

## Standard Recovery Diodes, (Stud Version), 400 A



DO-9 (DO-205AB)

### FEATURES

- Wide current range
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC® types
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	400 A
Package	DO-9 (DO-205AB)
Circuit configuration	Single

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		400	A
	$T_C$	120	°C
$I_{F(RMS)}$		630	A
$I_{FSM}$	50 Hz	8250	A
	60 Hz	8640	
$I^2t$	50 Hz	340	kA <sup>2</sup> s
	60 Hz	311	
$V_{RRM}$	Range	800 to 1600	V
$T_J$		-40 to +200	°C

### 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	$I_{RRM}$ MAXIMUM AT $T_J = T_J$ MAXIMUM mA
VS-400U(R)	80	800	900	15
	120	1200	1300	
	160	1600	1700	



FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		400	A
				120	°C
Maximum RMS forward current	$I_{F(RMS)}$	DC at 110 °C case temperature		630	A
Maximum peak, one cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	A
		t = 8.3 ms			
		t = 10 ms	100 % $V_{RRM}$ reapplied		
		t = 8.3 ms			
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reapplied	340	kA <sup>2</sup> s
		t = 8.3 ms			
		t = 10 ms	100 % $V_{RRM}$ reapplied	241	
		t = 8.3 ms			
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		3400	kA <sup>2</sup> √s
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum		0.77	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > $\pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum		0.85	
Low level value of forward slope resistance	$r_{f1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum		0.49	mΩ
High level value of forward slope resistance	$r_{f2}$	(I > $\pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum		0.49	
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 1500$ A, $T_J = T_J$ maximum, $t_p = 10$ ms sinusoidal wave		1.62	V

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction operating and storage temperature range	$T_J, T_{Stg}$			-40 to 200	°C
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation		0.15	K/W
Maximum thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth, flat and greased		0.04	
Maximum allowed mounting torque ± 10 %		Not lubricated threads		27	N · m
Approximate weight				250	g
Case style		See dimensions - link at the end of datasheet		DO-9 (DO-205AB)	

$\Delta R_{thJC}$ CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.020	0.013	$T_J = T_J$ maximum	K/W
120°	0.023	0.023		
90°	0.029	0.031		
60°	0.042	0.044		
30°	0.073	0.074		

**Note**

- The table above shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC

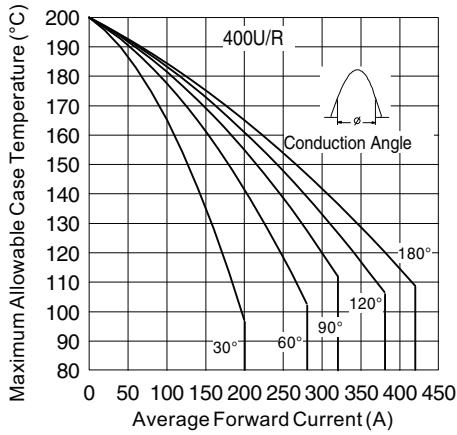


Fig. 1 - Current Ratings Characteristics

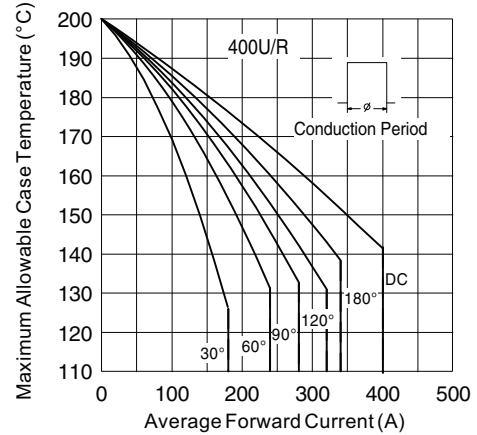


Fig. 2 - Current Ratings Characteristics

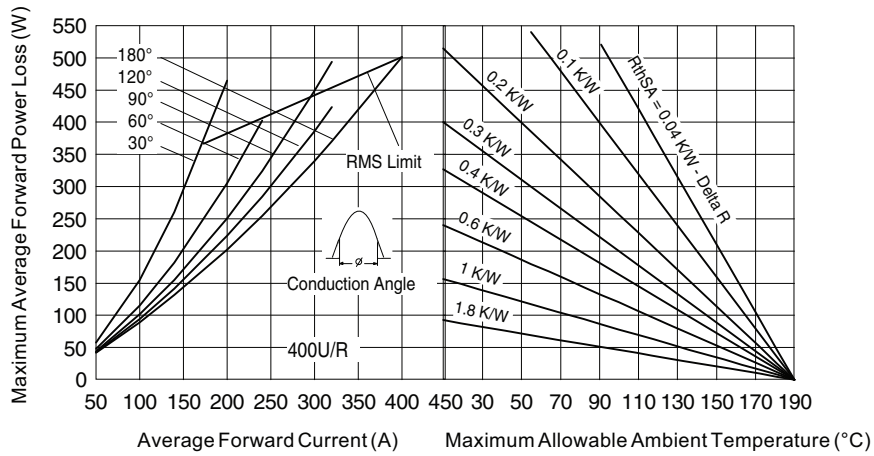


Fig. 3 - Forward Power Loss Characteristics

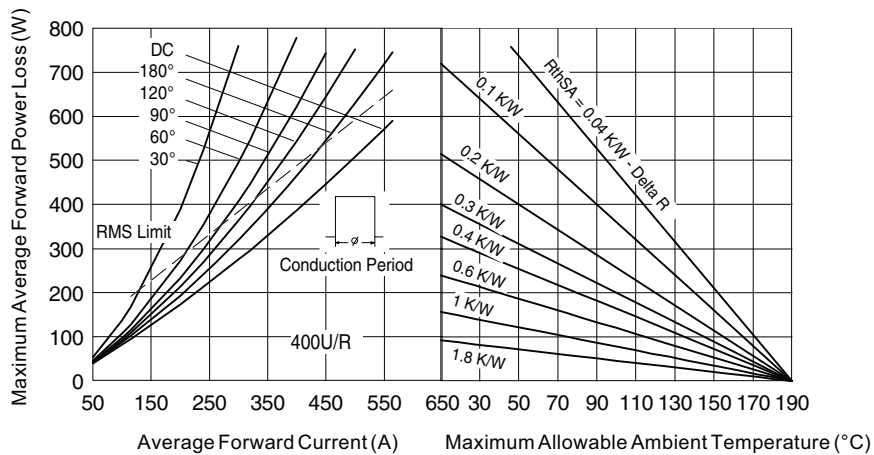


Fig. 4 - Forward Power Loss Characteristics

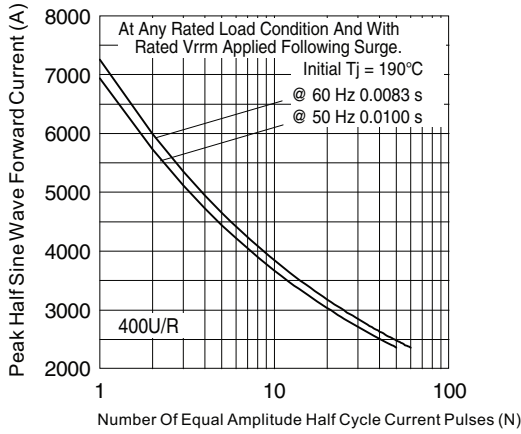


Fig. 5 - Maximum Non-Repetitive Surge Current

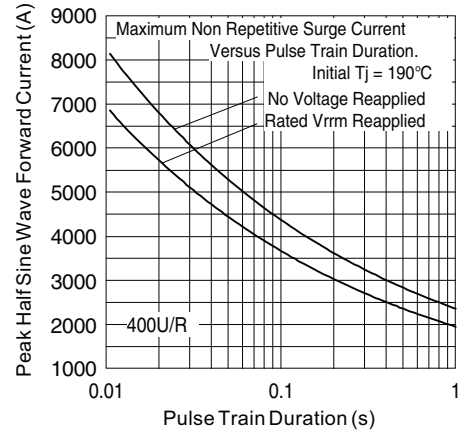


Fig. 6 - Maximum Non-Repetitive Surge Current

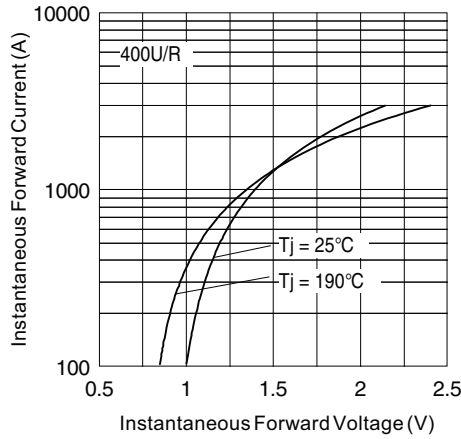


Fig. 7 - Forward Voltage Drop Characteristics

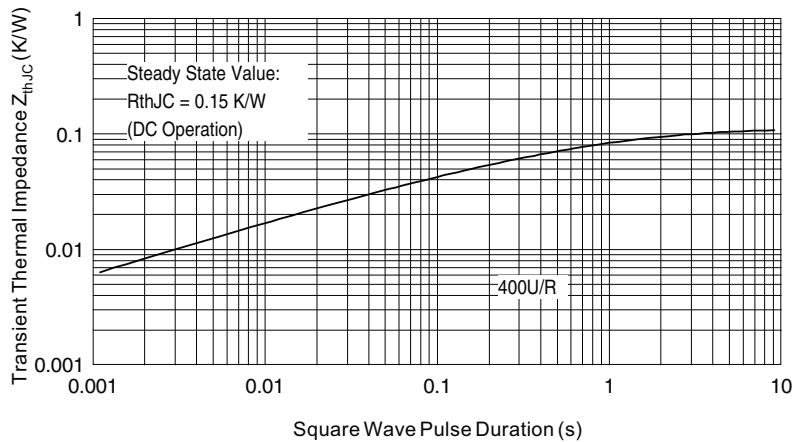
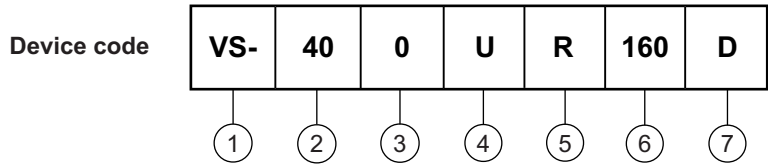


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristic



**ORDERING INFORMATION TABLE**



- 1** - Vishay Semiconductors product
- 2** - 40 = essential part number
- 3** - 0 = standard recovery device
- 4** - U = stud normal polarity (cathode to stud)
- 5** -
  - None = stud normal polarity (cathode to stud)
  - R = stud reverse polarity (anode to stud)
- 6** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 7** - Diffused diode

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95339">www.vishay.com/doc?95339</a>

## DO-205AB (DO-9) for 400U(R) Series

**DIMENSIONS** in millimeters (inches)



**Note**

- For metric device: M16 x 1.5 contact factory



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