Tentative

CM50RU-24NF

Pre.	H. Hanada	Rev		
Apr.	M. Takata 8-Aug. '03			

HIGH POWER SWITCHING USE

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

CM50RU-24NF
- Ic ····· 50A
- V_{CES} ····· 1200V
- Insulated Type
- 7-elements in a pack

APPLICATION

AC drive inverters & Servo controls,etc

ABSOLUTE MAXIMUM RATINGS (T_j = 25 ℃)

Inverter part

Symbol	Item	Conditions	Ratings	Units
V_{CES}	Collector-emitter voltage	G-E Short	1200	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	
I_C	Collector current	DC, Tc'=88℃ *3	50	A
I_{CM}		Pulse ②	100	
I_E ①	Emitter current		50	
I_{EM} ①		Pulse ②	100	
Pc ③	Maximum collector dissipation	Tc= 25 ℃	220	W

Brake part

Symbol	Item	Conditions	Ratings	Units
V_{CES}	Collector-emitter voltage	G-E Short	1200	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	
I_C	Collector current	DC, Tc'=99℃ *3	30	A
I_{CM}		Pulse ②	60	
Pc ③	Maximum collector dissipation	Tc= 25 ℃	160	W
V_{RRM}	Repetitive peak reverse voltage	Clamp diode part	1200	V
I_{FM}	Forward current	Clamp diode part	30	A

(Common rating)

Symbol	Item	Conditions	Ratings	Units
Tj	Junction temperature		−40~+150	℃
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 ℃)

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=5mA, V_{CE}= 10V		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 ℃	I_C = 50A	—	2.1	3.0	V
		T_j= 125 ℃	V_{GE}= 15V	—	2.4	—	
Cies	Input capacitance	V_{CE}= 10V, V_{GE}= 0V		—	—	8.5	nF
Coes	Output capacitance			—	—	0.75	
Cres	Reverse transfer capacitance			—	—	0.17	
Q_G	Total gate charge	V_{CC}=600V, Ic=50A, V_{GE}=15V		—	250	—	nC
td(on)	Turn-on delay time	V_{CC}=600V, Ic=50A, $V_{GE1}=V_{GE2}$=15V, R_G=6.3Ω, Inductive load switching operation, I_E=50A		—	—	120	ns
tr	Turn-on rise time			—	—	80	
td(off)	Turn-off delay time			—	—	450	
tf	Turn-off fall time			—	—	350	
trr ①	Reverse recovery time			—	—	150	
Qrr ①	Reverse recovery charge			—	4.5	—	μC
V_{EC} ①	Emitter-collector voltage	I_E=50A, V_{GE}= 0V		—	—	3.8	V
Rth(j-c)Q	Thermal resistance	IGBT part (1/6 module) *1		—	—	0.56	℃/W
Rth(j-c)R		FWDi part(1/6 module) *1		—	—	0.88	
Rth(c-f)	Contact thermal resistance	Case to fin, Thermal compound Applied (1/6module) *2		—	—	0.038	
Rth(j-c')Q	Thermal resistance	IGBT part (1/6 module) *3		—	—	0.35	
Rth(j-c')R	Thermal resistance	FWDi part (1/6 module) *3				0.48	
RG	External gate resistance			6.3	—	96	Ω

Brake Part

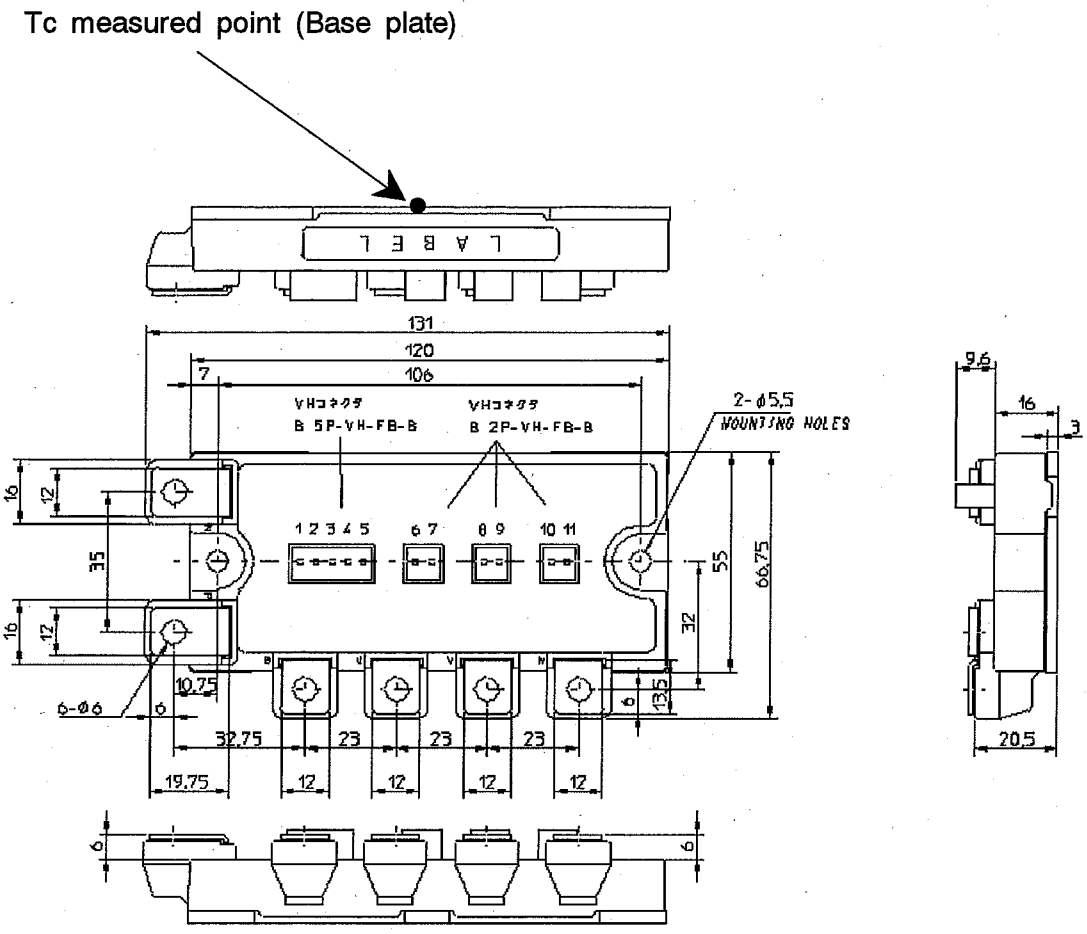
Symbol	Item	Conditions		Min.	Typ.	Max.	Units
I_{CES}	Collector cutoff current	$V_{CE}=V_{CES}, V_{GE}=$ 0V		–	–	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C=3mA, $V_{CE}=$ 10V		6	7	8	V
I_{GES}	Gate leakage current	$V_{GE}=V_{GES}$, $V_{CE}=$ 0V		–	–	0.5	μA
$V_{CE(sat)}$	Collector to emitter saturation voltage	$T_j=$ 25 °C	I_C = 50A	–	2.1	3.0	V
		$T_j=$ 125 °C	$V_{GE}=$ 15V	–	2.4	–	
Cies	Input capacitance	$V_{CE}=$ 10V		–	–	5.1	nF
Coes	Output capacitance	$V_{GE}=$ 0V		–	–	0.45	
Cres	Reverse transfer capacitance			–	–	0.10	
Q_G	Total gate charge	V_{CC}=600V, Ic=50A, V_{GE}=15V		–	150	–	nC
V_{FM}	Forward voltage drop						V
Rth(j-c)Q	Thermal resistance	IGBT part *1		–	–	0.77	°C/W
Rth(j-c)R		Clamp diode part*1		–	–	1.45	
Rth(j-c')Q		IGBT part *3		–	–	0.48	
Rth(j-c')R		Clamp diode part*3		–	–	0.79	

*1: Tc measured point is shown in page OUTLINE DRAWING.
*2: Typical value is measured by using Shin-etsu Silicone "G-746".
*3: Tc' measured point is just under the chips.
If you use this value , Rth(f-a) should be measured just under the chips.

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