Tentative

CM150RL-12NF

Pre.	M.Koura	Rev	B	H.Harada, M.Koura
Apr.	T.Furuie 27-Nov.-'03			T. Furuie 20-May-'04

HIGH POWER SWITCHING USE

Notice : This is not a final specification. Some parametric limits are subject to change.

CM150RL-12NF
- Ic 150A
- V_{CES} 600V
- Insulated Type
- 7-elements in a pack

APPLICATION

AC drive inverters & Servo controls,etc

ABSOLUTE MAXIMUM RATINGS (T_j = 25 °C)

Inverter part

Symbol	Item	Conditions	Ratings	Units
V_{CES}	Collector-emitter voltage	G-E Short	600	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	
I_C	Collector current	DC, Tc=93°C *1	150	A
I_{CM}		Pulse ②	300	
I_E ①	Emitter current		150	
I_{EM} ①		Pulse ②	300	
Pc ③	Maximum collector dissipation	Tc= 25 °C	730	W

Brake part

Symbol	Item	Conditions	Ratings	Units
V_{CES}	Collector-emitter voltage	G-E Short	600	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	
I_C	Collector current	DC, Tc=102°C *1	75	A
I_{CM}		Pulse ②	150	
Pc ③	Maximum collector dissipation	Tc= 25 °C	430	W
V_{RRM}	Repetitive peak reverse voltage	Clamp diode part	600	V
I_{FM}	Forward current	Clamp diode part	75	A

(Common rating)

Symbol	Item	Conditions	Ratings	Units
Tj	Junction temperature		−40~+150	°C
Tstg	Storage temperature		−40~+125	
Viso	Isolation voltage	Main terminal to base plate,AC 1 min.	2500	V
—	Torque strength	Main terminal M5	2.5~3.5	N·m
—	Torque strength	Mounting holes M5	2.5~3.5	
—	Weight	Typical value	350	g

ELECTRICAL CHARACTERISTICS (T_j = 25 °C)

Inverter part

Symbol	Item	Conditions	Min.	Typ.	Max.	Units	
I_{CES}	Collector cutoff current	$V_{CE}=V_{CES}, V_{GE}$= 0V	—	—	1	mA	
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C=15mA, V_{CE}= 10V	6	7	8	V	B
I_{GES}	Gate leakage current	$V_{GE}=V_{GES}$, V_{CE}= 0V	—	—	0.5	μA	
$V_{CE(sat)}$	Collector to emitter saturation voltage	T_j= 25 °C, I_C = 150A	—	1.7	2.2	V	
		T_j= 125 °C, V_{GE}= 15V	—	1.7	—		
Cies	Input capacitance	V_{CE}= 10V, V_{GE}= 0V	—	—	23	nF	
Coes	Output capacitance		—	—	2.8		
Cres	Reverse transfer capacitance		—	—	0.9		
Q_G	Total gate charge	V_{CC}=300V, Ic=150A, V_{GE}=15V	—	600	—	nC	
td(on)	Turn-on delay time	V_{CC}=300V, Ic=150A, $V_{GE1}=V_{GE2}$=15V, R_G=4.2Ω, Inductive load switching operation, I_E=150A	—	—	120	ns	A
tr	Turn-on rise time		—	—	100		
td(off)	Turn-off delay time		—	—	300		
tf	Turn-off fall time		—	—	300		
trr ①	Reverse recovery time		—	—	150		A
Qrr ①	Reverse recovery charge		—	2.5	—	μC	
V_{EC} ①	Emitter-collector voltage	I_E=150A, V_{GE}= 0V	—	—	2.8	V	B
Rth(j-c)Q	Thermal resistance	IGBT part (1/6 module) *1	—	—	0.17	°C/W	
Rth(j-c)R	Thermal resistance	FWDi part (1/6 module) *1			0.31		
Rth(c-f)	Contact thermal resistance	Case to fin, Thermal compound Applied (1/6module) *2	—	0.085	—		B
RG	External gate resistance		4.2	—	42	Ω	

Brake Part

Symbol	Item	Conditions		Min.	Typ.	Max.	Units
I_{CES}	Collector cutoff current	$V_{CE}=V_{CES}, V_{GE}=0V$		—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=7.5mA$		6	7	8	V
I_{GES}	Gate leakage current	$V_{GE}=V_{GES}, V_{CE}=0V$		—	—	0.5	μA
$V_{CE(sat)}$	Collector to emitter saturation voltage	$T_j=25$ °C	$I_C=75A$	—	1.7	2.2	V
		$T_j=125$ °C	$V_{GE}=15V$	—	1.7	—	
Cies	Input capacitance	$V_{CE}=10V$, $V_{GE}=0V$		—	—	11.3	nF
Coes	Output capacitance			—	—	1.4	
Cres	Reverse transfer capacitance			—	—	0.45	
Q_G	Total gate charge	$V_{CC}=300V, I_C=75A, V_{GE}=15V$		—	300	—	nC
V_{FM}	Forward voltage drop	$I_F=75A$				2.6	V
Rth(j-c)Q	Thermal resistance	IGBT part *1		—	—	0.29	°C/W
Rth(j-c)R		Clamp diode part*1		—	—	0.51	

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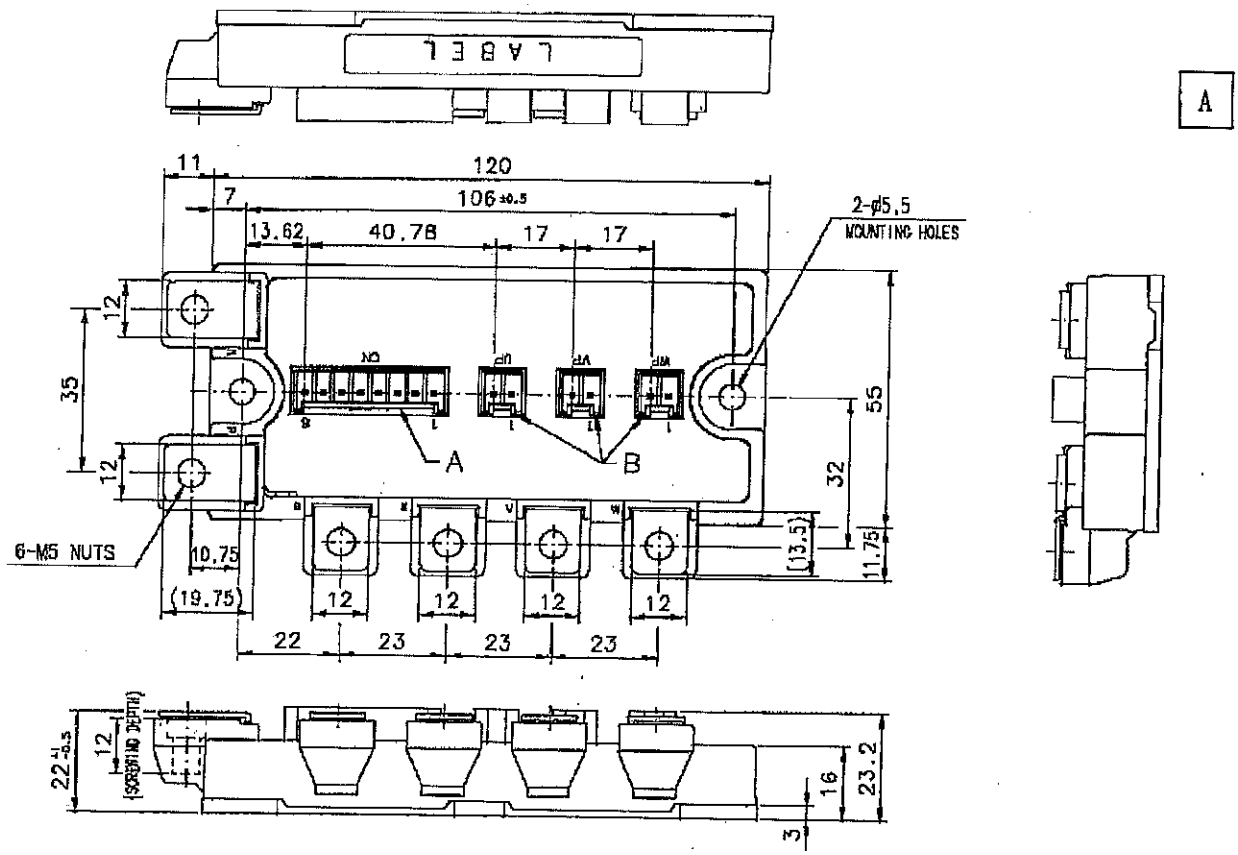
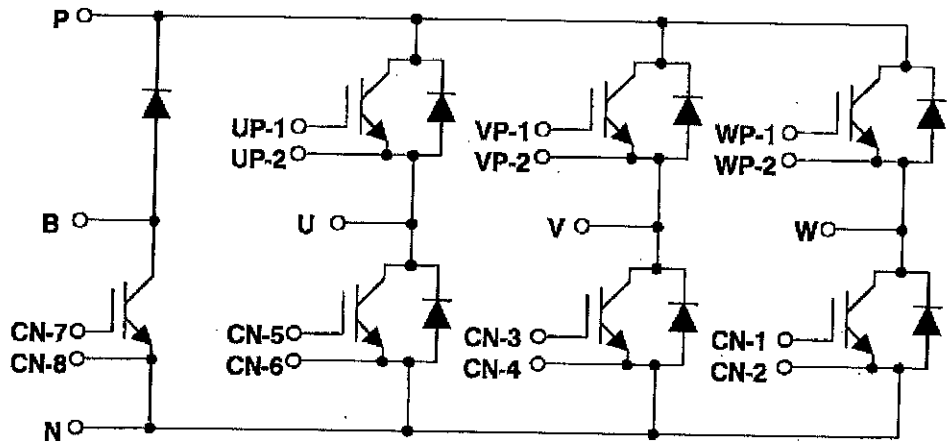
*1: Tc measured point is just under the chips.
If you use this value , Rth(f-a) should be measured just under the chips.
*2: Typical value is measured by using Shin-etsu Silicone "G-746".
① I_E,V_{EC},trr,Qrr represent characteristics of the anti-parallel,emitter to collector free-wheel diode (FWDi).
② Pulse width and repetition rate should be such that the device junction temp.(T_j) dose not exceed Tjmax rating.
③ Junction temperature (T_j) should not increase beyond 150°C.
④ Pulse width and repetition rate should be such as to cause neglible temperature rise.

OUTLINE DRAWING

Dimensions in mm



CIRCUIT DIAGRAM



CHIP LAYOUT DRAWING

Dimensions in mm

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