

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

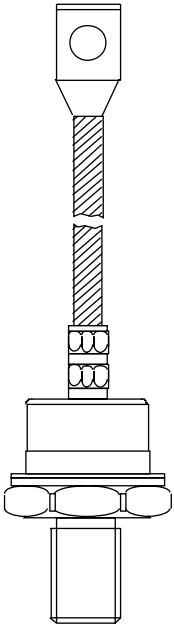
300A

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	$T_J = T_J \text{ max.}$
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

301U(R) Series

Bulletin I2032 rev. A 12/94

Outline Table

301U Case Style DO-205AB (DO-9) Side view dimensions: 19 (0.75) MAX. (top width), 24 (0.94) MAX. (top flange), DIA. 8.7 (0.34) MAX. (top hole), 140 (5.51) (total height), 146 (5.75) (height to base), 28 (1.10) MAX. (base flange), 21 (0.83) MAX. (base height), 3/4"-16UNF-2A (base thread), 32 (1.26) (bottom width), 3.9 (0.15) (bottom hole). Top view dimensions: 32 (1.26) (width), 3.9 (0.15) (hole diameter).	307U IR Case Style B60 Side view dimensions: 19 (0.75) MAX. (top width), 11 (0.43) NOM. (top flange), 12 (0.47) MIN. (top hole), DIA. 8.5 (0.33) (top hole), 140 (5.51) (total height), 148 (5.83) (height to base), 54 (2.13) MAX. (base flange), 21 (0.83) MAX. (base height), 3/4"-16UNF-2A (base thread), 32 (1.26) (bottom width), 3.9 (0.15) (bottom hole). Top view dimensions: 32 (1.26) (width), 3.9 (0.15) (hole diameter).
305U IR Case Style B61 Side view dimensions: 98 (3.86) MAX. (total height), 59 (2.32) MAX. (height to base), 6.4 (0.25) MAX. (base flange), 7 (0.28) MAX. (base height), 21 (0.83) MAX. (base height), 3/8"-16UNC-2A (top thread), 3/4"-16UNF-2A (base thread), 32 (1.26) (bottom width), 16 (0.63) (bottom hole). Top view dimensions: 32 (1.26) (width), 16 (0.63) (hole diameter).	309U IR Case Style B41 Side view dimensions: 97 (3.82) MAX. (total height), 60 (2.36) MAX. (height to base), 7.6 (0.3) MAX. (base flange), 7 (0.28) MAX. (base height), 21 (0.83) MAX. (base height), 3/8"-24UNF-2A (top thread), 3/4"-16UNF-2A (base thread), 32 (1.26) (bottom width), 17.5 (0.69) (bottom hole). Top view dimensions: 32 (1.26) (width), 17.5 (0.69) (hole diameter).

All dimensions in millimeters (inches)

Outline Table

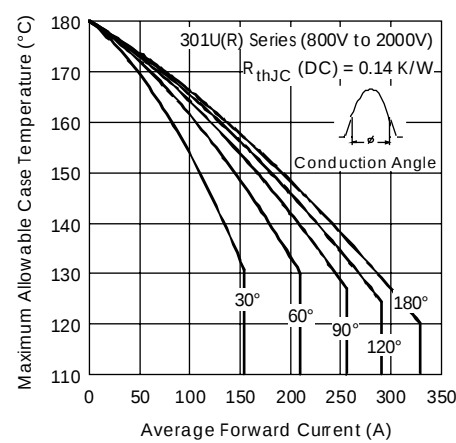
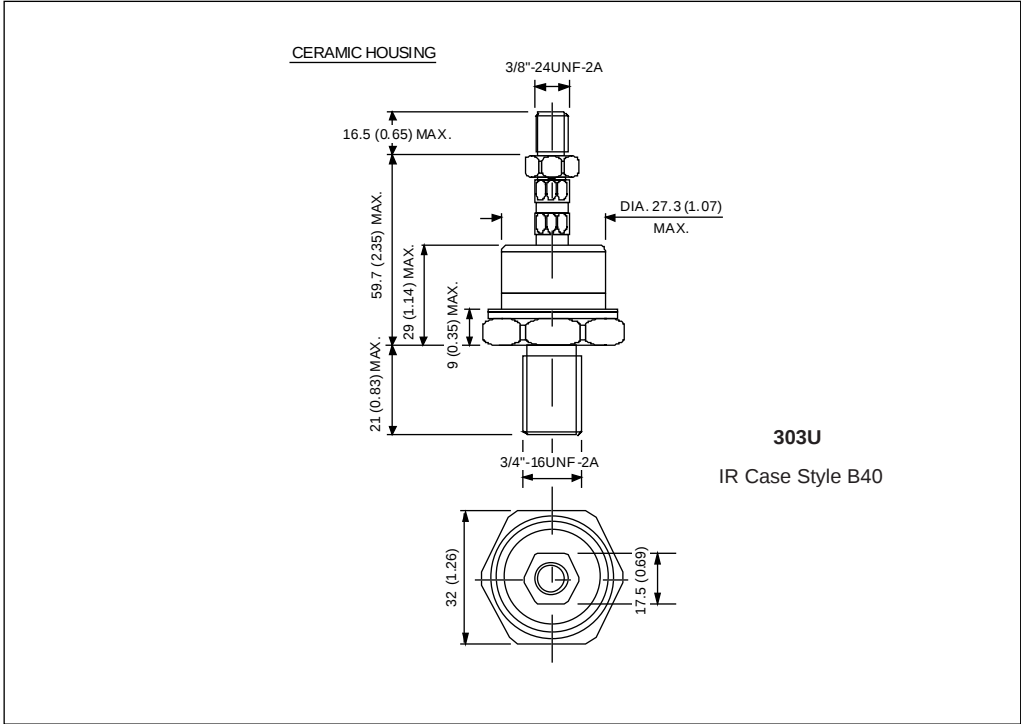


Fig. 1 - Current Ratings Characteristics

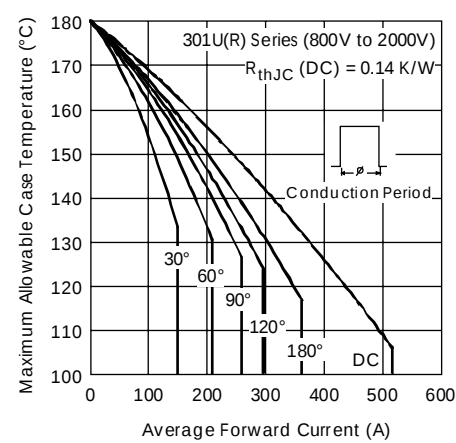


Fig. 2 - Current Ratings Characteristics

301U(R) Series

Bulletin I2032 rev. A 12/94

International
IR Rectifier

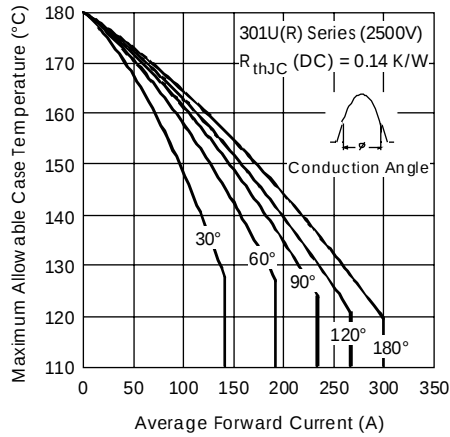


Fig. 3 - Current Ratings Characteristics

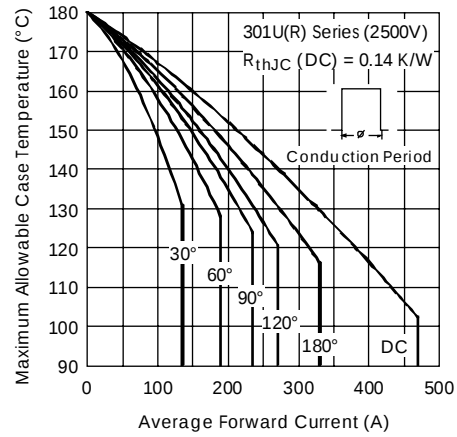


Fig. 4 - Current Ratings Characteristics

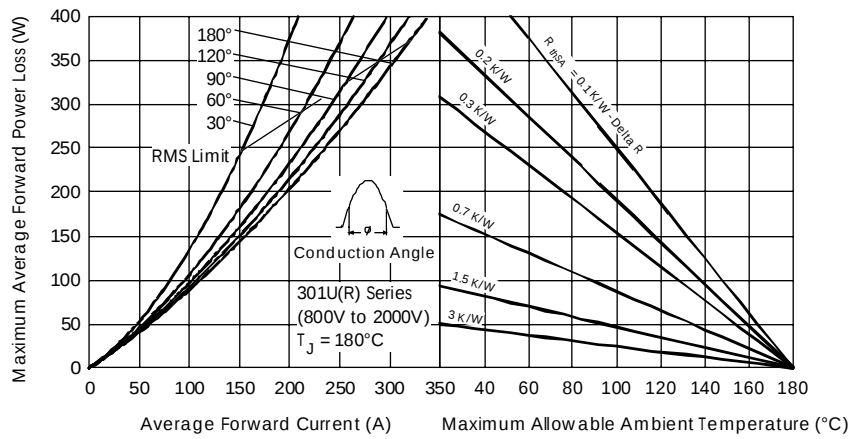


Fig. 5 - Forward Power Loss Characteristics

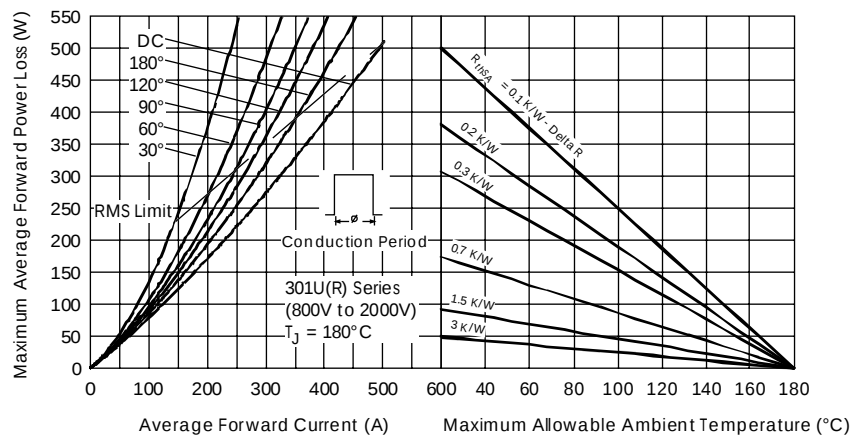


Fig. 6 - Forward Power Loss Characteristics

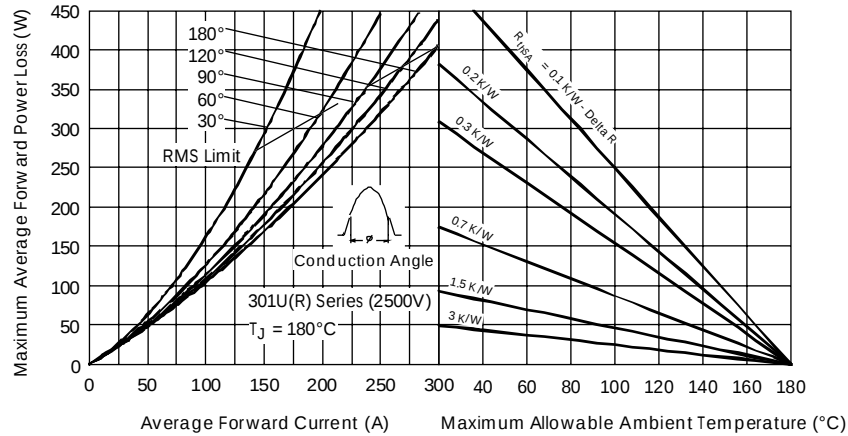


Fig. 7 - Forward Power Loss Characteristics

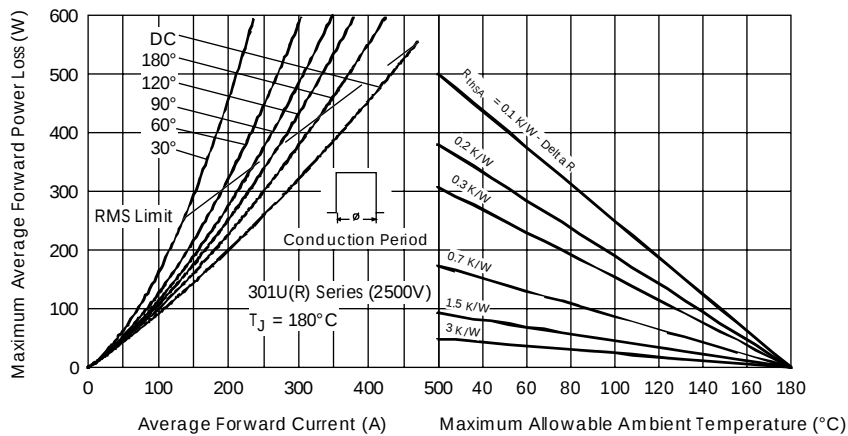


Fig. 8 - Forward Power Loss Characteristics

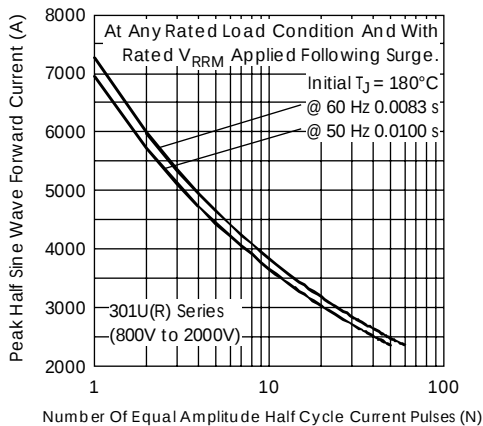


Fig. 9 - Maximum Non-Repetitive Surge Current

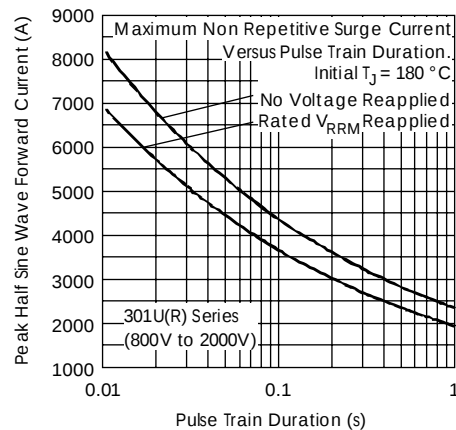


Fig. 10 - Maximum Non-Repetitive Surge Current

301U(R) Series

Bulletin I2032 rev. A 12/94

International
IR Rectifier

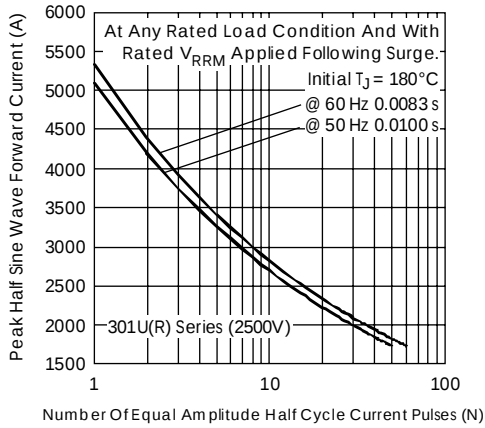


Fig. 11 - Maximum Non-Repetitive Surge Current

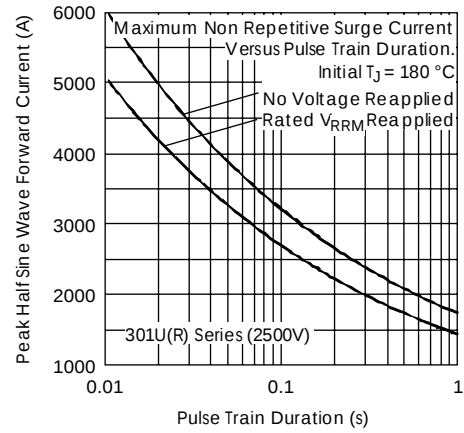


Fig. 12 - Maximum Non-Repetitive Surge Current

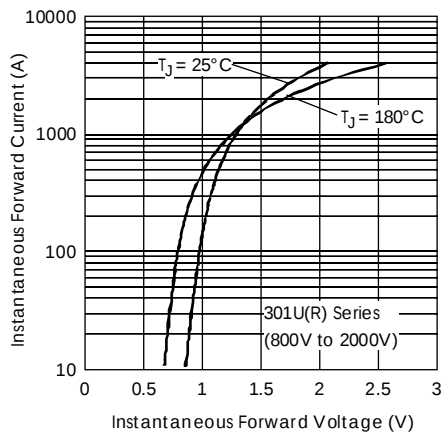


Fig. 13 - Forward Voltage Drop Characteristics

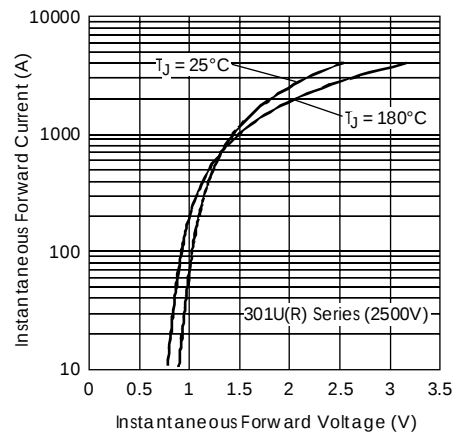


Fig. 14 - Forward Voltage Drop Characteristics

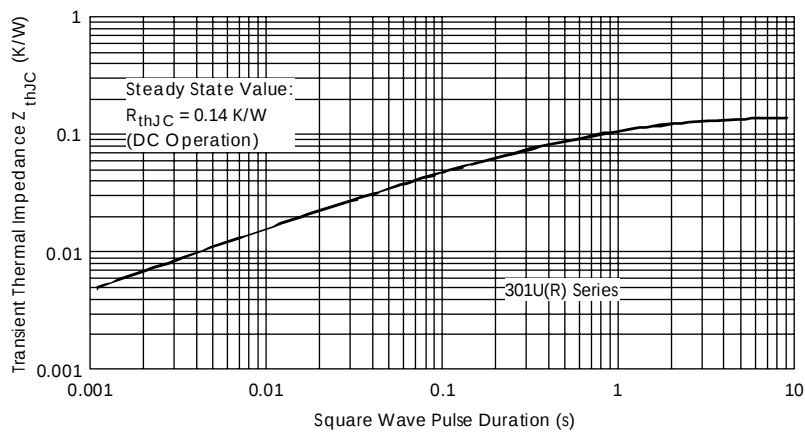


Fig. 15 - Thermal Impedance Z_{thJC} Characteristic