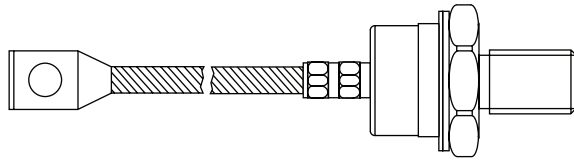


## Standard Recovery Diodes (Stud Version), 300 A



DO-205AB (DO-9)

### FEATURES

- Wide current range
- High voltage rating up to 2500 V
- High surge current capabilities
- Stud cathode and stud anode version
- High resistance to acceleration
- RoHS compliant
- Designed and qualified for industrial level


**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

$I_{F(AV)}$	300 A
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### TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	301U(R)		UNITS
		160 TO 200	250	
$I_{F(AV)}$		330	300	A
	$T_C$	120	120	°C
$I_{F(RMS)}$		520	470	A
$I_{FSM}$	50 Hz	8250	6050	A
	60 Hz	8640	6335	
$I^2t$	50 Hz	340	183	kA <sup>2</sup> s
	60 Hz	311	167	
$V_{RRM}$	Range	1600 to 2000	2500	V
$T_J$		- 40 to 180	- 40 to 180	°C

### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	$V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ MAXIMUM AT $T_J = T_J$ MAXIMUM mA
301U(R)	160	1600	1700	15
	200	2000	2100	
	250	2500	2600	

FORWARD CONDUCTION							
PARAMETER	SYMBOL	TEST CONDITIONS		301U(R)		UNITS	
				160 TO 200	250		
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		330	300	A	
				120	120	°C	
Maximum RMS forward current	$I_{F(RMS)}$	DC at $T_C = 115\text{ °C}$ (up to 2000 V), $T_C = 102\text{ °C}$ (2500 V)		520	470	A	
Maximum peak, one cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	8250	6050	A
		t = 8.3 ms			8640	6335	
		t = 10 ms	100 % $V_{RRM}$ reapplied		6940	5090	
		t = 8.3 ms			7270	5330	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reapplied		340	183	kA <sup>2</sup> s
		t = 8.3 ms			311	167	
		t = 10 ms	100 % $V_{RRM}$ reapplied		241	129	
		t = 8.3 ms			220	118	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		3400	1830	kA <sup>2</sup> √s	
Low level value of threshold voltage	$V_{F(TO)1}$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum		0.77	0.90	V	
High level value of threshold voltage	$V_{F(TO)2}$	$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum		0.84	0.97		
Low level value of forward slope resistance	$r_{f1}$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum		0.49	0.59	mΩ	
High level value of forward slope resistance	$r_{f2}$	$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum		0.49	0.55		
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 942\text{ A}$ , $T_J = T_J$ maximum, $t_p = 10\text{ ms}$ sinusoidal wave		1.22	1.46	V	

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	$T_J$		- 40 to 180	°C
Maximum storage temperature range	$T_{Stg}$		- 40 to 200	
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	0.14	K/W
Maximum thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth, flat and greased	0.08	
Maximum allowed mounting torque + 0 - 20 %		Not lubricated threads	37	N · m
		Lubricated threads	28	
Weight	301U		250 ± 5	g
	303U		152 ± 5	
	305U		177 ± 5	
	307U		197 ± 5	
	309U		160 ± 5	
Case style		See dimensions - link at the end of datasheet	DO-205AB (DO-9)	



$\Delta R_{thJC}$ CONDUCTION						
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	80 TO 200	250	80 TO 200	250		
180°	0.015	0.015	0.011	0.011	$T_J = T_J$ maximum	K/W
120°	0.018	0.018	0.019	0.019		
90°	0.023	0.023	0.025	0.025		
60°	0.034	0.034	0.035	0.035		
30°	0.056	0.056	0.057	0.057		

**Note**

- The table above shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC

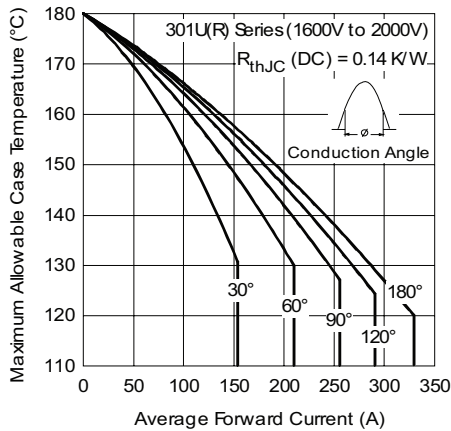


Fig. 1 - Current Ratings Characteristics

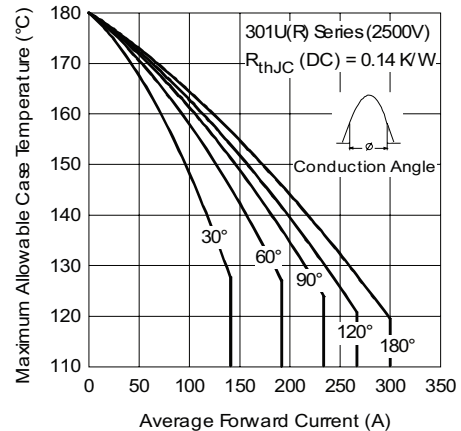


Fig. 3 - Current Ratings Characteristics

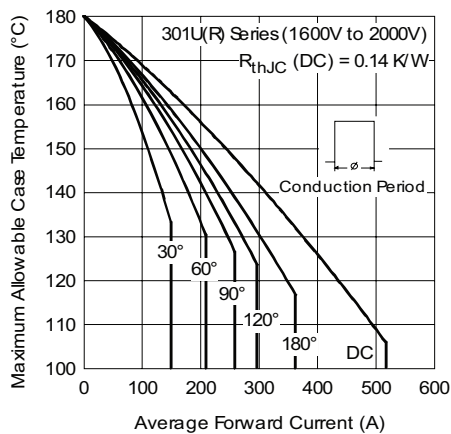


Fig. 2 - Current Ratings Characteristics

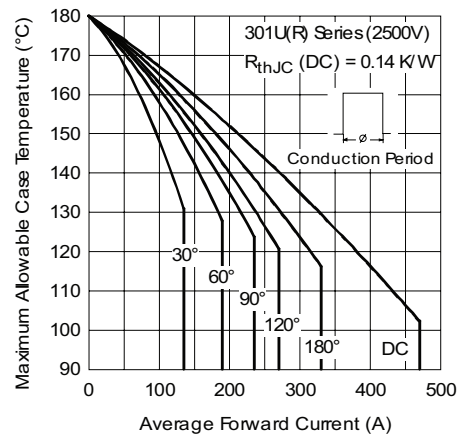


Fig. 4 - Current Ratings Characteristics

# 301U(R) Series

Vishay High Power Products Standard Recovery Diodes  
(Stud Version), 300 A

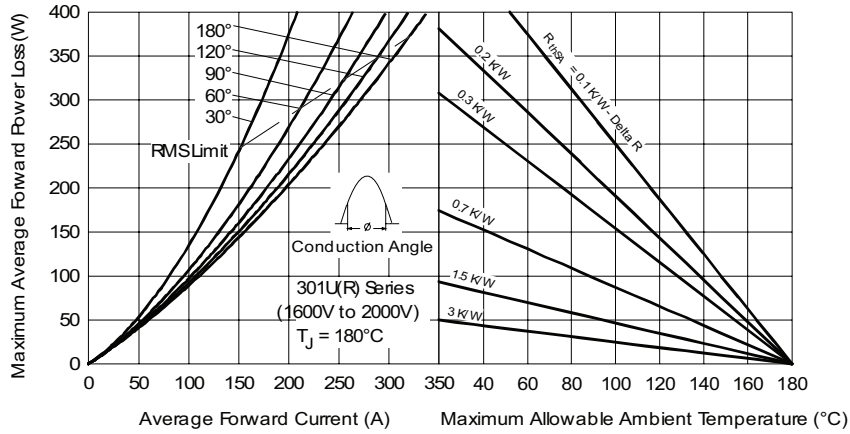


Fig. 5 - Forward Power Loss Characteristics

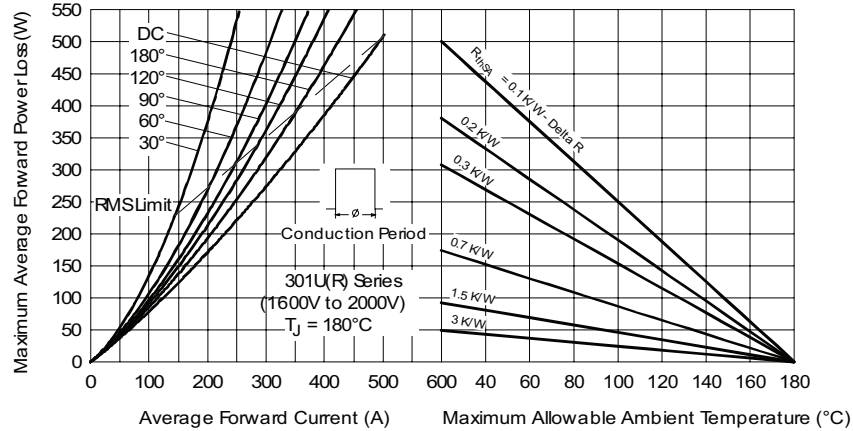


Fig. 6 - Forward Power Loss Characteristics

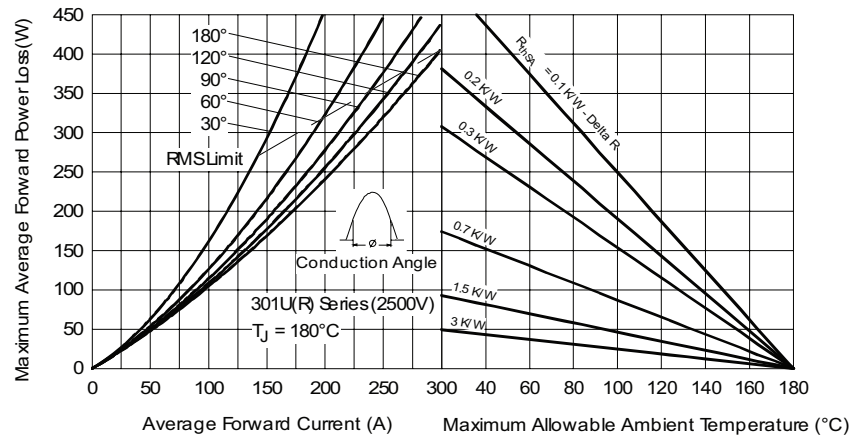


Fig. 7 - Forward Power Loss Characteristics

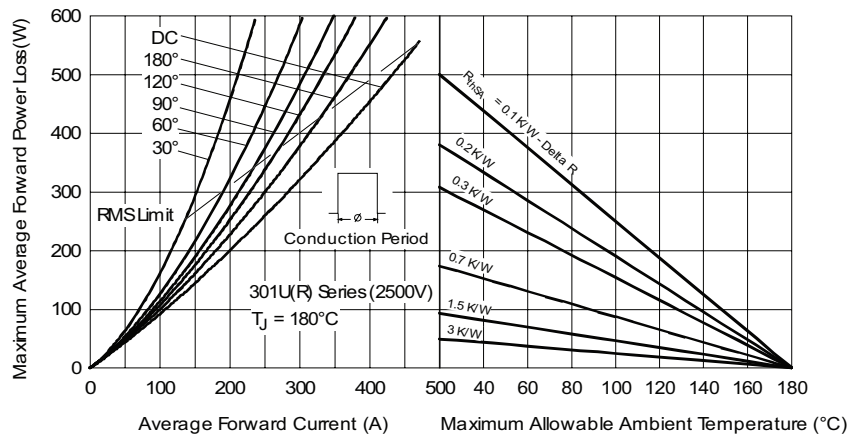


Fig. 8 - Forward Power Loss Characteristics

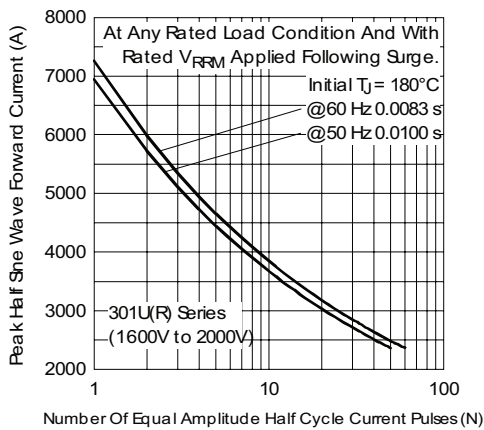


Fig. 9 - Maximum Non-Repetitive Surge Current

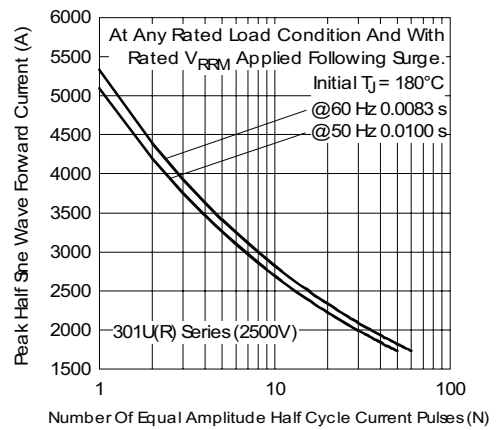


Fig. 11 - Maximum Non-Repetitive Surge Current

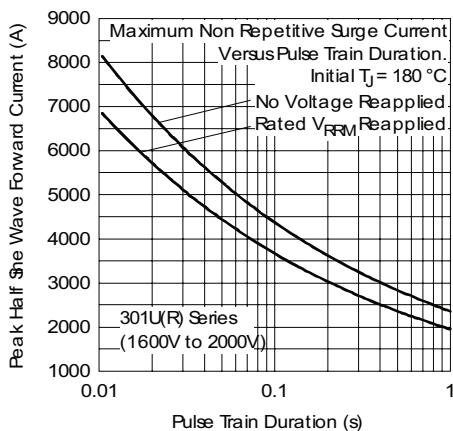


Fig. 10 - Maximum Non-Repetitive Surge Current

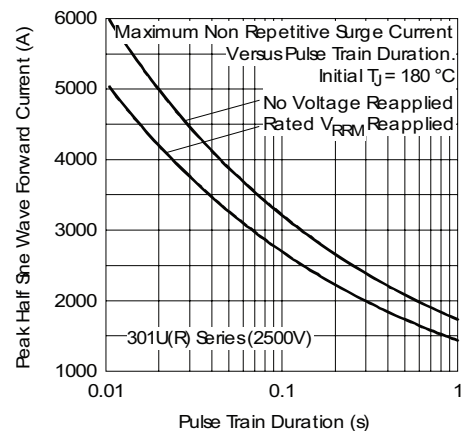


Fig. 12 - Maximum Non-Repetitive Surge Current

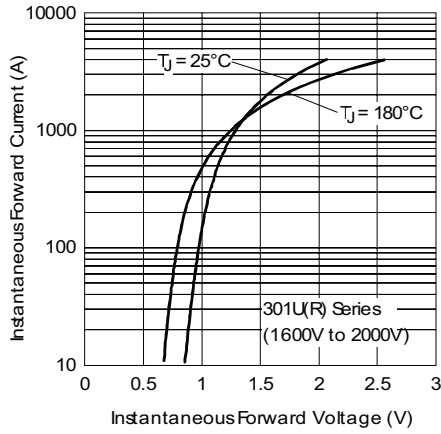


Fig. 13 - Forward Voltage Drop Characteristics

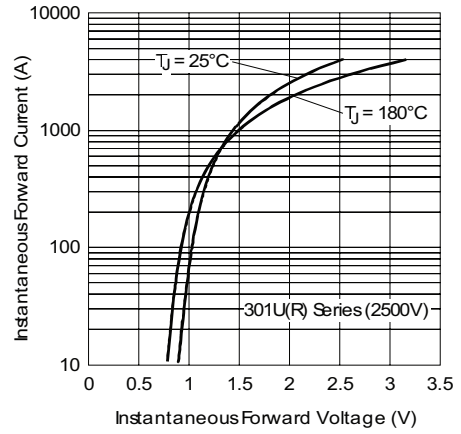


Fig. 14 - Forward Voltage Drop Characteristics

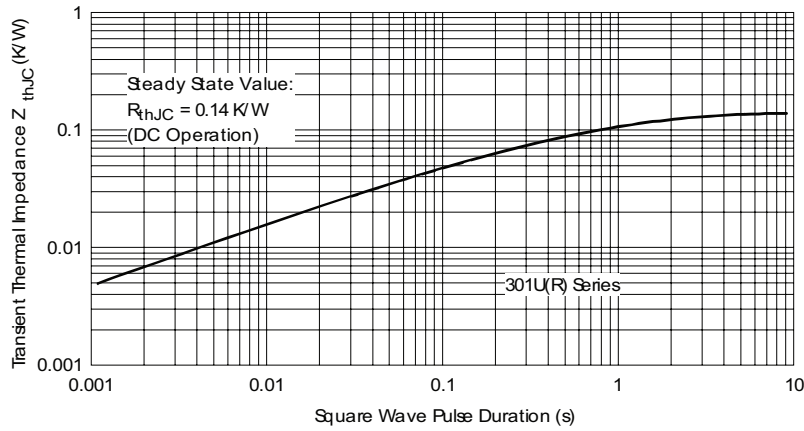
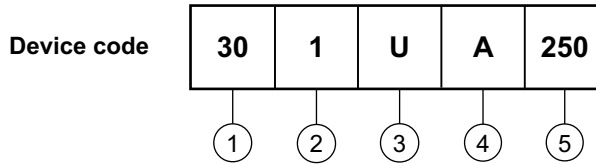


Fig. 15 - Thermal Impedance  $Z_{thJC}$  Characteristic



### ORDERING INFORMATION TABLE



- 1** - 30 = Essential part number
- 2** -
  - 1 = Standard device
  - 3 = Top threaded version
  - 5 = Type for rotating application with top threaded version 3/8 16UNC-2A
  - 7 = Type for rotating application with flexible lead
  - 9 = Type for rotating application with top threaded version 3/8 24UNF
- 3** -
  - U = Stud normal polarity (cathode to stud)
  - UR = Stud reverse polarity (anode to stud)
- 4** - A = Maximum leakage selection  $I_{RRM} = 2 \text{ mA } T_J = 25 \text{ }^\circ\text{C}$
- 5** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95337">http://www.vishay.com/doc?95337</a>



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