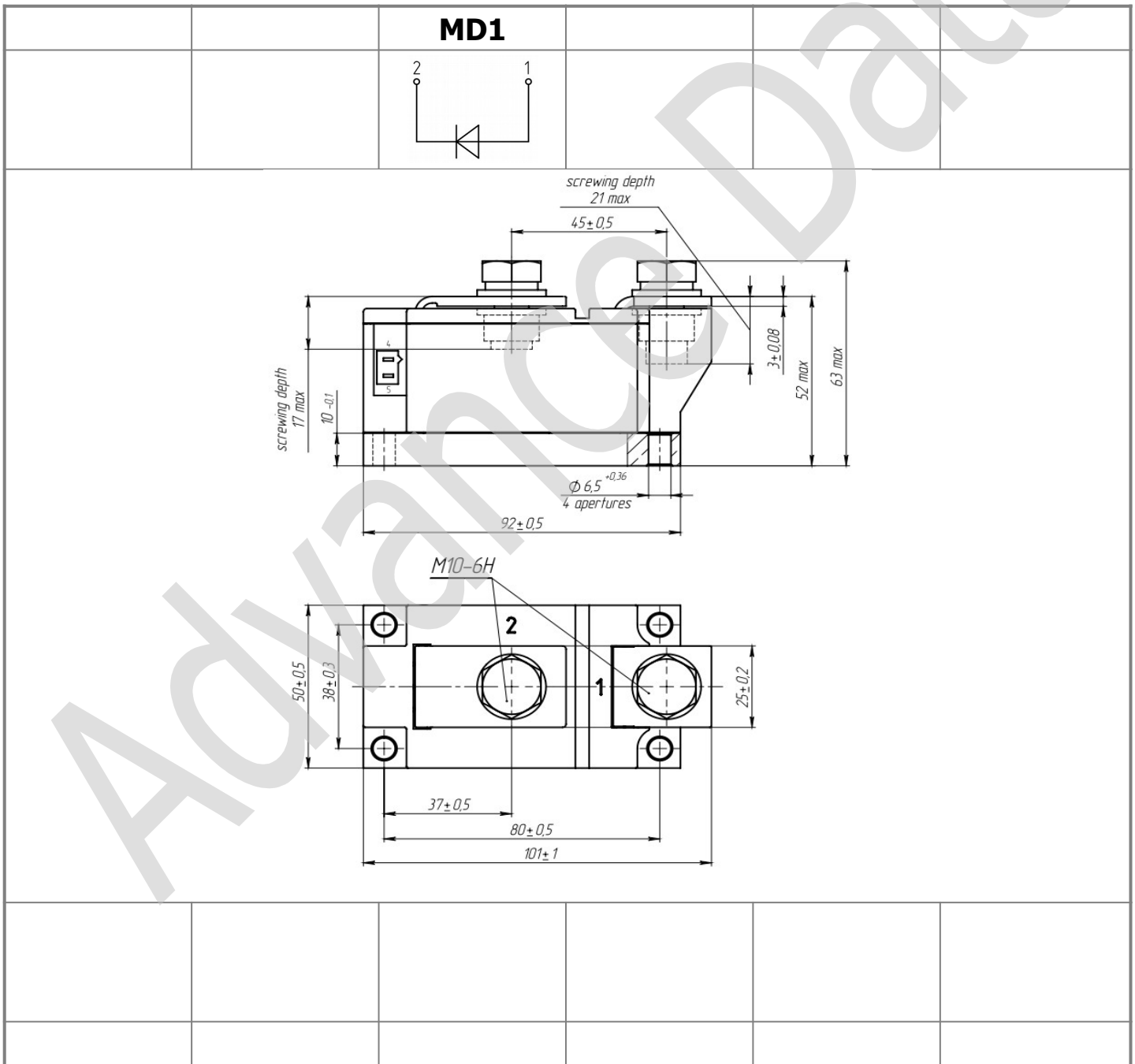




**Single Diode Module
For Phase Control
MD1-320-65-B0**

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

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											



All dimensions in millimeters (inches)

MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
ON-STATE					
I_{FAV}	Average forward current	A	320	$T_c=100\text{ }^\circ\text{C}$;	
I_{FRMS}	RMS forward current	A	502	180° half-sine wave; 50 Hz	
I_{FSM}	Surge forward current	kA	6.0	$T_j=T_{j\max}$ $T_j=25\text{ }^\circ\text{C}$	180° half-sine wave; $t_p=10\text{ ms}$; single pulse; $V_R=0\text{ V}$;
			7.0		
			6.5	$T_j=T_{j\max}$ $T_j=25\text{ }^\circ\text{C}$	180° half-sine wave; $t_p=8.3\text{ ms}$; single pulse; $V_R=0\text{ V}$;
			7.5		
I^2t	Safety factor	$A^2s\cdot 10^3$	180	$T_j=T_{j\max}$ $T_j=25\text{ }^\circ\text{C}$	180° half-sine wave; $t_p=10\text{ ms}$; single pulse; $V_R=0\text{ V}$;
			240		
			170	$T_j=T_{j\max}$ $T_j=25\text{ }^\circ\text{C}$	180° half-sine wave; $t_p=8.3\text{ ms}$; single pulse; $V_R=0\text{ V}$;
			230		
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	$^\circ\text{C}$	-40 ÷ 50		
T_j	Operating junction temperature	$^\circ\text{C}$	-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	$T_j=25\text{ }^\circ\text{C}$; $I_{FM}=1570\text{ A}$	
$V_{F(TO)}$	Forward threshold voltage, max	V	0.95	$T_j=T_{j\max}$;	
r_T	Forward slope resistance, max	$\text{m}\Omega$	1.100	$0.5\pi I_{FAV} < I_T < 1.5\pi I_{FAV}$	
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	$^\circ\text{C/W}$	0.0680	180° half-sine wave, 50 Hz	
	per module				
R_{thch}	Thermal resistance, case to heatsink	$^\circ\text{C/W}$	0.0100		
	per module				
INSULATION					
V_{ISOL}	Insulation test voltage	kV	3.00	Sine wave, 50 Hz; RMS	$t=1\text{ min}$
			3.60		$t=1\text{ sec}$
MECHANICAL					
M_1	Mounting torque (M6) ¹⁾	Nm	6.00	Tolerance $\pm 15\%$	
M_2	Terminal connection torque (M10) ¹⁾	Nm	12.00	Tolerance $\pm 15\%$	
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

Advance Data

The information contained herein is confidential and protected by Copyright.
In the interest of product improvement, Proton-Electrotex reserves the right to change data sheet without notice.

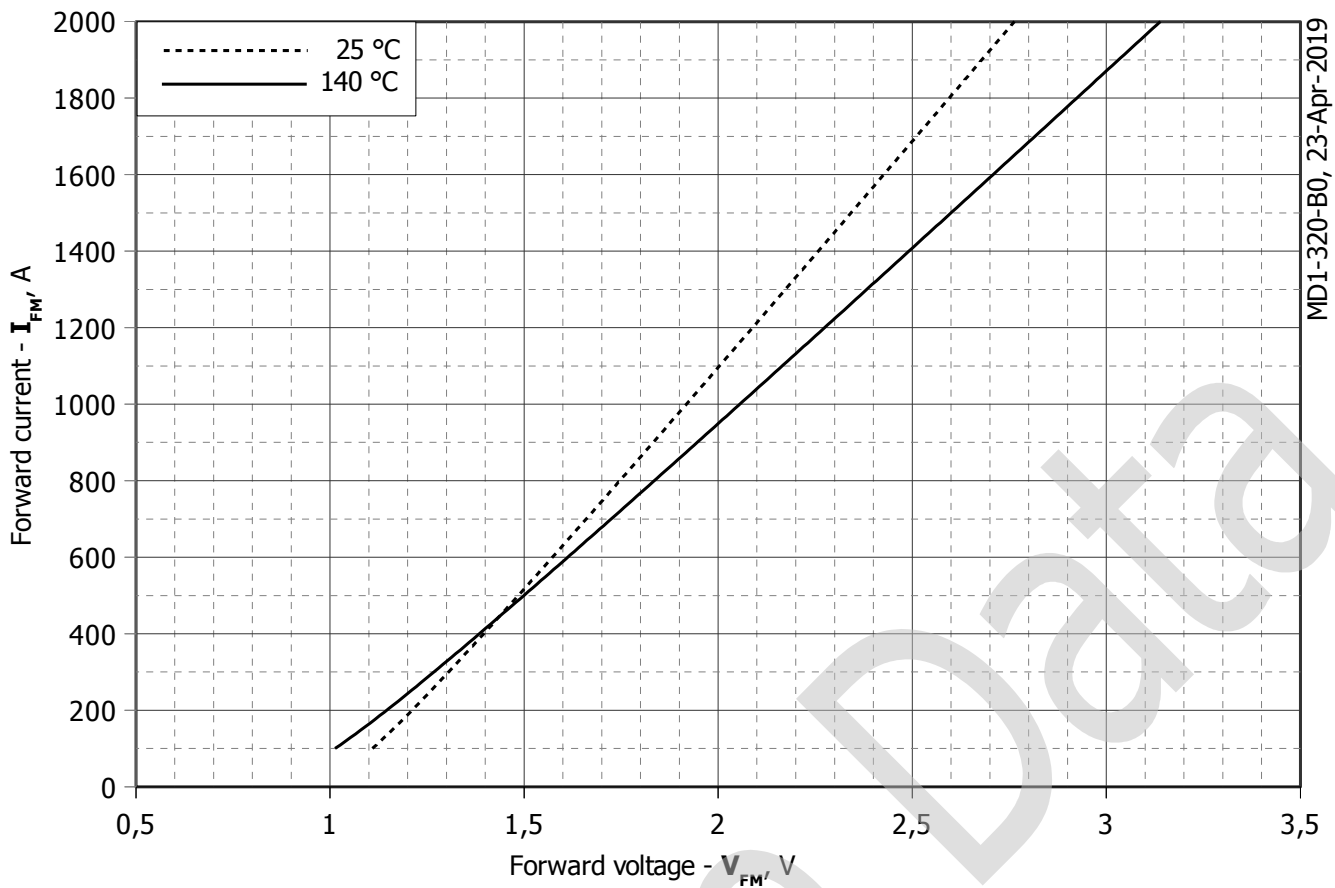


Fig 1 – Forward characteristics of Limit device

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	
	$T_j = 25^\circ\text{C}$	$T_j = T_{j\text{max}}$
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).

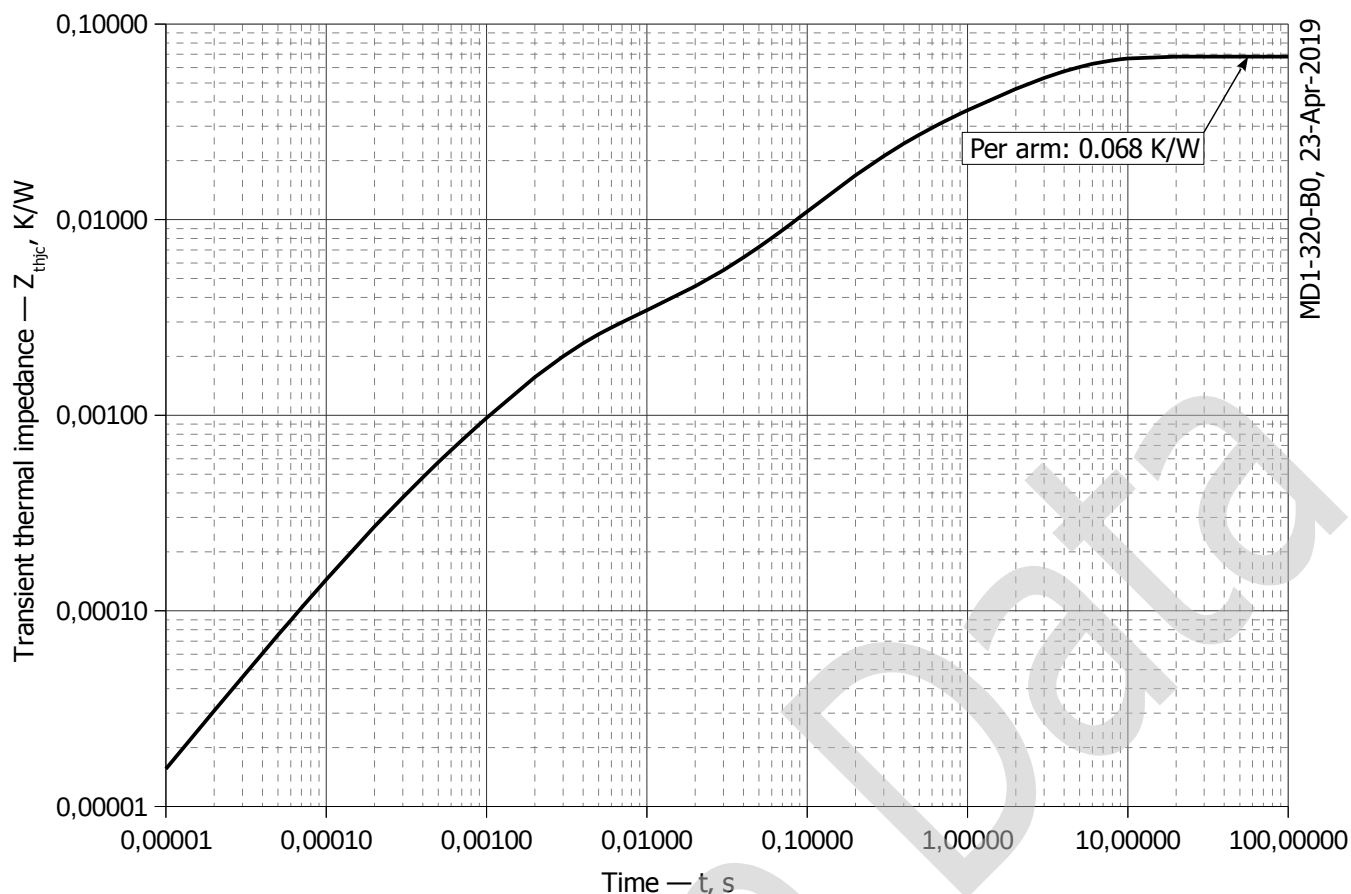


Fig 2 – Transient thermal impedance Z_{thjc} vs. time t

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 constant 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)

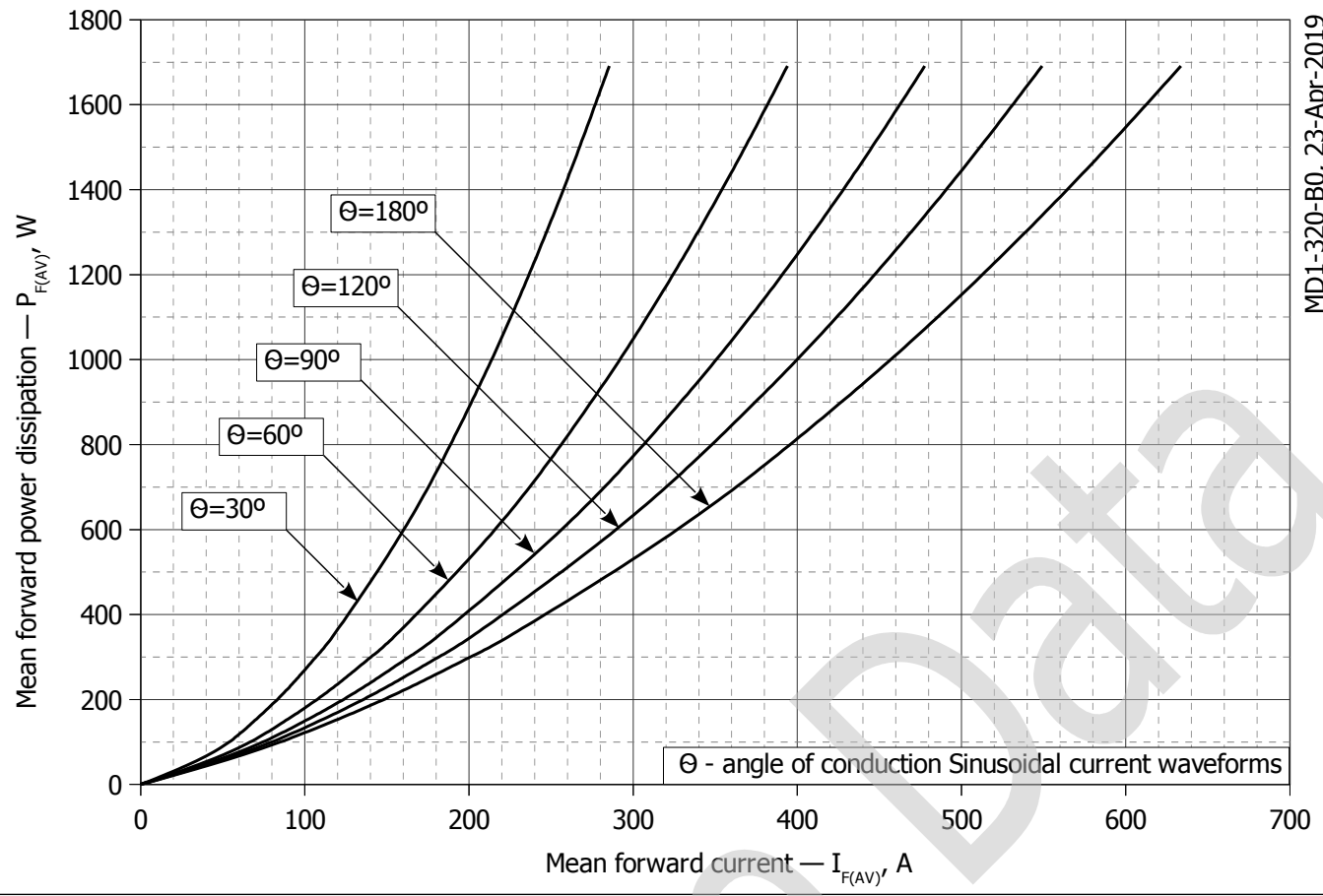


Fig. 3 - Mean forward power dissipation P_{FAV} vs. mean forward current I_{FAV} for sinusoidal current waveforms at different conduction angles (f=50Hz, DSC)

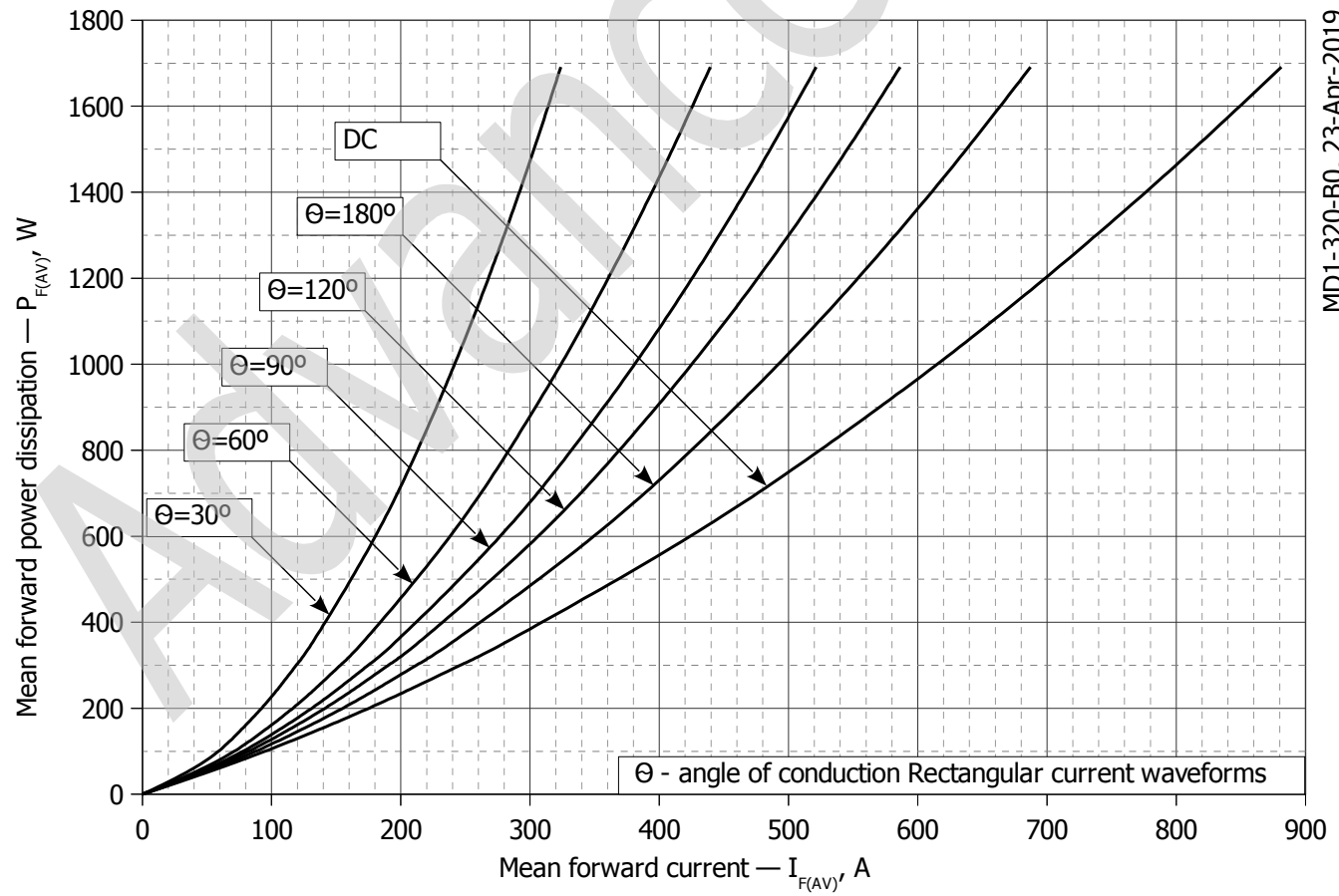


Fig. 4 - Mean forward power dissipation P_{FAV} vs. mean forward current I_{FAV} for rectangular current waveforms at different conduction angles and for DC (f=50Hz, DSC)

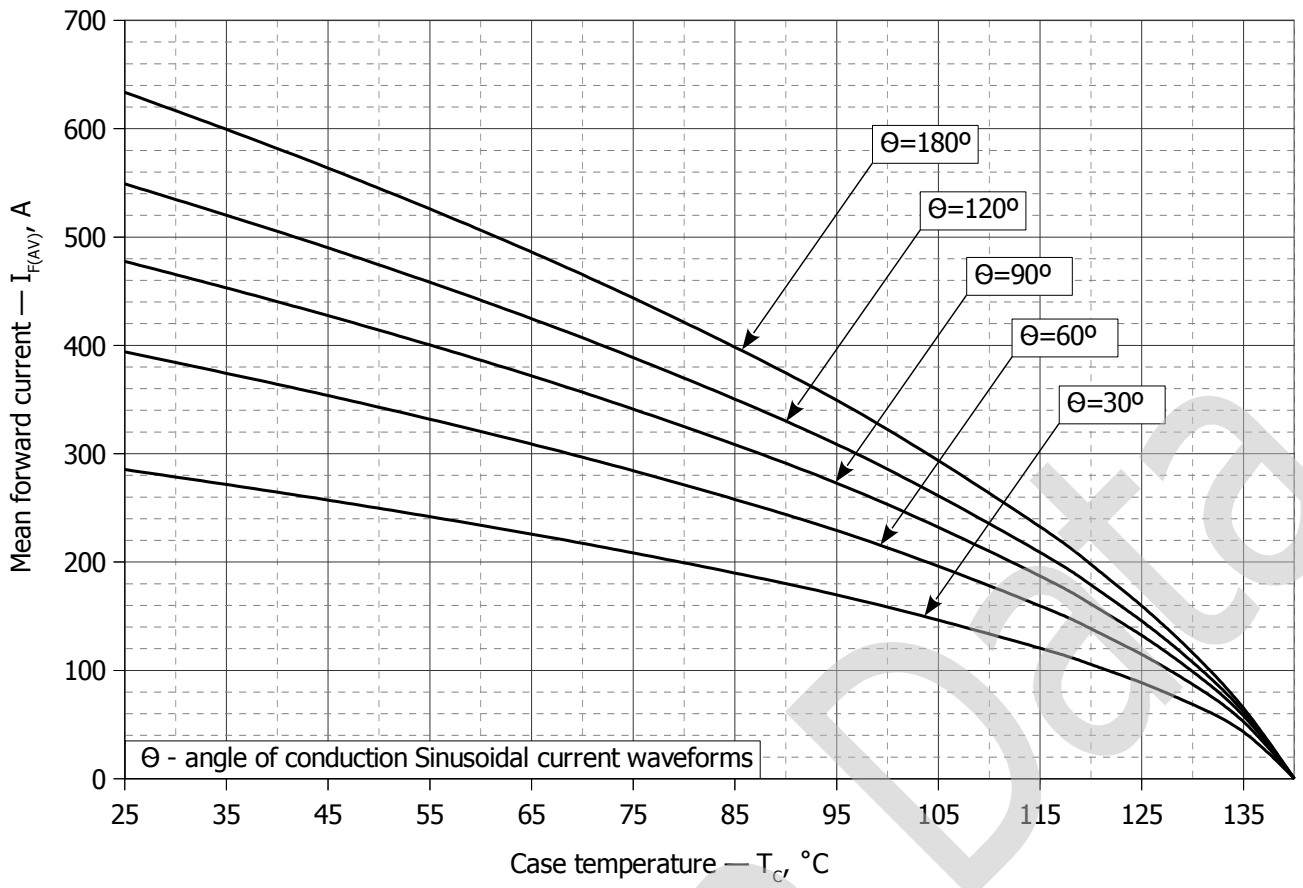


Fig. 5 – Mean forward current I_{FAV} vs. case temperature T_c for sinusoidal current waveforms at different conduction angles ($f=50\text{Hz}$, DSC)

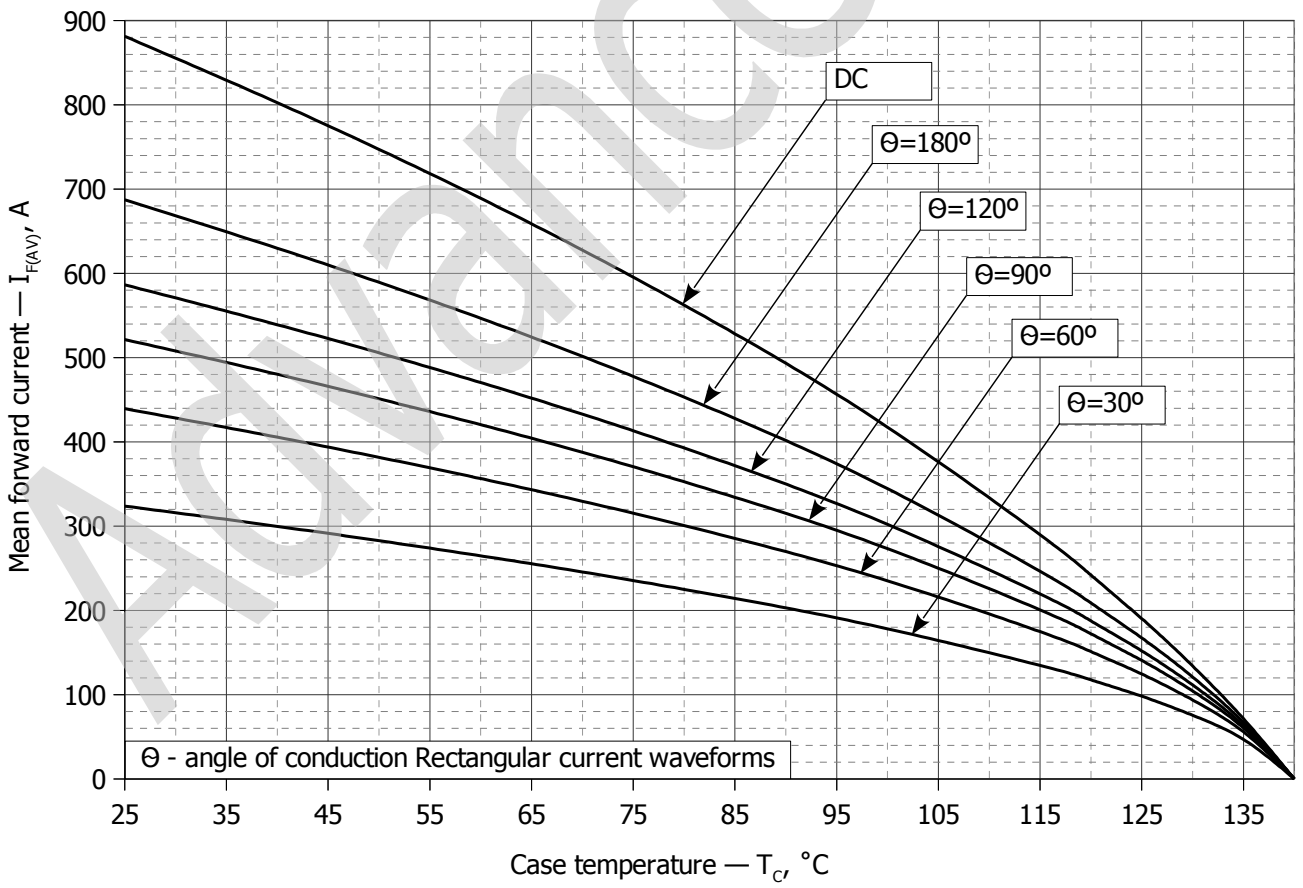


Fig. 6 - Mean forward current I_{FAV} vs. case temperature T_c for rectangular current waveforms at different conduction angles and for DC ($f=50\text{Hz}$, DSC)

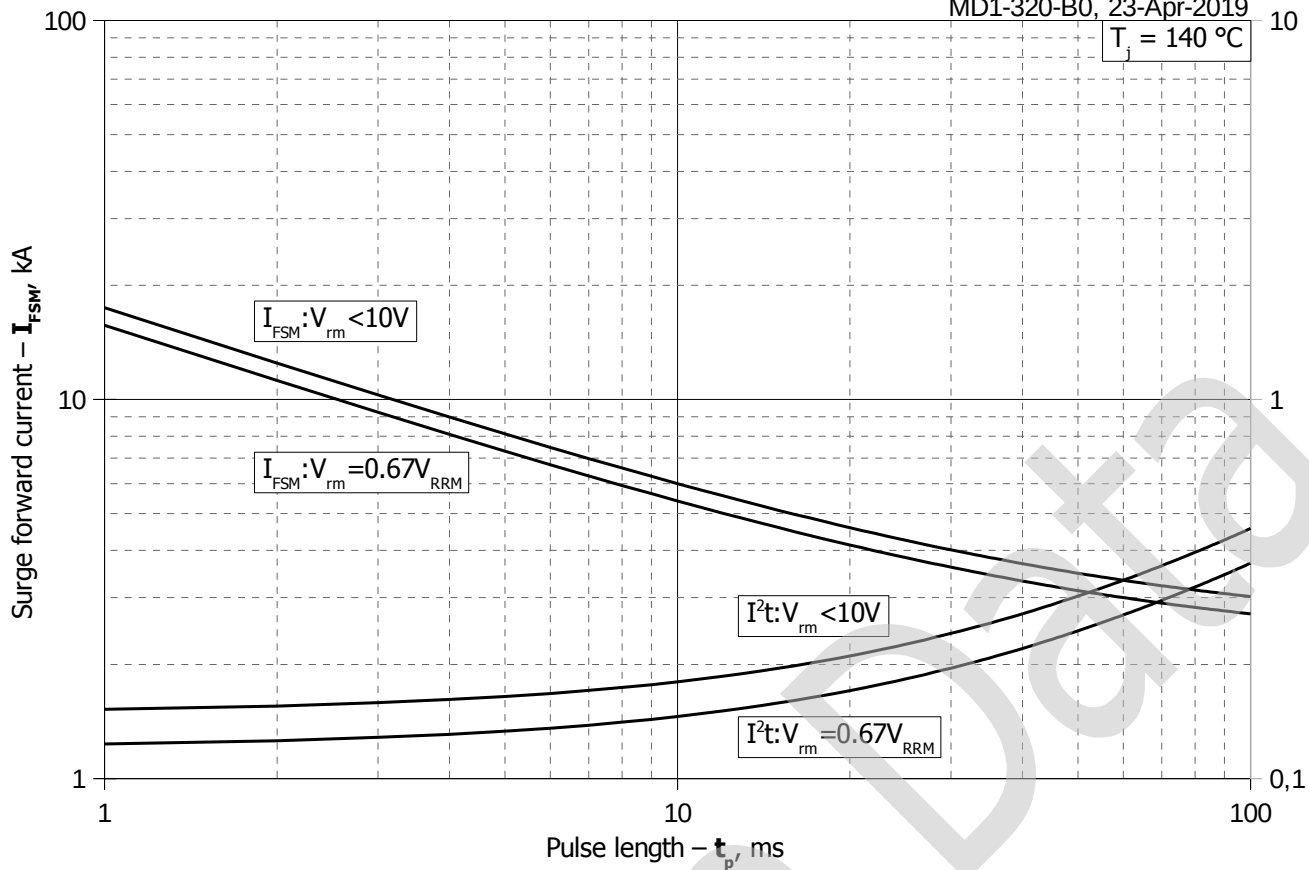


Fig. 7 – Maximum surge forward current I_{FSM} and safety factor I^2t vs. pulse length t_p

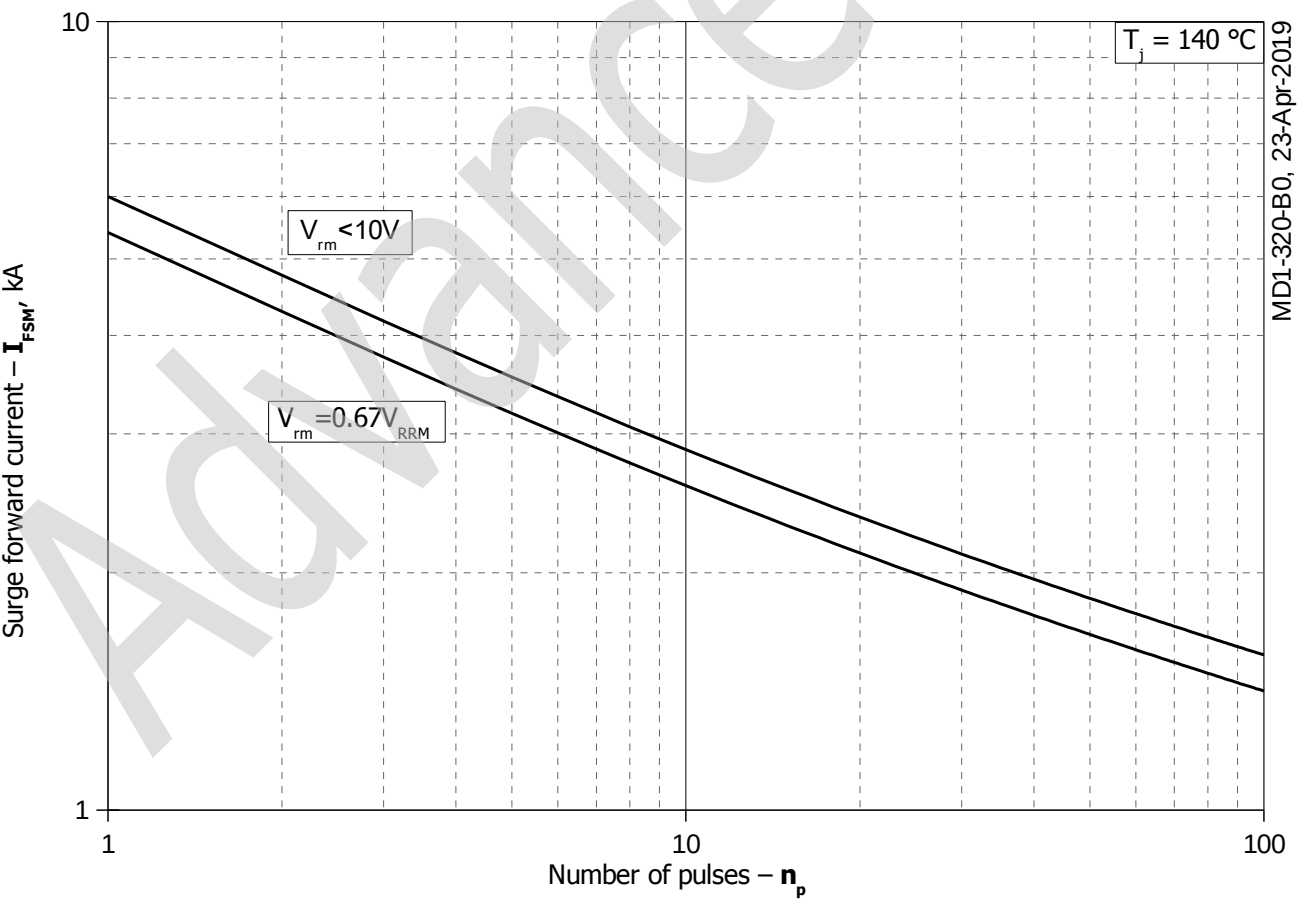


Fig. 8 - Maximum surge forward current I_{FSM} vs. number of pulses n_p