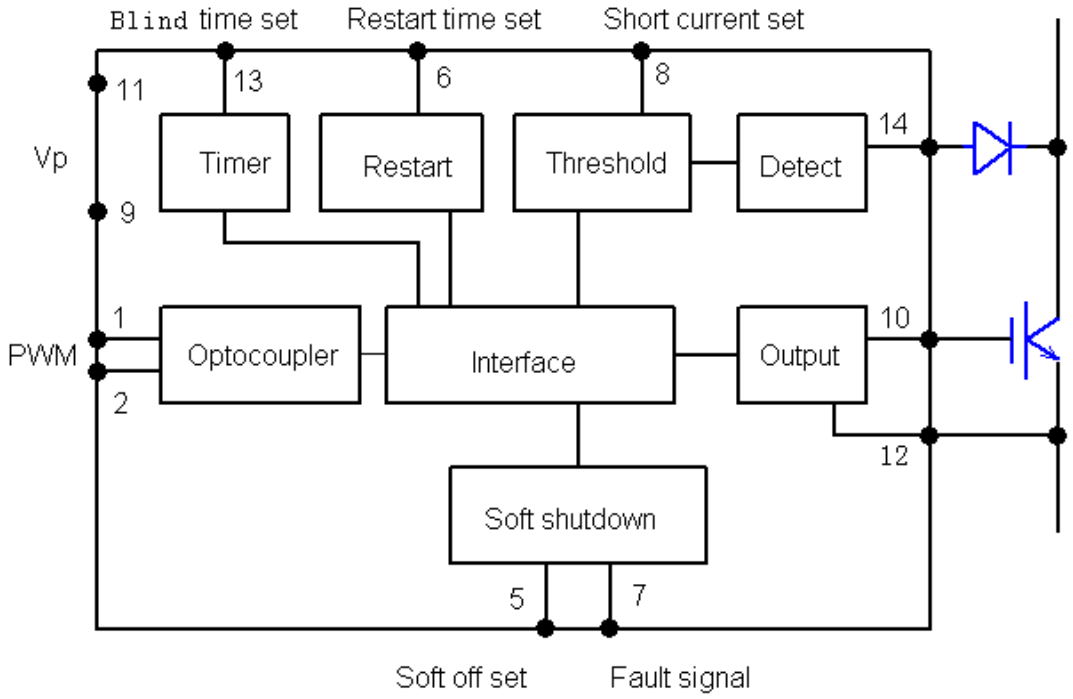
TX-KA962F IGBT Driver

Block Diagram



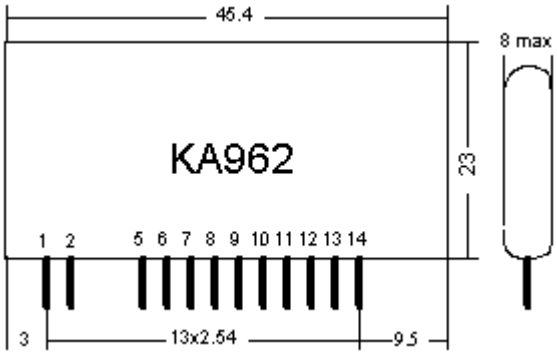
Features

- An IGBT driver for 300A/1200V .
- Default value can be generally used. Blind Time, Soft Shutdown Time and Restart Time after fault condition can also adjust with the requirement of application.
- Protect threshold of IGBT's short current can set exactly by a resistor.
- Use only one single power supply. A negative power supply generated by driver itself that reduce the external devices.

Application

- To drive IGBT for Inverter, Servo systems, Uninterrupted power supply (UPS), Welding applications.

Dimensions (mm)



Driving Characteristics (Ta=25℃, Vp=20V, Fop=50KHz, CL=100nF, unless otherwise stated)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input voltage and current (1)	Vm	Ipwm＝10mA		2		V
	Ipwm		9	10	12	mA
Output voltage	VOH			14.5		V
	VOL			-8		
Output current	IOHP	Fop=20KHz Ton=2μS		6		A
	IOLP			-6		
Gate resistor	Rg	User set	1.5	5.1	47	Ω
Output charge	Qout			2	2.8	μC
Operation Frequency	Fop		0		60	KHz
Duty cycle	δ		0		100	%
Min operation Ton	Tonmin	CL=100nF		0.5		μS
Rise delay	Trd			0.3		μS
Fall delay	Tfd			0.4		
Isolation voltage	VISO	Input to output, 50Hz/1 min		3500		Vrms
Max ΔV/Δt	CMR			30		KV/μS

Notes:

1. Need input pulse signal current 10mA, input resistance in series application Ri = (Vpwm-Vm) / 10mA, Vpwm PWM pulse is the input amplitude. When the user control system is 5V or 3.3V, because of different types and brands of the controller's output capacity of slightly different needs according to their actual output pulse rate to determine the value of Ri. General 5V system, Ri = 200-270Ω; 3.3V system, Ri = 56-120Ω.

Drive power requirements of

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Auxiliary supply voltage	Vp		20	24	25	V
Auxiliary supply current	Iio	CL=0		20		mA
	Iil	CL=100n		140		

Performance of short circuit protection (except otherwise specified, are measured in the following conditions: Ta = 25 ℃, Vp = 24V, Fop = 50KHz, analog load capacitance CL = 100nF)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Protection action threshold (1)	Vn	User settings, the default typical		10		V
Protection blind (2)	Tblind	User settings, the default minimal	1.2			μS
Soft turn-off time (3)	Tsoft	User settings, the default minimum	4			μS
Restart time after failure (4)	Treset	User settings, the default typical		1.1	10	mS
Failure signal delay	Talarm	Soft turn-off to output Failure		0.4		μS
Failure Signal output current	Ialarm	Negative level sink current		10		mA

注：

1. Over-current protection is triggered when the voltage between 14-pin to 12-pin (the IGBT emitter) rise to Vn. A resistor Rn between 8-pin to 12-pin can reduce the over-current protection threshold. Specific relationship is Rn / Vn (KΩ / V) = ∞ / 9.7, 220 / 9.2, 100 / 8.7, 68 / 8.3, 47 / 7.8, 33 / 7.2, 27 / 6.8, 22 / 6.35, 18 / 5.9, 15 / 5.5, 12 / 4.9. Threshold voltage Vn generally preferable to the normal turn-on voltage IGBT 2-2.5 times.

2. Drivers' response time for protection, namely, from the voltage of 14-pin is higher than the protection action threshold Vn to the soft turn-off beginning. There are several of transient disturb. But not all the disturb will damage IGBT. So it's necessary to setting blind time Tblind. Connecting a capacitor Cblind between pins 6 and 15 will set longer Tblind, the relation is: Cblind / Tblind (pF/μs) ＝0/1, 22/1.7, 47/2.2, 68/3, 100/4.1, 150/6.1 . Generally Tblind can be set in the 2-5μS.

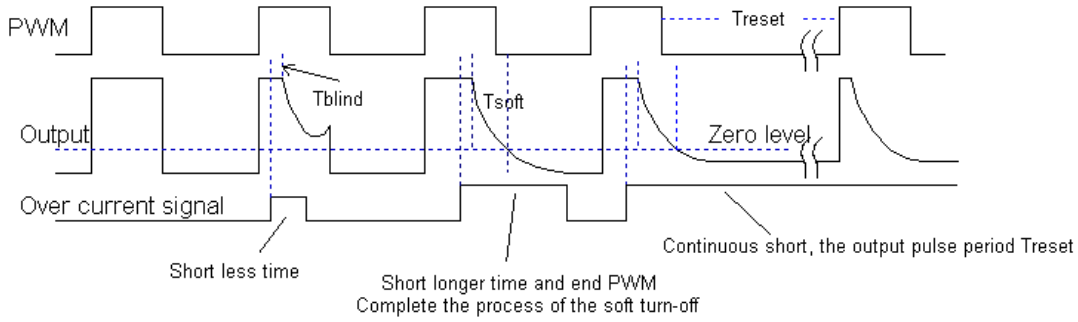
3. Time of Driving pulse voltage level down to 0V. A capacitor Csoft between pisn 5 and 12 can increase the soft turn-off time,the relation is Csoft / Tsoft (nF / μS) = 0 / 4, 2.2 / 5,4.7 / 6.2,10 / 8.6 , 15/10.6. Soft turn-off began, the driver blocks input PWM signal, even if the PWM signal becomes low, it will not immediately pull the output to normal negative level. The soft shutdown procedure will be carried through.

but in the end to turn-off process. When soft turn-off is began, pin 7 output alarm signal of low level, you can access a coupler, the signal transmitted to the control circuit.

When soft turn-off begins, the 7 pin drive low output alarm signal, you can access a coupler, the signal transmitted to the control circuit. The control circuit should shutdown the PWM signal.

4. Short-circuit fault occurs, the driver soft turn-off IGBT. If the control circuit does not take action, after the interval time Treset, the driver will output drive pulse again. A capacitor Creset in the Pins 6 and 12 can extend the time to start again. The relationship is Creset / Treset (nF / mS) = 0/1.15, 1/2.3, 2/3.45, the basic linear relationship . Capacitance Creset should not exceed 10nF.

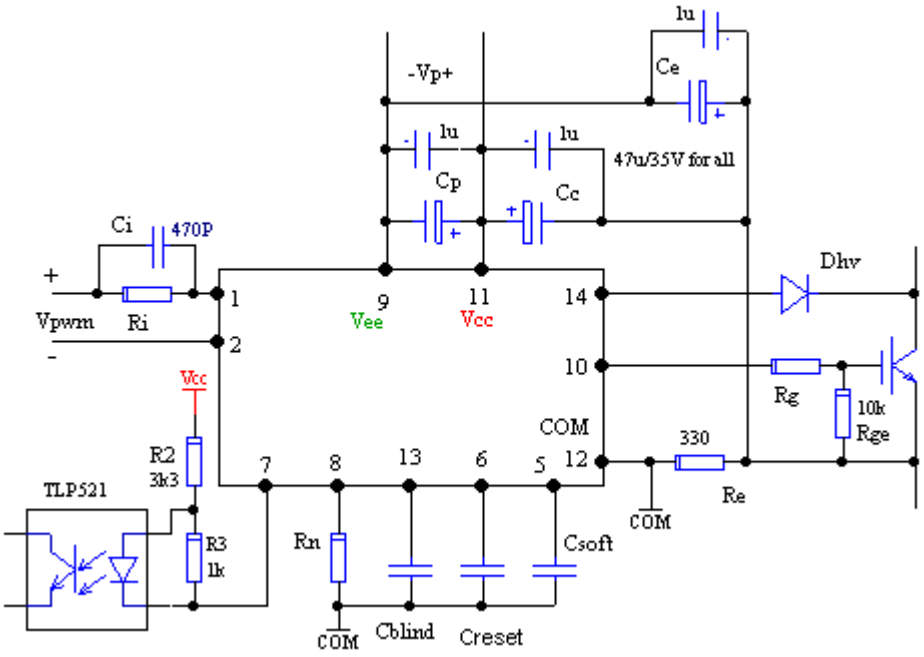
Over-current protection curve



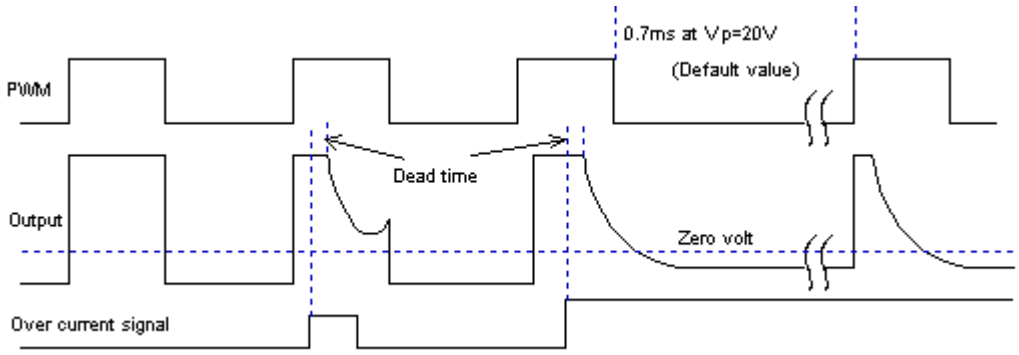
Working condition

	Symbol	Condition	Min	Typ	Max	Unit
Operating temperature	Top		-40		80	℃
Storage temperature	Tst		-60		140	℃

Application Circuit



Protect Waveform



Pins Descriptions:

1,2. Input signal. Potential of pin 1 is higher than pin 2, the driver output high.

3,4. None.

5. Soft turn-off time set port.

6. Restart time set port, after fault condition of short circuit.

7. Output port of fault signal.

8. Short current set port.

9. Negative port of auxiliary power supply Vp.

10. Output port of driver, connected to the gate of IGBT.

11. Positive port of auxiliary power supply Vp.

12. Ground reference of driver circuit, connected to the emitter of IGBT.

13. Blind time set port.

14. IGBT current detect port, connected to the collector of IGBT.