

Bulletin I2032 rev. B 03/03

International IOR Rectifier

301U(R) SERIES

STANDARD RECOVERY DIODES

Stud Version

Features

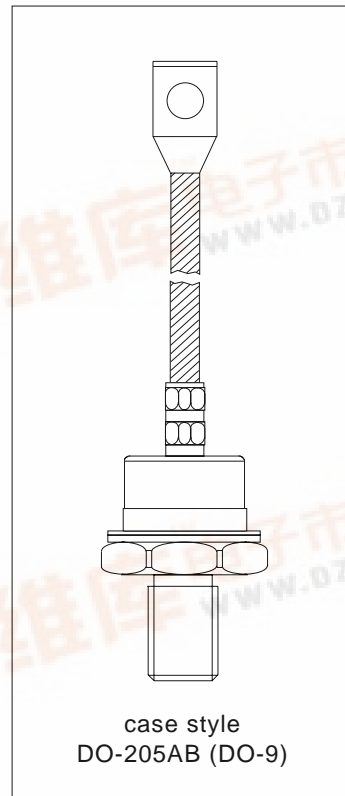
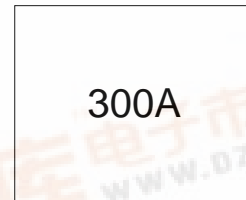
- Wide current range
- High voltage ratings up to 2500V
- High surge current capabilities
- Stud cathode and stud anode version
- High resistance to acceleration

Typical Applications

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

Major Ratings and Characteristics

Parameters	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}	@ 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	1600 to 2000	2500	V	
T_J	- 40 to 180	- 40 to 180	°C	



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IRF Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

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

Forward Conduction

Parameter	301U(R)		Units	Conditions		
	160to200	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 @ $T_C = 115^\circ\text{C}$ (up to 2000V), $T_C = 102^\circ\text{C}$ (2500V)		
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 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	
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ 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	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
$V_{F(TO)2}$ High level value of threshold voltage	0.84	0.97		$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
r_{f1} Low level value of forward slope resistance	0.49	0.59	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
r_{f2} High level value of forward slope resistance	0.49	0.55		$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ 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

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

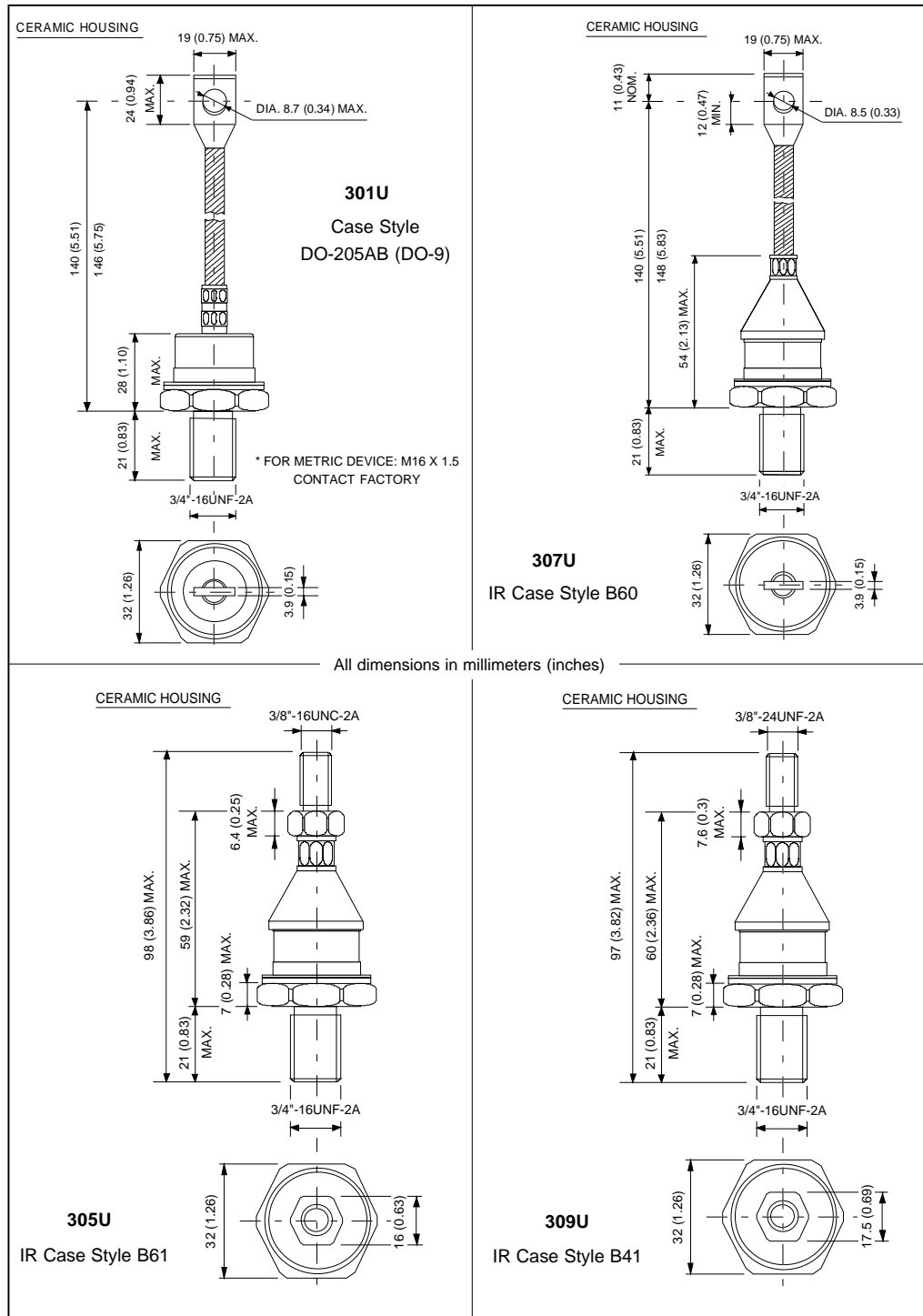
Device Code	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin: 2px;">30</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">1</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">U</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">A</div> <div style="border: 1px solid black; padding: 5px; margin: 2px;">250</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> ① ② ③ ④ ⑤ </div>	<p>1 - 30 = Essential Part Number</p> <p>2 - 1 = Standard Device</p> <p>3 = Top Threaded version</p> <p>5 = Type for rotating application with Top Threaded version 3/8 16UNC-2A</p> <p>7 = Type for rotating application with flexible lead</p> <p>9 = Type for rotating application with Top Threaded version 3/8 24UNF</p> <p>3 - U = Stud Normal Polarity (Cathode to Stud)</p> <p>UR = Stud Reverse Polarity (Anode to Stud)</p> <p>4 - A = Max. Leakage selection I_{RRM} = 2mA T_J = 25°C</p> <p>5 - Voltage code: Code x 10 = V_{RRM} (See Voltage Ratings table)</p>

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Outline Table



Outline Table

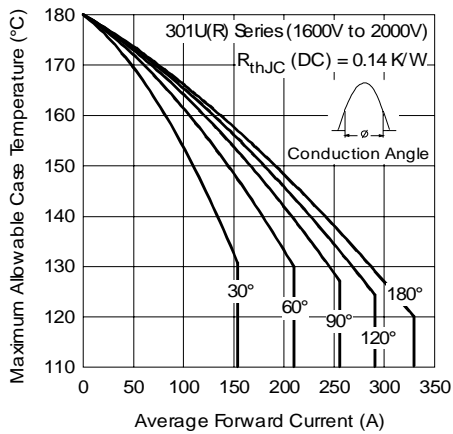
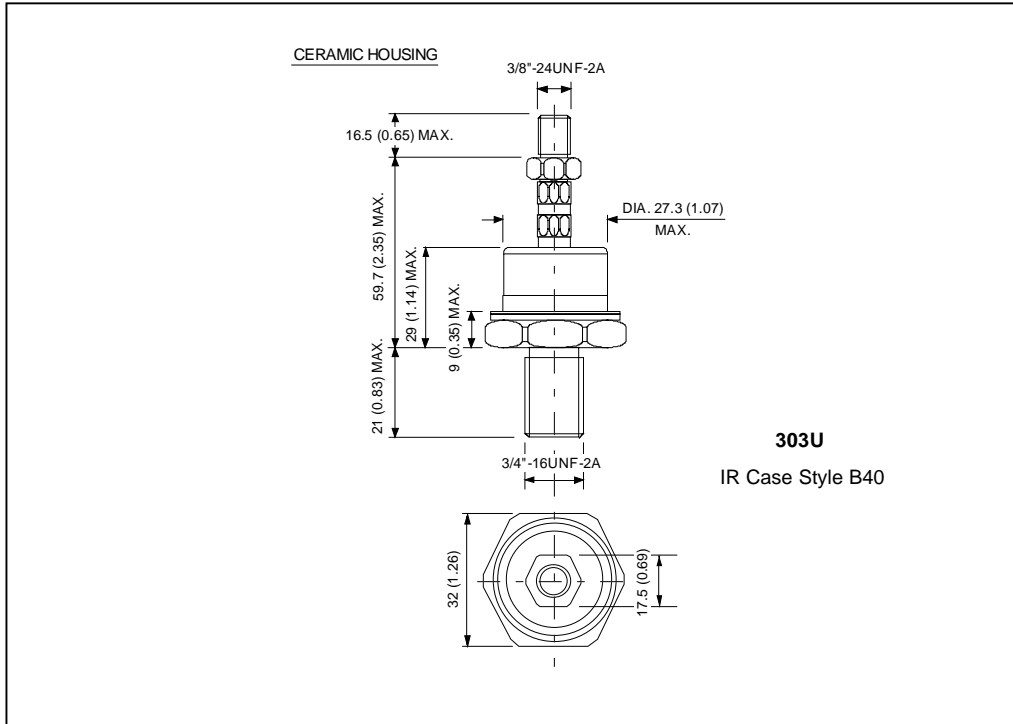


Fig. 1 - Current Ratings Characteristics

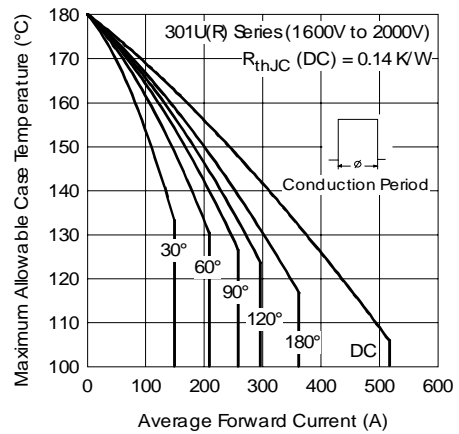


Fig.2 - Current Ratings Characteristics

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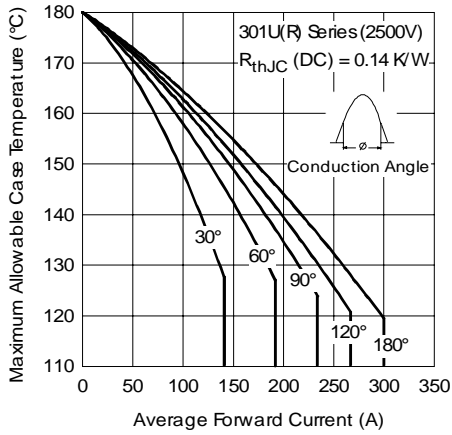


Fig. 3 - Current Ratings Characteristics

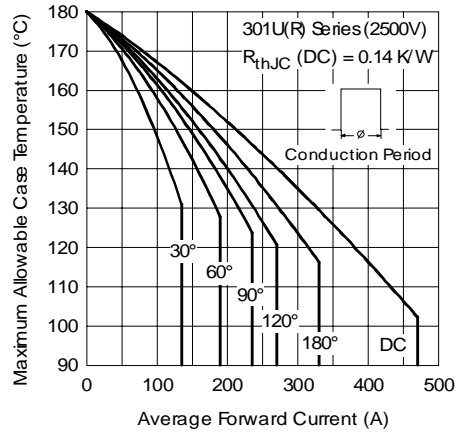


Fig. 4 - Current Ratings Characteristics

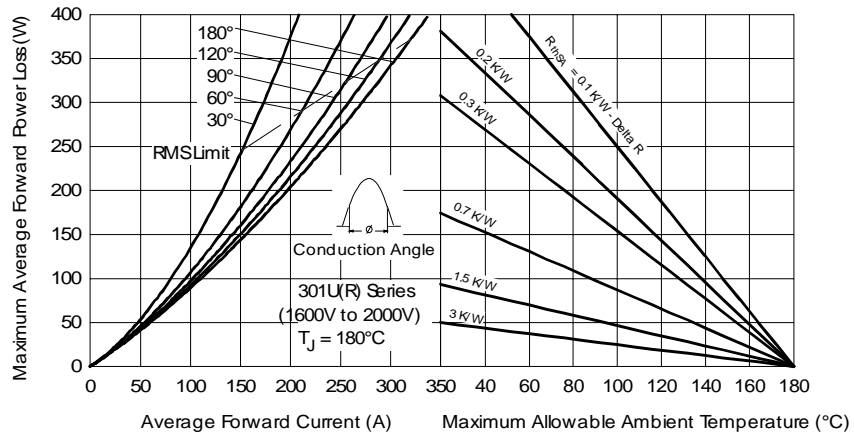


Fig. 5 - Forward Power Loss Characteristics

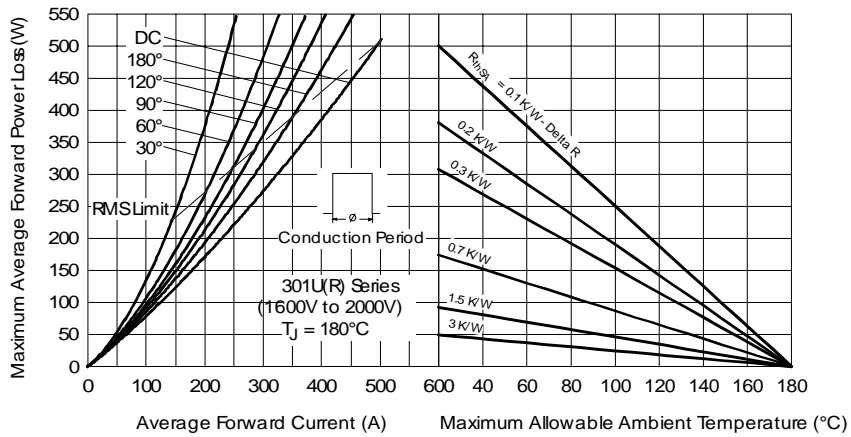


Fig. 6 - Forward Power Loss Characteristics

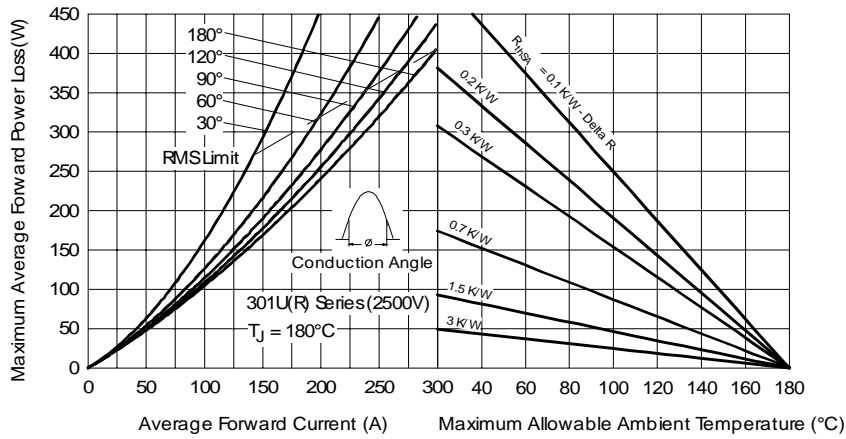


Fig. 7 - Forward Power Loss Characteristics

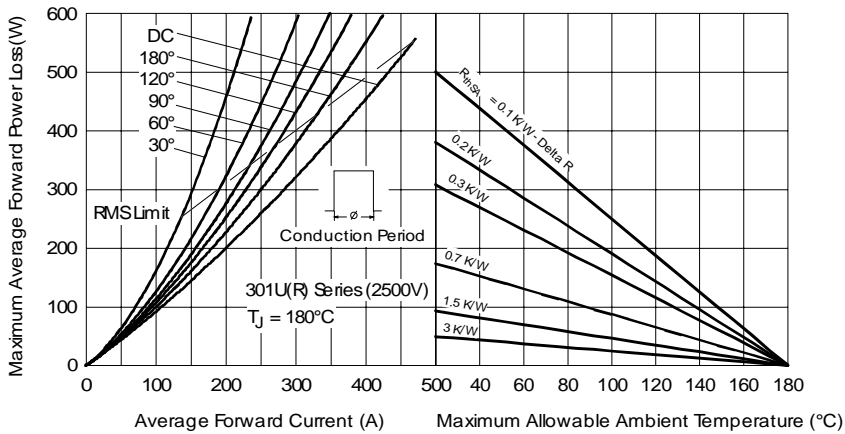


Fig. 8 - Forward Power Loss Characteristics

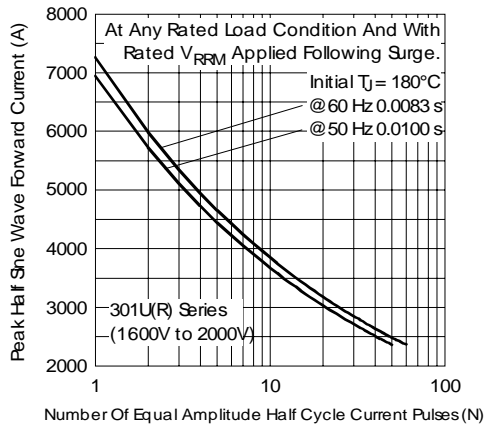


Fig. 9 - Maximum Non-Repetitive Surge Current

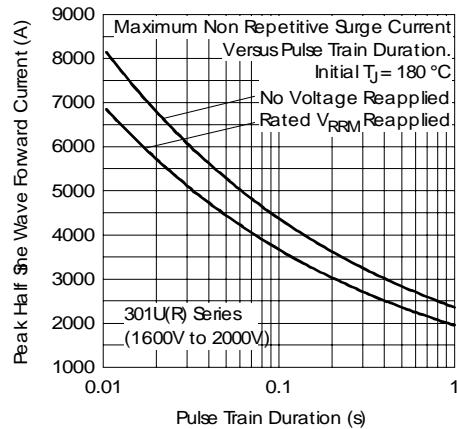


Fig. 10 - Maximum Non-Repetitive Surge Current

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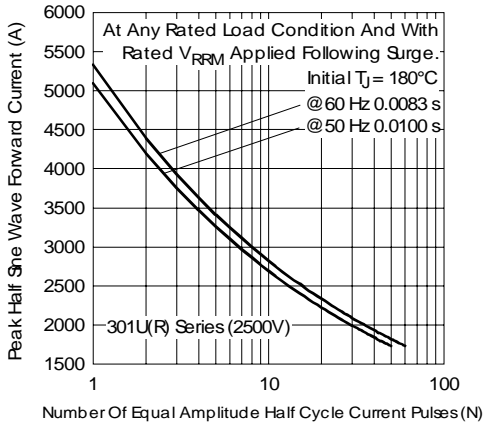


Fig. 11 - Maximum Non-Repetitive Surge Current

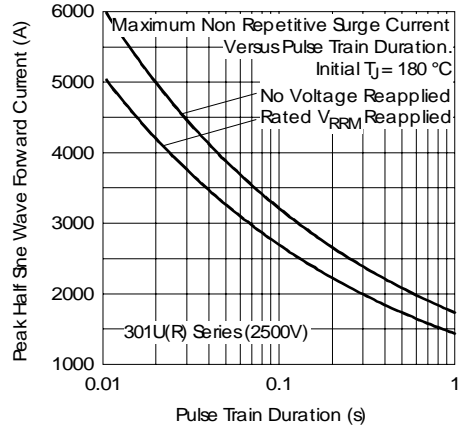


Fig. 12 - Maximum Non-Repetitive Surge Current

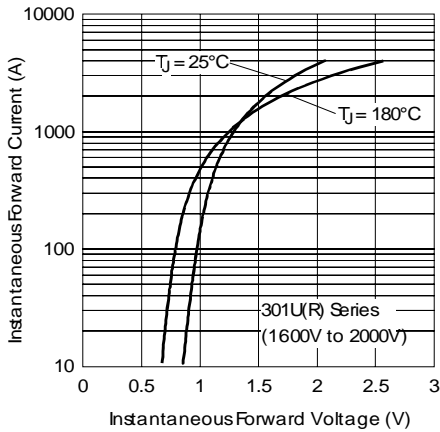


Fig. 13 - Forward Voltage Drop Characteristics

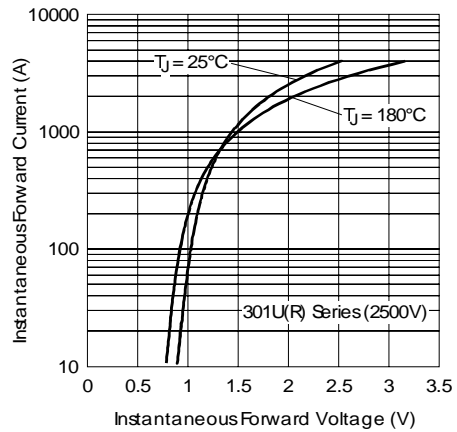


Fig. 14 - Forward Voltage Drop Characteristics

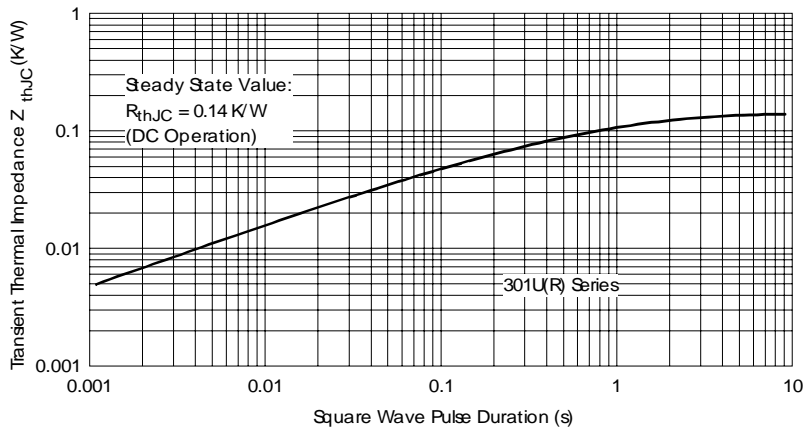


Fig. 15 - Thermal Impedance Z_{thJC} Characteristic

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 03/03