

### STANDARD RECOVERY DIODES

### Stud Version

#### Features

- Wide current range
- High voltage ratings up to 2400V
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC types

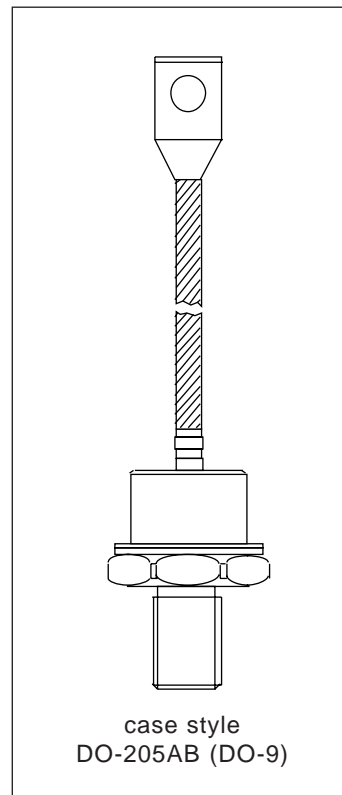
#### Typical Applications

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

#### Major Ratings and Characteristics

Parameters	SD400N/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	400 to 2400	V
$T_J$	- 40 to 190	°C

400A



**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
SD400N/R	04	400	500	15
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	
	24	2400	2500	

## Forward Conduction

Parameter	SD400N/R	Units	Conditions
$I_{F(AV)}$ Max. average forward current @ Case temperature	400	A	180° conduction, half sine wave
	120	°C	
$I_{F(AV)}$ Max. average forward current @ Case temperature	480	A	180° conduction, half sine wave
	100	°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	0.80	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	0.55	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	0.51		$(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ 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	SD400N/R	Units	Conditions
T <sub>J</sub> Max. junction operating temperature range	-40 to 190	°C	
T <sub>stg</sub> Max. storage temperature range	-55 to 200		
R <sub>thJC</sub> Max. thermal resistance, junction to case	0.11	K/W	DC operation
R <sub>thCS</sub> 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<sub>thJC</sub> 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°	0.020	0.013	K/W	T <sub>J</sub> = T <sub>J</sub> max.
120°	0.023	0.023		
90°	0.029	0.031		
60°	0.042	0.044		
30°	0.073	0.074		

**Ordering Information Table**

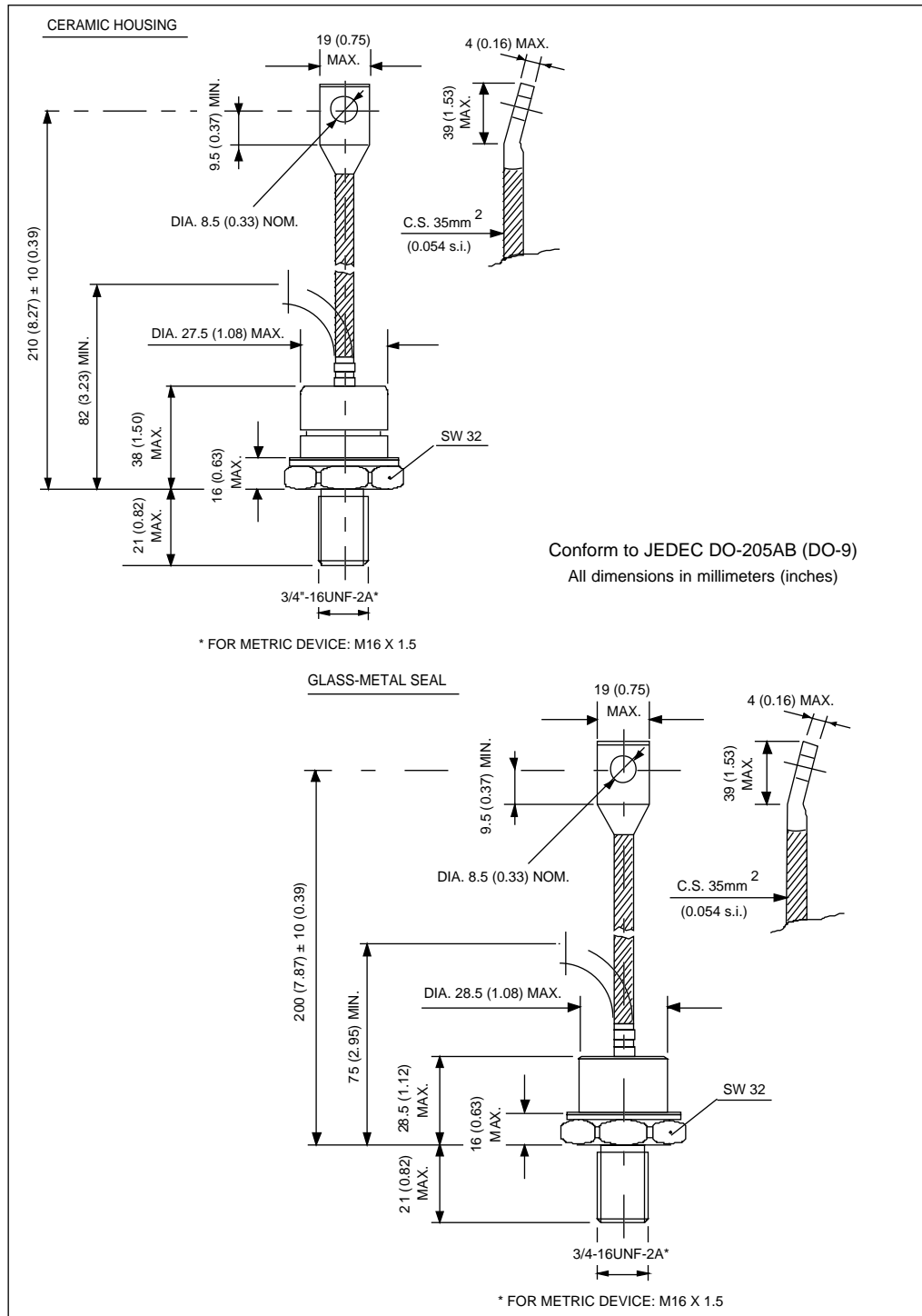
Device Code																	
	<table border="1" style="margin: auto;"> <tr> <td style="background-color: black; color: white; padding: 5px;">SD</td> <td style="background-color: black; color: white; padding: 5px;">40</td> <td style="background-color: black; color: white; padding: 5px;">0</td> <td style="background-color: black; color: white; padding: 5px;">N</td> <td style="background-color: black; color: white; padding: 5px;">24</td> <td style="background-color: black; color: white; padding: 5px;">P</td> <td style="background-color: black; color: white; padding: 5px;">B</td> <td style="background-color: black; color: white; padding: 5px;">C</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> <td style="text-align: center;">⑦</td> <td style="text-align: center;">⑧</td> </tr> </table>	SD	40	0	N	24	P	B	C	①	②	③	④	⑤	⑥	⑦	⑧
SD	40	0	N	24	P	B	C										
①	②	③	④	⑤	⑥	⑦	⑧										
<p><b>1</b> - Diode</p> <p><b>2</b> - Essential part number</p> <p><b>3</b> - 0 = Standard recovery</p> <p><b>4</b> - N = Stud Normal Polarity (Cathode to Stud) R = Stud Reverse Polarity (Anode to Stud)</p> <p><b>5</b> - Voltage code: Code x 100 = V<sub>RRM</sub> (See Voltage Ratings table)</p> <p><b>6</b> - P = Stud base DO-205AB (DO-9) 3/4" 16UNF-2A M = Stud base DO-205AB (DO-9) M16 X 1.5</p> <p><b>7</b> - B = Flag top terminal (for Cathode/ Anode Leads) S = Isolated lead with silicone sleeve (Red = Reverse Polarity; Blue = Normal Polarity) None = Non isolated lead</p> <p><b>8</b> - C = Ceramic Housing (over 1600V) V = Glass-metal seal (only up to 1600V)</p>																	

# SD400N/R Series

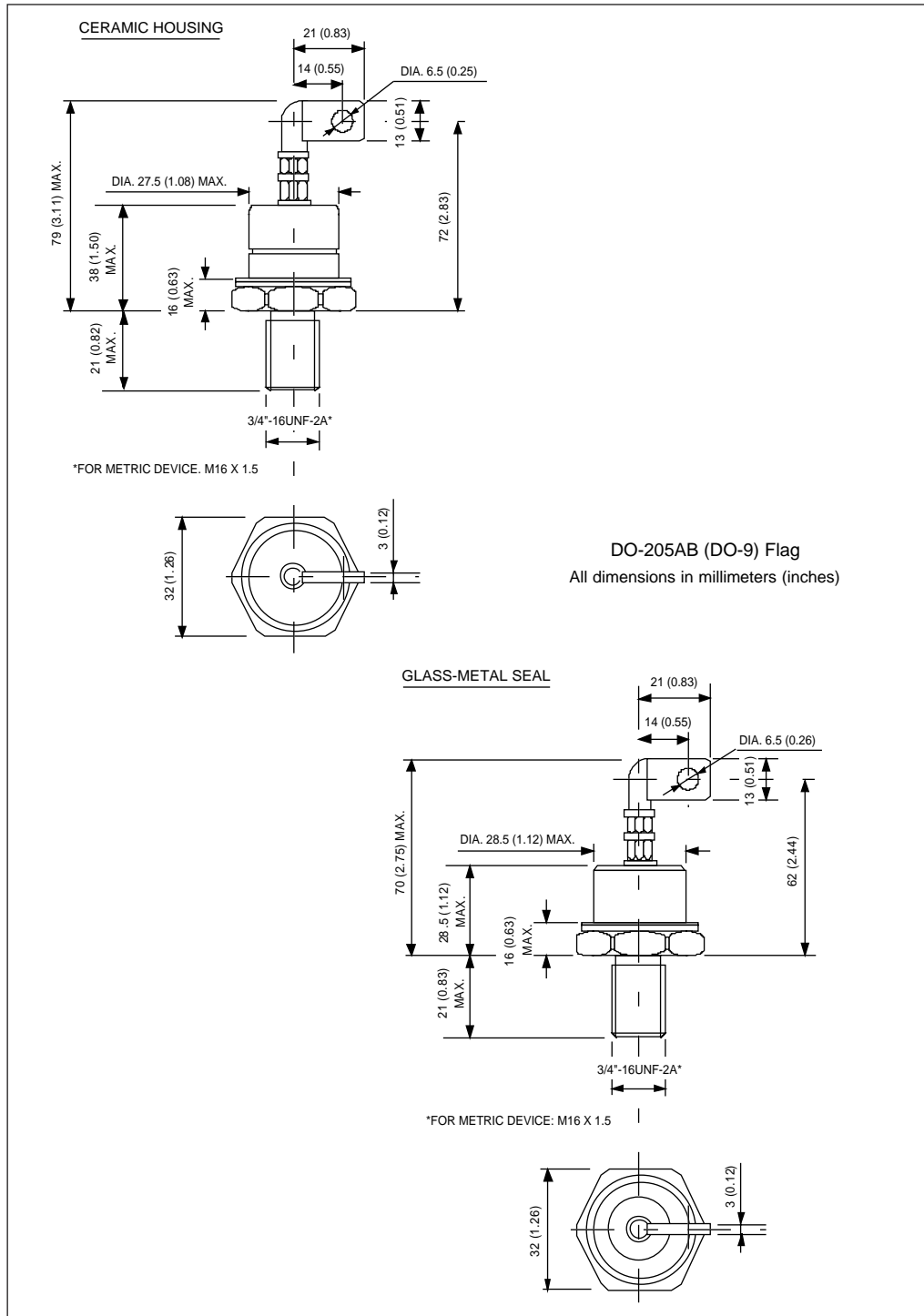
Bulletin I2082 rev. A 08/94



## Outline Table



Outline Table



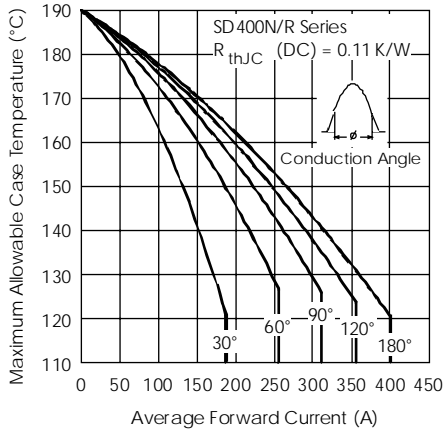


Fig. 1 - Current Ratings Characteristics

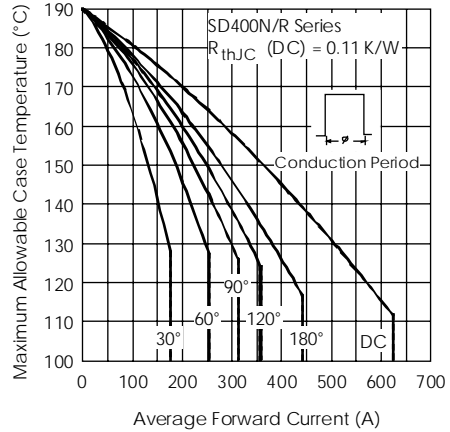


Fig. 2 - Current Ratings Characteristics

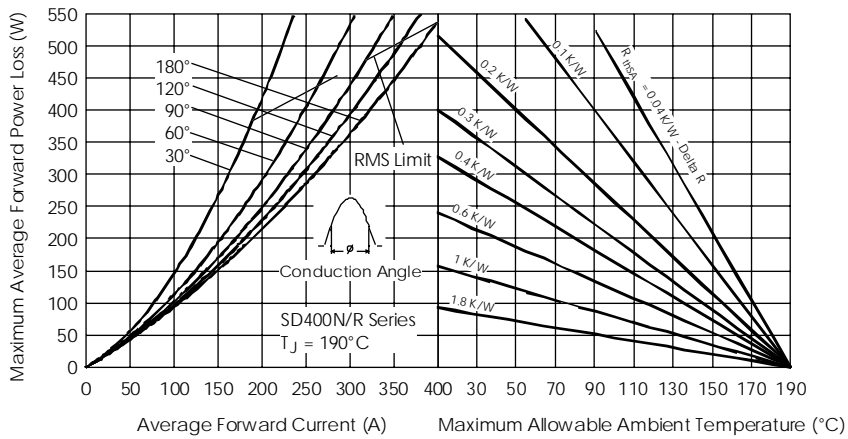


Fig. 3 - Forward Power Loss Characteristics

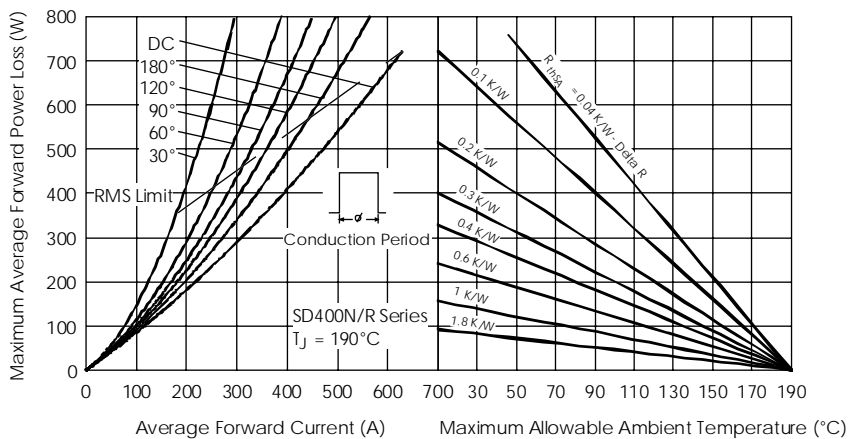


Fig. 4 - Forward Power Loss Characteristics

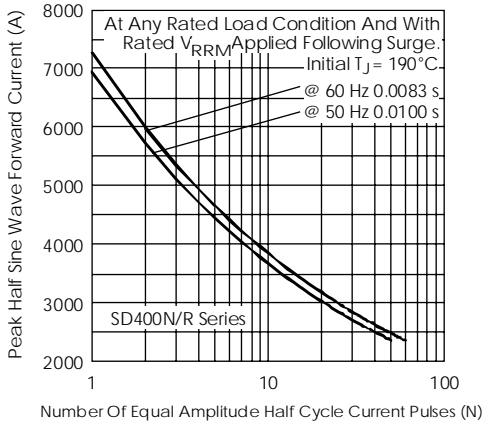


Fig. 5 - Maximum Non-Repetitive Surge Current

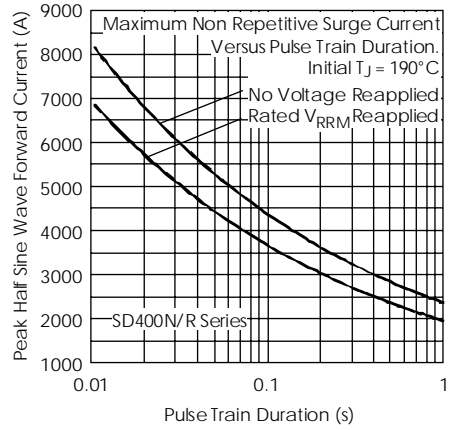


Fig. 6 - Maximum Non-Repetitive Surge Current

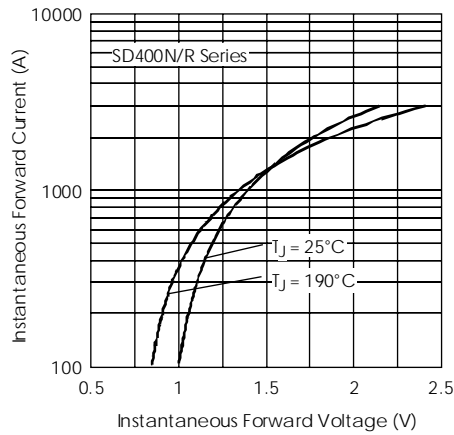


Fig. 7 - Forward Voltage Drop Characteristics

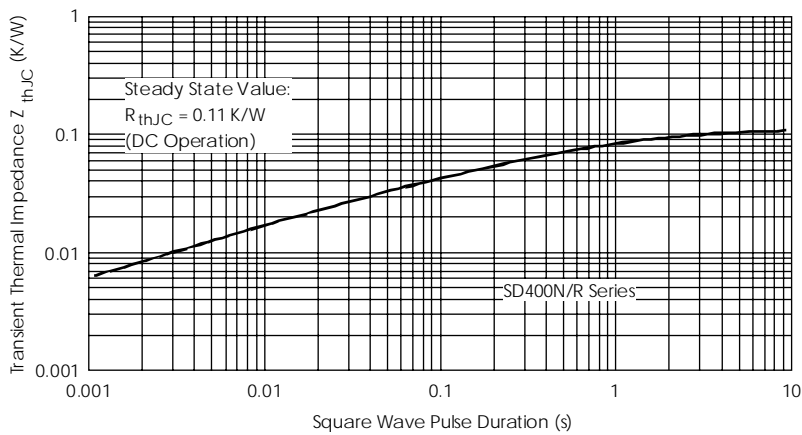


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristic