Bulletin I2032/A

International IOR Rectifier

301U(R) SERIES

STANDARD RECOVERY DIODES

Stud Version

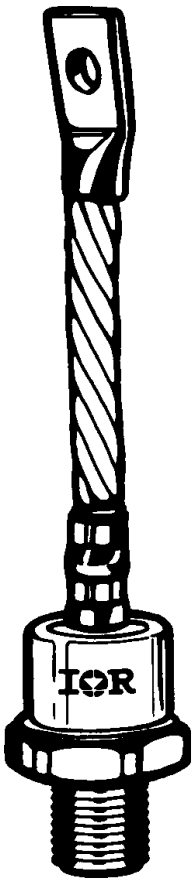
300A

Features

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

Typical Applications

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



case style
DO-205AB (DO-9)

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^2s
	@ 60Hz	311	167	KA^2s
V_{RRM} range		800 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 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) 80 to 200	301U(R) 250	Units	Conditions		
$I_{F(AV)}$	Max. average forward current	330	300	A	180° conduction, half sine wave		
	@ Case temperature	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 reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
		8640	6335		t = 8.3ms		
		6940	5090		t = 10ms	100% V_{RRM} reapplied	
		7270	5330		t = 8.3ms		
I^2t	Maximum I^2t for fusing	340	183	KA^2s	t = 10ms	No voltage reapplied	
		311	167		t = 8.3ms		
		241	129		t = 10ms	100% V_{RRM} reapplied	
		220	118		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	3400	1830	$KA^2\sqrt{s}$	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% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
$V_{F(TO)2}$	High level value of threshold voltage	0.84	0.97		(I > π x $I_{F(AV)}$),$T_J = T_J$ max.		
r_{f1}	Low level value of forward slope resistance	0.49	0.59	mΩ	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{f2}	High level value of forward slope resistance	0.49	0.55		(I > π x $I_{F(AV)}$),$T_J = T_J$ 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	250 ± 5	g	
		303U	152 ± 5		
		305U	177 ± 5		
		307U	197 ± 5		
		309U	160 ± 5		
	Case style		DO-205AB (DO-9)		See Outline Table

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistence 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} = 2mA T_J = 25°C
None = Std. Leakage selection I_{RRM}= 10mA T_J = 25°C

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

6 - P. = Forward selection
None = Standard Forward selection

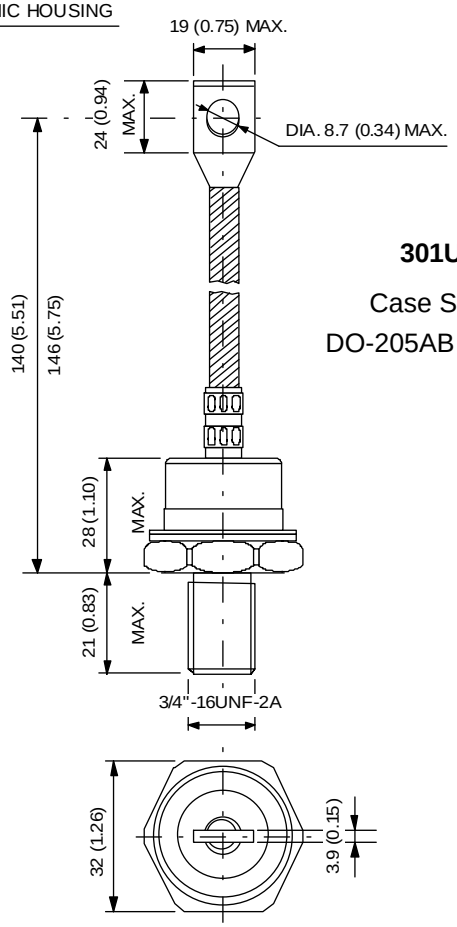
RANGE	I_{FM} T_J = 25°C (A)	V_{FM} min. (V)	V_{FM} max. (V)
P2 *	1000	1.16	1.25
P3 *		1.26	1.30
P4		1.31	1.40
P5		1.41	1.45

* 2500V not available

301U(R) Series

Outline Table

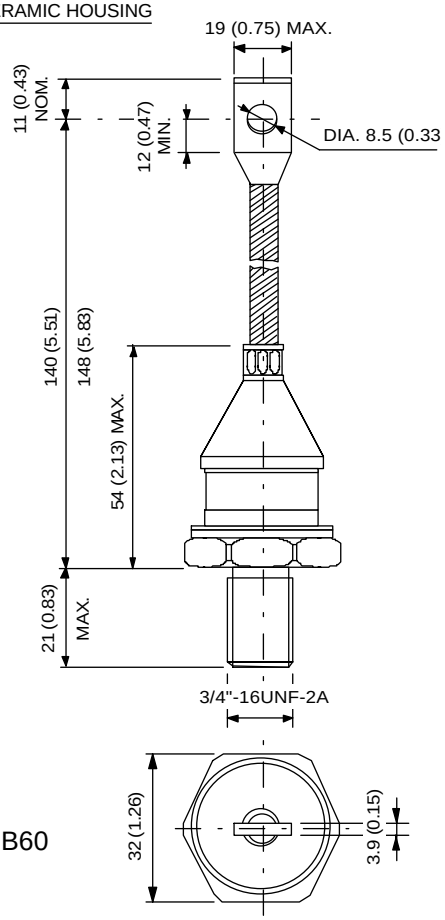
CERAMIC HOUSING



301U

Case Style
DO-205AB (DO-9)

CERAMIC HOUSING

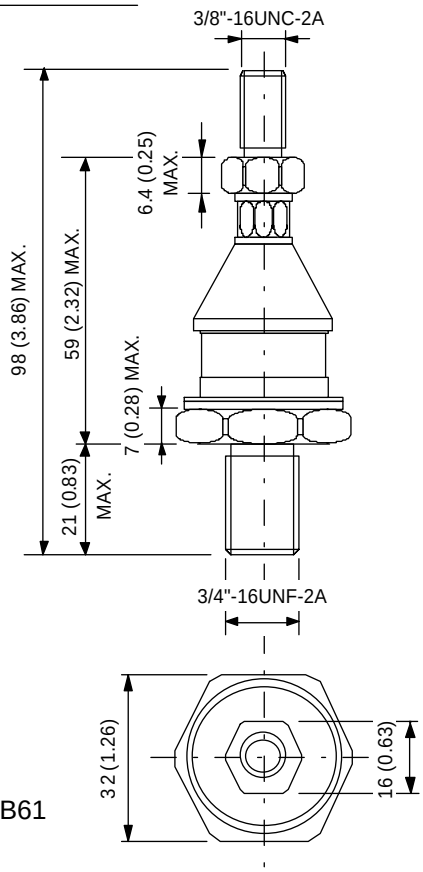


307U

IR Case Style B60

All dimensions in millimeters (inches)

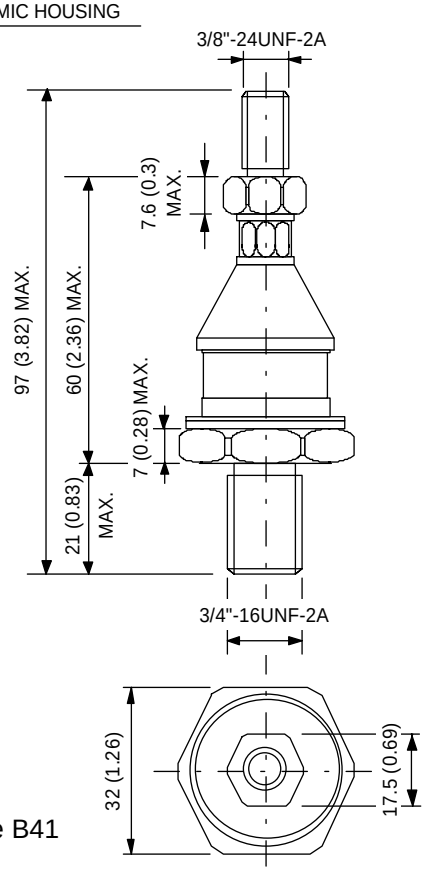
CERAMIC HOUSING



305U

IR Case Style B61

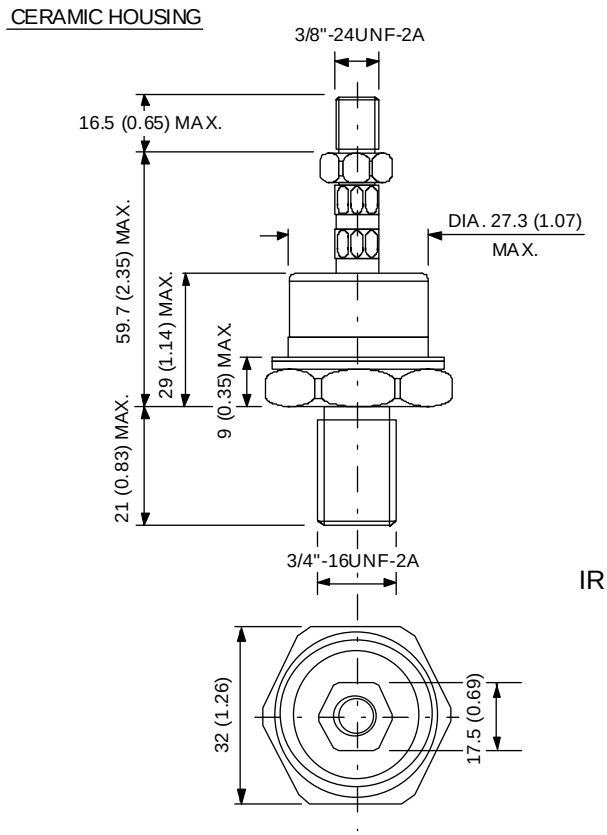
CERAMIC HOUSING



309U

IR Case Style B41

Outline Table



303U

IR Case Style B40

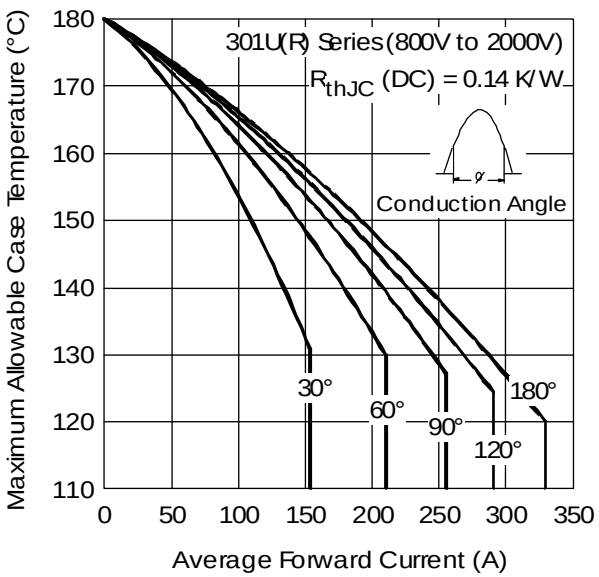


Fig. 1 - Current Ratings Characteristics

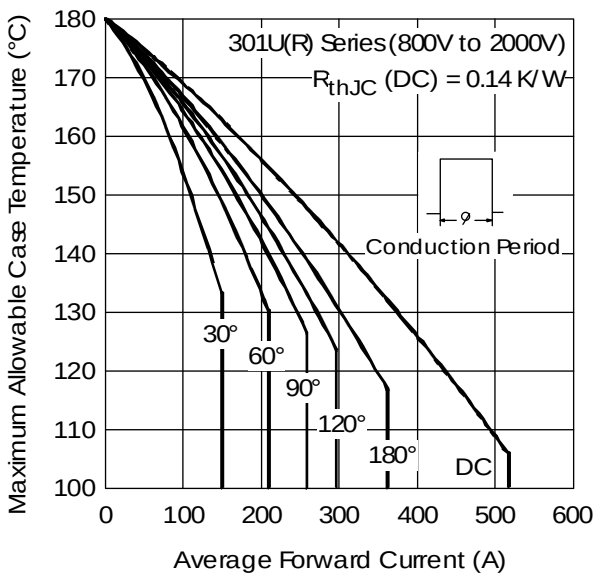


Fig.2 - Current Ratings Characteristics

301U(R) Series

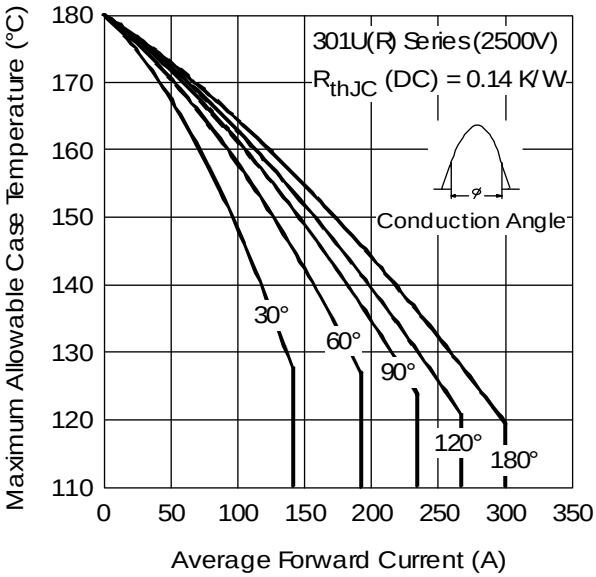


Fig. 3 - Current Ratings Characteristics

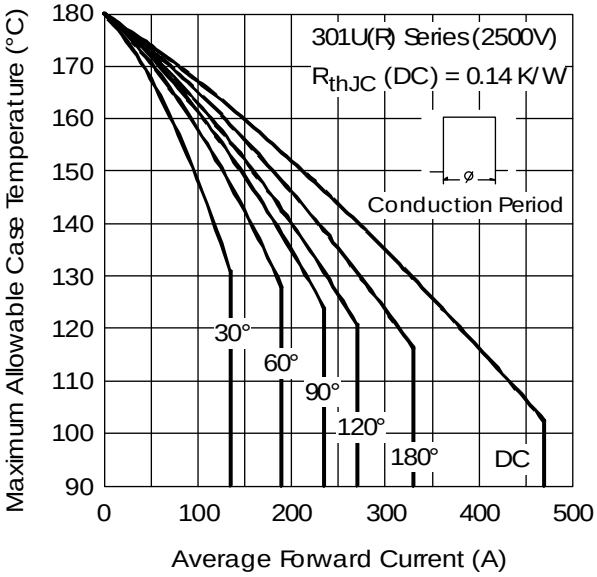


Fig. 4 - Current Ratings Characteristics

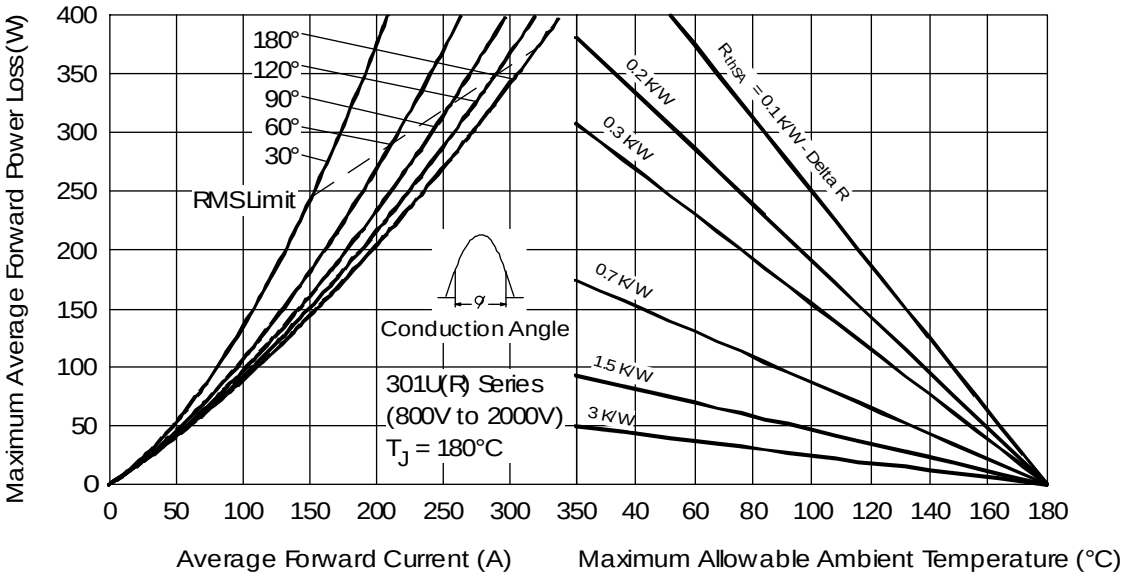


Fig. 5 - Forward Power Loss Characteristics

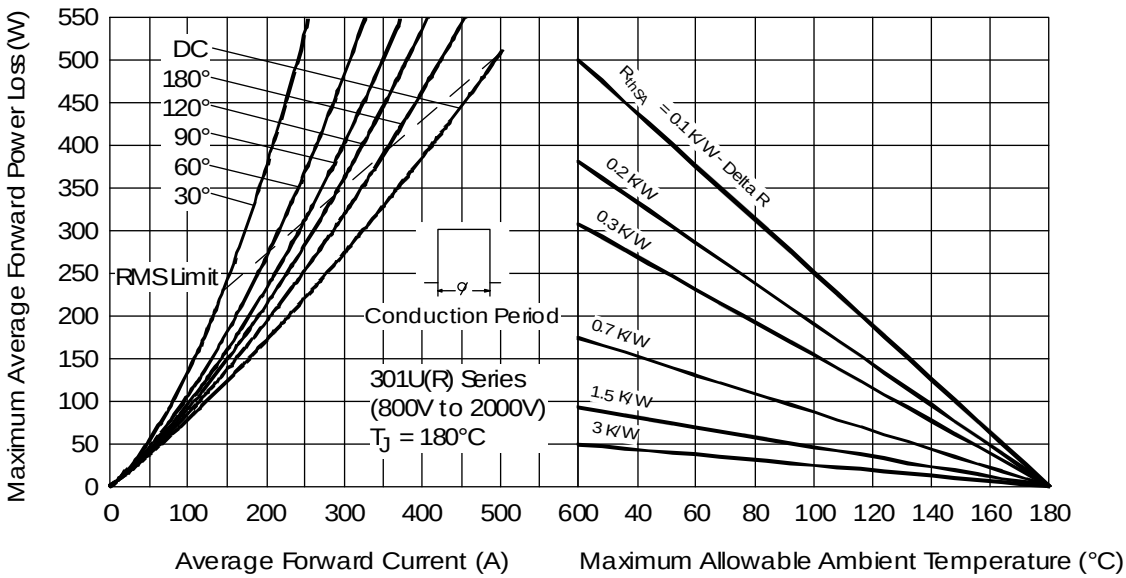


Fig. 6 - Forward Power Loss Characteristics

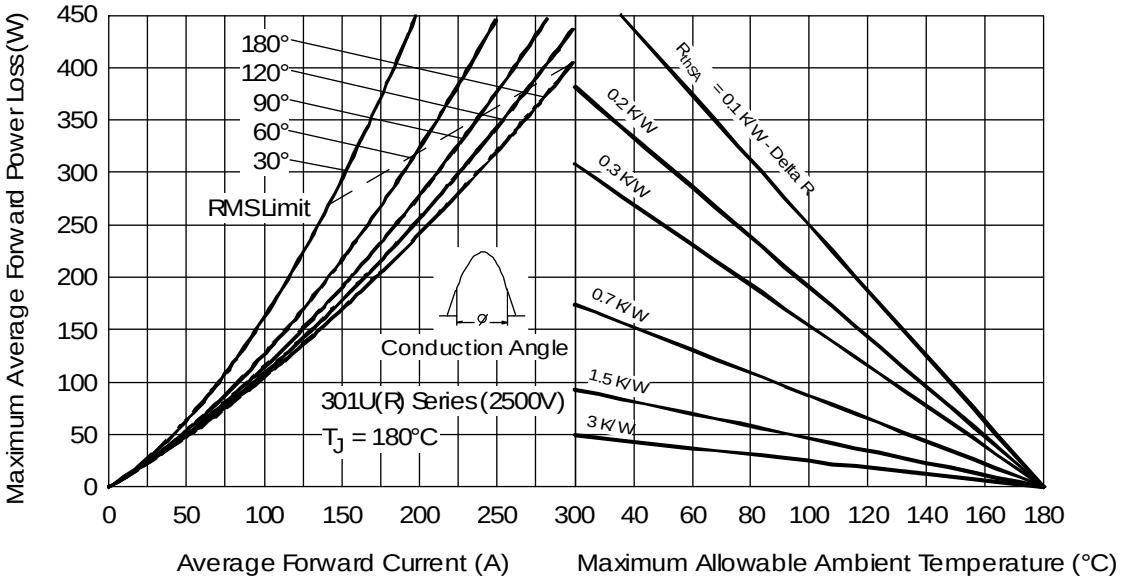


Fig. 7 - Forward Power Loss Characteristics

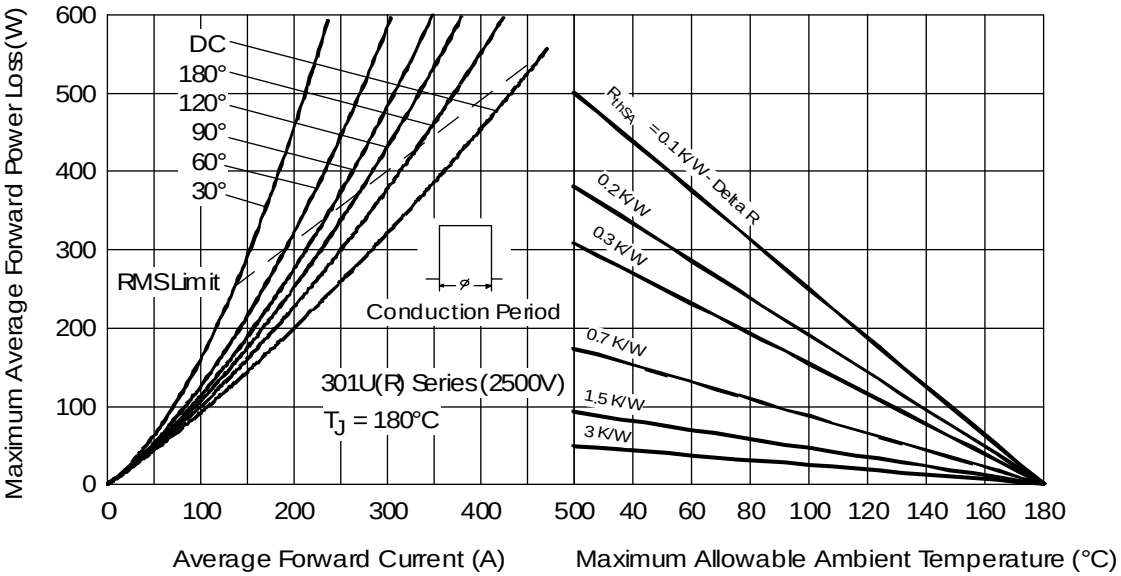


Fig. 8 - Forward Power Loss Characteristics

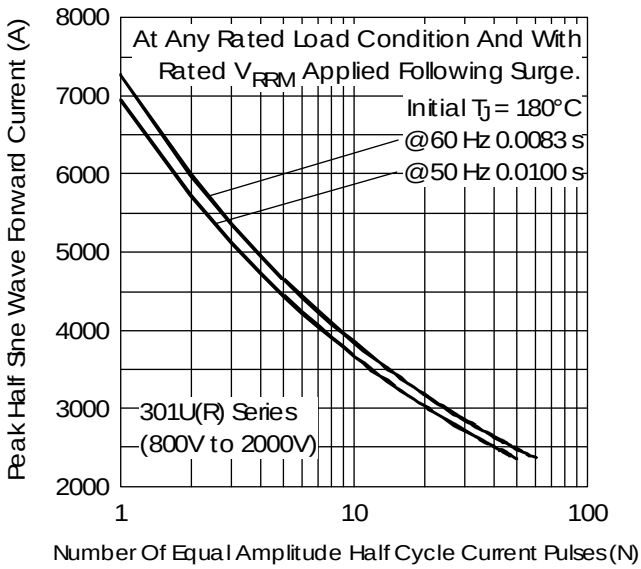


Fig. 9 - Maximum Non-Repetitive Surge Current

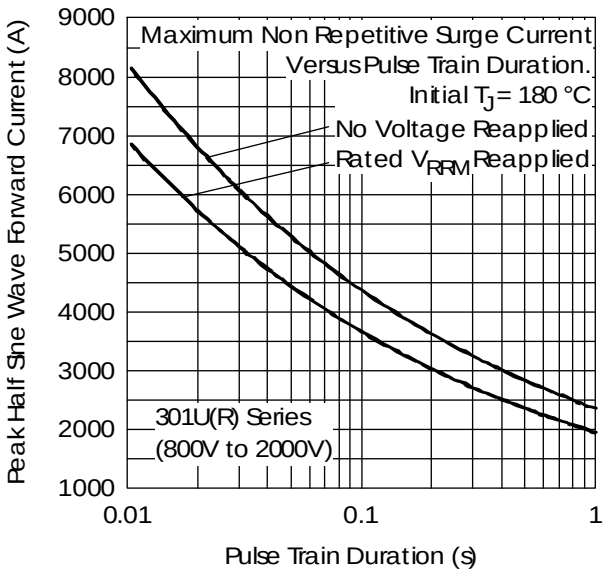


Fig. 10 - Maximum Non-Repetitive Surge Current

301U(R) Series

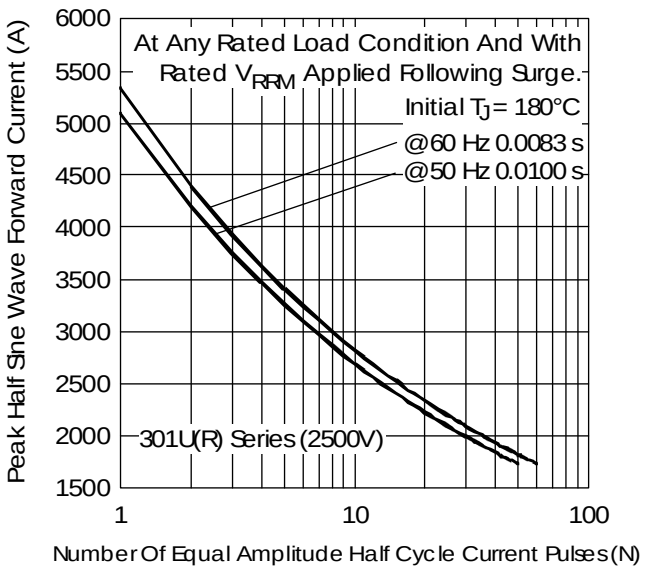


Fig. 11 - Maximum Non-Repetitive Surge Current

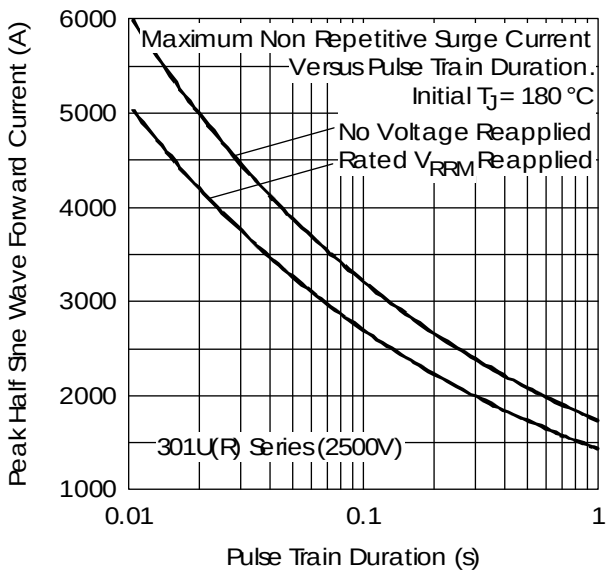


Fig. 12 - Maximum Non-Repetitive Surge Current

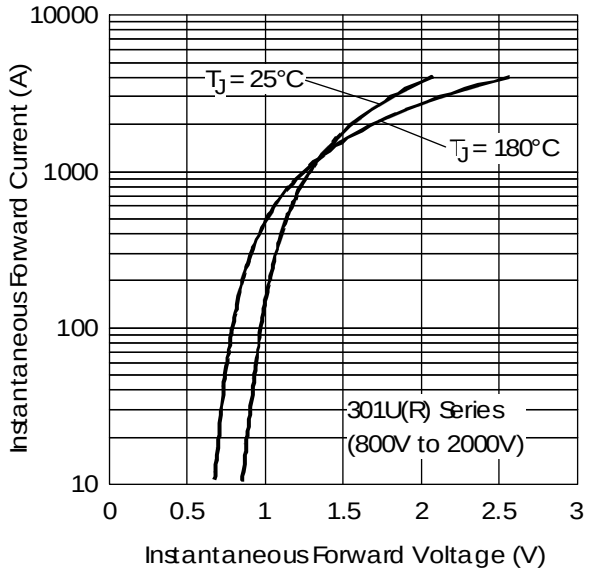


Fig. 13 - Forward Voltage Drop Characteristics

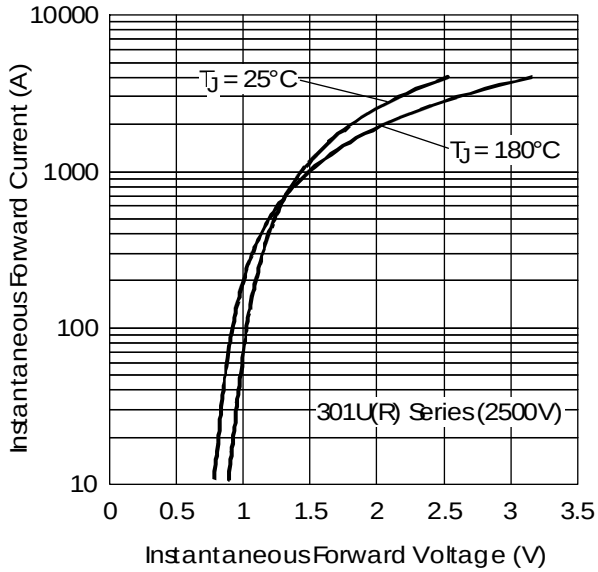


Fig. 14 - Forward Voltage Drop Characteristics

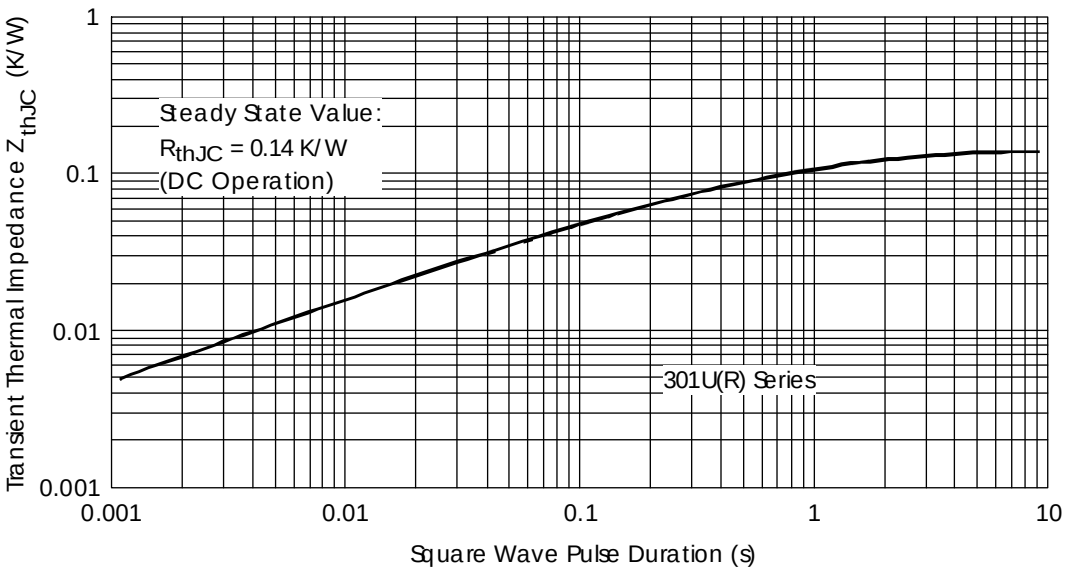


Fig. 15 - Thermal Impedance Z_{thJC} Characteristic

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