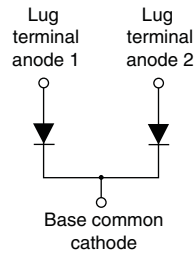




Schottky Rectifier, 300 A



TO-244



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



RoHS
COMPLIANT

DESCRIPTION

The 301CNQ... center tap 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 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)}	300 A
V _R	40/45 V

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}	Rectangular waveform	300	A
V _{R(RM)}	Range	40/45	V
I _{F(SM)}	t _p = 5 μs sine	16 000	A
V _F	150 Apk, T _J = 125 °C (per leg)	0.59	V
T _J	Range	- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	301CNQ040PbF	301CNQ045PbF	UNITS
Maximum DC reverse voltage	V _R	40	45	V
Maximum working peak reverse voltage	V _{R(WM)}			

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	I _{F(AV)}	50 % duty cycle at T _C = 132 °C, rectangular waveform	150	A
			300	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I _{F(SM)}	5 μs sine or 3 μs rect. pulse	16 000	A
		10 ms sine or 6 ms rect. pulse	3200	
Non-repetitive avalanche energy per leg	E _{AS}	T _J = 25 °C, I _{AS} = 21 A, L = 1 mH	202	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 x V _R typical	30	A

301CNQ...PbF Series



Vishay High Power Products Schottky Rectifier, 300 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	150 A	$T_J = 25\text{ }^\circ\text{C}$	0.69	V
		300 A		0.90	
		150 A	$T_J = 100\text{ }^\circ\text{C}$	0.59	
		300 A		0.76	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	10	mA
		$T_J = 125\text{ }^\circ\text{C}$		90	
Maximum junction capacitance per leg	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C		5200	pF
Typical series inductance per leg	L_S	From top of terminal hole to mounting plane		7.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/ μ s

Note

(1) Pulse width < 300 μ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}	- 55	-	175	°C
Thermal resistance, junction to case per leg	R_{thJC}	-	-	0.28	°C/W
Thermal resistance, junction to case per module		-	-	0.14	
Thermal resistance, case to heatsink	R_{thCS}	-	0.10	-	
Weight		-	68	-	g
		-	2.4	-	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	



301CNQ...PbF Series

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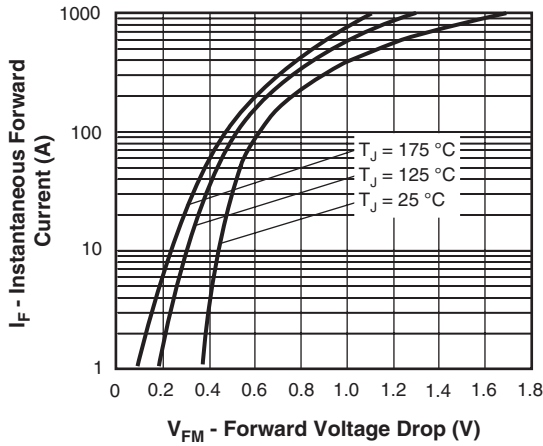


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

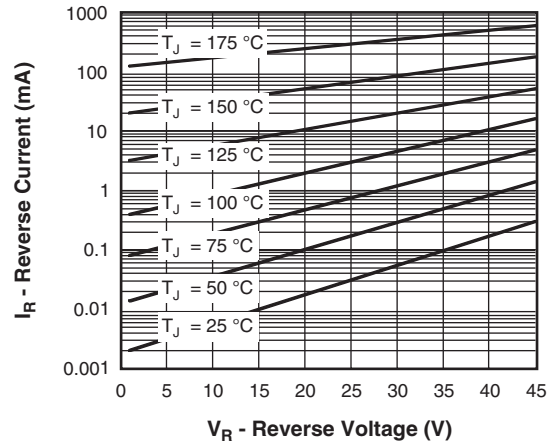


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

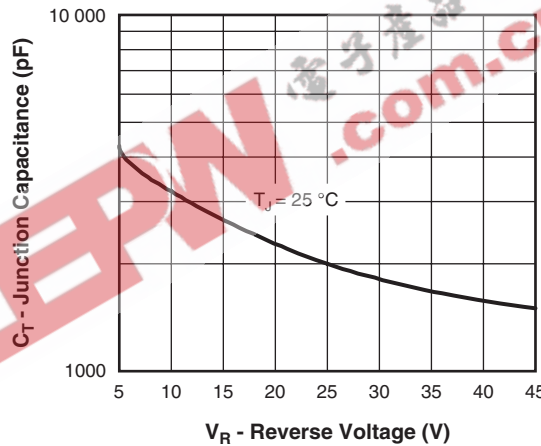


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

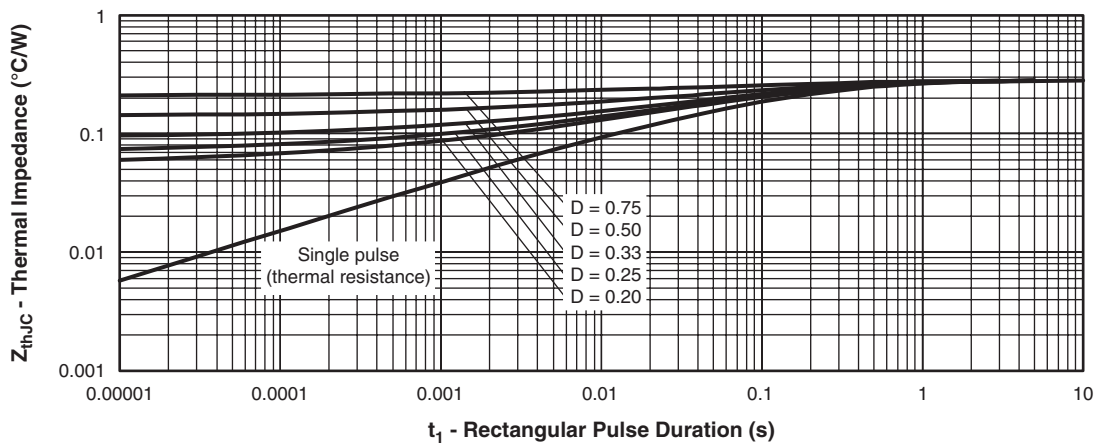


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

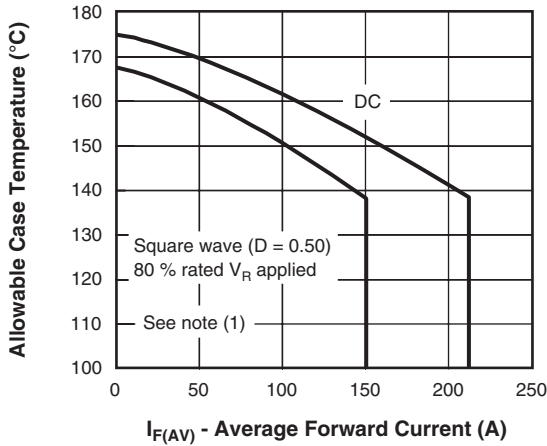


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

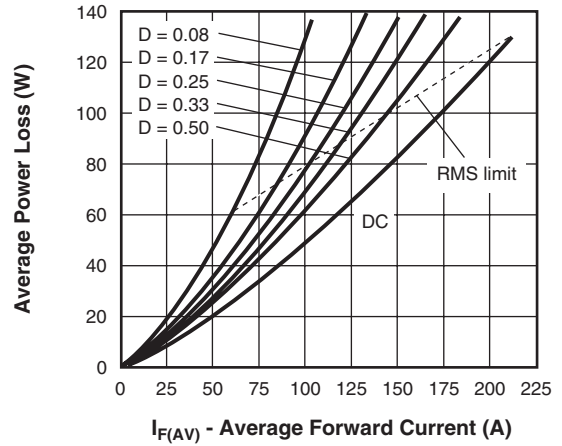


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

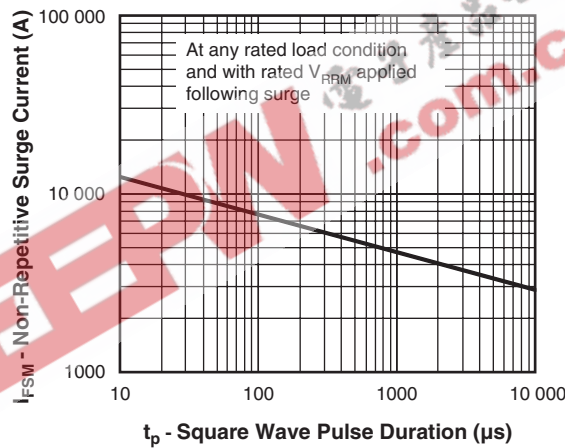


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

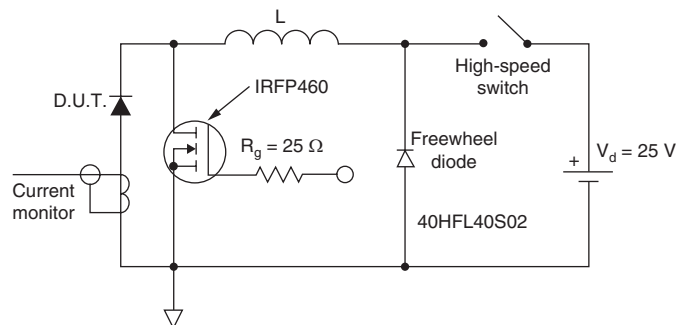


Fig. 8 - Unclamped Inductive Test Circuit

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



301CNQ...PbF Series

Schottky Rectifier, 300 A Vishay High Power Products

ORDERING INFORMATION TABLE

Device code	30	1	C	N	Q	045	PbF
	①	②	③	④	⑤	⑥	⑦

- 1** - Average current rating (x 10)
- 2** - Product silicon identification
- 3** - C = Circuit configuration
- 4** - N = Not isolated
- 5** - Q = Schottky rectifier diode
- 6** - Voltage ratings
 - 040 = 40 V
 - 045 = 45 V
- 7** - Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95021



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