TRIACS

Silicon triacs in metal envelopes, intended for industrial a.c. power control, and are particularly suitable for static switching of 3-phase induction motors. They may also be used for furnace control, lighting control and other static switching applications up to an r.m.s. on-state current of 55 A.

Two grades of commutation performance are available, 30 V/μs at 25 A/ms (suffix G) and 30 V/μs at 50 A/ms (suffix H).

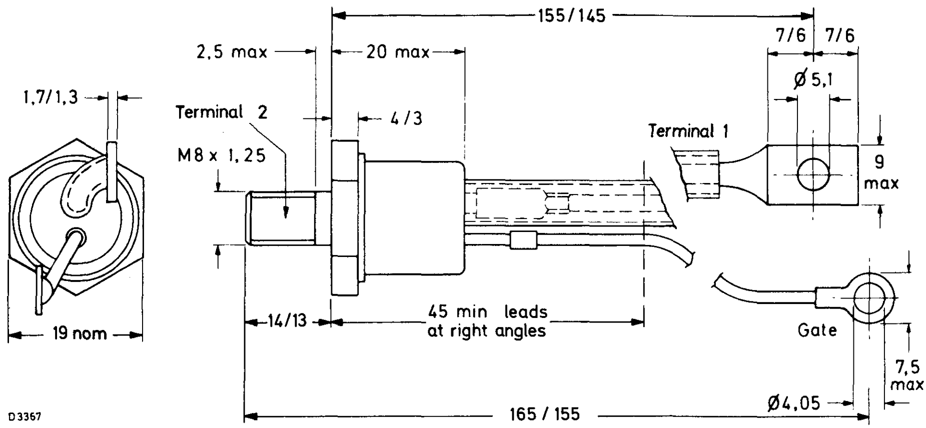
QUICK REFERENCE DATA

			BTW34-600	800	1000	1200	1400	1600	
Repetitive peak off-state voltage	V_{DRM}	max.	600	800	1000	1200	1400	1600	V
R.M.S. on-state current	$I_{T(RMS)}$	max.						55	A
Non-repetitive peak on-state current	I_{TSM}	max.						400	A
Rate of rise of commutating voltage that will not trigger any device (see page 3)	dV_{com}/dt	<						30	V/μs

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-103.



Net mass: 46 g
Diameter of clearance hole: 8,5 mm
Torque on nut: min. 4 Nm (40 kg cm)
max. 6 Nm (60 kg cm)

Supplied with device: 1 nut, 1 lock washer
Nut dimensions across the flats: 13 mm

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Voltages (in either direction)*

			BTW34-600	800	1000	1200	1400	1600	
Non-repetitive peak off-state voltage ($t \leqslant 10$ ms)	V_{DSM}	max.	700	900	1100	1300	1400	1600	V**
Repetitive peak off-state voltage	V_{DRM}	max.	600	800	1000	1200	1400	1600	V
Crest working off-state voltage	V_{DWM}	max.	400	600	700	800	800	800	V

Currents (in either direction)

R.M.S. on-state current (conduction angle 360°) up to T_{mb} = 75 °C	$I_{T(RMS)}$	max.	55	A
at T_{mb} = 85 °C	$I_{T(RMS)}$	max.	45	A
Average on-state current for half-cycle operation (averaged over any 20 ms period) at T_{mb} = 85 °C	$I_{T(AV)}$	max.	21	A
Repetitive peak on-state current	I_{TRM}	max.	300	A
Non-repetitive peak on-state current T_j = 125 °C prior to surge; t = 20 ms; full sine-wave	I_{TSM}	max.	400	A
I^2t for fusing (t = 10 ms)	I^2t	max.	800	A^2s
Rate of rise of on-state current after triggering with I_G = 1 A to I_T = 100 A; dI_G/dt = 1A/μs	dI_T/dt	max.	50	A/μs

Gate to terminal 1

Power dissipation

Average power dissipation (averaged over any 20 ms period)	$P_{G(AV)}$	max.	2	W
Peak power dissipation	P_{GM}	max.	10	W

Temperatures

Storage temperature	T_{stg}	−55 to + 125		°C
Junction temperature	T_j	max.	125	°C

THERMAL RESISTANCE

From junction to mounting base full-cycle operation	$R_{th\ j\text{-}mb}$	=	0,6	°C/W
half-cycle operation	$R_{th\ j\text{-}mb}$	=	1,2	°C/W
From mounting base to heatsink with heatsink compound	$R_{th\ mb\text{-}h}$	=	0,2	°C/W
Transient thermal impedance; t = 1 ms	$Z_{th\ j\text{-}mb}$	=	0,08	°C/W

* To ensure thermal stability: $R_{th\ j\text{-}a} < 2$ °C/W (full-cycle or half-cycle operation). For smaller heatsinks $T_{j\ max}$ should be derated (see Figs 2 and 3).

** Although not recommended, higher off-state voltages may be applied without damage, but the triac may switch into the on-state. The rate of rise of on-state current should not exceed 20 A/μs.

CHARACTERISTICS

Polarities, positive or negative, are identified with respect to T_1.

Voltages (in either direction)

On-state voltage			
I_T = 65 A; T_j = 25 °C	V_T	<	2,1 V*
Rate of rise of off-state voltage that will not trigger any device; exponential method; V_D = 2/3 $V_{DRM\,max}$; T_j = 125 °C	dV_D/dt	<	200 V/μs

Rate of rise of commutating voltage that will not trigger any device;
$I_{T(RMS)}$ = 45 A; V_D = $V_{DRM\,max}$; T_{mb} = 85 °C

	dV_{com}/dt (V/μs)	$-dI_T/dt$ (A/ms)
BTW34-600G to 1600G	<30	25 ←
BTW34-600H to 1600H	<30	50

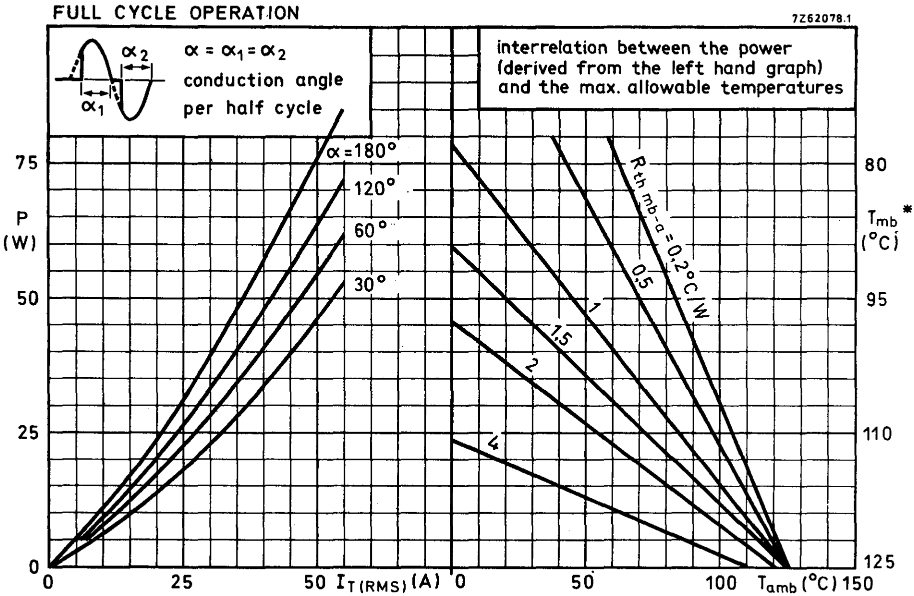
Currents (in either direction)

		T_2 pos.	T_2 neg.	
Off-state current V_D = $V_{DWM\,max}$; T_j = 125 °C	I_D	<	10	mA
Latching current; T_j = 25 °C				
G positive	I_L	<250	–	mA
G negative	I_L	<500	250	mA
Holding current; T_j = 25 °C				
G positive or negative	I_H	<200	200	mA

Gate to terminal 1

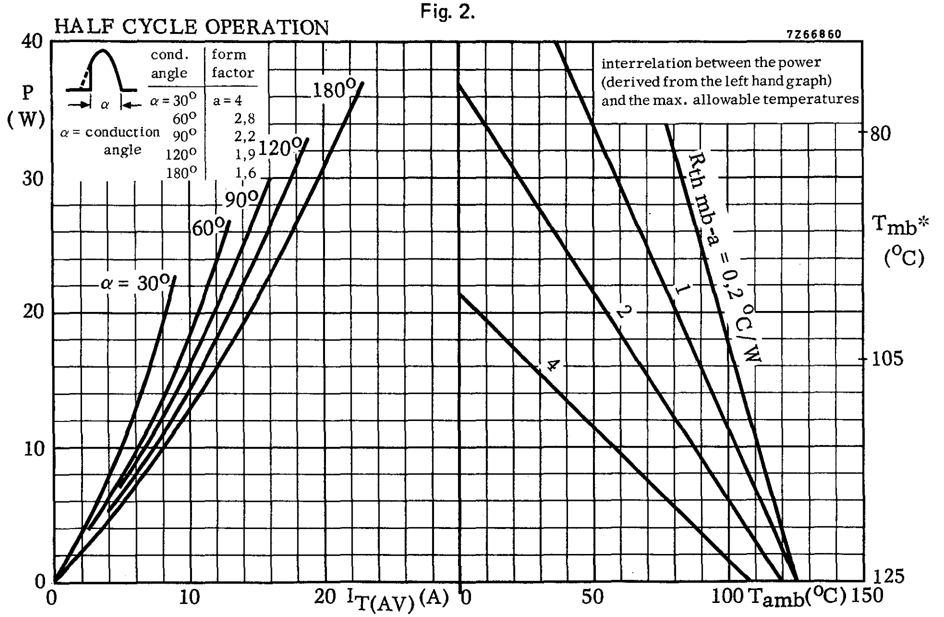
		T_2 pos.	T_2 neg.	
Voltage and current that will trigger all devices V_D = 12 V; T_j = 25 °C				
G positive	V_{GT}	> 2,5	–	V
	I_{GT}	> 200	–	mA
G negative	$-V_{GT}$	> 2,5	2,5	V
	$-I_{GT}$	> 200	200	mA
Voltage that will not trigger any device V_D = $V_{DRM\,max}$; T_j = 125 °C; G positive or negative	V_{GD}	< 0,2	0,2	V

* Measured under pulse conditions to avoid excessive dissipation.



* T_{mb}-scale is for comparison purposes only and is correct only for $R_{th\ mb-a} \leq 1,4$ °C/W

Fig. 2.



* T_{mb}- scale is for comparison purposes only and is correct only for $R_{th\ mb-a} \leq 0,8$ °C/

Fig. 3.

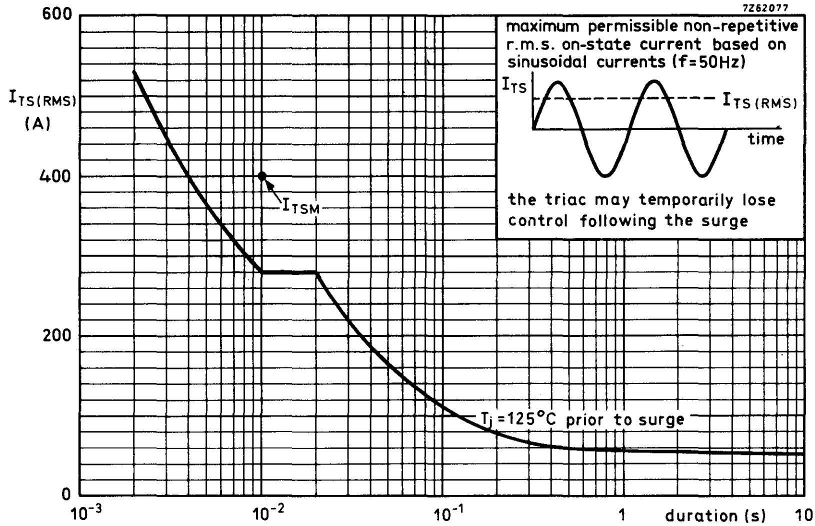

7Z62077
600
400
200
0
$I_{TS(RMS)}$
(A)
I_{TSM}
maximum permissible non-repetitive r.m.s. on-state current based on sinusoidal currents (f=50Hz)
I_{TS}
$I_{TS(RMS)}$
time
the triac may temporarily lose control following the surge
T_j =125°C prior to surge
10^{-3}
10^{-2}
10^{-1}
1
duration (s)
10

Fig. 4.

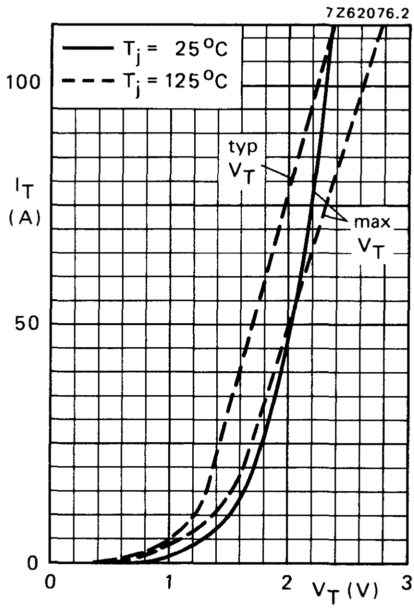

7Z62076.2
T_j = 25°C
T_j = 125°C
100
50
0
I_T
(A)
typ
V_T
max
V_T
0
1
2
V_T (V)
3

Fig. 5.

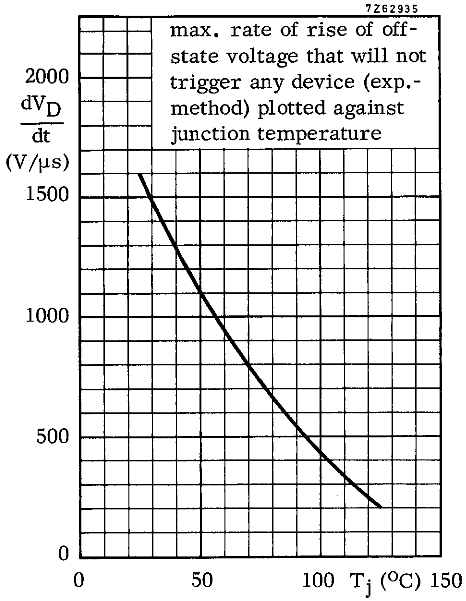


Fig. 6.

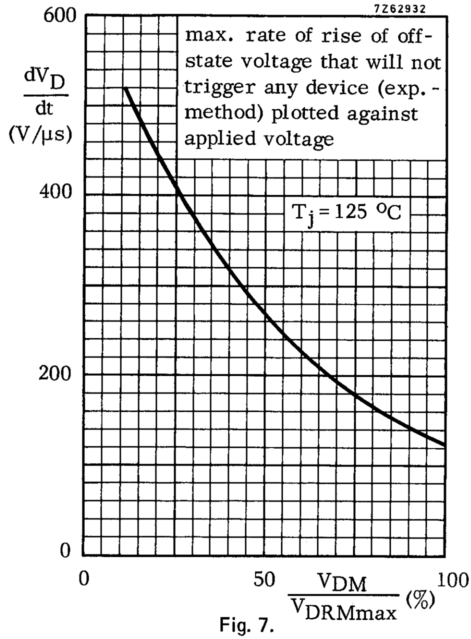


Fig. 7.

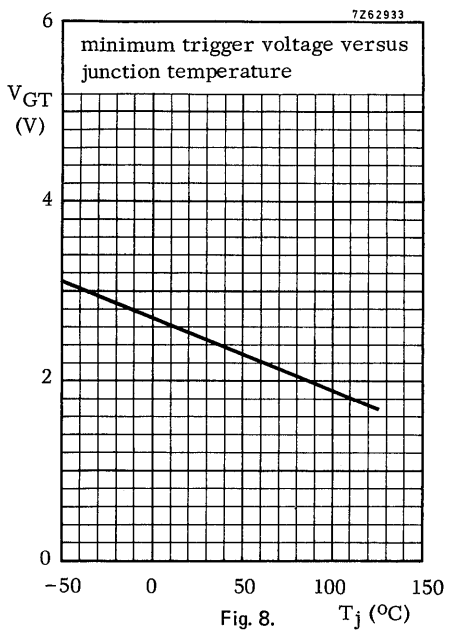


Fig. 8.

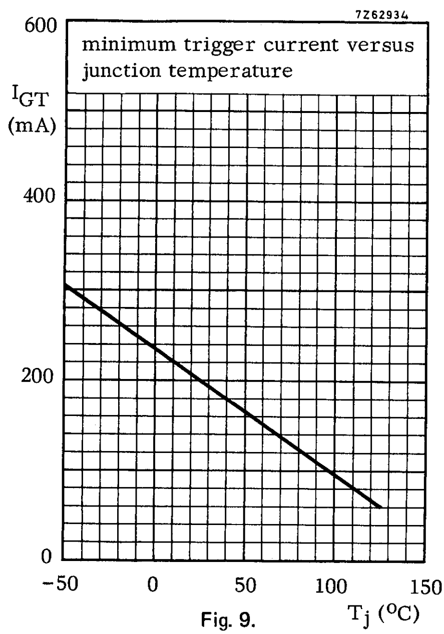


Fig. 9.

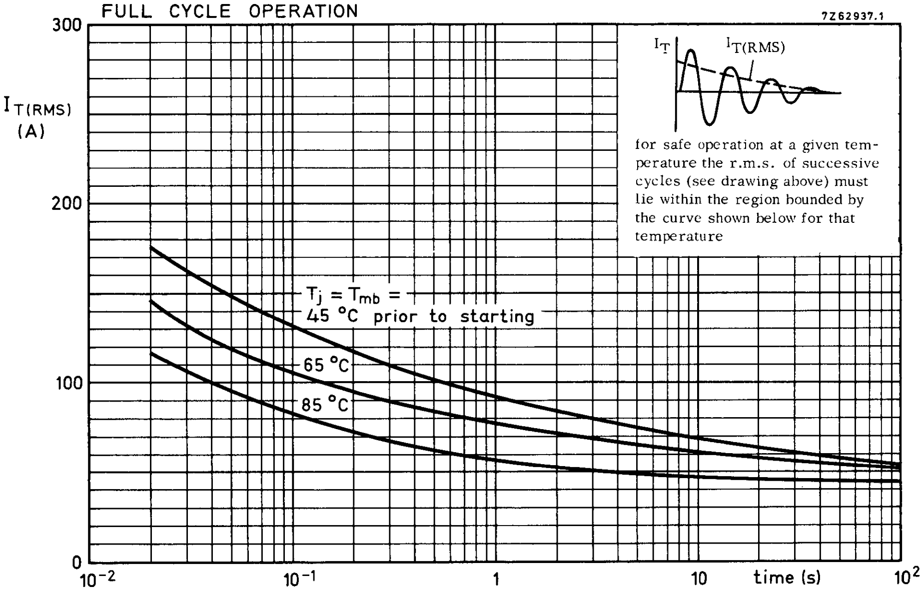

FULL CYCLE OPERATION
7Z62937.1
300
200
100
0
$I_{T(RMS)}$
(A)
I_T
$I_{T(RMS)}$
for safe operation at a given temperature the r.m.s. of successive cycles (see drawing above) must lie within the region bounded by the curve shown below for that temperature
$T_j = T_{mb}$ = 45 °C prior to starting
65 °C
85 °C
10^{-2}
10^{-1}
1
10
time (s)
10^2

Fig. 10.

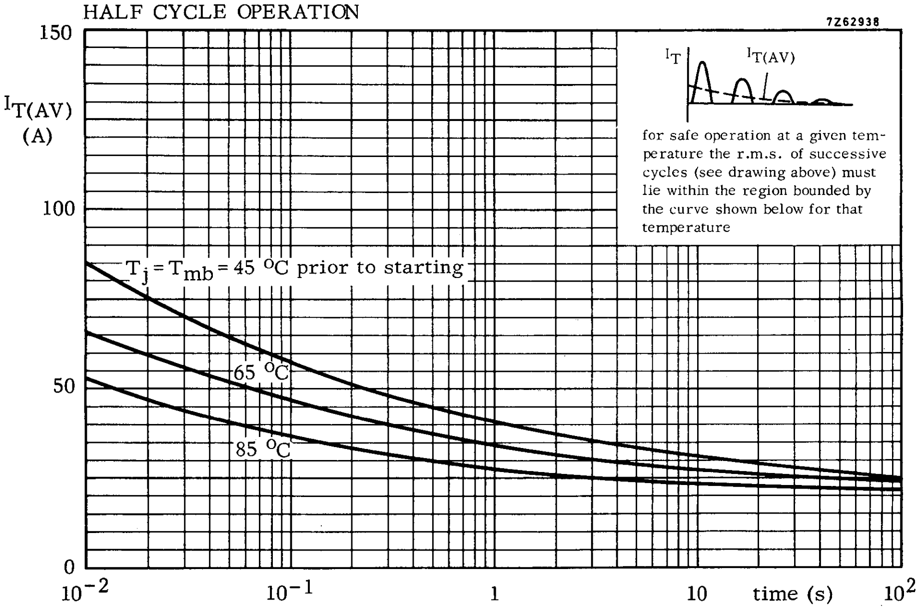

HALF CYCLE OPERATION
7Z62938
150
100
50
0
$I_{T(AV)}$
(A)
I_T
$I_{T(AV)}$
for safe operation at a given temperature the r.m.s. of successive cycles (see drawing above) must lie within the region bounded by the curve shown below for that temperature
$T_j = T_{mb}$ = 45 °C prior to starting
65 °C
85 °C
10^{-2}
10^{-1}
1
10
time (s)
10^2

Fig. 11.

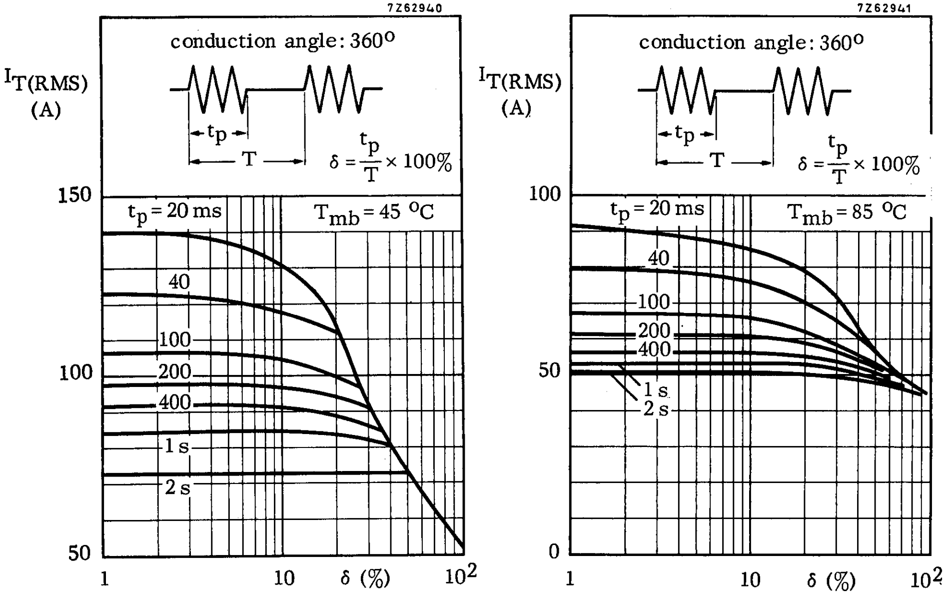


Fig. 12 Intermittent overload capability of one triac in a single phase a.c. control circuit.

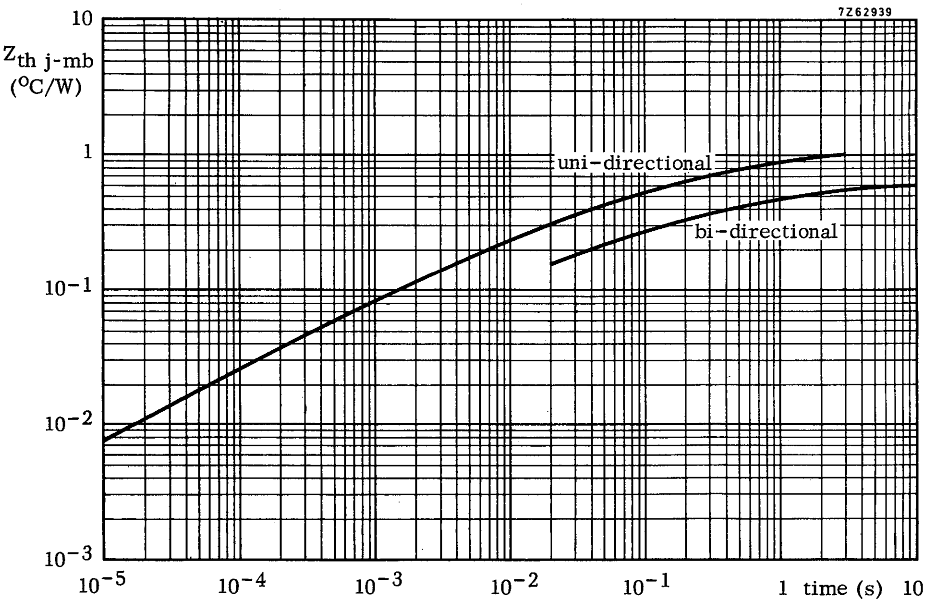


Fig. 13.