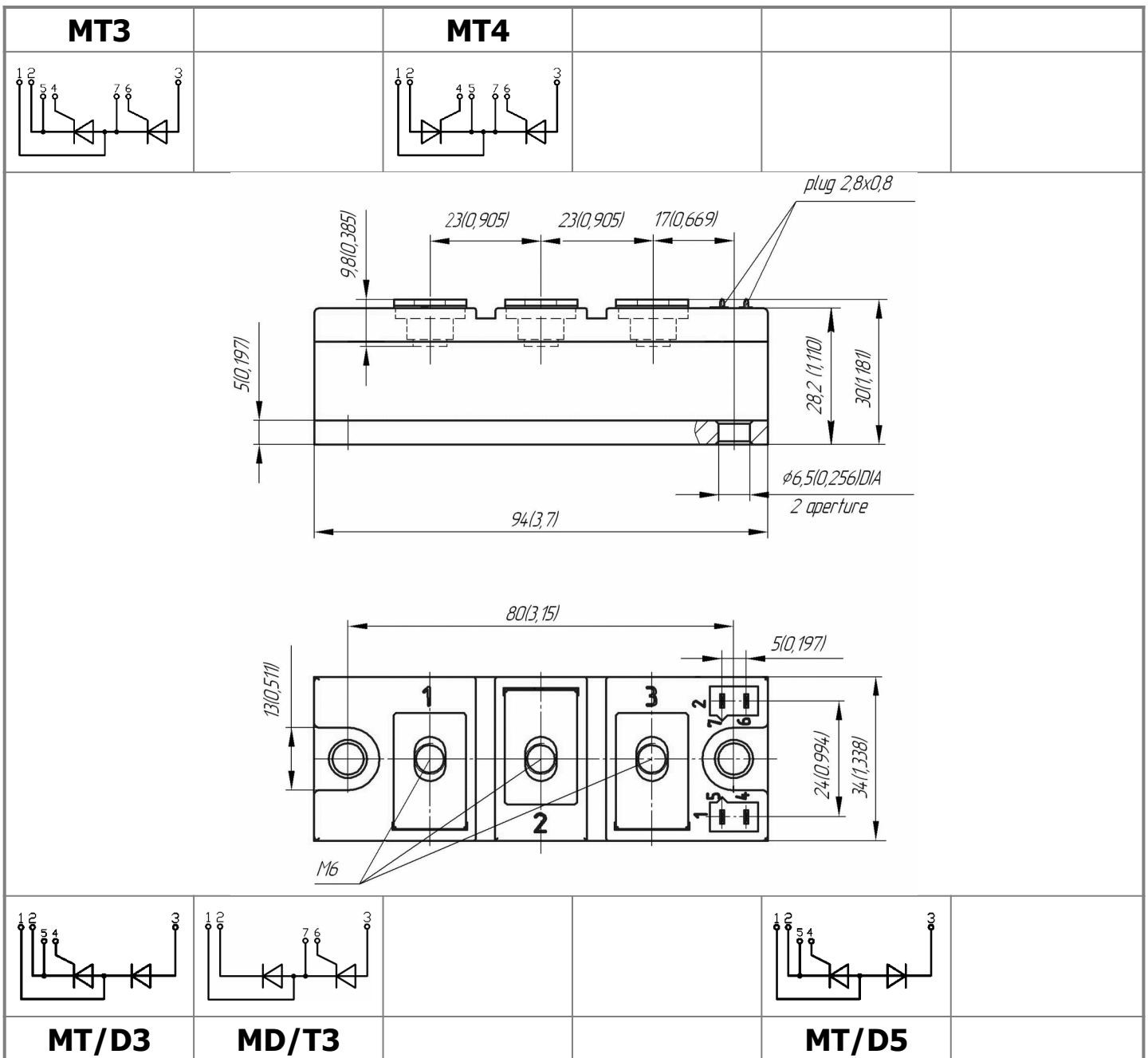


Electrically isolated base plate  
 Industrial standard package  
 Simplified mechanical design, rapid assembly  
 Pressure contact

# Double Thyristor Module For Phase Control MTx-115-36-F

Mean on-state current	$I_{TAV}$		115 A	
Repetitive peak off-state voltage	$V_{DRM}$		3000 ÷ 3600 V	
Repetitive peak reverse voltage	$V_{RRM}$			
Turn-off time	$t_q$		400 $\mu$ s	
$V_{DRM}, V_{RRM}, V$	3000	3200	3400	3600
Voltage code	30	32	34	36
$T_j, ^\circ C$	- 40 ÷ 125			



## MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions
<b>ON-STATE</b>				
$I_{TAV}$	Mean on-state current	A	115	$T_c = 85\text{ }^\circ\text{C}$ ; 180° half-sine wave; 50 Hz
$I_{TRMS}$	RMS on-state current	A	180	
$I_{TSM}$	Surge on-state current	kA	2.5 3.0	$T_j = T_{j\max}$ $T_j = 25\text{ }^\circ\text{C}$ 180° half-sine wave; $t_p = 10\text{ ms}$ ; single pulse; $V_D = V_R = 0\text{ V}$ ; Gate pulse: $I_G = 2\text{ A}$ ; $t_{GP} = 50\text{ }\mu\text{s}$ ; $di_G/dt \geq 1\text{ A}/\mu\text{s}$
			2.5 3.0	$T_j = T_{j\max}$ $T_j = 25\text{ }^\circ\text{C}$ 180° half-sine wave; $t_p = 8.3\text{ ms}$ ; single pulse; $V_D = V_R = 0\text{ V}$ ; 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	$A^2s \cdot 10^3$	30 40	$T_j = T_{j\max}$ $T_j = 25\text{ }^\circ\text{C}$ 180° half-sine wave; $t_p = 10\text{ ms}$ ; single pulse; $V_D = V_R = 0\text{ V}$ ; Gate pulse: $I_G = 2\text{ A}$ ; $t_{GP} = 50\text{ }\mu\text{s}$ ; $di_G/dt \geq 1\text{ A}/\mu\text{s}$
			20 30	$T_j = T_{j\max}$ $T_j = 25\text{ }^\circ\text{C}$ 180° half-sine wave; $t_p = 8.3\text{ ms}$ ; single pulse; $V_D = V_R = 0\text{ V}$ ; Gate pulse: $I_G = 2\text{ A}$ ; $t_{GP} = 50\text{ }\mu\text{s}$ ; $di_G/dt \geq 1\text{ A}/\mu\text{s}$
<b>BLOCKING</b>				
$V_{DRM}, V_{RRM}$	Repetitive peak off-state and Repetitive peak reverse voltages	V	3000÷3600	$T_{j\min} < T_j < T_{j\max}$ ; 180° half-sine wave; 50 Hz; Gate open
$V_{DSM}, V_{RSM}$	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	3100÷3700	$T_{j\min} < T_j < T_{j\max}$ ; 180° half-sine wave; single pulse; Gate open
$V_D, V_R$	Direct off-state and Direct reverse voltages	V	$0.6 \cdot V_{DRM}$ $0.6 \cdot V_{RRM}$	$T_j = T_{j\max}$ ; Gate open
<b>TRIGGERING</b>				
$I_{FGM}$	Peak forward gate current	A	5	$T_j = T_{j\max}$
$V_{RGM}$	Peak reverse gate voltage	V	5	
$P_G$	Gate power dissipation	W	3	$T_j = T_{j\max}$ for DC gate current
<b>SWITCHING</b>				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current non-repetitive ( $f = 1\text{ Hz}$ )	$A/\mu\text{s}$	200	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; $I_{TM} = 2 I_{TAV}$ ; Gate pulse: $I_G = 2\text{ A}$ ; $t_{GP} = 50\text{ }\mu\text{s}$ ; $di_G/dt \geq 2\text{ A}/\mu\text{s}$
<b>THERMAL</b>				
$T_{stg}$	Storage temperature	$^\circ\text{C}$	-40 ÷ 50	
$T_j$	Operating junction temperature	$^\circ\text{C}$	-40 ÷ 125	
$T_{c\text{ op}}$	Operating temperature	$^\circ\text{C}$	-40 ÷ 125	
<b>MECHANICAL</b>				
a	Acceleration under vibration	$\text{m/s}^2$	50	

## CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
<b>ON-STATE</b>					
$V_{TM}$	Peak on-state voltage, max	V	2.45	$T_j=25\text{ }^\circ\text{C}; I_{TM}=500\text{ A}$	
$V_{T(TO)}$	On-state threshold voltage, max	V	0.95	$T_j=T_{j\text{ max}};$	
$r_T$	On-state slope resistance, max	m $\Omega$	3.000	$0.5\pi I_{TAV} < I_T < 1.5\pi I_{TAV}$	
$I_L$	Latching current, max	mA	500	$T_j=25\text{ }^\circ\text{C}; V_D=12\text{ V};$ 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	250	$T_j=25\text{ }^\circ\text{C};$ $V_D=12\text{ V};$ Gate open	
<b>BLOCKING</b>					
$I_{DRM}, I_{RRM}$	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	70	$T_j=T_{j\text{ max}};$ $V_D=V_{DRM}; V_R=V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage <sup>1)</sup> , min	V/ $\mu\text{s}$	1000	$T_j=T_{j\text{ max}};$ $V_D=0.67\cdot V_{DRM};$ Gate open	
<b>TRIGGERING</b>					
$V_{GT}$	Gate trigger direct voltage, max	V	4.00 2.50 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	400 250 200	$T_j=T_{j\text{ min}}$ $T_j=25\text{ }^\circ\text{C}$ $T_j=T_{j\text{ max}}$	
$V_{GD}$	Gate non-trigger direct voltage, min	V	0.25	$T_j=T_{j\text{ max}};$ $V_D=0.67\cdot V_{DRM};$	
$I_{GD}$	Gate non-trigger direct current, min	mA	10.00	Direct gate current	
<b>SWITCHING</b>					
$t_{gd}$	Delay time	$\mu\text{s}$	3.00	$T_j=25\text{ }^\circ\text{C}; V_D=1500\text{ V}; I_{TM}=I_{TAV};$ $di/dt=200\text{ A}/\mu\text{s};$ Gate pulse: $I_G=2\text{ A}; V_G=20\text{ V};$ $t_{GP}=50\text{ }\mu\text{s}; di_G/dt=2\text{ A}/\mu\text{s}$	
$t_q$	Turn-off time <sup>2)</sup> , max	$\mu\text{s}$	400	$dv_D/dt=50\text{ V}/\mu\text{s}; T_j=T_{j\text{ max}}; I_{TM}=200\text{ A};$ $di_R/dt=-10\text{ A}/\mu\text{s}; V_R=100\text{ V};$ $V_D=0.67 V_{DRM};$	
<b>THERMAL</b>					
$R_{thjc}$	Thermal resistance, junction to case				
	per module	$^\circ\text{C}/\text{W}$	0.0950	180° half-sine wave, 50 Hz	
	per arm	$^\circ\text{C}/\text{W}$	0.1900		
	per module	$^\circ\text{C}/\text{W}$	0.0900	DC	
per arm	$^\circ\text{C}/\text{W}$	0.1800			
$R_{thch}$	Thermal resistance, case to heatsink				
	per module	$^\circ\text{C}/\text{W}$	0.0300		
	per arm	$^\circ\text{C}/\text{W}$	0.0600		
<b>INSULATION</b>					
$V_{ISOL}$	Insulation test voltage	kV	3.00	Sine wave, 50 Hz;	t=60 sec
			3.60	RMS	t=1 sec
<b>MECHANICAL</b>					
$M_1$	Mounting torque (M6) <sup>3)</sup>	Nm	6.00	Tolerance $\pm 15\%$	
$M_2$	Terminal connection torque (M6) <sup>3)</sup>	Nm	6.00	Tolerance $\pm 15\%$	
w	Weight, max	g	350		

**PART NUMBERING GUIDE**

MT	3	-	115	-	36	-	A2	H2	-	F	-	N
1	2		3		4		5	6		7		8

1. Thyristor module (MT)  
Thyristor – Diode module (MT/D)  
Diode – Thyristor module (MD/T)
2. Circuit Schematic:
3. Average On-state Current, A
4. Voltage Code
5. Critical rate of rise of off-state voltage
6. Group of turn-off time ( $dv_D/dt=50\text{ V}/\mu\text{s}$ )
7. Package Type (M.F)
8. Ambient Conditions:  
N – Normal

**NOTES**

<sup>1)</sup> Critical rate of rise of off-state voltage

Symbol of group	A2
$(dv_D/dt)_{crit}, \text{ V}/\mu\text{s}$	1000

<sup>2)</sup> Turn-off time ( $dv_D/dt=50\text{ V}/\mu\text{s}$ )

Symbol of group	H2
$t_{qr}, \mu\text{s}$	400

<sup>3)</sup> The screws must be lubricated



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