

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.

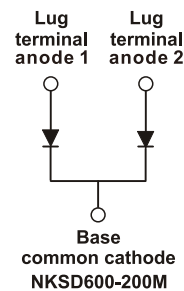
The proprietary barrier technology allows for reliable operation up to 175°C junction temperature.

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 See fig.5	$I_{F(AV)}$	50% duty cycle at $T_C = 125^{\circ}\text{C}$, 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}	$T_J=25^{\circ}\text{C}$, $I_{AS}=5.5\text{A}$, $L=1.0\text{mH}$		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	$V_{FM}^{(1)}$	300A	$T_J = 25^{\circ}C$	0.90	V
		600A		1.10	
		300A	$T_J = 125^{\circ}C$	0.78	
		600A		0.95	
Maximum reverse leakage current per leg See fig.2	$I_{RM}^{(1)}$	$T_J = 25^{\circ}C$	$V_R = \text{Rated } V_R$	100	μA
		$T_J = 125^{\circ}C$		50	mA
Maximum junction capacitance per leg	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25^{\circ}C$		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)

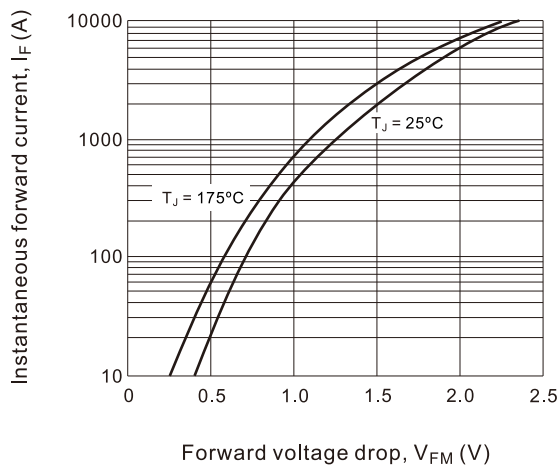


Fig.2 Typical values of reverse current vs. Reverse voltage (Per Leg)

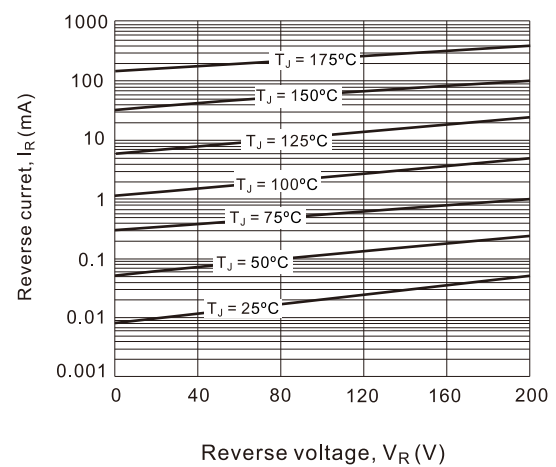


Fig.3 Maximum thermal impedance $R_{th(j-c)}$ characteristics (Per Leg, for TO-244 non-insulated)

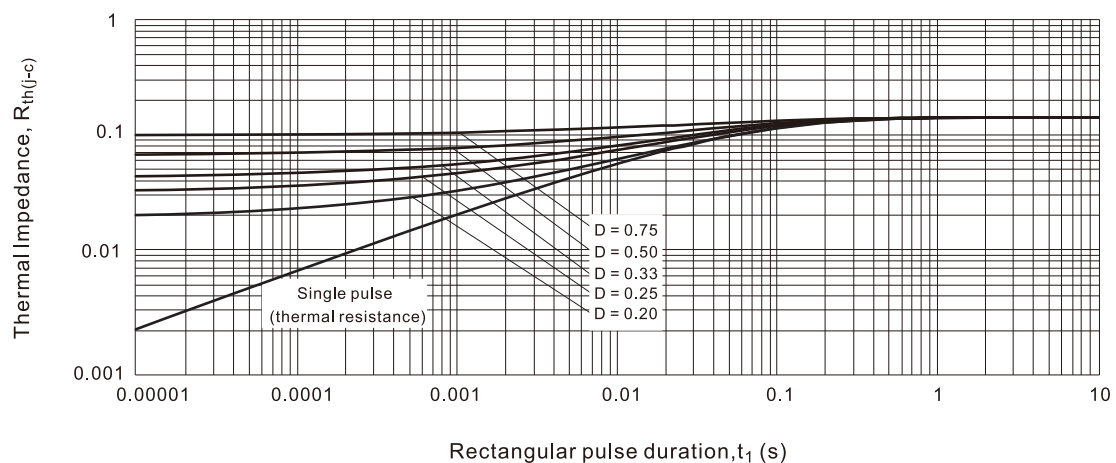


Fig.4 Typical junction capacitance vs. Reverse voltage (Per Leg)

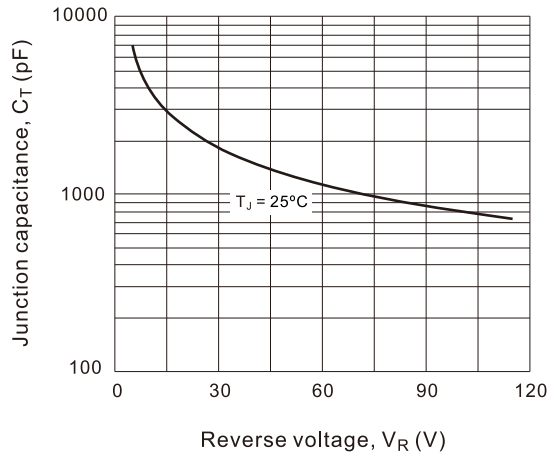


Fig.5 Maximum allowable case temperature vs. Average forward current (Per Leg)

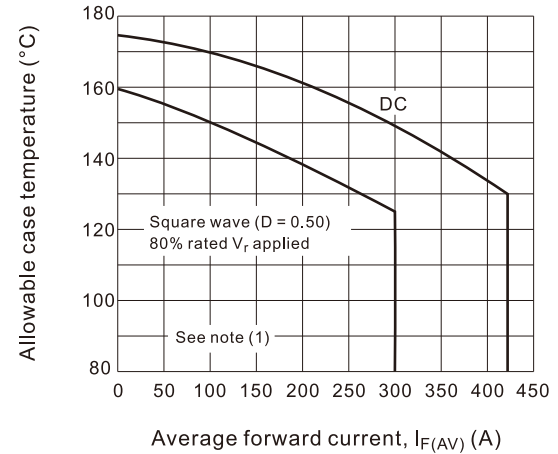


Fig.6 Forward power loss characteristics (Per Leg)

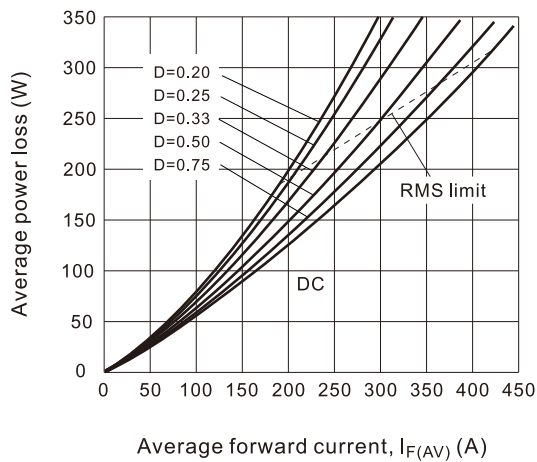


Fig.7 Maximum non-repetitive surge current (Per Leg)

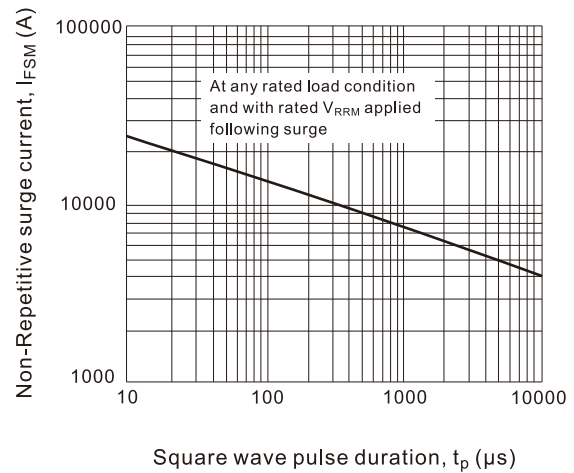
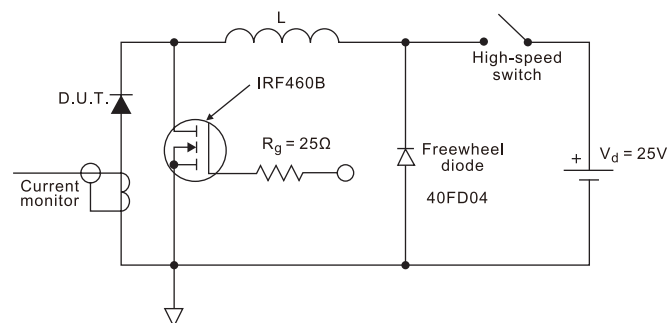


Fig.8 Unclamped Inductive test circuit



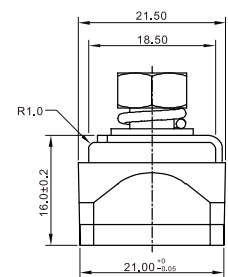
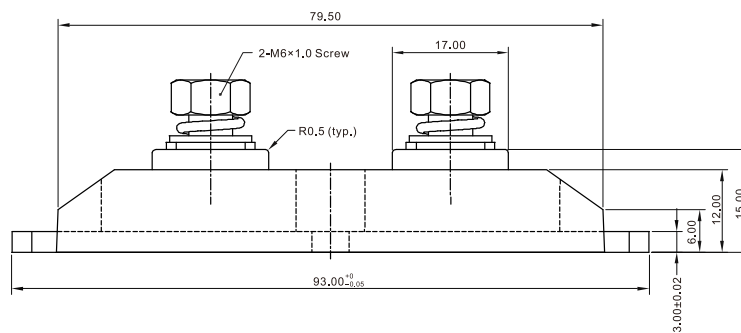
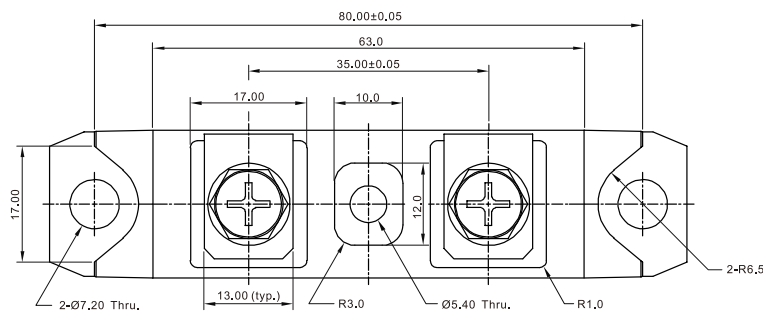
Note

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

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-244M (Non-Insulated)



All dimensions in millimeters