Optimum power handling
Low switching losses
Low reverse recovery charge
High power cycling capability

Fast Recovery Stud Diode
Type DF261-320-14

Mean on-state current		I_{FAV}	320 A	
Repetitive peak reverse voltage		V_{RRM}	800...1400 V	
Reverse recovery time		t_{rr}	3.2, 4.0, 5.0, 6.3 μs	
V_{RRM}, V	800	1000	1200	1400
Voltage code	8	10	12	14
T_j, °C	–60...+150			

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{FAV}	Maximum allowable average forward current	A	320 389	T_c=77 °C; T_c=55 °C; 180° half-sine wave; 50 Hz	
I_{FRMS}	RMS forward current	A	503	T_c=77 °C; 180° half-sine wave; 50 Hz	
I_{FSM}	Surge forward current	kA	7.5 8.5	T_j=$T_{j\,max}$ T_j=25 °C	180° half-sine wave; t_p=10 ms; single pulse; V_R=0 V
			8.0 9.0	T_j=$T_{j\,max}$ T_j=25 °C	180° half-sine wave; t_p=8.3 ms; single pulse; V_R=0 V
I^2t	Safety factor	$A^2s\cdot10^3$	280 360	T_j=$T_{j\,max}$ T_j=25 °C	180° half-sine wave; t_p=10 ms; single pulse; V_R=0 V
			260 330	T_j=$T_{j\,max}$ T_j=25 °C	180° half-sine wave; t_p=8.3 ms; single pulse; V_R=0 V
BLOCKING					
V_{RRM}	Repetitive peak reverse voltages	V	800...1400	$T_{j\,min}$< T_j <$T_{j\,max}$; 180° half-sine wave; 50 Hz	
V_{RSM}	Non-repetitive peak reverse voltages	V	900...1500	$T_{j\,min}$< T_j <$T_{j\,max}$; 180° half-sine wave; single pulse	
V_R	Reverse continuous voltages	V	0.6·V_{RRM}	T_j=$T_{j\,max}$	
THERMAL					
T_{stg}	Storage temperature	°C	–60...+50		
T_j	Operating junction temperature	°C	–60...+150		
MECHANICAL					
M	Tightening torque	Nm	20...30		
a	Acceleration	m/s^2	100		

CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions
ON-STATE				
V_{FM}	Peak forward voltage, max	V	1.70	T_j=25 °C; I_{FM}=1005 A
$V_{F(TO)}$	Forward threshold voltage, max	V	0.948	T_j=$T_{j\ max}$; 0.5 π I_{FAV} < I_T < 1.5 π I_{FAV}
r_T	Forward slope resistance, max	mΩ	0.712	
BLOCKING				
I_{RRM}	Repetitive peak reverse current, max	mA	40	T_j=$T_{j\ max}$; V_R=V_{RRM}
SWITCHING				
Q_r	Recovered charge, max	μC	300	T_j=$T_{j\ max}$; I_{FM}=320 A; di_R/dt=-100 A/μs; V_R=100 V;
t_{rr}	Reverse recovery time, max	μs	3.2, 4.0, 5.0, 6.3	
I_{rr}	Reverse recovery current, max	A	185	
THERMAL				
R_{thjc}	Thermal resistance, junction to case, max	°C/W	0.1500	Direct current
MECHANICAL				
m	Weight, max	g	280	
D_s	Surface creepage distance	mm (inch)	12.4 (4.882)	
D_a	Air strike distance	mm (inch)	12.4 (4.882)	

PART NUMBERING GUIDE

DF	261	320		14	K4	N
1	2	3	4	5	6	7

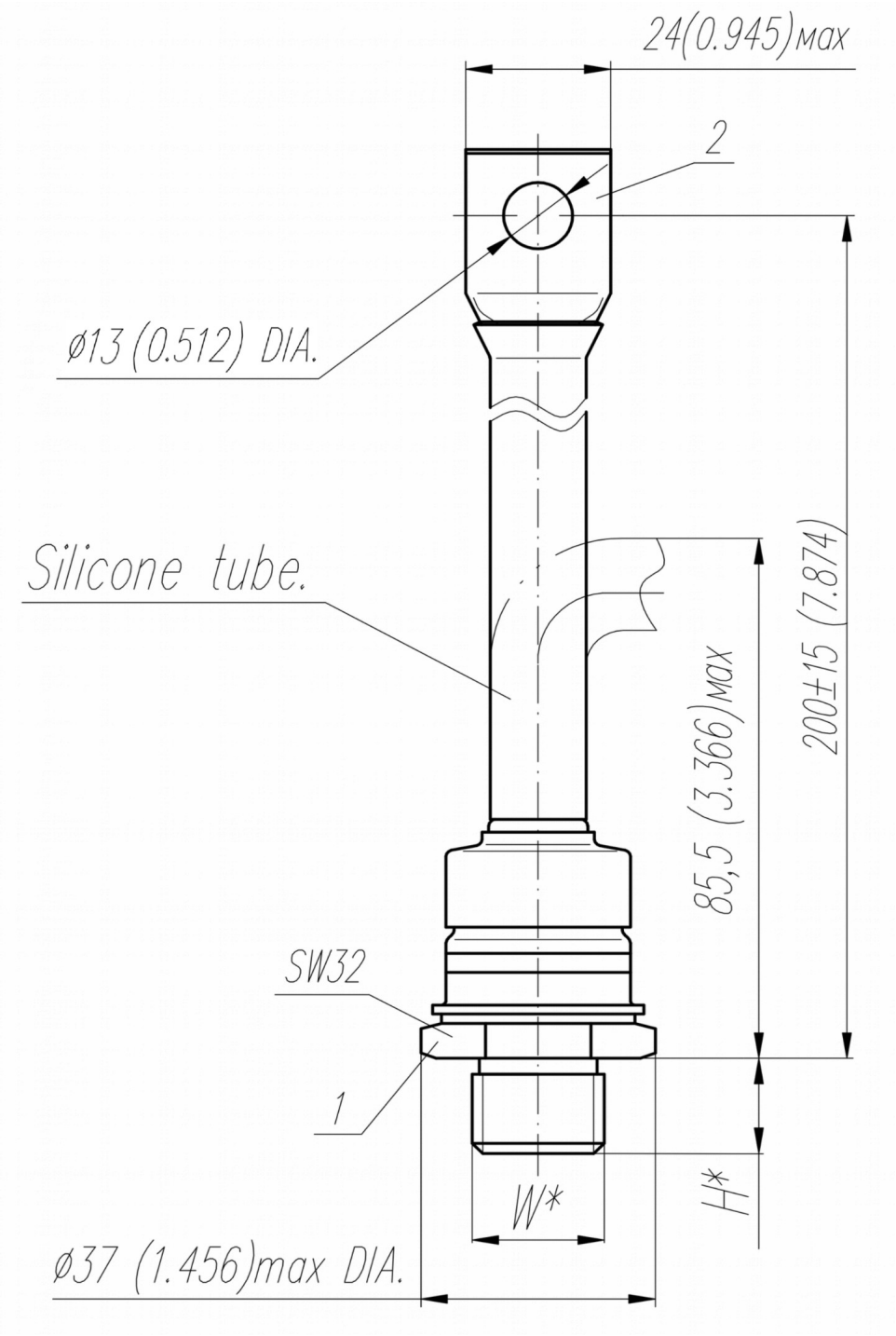
1. Fast recovery diode
2. Design version
3. Average forward current, A
4. Polarity: X – Cathode to Stud; Anode to Stud – no symbol
5. Voltage code
6. Group of reverse recovery time
7. Ambient conditions: N – normal; T – tropical

GROUP OF RECOVERY TIME

Group Symbol	K4	H4	E4	C4
t_{rr}, μs	3.2	4	5	6.3

OVERALL DIMENSIONS

Package type: D.SA2



Type of screw	W	H
Metric Screw Type A	M16x1,5 – 8g	13
Metric Screw Type B (upon request)	M20x1,5 – 8g	15

Polarity		Example of code designation	Reference designation	Colors	
				Anode	Cathode
Normal	Anode to stud	DF261-320-14		-	Red tube

All dimensions in millimeters (inches)

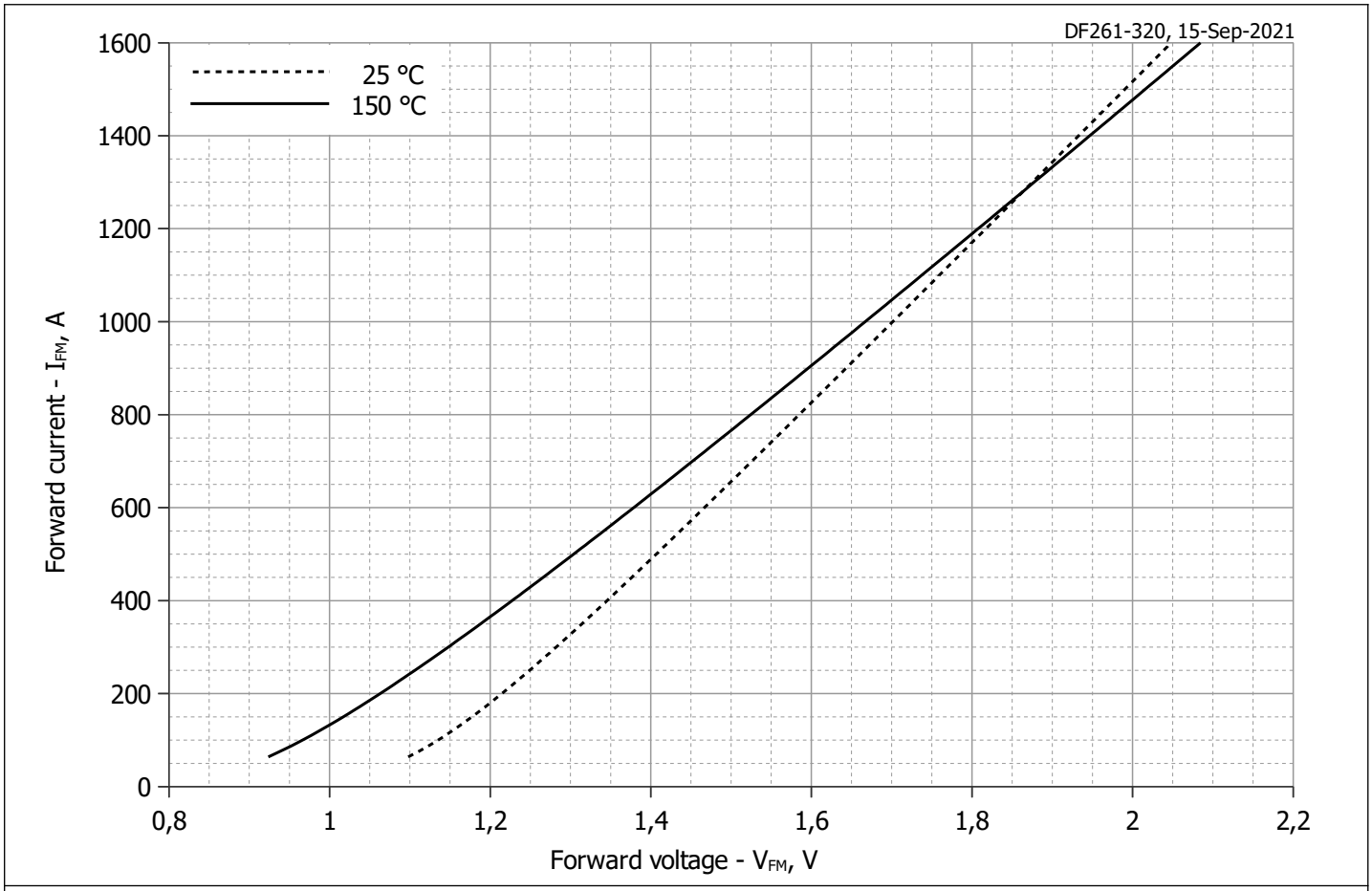


Fig 1 – Forward characteristics of Limit device

Analytical function for Forward characteristic:

$$V_F = A + B \cdot i_F + C \cdot \ln(i_F + 1) + D \cdot \sqrt{i_F}$$

	Coefficients for max curves	
	T_j = 25°C	$T_j = T_{j\,max}$
A	0.85598743	0.72023977
B	0.00060407	0.00063898
C	0.05858130	0.03487063
D	-0.00516698	0.00211727

Forward characteristic model (see Fig. 1).

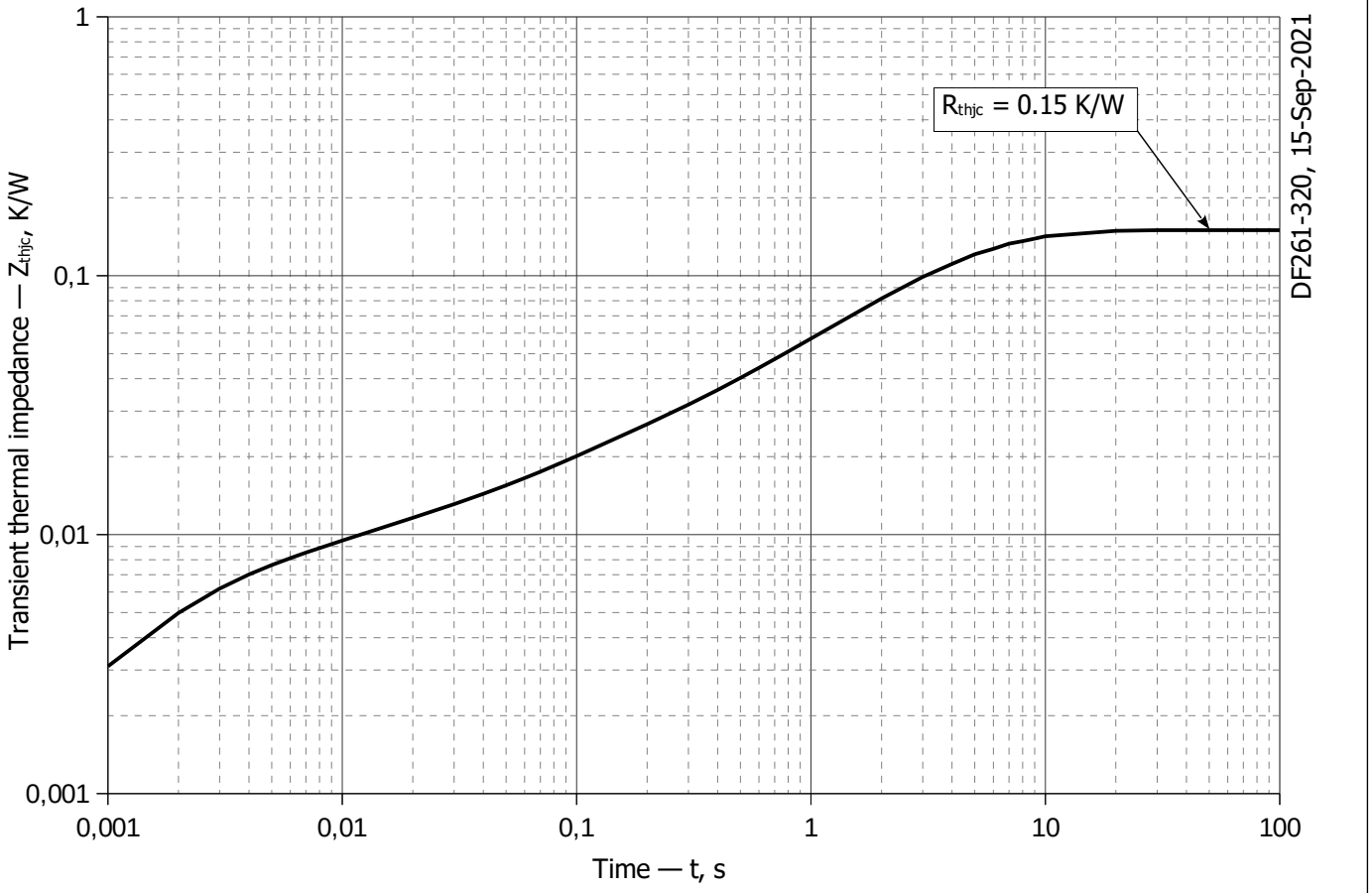


Fig 2 – Transient thermal impedance Z_{thjc} vs. time t

Analytical function for Transient thermal impedance junction to case Z_{thjc} for DC:

$$Z_{thjc} = \sum_{i=1}^{n} R_i \left(1 - e^{-\frac{t}{\tau_i}} \right)$$

Where ***i*** = 1 to ***n***, ***n*** is the number of terms in the series.

t = Duration of heating pulse in seconds.

Z_{thjc} = Thermal resistance at time t.

R_i = Amplitude of p_{th} term.

τ_i = Time constatnt of r_{th} term.

DC

i	1	2	3	4	5	6
R_i, K/W	0.07504	0.0516	0.007369	0.006977	0.003512	0.005502
τ_i, s	4.409	2.183	0.3382	0.07307	0.008189	0.001615

Transient thermal impedance junction to case Z_{thjc} model (see Fig. 2)

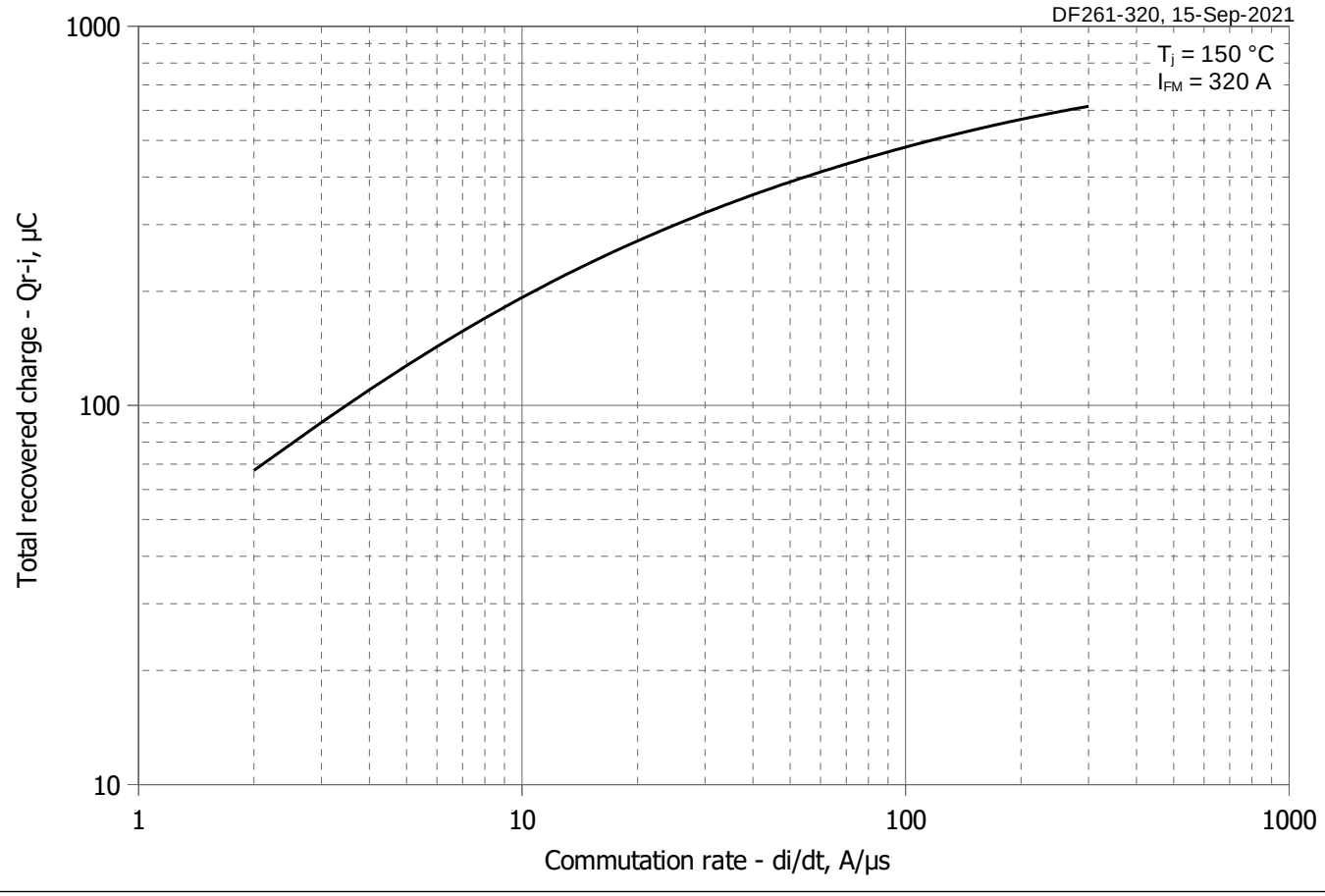


Fig 3 – Maximum recovered charge $Q_{r\text{-}i}$ (integral) vs. commutation rate di_R/dt

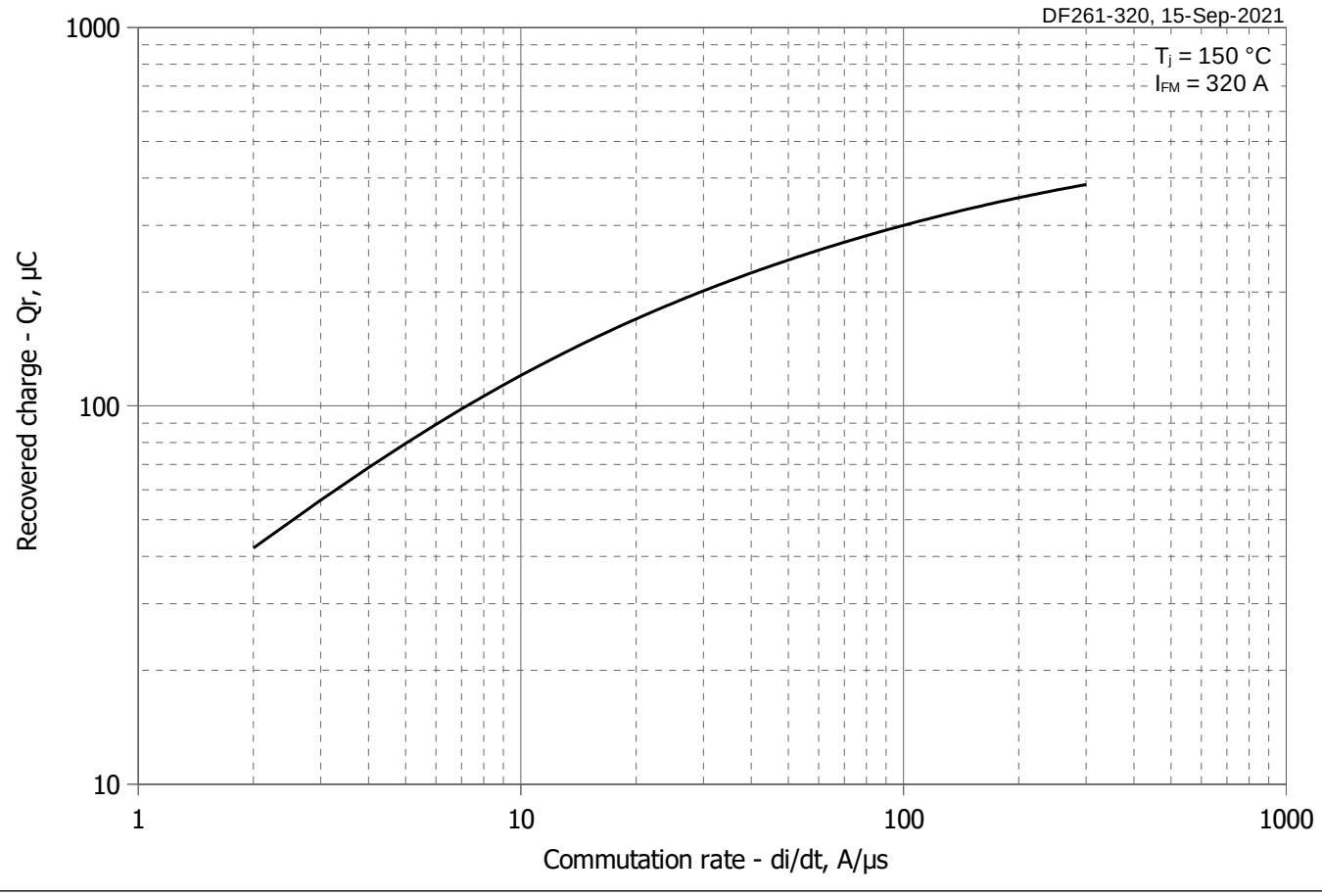


Fig 4 – Maximum recovered charge Q_r vs. commutation rate di_R/dt (25% chord)

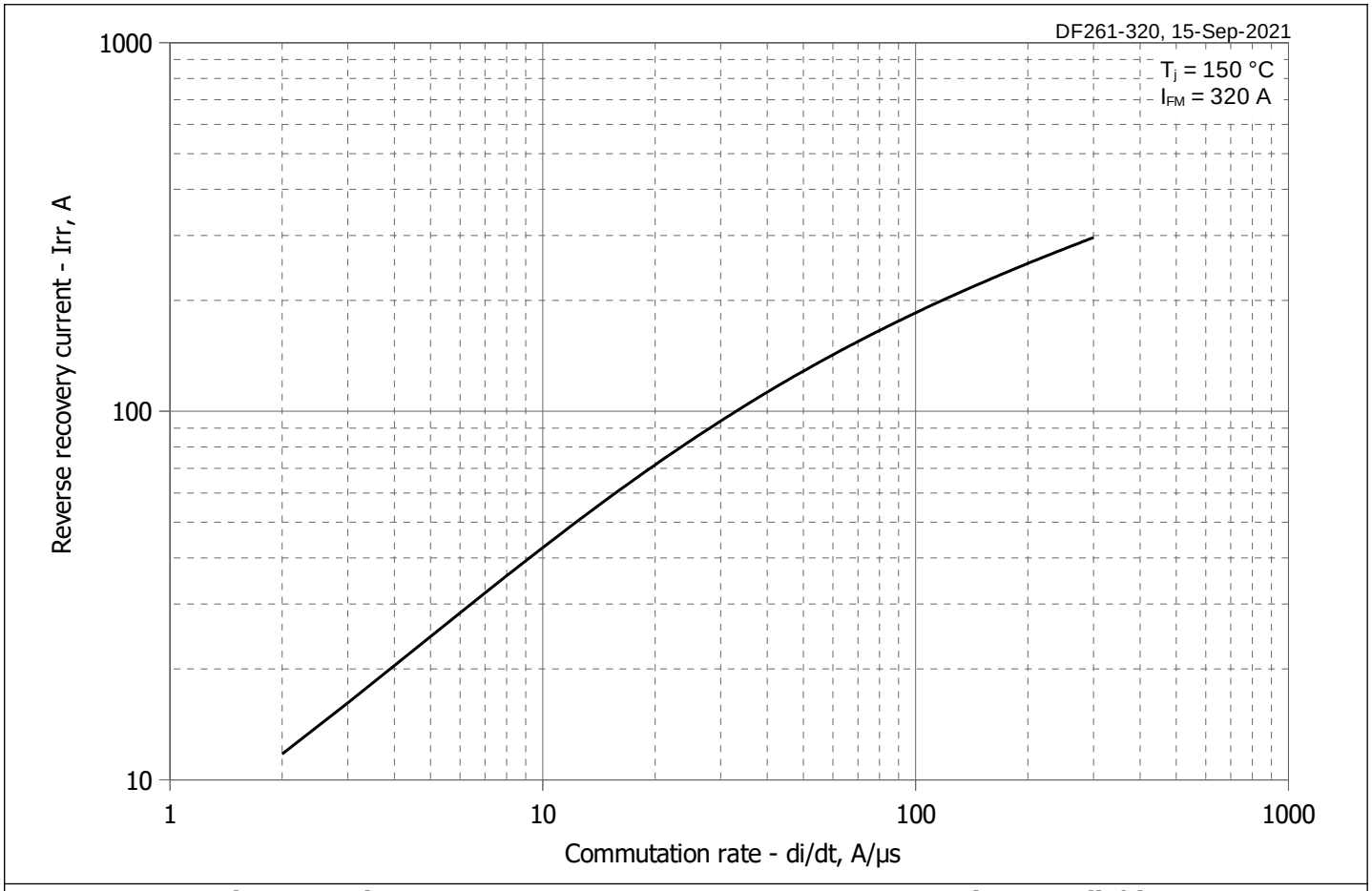


Fig 5 – Maximum reverse recovery current I_{rr} vs. commutation rate di_R/dt

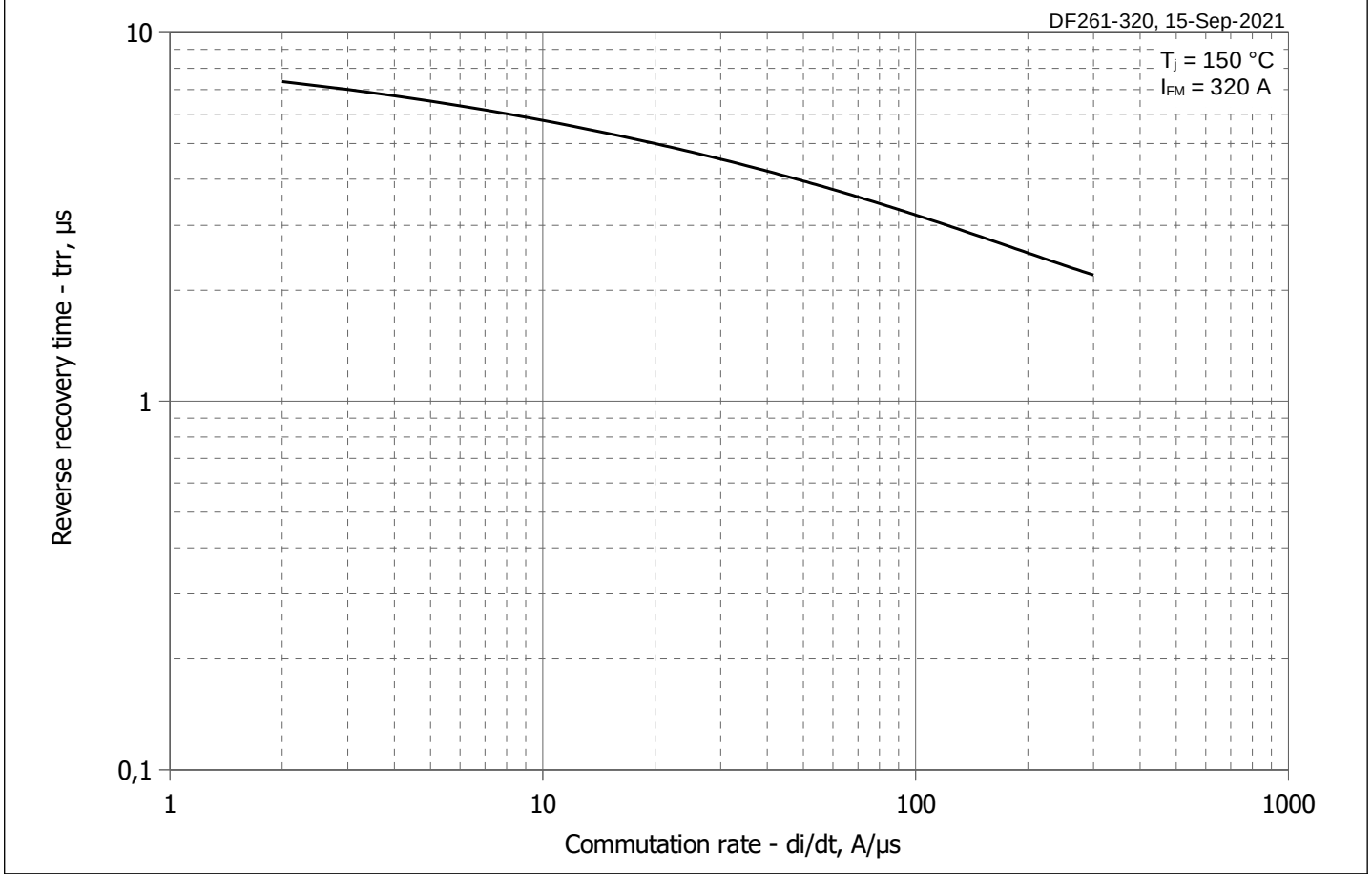


Fig 6 – Maximum recovery time t_{rr} vs. commutation rate di_R/dt (25% chord)

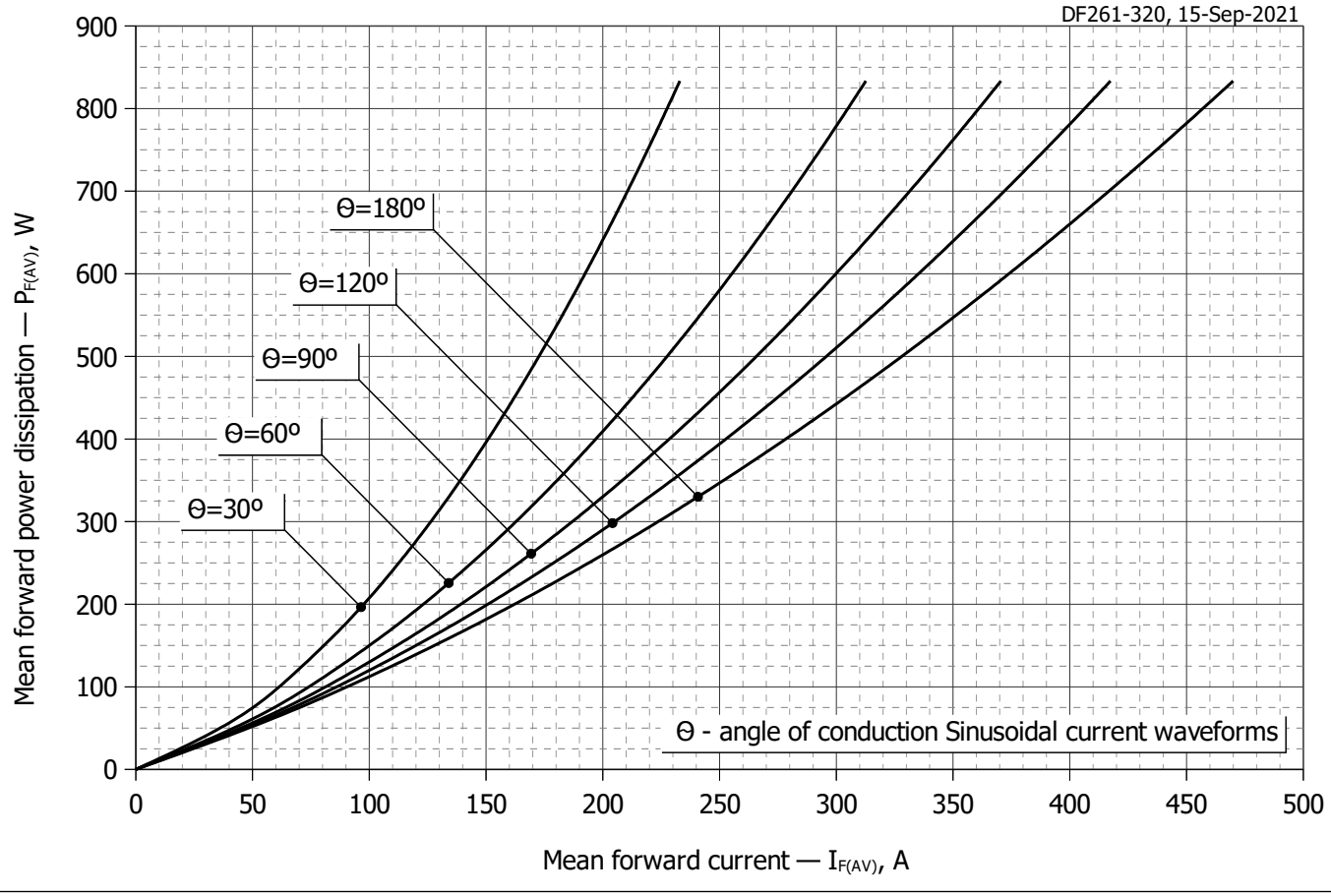


Fig. 7 - Mean forward power dissipation P_{FAV} vs. mean forward current I_{FAV} for sinusoidal current waveforms at different conduction angles (f=50Hz)

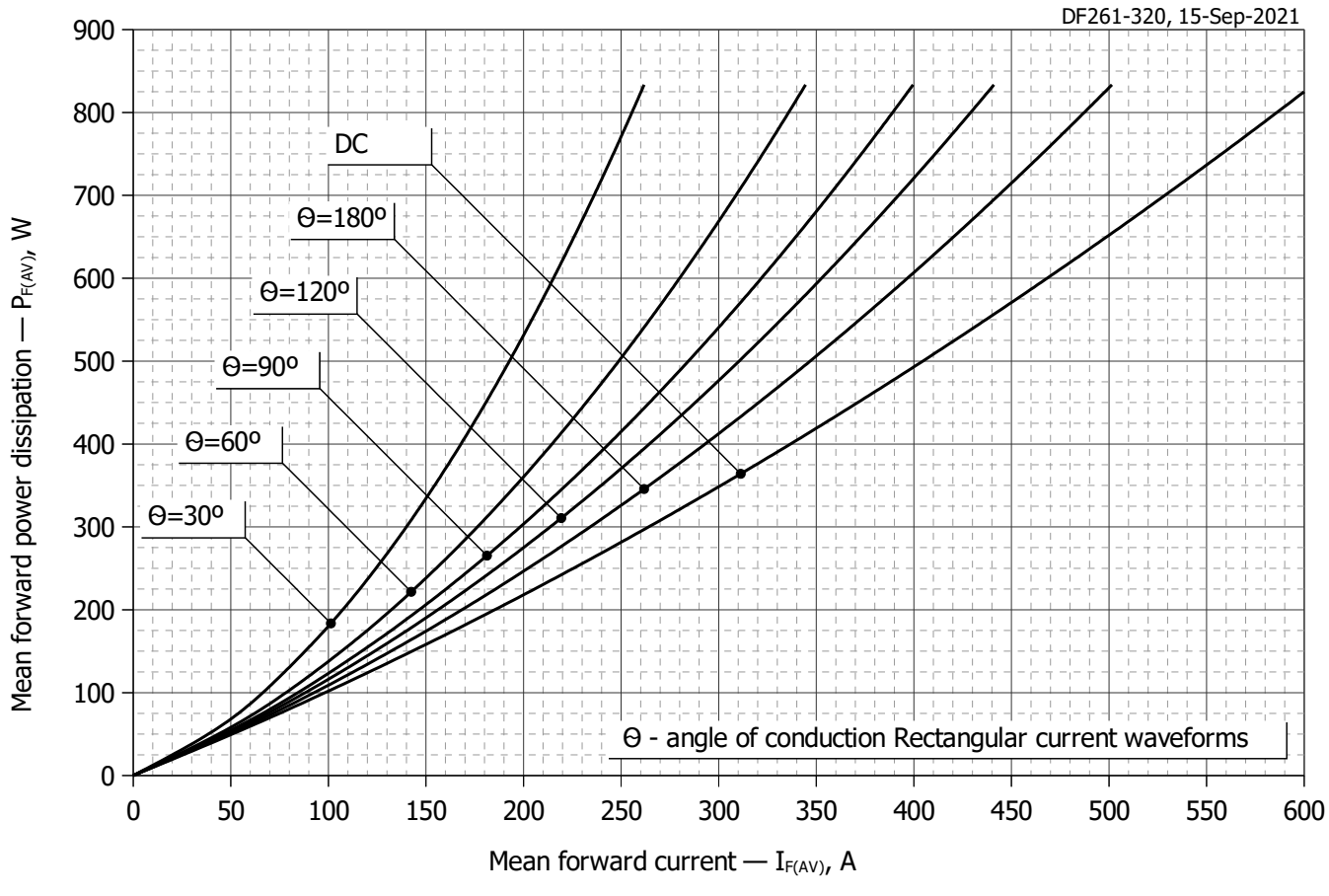


Fig. 8 – Mean forward power dissipation P_{FAV} vs. mean forward current I_{FAV} for rectangular current waveforms at different conduction angles and for DC (f=50Hz)

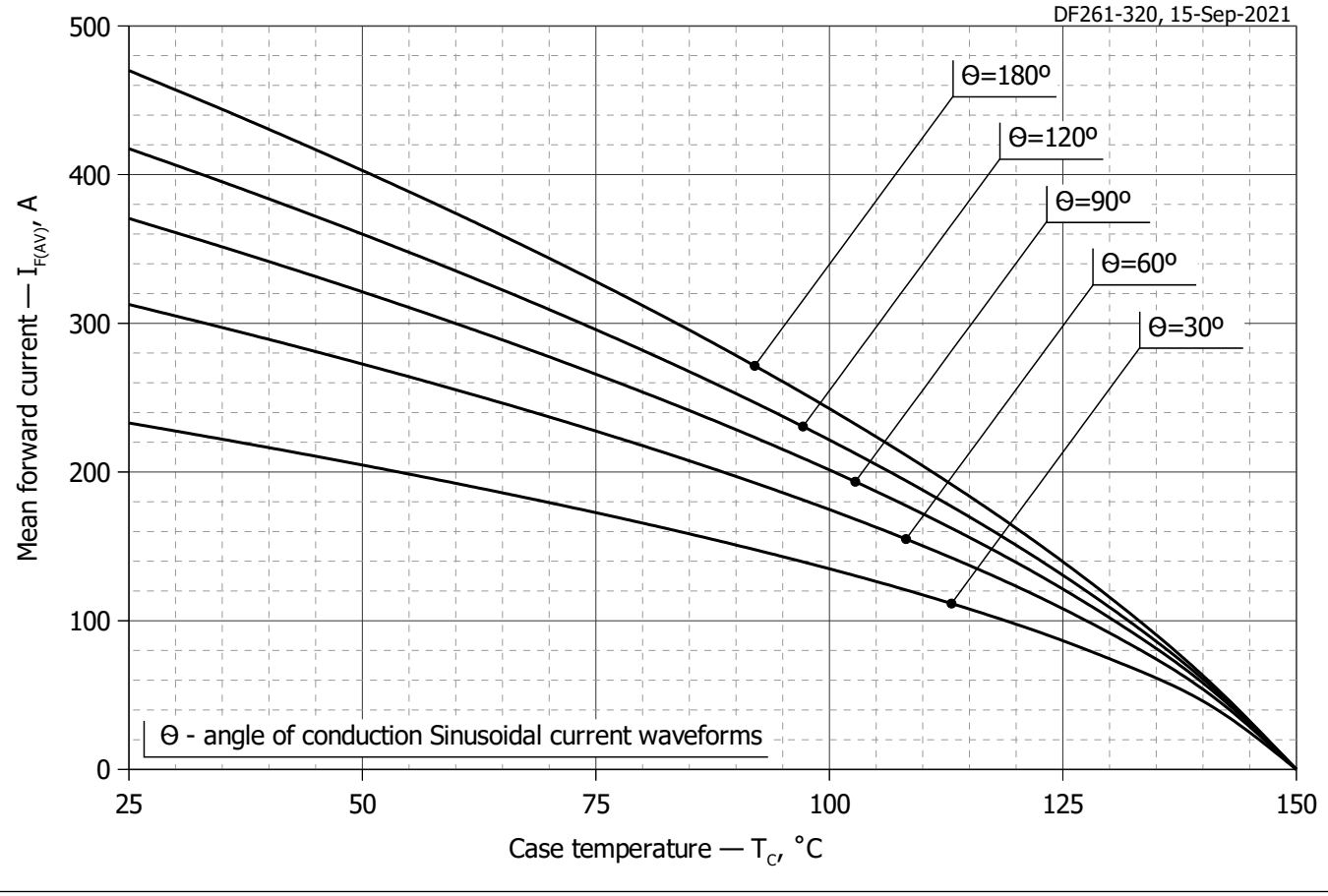


Fig. 9 – Mean forward current I_{FAV} vs. case temperature T_C for sinusoidal current waveforms at different conduction angles (f=50Hz)

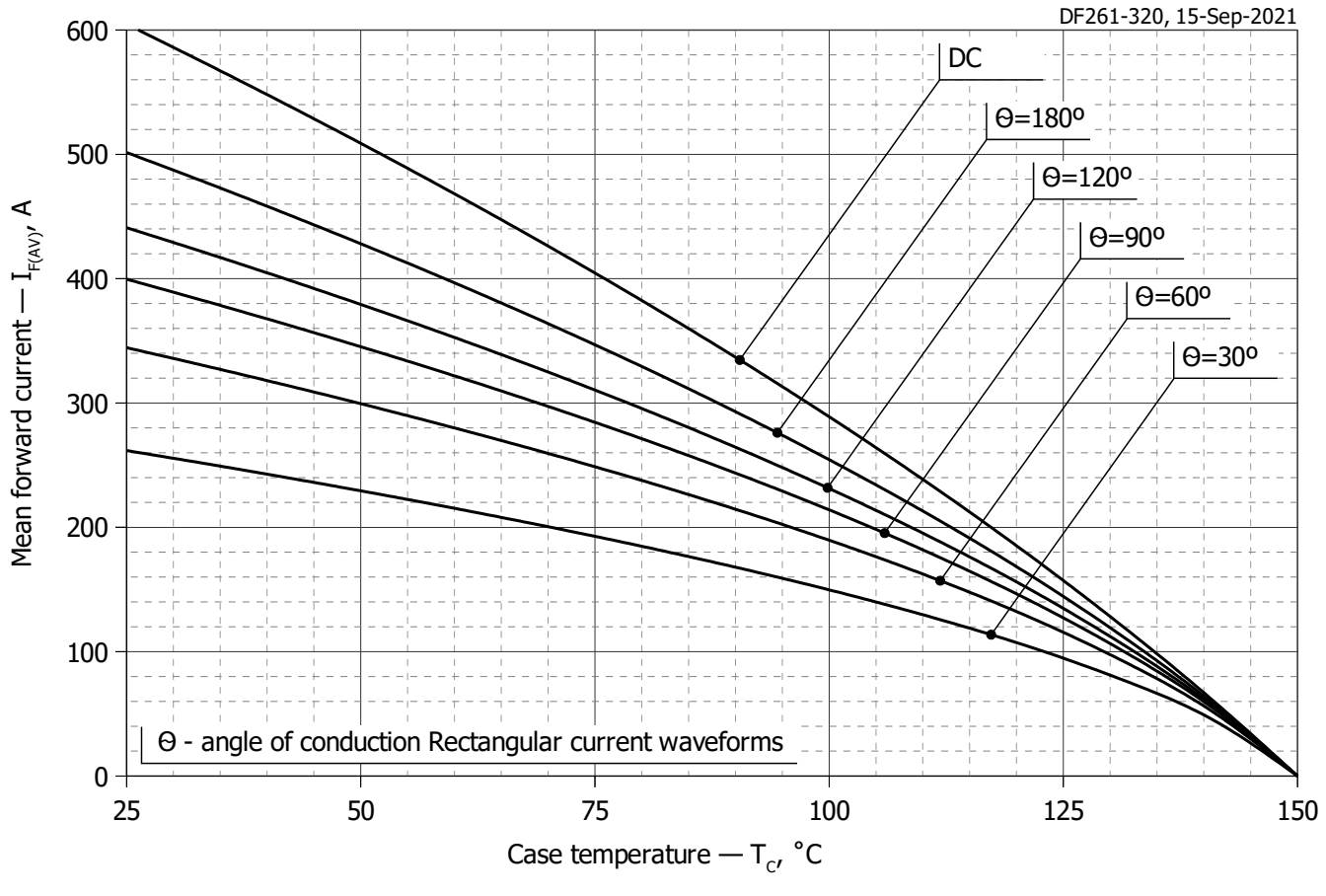


Fig. 10 - Mean forward current I_{FAV} vs. case temperature T_C for rectangular current waveforms at different conduction angles and for DC (f=50Hz)

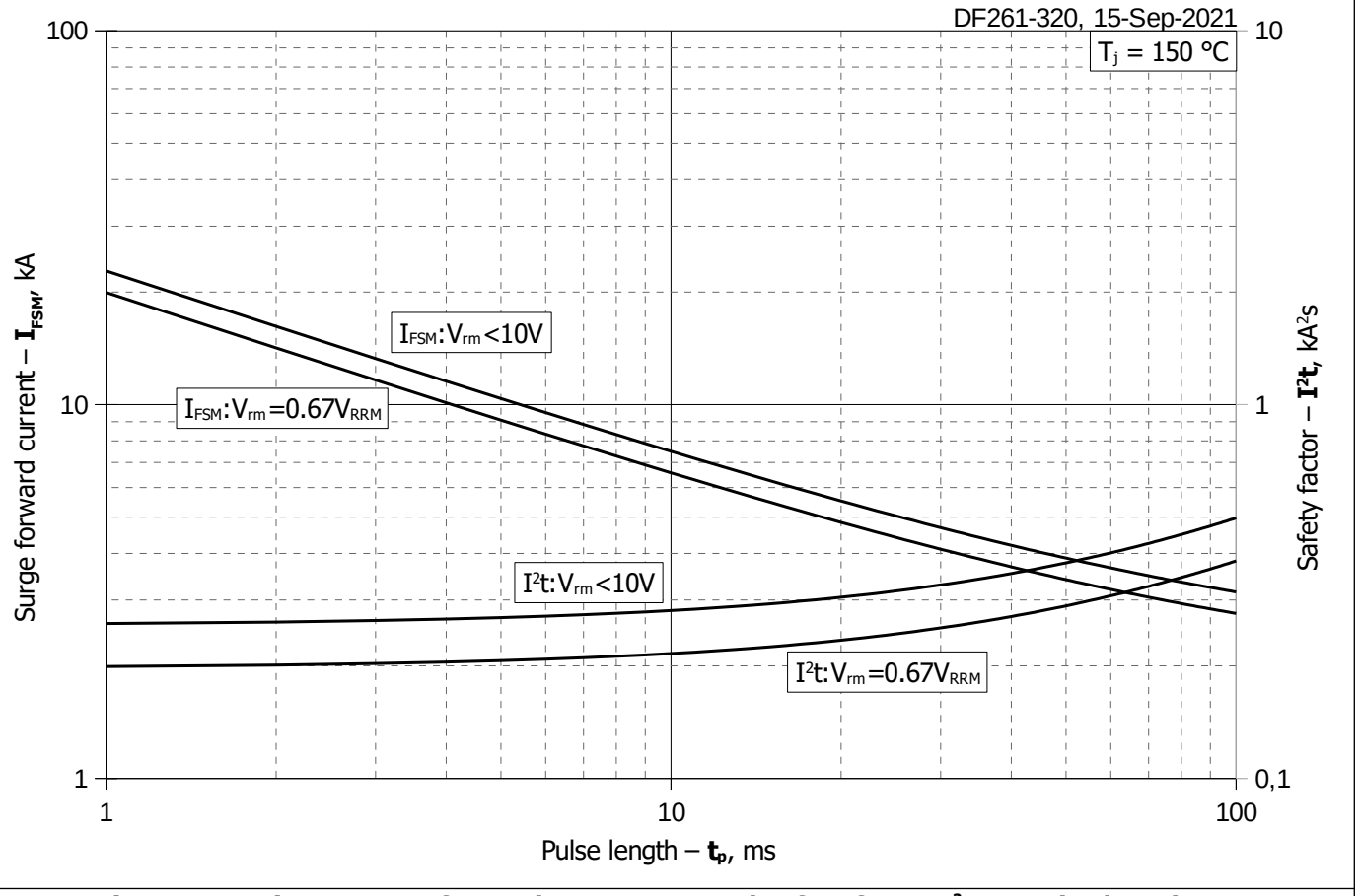


Fig. 11 – Maximum surge forward current I_{FSM} and safety factor I^2t vs. pulse length t_p

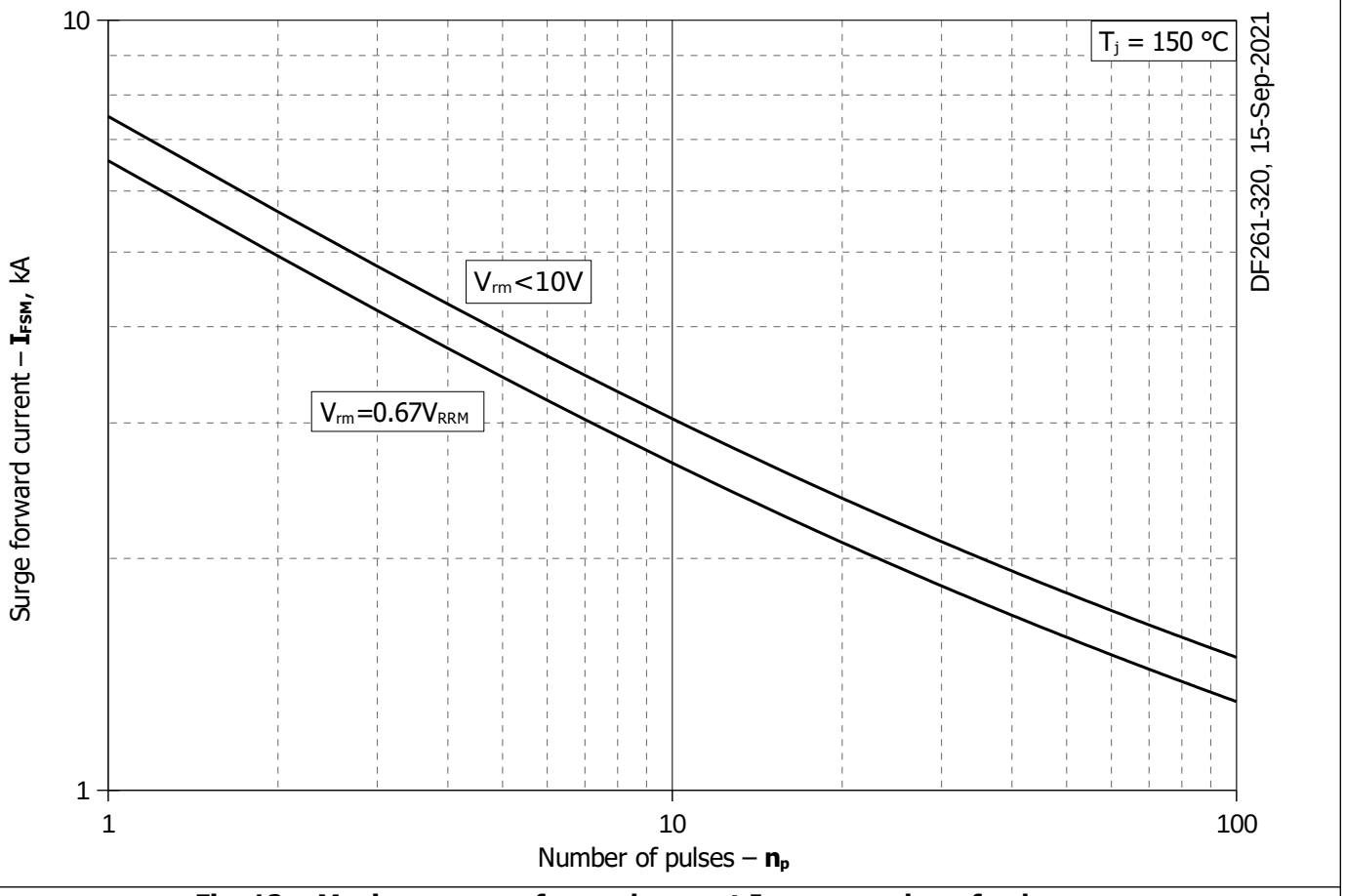


Fig. 12 - Maximum surge forward current I_{FSM} vs. number of pulses n_p