



**TET ESTEL AS**  
ESTONIA

**October**  
**2014**

**Series**  
**T161-160**

**Phase Control Stud Mounted Thyristor**  
**Type T161-160**

Center amplifying gate  
Low on-state and switching losses  
Designed for traction and industrial applications

Maximum mean on-state current	$I_{TAV}$	<b>160 A</b>									
Maximum repetitive peak off-state and reverse voltage	$U_{DRM}$	<b>800 ÷ 1800 V</b>									
Turn-off time	$U_{RRM}$	<b>100; 125; 160; 250 μs</b>									
$U_{DRM}, U_{RRM}, V$		800	900	1000	1100	1200	1300	1400	1500	1600	1800
Voltage code		8	9	10	11	12	13	14	15	16	18
$T_{vj}, °C$		- 60 ÷ 125									

**MAXIMUM ALLOWABLE RATINGS**

Symbols and parameters		Units	T161-160	Conditions
$I_{TAV}$	Mean on-state current	A	160 210	$T_c=87 °C$ , $T_c=70 °C$ 180° half-sine wave, 50 Hz
$I_{TRMS}$	RMS on-state current	A	251	$T_c=87 °C$
$I_{TSM}$	Surge on-state current	kA	4,5 5,0	$T_{vj}=125 °C$ $T_{vj}=25 °C$ tp=10 ms $U_R=0$
$I^2t$	Limiting load integral	kA <sup>2</sup> s	101 125	$T_{vj}=125 °C$ $T_{vj}=25 °C$
$U_{DRM}, U_{RRM}$	Repetitive peak off-state and reverse voltage	V	800÷1800	$T_j \min \leq T_{vj} \leq T_{jM}$ 180° half-sine wave, 50 Hz Gate open
$U_{DSM}, U_{RSM}$	Non-repetitive peak off-state and reverse voltage	V	900÷1900	$T_j \min \leq T_{vj} \leq T_{jM}$ 180° half-sine wave tp=10 ms, Single pulse Gate open
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current : non - repetitive repetitive	A/μs	250 125	$T_{vj}=125 °C$ ; $U_D=0,67 U_{DRM}$ , Gate pulse : 10V, 5 Ω, 1 μs rise time, 10 μs
$U_{RGM}$	Peak reverse gate voltage	V	5	$T_j \min \leq T_{vj} \leq T_{jM}$
$T_{stg}$	Storage temperature	°C	-60÷80	
$T_{vj}$	Junction temperature	°C	-60÷125	

**CHARACTERISTICS**

$U_{TM}$	Peak on-state voltage	V	1,7	$T_{vj}=25 °C$ , $I_{TM}=3,14 I_{TAV}$
$U_{T(TO)}$	Threshold voltage	V	1,03	$T_{vj}=125 °C$
$R_T$	On-state slope resistance	mΩ	1,38	1,57 $I_{TAV} < I_T < 4,71 I_{TAV}$
$I_{DRM}$ $I_{RRM}$	Repetitive peak off-state and reverse current	mA	20 20	$T_{vj}=125 °C$ , $U_D = U_{DRM}$ $U_R = U_{RRM}$

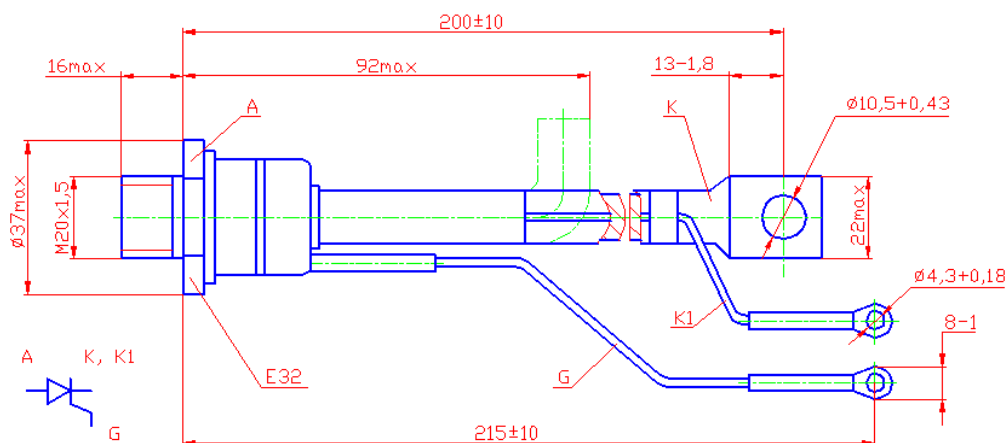
## CHARACTERISTICS

Symbols and parameters		Units	T161-160	Conditions
$I_L$	Latching current	A	0,5	$T_{vj}=25^{\circ}\text{C}, U_D=12\text{V}$ Gate pulse : 10V, 5 $\Omega$ , 1 $\mu\text{s}$ rise time, 10 $\mu\text{s}$
$I_H$	Holding current	A	0,25	$T_{vj}=25^{\circ}\text{C}, U_D=12\text{V}$ , Gate open
$U_{GT}$	Gate trigger direct voltage	V	2,5 5,0	$T_{vj}=25^{\circ}\text{C}$ , $T_{vj}=-60^{\circ}\text{C}$ <span style="float: right;"><math>U_D=12\text{V}</math></span>
$I_{GT}$	Gate trigger direct current	A	0,3 0,85	$T_{vj}=25^{\circ}\text{C}$ , $T_{vj}=-60^{\circ}\text{C}$
$U_{GD}$	Gate non-trigger direct voltage	V	0,25	$T_{vj}=125^{\circ}\text{C}$ , $U_D = 0,67 U_{DRM}$
$I_{GD}$	Gate non-trigger direct current	mA	10	Direct gate current
$t_{gd}$	Delay time	$\mu\text{s}$	1,6	$T_{vj}=25^{\circ}\text{C}, U_D=500\text{V}$ $I_{TM} = 160\text{ A}$
$t_{gt}$	Turn-on time	$\mu\text{s}$	3,2	Gate pulse : 10V, 5 $\Omega$ , 1 $\mu\text{s}$ rise time, 10 $\mu\text{s}$
$t_q$	Turn-off time	$\mu\text{s}$	100÷250	$T_{vj}=125^{\circ}\text{C}$ , $I_{TM}=160\text{ A}$ $di_R/dt = 10\text{ A}/\mu\text{s}$ , $U_R=100\text{V}$ $U_D = 0,67 U_{DRM}$ $du_D/dt=50\text{ V}/\mu\text{s}$
$Q_{rr}$	Recovered charge	$\mu\text{C}$	600	$T_{vj}=125^{\circ}\text{C}$ , $I_{TM}=160\text{ A}$ $di_R/dt = 10\text{ A}/\mu\text{s}$ , $U_R=100\text{V}$
$t_{rr}$	Reverse recovery time	$\mu\text{s}$	20	
$I_{rrm}$	Peak reverse recovery current	A	60	
$(du_D/dt)_{crit}$	Critical rate of rise of off-state voltage	V/ $\mu\text{s}$	500 1000	$T_{vj}=125^{\circ}\text{C}$ , $U_D = 0,67 U_{DRM}$ Gate open
$R_{thjc}$	Thermal resistance junction to case	$^{\circ}\text{C}/\text{W}$	0,15	Direct current

## ORDERING

	<b>T</b>	<b>161</b>	<b>160</b>	<b>16</b>	<b>7</b>	<b>4</b>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	

1. Phase control thyristor.
2. Design version.
3. Mean on-state current, A.
4. Voltage code (16=1600 V).
5. Critical rate of rise of off-state voltage (6  $\geq$  500 V/ $\mu\text{s}$ , 7  $\geq$  1000 V/ $\mu\text{s}$ ).
6. Group of turn-off time ( $du_D/dt = 50\text{ V}/\mu\text{s}$ , 4  $\leq$  100  $\mu\text{s}$ , X2  $\leq$  125  $\mu\text{s}$ ; 3  $\leq$  160  $\mu\text{s}$ , 2  $\leq$  250  $\mu\text{s}$ ).



Tightening torque : 25 ÷ 35 Nm. Weight : 250 grams.

Thyristors can be supplied in the packages with the framework of M16x1,5 in accordance to the customer.