

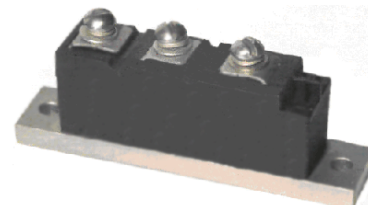


PHASE CONTROL DIODE MODULES

MDD-40, MDDC-40, MDDA-40

- ◆ $V_{RRM} = \underline{400 - 1600 V}$
- ◆ $I_{F(AV)} = \underline{40 A}$ ($T_C = 100\text{ °C}$)
- ◆ $I_{FSM} = \underline{1,2 kA}$ ($T_{Vj} = 140\text{ °C}$)

- ◆ Heat transfer through AlN ceramic isolated metal baseplate
- ◆ Presspack construction
- ◆ High reliability at thermal cycles (10^5 at $\Delta T_C = 70\text{ °C}$)
- ◆ Case width 20 mm



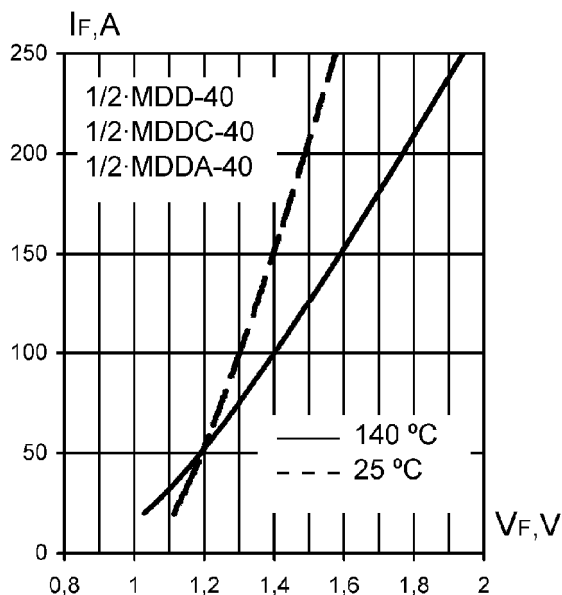
MAXIMUM RATED VALUES

Parameter and conditions	Symbol	Values			Units
		min.	typ.	max.	
Repetitive peak reverse voltage, $T_{Vj} = -60\text{ °C} \dots +140\text{ °C}$	V_{RRM}	400	-	1600	V
Non- repetitive peak reverse voltage, $T_{Vj} = -60\text{ °C} \dots +140\text{ °C}$	V_{RSM}	500	-	1700	
Repetitive peak reverse current, $T_{Vj} = 140\text{ °C}, V_R = V_{RRM}$	I_{RRM}	-	-	4,5	mA
Max. average forward current, $f = 50\text{ Hz},$ $T_C = 100\text{ °C}$	$I_{F(AV)}$	-	-	40	A
RMS forward current	I_{FRMS}	-	-	63	
Surge forward current, $V_R = 0, T_{Vj} = 140\text{ °C}, t_p = 10\text{ ms}$	I_{FSM}	-	-	1,2	kA
Safety factor	I^2t	-	-	7,2	kA^2s
Operation junction temperature range	T_{Vj}	- 60	-	+ 140	°C
Storage temperature range	T_{stg}	- 60	-	+ 50	

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ELECTRICAL CHARACTERISTICS					
Maximum peak forward voltage, $I_F = 125 \text{ A}$, $T_{Vj} = 25 \text{ }^\circ\text{C}$	V_{FM}	-	-	1,35	V
Threshold voltage, $T_{Vj} = 140 \text{ }^\circ\text{C}$, $I_F = 50 - 200 \text{ A}$	$V_{(TO)}$	-	-	1,00	
Slope resistance, $T_{Vj} = 140 \text{ }^\circ\text{C}$, $I_F = 50 - 200 \text{ A}$	r_T	-	-	3,80	m Ω
Recovery charge, $di_F/dt = -5 \text{ A}/\mu\text{s}$, $T_{Vj} = 140 \text{ }^\circ\text{C}$, $I_F = 40 \text{ A}$, $V_R \geq 100 \text{ V}$	Q_{rr}	-	-	200	μAs
Insulation test voltage (RMS), $f = 50 \text{ Hz}$, $t = 1\text{sec}/1\text{min}$	V_{isol}	-	-	3600/3000	V
THERMAL PARAMETERS					
Thermal resistance junction to case, per diode per module	R_{thjc}	-	-	0,68 0,34	$^\circ\text{C/W}$
Thermal resistance case to heatsink, per diode per module	R_{thch}	-	-	0,2 0,1	
MECHANICAL PARAMETERS					
Weight	w	-	0,2	-	kg
Terminal connection torque	M_t	2,5	-	3,5	Nm
Heatsink mounting torque	M_s	4	-	6	
Maximum acceleration (at nominal mounting force)	a	-	-	50	m/s ²

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forward characteristics model

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

Valid for $I_F = 20 - 250$ A

	$T_{Vj} = 140$ °C	$T_{Vj} = 25$ °C
A	0.749	0.985
B	0.002977	0.001418
C	0.063	0.022
D	0.006289	0.007293

Fig. 1. Maximum forward characteristics
(Limit device, 10 ms, half sine)

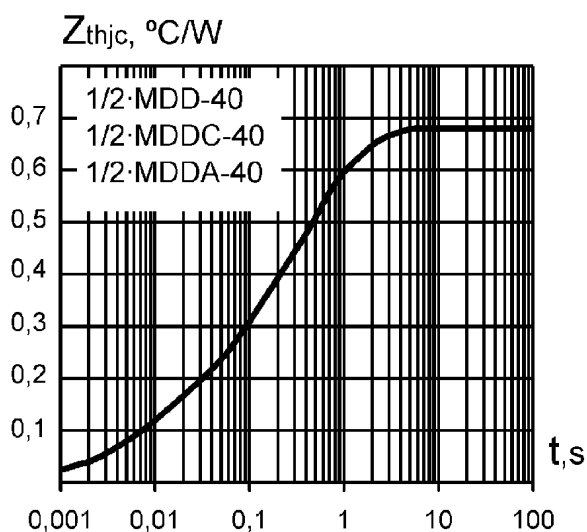


Fig. 2. Transient thermal impedance junction to case (DC)

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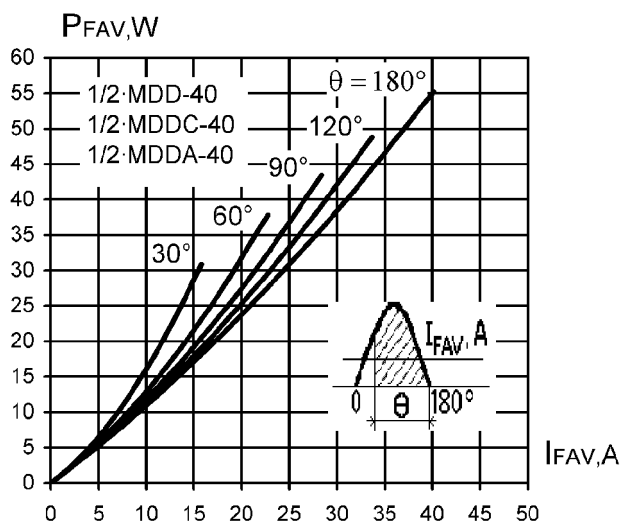


Fig. 3. Power loss vs. forward current
(sine)

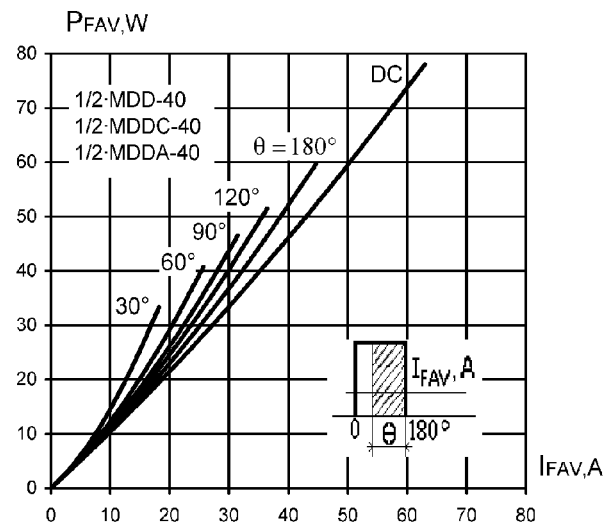


Fig. 4. Power loss vs. forward current
(rectangular)

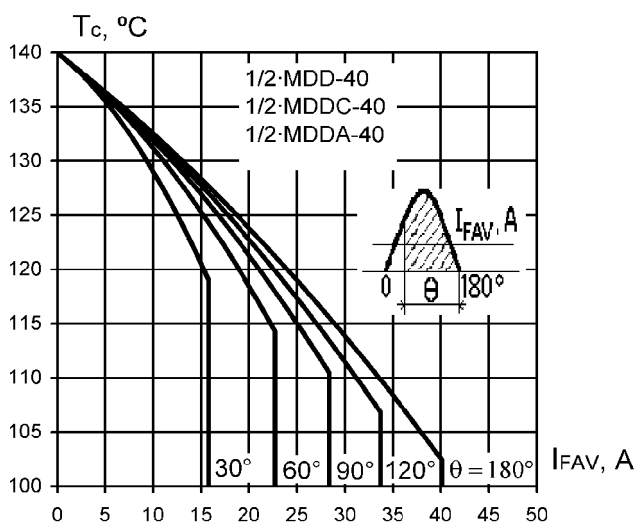


Fig. 5. Maximum allowable case temperature vs.
forward current
(sine)

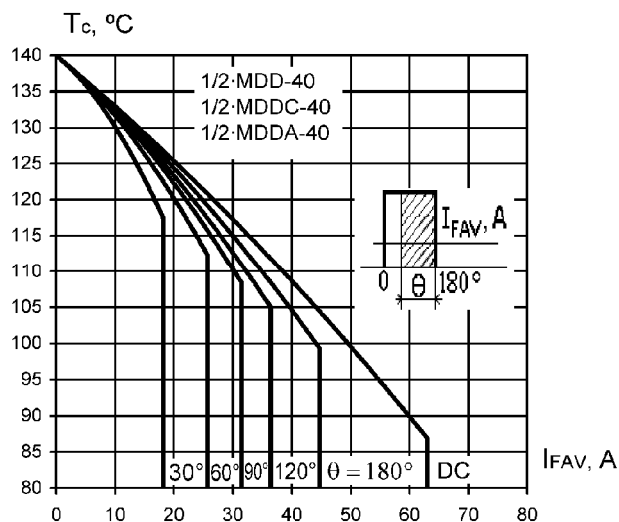


Fig. 6. Maximum allowable case temperature vs.
forward current
(rectangular)

MDD-40, MDDC-40, MDDA-40

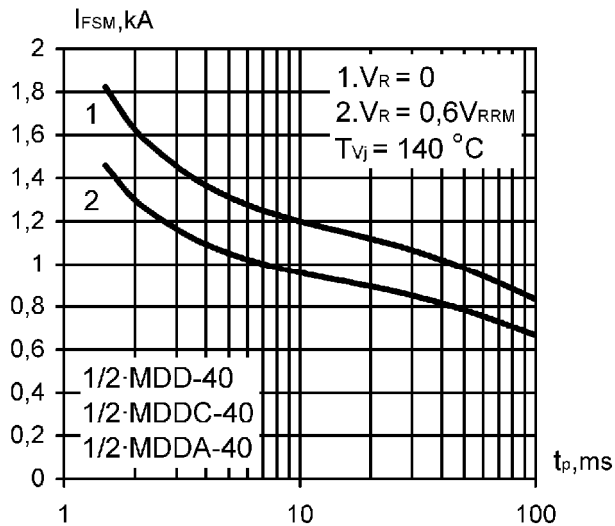


Fig. 7. Surge current vs. pulse length
(half-sine)

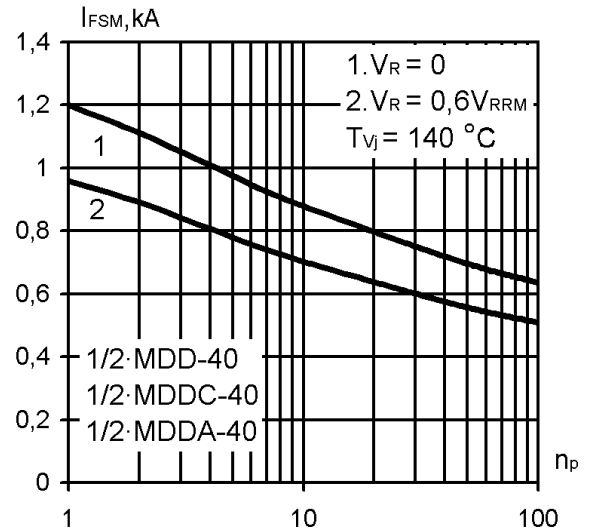


Fig. 8. Surge current vs. number of pulses
(half-sine, 10 ms, 50 Hz)

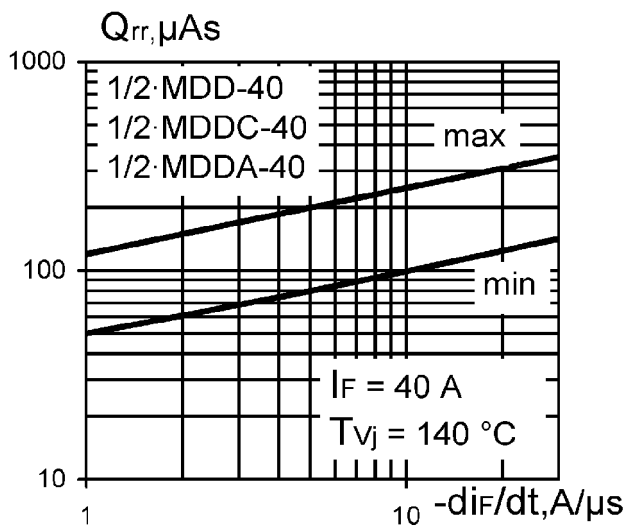


Fig. 9. Recovery charge vs. decay rate current

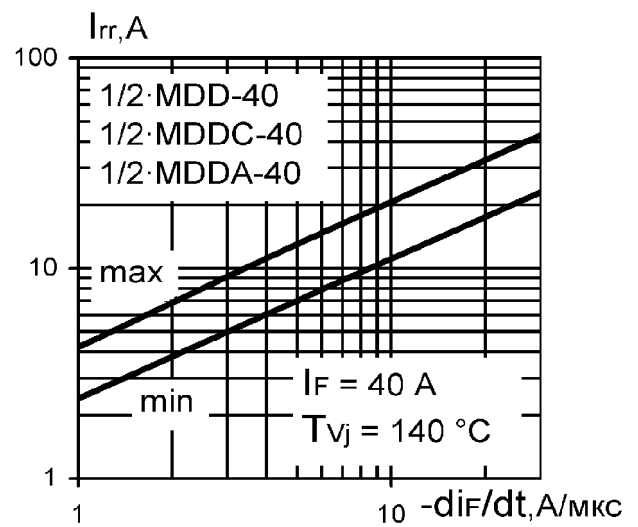


Fig. 10. Peak reverse recovery current vs.
decay rate current

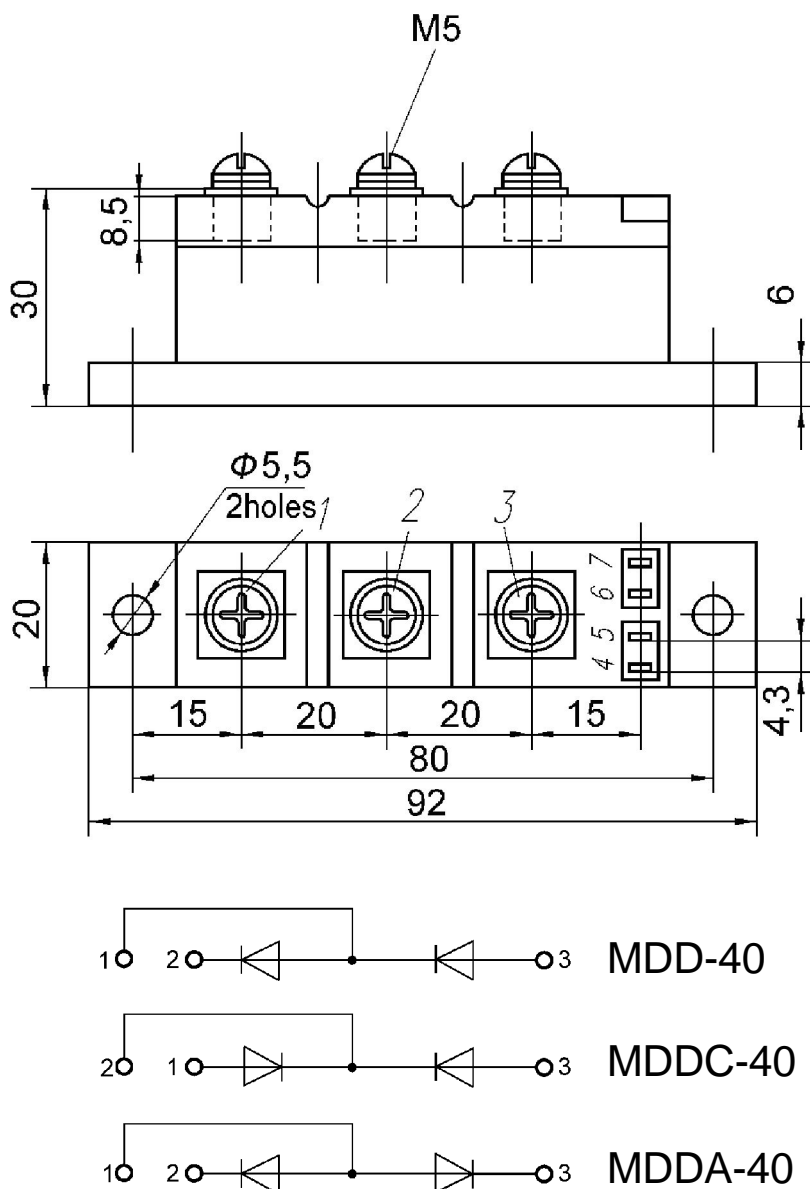
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Fig. 11. Device Outline Drawing
(dimensions in mm)

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