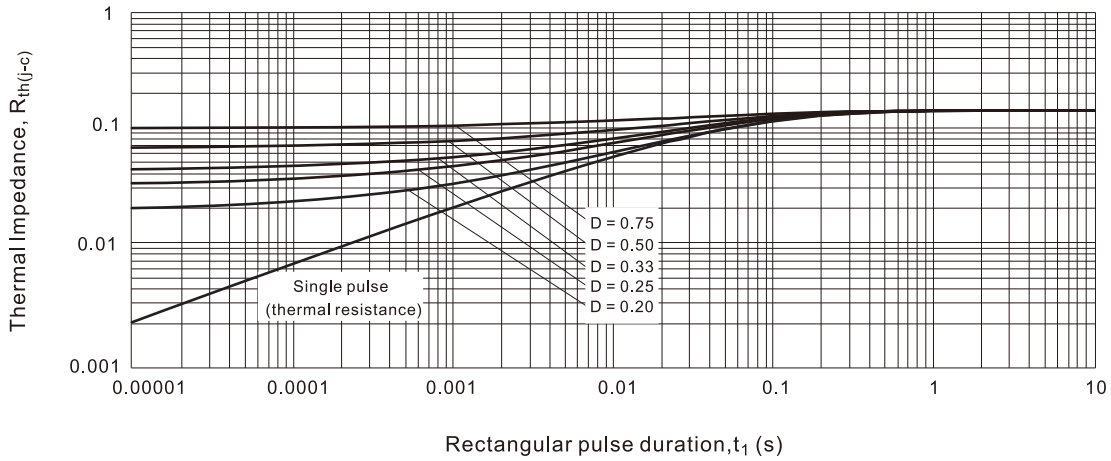


Fig.4 Typical junction capacitance vs. Reverse voltage (Per Leg)

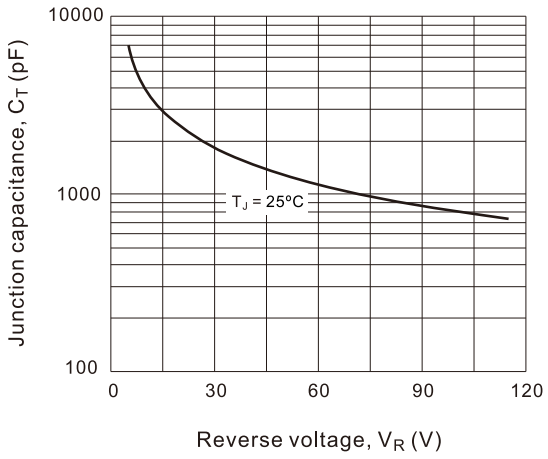


Fig.5 Maximum allowable case temperature vs. Average forward current (Per Leg)

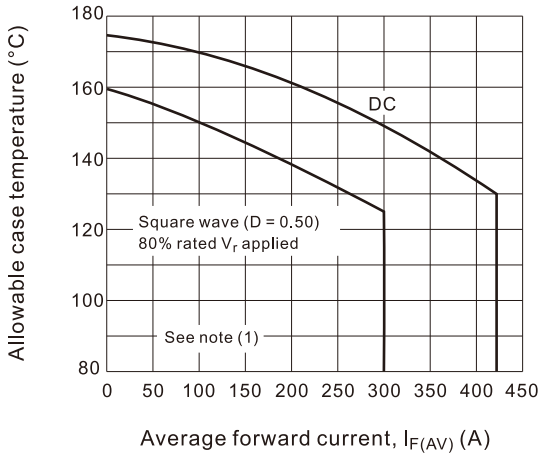


Fig.6 Forward power loss characteristics (Per Leg)

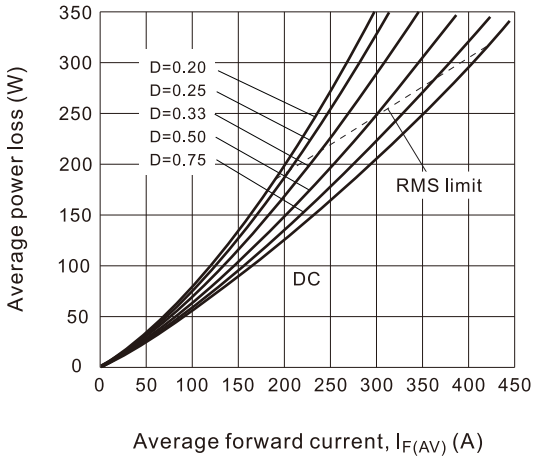


Fig.7 Maximum non-repetitive surge current (Per Leg)

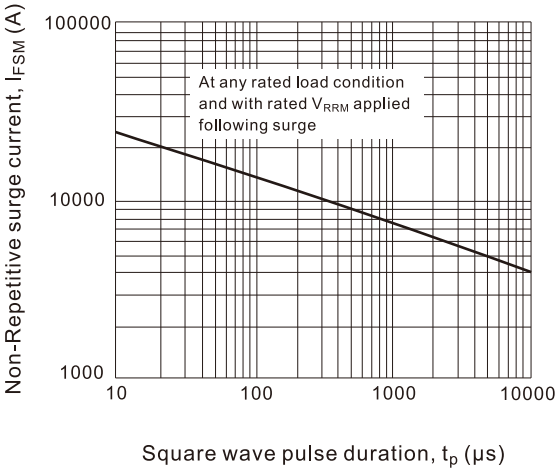
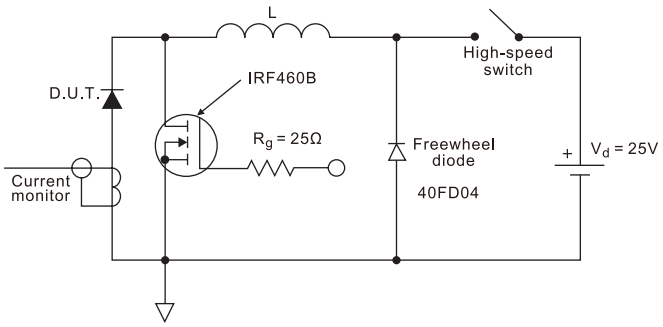


Fig.8 Unclamped Inductive test circuit



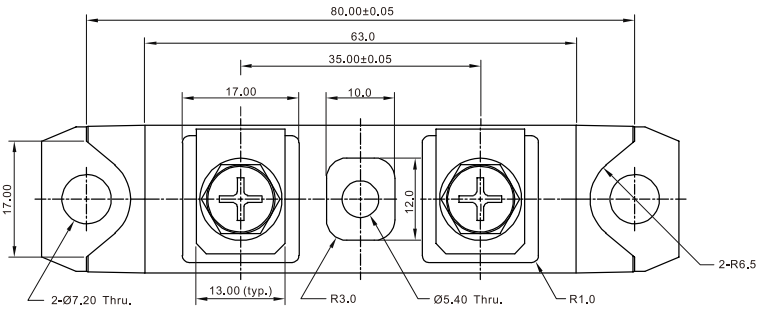
Note

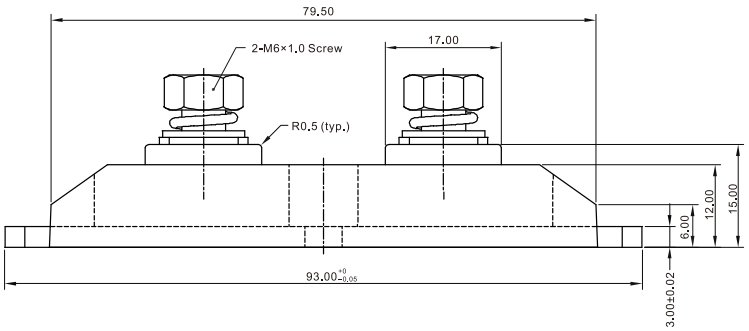
(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;

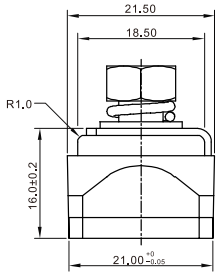
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at($I_{F(AV)}$/D)(see fig.6)

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

TO-244M (Non-Insulated)







All dimensions in millimeters