

Bulletin I2059 rev.C 03/03

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

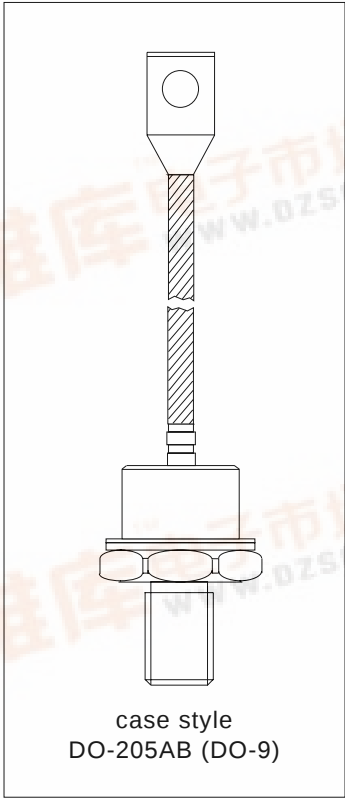
400A

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 ² s
@ 60Hz	311	KA ² s
V_{RRM} range	800 to 1600	V
T_J	- 40 to 200	°C



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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	400 120	A °C	180° conduction, half sine wave
$I_{F(RMS)}$ 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 ² 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 ² √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

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
180°	0.020	0.013	K/W	$T_J = T_{J \text{ max.}}$
120°	0.023	0.023		
90°	0.029	0.031		
60°	0.042	0.044		
30°	0.073	0.074		

Ordering Information Table

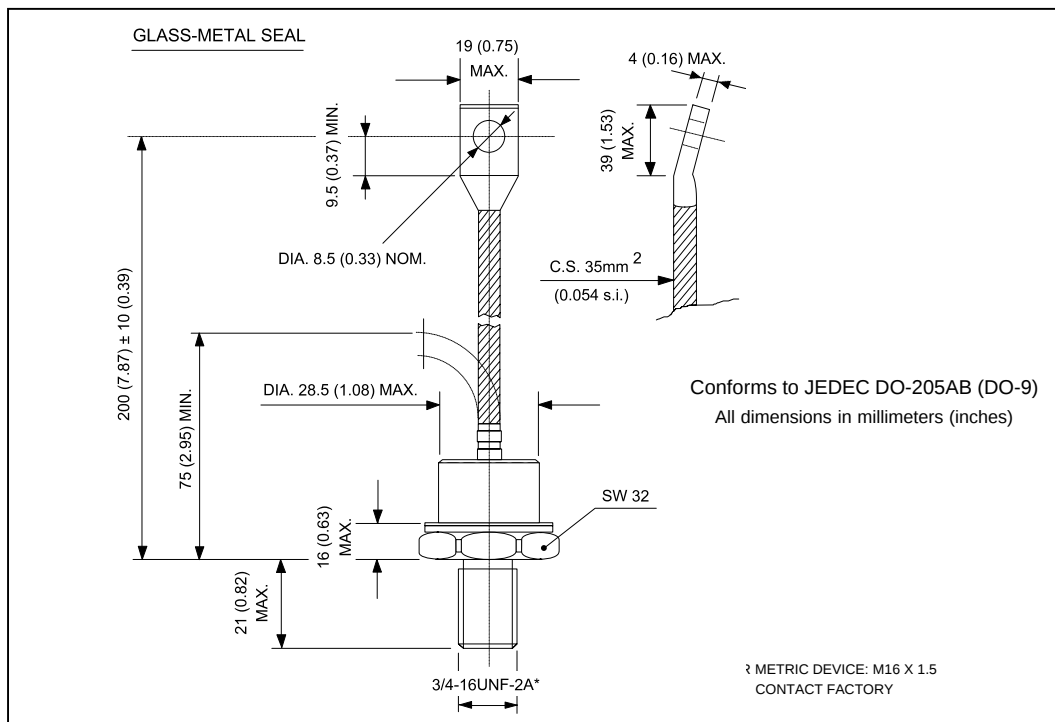
Device Code

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



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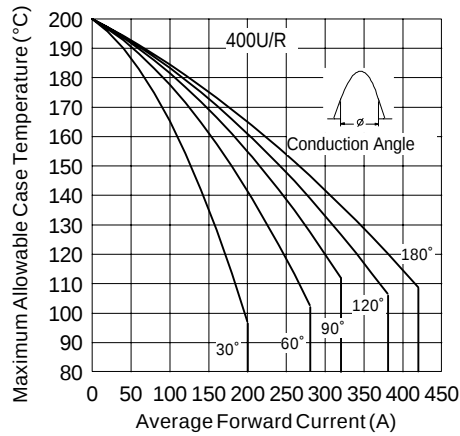


Fig. 1 - Current Ratings Characteristics

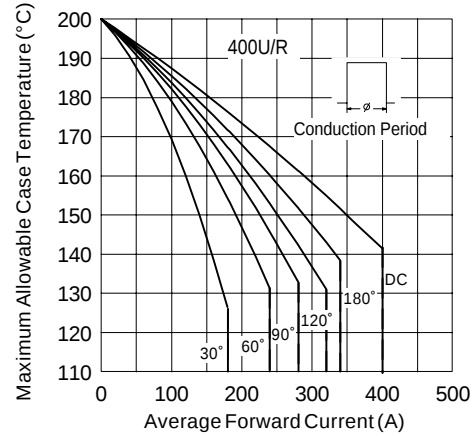


Fig. 2 - Current Ratings Characteristics

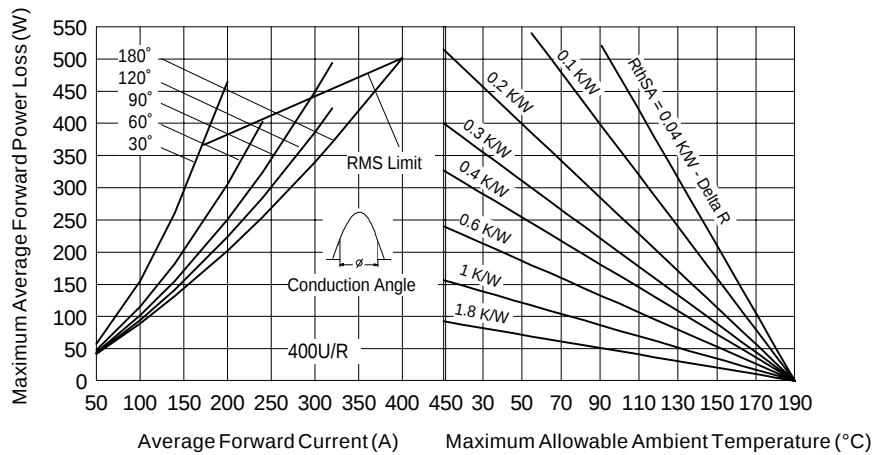


Fig. 3 - Forward Power Loss Characteristics

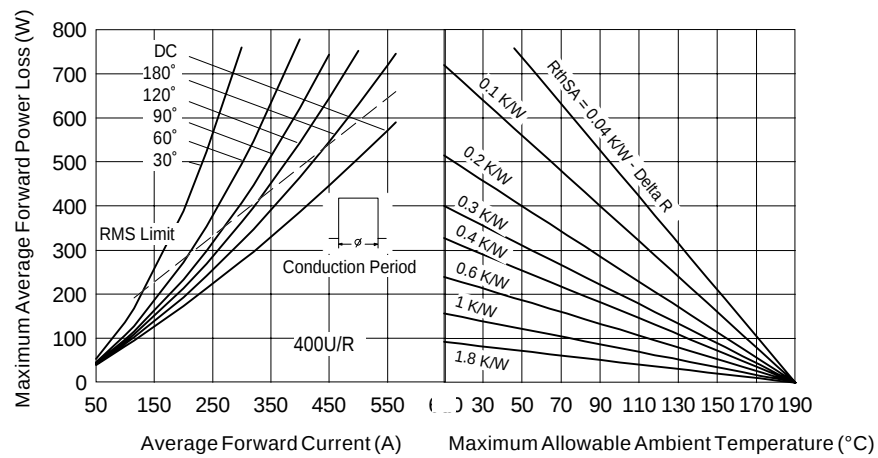


Fig. 4 - Forward Power Loss Characteristics

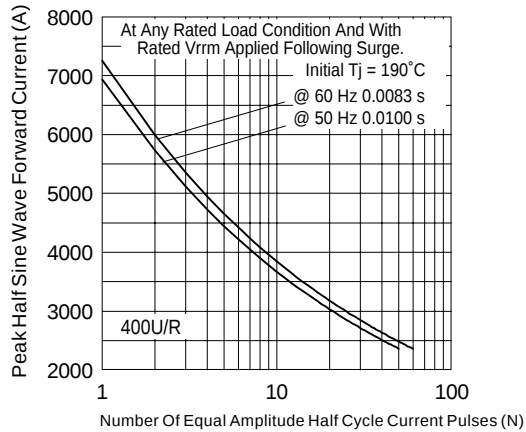


Fig. 5 - Maximum Non-Repetitive Surge Current

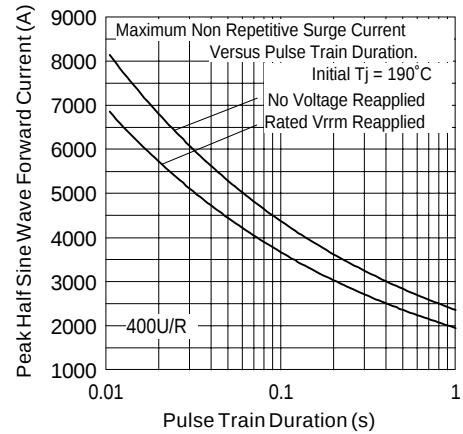


Fig. 6 - Maximum Non-Repetitive Surge Current

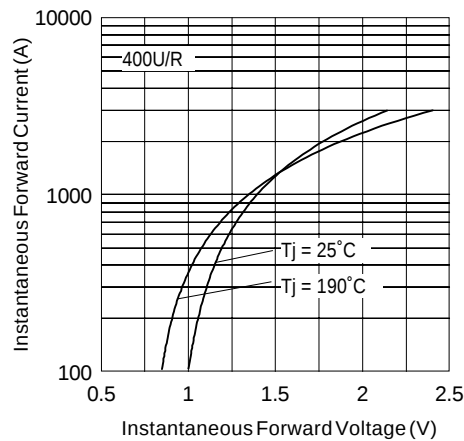


Fig. 7 - Forward Voltage Drop Characteristics

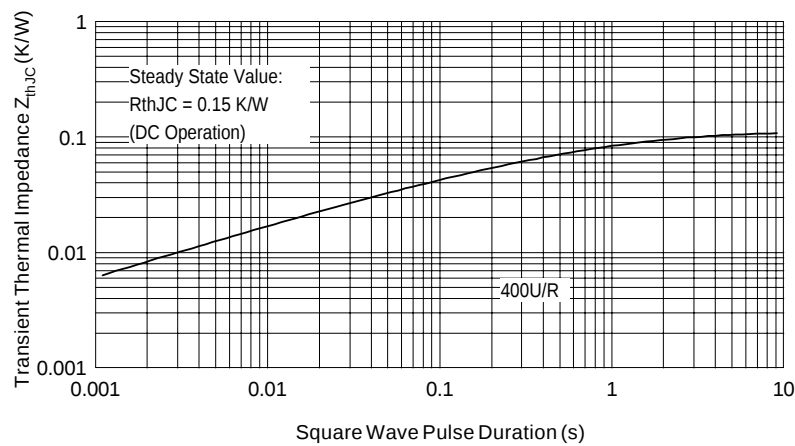


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

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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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