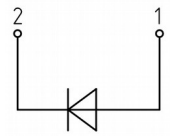
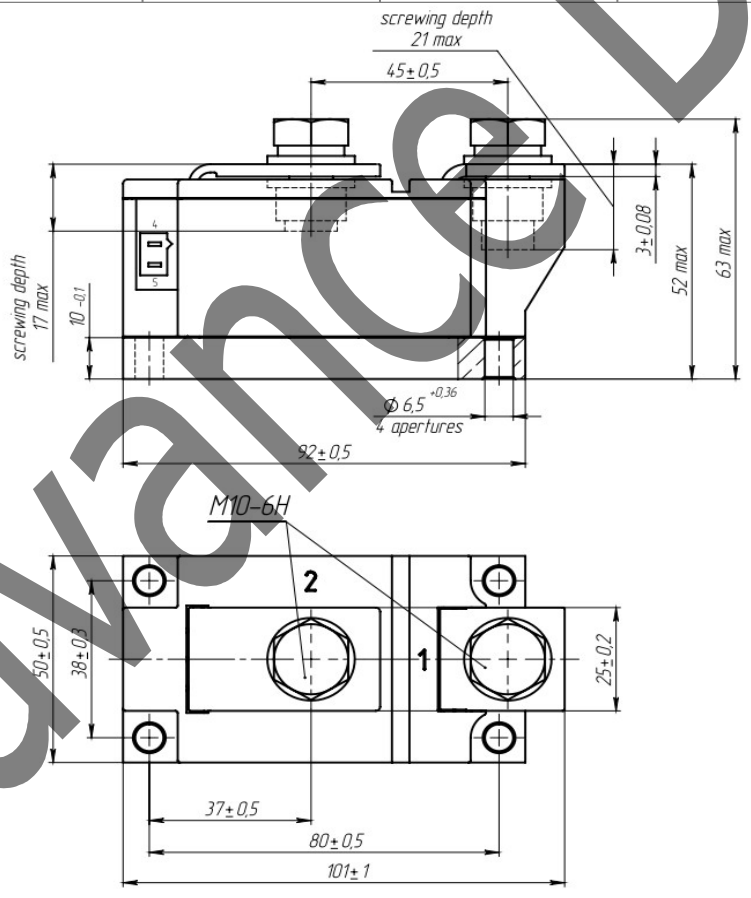
Electrically isolated base plate
Industrial standard package
Simplified mechanical design, rapid assembly
Pressure contact

Single Diode Module
For Phase Control
MD1-320-65-B0

Average forward current					I_{FAV}		320 A				
Repetitive peak reverse voltage					V_{RRM}		4600 ÷ 6500 V				
V_{RRM}, V	4600	4800	5000	5200	5400	5600	5800	6000	6200	6400	6500
Voltage code	46	48	50	52	54	56	58	60	62	64	65
T_j, °C	– 40 ÷ 140										

MD1





All dimensions in millimeters (inches)

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{FAV}	Average forward current	A	320	T_c=100 °C; 180° half-sine wave; 50 Hz	
I_{FRMS}	RMS forward current	A	502		
I_{FSM}	Surge forward current	kA	6.0 7.0	T_j=$T_{j\,max}$ T_j=25 °C	180° half-sine wave; t_p=10 ms; single pulse; V_R=0 V;
			6.5 7.5	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	$A^2s{\cdot}10^3$	180 240	T_j=$T_{j\,max}$ T_j=25 °C	180° half-sine wave; t_p=10 ms; single pulse; V_R=0 V;
			170 230	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	4600÷6500	$T_{j\,min}$< T_j <$T_{j\,max}$; 180° half-sine wave; 50 Hz;	
V_{RSM}	Non-repetitive peak reverse voltages	V	5700÷6600	$T_{j\,min}$< T_j <$T_{j\,max}$; 180° half-sine wave; single pulse;	
V_R	Reverse continuous voltages	V	$0.6{\cdot}V_{RRM}$	T_j=$T_{j\,max}$;	
THERMAL					
T_{stg}	Storage temperature	°C	-40 ÷ 50		
T_j	Operating junction temperature	°C	-40 ÷ 140		
MECHANICAL					
a	Acceleration under vibration	m/s^2	50		

CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{FM}	Peak forward voltage, max	V	2.40	T_j=25 °C; I_{FM}=1570 A	
$V_{F(TO)}$	Forward threshold voltage, max	V	0.95	T_j=$T_{j\,max}$; 0.5 π I_{FAV} < I_T < 1.5 π I_{FAV}	
r_T	Forward slope resistance, max	mΩ	1.100		
BLOCKING					
I_{RRM}	Repetitive peak reverse current, max	mA	100	T_j=$T_{j\,max}$; V_R=V_{RRM}	
THERMAL					
R_{thjc}	Thermal resistance, junction to case per module	°C/W	0.0680	180° half-sine wave, 50 Hz	
R_{thch}	Thermal resistance, case to heatsink per module	°C/W	0.0100		
INSULATION					
V_{ISOL}	Insulation test voltage	kV	3.00	Sine wave, 50 Hz; RMS	t=1 min
			3.60		t=1 sec
MECHANICAL					
M_1	Mounting torque (M6)[1)]	Nm	6.00	Tolerance ± 15%	
M_2	Terminal connection torque (M10)[1)]	Nm	12.00	Tolerance ± 15%	
w	Weight, max	g	900		

PART NUMBERING GUIDE	NOTES
MD 1 - 320 - 65 - B0 - N 1 2 3 4 5 6 1. MD - Rectifier Diode 2. Circuit Schematic 3. Average Forward Current, A 4. Voltage Code 5. Package Type (M.B0) 6. Ambient Conditions: N – Normal	[1)] The screws must be lubricated

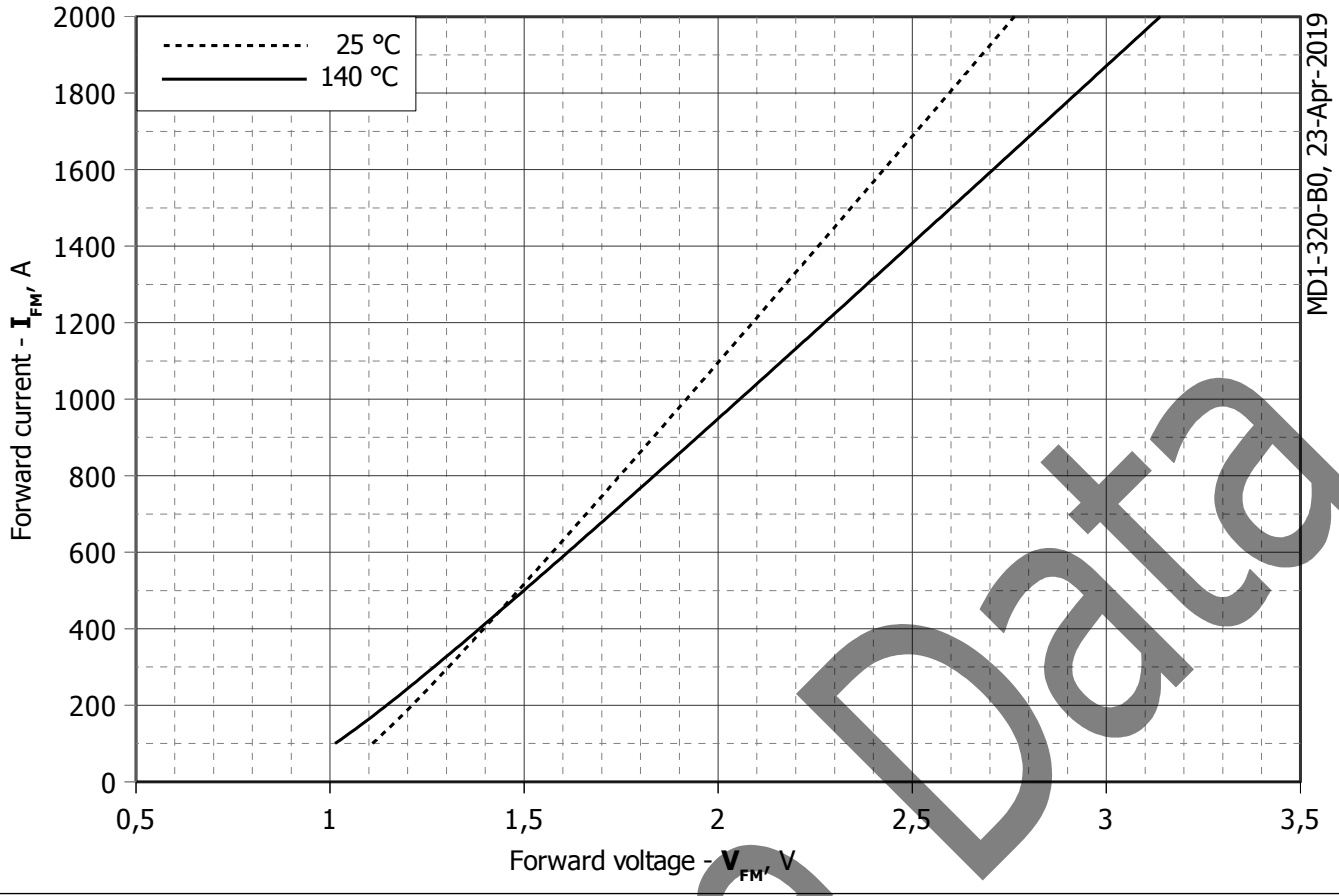


Fig 1 – Forward characteristics of Limit device

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

	Coefficients for max curves	
	T_j = 25°C	$T_j = T_{j\,max}$
A	0.90420000	0.7351400
B	0.00081932	0.0010480
C	0.02528100	0.0356870
D	0.00063235	0.0008240

Forward characteristic model (see Fig. 1).

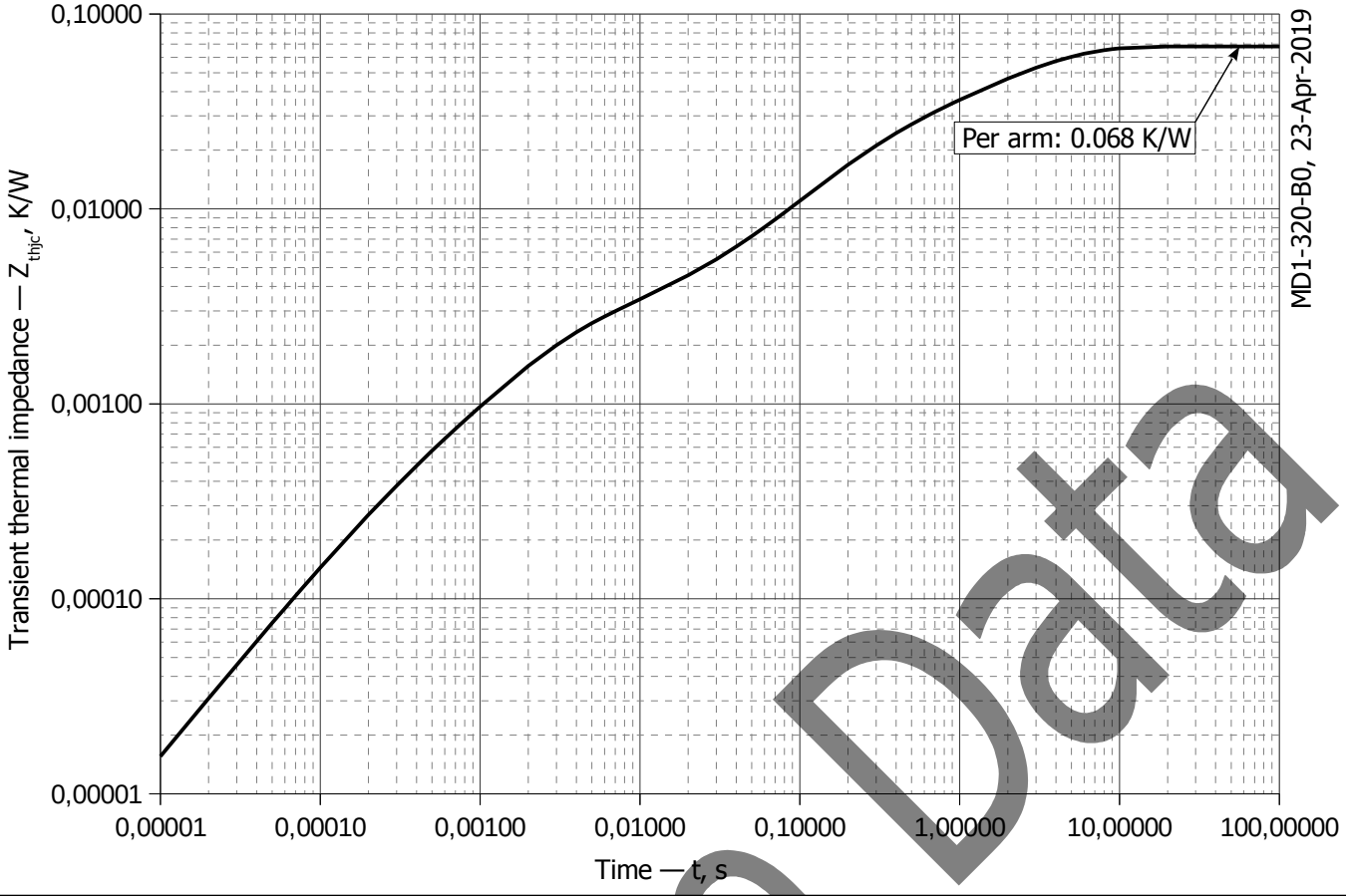


Fig 2 – Transient thermal impedance Z_{thjc} vs. time t

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	0.0385	0.01253	0.0144	0.0007273	0.001871	0.0001367
τ_i, s	3.124	0.8558	0.1999	0.009185	0.002295	0.000238

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

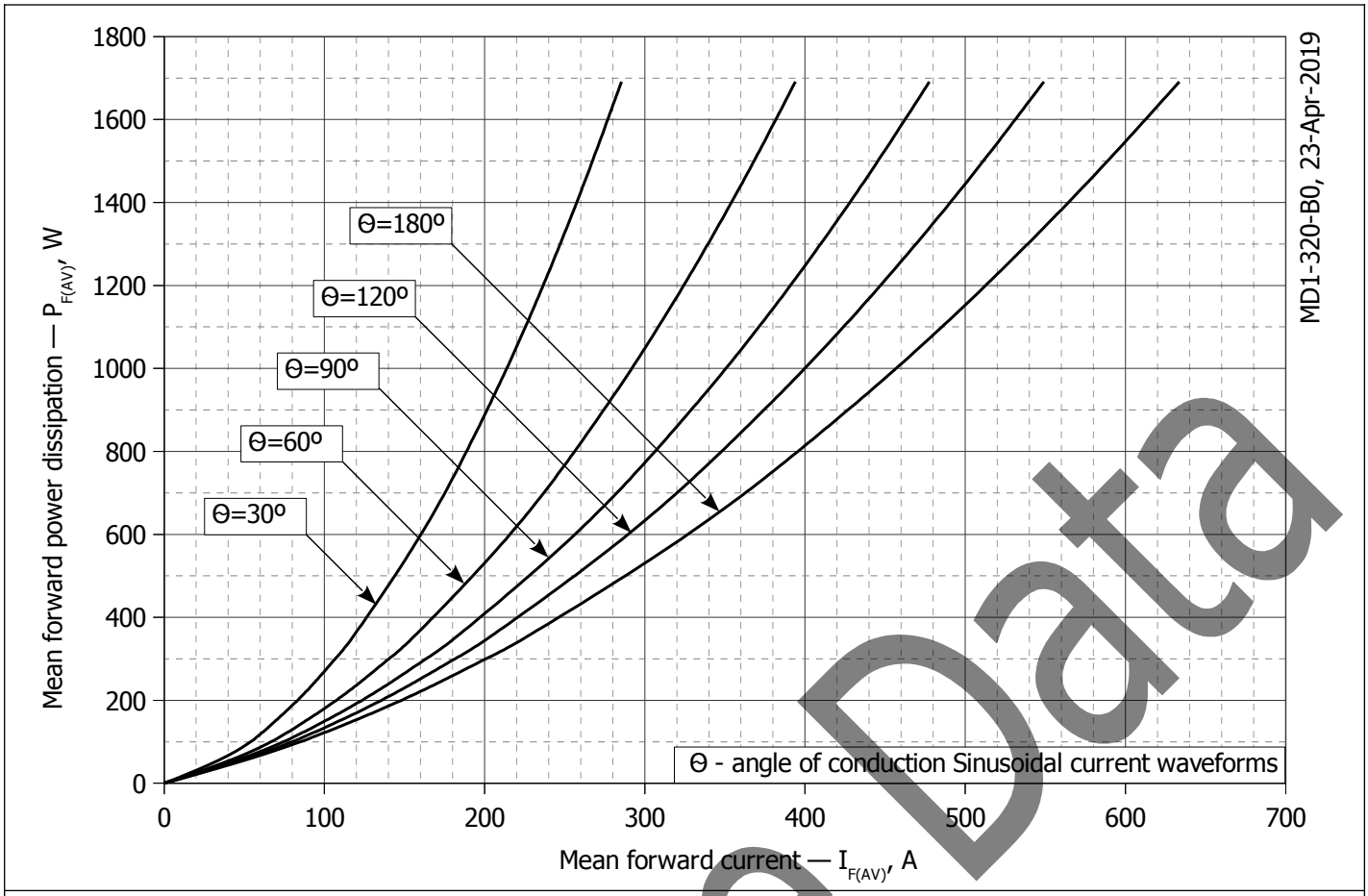


Fig. 3 - Mean forward power dissipation P_{FAV} vs. mean forward current I_{FAV} for sinusoidal current waveforms at different conduction angles (f=50Hz, DSC)

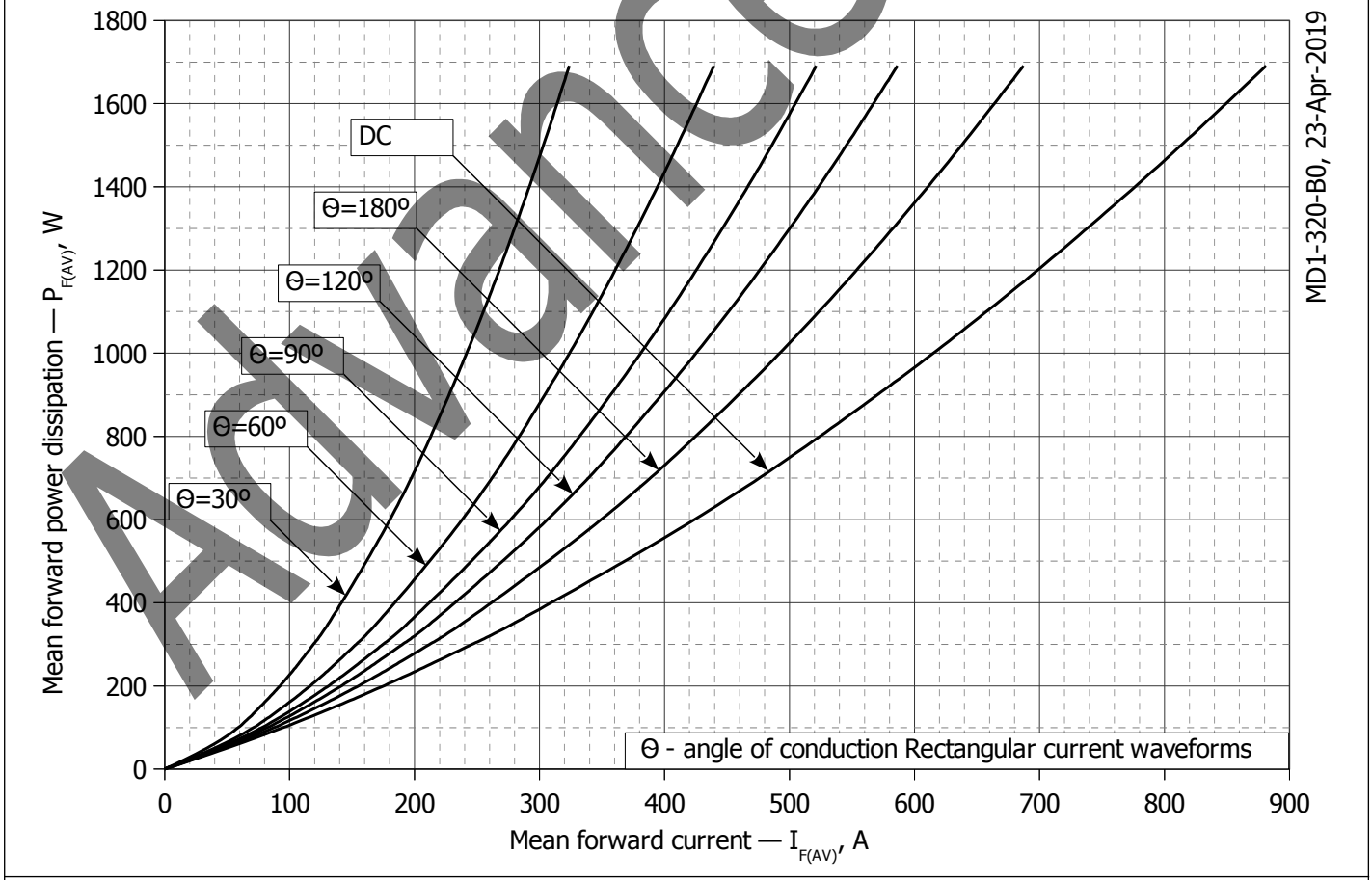


Fig. 4 – Mean forward power dissipation P_{FAV} vs. mean forward current I_{FAV} for rectangular current waveforms at different conduction angles and for DC (f=50Hz, DSC)

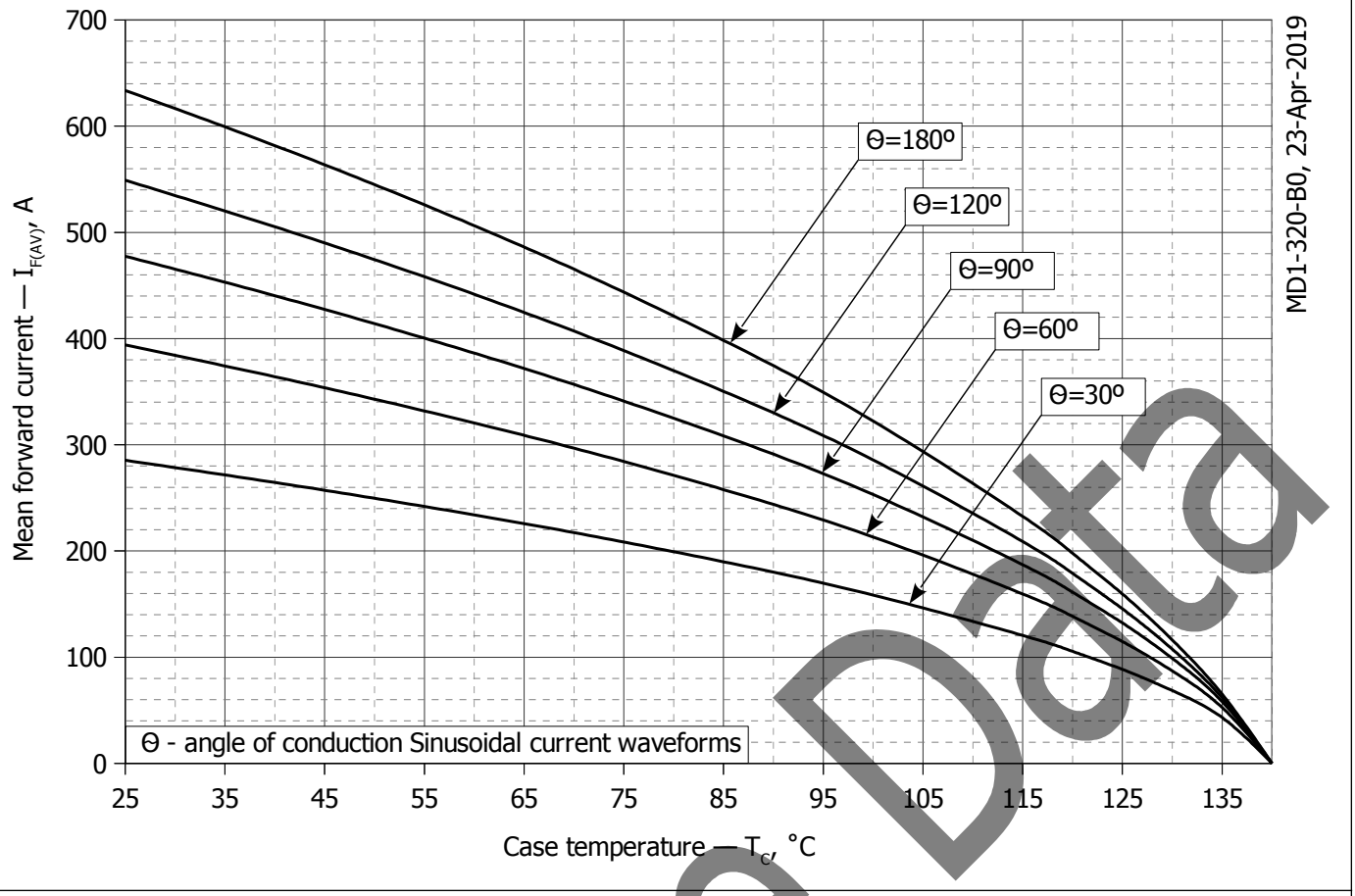


Fig. 5 – Mean forward current I_{FAV} vs. case temperature T_C for sinusoidal current waveforms at different conduction angles (f=50Hz, DSC)

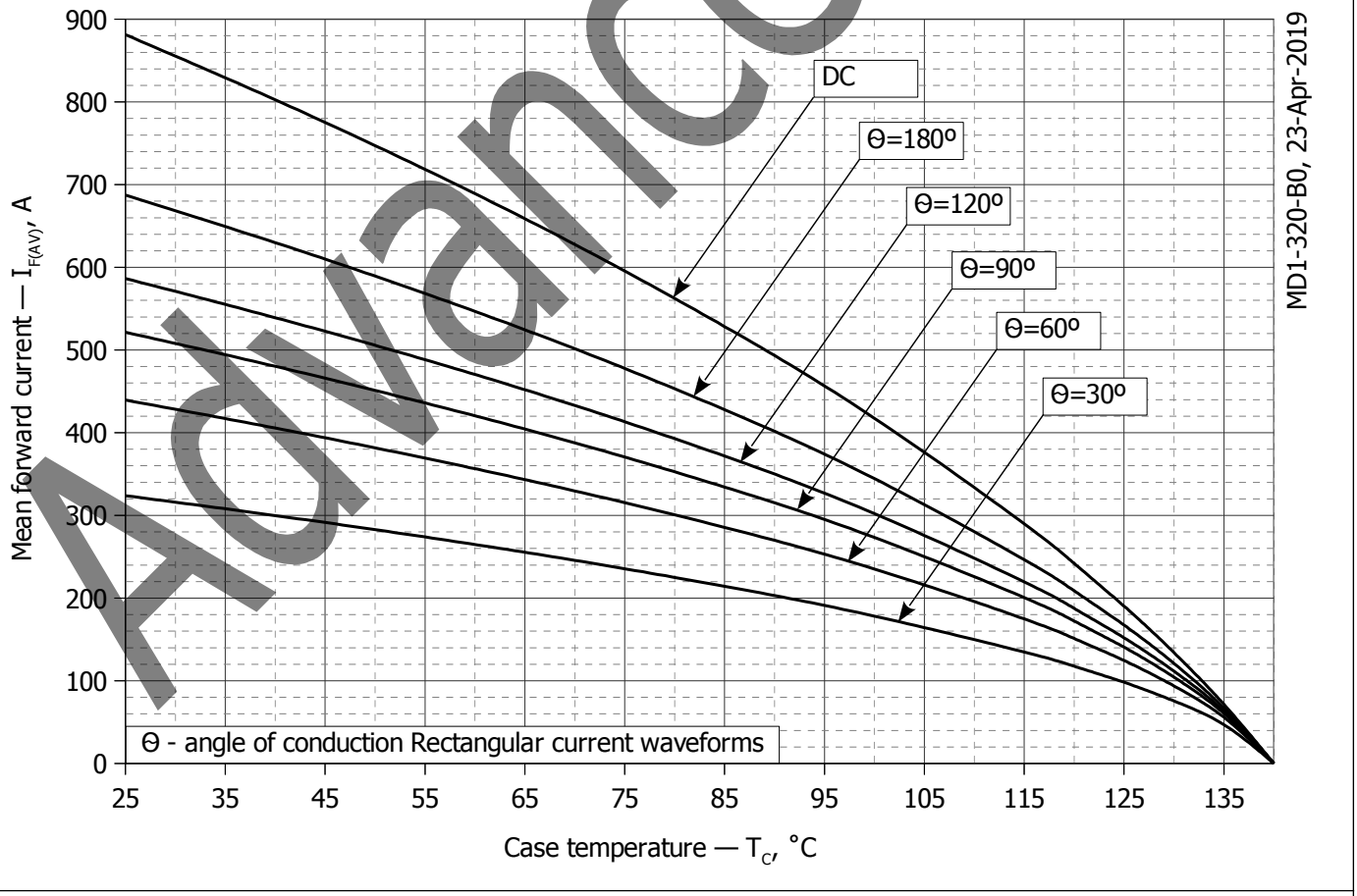


Fig. 6 - Mean forward current I_{FAV} vs. case temperature T_C for rectangular current waveforms at different conduction angles and for DC (f=50Hz, DSC)

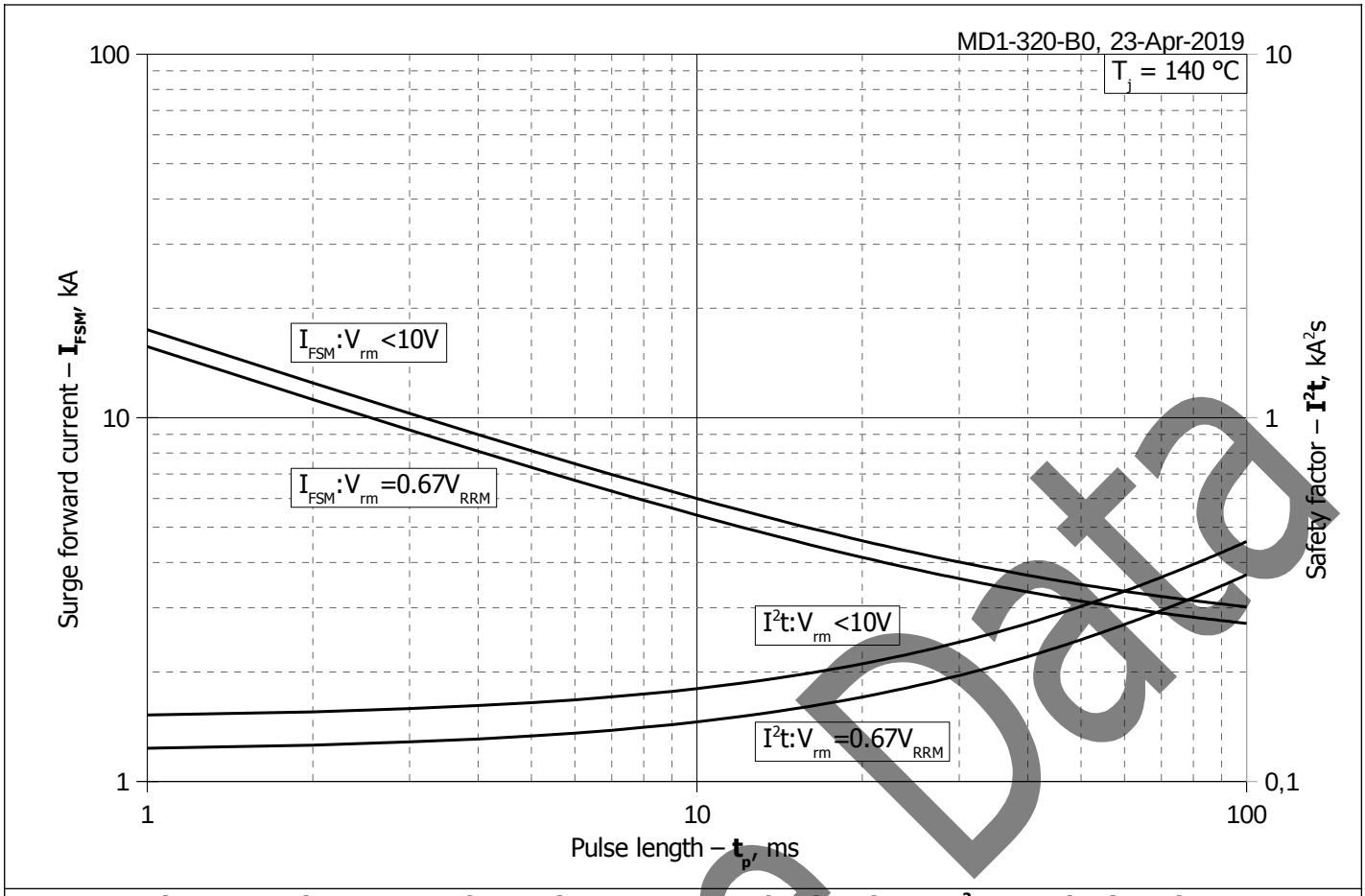


Fig. 7 – Maximum surge forward current I_{FSM} and safety factor I^2t vs. pulse length t_p

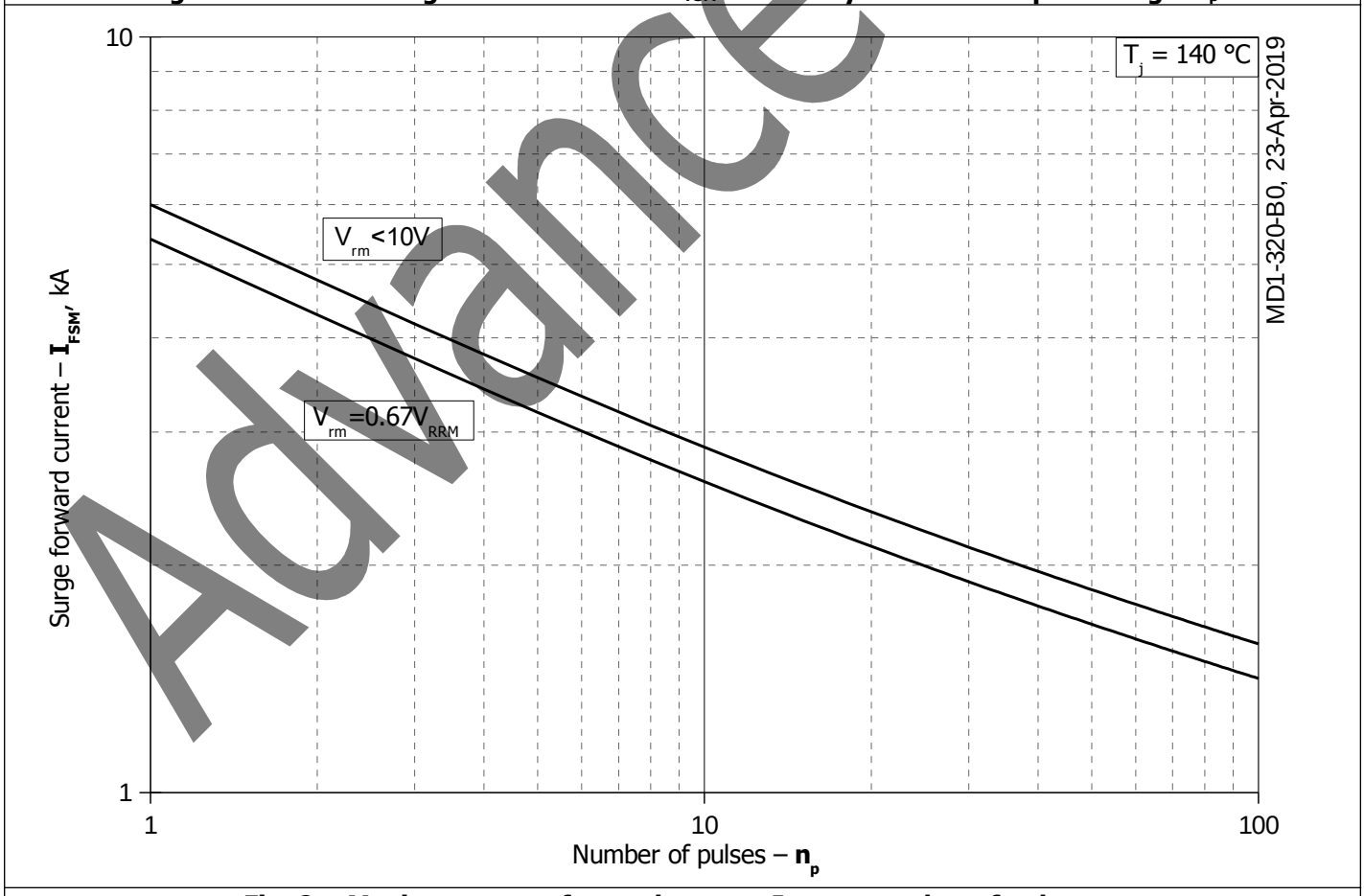


Fig. 8 - Maximum surge forward current I_{FSM} vs. number of pulses n_p