TK12

PHASE CONTROL THYRISTOR

APPLICATIONS

- High Power Drives.
- High Voltage Power Supplies.
- DC Motor Control.
- Welding.
- Battery Chargers.

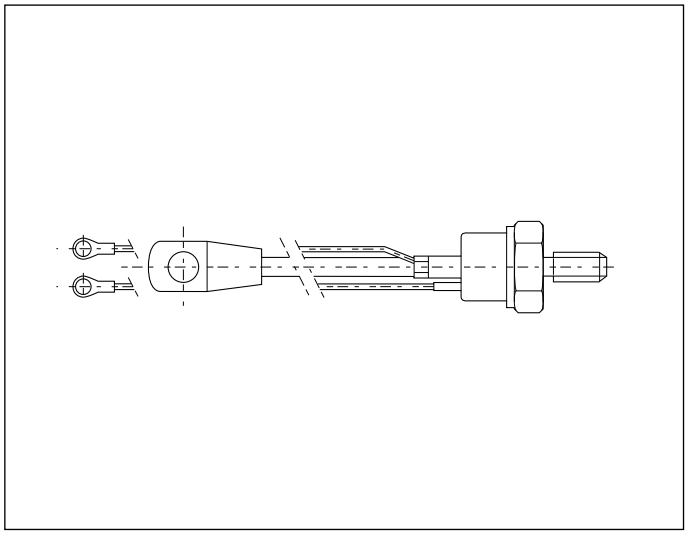
KEY PARAMETERS

V_{DRM}	2000V
$I_{T(AV)}$	75A
I_{TSM}	1400A
dVdt*	200V/μs
dI/dt	500A/μs

***Higher dV/dt selections available**

FEATURES

- High Surge Capability.



Outline type code: TO94 Turn to page 8 for further information.

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
TK12 20 M or K TK12 18 M or K TK12 16 M or K TK12 14 M or K	2000 1800 1600 1400	T_{vj} = 0° to 125°C, I_{DRM} = I_{RRM} = 100mA, V_{DRM}, V_{RRM} t_p = 10ms, V_{DSM} & V_{RSM} = V_{DRM} & V_{RRM} + 100V Respectively

Lower voltage grades available.
For 1/2" 20 UNF thread add K to type number, e.g. TK12 18K.
For M12 thread add M to type number, e.g. TK12 14M.

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, T_{case} = 80°C	75	A
$I_{T(RMS)}$	RMS value	T_{case} = 80°C	120	A
I_T	Continuous (direct) on-state current	T_{case} = 80°C	100	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	1.12	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - 1/4 sine	6.2 x 10^3	A^2s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	1.4	kA
I^2t	I^2t for fusing	V_R = 0	9.8 x 10^3	A^2s

THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions	Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	dc	-	0.24	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Mounting torque 15.0Nm with mounting compound	-	0.08	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)	-	125	°C
		Reverse (blocking)	-	125	°C
T_{stg}	Storage temperature range		-40	150	°C
-	Mounting torque		12.0	15.0	Nm

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Conditions		Min.	Max.	Units
V_{TM}	Maximum on-state voltage	At 150A peak, T_{case} = 25°C		-	2.0	V
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM}, T_{case} = 125°C		-	10	mA
dV/dt	Maximum linear rate of rise of off-state voltage	To 60% V_{DRM} T_j = 125°C, Gate open circuit		-	200	V/µs
dI/dt	Rate of rise of on-state current	Gate source 20V, 20Ω $t_r \leq 0.5\mu s$, T_j = 125˚C	Repetitive 50Hz	-	500	A/µs
			Non-repetitive	-	800	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125°C		-	1.4	V
r_T	On-state slope resistance	At T_{vj} = 125°C		-	4.0	mΩ
t_{gd}	Delay time	V_D = 300V, I_G = 1A, I_T = 50A, dI/dt = 50A/µs, dI_G/dt = 1A/µs, T_j = 25°C		-	1.5	µs
I_L	Latching current	T_j = 25°C, V_D = 12V		-	-	mA
I_H	Holding current	T_j = 25°C, V_D = 12V, I_{TM} = 1A		-	50	mA

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 12V, T_{case} = 25°C, R_L = 6Ω	-	3.0	V
I_{GT}	Gate trigger current	V_{DRM} = 12V, T_{case} = 25°C, R_L = 6Ω	-	125	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} T_{case} = 125°C, R_L = 12Ω	-	0.2	V
V_{FGM}	Peak forward gate voltage	Anode positive with respect to cathode	-	3.0	V
V_{FGN}	Peak forward gate voltage	Anode negative with respect to cathode	-	0.25	V
V_{RGM}	Peak reverse gate voltage		-	5	V
I_{FGM}	Peak forward gate current	Anode positive with respect to cathode	-	4	A
P_{GM}	Peak gate power	-	-	16	W
$P_{G(AV)}$	Mean gate power		-	3	W

CURVES

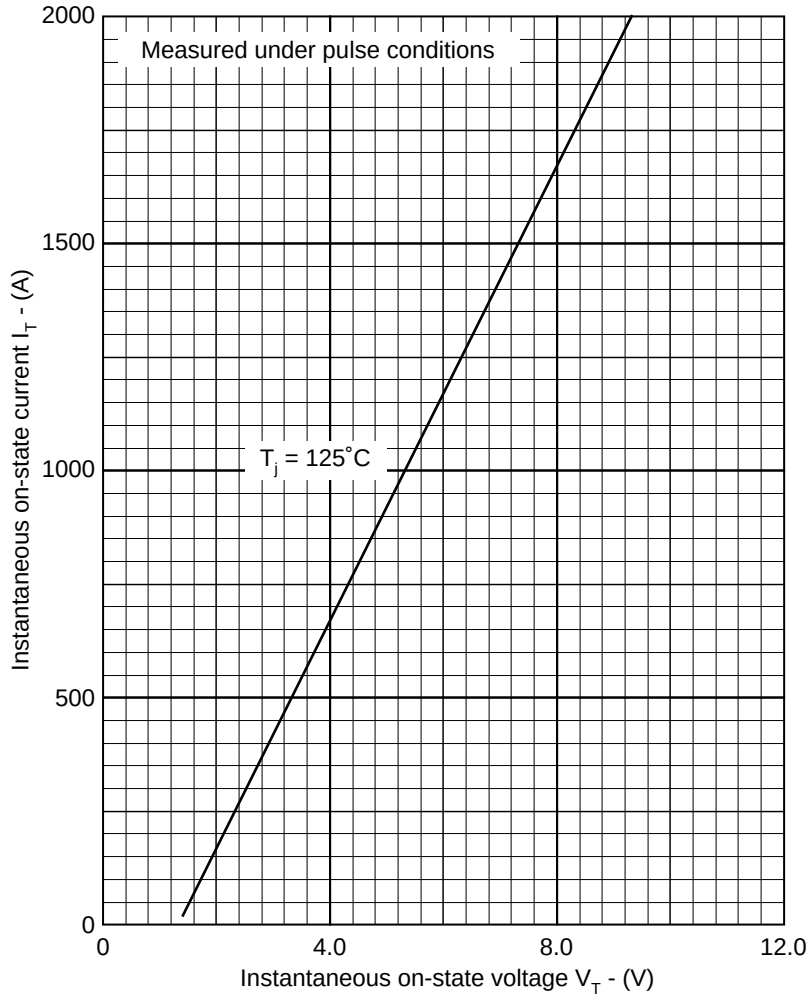
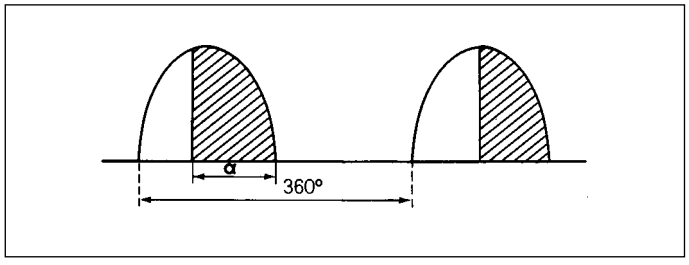
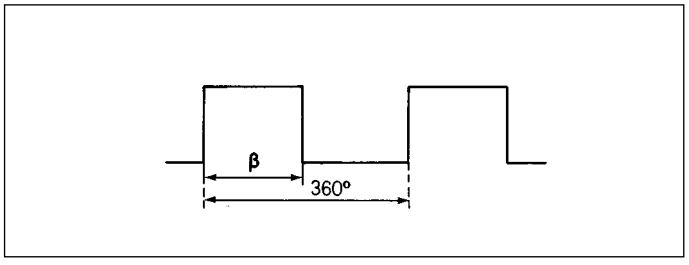


FIG. 1 MAXIMUM (LIMIT) ON-STATE CHARACTERISTICS

SINUSOIDAL CURRENT WAVEFORM



RECTANGULAR CURRENT WAVEFORM



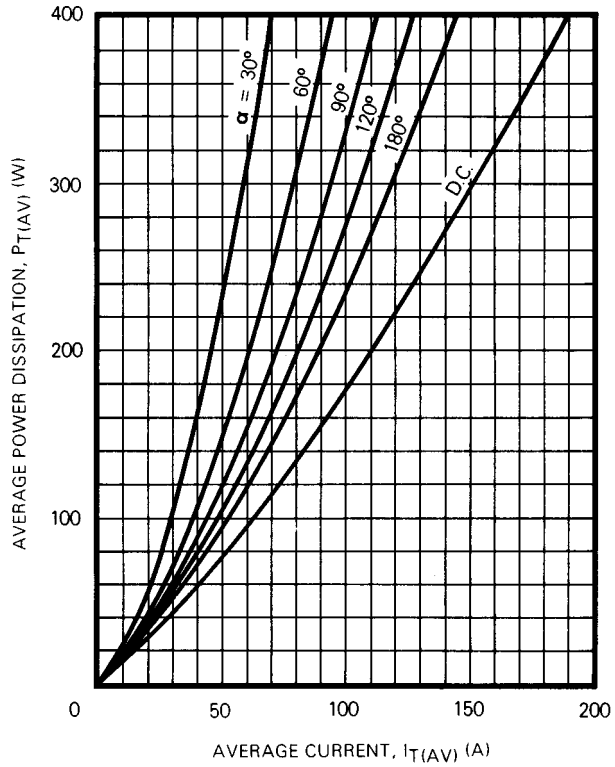


FIG. 2 MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM

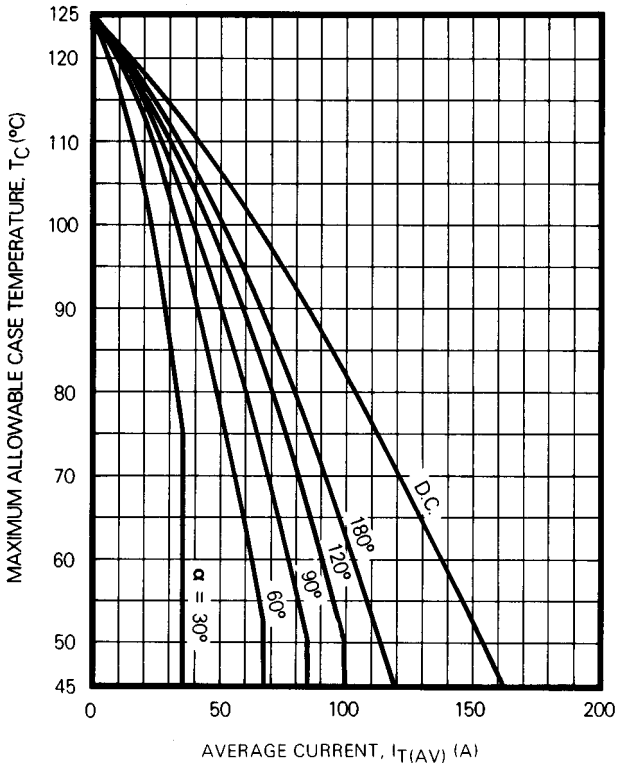


FIG. 3 MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM

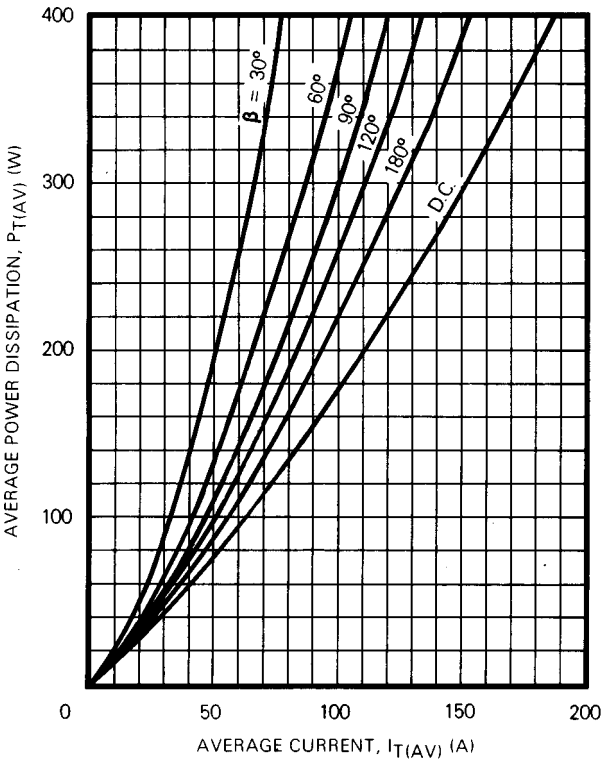


FIG. 4 MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM

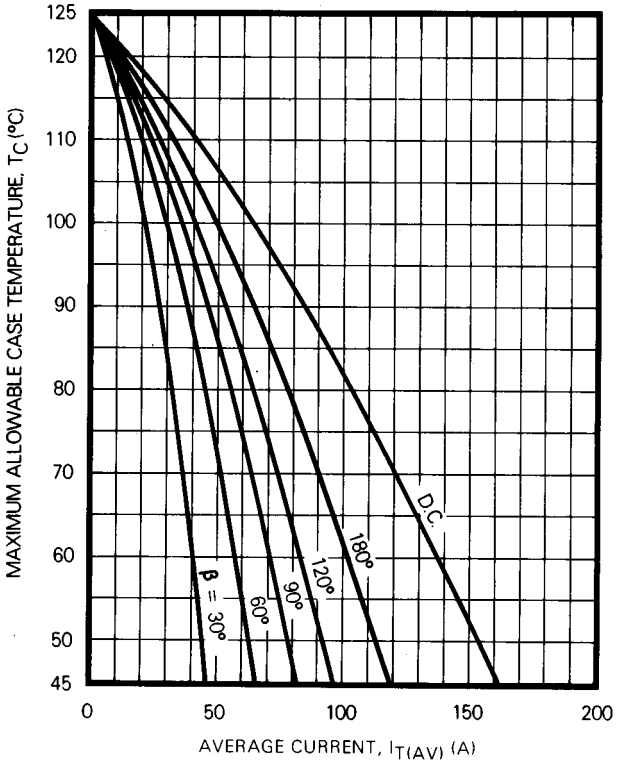


FIG. 5 MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM

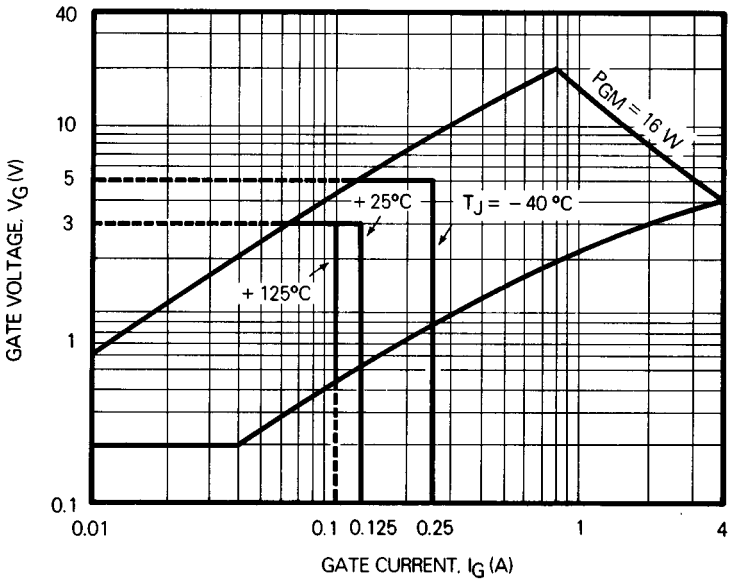
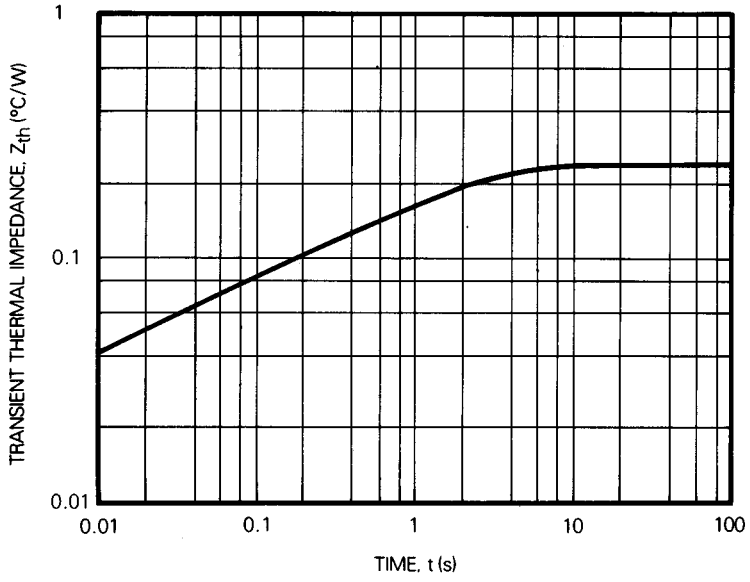


FIG. 6 GATE TRIGGER CHARACTERISTICS



Conduction angle (α,β)	Effective thermal Resistance (°C/W) Junction to case	
	Sinusoïdal	Rectangular
180°	0.259	0.288
120°	0.268	0.324
90°	0.288	0.360
60°	0.312	0.408
30°	0.384	0.480

FIG. 7 TRANSIENT THERMAL IMPEDANCE - JUNCTION TO CASE

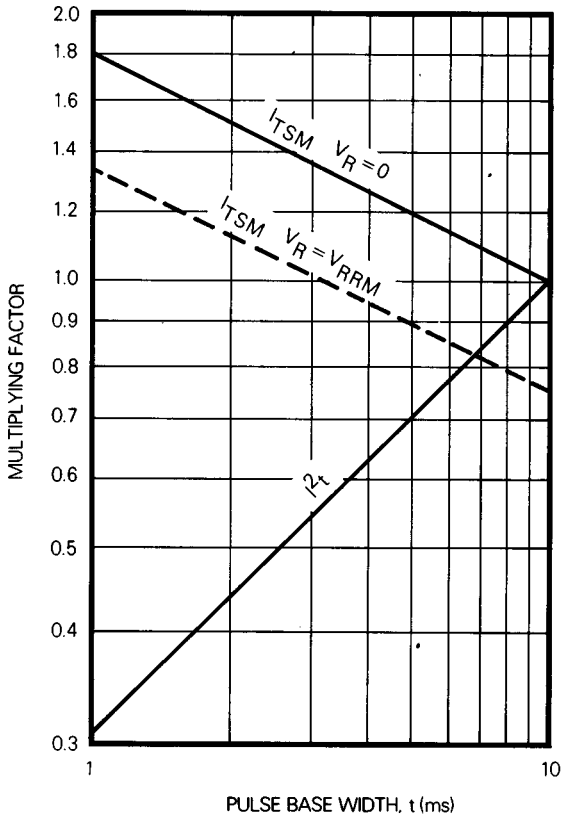


FIG. 8 MULTIPLYING FACTOR FOR NON-REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I2t RATING

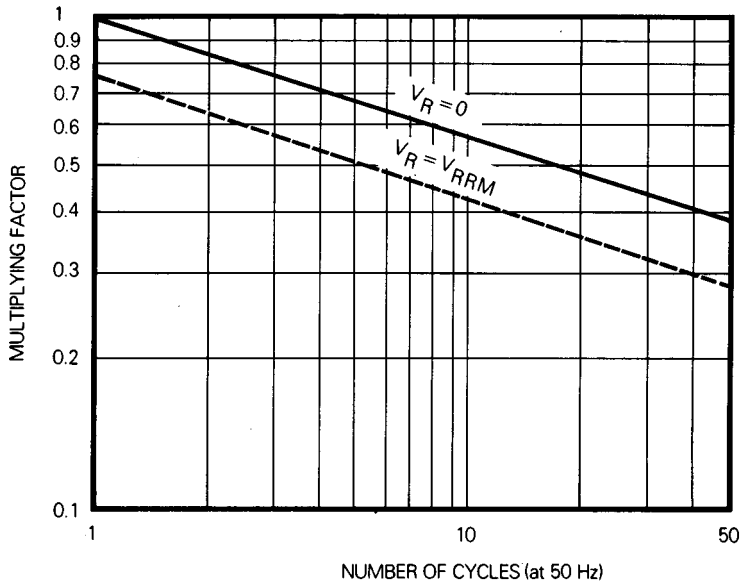
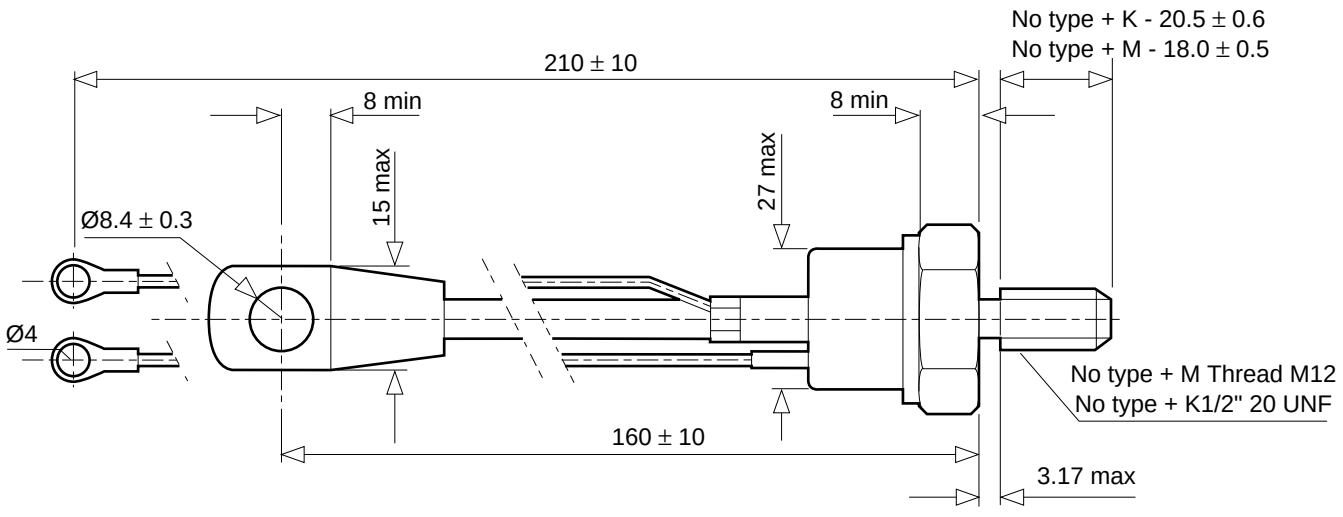


FIG. 9 MULTIPLYING FACTOR FOR NON-REPETITIVE SURGE ON-STATE CURRENT

PACKAGE DETAILS - TO94

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Weight:120g

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