

301U(R) SERIES

STANDARD RECOVERY DIODES

Stud Version

Features

- Wide current range
- High voltage ratings up to 2500V
- High surge current capabilities
- Stud cathode and stud anode version

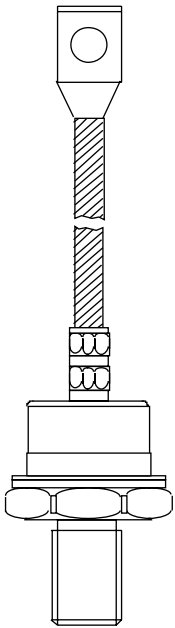
300A

Typical Applications

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

Major Ratings and Characteristics

Parameters	301U(R)		Units
	80 to 200	250	
$I_{F(AV)}$	330	300	A
@ T_C	120	120	°C
$I_{F(RMS)}$	520	470	A
I_{FSM} @ 50Hz	8250	6050	A
@ 60Hz	8640	6335	A
I^2t @ 50Hz	340	183	KA ² s
@ 60Hz	311	167	KA ² s
V_{RRM} range	800 to 2000	2500	V
T_J	- 40 to 180	- 40 to 180	°C



case style
DO-205AB (DO-9)

301U(R) Series

Bulletin I2032 rev. A 12/94

International
IR Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ $T_J = T_J$ max. mA
301U(R)	80	800	900	15
	120	1200	1300	
	160	1600	1700	
	200	2000	2100	
	250	2500	2600	

Forward Conduction

Parameter		301U(R)		Units	Conditions			
		80 to 200	250					
I _{F(AV)}	Max. average forward current @ Case temperature	330	300	A	180° conduction, half sine wave			
		120	120	°C				
I _{F(RMS)}	Max. RMS forward current	520	470	A	DC @ T _C = 115°C (08 to 20), T _C = 102°C (25)			
I _{FSM}	Max. peak, one-cycle forward, non-repetitive surge current	8250	6050	A	t = 10ms	No voltage	Sinusoidal half wave, Initial T _J = T _J max.	
		8640	6335		t = 8.3ms	reapplied		
		6940	5090		t = 10ms	100% V _{RRM}		
		7270	5330		t = 8.3ms	reapplied		
I ² t	Maximum I ² t for fusing	340	183	KA ² s	t = 10ms	No voltage		
		311	167		t = 8.3ms	reapplied		
		241	129		t = 10ms	100% V _{RRM}		
		220	118		t = 8.3ms	reapplied		
I ² √t	Maximum I ² √t for fusing	3400	1830	KA ² /s	t = 0.1 to 10ms, no voltage reapplied			
V _{F(TO)1}	Low level value of threshold voltage	0.77	0.90	V	(16.7% × π × I _{F(AV)}) < I < π × I _{F(AV)} , T _J = T _J max.			
V _{F(TO)2}	High level value of threshold voltage	0.84	0.97		(I > π × I _{F(AV)}), T _J = T _J max.			
r _{f1}	Low level value of forward slope resistance	0.49	0.59	mΩ	(16.7% × π × I _{F(AV)}) < I < π × I _{F(AV)} , T _J = T _J max.			
r _{f2}	High level value of forward slope resistance	0.49	0.55		(I > π × I _{F(AV)}), T _J = T _J max.			
V _{FM}	Max. forward voltage drop	1.22	1.46	V	I _{pk} = 942A, T _J = T _J max, t _p = 10ms sinusoidal wave			

Thermal and Mechanical Specifications

Parameter	301U(R)	Units	Conditions
T _J Max. junction operating temperature range	-40 to 180	°C	
T _{stg} Max. storage temperature range	-40 to 200		
R _{thJC} Max. thermal resistance, junction to case	0.14	K/W	DC operation
R _{thCS} Max. thermal resistance, case to heatsink	0.08		Mounting surface, smooth, flat and greased
T Max. allowed mounting torque +0 -20%	37	Nm	Not lubricated threads
	28		Lubricated threads
wt Weight	301U	g	
	303U		
	305U		
	307U		
	309U		
Case style	DO-205AB (DO-9)		See Outline Table

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction		Rectangular conduction		Units	Conditions
	80 to 200	250	00 to 200	250		
180°	0.015	0.015	0.011	0.011	K/W	T _J = T _J max.
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		

Ordering Information Table

Device Code

30	1	U	A	250	P5
1	2	3	4	5	6

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 = Max. Leakage selection $I_{RRM} = 2\text{mA } T_J = 25^\circ\text{C}$

None = Std. Leakage selection $I_{RRM} = 10\text{mA } T_J = 25^\circ\text{C}$

5

- Voltage code: Code x 10 = V_{RRM} (See Voltage Ratings table)

6

- P. = Forward selection

None = Standard Forward selection

RANGE	I_{FM} $T_J = 25^\circ\text{C}$ (A)	V_{FM} min. (V)	V_{FM} max. (V)
P2 *	1000	1.16	1.25
P3 *		1.26	1.30
P4		1.31	1.40
P5		1.41	1.45

* 2500V not available

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Outline Table

CERAMIC HOUSING 301U Case Style DO-205AB (DO-9) 19 (0.75) MAX. 24 (0.94) MAX. DIA. 8.7 (0.34) MAX. 140 (5.51) 146 (5.75) 28 (1.10) MAX. 21 (0.83) MAX. 3/4"-16UNF-2A 32 (1.26) 3.9 (0.15)	CERAMIC HOUSING 307U IR Case Style B60 19 (0.75) MAX. 11 (0.43) NOM. 12 (0.47) MIN. DIA. 8.5 (0.33) 140 (5.51) 148 (5.83) 54 (2.13) MAX. 21 (0.83) MAX. 3/4"-16UNF-2A 32 (1.26) 3.9 (0.15)
All dimensions in millimeters (inches)	
CERAMIC HOUSING 305U IR Case Style B61 3/8"-16UNC-2A 98 (3.86) MAX. 59 (2.32) MAX. 6.4 (0.25) MAX. 7 (0.28) MAX. 21 (0.83) MAX. 3/4"-16UNF-2A 32 (1.26) 16 (0.63)	CERAMIC HOUSING 309U IR Case Style B41 3/8"-24UNF-2A 97 (3.82) MAX. 60 (2.36) MAX. 7.6 (0.3) MAX. 7 (0.28) MAX. 21 (0.83) MAX. 3/4"-16UNF-2A 32 (1.26) 17.5 (0.69)

Outline Table

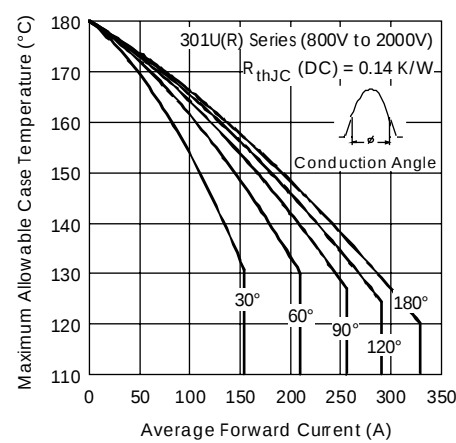
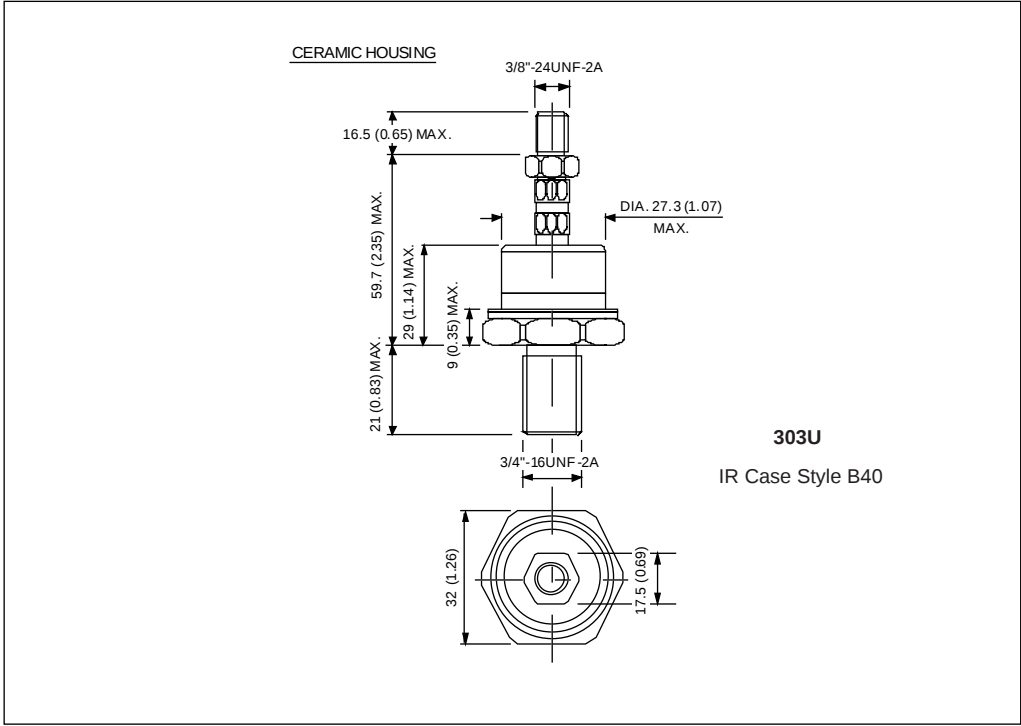


Fig. 1 - Current Ratings Characteristics

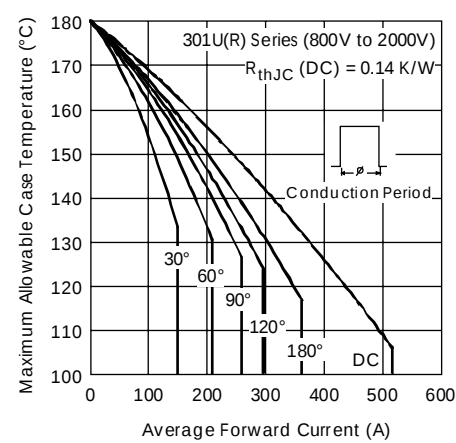


Fig. 2 - Current Ratings Characteristics

301U(R) Series

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International
IRF Rectifier

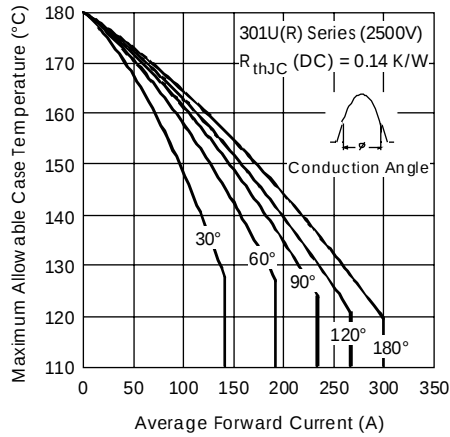


Fig. 3 - Current Ratings Characteristics

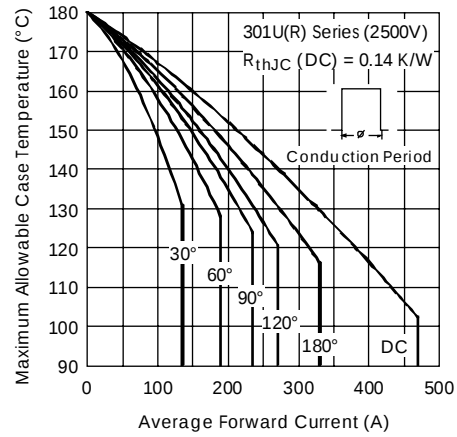


Fig. 4 - Current Ratings Characteristics

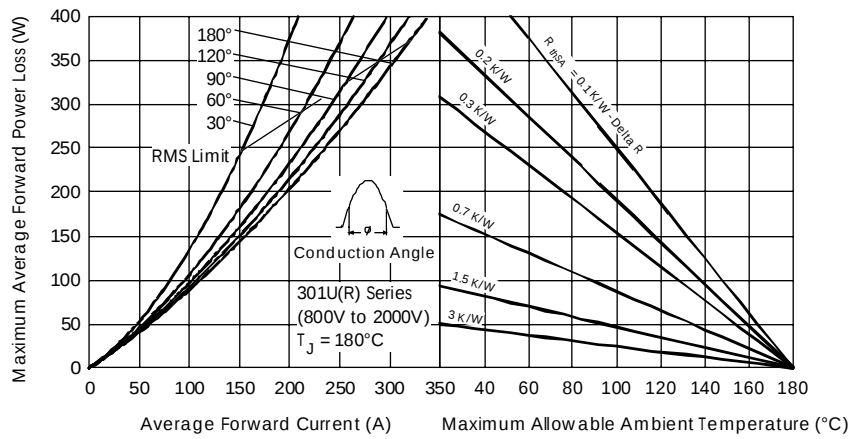


Fig. 5 - Forward Power Loss Characteristics

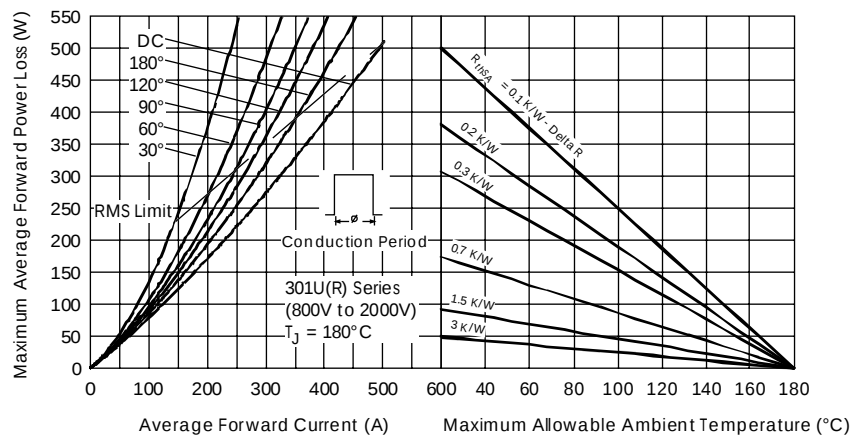


Fig. 6 - Forward Power Loss Characteristics

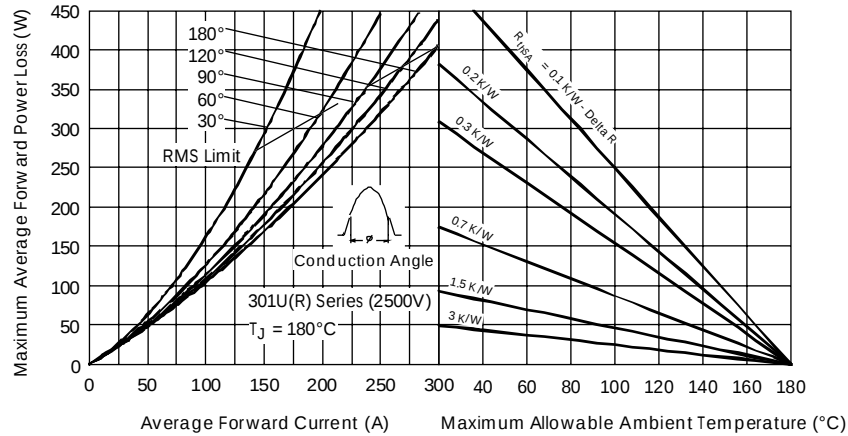


Fig. 7 - Forward Power Loss Characteristics

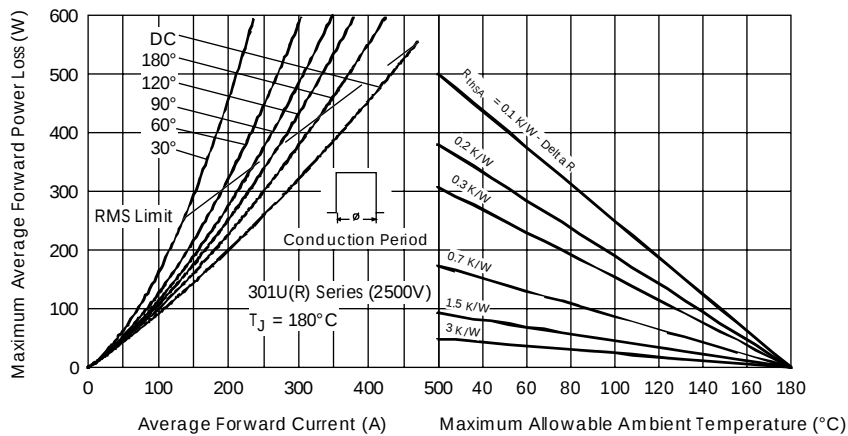


Fig. 8 - Forward Power Loss Characteristics

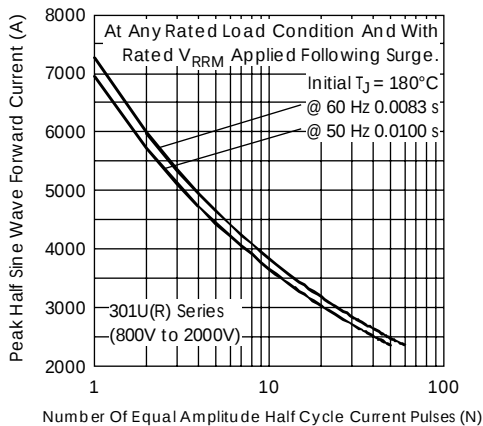


Fig. 9 - Maximum Non-Repetitive Surge Current

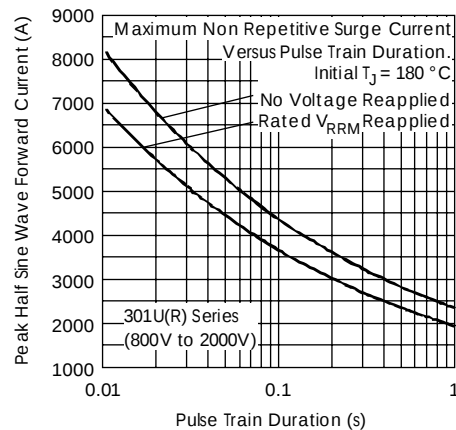


Fig. 10 - Maximum Non-Repetitive Surge Current

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International
IOR Rectifier

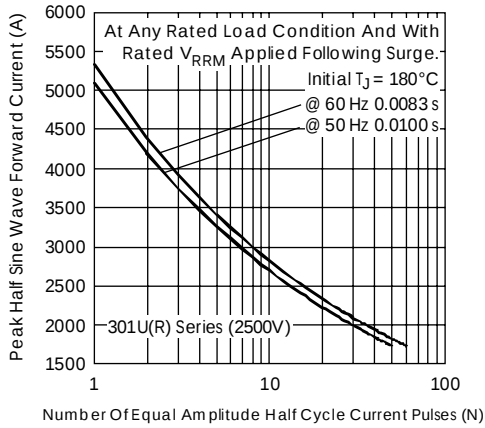


Fig. 11 - Maximum Non-Repetitive Surge Current

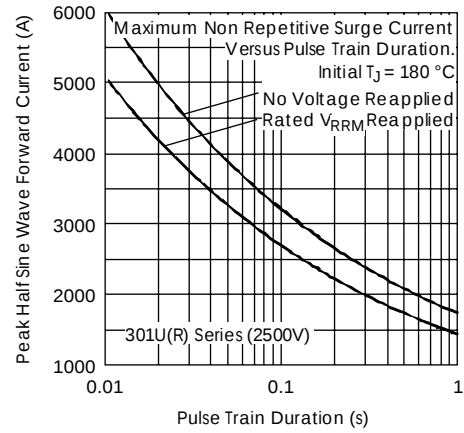


Fig. 12 - Maximum Non-Repetitive Surge Current

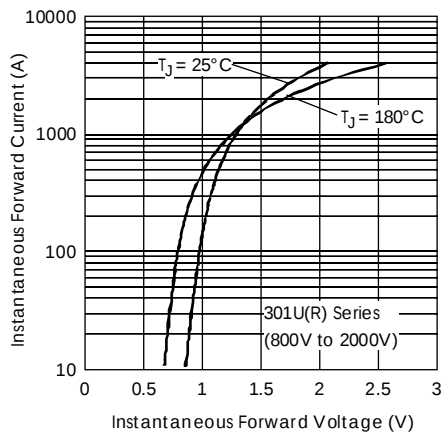


Fig. 13 - Forward Voltage Drop Characteristics

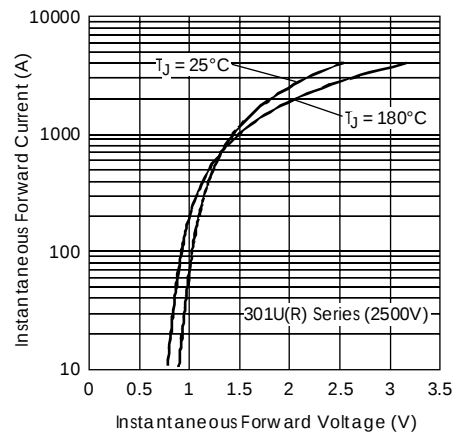


Fig. 14 - Forward Voltage Drop Characteristics

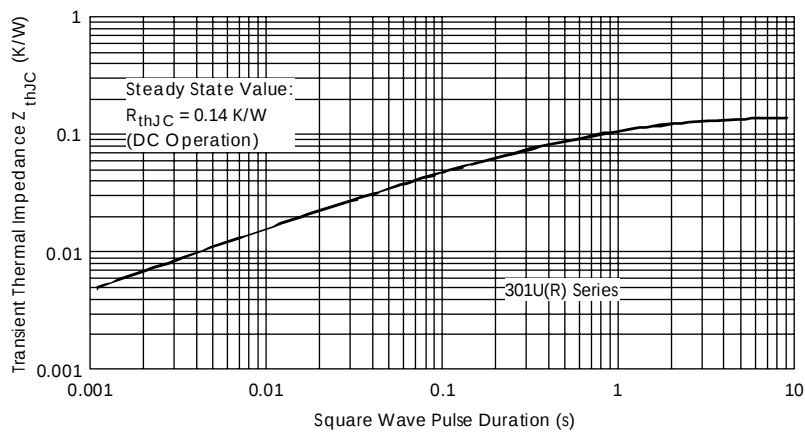


Fig. 15 - Thermal Impedance Z_{thJC} Characteristic