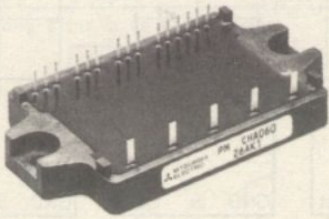


PM20CHA060

FLAT-BASE TYPE
INSULATED PACKAGE

Datasheet provided by
www.ineltron.com

PM20CHA060



- 3φ 20A, 600V Current-sense IGBT type inverter
- Monolithic gate drive & protection logic
- Detection, protection & status indication circuits for over-current, short-circuit, over-temperature & under-voltage
- Acoustic noise-less 1.5kW class inverter application
- UL Recognized

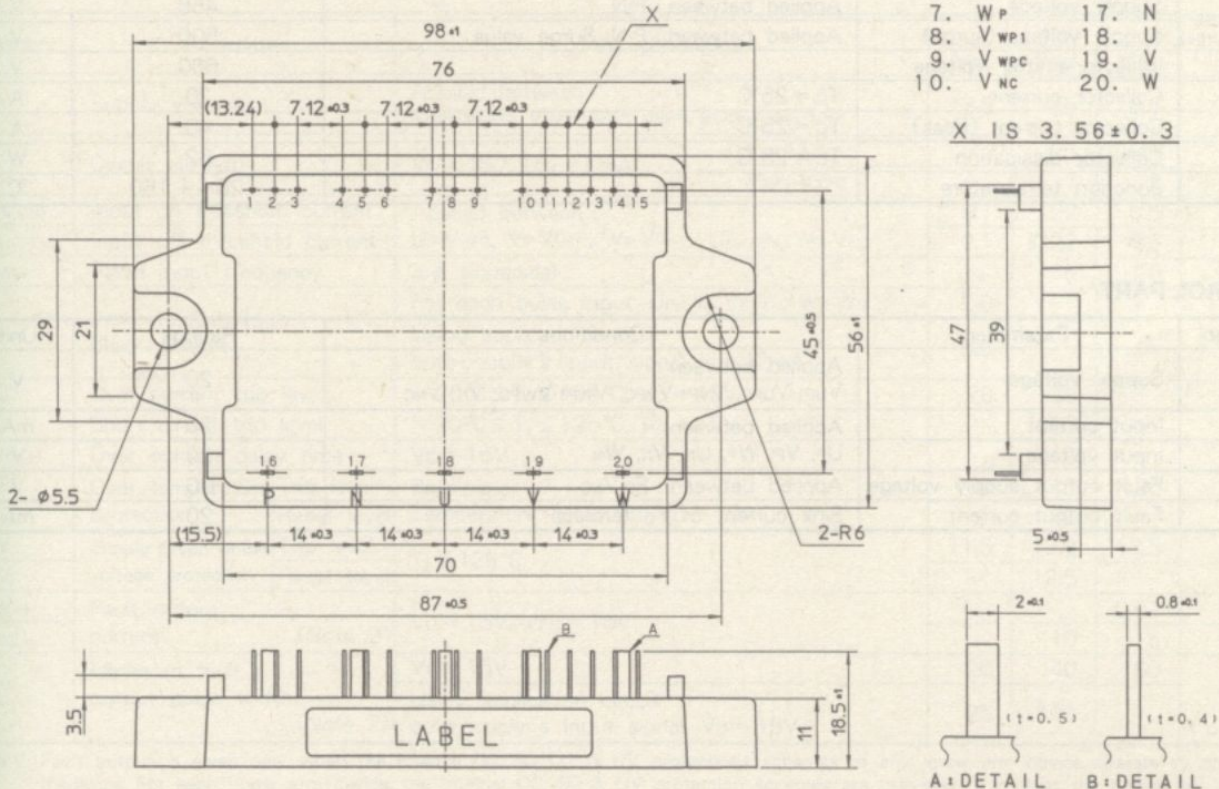
Yellow Card No. E80276 (N)
File No. E80271

APPLICATION

General purpose inverter, servo drives and other motor controls

OUTLINE DRAWING

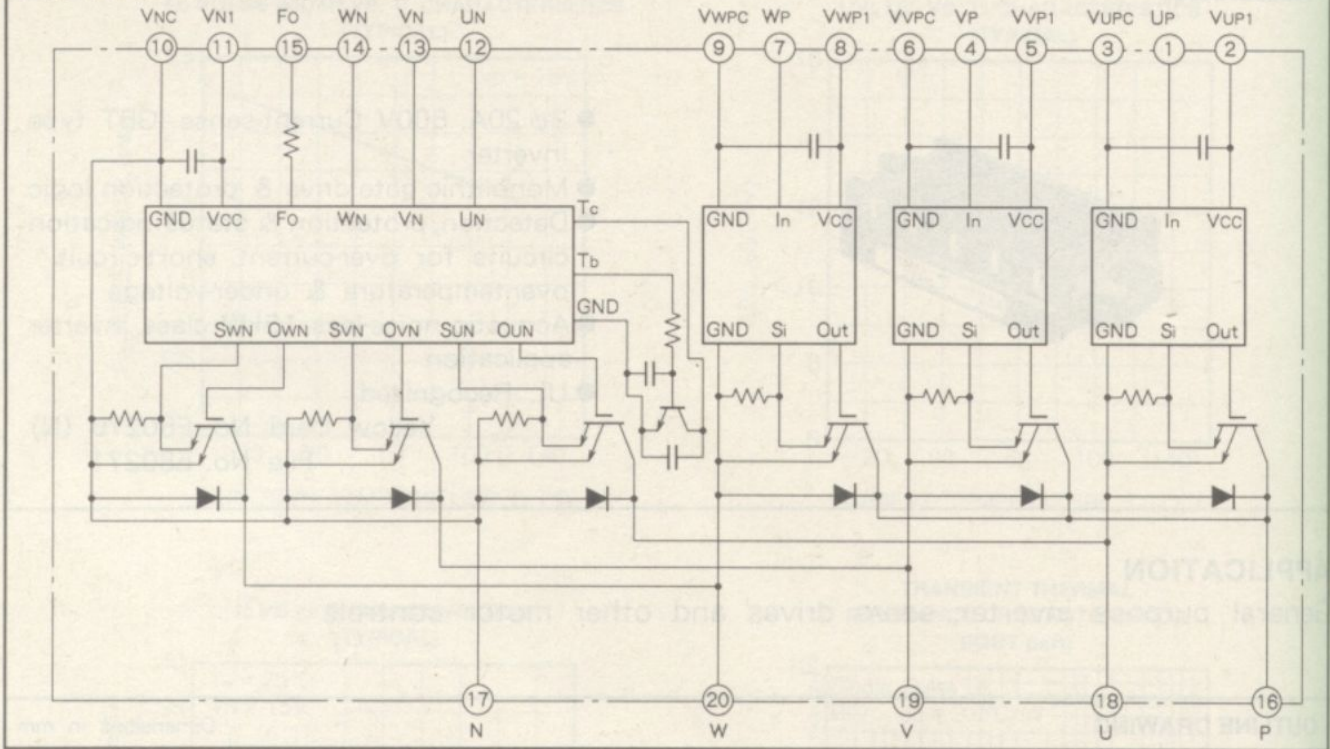
Dimensions in mm



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EQUIVALENT CIRCUIT DIAGRAM



MAXIMUM RATINGS (Tj = 25 °C, unless otherwise noted)

INVERTER PART

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply voltage	Applied between : P-N	450	V
Vcc(surge)	Supply voltage (surge)	Applied between : P-N, Surge value	500	V
Vces	Collector-emitter voltage		600	V
± Ic	Collector current	Tc = 25 °C	20	A
± Icp	Collector current (Peak)	Tc = 25 °C	40	A
Pc	Collector dissipation	Tc = 25 °C	62	W
Tj	Junction temperature		- 20 ~ + 150	°C

CONTROL PART

Symbol	Parameter	Conditions	Ratings	Unit
Vd	Supply voltage	Applied between : VUP1-VUPC, VVP1-VVPC, VN1-VNC	20	V
Icin	Input current	Applied between :	20	mA
Vcin	Input voltage	Up, Vp, Wp, Un, Vn, Wn	20	V
Vfo	Fault output supply voltage	Applied between : Fo-Vnc	20	V
Ifo	Fault output current	Sink current of Fo terminal	20	mA

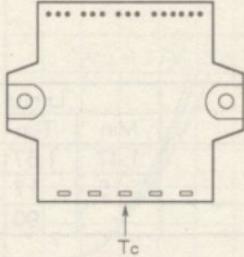
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TOTAL SYSTEM

Symbol	Parameter	Conditions	Ratings	Unit
V _{CC(Prot)}	Supply voltage protected by OC & SC	V _D = 13.5~16.5V Inverter Part, T _j = 125°C Start	400	V
T _c	Module case operating temperature	(Note 1)	- 20~+ 100	°C
T _{stg}	Storage temperature		- 40~+ 125	°C
V _{iso}	Isolation voltage	60Hz, Sinusoidal, AC, 1min	2500	V _{rms}

Note 1. T_c measuring point is as shown below



ELECTRICAL CHARACTERISTICS (T_j = 25°C, unless otherwise noted)

INVERTER PART

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _{CE(sat)}	Collector-emitter saturation voltage	V _D = 15V, I _{CIN} = 0mA Pulsed				V
		I _c = 20A, T _j = 25°C I _c = 20A, T _j = 125°C	-	2.6 2.5	3.5 3.4	
V _{EC}	FWDi forward voltage	- I _c = 20A, V _D = 15V, I _{CIN} = 1mA	-	1.9	2.5	V
t _{on}	Switching time	V _D = 15V, I _{CIN} = 0mA ↔ 1mA V _{CC} = 300V, I _c = 20A T _j = 125°C (Per 1 arm) Inductive load	0.5	0.9	1.5	μs
t _{rr}			-	0.15	0.4	μs
t _{c(on)}			-	0.3	1.0	μs
t _{off}			-	2.0	2.5	μs
t _{c(off)}			-	0.5	1.5	μs
I _{CES}	Collector-emitter cutoff current	V _{CE} = V _{CES}				mA
		T _j = 25°C T _j = 125°C	-	-	1 10	

CONTROL PART

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _D	Supply voltage	Applied between : V _{UP1} -V _{UPC} , V _{VP1} -V _{VPc} , V _{WP1} -V _{WPC} , V _{N1} -V _{Nc}	13.5	15	16.5	V
I _D	Circuit current	V _D = 15V, I _{CIN} = 1mA				mA
		V _{N1} -V _{Nc} V _{XP1} -V _{XPc}	-	25 7	40 12	
I _{CIN(ON)}	Input on threshold current	Applied between :	0.1	0.22	0.5	mA
I _{CIN(OFF)}	Input off threshold current	U _P -V _{UPC} , V _P -V _{VPc} , W _P -V _{WPC} , U _N , V _N , W _N -V _{Nc}	0.1	0.22	0.5	
f _{PWM}	PWM input frequency	3 φ sinusoidal	-	15	20	kHz
t _{dead}	Arm shoot-through blocking time	For each pulse input, U _P -U _N , V _P -V _N , W _P -W _N	2.0	-	-	μs
		Using application circuit opto-coupler's input signal I _F = 12mA	5.0	-	-	
OC	Over current trip level	- 20°C ≤ T _j ≤ 125°C, V _D = 15V	28	38	-	A
SC	Short circuit trip level	- 20°C ≤ T _j ≤ 125°C, V _D = 15V	-	57	-	A
t _{off(oc)}	Over current delay time	V _D = 15V	-	10	-	μs
OT	Over temperature protection	Trip level	100	110	120	°C
OT _r		Reset level	-	90	-	
UV	Supply circuit under voltage protection	Trip level	11.5	12.0	12.5	V
UV _r		Reset level	-	12.5	-	
I _{FO(H)}	Fault output current (Note 2)	V _D = 15V, V _{FO} = 15V	-	-	0.01	mA
I _{FO(L)}			-	10	15	
t _{fo}	Minimum fault output pulse width (Note 2)	V _D = 15V	20	40	60	μs
		Using application circuit opto-coupler's input signal, V _D = 15V	25	100	-	

Note 2. Fault output is given only when the internal OC, SC, OT & UV protections schemes of any lower arm device operate to protect the device. For each upper arm device, the internal OC, SC & UV protection schemes are provided to protect the device but, no fault output is given.

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THERMAL RESISTANCES

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
R _{th(j-c)Q}	Junction-to-case	Inverter IGBT part, per 1/6 module	-	-	2.0	°C/W
R _{th(j-c)F}	thermal resistances	Inverter FWDi part, per 1/6 module	-	-	4.5	°C/W
R _{th(c-f)}	Contact thermal resistance	Thermal grease applied, per 1/6 module	-	-	0.4	°C/W

MECHANICAL RATINGS AND CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
-	Mounting torque	Mounting part screw : M5	1.47	1.67	1.96	N · m
-	Weight	-	15	17	20	kg · cm
-	Weight	-	-	90	-	g

RECOMMENDED CONDITIONS FOR USE

Symbol	Parameter	Test conditions	Value			Unit
			Min	Typ	Max	
V _{cc}	Supply voltage	Applied across P-N terminals	0	300	400	V
V _D		Applied between : V _{UP1} -V _{UPC} , V _{VP1} -V _{VP3} , V _{WP1} -V _{WPC} , V _{NP1} -V _{N3}	13.5	15	16.5	V
I _{CIN(ON)}	Input on current	Applied between :	0	-	0.05	mA
I _{CIN(OFF)}	Input off current	U _P , V _P , W _P , U _N , V _N , W _N	0.5	-	2	mA
f _{PWM}	PWM input frequency	Using application circuit	5	15	20	kHz
t _{dead}	Arm shoot-through blocking time	Using application circuit opto-coupler's input signal	5.0	-	-	μs