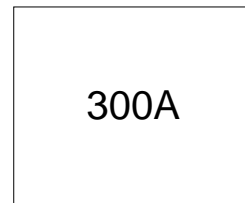


Features

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

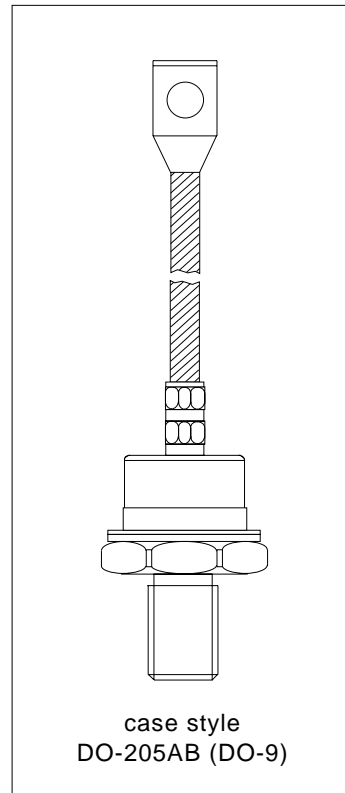


Typical Applications

- 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



301U(R) Series

Bulletin I2032 rev. B 03/03

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)	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 reappplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
	8640	6335		t = 8.3ms	reappplied	
	6940	5090		t = 10ms	100% V_{RRM}	
	7270	5330		t = 8.3ms	reappplied	
I^2t Maximum I^2t for fusing	340	183	KA ² s	t = 10ms	No voltage reappplied	Initial $T_J = T_J$ max.
	311	167		t = 8.3ms	reappplied	
	241	129		t = 10ms	100% V_{RRM}	
	220	118		t = 8.3ms	reappplied	
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	3400	1830	KA ² √s	t = 0.1 to 10ms, no voltage reappplied		
$V_{F(TO)1}$ 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

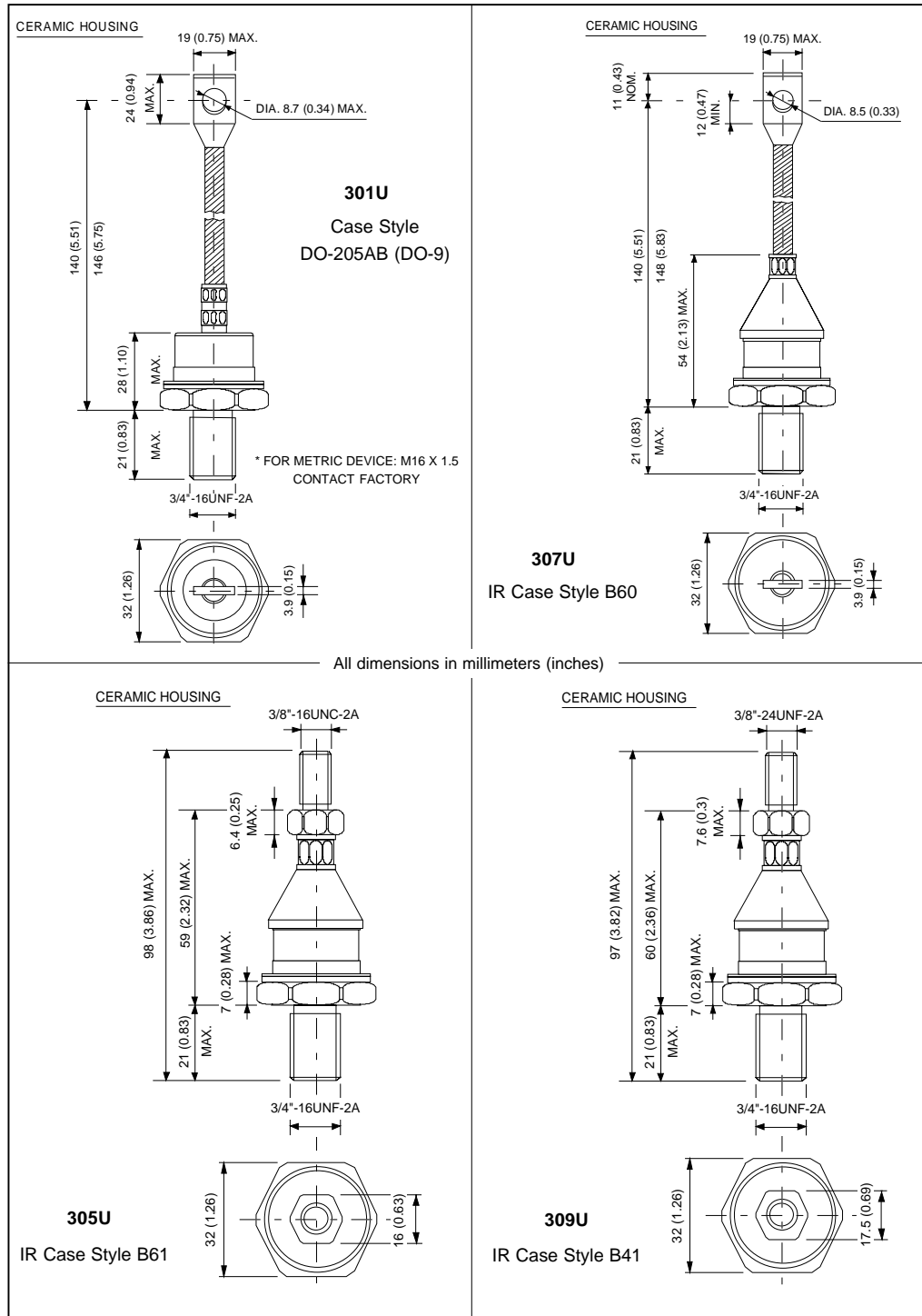
Device Code	
1 - 30	= Essential Part Number
2 - 1	= Standard Device
3	= Top Threaded version
5	= Type for rotating application with Top Threaded version 3/8 16UNC-2A
7	= Type for rotating application with flexible lead
9	= Type for rotating application with Top Threaded version 3/8 24UNF
3 - U	= Stud Normal Polarity (Cathode to Stud)
	UR = Stud Reverse Polarity (Anode to Stud)
4 - A	= Max. Leakage selection I _{RRM} = 2mA T _J = 25°C
5 -	Voltage code: Code x 10 = V _{RRM} (See Voltage Ratings table)

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Outline Table



Outline Table

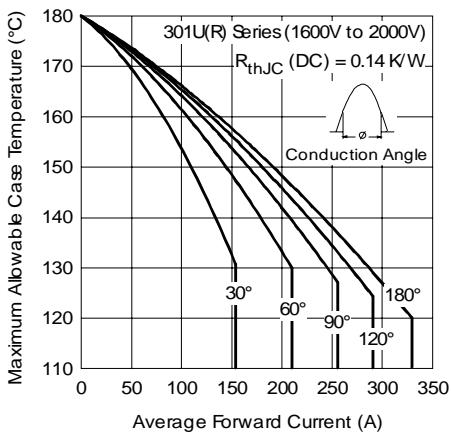
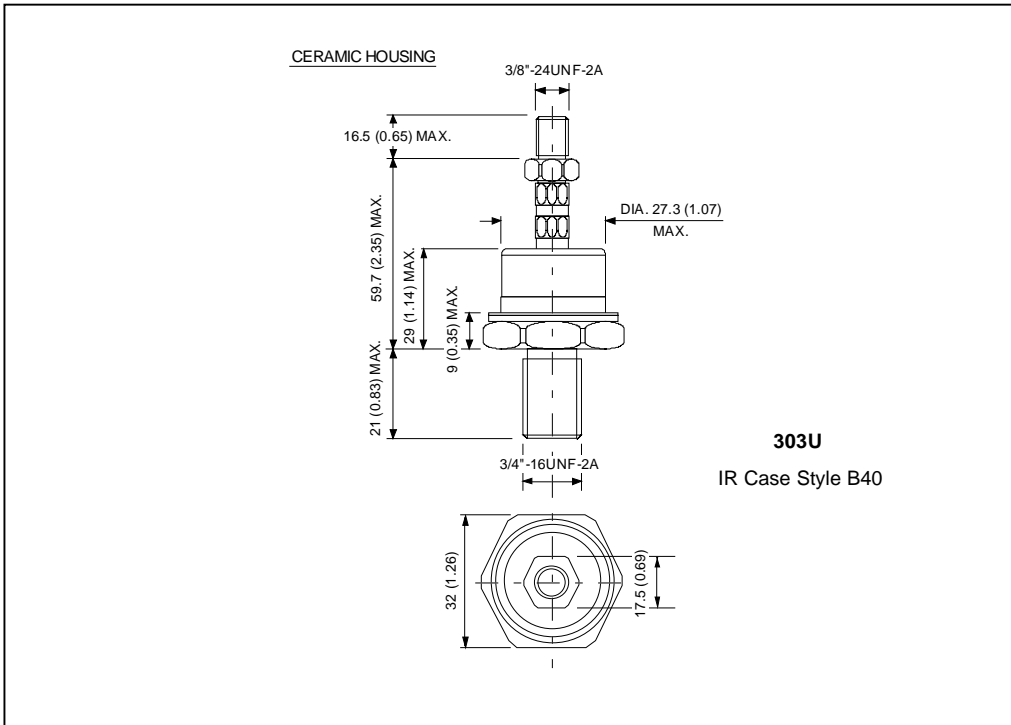


Fig. 1 - Current Ratings Characteristics

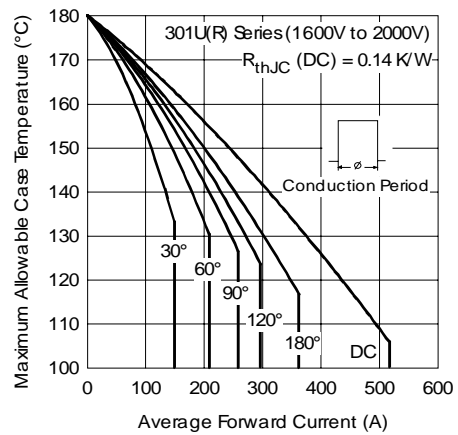


Fig. 2 - Current Ratings Characteristics

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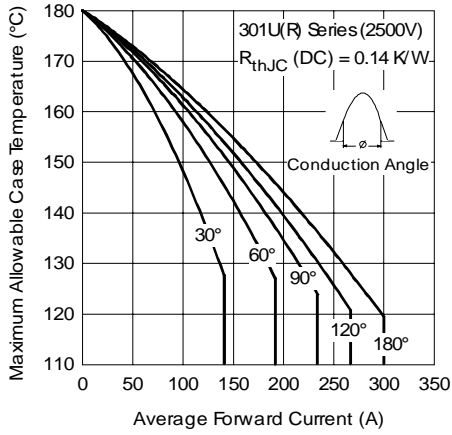


Fig. 3 - Current Ratings Characteristics

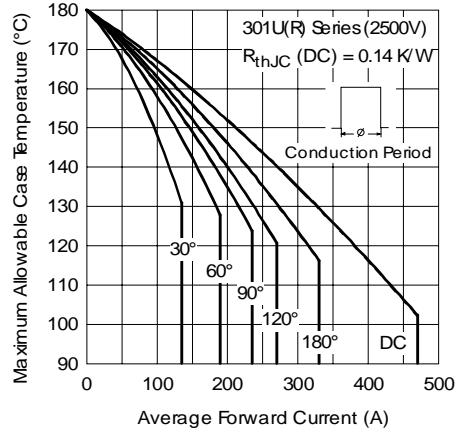


Fig. 4 - Current Ratings Characteristics

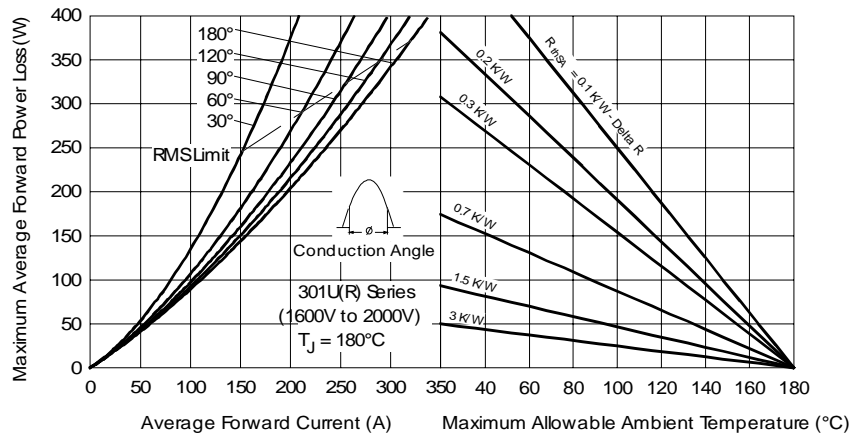


Fig. 5 - Forward Power Loss Characteristics

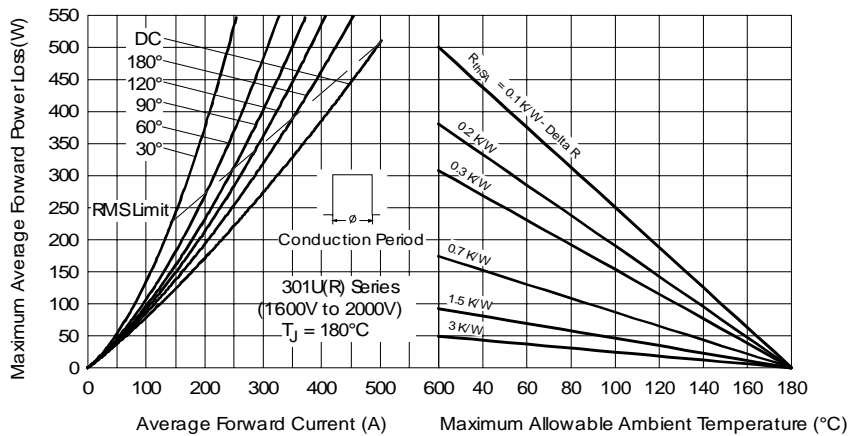


Fig. 6 - Forward Power Loss Characteristics

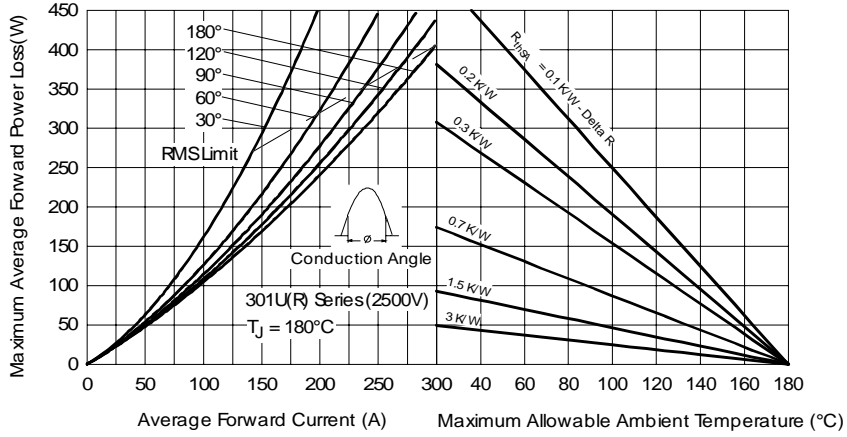


Fig. 7 - Forward Power Loss Characteristics

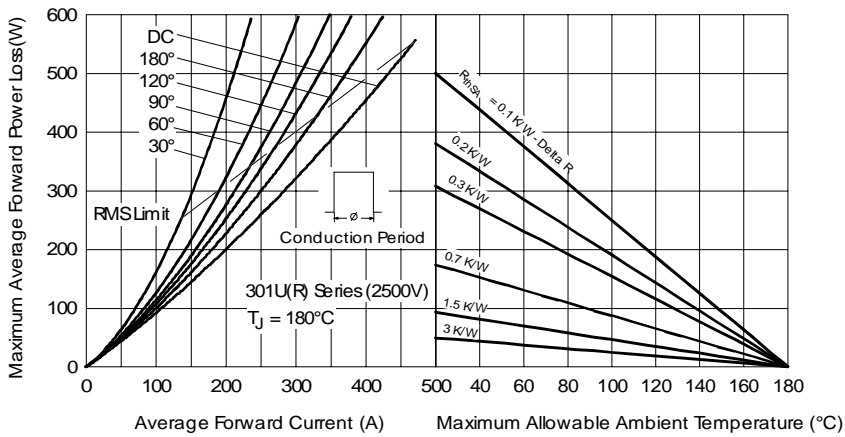


Fig. 8 - Forward Power Loss Characteristics

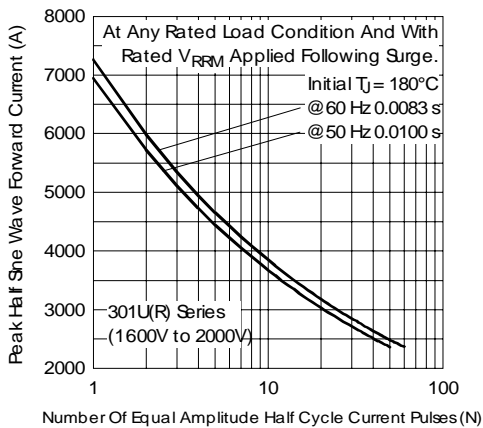


Fig. 9 - Maximum Non-Repetitive Surge Current

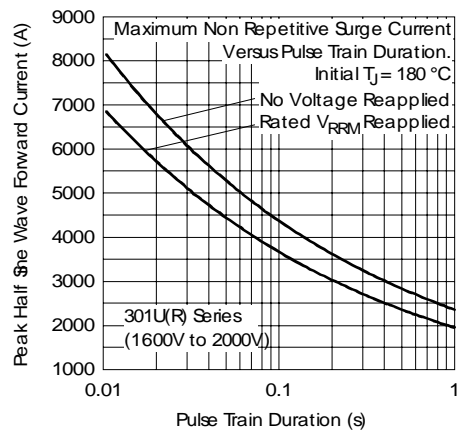


Fig. 10 - Maximum Non-Repetitive Surge Current

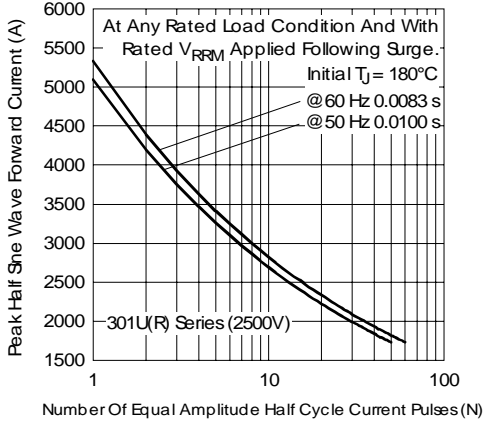


Fig. 11 - Maximum Non-Repetitive Surge Current

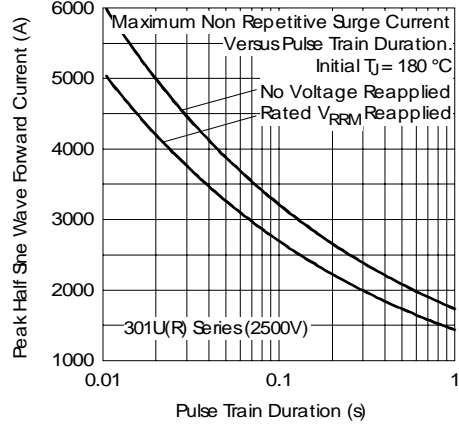


Fig. 12 - Maximum Non-Repetitive Surge Current

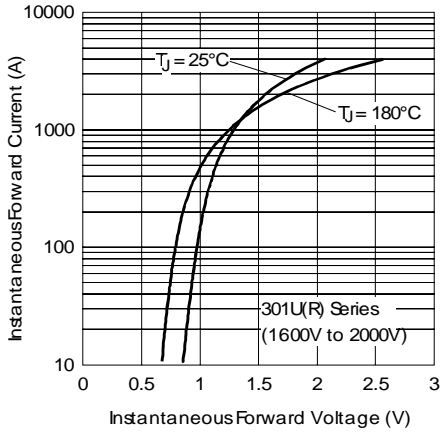


Fig. 13 - Forward Voltage Drop Characteristics

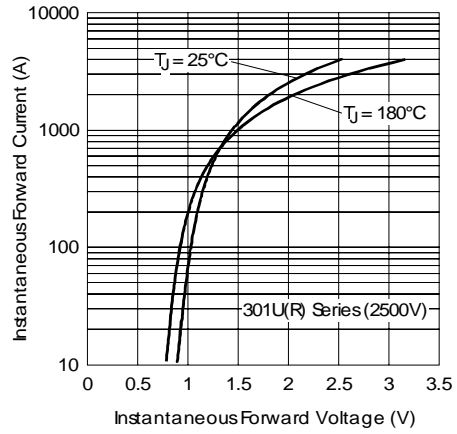


Fig. 14 - Forward Voltage Drop Characteristics

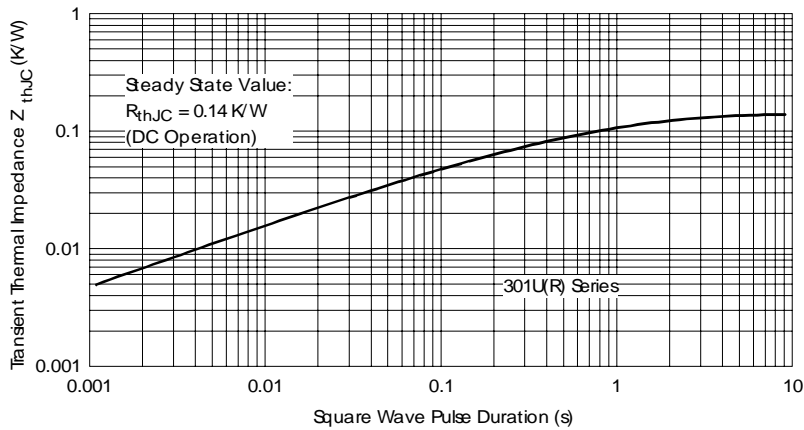


Fig. 15 - Thermal Impedance Z_{thJC} Characteristic

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.

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