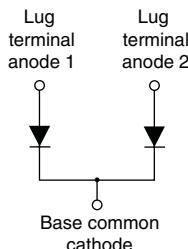


## Schottky Rectifier, 300 A



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  
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### 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
$V_{RRM}$	Range	40/45	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	16 000	A
$V_F$	150 Apk, $T_J = 125^\circ C$ (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	$V_{RWM}$			

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current per leg See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 132^\circ C$ , rectangular waveform		150	A
Maximum peak one cycle non-repetitive surge current per leg See fig. 7		5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	300	
Non-repetitive avalanche energy per leg	$E_{AS}$	10 ms sine or 6 ms rect. pulse		16 000	
Repetitive avalanche current per leg	$I_{AR}$			3200	
		Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical		202	mJ
				30	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	150 A	$T_J = 25 \text{ }^\circ\text{C}$	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	$C_T$	$V_R = 5 \text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25 \text{ }^\circ\text{C}$		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/μs	

**Note**

(1) Pulse width &lt; 300 μs, duty cycle &lt; 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	

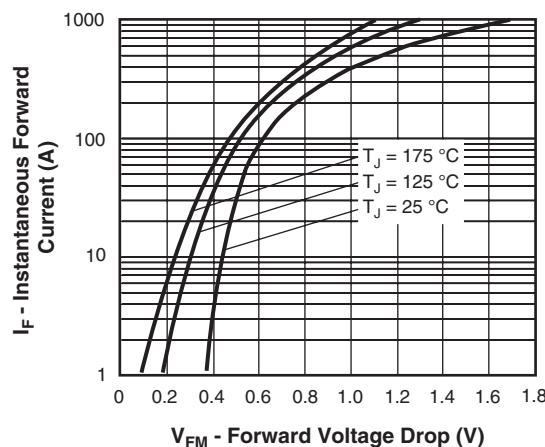


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

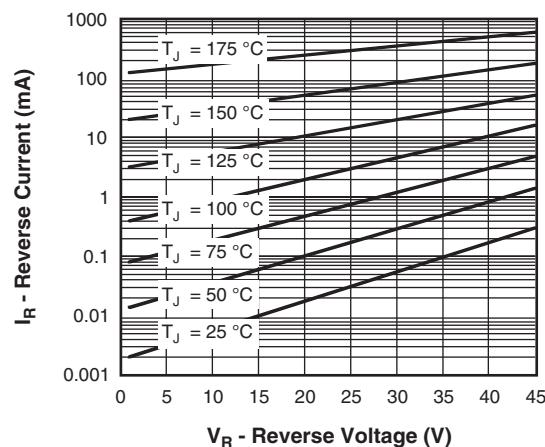


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

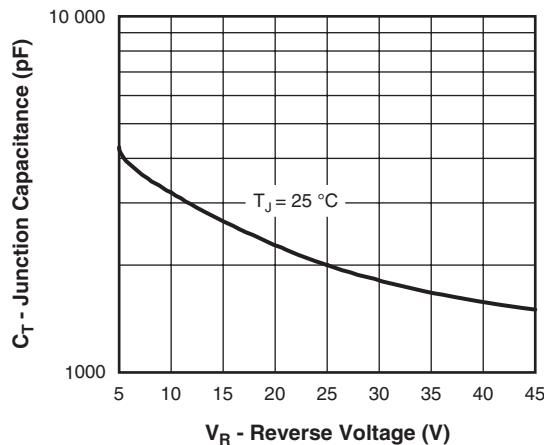


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

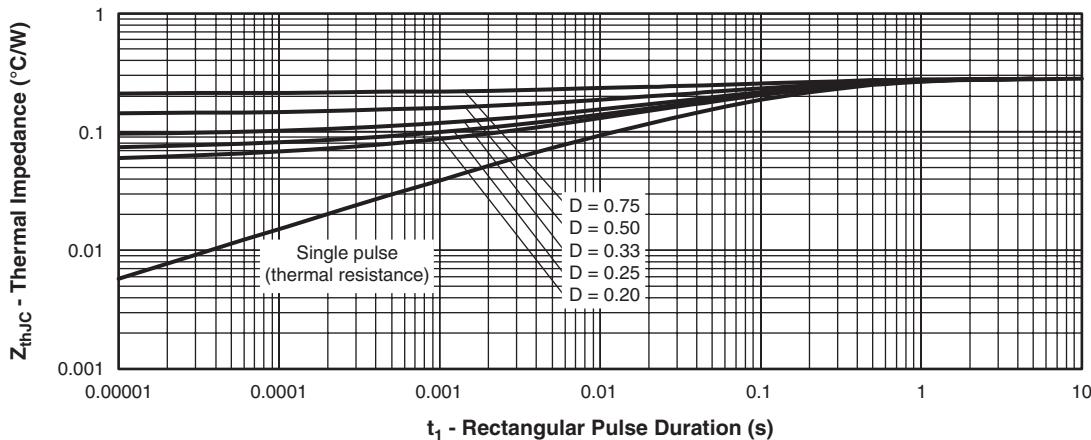


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

# 301CNQ...PbF Series

Vishay High Power Products Schottky Rectifier, 300 A

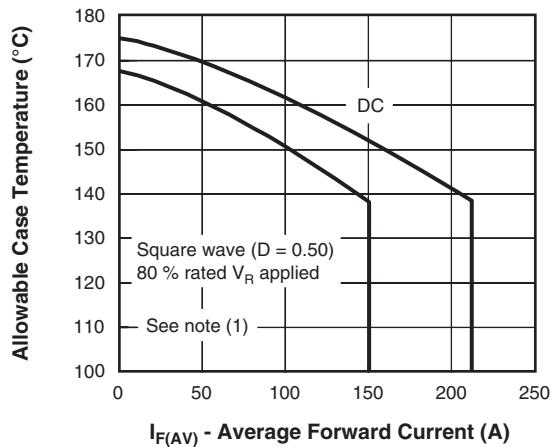


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

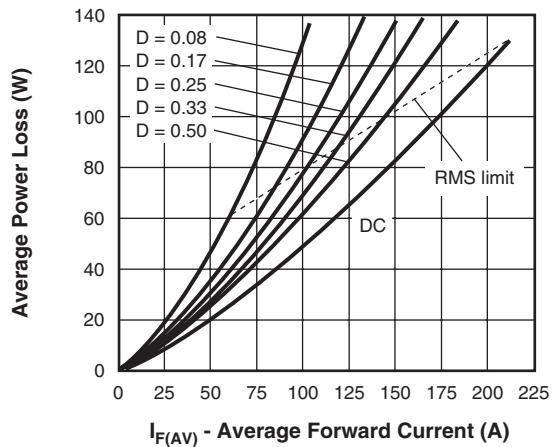


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

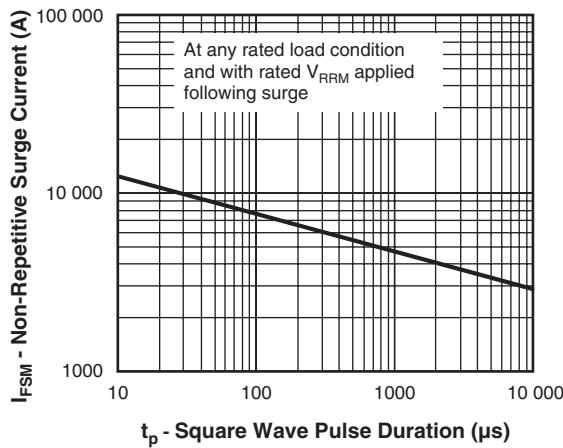


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

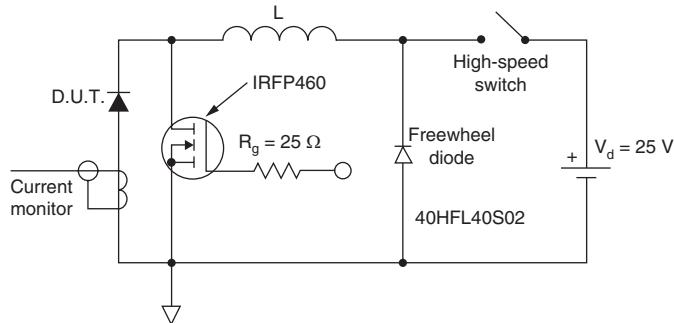


Fig. 8 - Unclamped Inductive Test Circuit

## Note

(1) Formula used:  $T_C = T_J - (P_d + P_{d,REV}) \times R_{thJC}$   
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d,REV} = \text{Inverse power loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

**ORDERING INFORMATION TABLE**

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

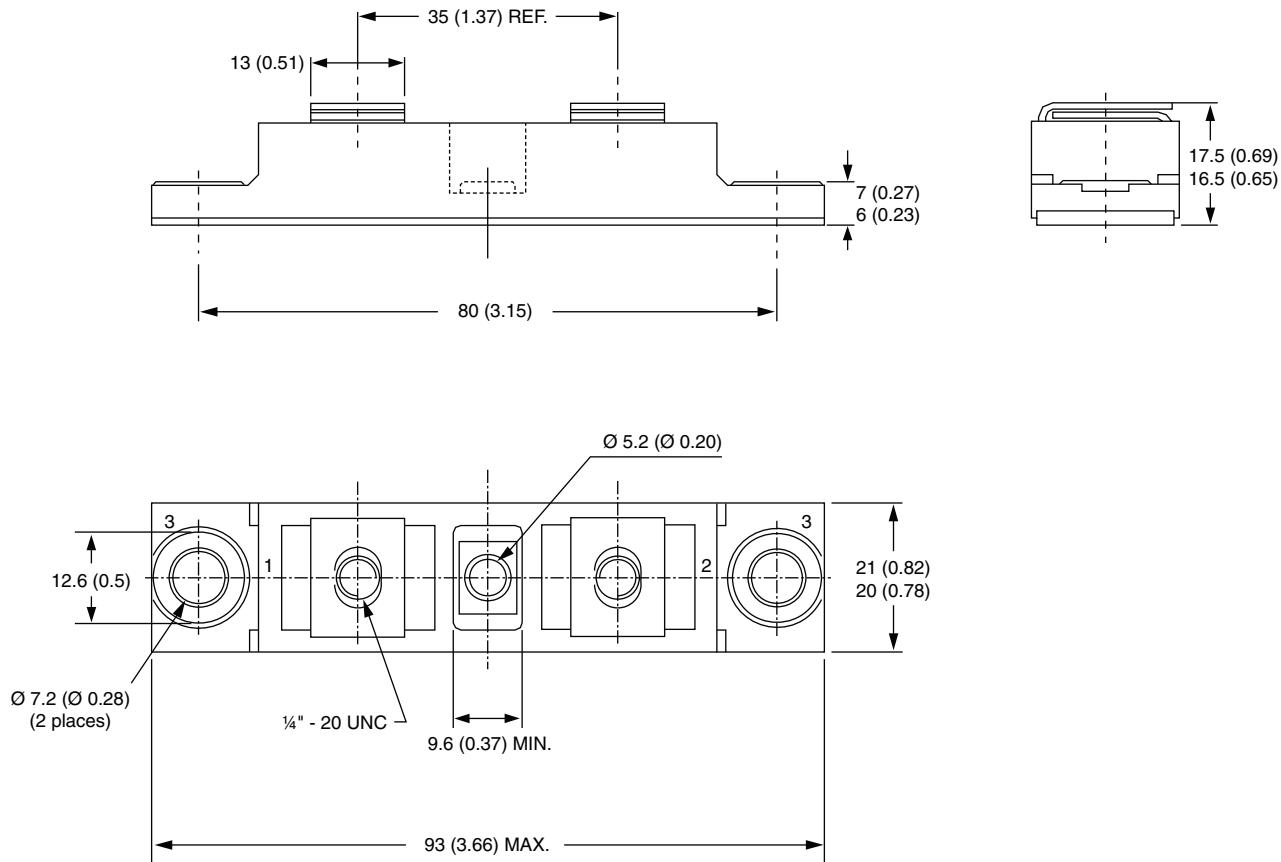
<b>1</b>	- Average current rating (x 10)
<b>2</b>	- Product silicon identification
<b>3</b>	- C = Circuit configuration
<b>4</b>	- N = Not isolated
<b>5</b>	- Q = Schottky rectifier diode
<b>6</b>	- Voltage ratings
<b>7</b>	- Lead (Pb)-free

040 = 40 V  
045 = 45 V

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95021">http://www.vishay.com/doc?95021</a>

### TO-244

#### DIMENSIONS in millimeters (inches)



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