

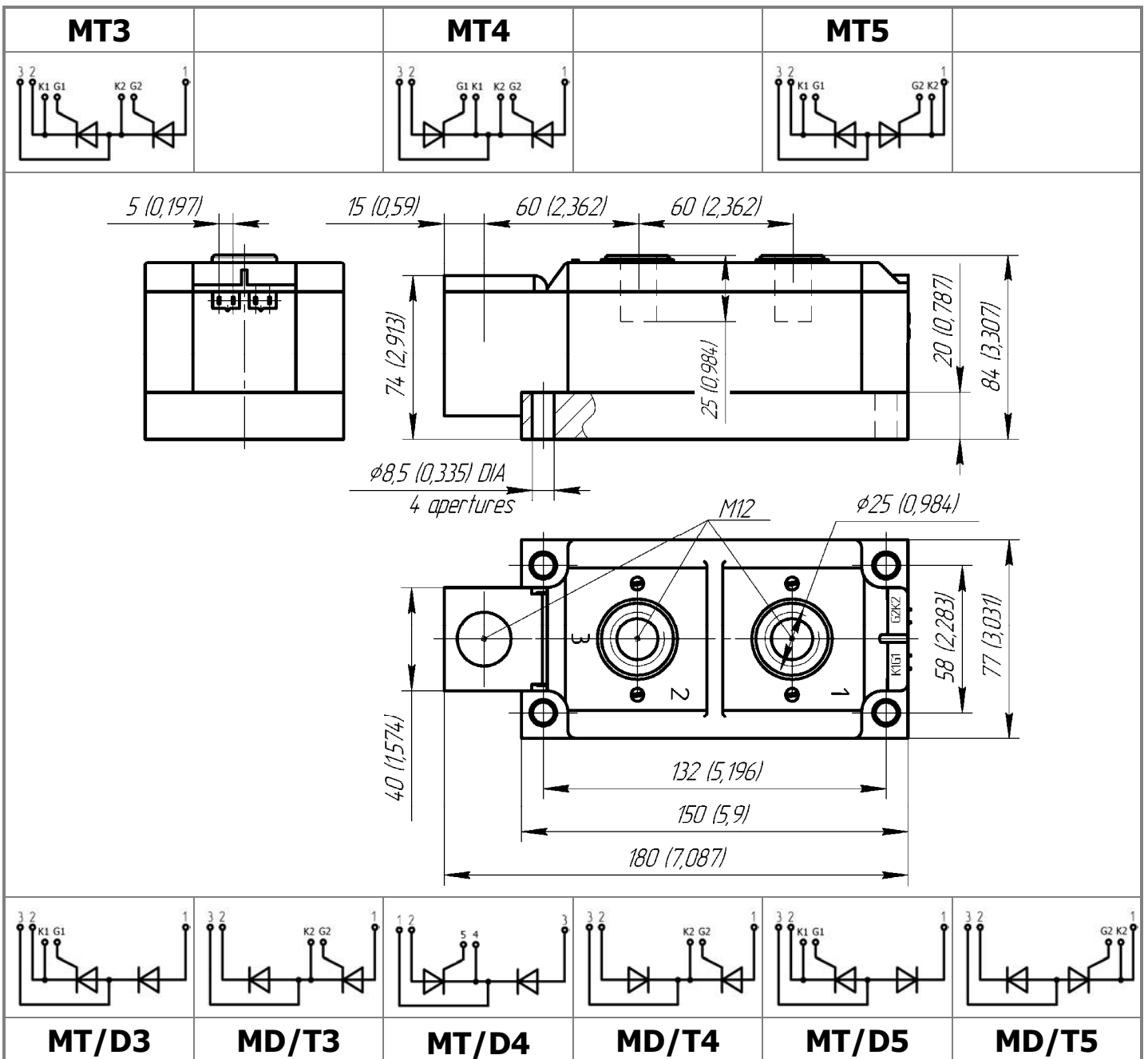


Thyristor / Diode Modules

MT/Dx-400-44-D, MD/Tx-400-44-D



Mean on-state current	I_{TAV}		400 A	
Repetitive peak off-state voltage	V_{DRM}		3800 ÷ 4400 V	
Repetitive peak reverse voltage	V_{RRM}			
Turn-off time	t_q		500 μ s	
V_{DRM}, V_{RRM}, V	3800	4000	4200	4400
Voltage code	38	40	42	44
$T_{jv}, ^\circ C$	- 40 ÷ 125			



MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions
ON-STATE				
I_{TAV}	Mean on-state current	A	400	$T_c=88\text{ }^\circ\text{C}$; 180° half-sine wave; 50 Hz
I_{TRMS}	RMS on-state current	A	628	
I_{TSM}	Surge on-state current	kA	14.0 16.0	$T_j=T_{j\text{ max}}$ $T_j=25\text{ }^\circ\text{C}$ 180° half-sine wave; 50 Hz ($t_p=10\text{ ms}$); single pulse; $V_D=V_R=0\text{ V}$; Gate pulse: $I_G=2\text{ A}$; $t_{GP}=50\text{ }\mu\text{s}$; $di_G/dt\geq 1\text{ A}/\mu\text{s}$
			15.0 17.0	$T_j=T_{j\text{ max}}$ $T_j=25\text{ }^\circ\text{C}$ 180° half-sine wave; 60 Hz ($t_p=8.3\text{ ms}$); single pulse; $V_D=V_R=0\text{ V}$; Gate pulse: $I_G=2\text{ A}$; $t_{GP}=50\text{ }\mu\text{s}$; $di_G/dt\geq 1\text{ A}/\mu\text{s}$
I^2t	Safety factor	$A^2s\cdot 10^3$	980 1280	$T_j=T_{j\text{ max}}$ $T_j=25\text{ }^\circ\text{C}$ 180° half-sine wave; 50 Hz ($t_p=10\text{ ms}$); single pulse; $V_D=V_R=0\text{ V}$; Gate pulse: $I_G=2\text{ A}$; $t_{GP}=50\text{ }\mu\text{s}$; $di_G/dt\geq 1\text{ A}/\mu\text{s}$
			930 1195	$T_j=T_{j\text{ max}}$ $T_j=25\text{ }^\circ\text{C}$ 180° half-sine wave; 60 Hz ($t_p=8.3\text{ ms}$); single pulse; $V_D=V_R=0\text{ V}$; Gate pulse: $I_G=2\text{ A}$; $t_{GP}=50\text{ }\mu\text{s}$; $di_G/dt\geq 1\text{ A}/\mu\text{s}$
BLOCKING				
V_{DRM}, V_{RRM}	Repetitive peak off-state and Repetitive peak reverse voltages	V	3800÷4400	$T_{j\text{ min}} < T_j < T_{j\text{ max}}$; 180° half-sine wave; 50 Hz; Gate open
V_{DSM}, V_{RSM}	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	3900÷4500	$T_{j\text{ min}} < T_j < T_{j\text{ max}}$; 180° half-sine wave; 50 Hz; single pulse; Gate open
V_D, V_R	Direct off-state and Direct reverse voltages	V	$0.75\cdot V_{DRM}$ $0.75\cdot V_{RRM}$	$T_j=T_{j\text{ max}}$; Gate open
TRIGGERING				
I_{FGM}	Peak forward gate current	A	8	$T_j=T_{j\text{ max}}$
V_{RGM}	Peak reverse gate voltage	V	5	
P_G	Gate power dissipation	W	4	$T_j=T_{j\text{ max}}$ for DC gate current
SWITCHING				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current non-repetitive ($f=1\text{ Hz}$)	$A/\mu\text{s}$	630	$T_j=T_{j\text{ max}}$; $V_D=0.67\cdot V_{DRM}$; $I_{TM}=2\text{ }I_{TAV}$; Gate pulse: $I_G=2\text{ A}$; $t_{GP}=50\text{ }\mu\text{s}$; $di_G/dt\geq 1\text{ A}/\mu\text{s}$
THERMAL				
T_{stg}	Storage temperature	$^\circ\text{C}$	-40 ÷ 125	
T_j	Operating junction temperature	$^\circ\text{C}$	-40 ÷ 125	
MECHANICAL				
a	Acceleration under vibration	m/s^2	50	

CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
ON-STATE					
V_{TM}	Peak on-state voltage, max	V	2.70	$T_j=25\text{ }^\circ\text{C}; I_{TM}=2512\text{ A}$	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.20	$T_j=T_{j\text{ max}};$	
r_T	On-state slope resistance, max	m Ω	0.650	$0.5\pi I_{TAV} < I_T < 1.5\pi I_{TAV}$	
I_L	Latching current, max	mA	1500	$T_j=25\text{ }^\circ\text{C}; V_D=12\text{ V};$ Gate pulse: $I_G=2\text{ A};$ $t_{GP}=50\text{ }\mu\text{s}; di_G/dt\geq 1\text{ A}/\mu\text{s}$	
I_H	Holding current, max	mA	300	$T_j=25\text{ }^\circ\text{C};$ $V_D=12\text{ V};$ Gate open	
BLOCKING					
I_{DRM}, I_{RRM}	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	150	$T_j=T_{j\text{ max}};$ $V_D=V_{DRM}; V_R=V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage, min	V/ μs	1000	$T_j=T_{j\text{ max}};$ $V_D=0.67\cdot V_{DRM};$ Gate open	
TRIGGERING					
V_{GT}	Gate trigger direct voltage, max	V	5.00 3.00 2.00	$T_j= T_{j\text{ min}}$ $T_j=25\text{ }^\circ\text{C}$ $T_j= T_{j\text{ max}}$	$V_D=12\text{ V}; I_D=3\text{ A};$ Direct gate current
I_{GT}	Gate trigger direct current, max	mA	500 300 200	$T_j= T_{j\text{ min}}$ $T_j= 25\text{ }^\circ\text{C}$ $T_j= T_{j\text{ max}}$	
V_{GD}	Gate non-trigger direct voltage, min	V	0.35	$T_j=T_{j\text{ max}};$ $V_D=0.67\cdot V_{DRM};$	
I_{GD}	Gate non-trigger direct current, min	mA	15.00	Direct gate current	
SWITCHING					
t_{gd}	Delay time	μs	3.50	$T_j=25\text{ }^\circ\text{C}; V_D=0.4\cdot V_{DRM}; I_{TM}=I_{TAV};$ Gate pulse: $I_G=2\text{ A};$ $t_{GP}=50\text{ }\mu\text{s}; di_G/dt\geq 1\text{ A}/\mu\text{s}$	
t_q	Turn-off time, max	μs	500	$dv_D/dt=50\text{ V}/\mu\text{s}; T_j=T_{j\text{ max}}; I_{TM}= I_{TAV};$ $di_R/dt=-10\text{ A}/\mu\text{s}; V_R=100\text{V};$ $V_D=0.67\text{ }V_{DRM};$	
THERMAL					
R_{thjc}	Thermal resistance, junction to case			180° half-sine wave, 50 Hz	
	per module	$^\circ\text{C}/\text{W}$	0.0250		
	per arm	$^\circ\text{C}/\text{W}$	0.0500		
R_{thch}	Thermal resistance, case to heatsink				
	per module	$^\circ\text{C}/\text{W}$	0.0080		
	per arm	$^\circ\text{C}/\text{W}$	0.0160		
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 (M8) ¹⁾	Nm	9.00	Tolerance $\pm 15\%$	
M_2	Terminal connection torque (M12) ¹⁾	Nm	18.00	Tolerance $\pm 15\%$	
w	Weight	g	3500		

PART NUMBERING GUIDE	NOTES
<p>MT 3 - 400 - 44 - D - N 1 2 3 4 5 6</p> <p>1. Thyristor module (MT) Thyristor – Diode module (MT/D) Diode – Thyristor module (MD/T)</p> <p>2. Circuit Schematic: 3 – serial connection 4 – common Cathode 5 – common Anode</p> <p>3. Average On-state Current, A</p> <p>4. Voltage Code</p> <p>5. Package Type (M.D)</p> <p>6. Ambient Conditions: N – Normal</p>	<p>¹⁾ The screws must be lubricated</p>