LAMPIRAN PROGRAM

```
//Masukin data table
.include"c:\appnotes\m8.inc"
.equ timer_value =
.equ ramend

.org 0x0000
rjmp main

LONCAT:
LD R17, TCR1L
INC R19
CPSE R19, R20
RJMP LONCAT
LD R18, TCR1L
SUB R18, R17
LDI TCR1L, #0H
LDI R19, #0H
RETI

MY TABLE
.DB
59,62,65,68,70,73,77,80,83,86,89,93,95,97,99,101,104,106,108,110,113,115,1
17,119,122,124,126,129,131,134,136,139,141,144,146,149,151,154,156,159,1
61,164,167,169,172,175,178,222,240,257,275,293,311,328,346,364,382,400,4
17,435,471,487,506

main:
//inisalisasi
ldi r19,#00h
```

```
ldi TCCR1B, 0b00000101
ldi TCCR1A, 0b00000000
ldi TCR1H, #0H
LDI TCR1L, #0H
LDI DDRC,#0FFH;
LDI DDRD,#010h;
CBI PD5
CBI PC5
CBI PC4
LDI R31, #0h

//READ TABLE
LDI YH,HIGH(RAMEND)
LDI YL,LOW(RAMEND)

//percabangan

DIAM:
NOP
RJMP DIAM

cpi R18, #48
BRCS MAIN //RPM OVER
CPI R18,#228
BRCS SCR1
RJMP MATI_MESIN //RPM KECIL

SCR1:
        MOV R14,#31
        SUB R18,R14
        MOV R13,R18
        CALL ADATA
```

```
        LD R32,#R25
        LOOP:
        CALL DELAY
        DEC R32
        CPSE R32,R31
        RJMP LOOP
        SBI PC5 // HIDUPIN SCR
        CALL DELAY
        CBI PC5

MATI_MESIN:
CBI PC5
RJMP MAIN

//AMBIL DATA DARI SRAM
ADATA:
ADIW YL,r13
LPM
MOV R24,R0
ADIW YL,1
LPM
MOV R25,R0 //output ada di R25
RET

DELAY:
LDI R30, #7H
LOOP:
DEC R30
CPSE R30, R31
RJMP LOOP
RET
```

PC123/PC123F

European Safety Standard Approved Type Long Creepage Distance Photocoupler

※ DIN-VDE0884 approved type (PC123Y/PC123FY) is also available as an option.

■ Features

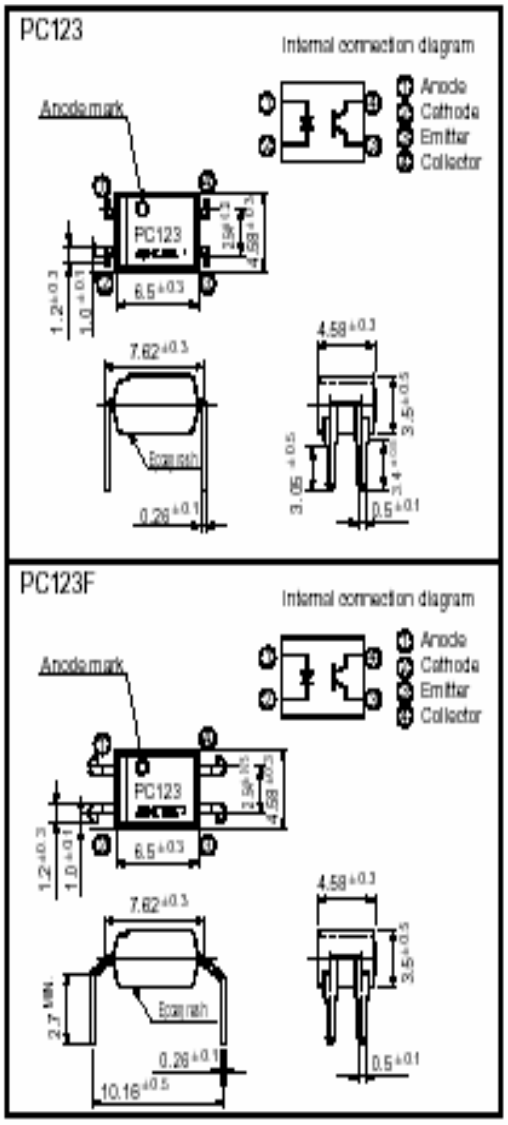
1. Conform to European Safety Standard
2. Internal isolation distance : 0.4mm or more
3. High collector-emitter voltage (V_{CEO} : 70V)
4. Long creepage distance type
5. Recognized by UL (No. E64380)
   Approved by VDE (DIN-VDE83601)
   Approved by BSI
   (BS415 No. 7087, BS7002 No. 7409)
   Approved by SEMCO (No. 9216212)
   Approved by DEMCO (No. 108954)
   Approved by NEMKO (No. 199438181)
   Approved by EI (No. 155030)
   Recognized by CSA (No. CA95323)

	Creepage distance	Space distance
PC123	6.4mm or more	6.4mm or more
PC123F	8mm or more	8mm or more

■ Applications

1. Power supplies
2. OA equipment

■ Outline Dimensions (Unit : mm)



■ Absolute Maximum Ratings (Ta= 25°C)

Parameter		Symbol	Ratings	Unit
Input	Forward current	I_F	50	mA
	*1 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	V_{CEO}	70	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	150	mW
Total power dissipation		P_{tot}	200	mW
*2 Isolation voltage		V_{iso}	5	kV rms
Operating temperature		T_{opr}	- 30 to + 100	°C
Storage temperature		T_{stg}	- 55 to + 125	°C
*3 Soldering temperature		T_{sol}	260	°C

*1 Pulse width <= 100μs, Duty ratio : 0.001
*2 AC for 1 minute, 40 to 60% RH
*3 For 10 seconds

■ Electro-optical Characteristics

(Ta= 25°C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F = 20mA	-	1.2	1.4	V
	Reverse current		I_R	V_R = 4V	-	-	10	μA
	Terminal capacitance		C_t	V= 0, f= 1kHz	-	30	250	pF
Output	Collector dark current		I_{CEO}	V_{CE}= 50V, I_F = 0	-	-	100	nA
	Collector-emitter breakdown voltage		BV_{CEO}	I_C = 0.1mA, I_F = 0	70	-	-	V
	Emitter-collector breakdown voltage		BV_{ECO}	I_E = 10 μA, I_F = 0	6	-	-	V
Transfer characteristics	Collector current		I_C	I_F = 5mA, V_{CE}= 5V	2.5	-	20	mA
	Collector-emitter saturation voltage		$V_{CE(sat)}$	I_F = 20mA, I_C = 1mA	-	0.1	0.2	V
	Isolation resistance		R_{ISO}	DC500V, 40 to 60%RH	5×10^{10}	10^{11}	-	Ω
	Floating capacitance		C_f	V= 0, f= 1MHz	-	0.6	1.0	pF
	Cut-off frequency		f_c	V_{CE}= 5V, I_C = 2mA R_L = 100Ω, - 3dB	-	80	-	kHz
	Response time	Rise time	t_r	V_{CE}= 2V, I_C = 2mA	-	4	18	μs
		Fall time	t_f	R_L = 100Ω	-	3	18	μs

Fig. 1 Forward Current vs. Ambient Temperature

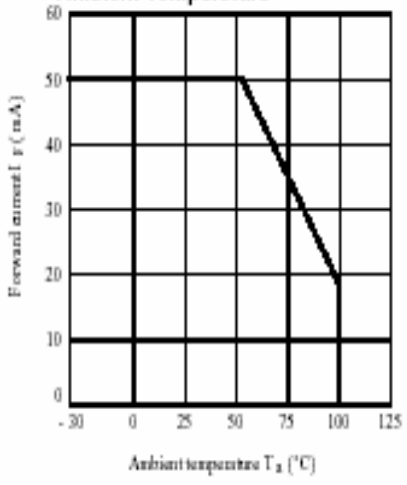


Fig. 2 Diode Power Dissipation vs. Ambient Temperature

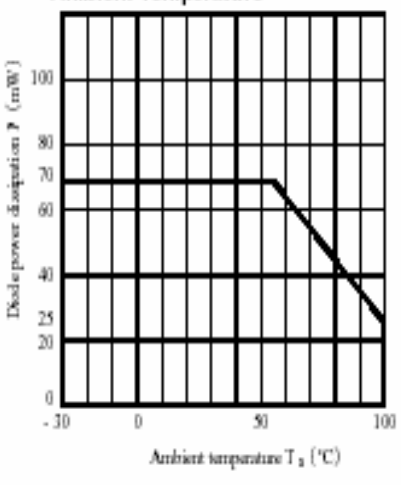


Fig. 3 Collector Power Dissipation vs. Ambient Temperature

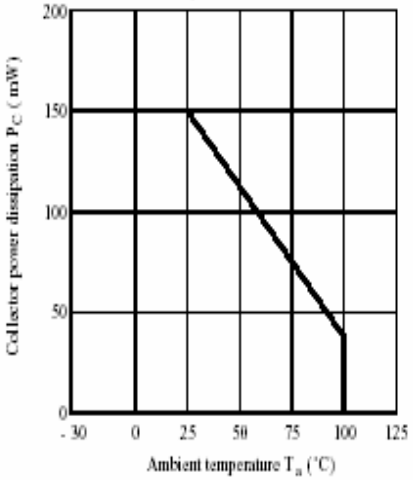


Fig. 4 Power Dissipation vs. Ambient Temperature

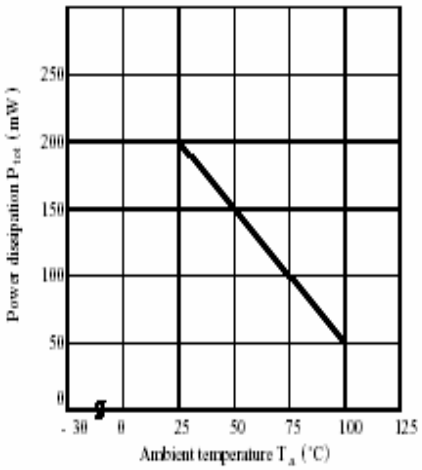


Fig. 5 Peak Forward Current vs. Duty Ratio

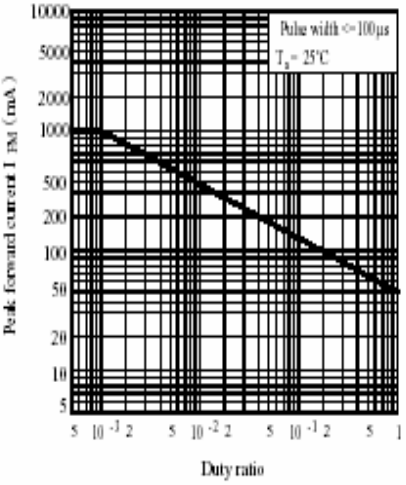


Fig. 6 Forward Current vs. Forward Voltage

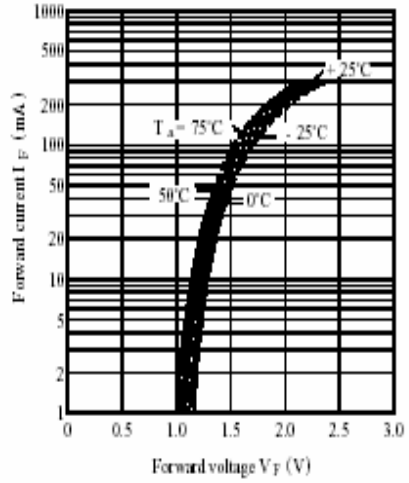


Fig. 7 Current Transfer Ratio vs. Forward Current

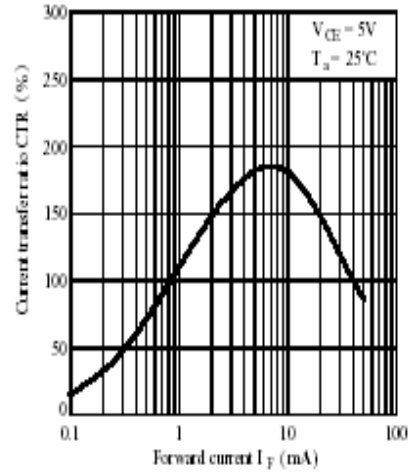


Fig. 8 Collector Current vs. Collector-emitter Voltage

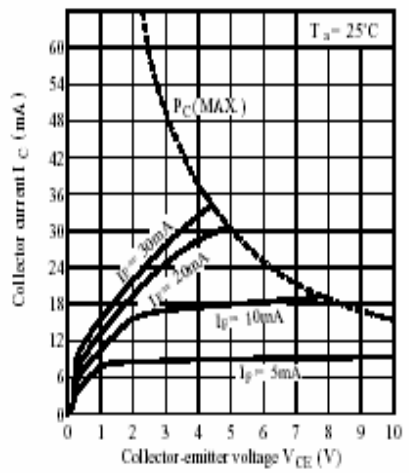


Fig. 9 Relative Current Transfer Ratio vs. Ambient Temperature

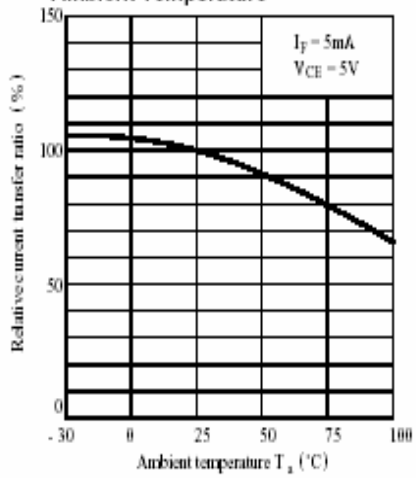


Fig.10 Collector-emitter Saturation Voltage vs. Ambient temperature

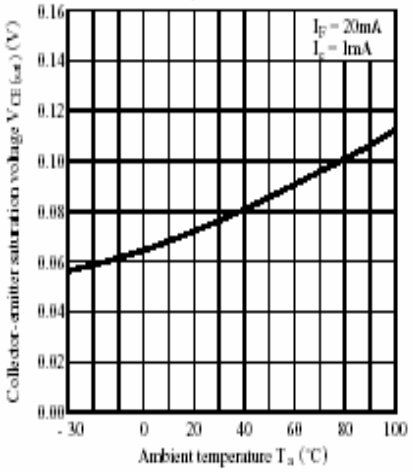


Fig.11 Collector Dark Current vs. Ambient Temperature

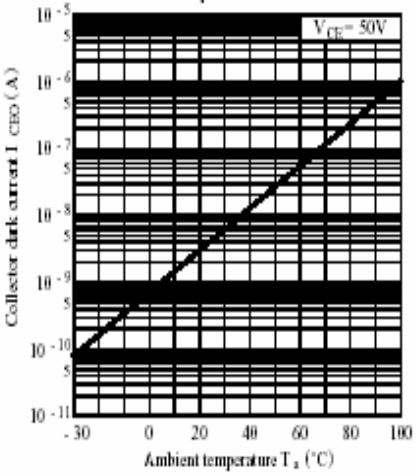


Fig.12 Response Time vs. Load Resistance

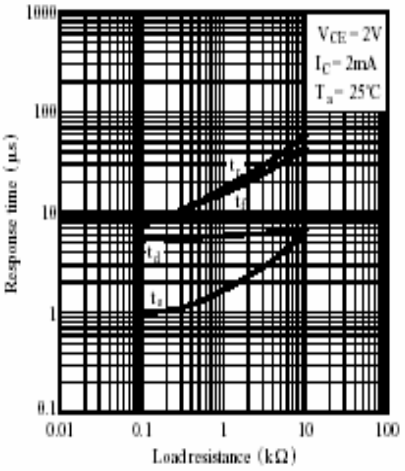


Fig.13 Frequency Response

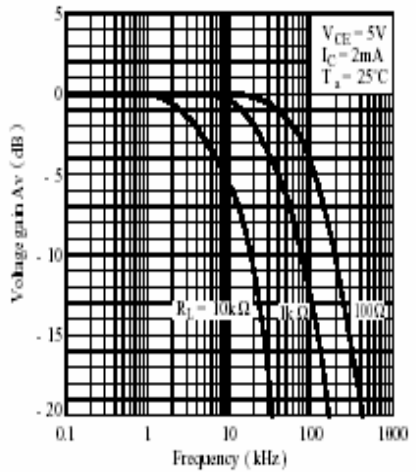
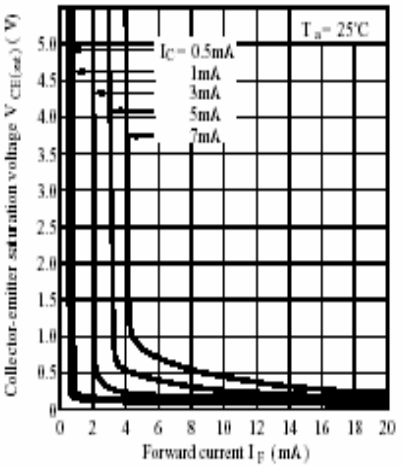


Fig.14 Collector-emitter Saturation Voltage vs. Forward Currnt



GENERAL DESCRIPTION

Glass passivated triacs in a plastic envelope, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

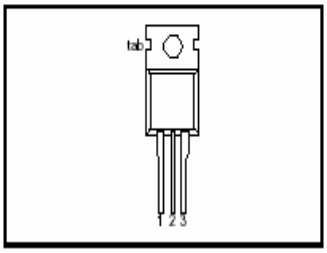
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BT139-	500	600	800	
	BT139-	500F	600F	800F	
	BT139-	500G	600G	800G	
V_{DRM}	Repetitive peak off-state voltages	500	600	800	V
$I_{T(RMS)}$	RMS on-state current	16	16	16	A
I_{TSM}	Non-repetitive peak on-state current	140	140	140	A

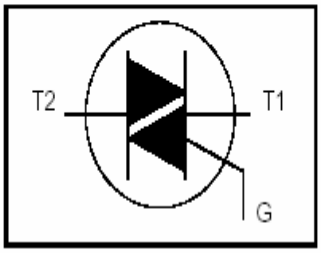
PINNING - TO220AB

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
tab	main terminal 2

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-500	-600	-800	
V_{DRM}	Repetitive peak off-state voltages		-	500[1]	600[1]	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 99$ °C	-		16		A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25$ °C prior to surge					
		t = 20 ms	-		140		A
		t = 16.7 ms	-		150		A
I^2t	I^2t for fusing	t = 10 ms	-		98		A^2s
dI_T/dt	Repetitive rate of rise of on-state current after triggering	I_{TM} = 20 A; I_G = 0.2 A; dI_G/dt = 0.2 A/µs					
		T2+ G+	-		50		A/µs
		T2+ G-	-		50		A/µs
		T2- G-	-		50		A/µs
		T2- G+	-		10		A/µs
I_{GM}	Peak gate current		-		2		A
V_{GM}	Peak gate voltage		-		5		V
P_{GM}	Peak gate power		-		5		W
$P_{G(AV)}$	Average gate power	over any 20 ms period	-		0.5		W
T_{stg}	Storage temperature		-40		150		°C
T_j	Operating junction temperature		-		125		°C

1 Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/µs.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	full cycle	-	-	1.2	K/W
		half cycle	-	-	1.7	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.			UNIT
		BT139-			...	...F	...G	
I_{GT}	Gate trigger current	V_D = 12 V; I_T = 0.1 A						
		T2+ G+	-	5	35	25	50	mA
		T2+ G-	-	8	35	25	50	mA
		T2- G-	-	10	35	25	50	mA
		T2- G+	-	22	70	70	100	mA
I_L	Latching current	V_D = 12 V; I_{GT} = 0.1 A						
		T2+ G+	-	7	40	40	60	mA
		T2+ G-	-	20	60	60	90	mA
		T2- G-	-	8	40	40	60	mA
		T2- G+	-	10	60	60	90	mA
I_H	Holding current	V_D = 12 V; I_{GT} = 0.1 A	-	6	30	30	60	mA
V_T	On-state voltage	I_T = 20 A	-	1.2		1.6		V
V_{GT}	Gate trigger voltage	V_D = 12 V; I_T = 0.1 A	-	0.7		1.5		V
		V_D = 400 V; I_T = 0.1 A; T_j = 125 °C	0.25	0.4		-		V
I_D	Off-state leakage current	V_D = $V_{DRM(max)}$; T_j = 125 °C	-	0.1		0.5		mA

DYNAMIC CHARACTERISTICS

T_j = 25 °C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.			TYP.	MAX.	UNIT
		BT139-	...	...F	...G			
dV_D/dt	Critical rate of rise of off-state voltage	V_{DM} = 67% $V_{DRM(max)}$; T_j = 125 °C; exponential waveform; gate open circuit	100	50	200	250	-	V/µs
dV_{com}/dt	Critical rate of change of commutating voltage	V_{DM} = 400 V; T_j = 95 °C; $I_{T(RMS)}$ = 16 A; dI_{com}/dt = 7.2 A/ms; gate open circuit	-	-	10	20	-	V/µs
t_{gt}	Gate controlled turn-on time	I_{TM} = 20 A; V_D = $V_{DRM(max)}$; I_G = 0.1 A; dI_G/dt = 5 A/µs	-	-	-	2	-	µs

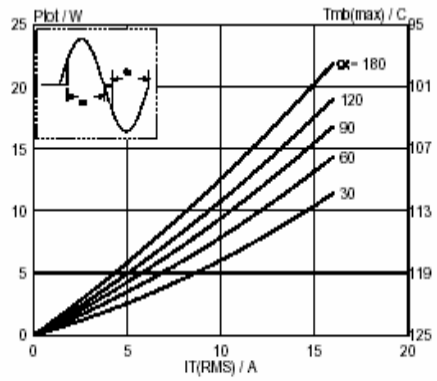


Fig.1. Maximum on-state dissipation, P_{tot}, versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

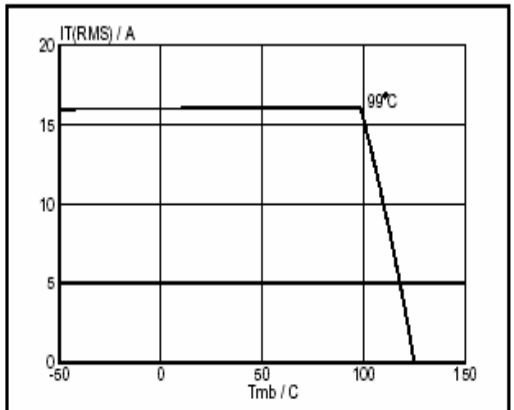


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb}.

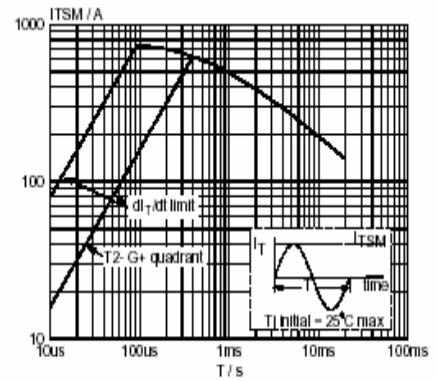


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width t_p, for sinusoidal currents, $t_p \leq 20ms$.

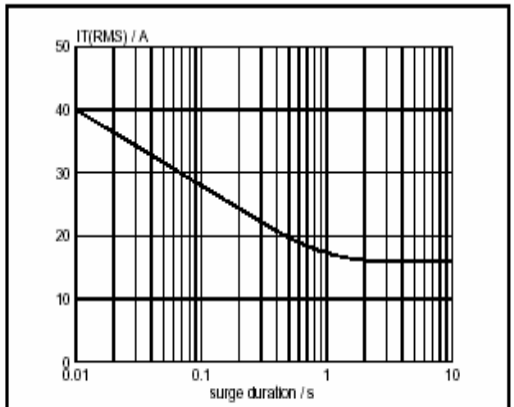


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{mb} \leq 99°C$.

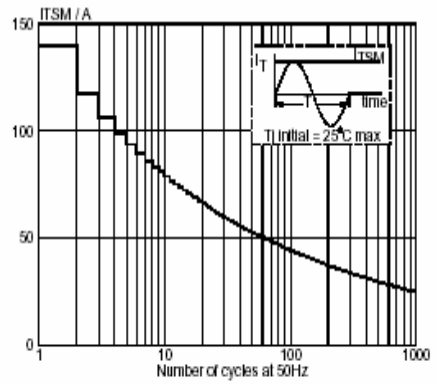


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

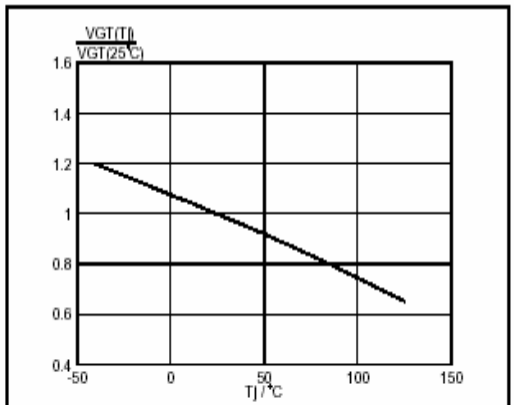


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/ V_{GT}(25°C)$, versus junction temperature T_j

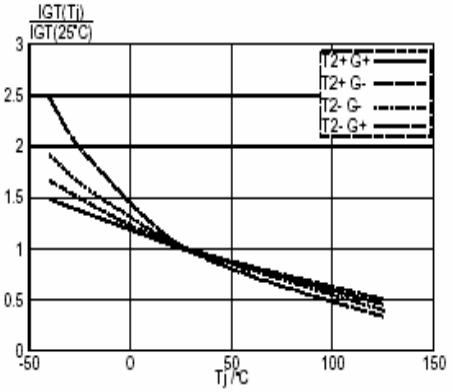


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/ I_{GT}(25^{\circ}C)$, versus junction temperature T_j.

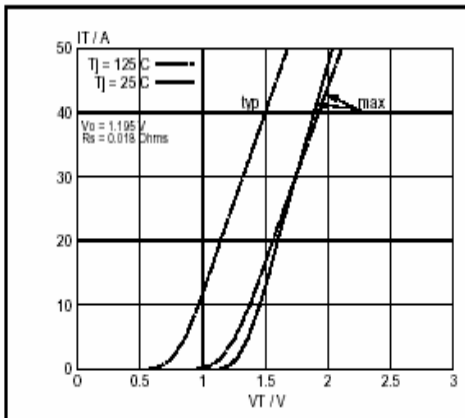


Fig.10. Typical and maximum on-state characteristic.

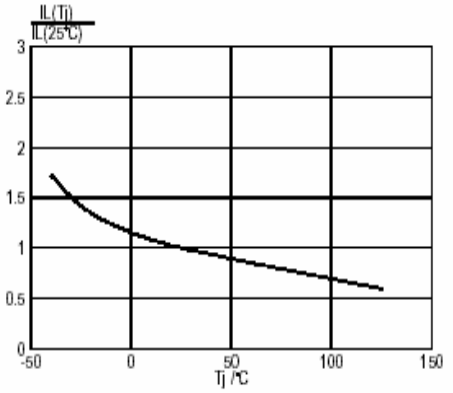


Fig.8. Normalised latching current $I_L(T_j)/ I_L(25^{\circ}C)$, versus junction temperature T_j.

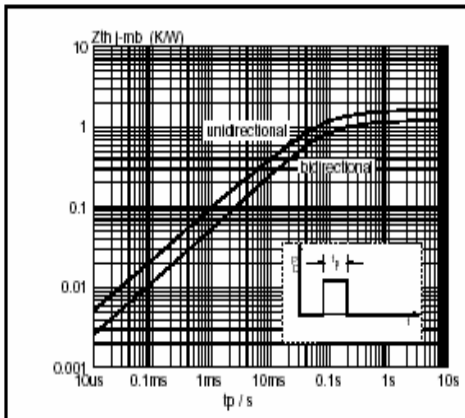


Fig.11. Transient thermal impedance $Z_{th\ j\text{-}mb}$, versus pulse width t_p.

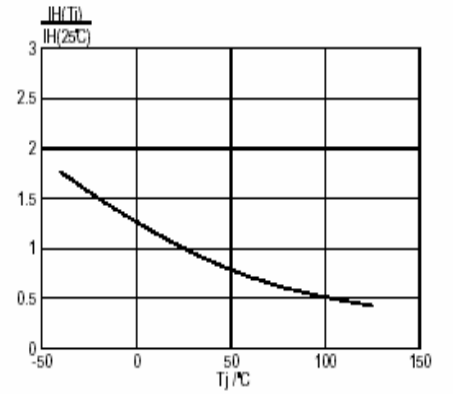


Fig.9. Normalised holding current $I_H(T_j)/ I_H(25^{\circ}C)$, versus junction temperature T_j.

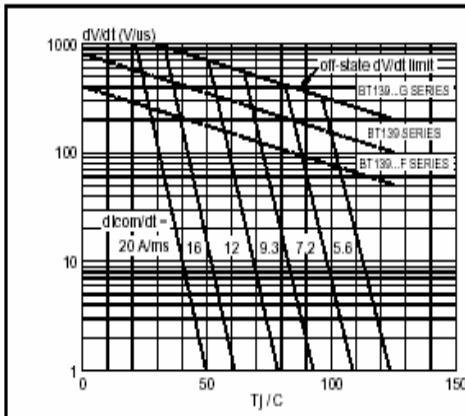


Fig.12. Typical commutation dV/dt versus junction temperature, parameter commutation dI_T/dt. The triac should commutate when the dV/dt is below the value on the appropriate curve for pre-commutation dI_T/dt.