

International  
**IR** Rectifier

## 400U(R) SERIES

STANDARD RECOVERY DIODES

Stud Version

### Features

- Wide current range
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC types

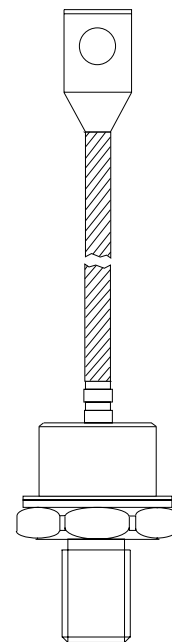
400A

### Typical Applications

- Converters
- Power supplies
- Machine tool controls
- High power drives

### Major Ratings and Characteristics

Parameters	400U/R	Units
$I_{F(AV)}$	400	A
@ $T_C$	120	°C
$I_{F(RMS)}$	630	A
$I_{FSM}$ @ 50Hz	8250	A
@ 60Hz	8640	A
$I^2t$ @ 50Hz	340	KA <sup>2</sup> s
@ 60Hz	311	KA <sup>2</sup> s
$V_{RRM}$ range	800 to 1600	V
$T_J$	- 40 to 200	°C



case style  
DO-205AB (DO-9)

## 400U(R) Series

Bulletin I2059 rev. C 03/03

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### 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
400U(R)	80	800	900	15
	120	1200	1300	
	160	1600	1700	

#### Forward Conduction

Parameter	400U(R)	Units	Conditions
$I_{F(AV)}$ Max. average forward current @ Case temperature	400	A	180° conduction, half sine wave
	120	°C	
$I_{F(RMS)}$ Max. RMS forward current	630	A	DC @ 110°C case temperature
$I_{FSM}$ Max. peak, one-cycle forward, non-repetitive surge current	8250	A	t = 10ms No voltage
	8640		t = 8.3ms reapplied
	6940		t = 10ms 100% $V_{RRM}$
	7270		t = 8.3ms reapplied
$I^2t$ Maximum $I^2t$ for fusing	340	KA <sup>2</sup> s	t = 10ms No voltage
	311		t = 8.3ms reapplied
	241		t = 10ms 100% $V_{RRM}$
	220		t = 8.3ms reapplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	3400	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	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	0.85		$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.
$r_{f1}$ Low level value of forward slope resistance	0.49	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		$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.
$V_{FM}$ Max. forward voltage drop	1.62	V	$I_{pk} = 1500A$ , $T_J = T_J$ max, $t_p = 10ms$ sinusoidal wave

#### Thermal and Mechanical Specifications

Parameter	400U(R)	Units	Conditions
$T_J$ Max. junction operating temperature range	-40 to 200	°C	
$T_{stg}$ Max. storage temperature range	-40 to 200		
$R_{thJC}$ Max. thermal resistance, junction to case	0.15	K/W	DC operation
$R_{thCS}$ Max. thermal resistance, case to heatsink	0.04		Mounting surface, smooth, flat and greased
T Max. allowed mounting torque ±10%	27	Nm	Not lubricated threads
wt Approximate weight	250	g	
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
180°	0.020	0.013	KW	$T_J = T_{J \text{ max.}}$
120°	0.023	0.023		
90°	0.029	0.031		
60°	0.042	0.044		
30°	0.073	0.074		

Ordering Information Table

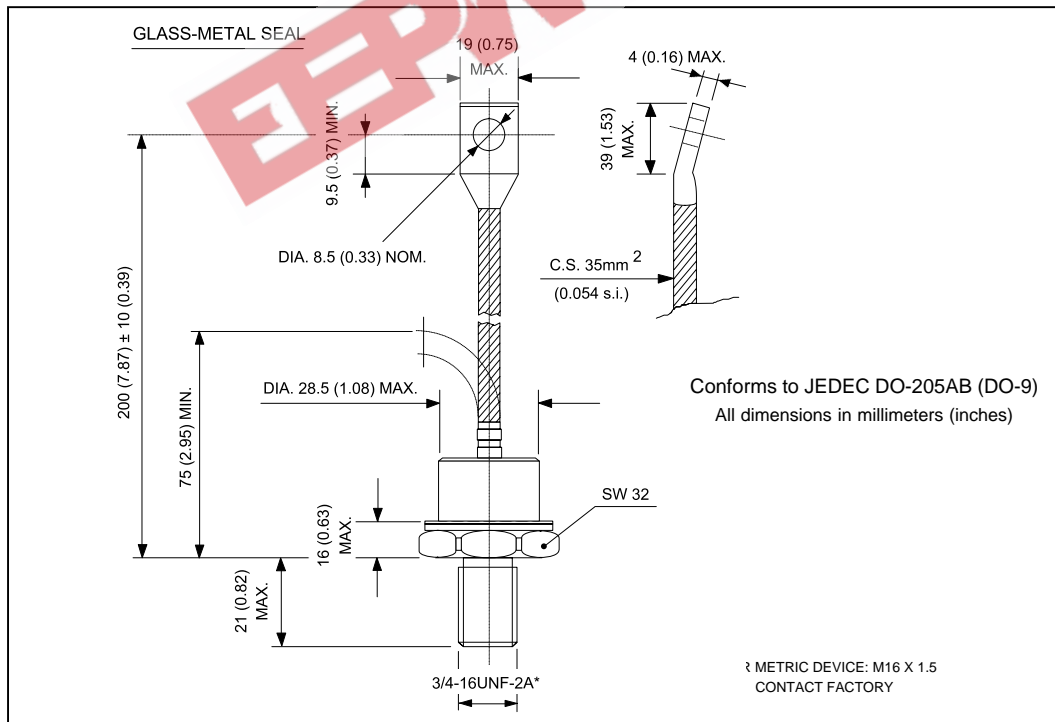
**Device Code**

40	0	U	R	160	D
1	2	3	4	5	6

- 1** - 40 = Essential Part Number
- 2** - 0 = Standard Recovery Device
- 3** - U = Stud Normal Polarity (Cathode to Stud)
- 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** - Diffused diode

NOTE: For Metric device M16 x 1.5 Contact Factory

Outline Table



# 400U(R) Series

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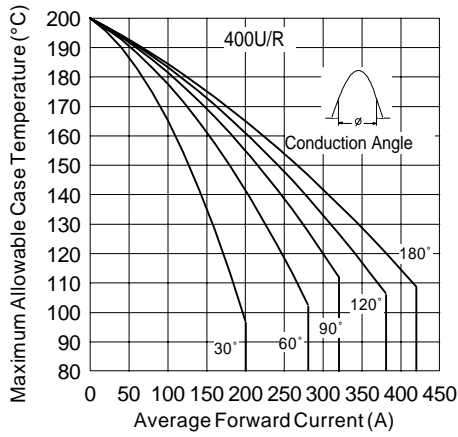


Fig. 1 - Current Ratings Characteristics

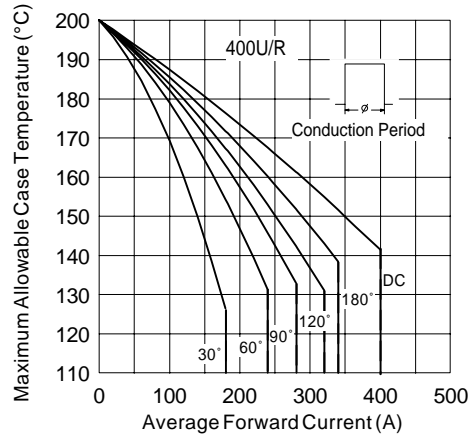


Fig. 2 - Current Ratings Characteristics

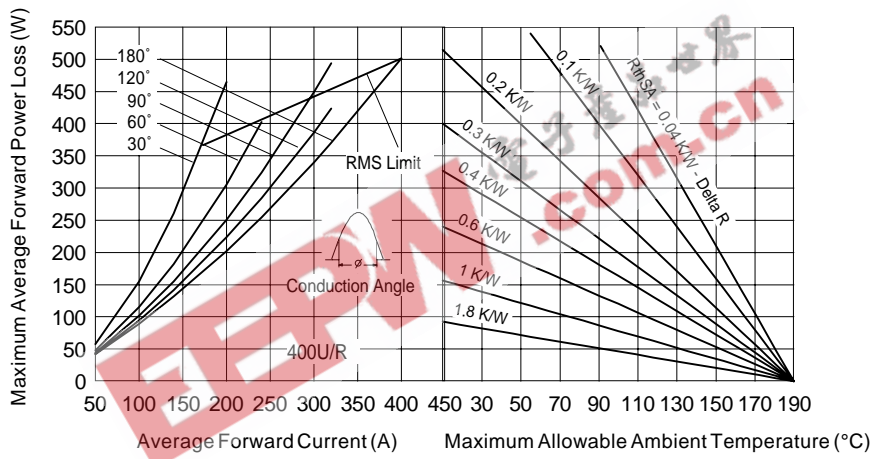


Fig. 3 - Forward Power Loss Characteristics

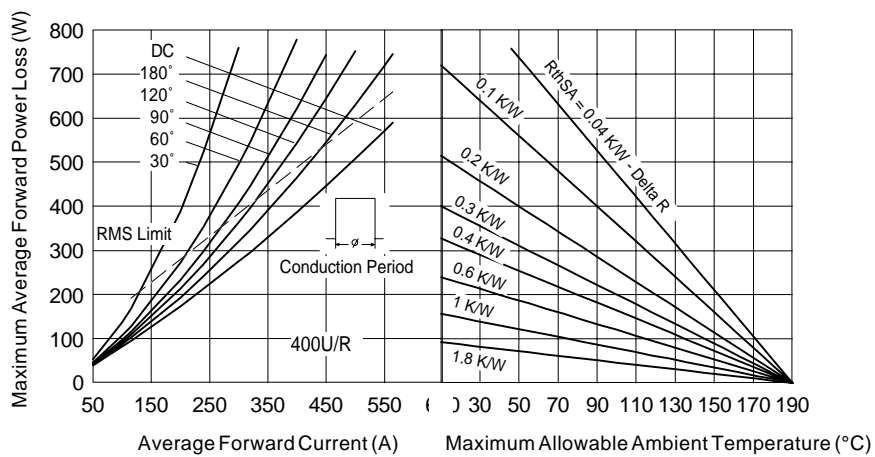


Fig. 4 - Forward Power Loss Characteristics

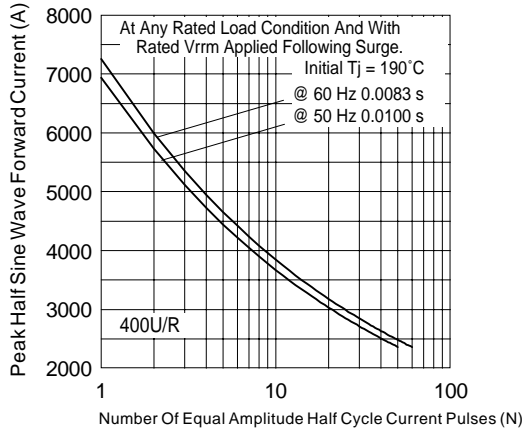


Fig. 5 - Maximum Non-Repetitive Surge Current

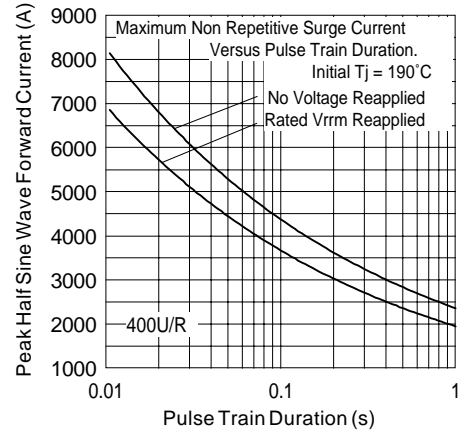


Fig. 6 - Maximum Non-Repetitive Surge Current

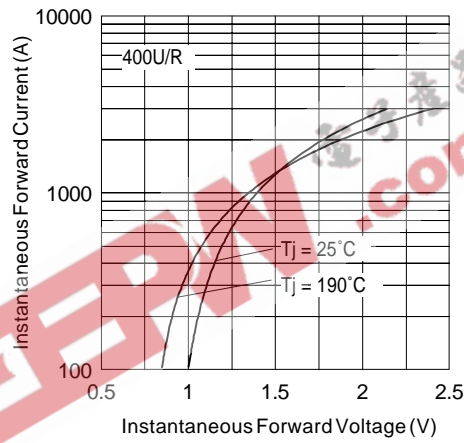


Fig. 7 - Forward Voltage Drop Characteristics

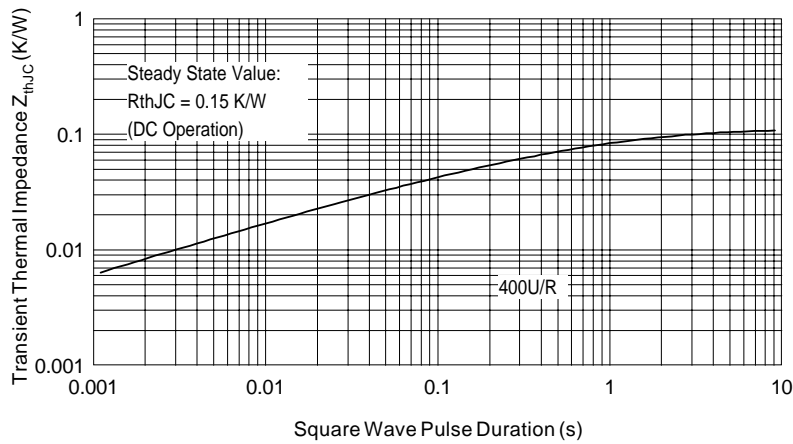


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristic

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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.

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