

PRODUCT SPECIFICATION

DATE:05/04/2011

cosmo ELECTRONICS CORPORATION	Photocoupler: KTLP250S	No.61P32001	REV
		SHEET 1 OF 8	2

✕THE KTLP250 BUILT- IN DIRECT DRIVE CIRCUIT FOR GATE DRIVING
CIRCUIT OF IGBT OR POWER MOSFET.

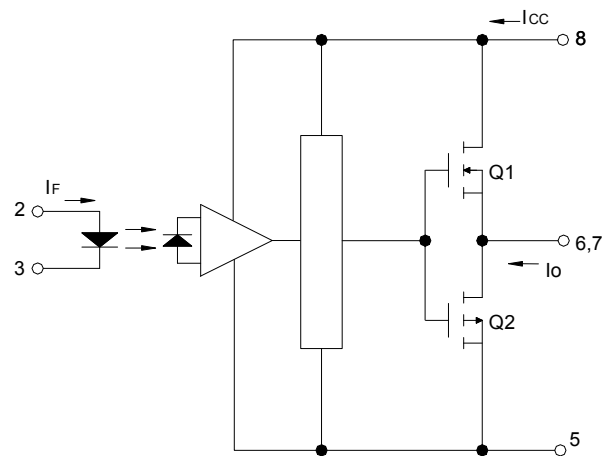
• Feature:

- 1.This unit is 8.lead DIP package.
- 2.Input threshold current: $I_F=5\text{mA}(\text{max.})$
- 3.Supply current (I_{CC}): $11\text{mA}(\text{max.})$
- 4.Supply voltage (V_{CC}): $10 - 35\text{V}$
- 5.Output current (I_O): $\pm 1.5\text{A}(\text{max.})$
- 6.Switching time (t_{pLH}/t_{pHL}): $0.5\mu\text{s}(\text{max.})$
- 7.Isolation voltage: $2500\text{Vrms}(\text{min.})$

• Applications:

- 1.Transistor Inverter
- 2.Inverter For Air Conditionor
- 3.IGBT Gate Drive
- 4.Power MOS FET Gate Drive

■ Functional Diagram



■ Truth Table

LED	OUTPUT	Q1	Q2
ON	HIGH LEVEL	ON	OFF
OFF	LOW LEVEL	OFF	ON

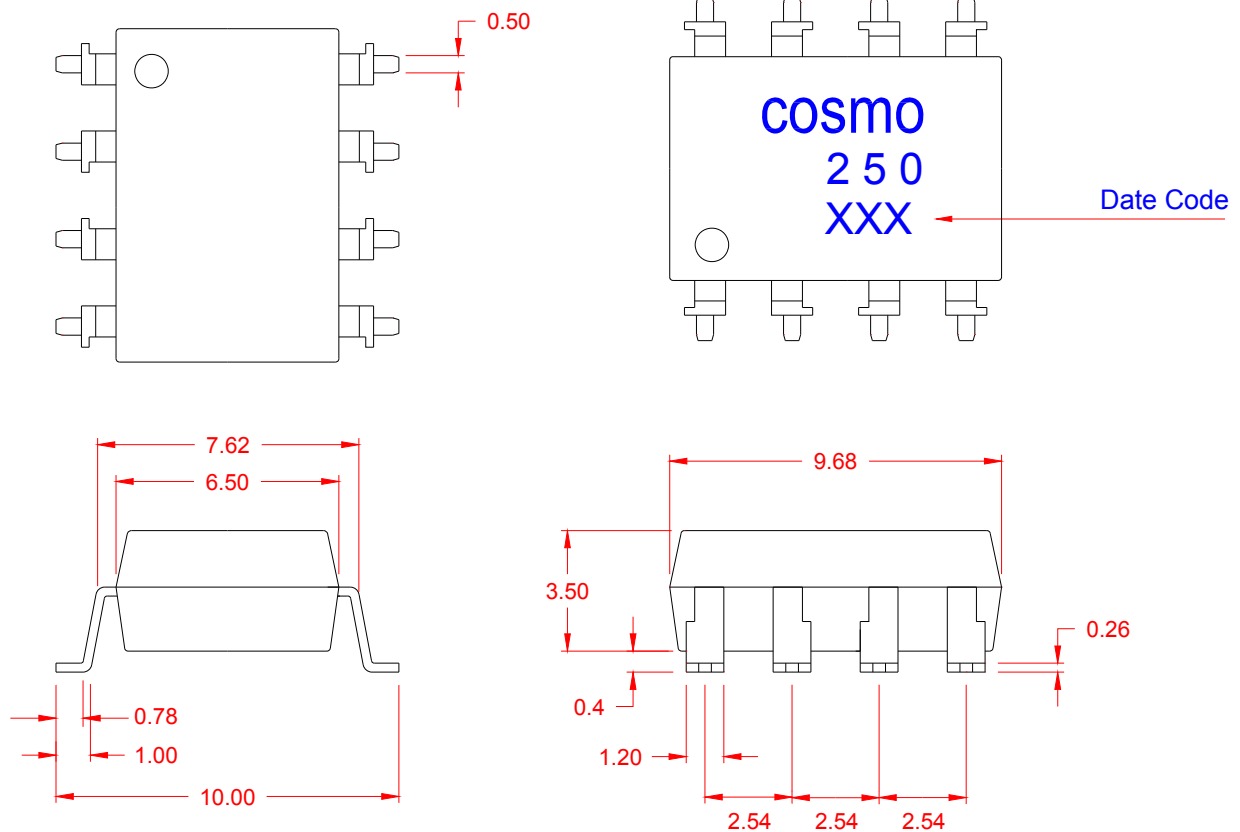
* The use of a $0.1\mu\text{F}$ bypass capacitor must be connected between pins 8 and 5 is recommended.

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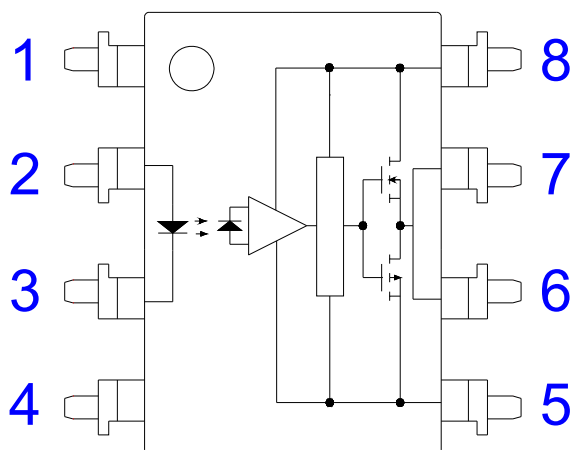
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1. Output Dimensions : Unit (mm)



2.KTLP250 Top View:



Pin 1:	N.C.
Pin 2:	Anode
Pin 3:	Cathode
Pin 4:	N.C.
Pin 5:	GND
Pin 6:	Vo (Voltage Output)
Pin 7:	Vo (Voltage Output)
Pin 8:	Vcc

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■ Absolute Maximum Ratings (Ta = 25°C)

Parameter			Symbol	Rating	Unit
Input	Forward Current		I _F	20	mA
	Forward Current Derating(Ta≥70℃)		Δ I _F / Δ Ta	-0.36	mA /℃
	Peak Transient Forward Current (*Note 1)		I _{FPT}	1	A
	Reverse Voltage		V _R	5	V
	Junction Temperature		T _j	125	℃
Output	“H”Peak Output Current(Pw≤2.5μs,f≤15kHz) (*Note 2)		I _{OPH}	-1.5	A
	“L”Peak Output Current(Pw≤2.5μs,f≤15kHz) (*Note 2)		I _{OPL}	+1.5	A
	Output Voltage	(Ta≤70℃)	V _O	35	V
		(Ta=85℃)		24	
	Supply Voltage	(Ta≤70℃)	V _{CC}	35	V
		(Ta=85℃)		24	
	Output Voltage Derating (Ta≥70℃)		Δ V _O / Δ Ta	-0.73	V / ℃
	Supply Voltage Derating (Ta≥70℃)		Δ V _{CC} / Δ Ta	-0.73	V / ℃
	Junction Temperature		T _j	125	℃
Operating Frequency (*Note 3)			f	25	KhZ
Operating Temperature Range			T _{opr}	-20~85	℃
Storage Temperature Range			T _{stg}	-55~125	℃
Lead Soldering Temperature(10s) (*Note 4)			T _{sol}	260	℃
Isolation Voltage (AC,1min.,R.H≤60%) (*Note 5)			BVs	2500	V _{rms}

*Note1:Pulse width $P_w \leq 1\mu\text{s}, 300\text{pps}$.

*Note2:Exponential waveform.

*Note3:Exponential waveform, $I_{OPH} \leq -1.0\text{A} (\leq 2.5\mu\text{s}), I_{OPL} \leq +1.0\text{A} (\leq 2.5\mu\text{s})$.

*Note4:It IS 2 mm or more from a lead root.

*Note5:Device considered a two terminal device: Pin1,2,3 and 4 shorted together,
and pins 5,6,7 and 8 shorted together.

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Electrical Characteristics (Ta = -20~70°C, unless otherwise specified)

Parameter		Symbol	Test Circuit	Test Condition		Min.	Typ.	Max.	Unit
Input forward voltage		V _F	—	IF=10mA,Ta=25℃		—	1.6	1.8	V
Temperature coefficient of forward voltage		ΔV _F /ΔTa	—	IF=10mA		—	-2.0	—	mV/℃
Input reverse current		I _R	—	VR=5V,Ta=25℃		—	—	10	μA
Input capacitance		C _T	—	V=0,f=1MHz,Ta=25℃		—	45	250	pF
Output current	“H” level	I _{OPH}	3	VCC=30V (*A)	IF=10mA Vb=4V	-0.5	-1.5	—	A
	“L” level	I _{OPL}	2		IF=0 Va=2.5V	0.5	2	—	
Output voltage	“H” level	V _{OH}	4	VCC1=15V,VEE1=-15V RL=200Ω,IF=5mA		11	12.8	—	V
	“L” level	V _{OL}	5	VCC1=15V,VEE1=-15V RL=200Ω,VF=0.8V		—	-14.2	-12.5	
Supply current	“H” level	I _{CCH}	—	VCC=30V,IF=10mA, Ta=25℃		—	7	—	mA
				VCC=30V,IF=10mA		—	—	11	
	“L” level	I _{CCL}	—	VCC=30V,IF=0mA, Ta=25℃		—	7.5	—	
				VCC=30V,IF=0mA		—	—	11	
Threshold input current	“Output L→H”	I _{FLH}	—	VCC1=15V,VEE1=-15V, RL=200Ω,VO>0V		—	1.2	5	mA
Threshold input voltage	“Output H→L”	V _{FHL}	—	VCC1=15V,VEE1=-15V, RL=200Ω,VO<0V		0.8	—	—	V
Supply voltage		V _{CC}	—			10	—	35	V
Capacitance (input-output)		C _S	—	Vs=0,f=1MHz,Ta=25℃		—	1.0	2.0	pF
Resistance (input-output)		R _S	—	Vs=500V,Ta=25℃, R.H.≤60%		1*10 ¹²	10 ¹⁴	—	Ω

* All typical values are at Ta=25°C (*A): Duration of I_o time ≤ 50μs

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■ Switching Characteristics (Ta = -20~70°C, unless otherwise specified)

Parameter		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time	"L→H"	t_{pLH}	6	$I_F=8mA$ (Note8) $V_{CC1}=+15V, V_{EE1}=-15V$ $R_g=20\Omega, C_g=10nF$	—	0.15	0.5	μs
	"H→L"	t_{pHL}			—	0.15	0.5	
Output rise time		t_r			—	—	—	
Output fall time		t_f			—	—	—	
Common mode transient immunity at high level output		C_{MH}	7	$V_{CM}=600V, I_F=8mA$ $V_{CC}=30V, T_a=25^\circ C$	-5	—	—	KV / μs
Common mode transient immunity at low level output		C_{ML}	7	$V_{CM}=600V, I_F=0$ $V_{CC}=30V, T_a=25^\circ C$	5	—	—	KV / μs

* All typical values are at $T_a=25^\circ C$.

*Note 8: Input signal rise time (fall time) < 0.5 μs .

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■ Test Circuit:

Fig.1 : Top View

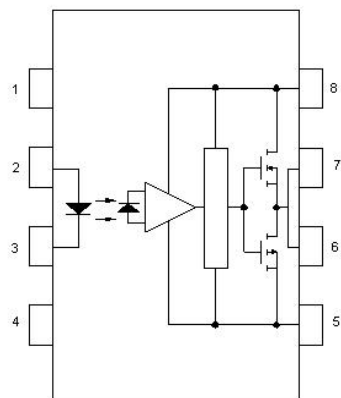


Fig.2 : I_{OPL} Measure.

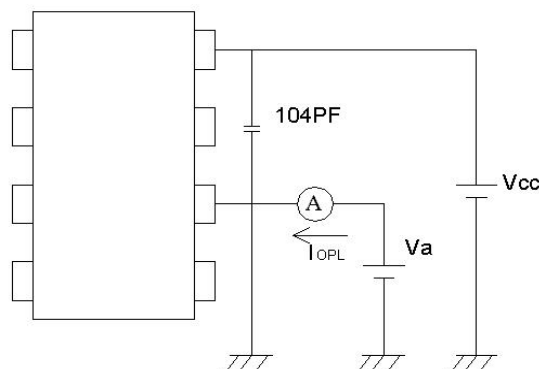


Fig.3 : I_{OPH} Measure.

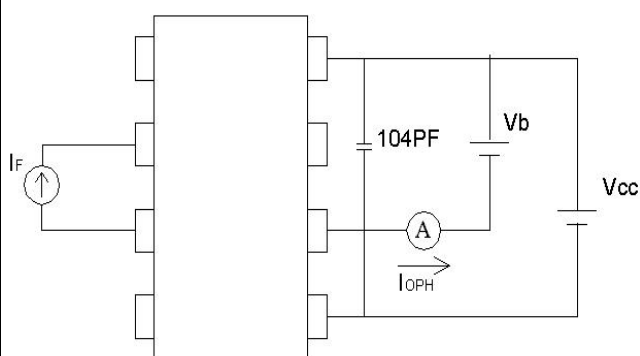


Fig.4 : V_{OH} Measure.

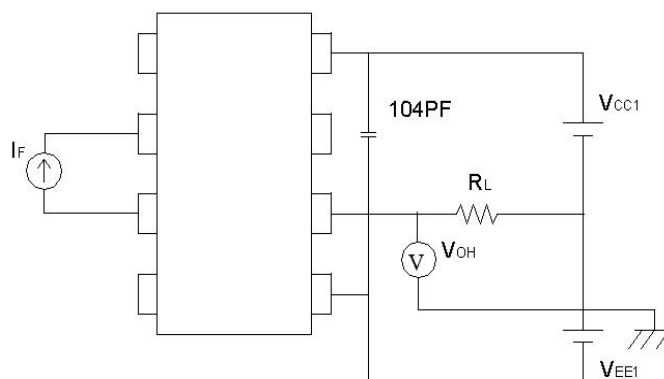
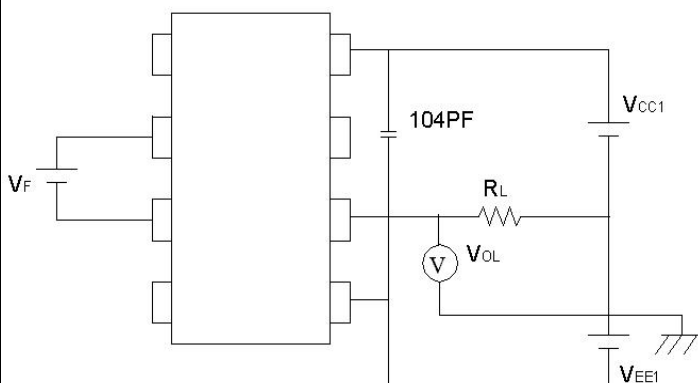


Fig.5 : V_{OL} Measure.



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Fig.6: t_{pLH} , t_{pHL} , t_r , t_f Measure.

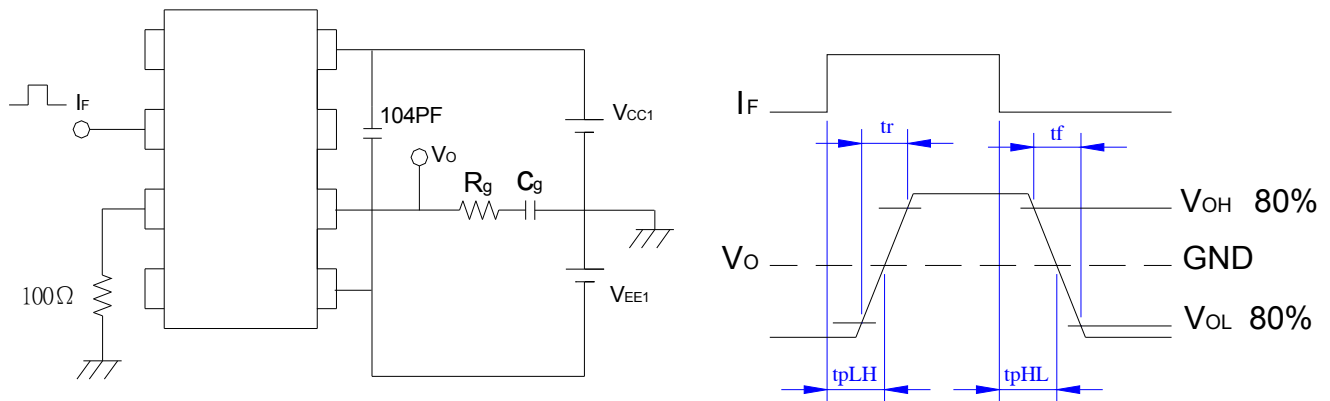
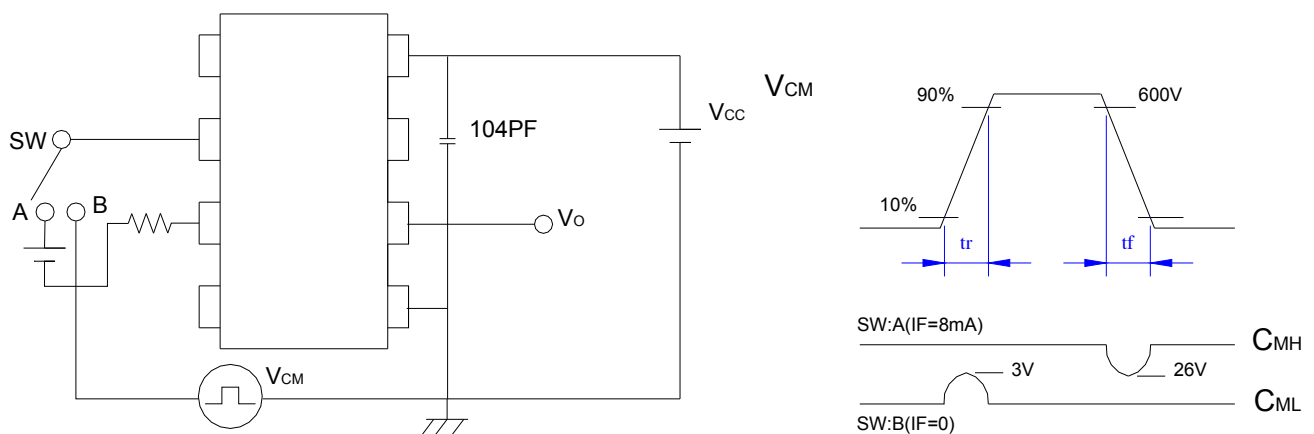


Fig.7: C_{MH} , C_{ML} .



$$C_{ML} = \frac{480(V)}{t_r (\mu s)} ; C_{MH} = \frac{480(V)}{t_f (\mu s)}$$

* C_{ML} (C_{MH}) is the maximum rate of rise (fall) of the common mode voltage that can be sustained with the output voltage in the low (high) state.

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Fig.8:

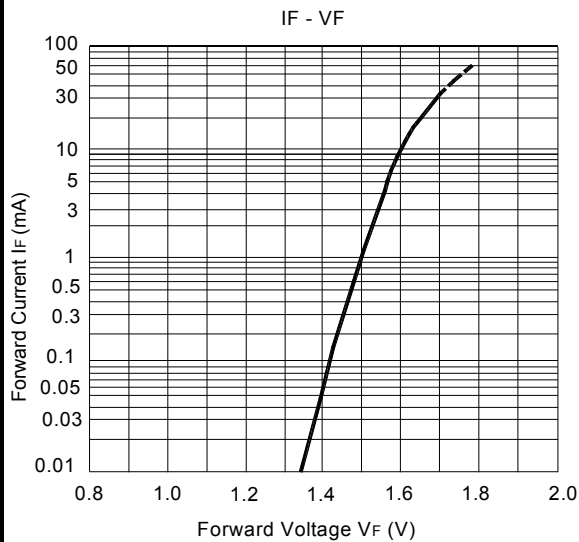


Fig.9 :

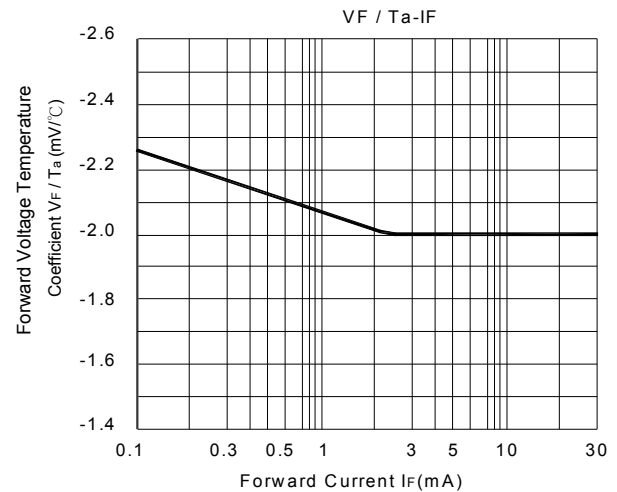


Fig.10 :

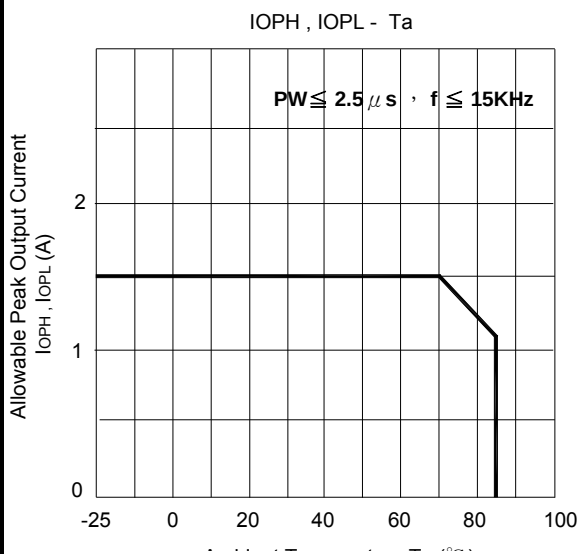


Fig.11:

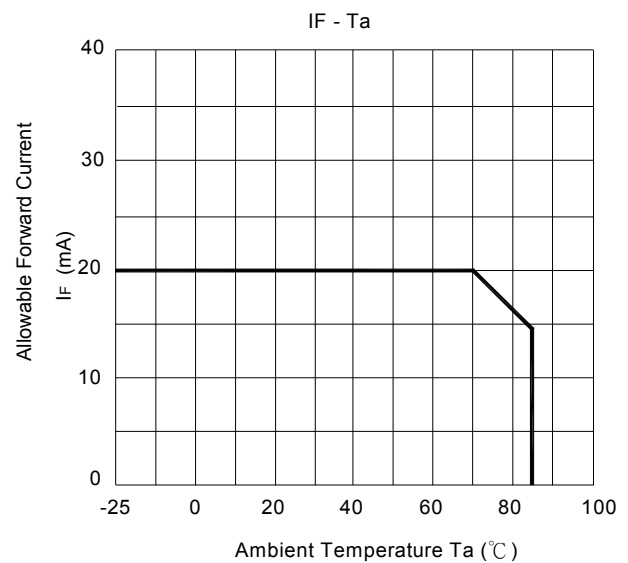


Fig.12:

