Fast Recovery Diodes
(Stud Version), 85A

Available
RoHS*
COMPLIANT

FEATURES

- Short reverse recovery time
- Low stored charge
- Wide current range
- Excellent surge capabilities
- Stud cathode and stud anode versions
- Voltage up to 1200 V_{RRM}
- Compliant to RoHS directive 2002/95/EC



DO-203AB(DO-5)

TYPICAL APPLICATIONS

- DC power supplies
- Inverters
- Converters
- Choppers
- Ultrasonic systems
- Freewheeling diodes

PRODUCT SUMMARY	
$I_{F(AV)}$	85A

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	85FD(R)	UNIT
$I_{F(AV)}$		85	A
	Maximum T_C	85	°C
I_{FSM}	50 HZ	1308	A
	60 HZ	1369	
I^2t	50 HZ	8554	A^2s
	60 HZ	7778	
$I^2\sqrt{t}$		85543	$I^2\sqrt{s}$
V_{RRM}	Range	200 to 1200	V
t_{rr}		See Recovery Characteristics table	ns
T_J	Range	-40 to 125	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS					
TYPE NUMBER	VOLTAGE CODE	V_{RRM}, MAXIMUM PEAK REPETITIVE REVERSE VOLTAGE T_J = -40°C TO 125°C V	V_{RSM}, MAXIMUM PEAK NON-REPETITIVE REVERSE VOLTAGE T_J = 25°C TO 125°C V	I_{FM}, MAXIMUM PEAK REVERSE CURRENT AT RATED V_{RRM} mA	
				T_J = 25°C	T_J = 125°C
85FD(R)	02	200	300	0.1	20
	04	400	500		
	06	600	700		
	08	800	900		
	10	1000	1100		
	12	1200	1300		

FORWARD CONDUCTION					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**85FD(R)**	**UNIT**
Maximum average forward current at maximum case temperature	$I_{F(AV)}$	180° conduction, half sine wave		85	A
				85	°C
Maximum RMS forward current	$I_{F(RMS)}$			133	A
Maximum peak repetitive forward current	I_{FRM}	Sinusoidal half wave, 30° conduction		470	A
Maximum peak, one-cycle non-reptitive surge current	I_{FSM}	t = 10ms	Sinusoidal half wave, 100% V_{RRM} reapplied, initial $T_J = T_J$ maximum	1100	A
		t = 8.3ms		1151	
		t = 10ms	Sinusoidal half wave, no voltage reapplied, initial $T_J = T_J$ maximum	1308	
		t = 8.3ms		1369	
Maximum I^2t for fusing	I^2t	t = 10ms	100% V_{RRM} reapplied, initial $T_J = T_J$ maximum	6050	A^2s
		t = 8.3ms		5498	
		t = 10ms	no voltage reapplied, initial $T_J = T_J$ maximum	8554	
		t = 8.3ms		7778	
Maximum $I^2\sqrt{t}$ for fusing(1)	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied		85543	$A^2\sqrt{s}$
Maximum value of threshold voltage	$V_{F(TO)}$	T_J = 125°C		1.128	V
Maximum value of forward slope resistance	r_F			2.11	mΩ
Maximum forward voltage drop	V_{FM}	T_J = 25°C; I_{FM} = 265A		1.75	V

Note : (1) I^2t for time $t_x = I^2\sqrt{t} \cdot \sqrt{t_x}$

SWITCHING					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**85FD(R)**		**UNIT**
			02 to 06	**08 to 12**	
Typical reverse recovery time	t_{rr}	T_J = 25°C, I_F = 1A, I_R = 1.0A, I_{RR} = 250mA (RG#1 CKT)	200	500	ns
		T_J = 25°C, I_F = 1A to V_R = 30V, $-dI_F/dt$ = 100 A/μs	50	120	
		T_J = 25°C, $-dI_F/dt$ = 25 A/μs, I_{FM} = π x rated $I_{F(AV)}$	200	500	
Typical reverse recovered charge	Q_{rr}	T_J = 25°C, I_F = 1A to V_R = 30V, $-dI_F/dt$ = 100 A/μs	70	340	nC
		T_J = 25°C, $-dI_F/dt$ = 25 A/μs, I_{FM} = π x rated $I_{F(AV)}$	240	1300	

THERMAL AND MECHANICAL SPECIFCATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	85FD(R)	UNITS
Maximum junction operating temperature range	T_J		-40 to125	°C
Maximum storage temperature range	T_{stg}		- 40 to150	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.30	K/W
Maximum thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth, flat and greased	0.25	
Maximum allowable mounting torque (+0%, -10%)		Not lubricated threads, tighting on nut(1)	3.4(30)	N · m (lbf · in)
		Lubricated thread, tighting on nut (1)	2.3(20)	
		Not lubricated threads, tighting on hexagon(2)	4.2(37)	
		Lubricated thread, tighting on hexagon(2)	3.2(28)	
Approximate weight			25	g
			0.88	oz.
Case style		JEDEC	DO-203AB (DO-5)	

Note : (1) Recommended for pass-through holes
(2) Recommended for holed threaded heatsinks

△R_{thJC} CONDUCTION

CONDUCTION ANGEL	85FD(R)		TEST CONDUCTIONS	UNITS
	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION		
180˚	0.37	0.21	T_J = 150°C	K/W
120˚	0.39	0.37		
60˚	0.82	0.82		
30˚	1.41	1.41		

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

ORDERING INFORMATION SCHEME

85 FD R 06 A

Current
85 = 85A

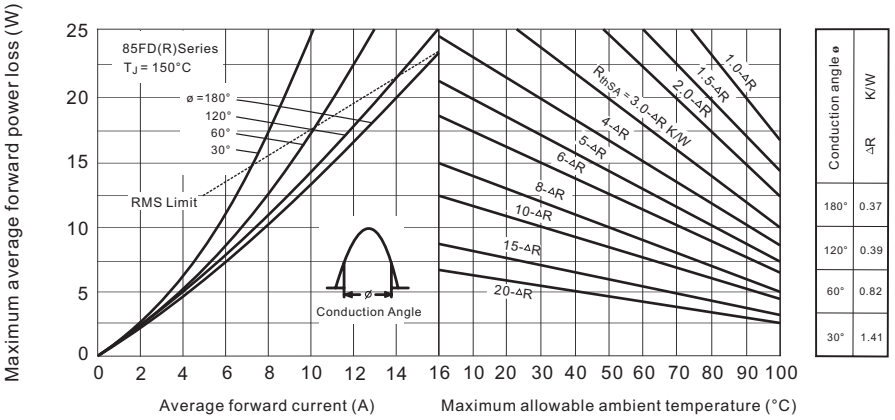
Diode type
FD = Fast Recovery Diode

Polarity
R = Reverse, Anode on Stud
None = standard, Cathode on Stud

Voltage
06 = 600V
08 = 800V
10 = 1000V
12 = 1200V

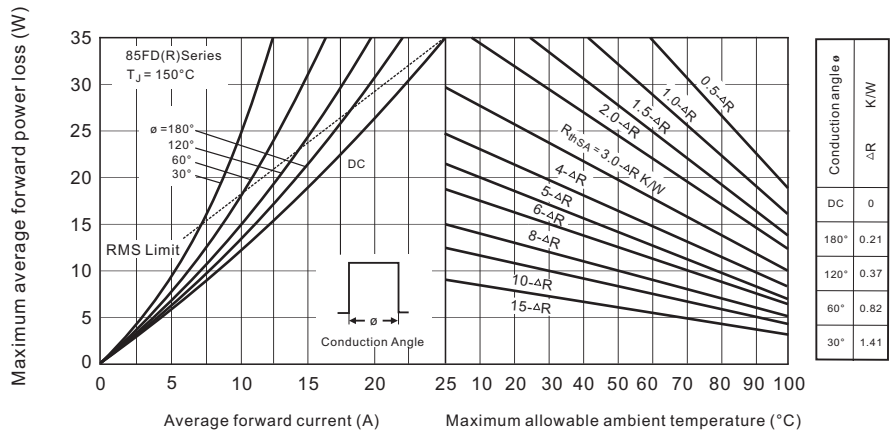
Trr value
A = 200 ns Max.
B = 500 ns Max.

Fig.1 Current rating nomogram (Sinusoidal Waveforms)



Conduction angle ø	K/W ΔR
180°	0.37
120°	0.39
60°	0.82
30°	1.41

Fig.2 Current rating nomogram (Rectangular waveforms)



Conduction angle ø	K/W ΔR
DC	0
180°	0.21
120°	0.37
60°	0.82
30°	1.41

Fig .3 Maximum high level forward power loss vs. average forward current

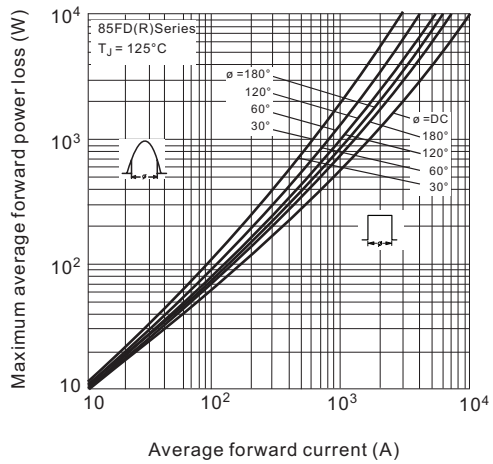


Fig. 4 Maximum forward voltage vs. forward current.

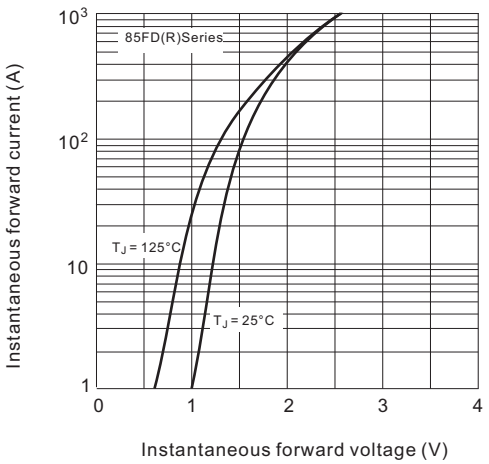


Fig.5 Average forward current vs. maximum allowable case temperature.

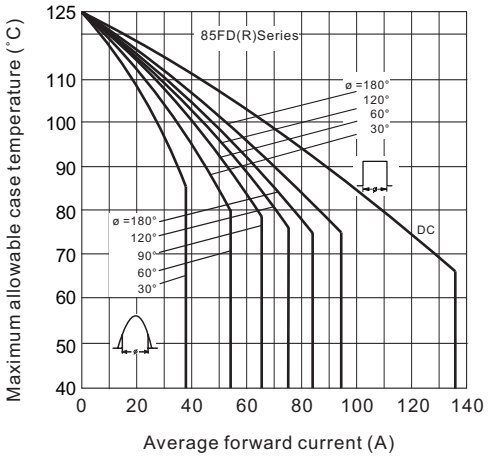


Fig .6 Typical reverse recovery time vs. rate of fall of forward current.

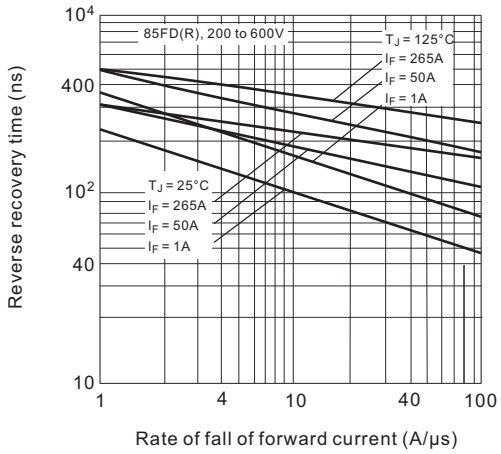


Fig .7 Typical recovered charge vs. rate of fall of forward current.

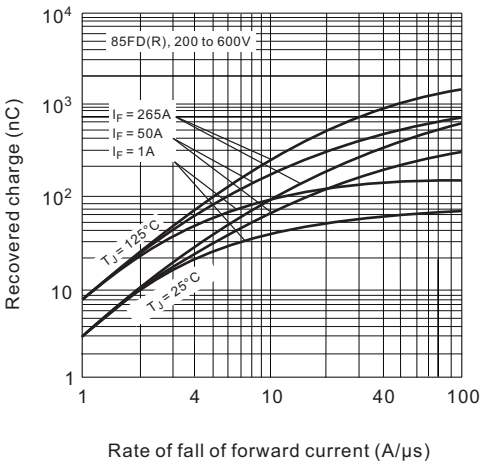


Fig .8 Typical reverse recovery time vs. rate of fall of forward current.

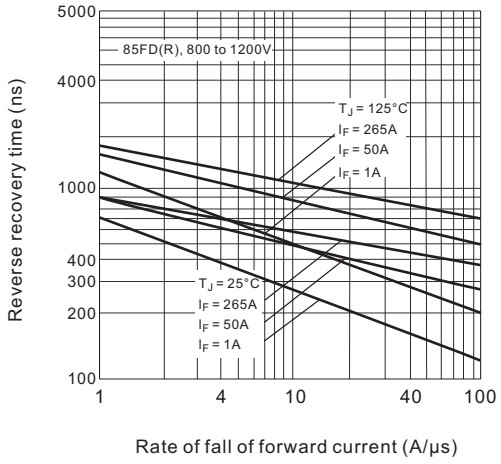
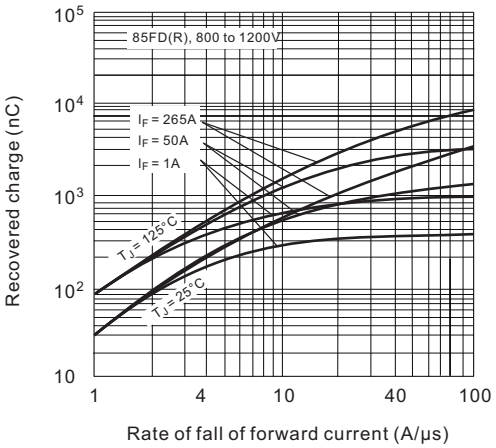
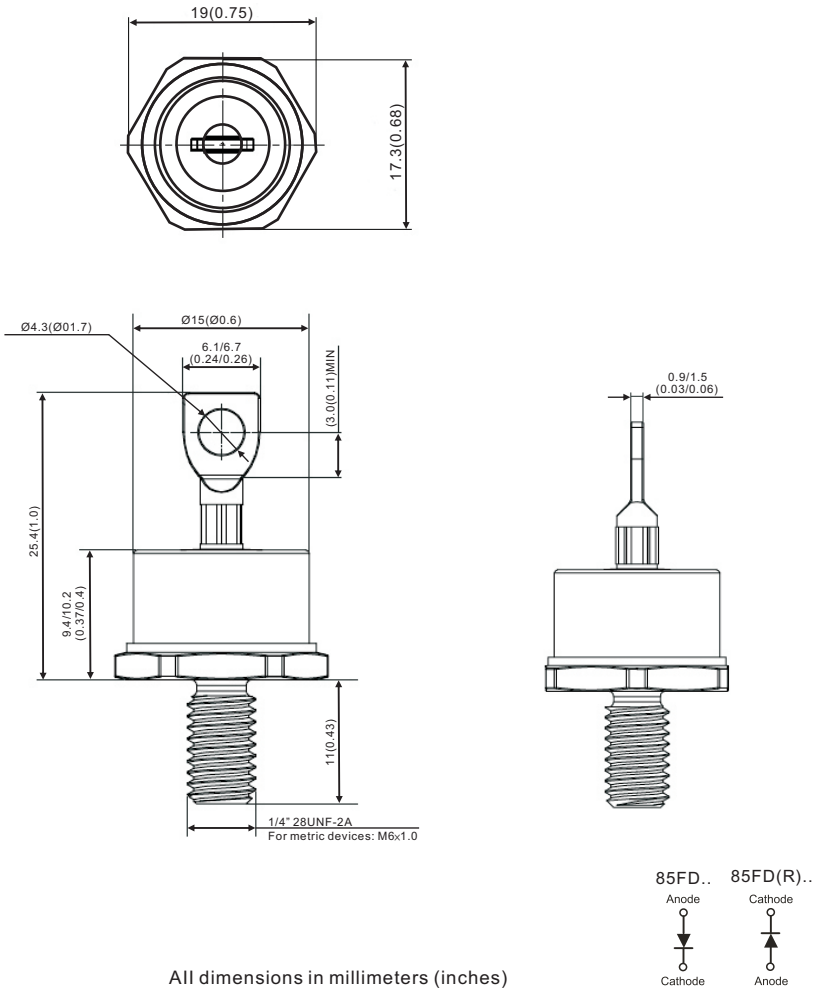


Fig .9 Typical recovered charge vs. rate of fall of forward current.



DO-203AB (DO-5)



All dimensions in millimeters (inches)