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Apr.	T.Igarashi 14,Jul,'05			

TENTATIVE

- I_C.....20A
- V_{CES}.....600V
- Insulated Type
- DIP-CIB Module
  3 ϕ Inverter+3 ϕ Converter+Brake

APPLICATION

AC & DC motor controls, General purpose inverters

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

Inverter Part

Symbol	Parameter	Condition	Rating	Units
V_{CES}	Collector-emitter voltage	G-E Short	600	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	V
I_C	Collector current	DC, Tc=100°C (Note 1)	(20)	A
I_{CM}		Pulse (Note 3)	(40)	A
P_C	Maximum collector dissipation	Tc=25°C	(−)	W
$I_{E\ (Note2)}$	Emitter current	DC, Tc=56°C (Note 1)	(20)	A
$I_{EM\ (Note2)}$		Pulse (Note 3)	(40)	A

Brake Part

Symbol	Parameter	Condition	Rating	Units
V_{CES}	Collector-emitter voltage	G-E Short	600	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	V
I_C	Collector current	DC, Tc=100°C (Note 1)	(10)	A
I_{CM}		Pulse (Note 3)	(20)	A
$P_{C\ (Note4)}$	Maximum collector dissipation	Tc=25°C	(−)	W
V_{RRM}	Repetitive peak reverse voltage	Clamp diode part	600	V
$I_{FM\ (Note4)}$	Forward current	Clamp diode part	(10)	A

Converter Part

Symbol	Parameter	Condition	Rating	Units
V_{RRM}	Repetitive peak reverse voltage		(800)	V
E_a	Recommended AC input voltage		(220)	V
I_O	DC output current	3 ϕ rectifying circuit	(20)	A
I_{FSM}	Surge forward current	1/2cycle at 60Hz,Peak value Non-repetitive	(−)	A
I^2t	I^2t for fusing	Value for 1cycle of surge current	(−)	A^2s

Common Rating

Symbol	Parameter	Condition	Rating	Units
Tj	junction temperature (Note 5)	Inverter, brake, converter part	-20 ～ 125	°C
Tstg	Storage temperature		-20 ～ 125	°C
Viso	Isolation voltage	60Hz, Sinusoidal AC 1 min. Applied between pins and heat-sink	2500	Vrms
-	Mounting torque	Screw: M4 Recommended: 1.18N·m	(0.98～1.47)	N·m
-	Weight	Typical value	52	g

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

Inverter Part

Symbol	Parameter	Conditions		Characteristics			Units
				Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	$V_{CE}=V_{CES}$, $V_{GE}=0V$		—	—	1	mA
$V_{GE(th)}$	Gate emitter threshold voltage	$I_C=2.0mA$, $V_{CE}=10V$		(6.5)	(7.5)	(8.5)	V
I_{GES}	Gate emitter cutoff current	$V_{GE}=20V$, $V_{CE}=0V$		—	—	(1)	μA
V_{CE}(sat)	Collector emitter saturation voltage	$I_C=20A$	Tj=25°C	—	(1.8)	(2.5)	V
		$V_{GE}=15V$ (Note6)	Tj=125°C	—	(2.0)	—	
Cies	Input capacitance	$V_{CE}=10V$, $V_{GE}=0V$ f=1MHz		—	—	(—)	nF
Coes	Output Capacitance			—	—	(—)	
Cres	Reverse transfer capacitance			—	—	(—)	
Q_G	Total gate charge	$V_{CC}=300V$,$I_C=20A$,$V_{GE}=15V$		—	(—)	—	nC
td(on)	Turn-on delay time	$V_{CC}=300V$, $I_C=20A$ $V_{GE}=\pm15V$, $R_G=**\Omega$ Tj=25°C Inductive load		—	—	(—)	ns
tr	Turn-on rise time			—	—	(—)	
td(off)	Turn-off delay time			—	—	(—)	
tf	Turn-off fall time			—	—	(—)	
V_{EC} (Note1)	Emitter-collector voltage	$I_E=20A$,$V_{GE}=0V$		—	(1.7)	(2.2)	V
trr (Note1)	Reverse recovery time	$V_{CC}=300V$, $I_C=(10A)$ $V_{GE}=\pm15V$, $R_G=**\Omega$,Tj=25°C		—	(—)	—	ns
Qrr (Note1)	Reverse recovery charge			—	(—)	—	μC
Rth(j-c)Q	Thermal resistance	IGBT part, per 1/6 module		—	(1.3)	—	°C/W
Rth(j-c)R		FWDi part, per 1/6 module		—	(1.9)	—	
Rg	External gate resistance			(—)	—	(—)	Ω

Brake Part

Symbol	Parameter	Conditions		Characteristics			Units
				Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	$V_{CE}=V_{CES}$, $V_{GE}=0V$		—	—	1	mA
$V_{GE(th)}$	Gate emitter threshold voltage	I_C=1.0mA, V_{CE}=10V		(6.5)	(7.5)	(8.5)	V
I_{GES}	Gate emitter cutoff current	V_{GE}=20V, V_{CE}=0V		—	—	(1)	μA
VCE(sat)	Collector emitter saturation voltage	I_C=(10)A	Tj=25°C	—	(1.8)	(2.5)	V
		V_{GE}=15V (Note6)	Tj=125°C	—	(2.0)	—	
Cies	Input capacitance	V_{CE}=10V, V_{GE}=0V		—	—	(—)	nF
Coes	Output Capacitance	f=1MHz		—	—	(—)	
Cres	Reverse transfer capacitance			—	—	(—)	
Q_G	Total gate charge	V_{CC}=300V,I_C=(10)A,V_{GE}=15V		—	(—)	—	nC
td(on)	Turn-on delay time	V_{CC}=300V, I_C=(10)A		—	—	(—)	ns
Tr	Turn-on rise time	V_{GE}=±15V, R_G= **Ω		—	—	(—)	
td(off)	Turn-off delay time	Tj=25°C		—	—	(—)	
Tf	Turn-off fall time	Inductive load		—	—	(—)	
V_{FM}	Forward voltage drop	IF=(10)A,Clamp diode part		—	(1.7)	(2.2)	V
Trr	Reverse recovery time	V_{CC}=300V, I_C=(10)A,		—	(—)	—	ns
Qrr	Reverse recovery charge	V_{GE}=±15V R_G=**Ω, Tj=25°C		—	(—)	—	μC
Rth(j-c)Q	Thermal resistance	IGBT part		—	(1.7)	—	°C/W
Rth(j-c)R		FWDi part		—	(2.3)	—	
Rg	External gate resistance			(—)	—	(—)	Ω

Converter Diode Part

Symbol	Parameter	Conditions	Characteristics			Units
			Min.	Typ.	Max.	
I_{RRM}	Repetitive reverse current	$V_R=V_{RRM}$, Tj=125°C	—	—	(1.0)	mA
V_{FM}	Forward voltage drop	I_F=20A	—	(—)	(—)	V
Rth(j-c)	Thermal resistance	Per 1/6 module	—	(1.4)	—	°C/W

NTC Thermistor Part

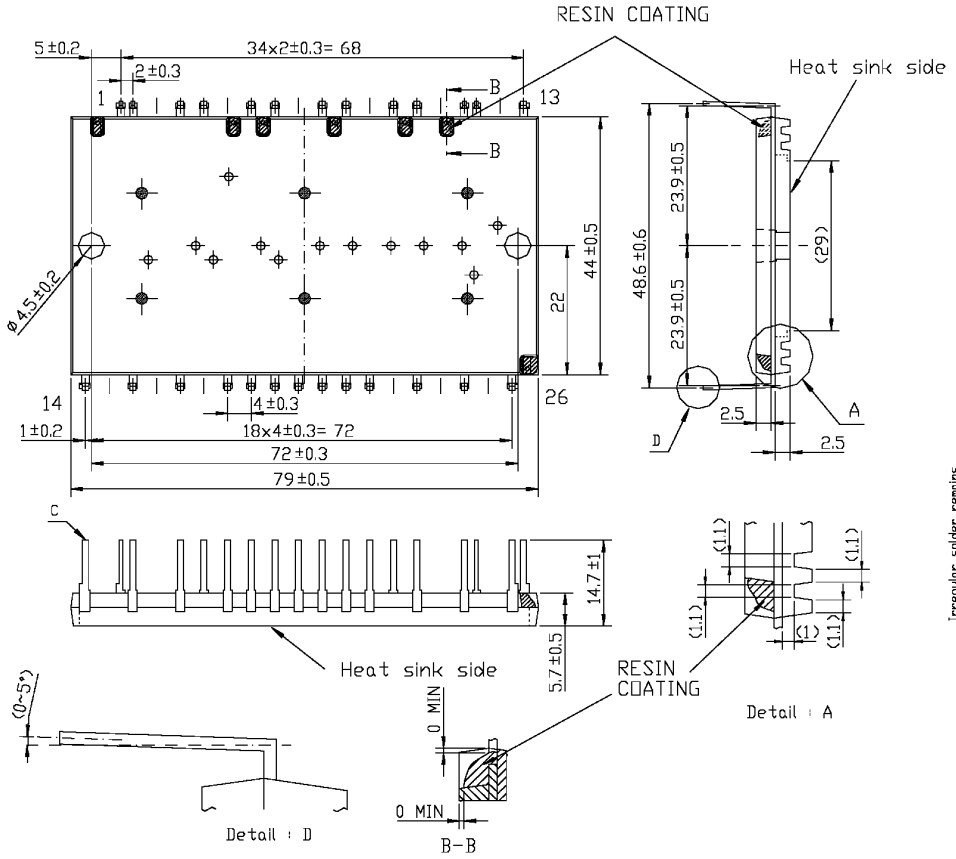
Symbol	Parameter	Conditions	Characteristics			Units
			Min.	Typ.	Max.	
R_{TH}	Resistance	Tc=25°C	(9.5)	10.0	(10.5)	kΩ
$B_{(25/100)}$	B Constant	Resistance at 25°C,100℃ (Note 7)	—	3450	—	K

Common Rating

Symbol	Parameter	Conditions	Characteristics			Units
			Min.	Typ.	Max.	
Rth(c-f)	Contact thermal resistance	Case to fin,thermal compound applied (1module)	—	—	—	°C/W

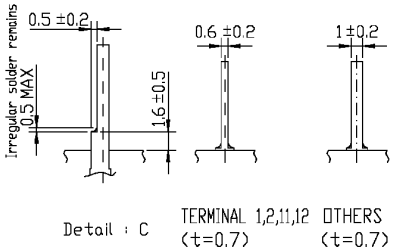
Note1 Tc is measured at the position just underneath the power chip.
Note2 I_E, V_{EC}, trr, and Qrr represent characteristics of the anti-paralleled emitter to collector free-wheel diode(FWDi).
Note3 Pulse width and repetition rate should be such that the device junction temp.(Tj) does not exceed Tjmax rating.
Note4 Junction temperature(Tj) should not increase beyond 150°C.
Note5 The maximum junction temperature rating of the power chips integrated inside DIP-CIB is 150°C. However, to ensure safe operation of DIP-CIB, the average junction temperature should be limited to below 125°C.
Note5 Pulse width and repetition rate should be such as to cause negligible temperature rise.
Note6 B = (lnR1-lnR2)/(1/T1-1/T2) where R1 is the resistance at T1(K), R2 the resistance at T2(K)

Outline Drawing



TERMINAL CODE

1. TH1	15. S
2. TH2	16. T
3. P1	17. N1
4. P	18. GUN
5. GUP	19. UN
6. EUP	20. GVN
7. GVP	21. VN
8. EVP	22. GWN
9. GWP	23. WN
10. EWP	24. U
11. GB	25. V
12. N(B)	26. W
13. B	
14. R	



Circuit Diagram