

Block Diagram

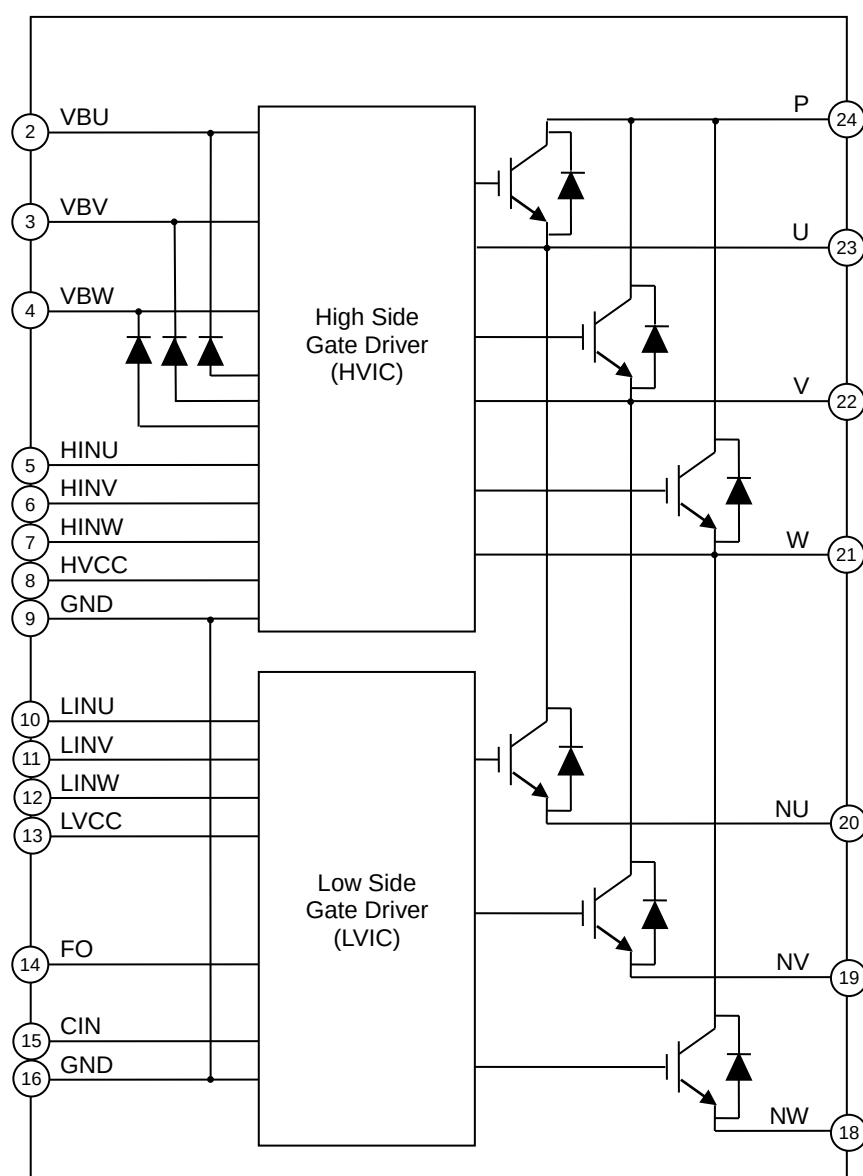


Figure 3. Block Diagram

Description of Block

1) High Side IGBT Drive (HVIC, Bootstrap Diode)

High voltage level shifting circuit drives high side IGBT.

Built-in bootstrap diode and current limit function for bootstrap diode enable HVIC to drive high side IGBT without external component (bootstrap diode, resistor). There is under-voltage-locked-out (UVLO) function for floating control power supply.

2) Low Side IGBT Drive (LVIC)

LVIC drives low side IGBT.

There is short circuit current protection (SCP), under-voltage locked out (UVLO) for control power supply LVCC, thermal shutdown (TSD) function. Alarm signal (FO) will output when these protection circuits work.

Absolute Maximum Ratings (Unless otherwise specified, T_j=25°C)

Inverter Part

Item		Symbol	Ratings	Unit	Conditions
Supply Voltage		V _P	450	V	Applied between P-NU,NV,NW
Supply Voltage(Surge)		V _{P(surge)}	500	V	Applied between P-NU,NV,NW
Collector-Emitter Voltage		V _{CES}	600	V	
Collector Current	DC	I _C	±30 (Note 1)	A	T _C =25°C
	PEAK	I _{CP}	±60 (Note 1)	A	T _C =25°C, less than 1ms
Collector Power Dissipation		P _C	59	W	T _C =25°C, per 1 chip
Junction Temperature		T _{jmax}	150	°C	

(Note 1) Do not, however exceed P_C, ASO.

Control part

Item		Symbol	Ratings	Unit	Conditions
Control Power Supply		V _{CC}	20	V	Applied between HVCC-GND, LVCC-GND
Floating Control Power Supply		V _{BS}	20	V	Applied between VBU-U, VBV-V, VBW-W
Control Input Voltage		V _{IN}	-0.5 to V _{CC} +0.5	V	Applied between HINX, LINX-GND (X=U,V,W)
Fault Output Supply Voltage		V _{FO}	-0.5 to V _{CC} +0.5	V	Applied between FO-GND
Fault Output Current		I _{FO}	1	mA	Sink current at FO pin
Current Sensing Input Voltage		V _{CIN}	-0.5 to +7.0	V	Applied between CIN-GND

Bootstrap diode part

Item		Symbol	Ratings	Unit	Conditions
Reverse Voltage		V _{RB}	600	V	
Junction Temperature		T _{jmaxD}	150	°C	

Total system

Item		Symbol	Ratings	Unit	Conditions
Self Protection Supply Voltage (SCP Capability)		V _{P(PROT)}	400	V	V _{CC} =13.5 to 16.5V, Inverter part T _J =125°C, non-repetitive, less than 2μs
Module Case Temperature		T _C	-25 to +100	°C	Measurement point of T _C is provided in Figure 2
Storage Temperature		T _{stg}	-40 to +125	°C	
Isolation Voltage		V _{iso}	1500	V _{rms}	Sinusoidal, 60Hz, AC 1minute, between connected all pins and heat sink plate

Thermal resistance

Item	Symbol	Limit			Unit	Conditions
		Min	Typ	Max		
Junction to Case Thermal Resistance (Note 2)	R _{th(j-c)_IGBT}	-	-	2.1	°C /W	Inverter IGBT(1/6 module)
	R _{th(j-c)_FWD}	-	-	3.0	°C /W	Inverter FWD(1/6 module)

(Note 2) Grease with good conductivity and high reliability should be applied evenly with +100 to +200μm on the contacting surface of IPM and heat sink. Use a torque wrench to fasten up to the specified torque rating. The contacting thermal resistance between IPM case and heat sink is determined by the thickness and the thermal conductivity of the applied grease.

Caution: Operating the IPM over the absolute maximum ratings may damage the IPM. The damage can either be a short circuit between pins or an open circuit between pins and the internal circuitry. Therefore, it is important to consider circuit protection measures, such as adding a fuse, in case the IPM is operated over the absolute maximum ratings.