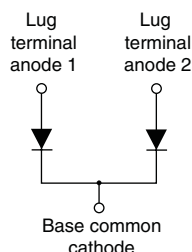


## Schottky Rectifier, 300 A



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

### PRODUCT SUMMARY

$I_{F(AV)}$	300 A
$V_R$	40/45 V

### 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.

### 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 See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 132\text{ }^{\circ}\text{C}$ , rectangular waveform		150	A
per leg per device				300	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	16 000	
		10 ms sine or 6 ms rect. pulse		3200	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25\text{ }^{\circ}\text{C}$ , $I_{AS} = 21\text{ A}$ , $L = 1\text{ mH}$		202	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical		30	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	V <sub>FM</sub> <sup>(1)</sup>	150 A	T <sub>J</sub> = 25 °C	0.69	V
		300 A		0.90	
		150 A	T <sub>J</sub> = 100 °C	0.59	
		300 A		0.76	
Maximum reverse leakage current per leg See fig. 2	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	10	mA
		T <sub>J</sub> = 125 °C		90	
Maximum junction capacitance per leg	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz) 25 °C		5200	pF
Typical series inductance per leg	L <sub>S</sub>	From top of terminal hole to mounting plane		7.0	nH
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		10 000	V/μs

**Note**(1) Pulse width < 300  $\mu$ 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	$^{\circ}\text{C}$
Thermal resistance, junction to case per leg	$R_{thJC}$	-	-	0.28	$^{\circ}\text{C/W}$
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	

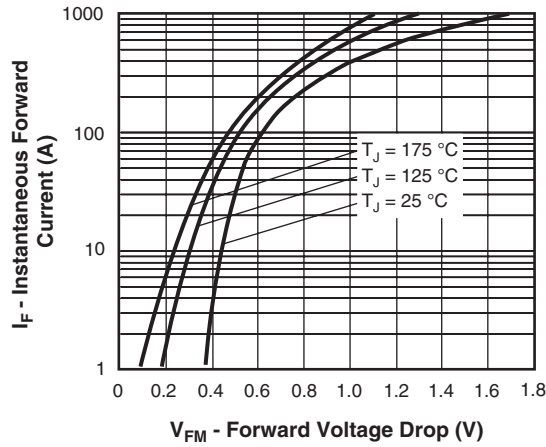


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

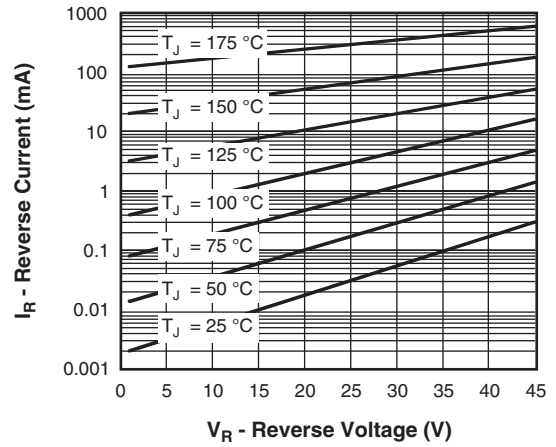


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

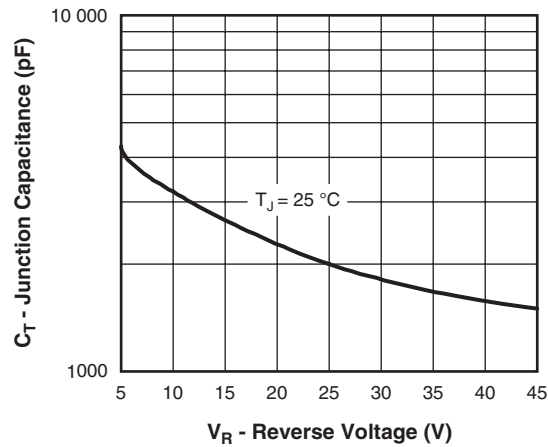


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

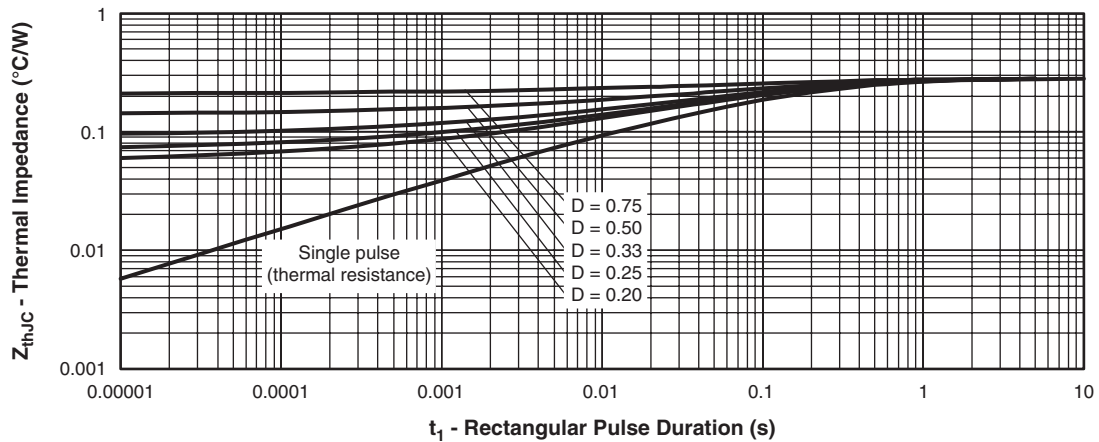


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

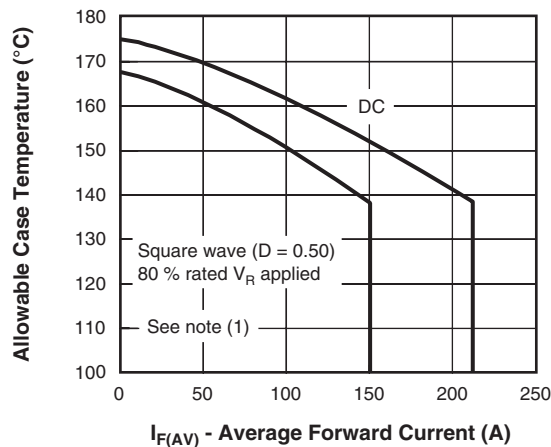


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

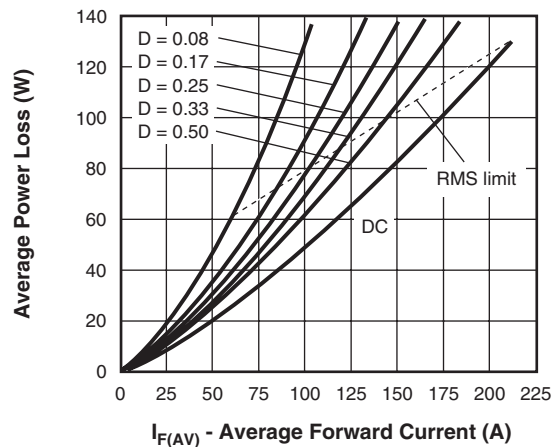


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

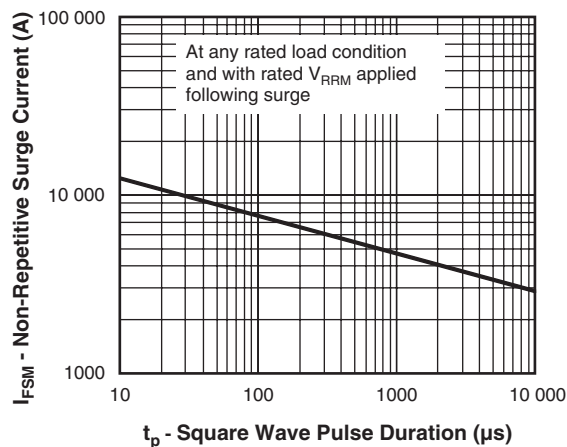


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

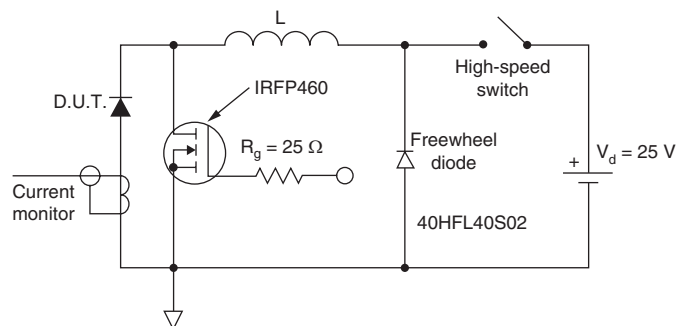


Fig. 8 - Unclamped Inductive Test Circuit

### 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  $V_R$



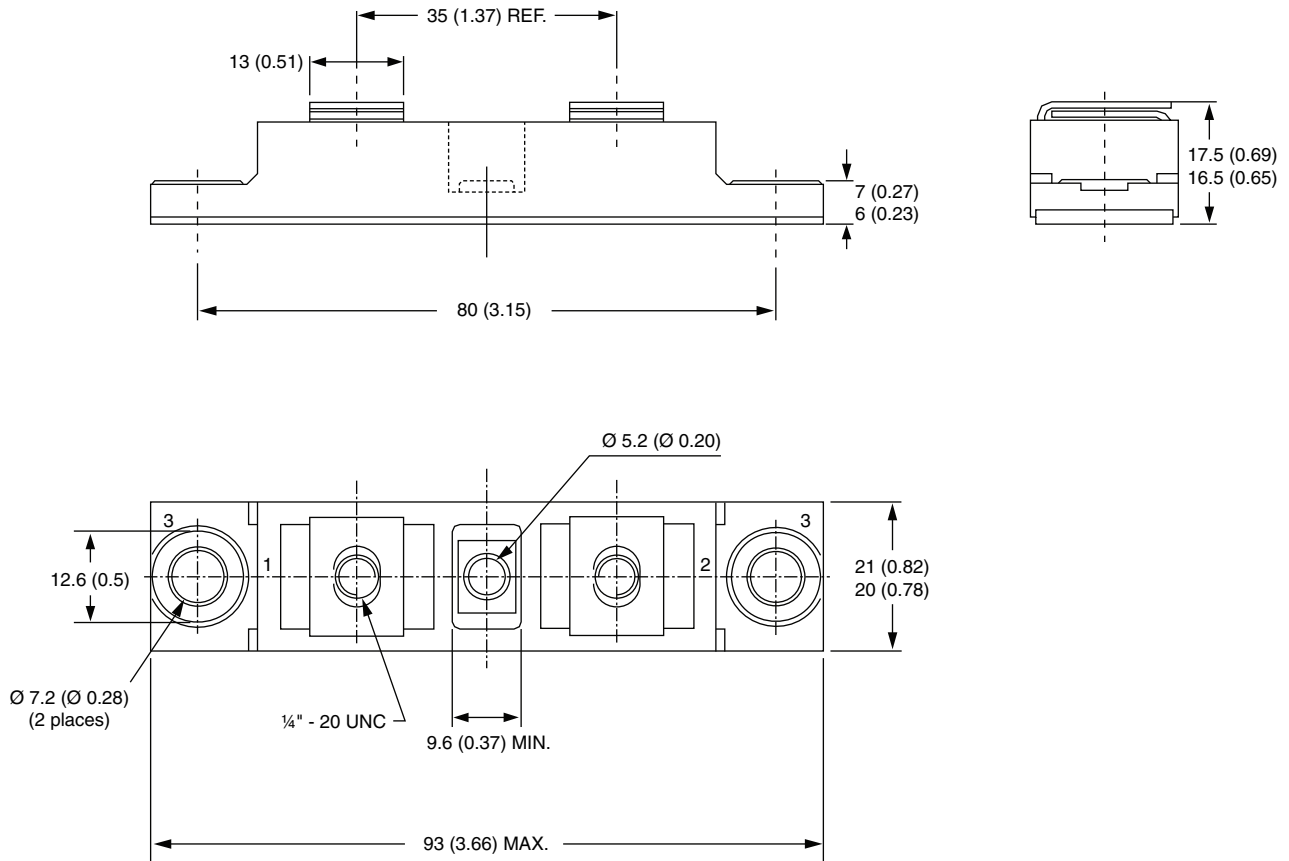
### ORDERING INFORMATION TABLE

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	<a href="http://www.vishay.com/doc?95021">http://www.vishay.com/doc?95021</a>

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**DIMENSIONS** in millimeters (inches)





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