

### 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

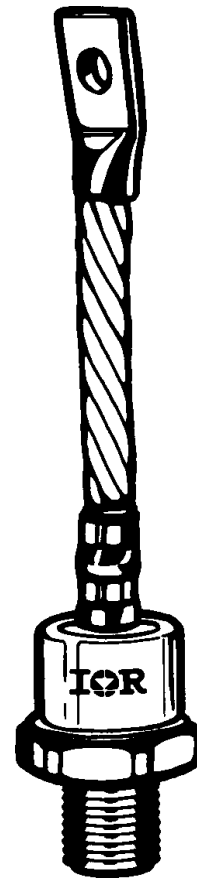
300A

#### 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 <sup>2</sup> s
@ 60Hz	311	167	KA <sup>2</sup> 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

## 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 @ $T_C = 115^\circ\text{C}$ (08 to 20), $T_C = 102^\circ\text{C}$ (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	
$I^2t$ Maximum $I^2t$ for fusing	340	183	KA <sup>2</sup> s	t = 10ms	No voltage	
	311	167		t = 8.3ms	reapplied	
	241	129		t = 10ms	100% $V_{RRM}$	
	220	118		t = 8.3ms	reapplied	
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	3400	1830	KA <sup>2</sup> /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 $\pi$ x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.		
$V_{F(TO)2}$ High level value of threshold voltage	0.84	0.97		(I > $\pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.		
$r_{f1}$ Low level value of forward slope resistance	0.49	0.59	m $\Omega$	(16.7% x $\pi$ x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.		
$r_{f2}$ High level value of forward slope resistance	0.49	0.55		(I > $\pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.		
$V_{FM}$ Max. forward voltage drop	1.22	1.46	V	$I_{pk} = 942\text{A}$ , $T_J = T_J$ max, $t_p = 10\text{ms}$ 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

 $\Delta R_{thJC}$  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

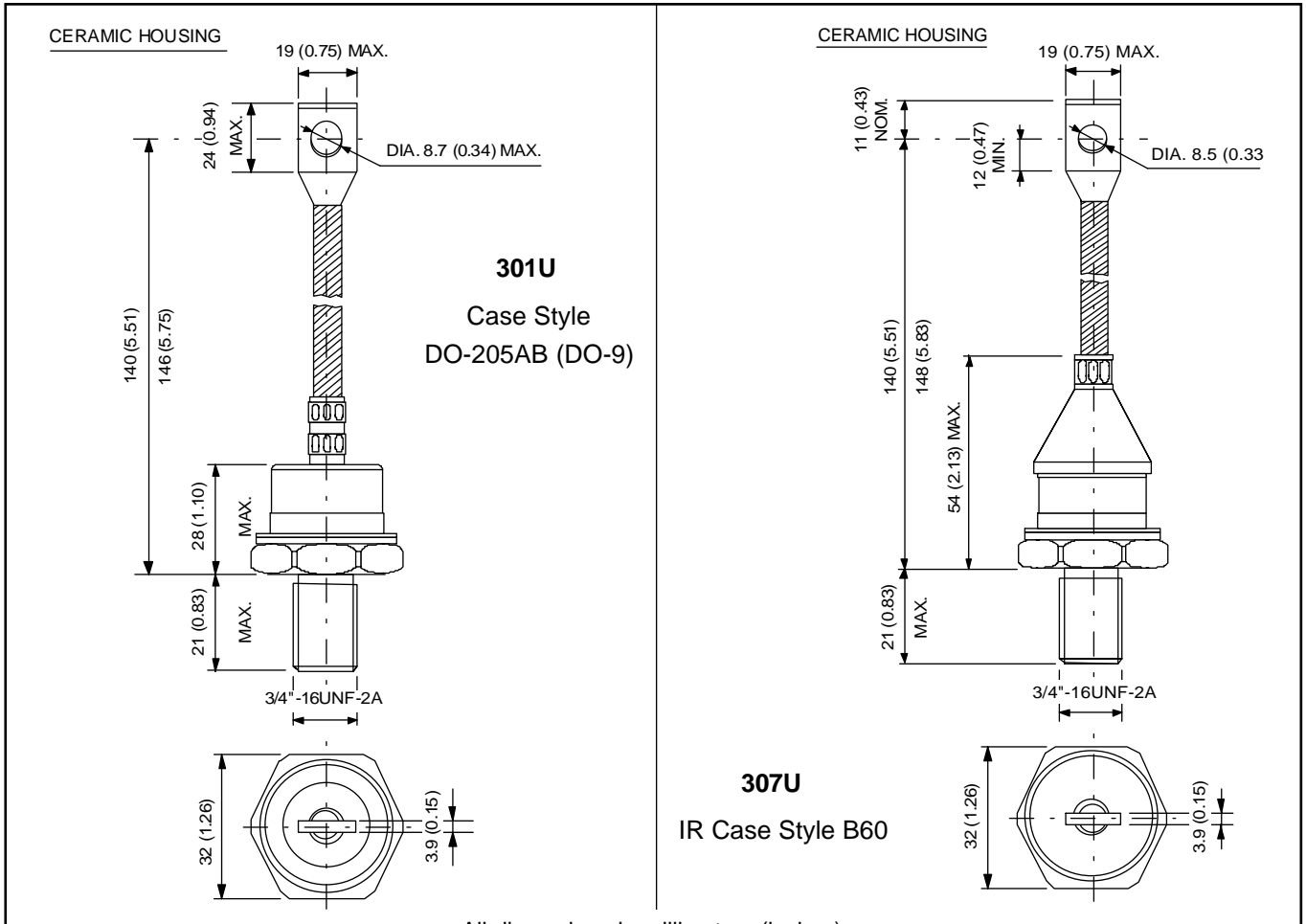
Device Code	
<b>30</b>	<b>1 U A 250 P5</b>
①	② ③ ④ ⑤ ⑥
<b>1</b> - 30	= Essential Part Number
<b>2</b> - 1	= Standard Device
	3 = Top Threaded version
	5 = Type for rotating application with Top Threaded version 3/8 16UNC-2A
	7 = Type for rotating application with flexible lead
	9 = Type for rotating application with Top Threaded version 3/8 24UNF
<b>3</b> - U	= Stud Normal Polarity (Cathode to Stud)
	UR = Stud Reverse Polarity (Anode to Stud)
<b>4</b> - A	= Max. Leakage selection $I_{RRM} = 2\text{mA}$ $T_J = 25^\circ\text{C}$
	None = Std. Leakage selection $I_{RRM} = 10\text{mA}$ $T_J = 25^\circ\text{C}$
<b>5</b> -	Voltage code: Code x 10 = $V_{RRM}$ (See Voltage Ratings table)
<b>6</b> - 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

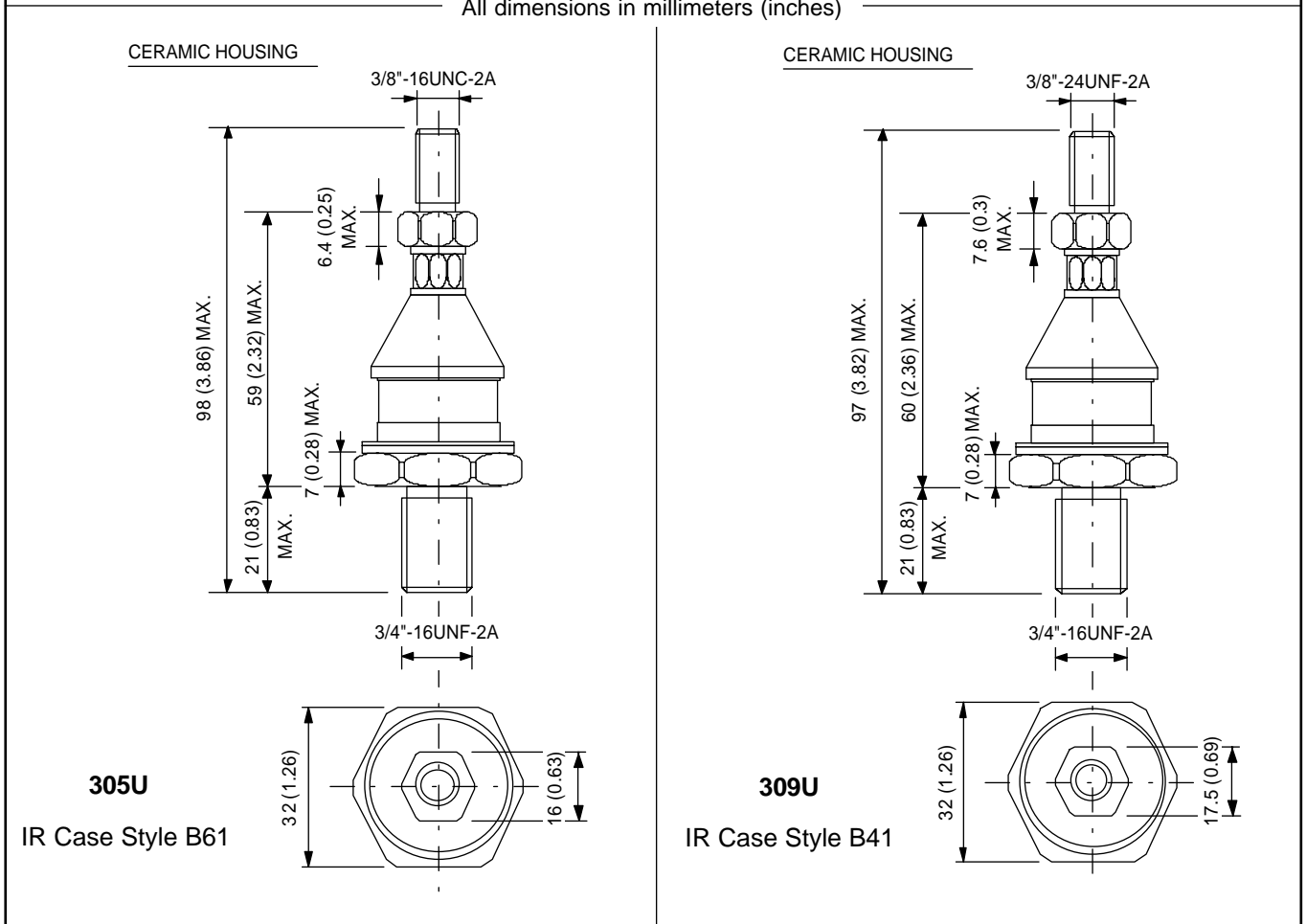
\* 2500V not available

# 301U(R) Series

## Outline Table



All dimensions in millimeters (inches)



Outline Table

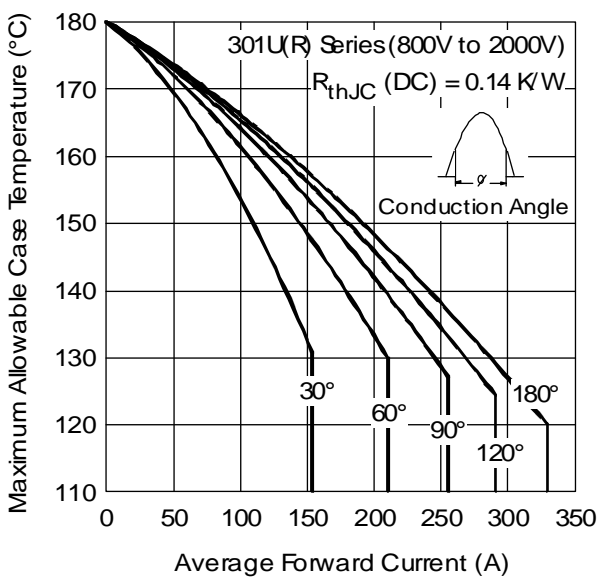
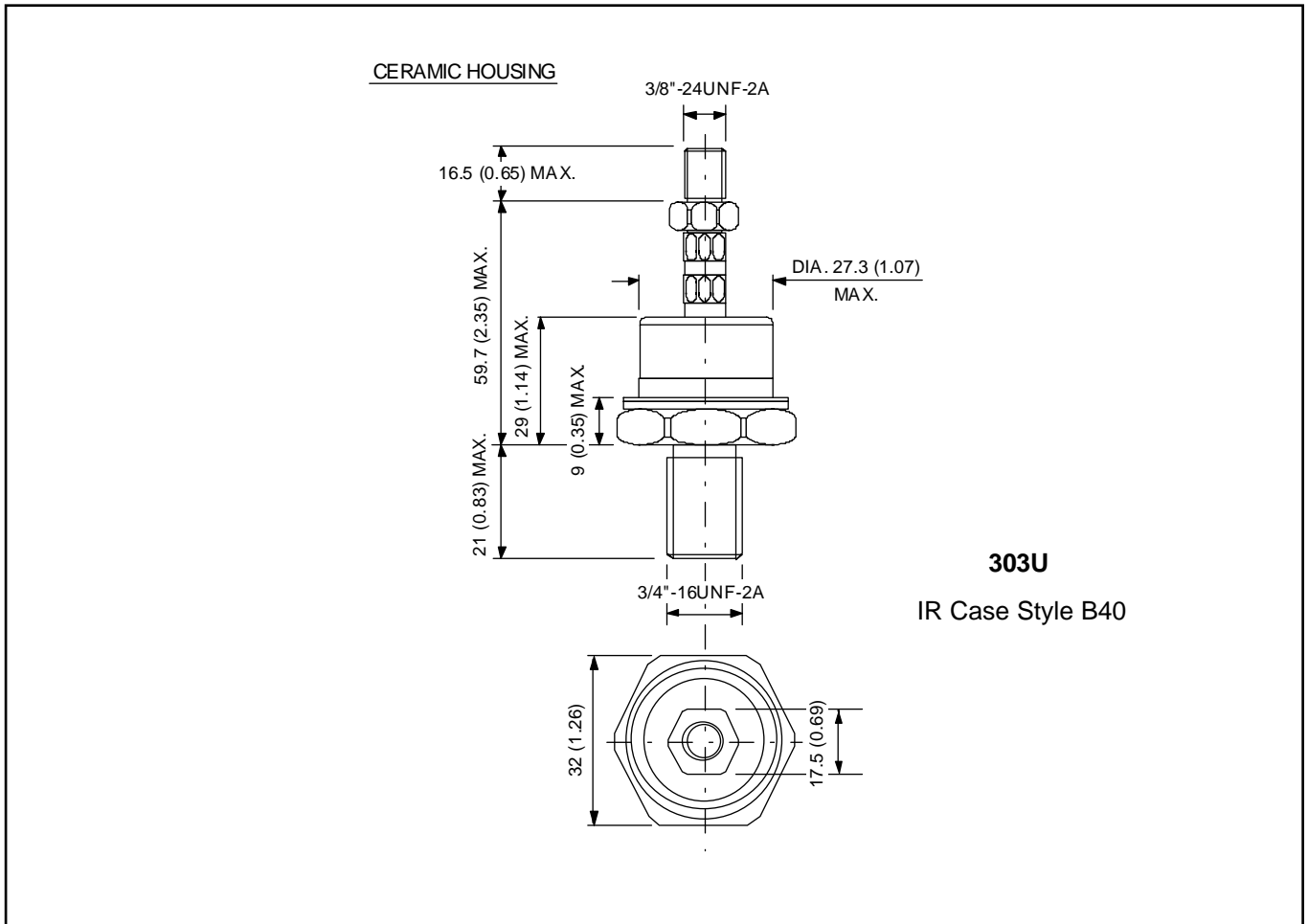


Fig. 1 - Current Ratings Characteristics

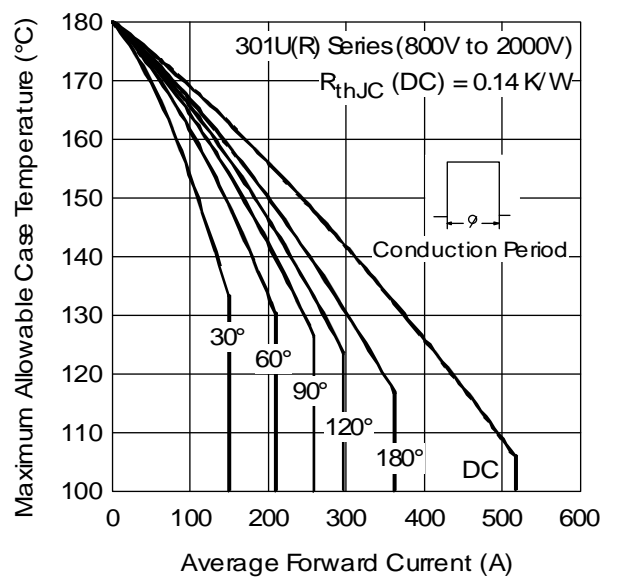


Fig.2 - Current Ratings Characteristics

# 301U(R) Series

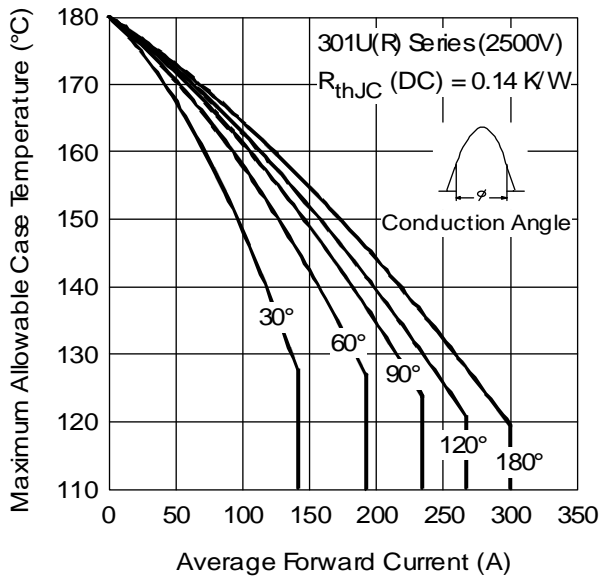


Fig. 3 - Current Ratings Characteristics

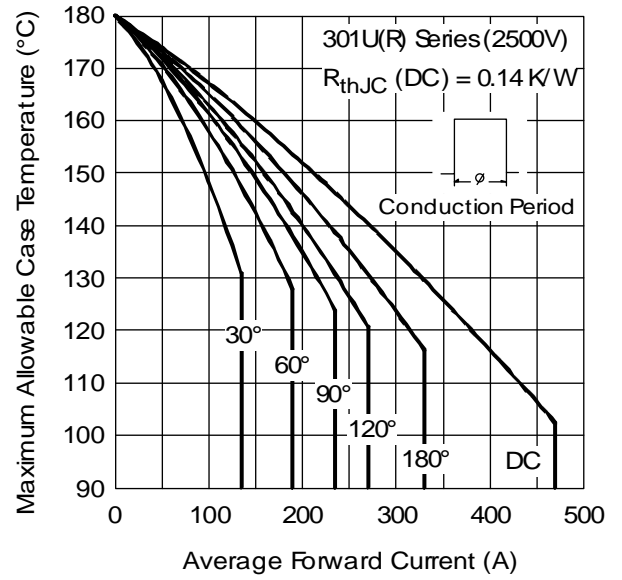


Fig. 4 - Current Ratings Characteristics

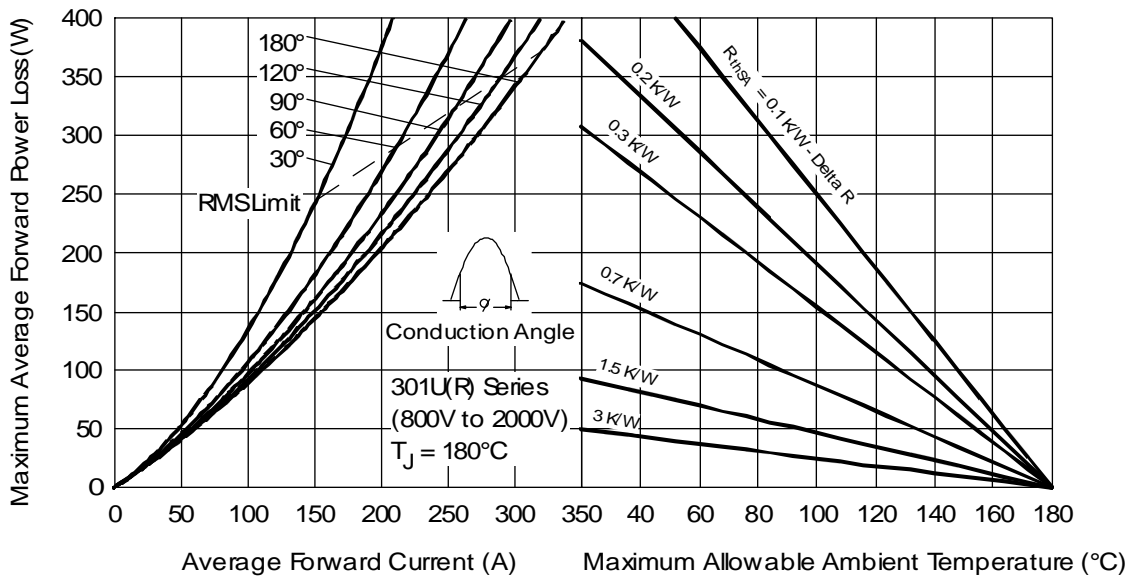


Fig. 5 - Forward Power Loss Characteristics

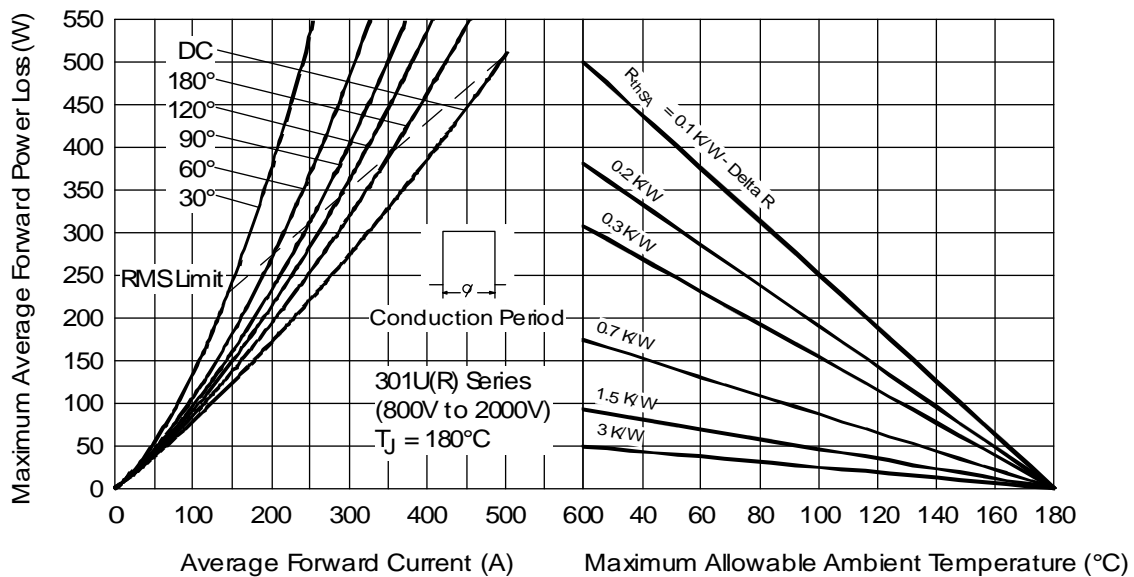


Fig. 6 - Forward Power Loss Characteristics

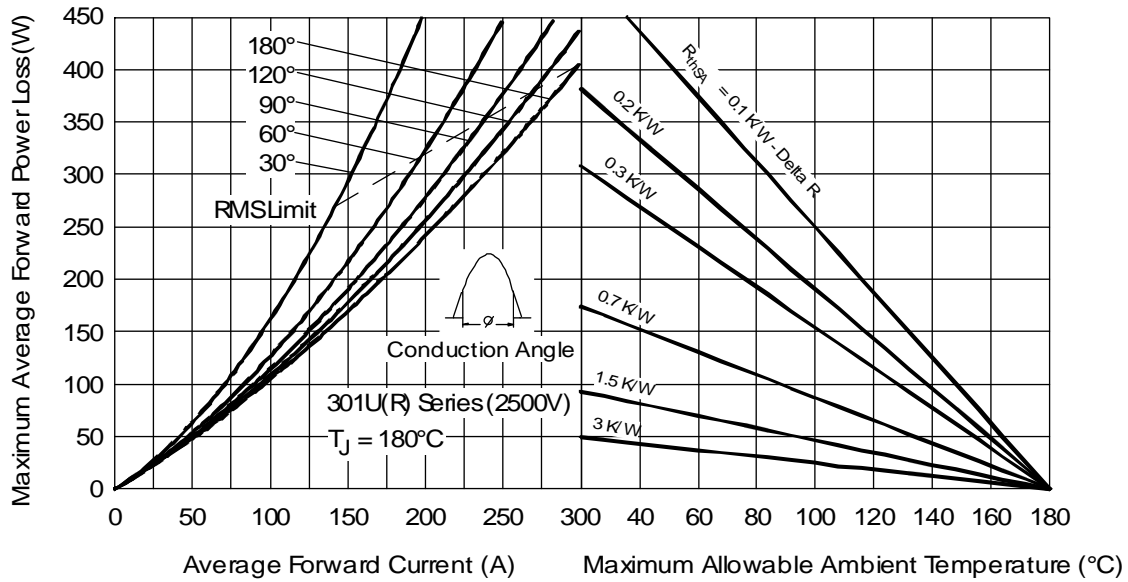


Fig. 7 - Forward Power Loss Characteristics

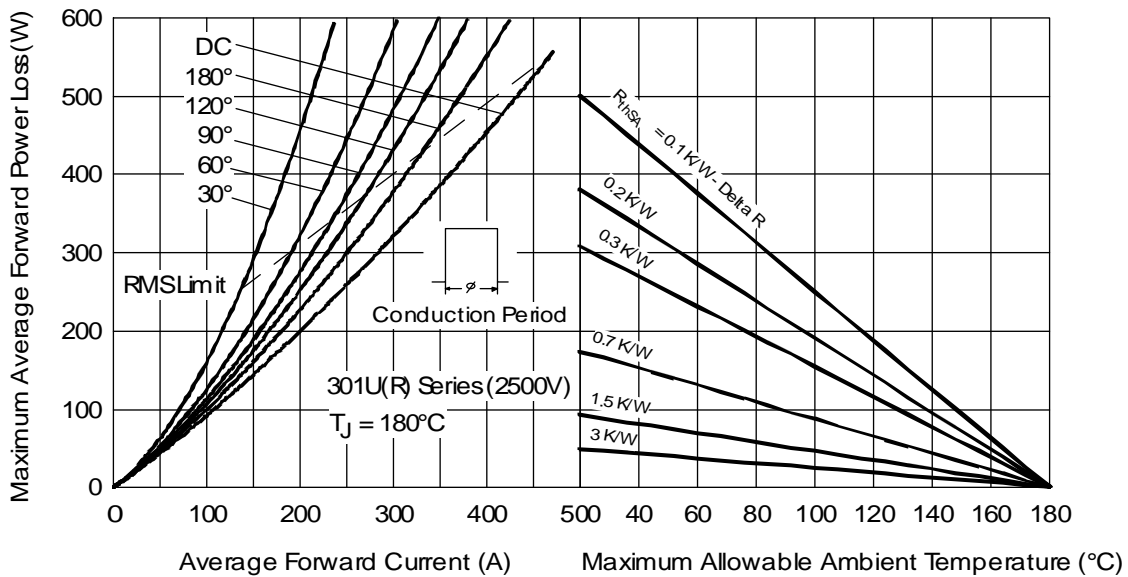


Fig. 8 - Forward Power Loss Characteristics

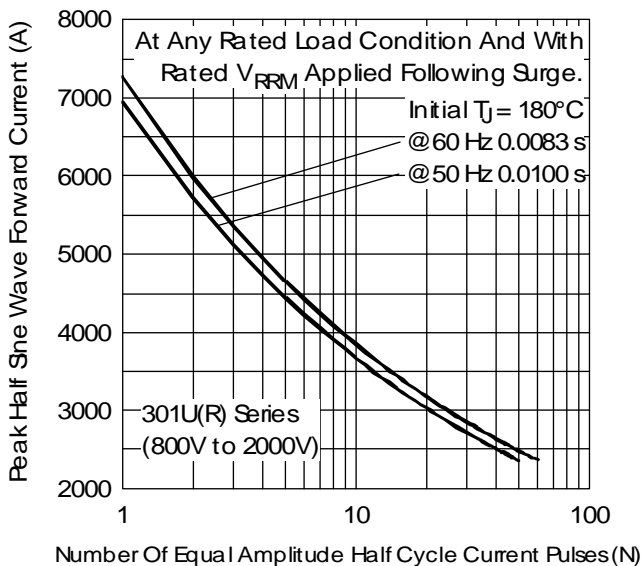


Fig. 9 - Maximum Non-Repetitive Surge Current

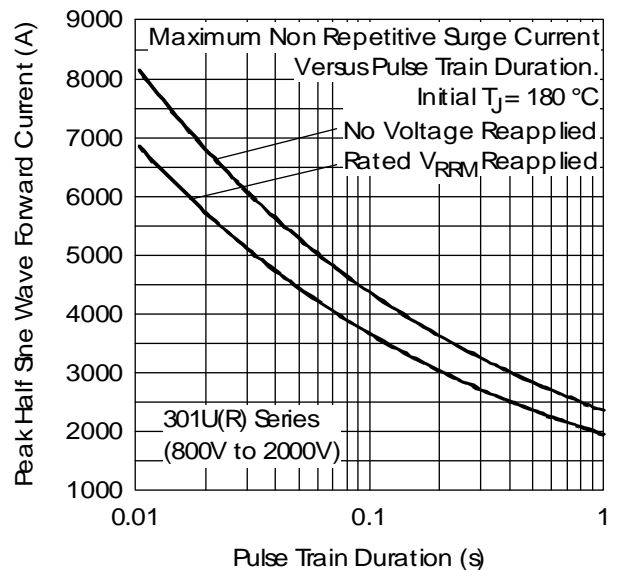


Fig. 10 - Maximum Non-Repetitive Surge Current

# 301U(R) Series

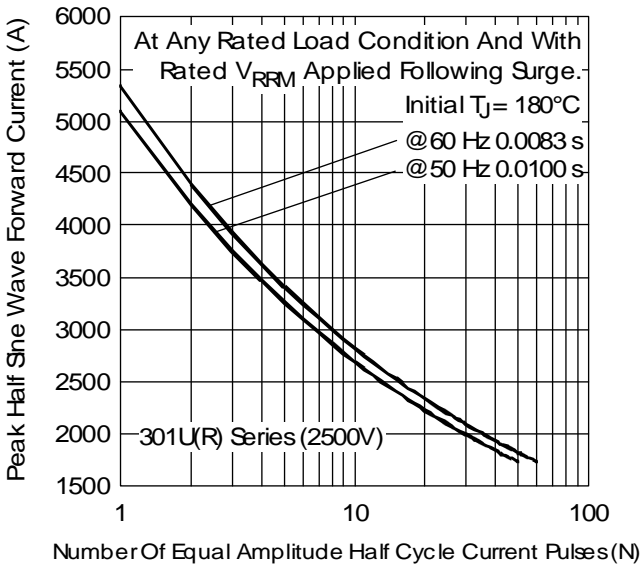


Fig. 11 - Maximum Non-Repetitive Surge Current

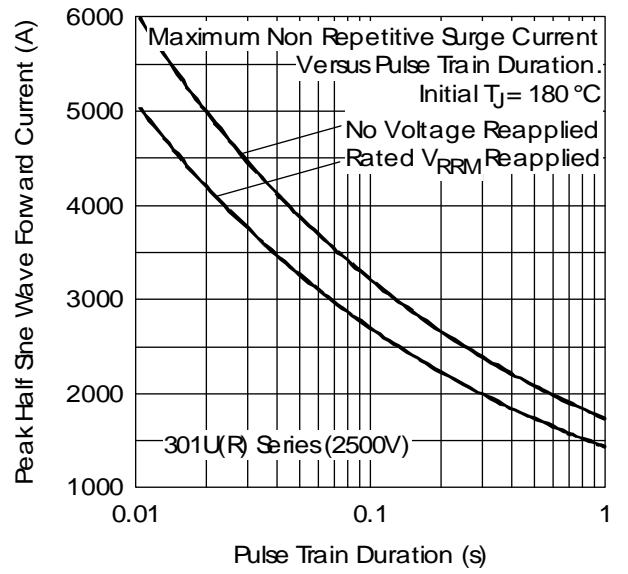


Fig. 12 - Maximum Non-Repetitive Surge Current

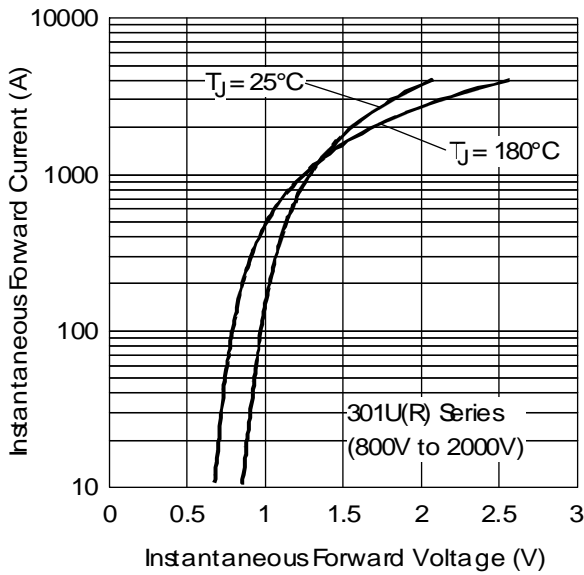


Fig. 13 - Forward Voltage Drop Characteristics

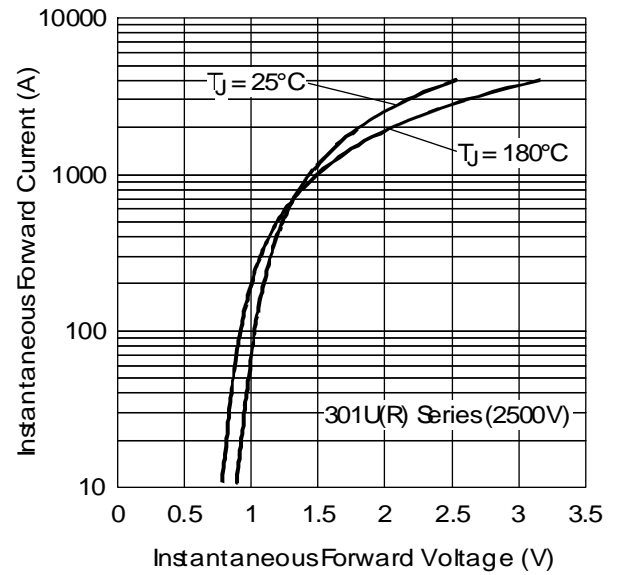


Fig. 14 - Forward Voltage Drop Characteristics

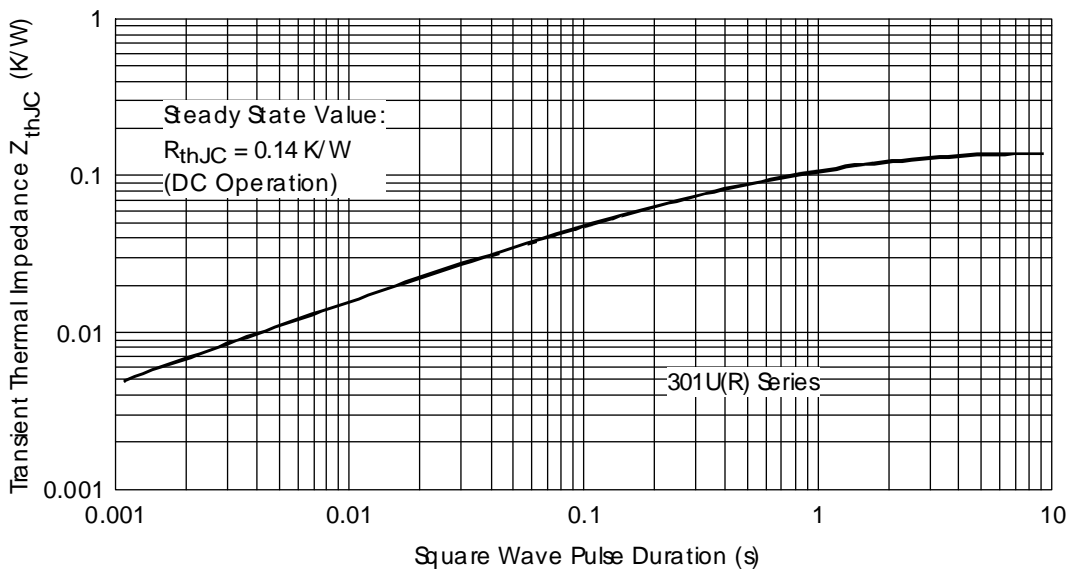


Fig. 15 - Thermal Impedance  $Z_{thJC}$  Characteristic