

## STANDARD RECOVERY DIODES

Stud Version

### Features

- High surge current capability
- Designed for a wide range of applications
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600V  $V_{RRM}$

70 A

### Typical Applications

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

### Major Ratings and Characteristics

Parameters	70HF(R)		Units	
	10 to 120	140 to 160		
$I_{F(AV)}$	70	70	A	
@ $T_C$	140	110	°C	
$I_{F(RMS)}$	110		A	
$I_{FSM}$	@ 50Hz	1200	A	
	@ 60Hz	1250	A	
$I^2t$	@ 50Hz	7100	A <sup>2</sup> s	
	@ 60Hz	6450	A <sup>2</sup> s	
$V_{RRM}$	range	100 to 1200	1400 to 1600	V
$T_J$	range	- 65 to 180	- 65 to 150	°C



## 70HF(R) Series

Bulletin I20202 rev. E 03/04

International  
IR Rectifier

### ELECTRICAL SPECIFICATIONS

#### Voltage Ratings

Type number	Voltage Code	V <sub>RRM</sub> : maximum repetitive peak reverse voltage V	V <sub>RSM</sub> : maximum non-repetitive peak reverse voltage V	V <sub>R(BR)</sub> : minimum avalanche voltage V	I <sub>RRM</sub> max. @ T <sub>J</sub> = T <sub>J</sub> max. mA
70HF(R)	10	100	200	200	15
	20	200	300	300	
	40	400	500	500	
	60	600	720	725	9
	80	800	960	950	
	100	1000	1200	1150	
	120	1200	1440	1350	
	140	1400	1650	1550	4.5
160	1600	1900	1750		

#### Forward Conduction

Parameter	70HF(R)		Units	Conditions						
	10 to 120	140 to 160								
I <sub>F(AV)</sub> Max. average forward current @ Case temperature	70 140	70 110	A °C	180° conduction, half sine wave						
I <sub>F(RMS)</sub> Max. RMS forward current	110		A							
I <sub>FSM</sub> Max. peak, one-cycle forward, non-repetitive surge current	1200 1250 1000 1050		A	<table border="1"> <tr> <td>t = 10ms</td> <td rowspan="2">No voltage reappplied</td> </tr> <tr> <td>t = 8.3ms</td> </tr> <tr> <td>t = 10ms</td> <td rowspan="2">100% V<sub>RRM</sub> reappplied</td> </tr> <tr> <td>t = 8.3ms</td> </tr> </table>	t = 10ms	No voltage reappplied	t = 8.3ms	t = 10ms	100% V <sub>RRM</sub> reappplied	t = 8.3ms
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t = 10ms	100% V <sub>RRM</sub> reappplied									
t = 8.3ms										
I <sup>2</sup> t Maximum I <sup>2</sup> t for fusing	7100 6450 5000 4550		A <sup>2</sup> s	<table border="1"> <tr> <td>t = 10ms</td> <td rowspan="2">No voltage reappplied</td> </tr> <tr> <td>t = 8.3ms</td> </tr> <tr> <td>t = 10ms</td> <td rowspan="2">100% V<sub>RRM</sub> reappplied</td> </tr> <tr> <td>t = 8.3ms</td> </tr> </table>	t = 10ms	No voltage reappplied	t = 8.3ms	t = 10ms	100% V <sub>RRM</sub> reappplied	t = 8.3ms
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t = 8.3ms										
I <sup>2</sup> /t Maximum I <sup>2</sup> /t for fusing	71000		A <sup>2</sup> /s	t = 0.1 to 10ms, no voltage reappplied						
V <sub>F(TO)1</sub> Low level value of threshold voltage	0.79		V	(16.7% × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> max.						
V <sub>F(TO)2</sub> High level value of threshold voltage	1.00			(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.						
r <sub>f1</sub> Low level value of forward slope resistance	2.33		mΩ	(16.7% × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> max.						
r <sub>f2</sub> High level value of forward slope resistance	1.53			(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.						
V <sub>FM</sub> Max. forward voltage drop	1.35	1.46	V	I <sub>pk</sub> = 220A, T <sub>J</sub> = 25°C, t <sub>p</sub> = 400μs rectangular wave						

Thermal and Mechanical Specifications

Parameter	70HF(R)		Units	Conditions
	10 to 120	140 to 160		
T <sub>J</sub> Max. junction operating temperature range	-65 to 180	-65 to 150	°C	
T <sub>stg</sub> Max. storage temperature range	-65 to 180	-65 to 150		
R <sub>thJC</sub> Max. thermal resistance, junction to case	0.45		K/W	DC operation
R <sub>thCS</sub> Max. thermal resistance, case to heatsink	0.25			Mounting surface, smooth, flat and greased
T Max. allowed mounting torque ±10%	2.3 - 3.4		Nm	Not lubricated threads
	20 - 30		lbf · in	
wt Approximate weight	17 (0.6)		g (oz)	
Case style	DO-203AB (DO5)			See Outline Table

$\Delta R_{thJC}$  Conduction

(The following table shows the increment of thermal resistance R<sub>thJC</sub> when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.08	0.06	K/W	T <sub>J</sub> = T <sub>J</sub> max.
120°	0.10	0.11		
90°	0.13	0.14		
60°	0.19	0.20		
30°	0.30	0.30		

Ordering Information Table

Device Code

70	HF	R	160	M
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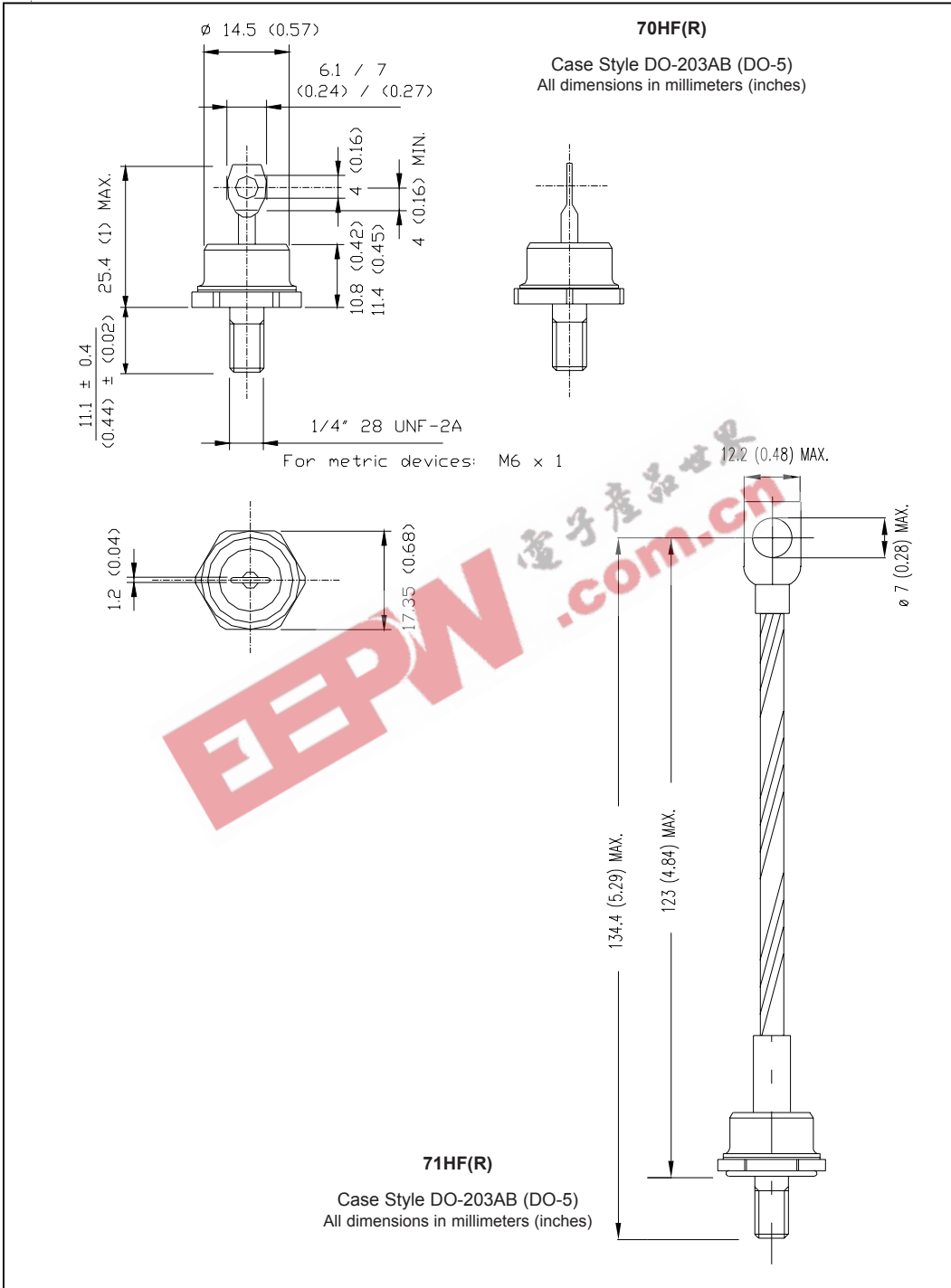
(1)
(2)
(3)
(4)
(5)

- 1** - 70 = Standard device  
71 = Not isolated lead  
72 = Isolated lead with silicone sleeve  
(Red = Reverse polarity)  
(Blue = Normal polarity)
- 2** - HF = Standard diode
- 3** - None = Stud Normal Polarity (Cathode to Stud)  
R = Stud Reverse Polarity (Anode to Stud)
- 4** - Voltage code: Code x 10 = V<sub>RRM</sub> (See Voltage Ratings table)
- 5** - None = Stud base DO-203AB (DO-5) 1/4" 28UNF-2A  
M = Stud base DO-203AB (DO-5) M6 X 1

**70HF(R) Series**

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Outlines Table



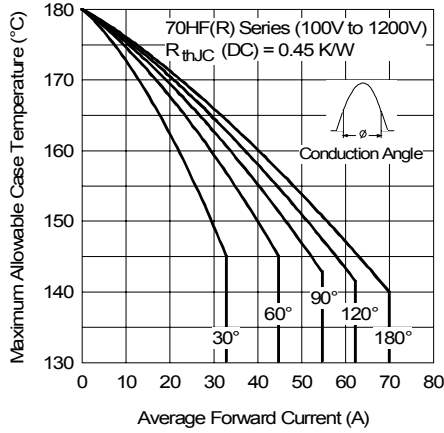


Fig. 1 - Current Ratings Characteristics

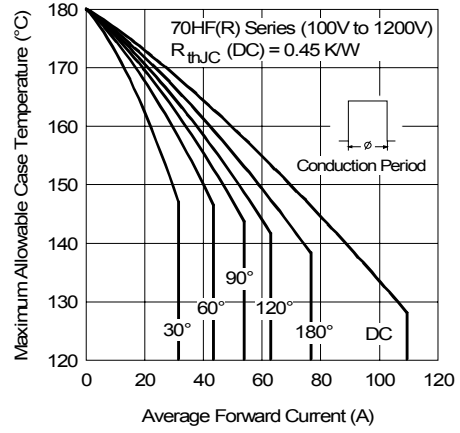


Fig. 2 - Current Ratings Characteristics

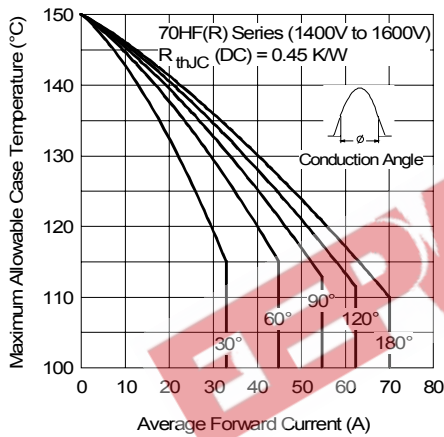


Fig. 3 - Current Ratings Characteristics

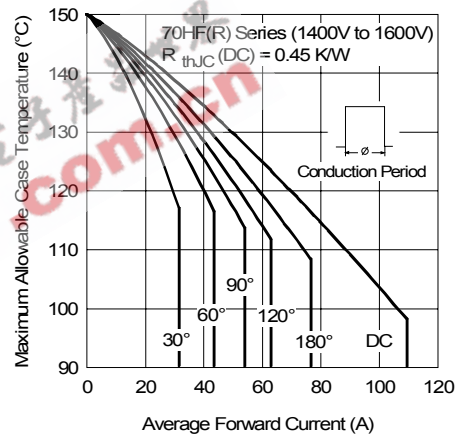


Fig. 4 - Current Ratings Characteristics



Fig. 5 - Forward Power Loss Characteristics

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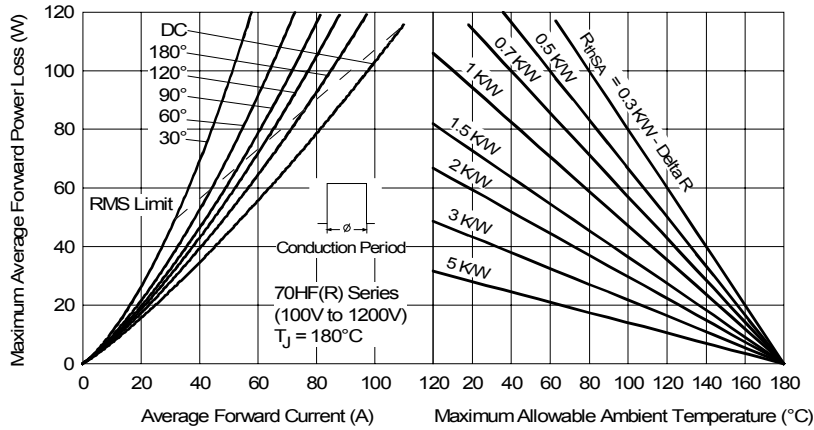


Fig. 6 - Forward Power Loss Characteristics



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 - Forward Voltage Drop Characteristics



Fig. 12 - Thermal Impedance  $Z_{thjC}$  Characteristics



Fig. 13 - Forward Voltage Drop Characteristics

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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

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