AS ENERGI

Thyristor
AGA 3000-25-J-01

Key Parameters

V_{DRM}	=	2500	V
I_{TGQM}	=	2800	A
I_{TSM}	=	30	kA
V_{T0}	=	1.5	V
r_T	=	0.33	mΩ
V_{Dclink}	=	1400	V

Features

- Patented free-floating silicon technology
- Low on-state and switching losses
- Annular gate electrode
- Industry standard housing
- Cosmic radiation withstand rating

Blocking

Symbols and parameters			Value			Unit
			min	typ	max	
V_{DRM}	Repetitive peak off-state voltage	$V_{GR} \geq 2$ V			2500	V
V_{RRM}	Repetitive peak reverse voltage				17	V
$V_{DC\text{-}link}$	Permanent DC voltage for 100 FIT failure rate	-40 ≤ T_j ≤ 125 °C. Ambient cosmic radiation at sea level in open air.			1400	V
I_{DRM}	Repetitive peak off-state current	$V_D = V_{DRM}$, $V_{GR} \geq 2$ V			100	mA
I_{RRM}	Repetitive peak reverse current	$V_R = V_{RRM}$, $R_{GK} = \infty$			50	mA

Mechanical data

Symbols and parameters			Value			Unit
			min	typ	max	
F_m	Mounting force		36		44	kN
A	Acceleration: Device unclamped Device clamped				 50 200	m/s^2
m	Weight				1.3	kg
D_s	Surface creepage distance		33			mm
D_a	Air strike distance		15			mm

GTO Data

Symbols and parameters				Value			Unit
				min	typ	max	
$I_{T(AV)M}$	Max. average on-state current	Half sine wave, T_C = 85 °C				1300	A
$I_{T(RMS)}$	Max. RMS on-state current					2040	kA
I_{TSM}	Max. peak non-repetitive surge current	t_P = 10 ms t_P = 1 ms	T_j = 125 °C After surge: $V_D = V_R$ = 0V			30 51	kA
I^2t	Limiting load integral	t_P = 10 ms t_P = 1 ms				4.50×10^6 1.30×10^6	A^2s
V_T	On-state voltage	I_T = 3000 A				2.5	V
$V_{(T0)}$	Threshold voltage	I_T= 400-4000 A	T_j = 125 °C			1.5	V
r_T	Slope resistance					0.33	mΩ
I_H	Holding current	T_j = 25°C				100	A

Turn-on switching

Symbols and parameters				Value			Unit
				min	typ	max	
di_T/dt_{cr}	Max. rate of rise of on-state current	I_T = 3000 A, T_j = 125 °C I_{GM} = 30 A, di_G/dt = 20 A/µs	f = 200 Hz			500	A/µs
			f = 1 Hz			1000	A/µs
$t_{on(min)}$	Min. on-time	V_D = 0.5 V_{DRM}, T_{vj}=125 °C I_T = 3000 A, di/dt = 300 A/µs, I_{GM} = 30 A, di_G/dt = 20 A/µs, C_S = 5 µF, R_S = 5 Ω		100			µs
t_d	Delay time					2.5	µs
t_r	Rise time					5.0	µs
E_{on}	Turn-on energy per pulse					2	Ws

Turn-off switching

Symbols and parameters			Value			Unit
			min	typ	max	
I_{TGQM}	Max. controllable turn-off current	$V_{DM} = V_{DRM}$, $di_{GQ}/dt = 40$ A/µs $C_S = 5$ µF, $L_S \leq 0.3$ µH			2800	A
t_{off}	Min. off-time	$V_D = 0.5\ V_{DRM}$, $T_{vj} = 125$ °C, $V_{DM} = V_{DRM}$, $di_{GQ}/dt = 40$ A/µs, $I_{TGQ} = I_{TGQM}$, $R_S = 5\ \Omega$, $C_S = 5$ µF, $L_S \leq 0.3$ µH	100			µs
t_S	Storage time				25	µs
t_f	Fall time				3	µs
E_{off}	Turn-on energy per pulse				4.7	Ws
I_{GQM}	Peak turn-off gate current				1000	A

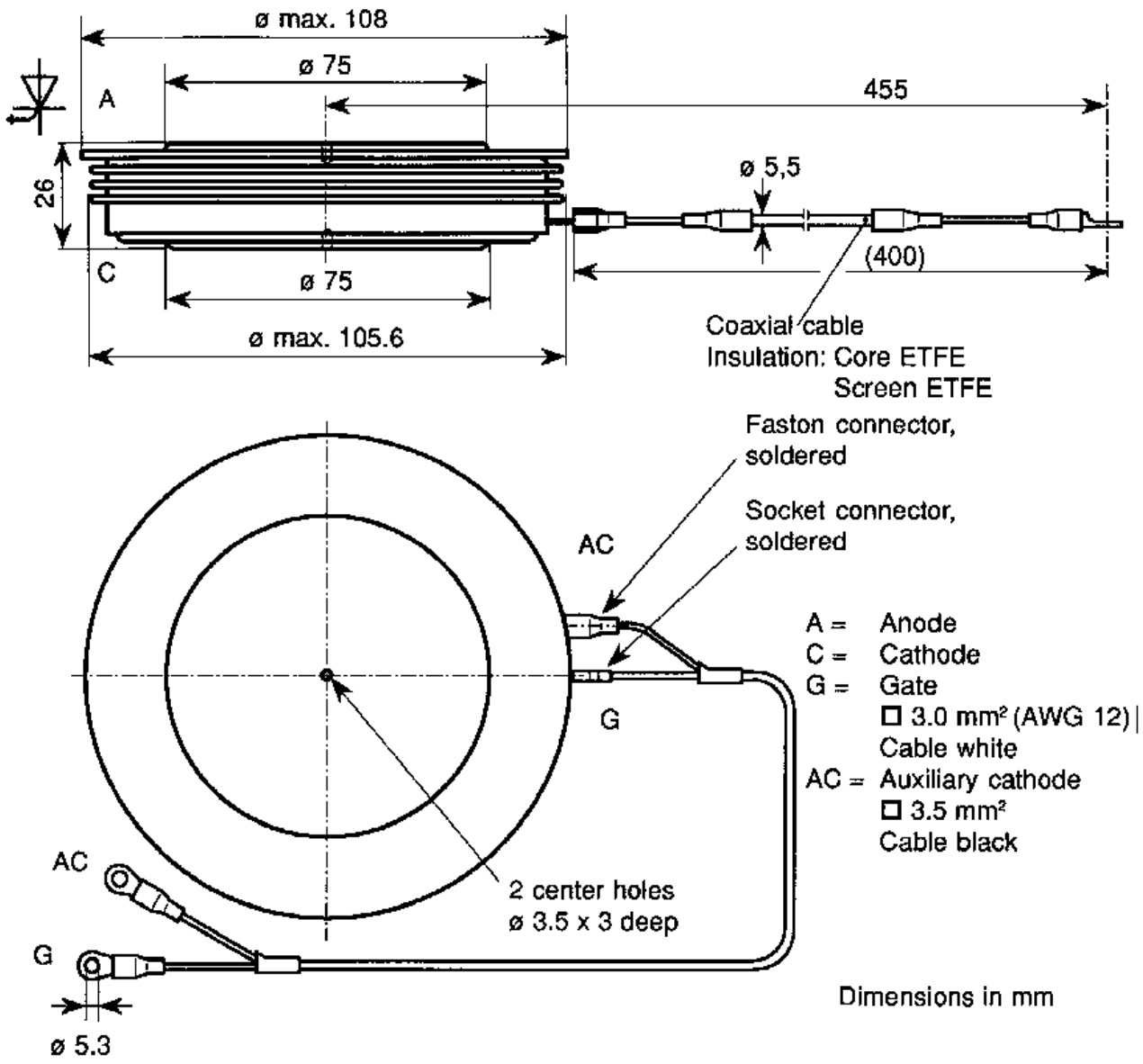
Gate

Symbols and parameters			Value			Unit
			min	typ	max	
V_{GRM}	Repetitive peak reverse voltage				17	V
I_{GRM}	Repetitive peak reverse current	$V_{GR} = V_{GRM}$			50	mA
V_{GT}	Gate trigger voltage	$T_{vj} = 25$°C, $V_D = 24$ V, $R_A = 0.1\ \Omega$		1.2		V
I_{GT}	Gate trigger current			4		A

Thermal

Symbols and parameters			Value	Unit
T_j	Junction operating temperature		-40 ... 125	°C
R_{thJC}	Thermal resistance junction to case	Anode side cooled	22	K/kW
		Cathode side cooled	27	K/kW
		Double side cooled	12	K/kW
R_{thCH}	Thermal resistance case to heatsink (Double side cooled)	Single side cooled	6	K/kW
		Double side cooled	3	K/kW

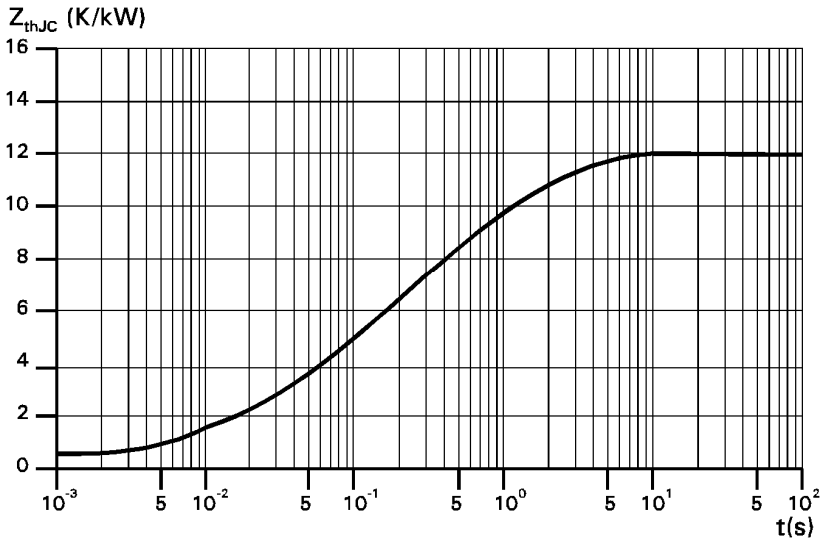
DIMENSIONS


ø max. 108
ø 75
A
455
26
ø 5,5
C
ø 75
(400)
ø max. 105.6
Coaxial cable
Insulation: Core ETFE
Screen ETFE
Faston connector,
soldered
Socket connector,
soldered
AC
A = Anode
C = Cathode
G = Gate
□ 3.0 mm² (AWG 12)
Cable white
AC = Auxiliary cathode
□ 3.5 mm²
Cable black
G
AC
2 center holes
ø 3.5 x 3 deep
G
ø 5.3
Dimensions in mm

Analytical function for transient thermal impedance:

$$Z_{thJC}(t) = \sum_{i=1}^{4} R_i(1 - e^{-t/\tau_i})$$

i	1	2	3	4
R_i (K/kW)	5.4	4.5	1.7	0.4
τ_i (s)	1.2	0.17	0.01	0.001



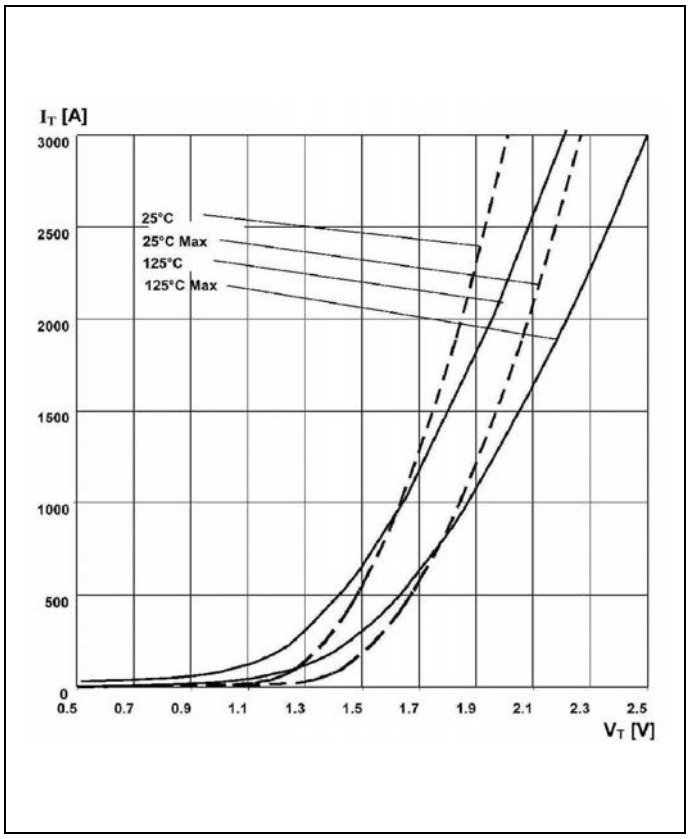


Fig. 1 On-state characteristics

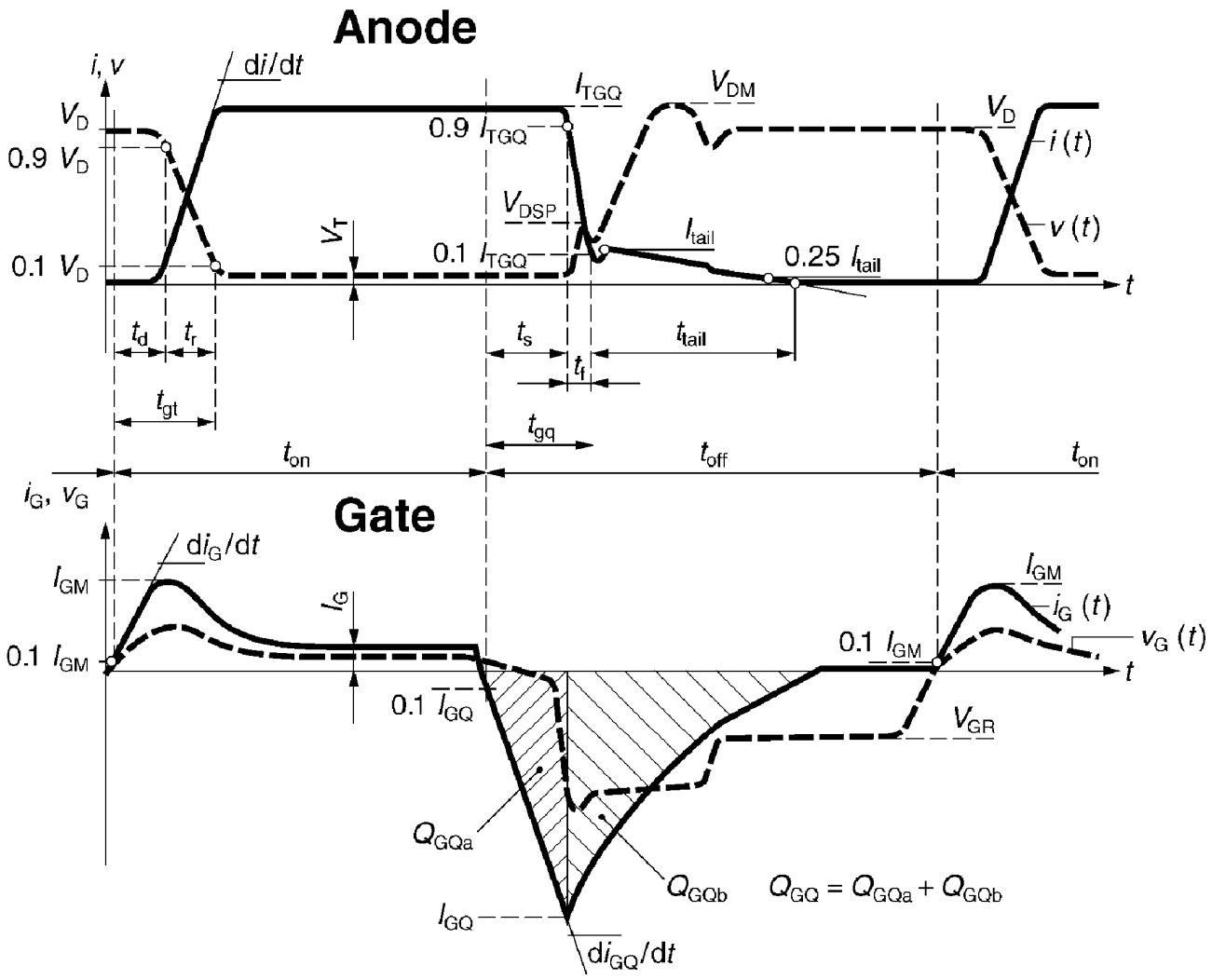


Fig. 2 General current and voltage waveforms with GTO-specific symbols