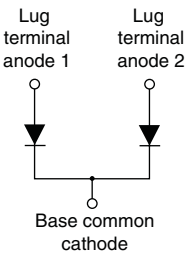
Schottky Rectifier, 300 A

TO-244



FEATURES

- 150 °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 300CNQ... 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 150 °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	45 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	300	A
V_{RRM}		45	V
I_{FSM}	t_p = 5 µs sine	27 000	A
V_F	150 Apk, T_J = 125 °C (per leg)	0.56	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	300CNQ045PbF	UNITS
Maximum DC reverse voltage	V_R	45	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current per leg	$I_{F(AV)}$	50 % duty cycle at T_C = 111 °C, rectangular waveform		150	A
Maximum average forward current per device See fig. 5				300	
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	27 000	
		10 ms sine or 6 ms rect. pulse		2400	
Non-repetitive avalanche energy per leg	E_{AS}	T_J = 25 °C, I_{AS} = 18 A, L = 1 mH		150	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

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 °C	0.61	V
		300 A		0.77	
		150 A	T_J = 125 °C	0.56	
		300 A		0.75	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	15	mA
		T_J = 125 °C		1100	
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		7750	pF
Typical series inductance per leg	L_S	From top of terminal hole to mounting plane		6.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs

Note

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

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range		T_J, T_{Stg}	- 55	-	150	°C
Thermal resistance, junction to case	per leg	R_{thJC}	-	-	0.28	°C/W
	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	

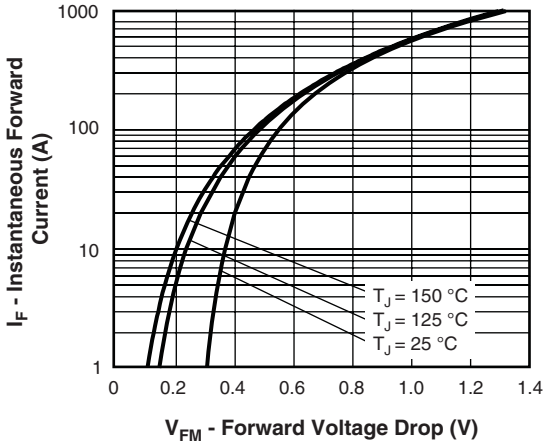


Fig. 1 - Maximum Forward Voltage Drop Characteristics

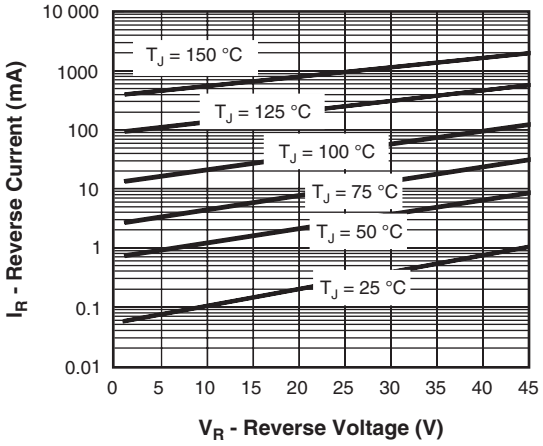


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

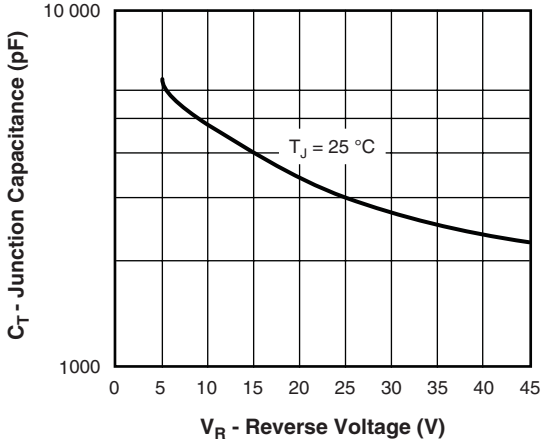


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

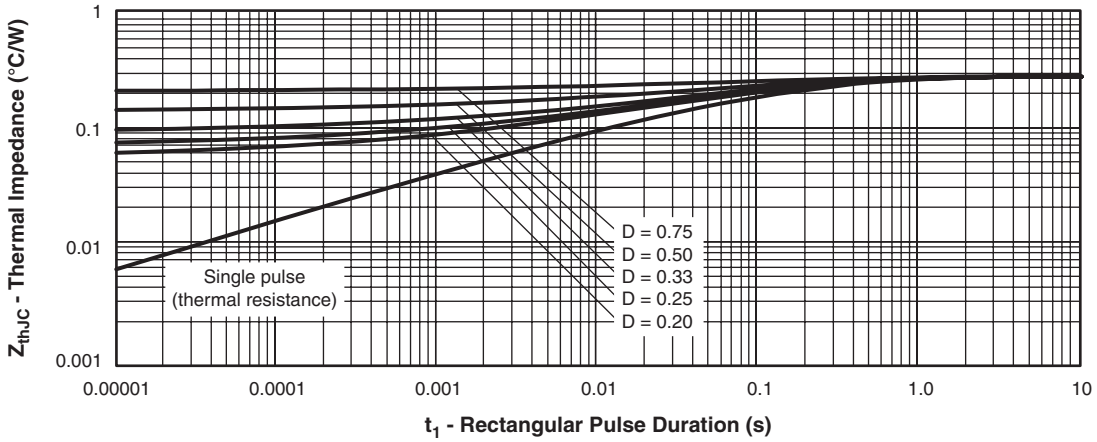


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

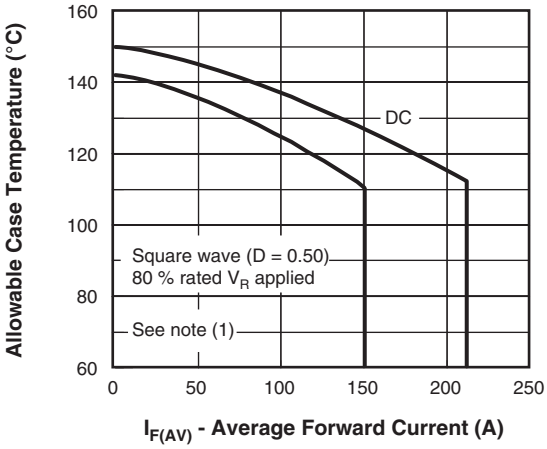


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

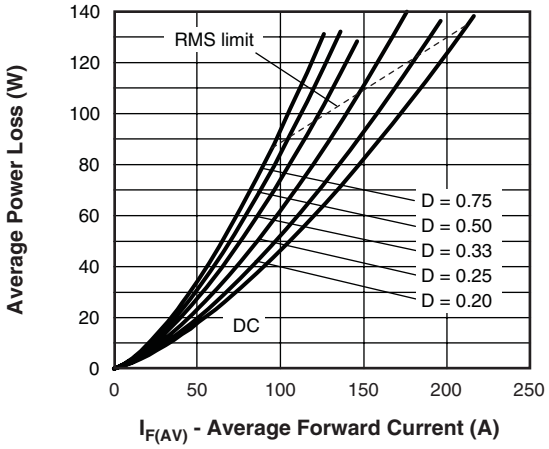


Fig. 6 - Forward Power Loss Characteristics

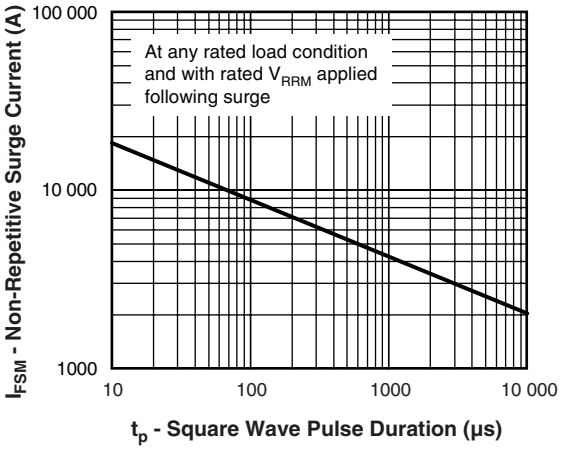


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

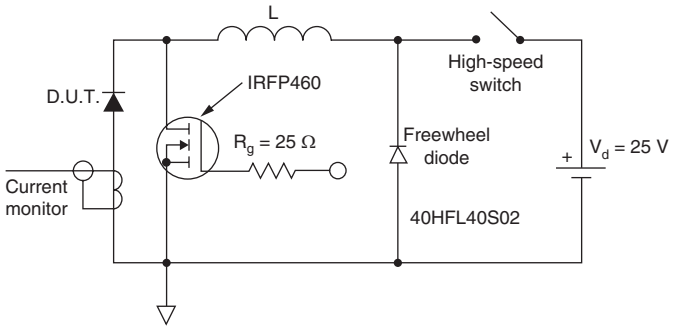


Fig. 8 - Unclamped Inductive Test Circuit

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

ORDERING INFORMATION TABLE

Device code

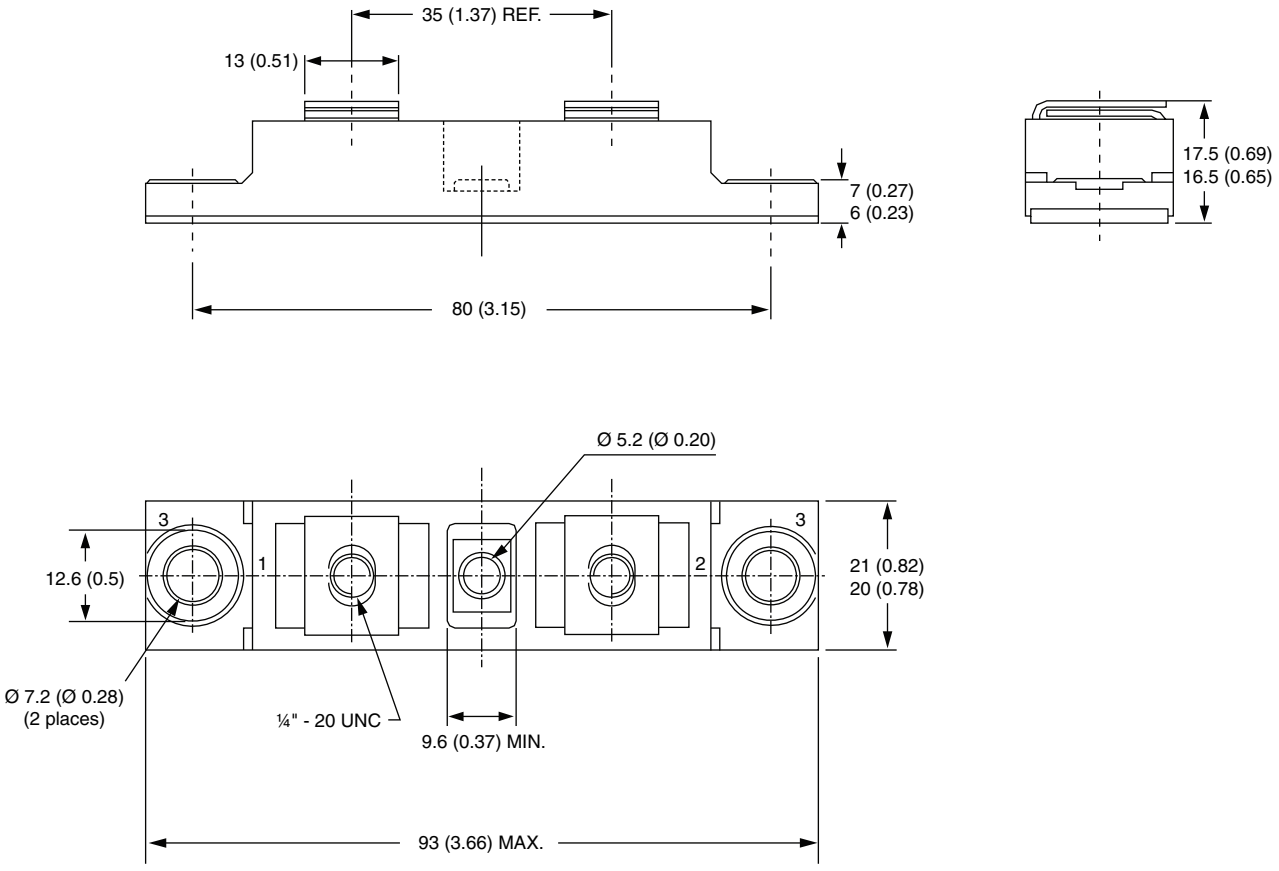
30	0	C	N	Q	045	PbF
1	2	3	4	5	6	7

- 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 rating (045 = 45 V)
- 7 - Lead (Pb)-free

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

TO-244

DIMENSIONS in millimeters (inches)



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.