International
IOR Rectifier

12F(R) SERIES

STANDARD RECOVERY DIODES

Stud Version

Features

- High surge current capability
- Avalanche types available
- Stud cathode and stud anode version
- Wide current range
- Types up to 1200V V_{RRM}
- RoHS COmpliant

12 A

Typical Applications

- Battery charges
- Converters
- Power supplies
- Machine tool controls

Major Ratings and Characteristics

Parameters		12F(R)	Units
$I_{F(AV)}$		12	A
	@ T_C	144	°C
$I_{F(RMS)}$		19	A
I_{FSM}	@ 50Hz	265	A
	@ 60Hz	280	A
I^2t	@ 50Hz	351	A^2s
	@ 60Hz	320	A^2s
V_{RRM}	range	100 to 1200	V
T_J	range	- 65 to 175	°C

case style
DO-203AA (DO-4)

ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{RRM}, maximum repetitive peak reverse voltage V	V_{RSM}, maximum non-repetitive peak reverse voltage V	$V_{R(BR)}$, minimum avalanche voltage V **(1)**	I_{RRM} max. @ T_J = 175°C mA
12F(R)	10	100	150	--	12
	20	200	275	--	
	40	400	500	500	
	60	600	725	750	
	80	800	950	950	
	100	1000	1200	1150	
	120	1200	1400	1350	

(1) Avalanche version only available from V_{RRM} 400V to 1200V.

Forward Conduction

	Parameter	12F(R)	Units	Conditions		
$I_{F(AV)}$	Max. average forward current	12	A	180° conduction, half sine wave		
	@ Case temperature	144	°C			
$I_{F(RMS)}$	Max. RMS forward current	19	A			
P_R	Maximum non-repetitive peak reverse power	7	K/W	10µs square pulse, $T_J = T_J$ max. **see note (2)**		
I_{FSM}	Max. peak, one-cycle forward, non-repetitive surge current	265	A	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
		280		t = 8.3ms		
		225		t = 10ms	100% V_{RRM} reapplied	
		235		t = 8.3ms		
I^2t	Maximum I^2t for fusing	351	A^2s	t = 10ms	No voltage reapplied	
		320		t = 8.3ms		
		250		t = 10ms	100% V_{RRM} reapplied	
		226		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	3510	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$	Low level value of threshold voltage	0.77	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	0.97		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{f1}	Low level value of forward slope resistance	10.70	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	6.20		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
V_{FM}	Max. forward voltage drop	1.26	V	I_{pk}= 38A, T_J = 25°C, t_p = 400µs rectangular wave		

(2) Available only for Avalanche version, all other parameters the same as 12F.

Thermal and Mechanical Specifications

Parameter		12F(R)	Units	Conditions
T_J	Max. junction operating temperature range	-65 to 175	°C	
T_{stg}	Max. storage temperature range	-65 to 200		
R_{thJC}	Max. thermal resistance, junction to case	2	K/W	DC operation
R_{thCS}	Max. thermal resistance, case to heatsink	0.5		Mounting surface, smooth, flat and greased
T	Allowable mounting torque	$1.5^{+0-10\%}$	Nm	Not lubricated threads
		13	lbf.in	
		$1.2^{+0-10\%}$	Nm	Lubricated threads
		10	lbf.in	
wt	Approximate weight	7 (0.25)	g (oz)	
	Case style	DO-203AA (DO-4)	See Outline Table	

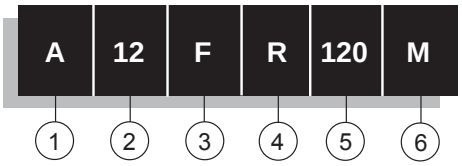
ΔR_{thJC} Conduction

(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
180°	0.33	0.26	K/W	$T_J = T_J$ max.
120°	0.41	0.44		
90°	0.53	0.58		
60°	0.78	0.81		
30°	1.28	1.29		

Ordering Information Table

Device Code



1 - A = Avalanche diode
None = Standard diode

2 - Current rating: Code = $I_{F(AV)}$

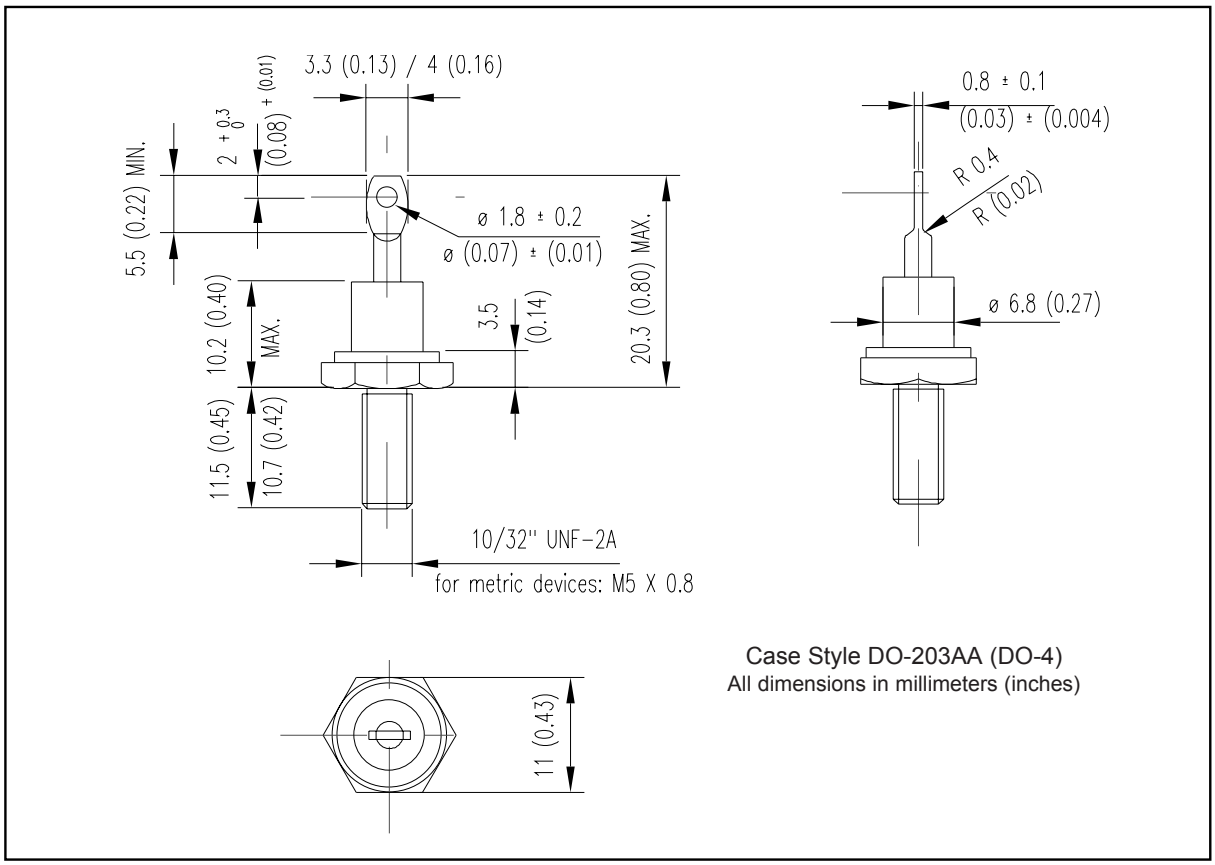
3 - F = Standard device

4 - None = Stud Normal Polarity (Cathode to Stud)
R = Stud Reverse Polarity (Anode to Stud)

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

6 - None = Stud base DO-203AA (DO-4) 10-32UNF-2A
M = Stud base DO-203AA (DO-4) M5 X 0.8 - (Not available for Avalanche diodes)

Outlines Table



Case Style DO-203AA (DO-4)
All dimensions in millimeters (inches)

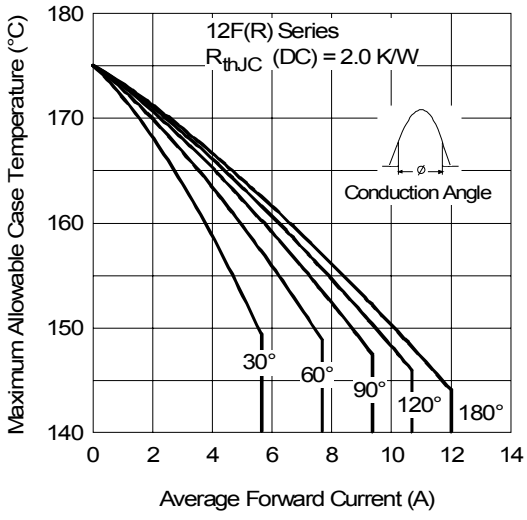


Fig. 1 - Current Ratings Characteristics

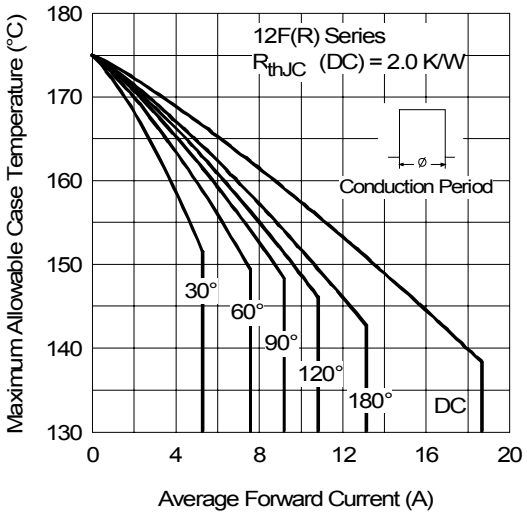


Fig. 2 - Current Ratings Characteristics

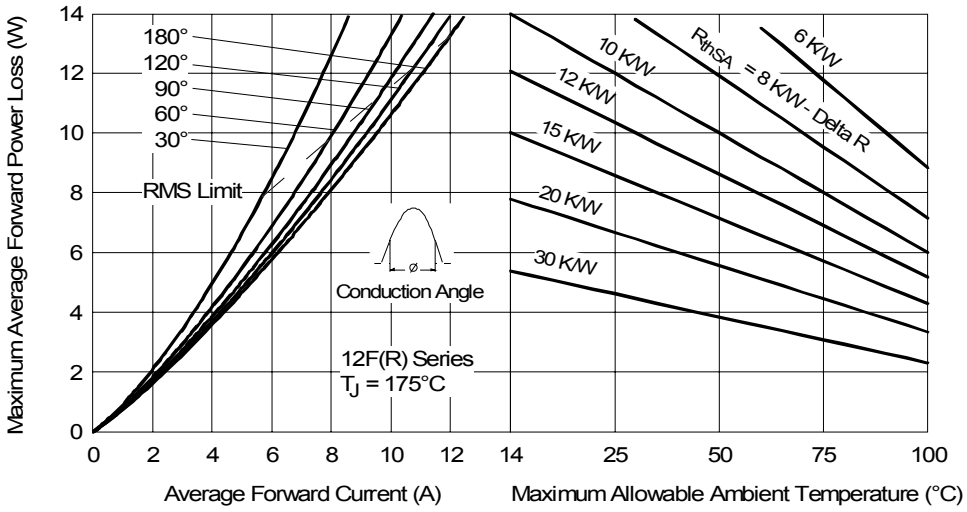


Fig. 3 - Forward Power Loss Characteristics

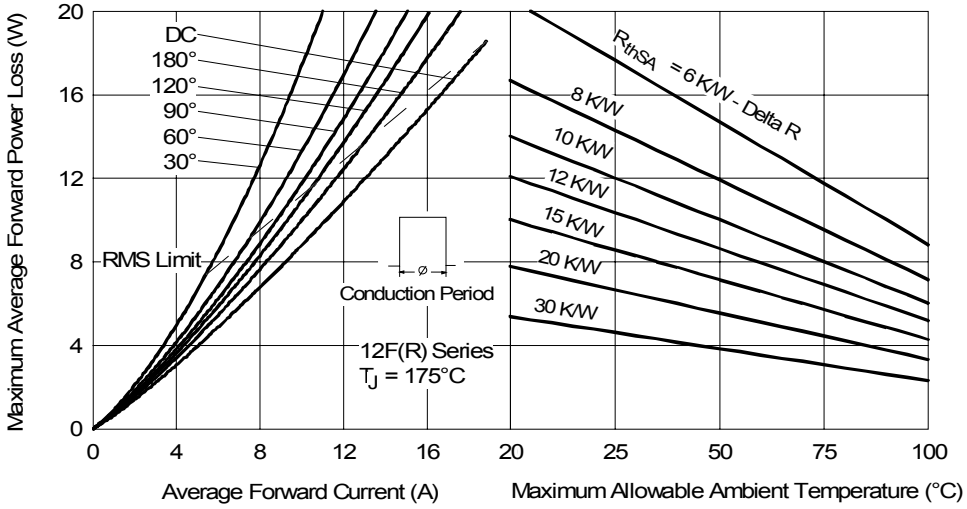


Fig. 4 - Forward Power Loss Characteristics

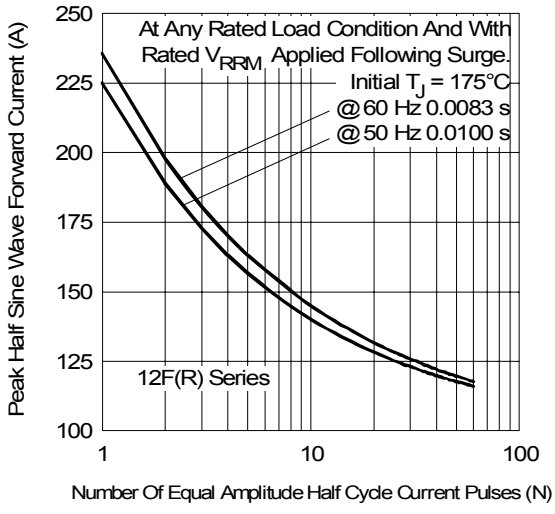


Fig. 5 - Maximum Non-Repetitive Surge Current

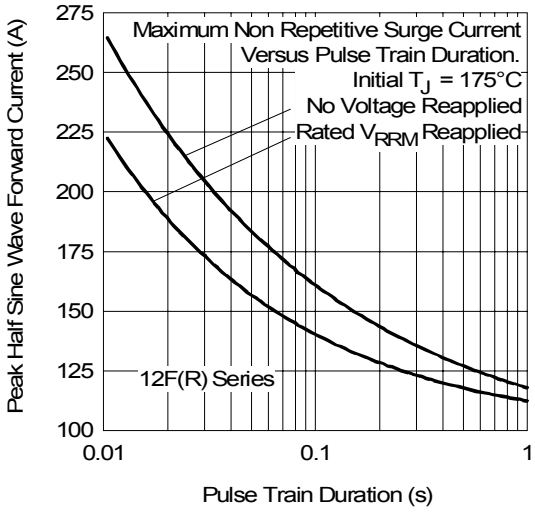


Fig. 6 - Maximum Non-Repetitive Surge Current

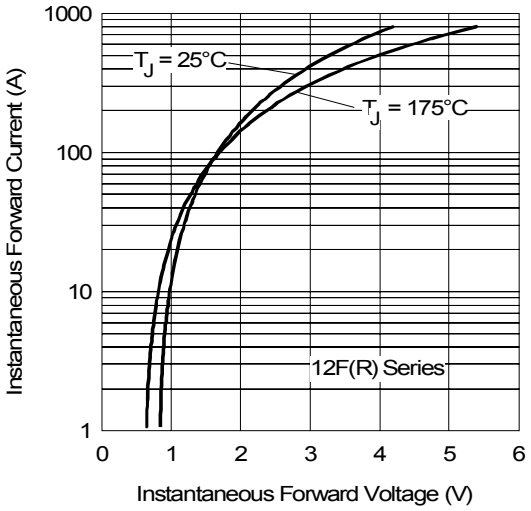


Fig. 7 - Forward Voltage Drop Characteristics

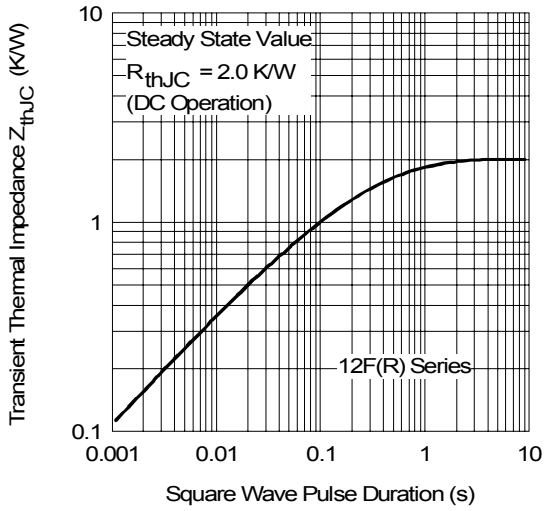


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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

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. 03/06