

Fast Recovery Diodes

FEATURES

- High surge capability
- Qualified for industrial level
- International standard case TO-200AC
- Both metric and inch threads

TYPICAL APPLICATIONS

- Power supplies
- Machine tools control
- High power drives
- Welders
- Large traction

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		500	A
	T_{Case}	85	°C
$I_{F(RMS)}$		785	A
	T_{Case}	85	°C
I_{FSM}	50 Hz	10640	A
	60 Hz	11600	A
I^2t	50 Hz	519	kA ² s
	60 Hz	566	kA ² s
V_{DRM}/V_{RRM}		1600 to 2400	V
T_J		-40 to 150	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
SERIES	VOLTAGE CODE	V_{DRM}/V_{RRM} , MAX. RE- PETITIVE PEAK AND OFF-STATE VOLTAGE (V)	V_{RSM} , MAX. NON- REPETITIVE PEAK VOLTAGE (V)	I_{DRM}/I_{RRM} , MAX. at T_J = $T_{J(Max.)}$ (mA)
DF500/...48	16	1600	1700	75
DF500/...48	18	1800	1900	
DF500/...48	20	2000	2100	
DF500/...48	22	2200	2300	
DF500/...48	24	2400	2500	

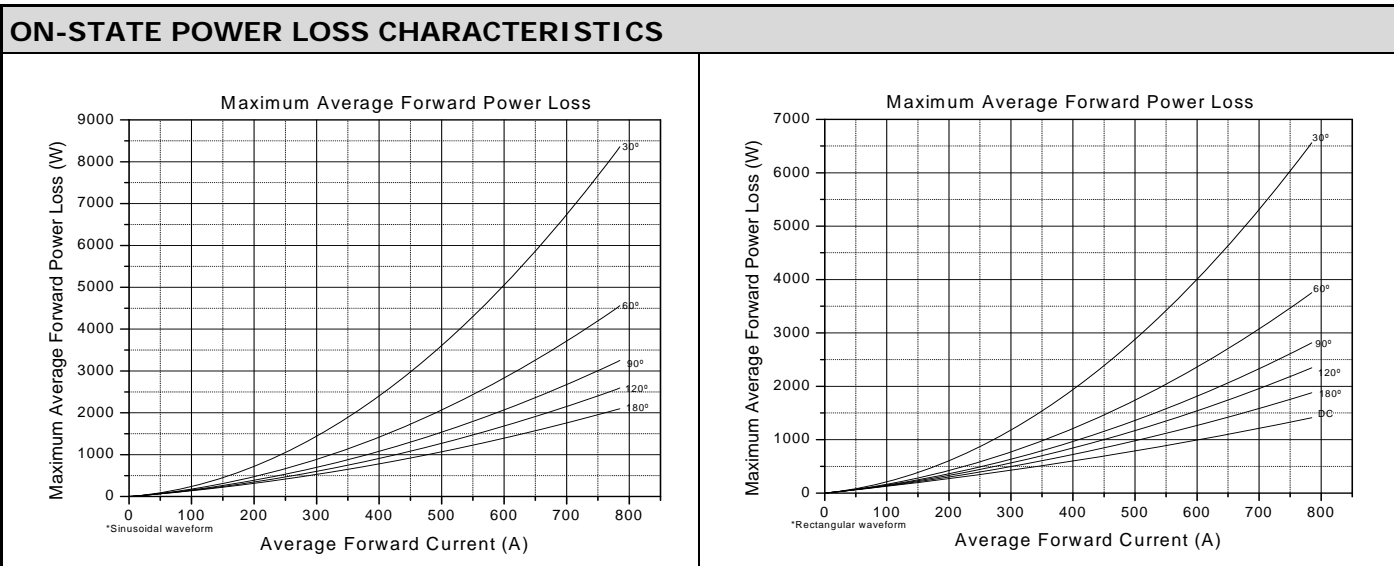
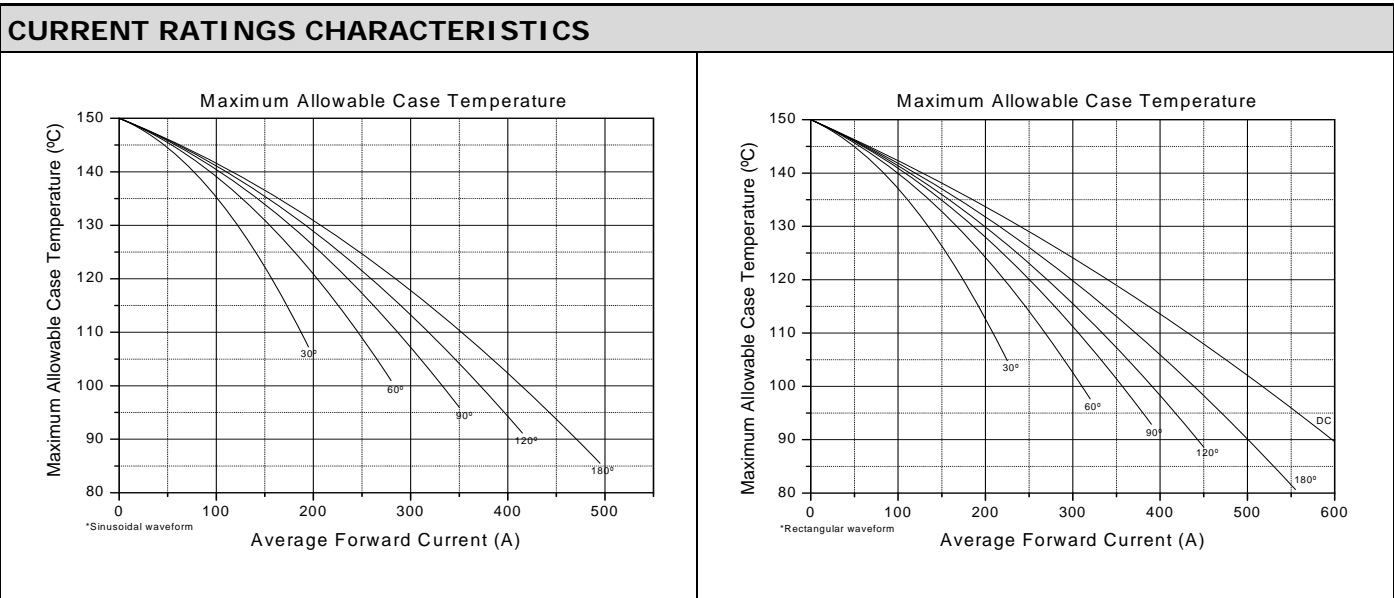
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MAXIMUM ALLOWABLE RATINGS					
SYMBOL	DESCRIPTION	TEST CONDITIONS		VALUE	UNITS
$I_{F(AV)}$	Maximum average on-state current at heatsink temperature	180° conduction, half sine wave, double side cooled		500	A
				85	°C
$I_{F(RMS)}$	Maximum RMS on-state current	DC at 25°C heatsink temperature		785	A
I_{FSM}	Maximum peak, one-cycle non-repetitive surge current	t = 10 ms	100% V_{RRM} reapplied	Sinusoidal half wave, initial $T_J = T_J \text{ max.}$	kA
		t = 8.3 ms			
		t = 10 ms	No voltage reapplied		
		t = 8.3 ms			
I^2t	Maximum I^2t	t = 10 ms	100% V_{RRM} reapplied		kA ² s
		t = 8.3 ms			
		t = 10 ms	No voltage reapplied		
		t = 8.3 ms			
$I^2t^{1/2}$	Maximum $I^2t^{1/2}$	t = 0.1 to 10 ms, no voltage reapplied		6200	kA ² s ^{1/2}
$I_{RM(REC)}$	Peak reverse recovery current	-		173	A
I_{RM}	Peak reverse current	-		75	mA
I_{FM}	Peak forward current	-		2000	A
di/dt	Max.non-rep. rate of rise of current	$T_J = 25^\circ\text{C}, V_D = V_{DRM}, I_{FM} = 1\text{A}$		63	A/μs
t_{rr}	Max.reverse recovery time	$T_J = 25^\circ\text{C}, I_{FM} = 1\text{A}, V_R = 30\text{V}, -di_F/dt = 25\text{A}/\mu\text{s}$		4800	ns
		$T_J = 25^\circ\text{C}, -di_F/dt = 25\text{A}/\mu\text{s}, I_{FM} = \pi \times \text{rated } I_{F(AV)}$		9600	ns
$V_{F(TO)}$	Low level threshold voltage	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$, double side cooled		1.20	V
r_F	Low level on-state slope resistance			0.76	mΩ
V_{FM}	Maximum on-state voltage	$I_{pk} = 1571\text{A}, 50\text{Hz}$ half sine pulse, $T_J = T_J \text{ max.}$		2.33	V

THERMAL AND MECHANICAL SPECIFICATIONS				
SYMBOL	DESCRIPTION	TEST CONDITIONS	VALUE	UNITS
T_J	Maximum operating junction temperature	-	-40 to 150	°C
T_{Stg}	Maximum storage temperature	-	-40 to 150	
R_{thJ-hs}	Maximum thermal resistance, junction to heatsink	DC	0.035	°C/W
		180° sine wave	0.036	
		120° rectangular wave	0.039	
R_{thC-hs}	Maximum thermal resistance, case to heat-sink	Mtg. Surface smooth, flat, greased	0.015	
-	Mounting force, ± 10%	-	1250	kgf
-	Approximate weight	-	255	g
-	Case style	-	TO-200AC	JEDEC

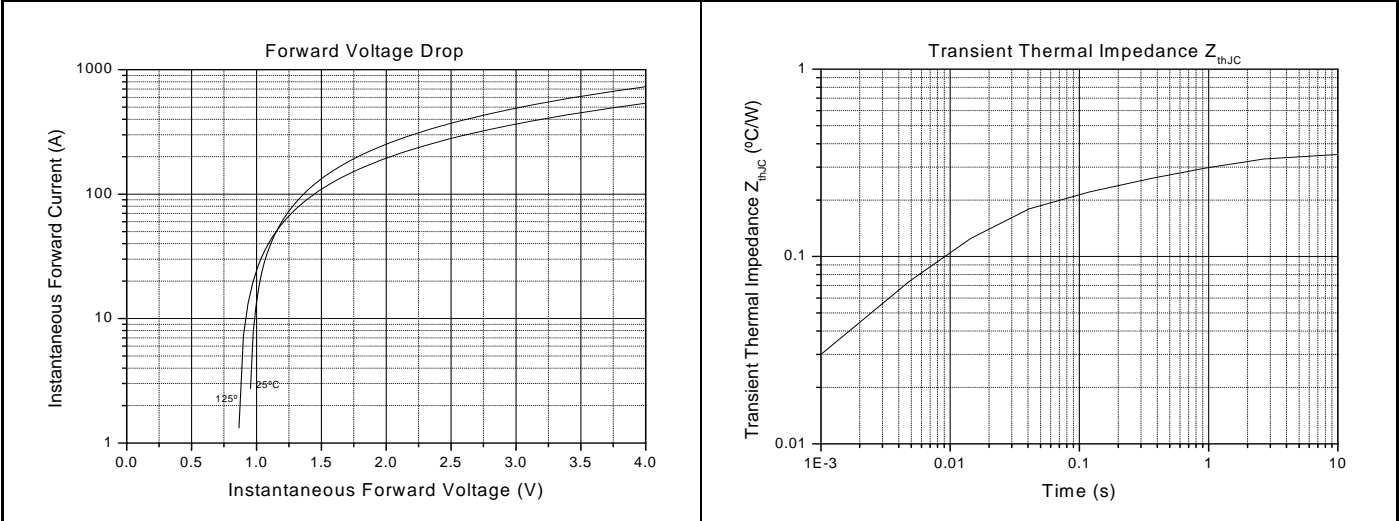
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CURRENT FORM FACTOR								
FORM FACTOR	CONDUCTION ANGLE	15°	30°	45°	60°	90°	120°	180°
Sine wave		31.956	15.832	10.452	7.721	4.933	3.527	2.468
Rectangular wave		24.000	12.000	8.000	6.000	4.000	3.000	2.000

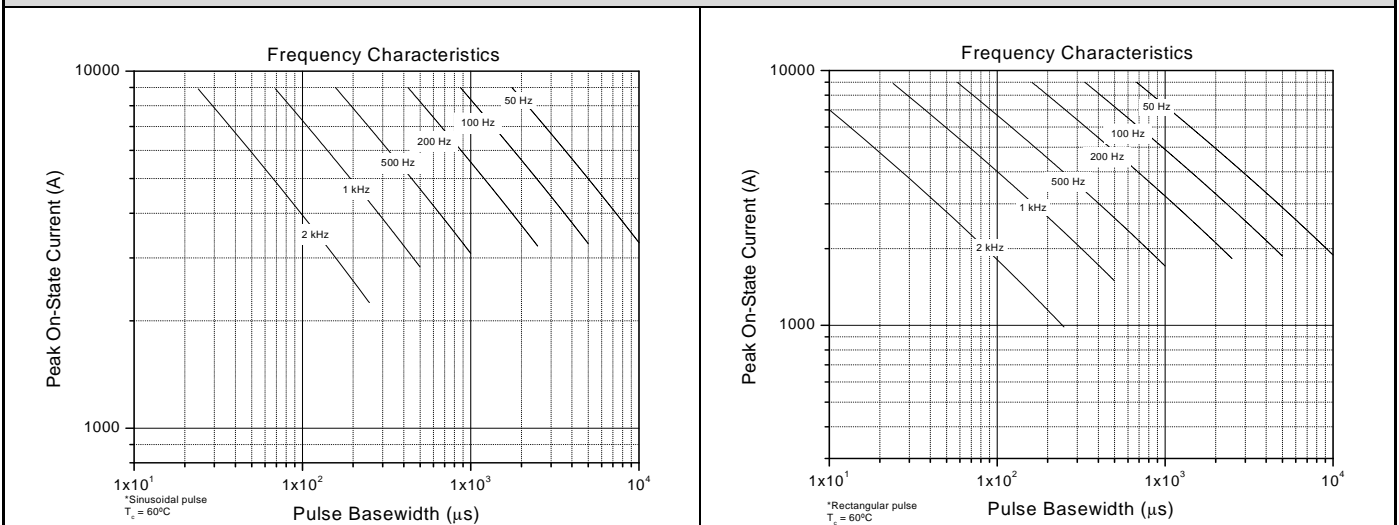


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FORWARD VOLTAGE DROP / THERMAL IMPEDANCE CHARACTERISTICS

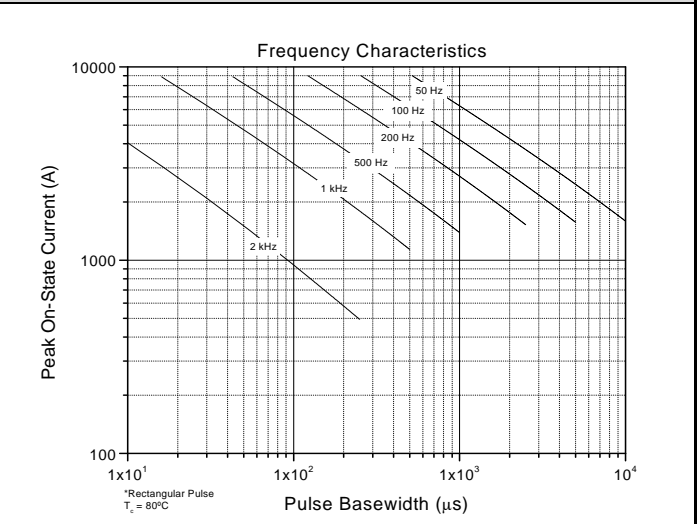
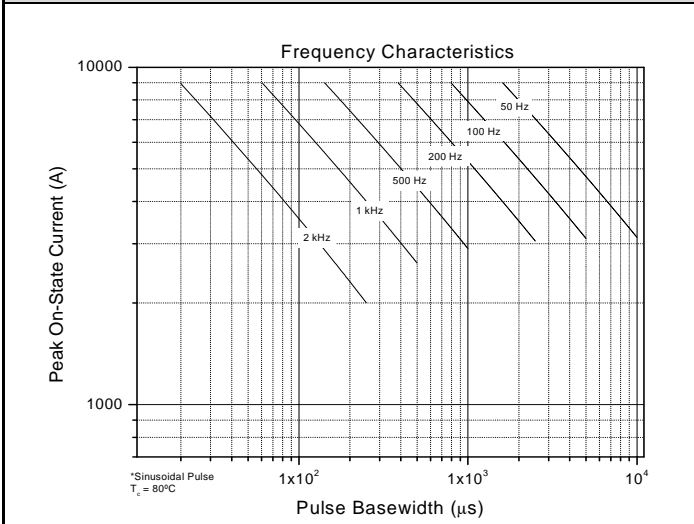


FREQUENCY CHARACTERISTICS

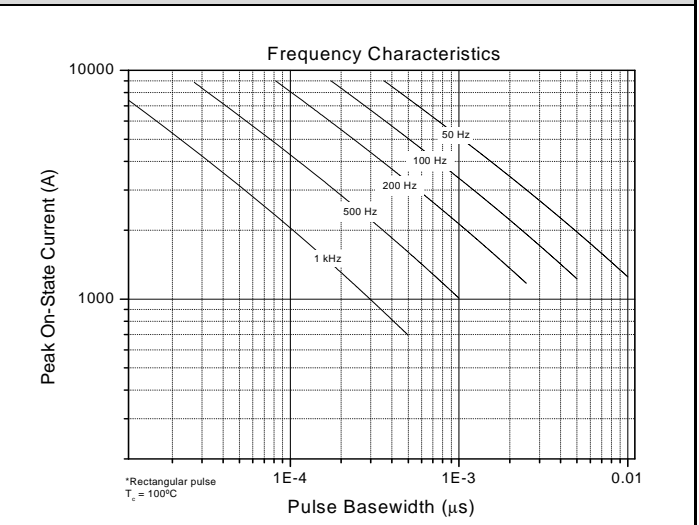
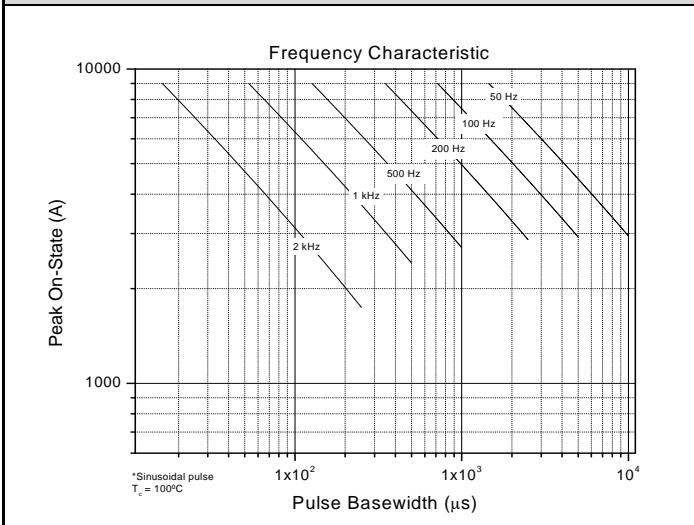


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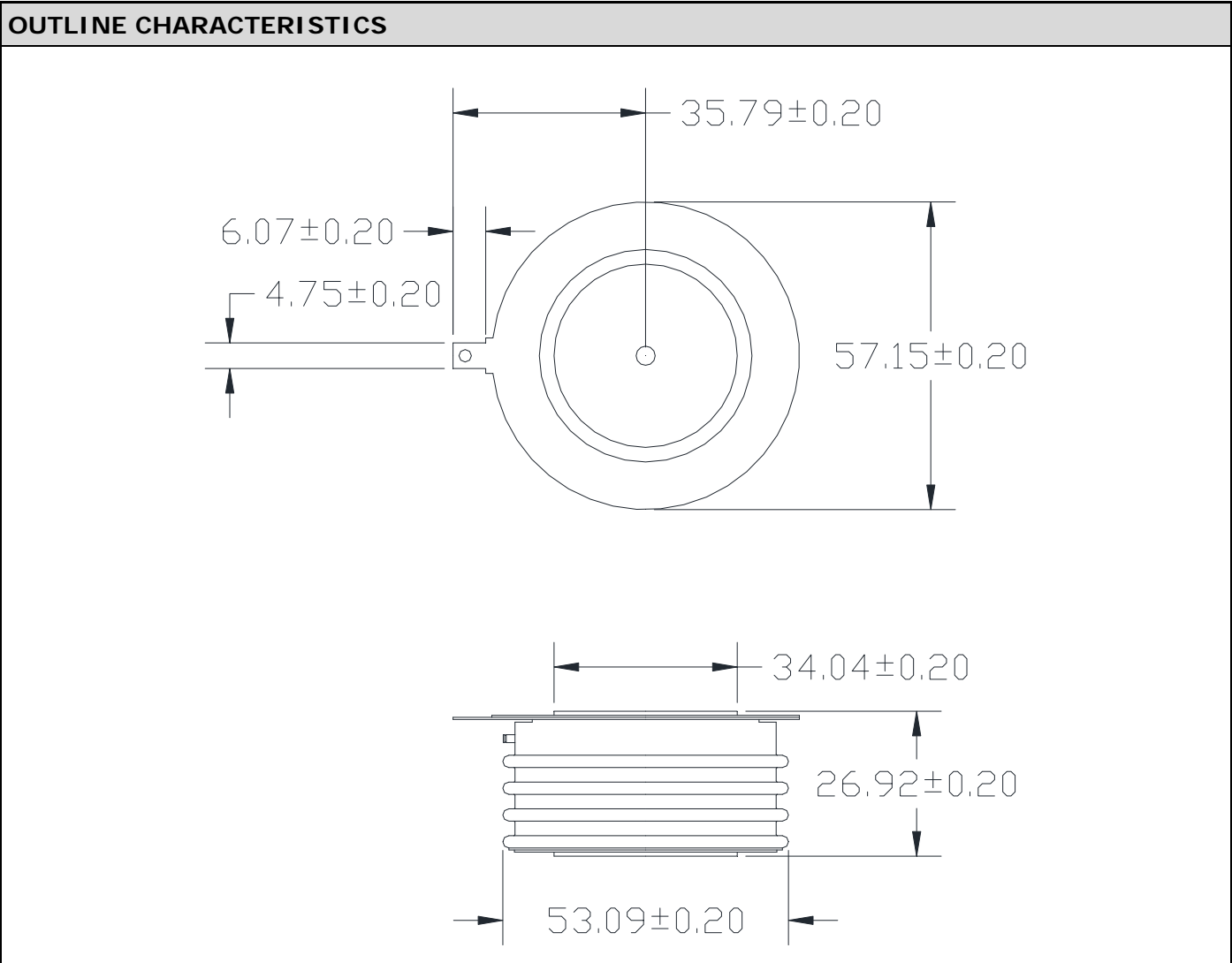
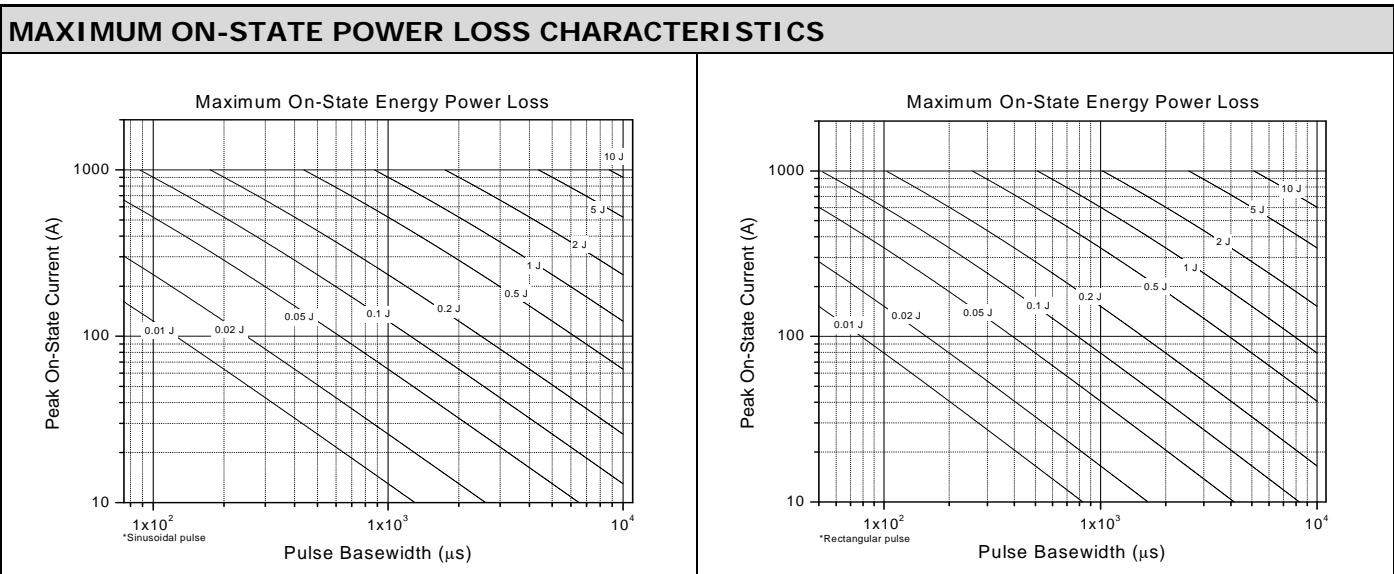
FREQUENCY CHARACTERISTICS



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ORDERING INFORMATION

Device code

DF	500	/	24	48	-	-
①	②	③	④	⑤	⑥	⑦

1

- N = Phase Control Thyristors
- F = Fast Thyristors (inverter grade)
- D = Normal Recovery Diodes
- DF = Fast Recovery Diodes
- DD = Module (diode-diode)
- DT = Module (diode-thyristor)
- TD = Module (thyristor-diode)
- TT = Module (thyristor-thyristor)
- P = Press-fit diode

2

- Average Current Code

3

- Essential Part Number

4

- Voltage Code x 100 = V_{RRM}

5

- Turn-off time (fast thyristors only)
- Reverse Recovery Time (fast diodes only)

6

- M = Metric Thread
- I = Inch Thread

7

- None = Anode to stud (stud diodes only)
- R = Cathode to stud (stud diodes only)

Disclaimer

All product specifications and data are subject to change without notice.

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