

Date: '04/3/9

Ref: M 7098

Reply Sheet for Technical Inquiry

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P海営

MELCO Power Device Works. MKT-B



Report	Date	-	No.	CM-641	Customer	Elin
Request	CMxx-24Aの1,2素子の並列使用について				Person in charge	

We'd like to report you as follows.

Question / Inquiry

型名 : CM200DY-24A, CM300DY-24A, CM400DY-24A, CM600DY-24A,
CM400HA-24A, CM600HA-24A, CM600HB-24A

並列使用についての問い合わせ

Reply :

Check

T. Sumie 09-Mar-'04

Draft

M. Ando

応用技術資料

CMH-5777-A

をご参照ください。

以上

APPLICATION NOTE	Prepared by	T.Furuie, J.Yamada	R E V	A		
	Approved by	M.Fukunaga '04-1/26		T. Furuie	08-Mar-'09	

Issue

The Parallel connection of A-series IGBT (CMxx-24A)

type : CM200DY-24A, CM300DY-24A, CM400DY-24A, CM600DY-24A,
 CM400HA-24A, CM600HA-24A, CM600HB-24A,

This parallel specification is applied for above A series IGBT module.

Parallel specification

- 1) Shipping ;
 We ship the classified modules which are in the same rank of VCE(sat) as following table.1 according to the paralleled number of modules on the orders received.

- 2) Indication ;
 The symbol of VCE(sat) rank is marked on the module label. (for example, D or E, etc.)

Table.1 : VCE(sat) rank

symbol	1200V series		(unit:V)
D	1.76 ~ 1.96		
E	1.92 ~ 2.16		
F	2.12 ~ 2.41		
G	2.37 ~ 2.69		
H	2.65 ~ 3.00		

Conditions :

Ic=rating current, VGE=+15V, Tj=25degreeC,
 measurement point = between the collector terminal and gate side emitter terminal.

Notes

1. This table is settled from the view point of keeping current unbalance within +/-15% at its rating.
2. Modules of same rank should be applied only for each paralleled connection, and it permits to use the different rank modules to the different phase or axis in one equipment.
3. This rank specification is useful for the static balance at DC current portion, and this is not effective for dynamic balance at switching transition.
 As the switching balance is dominated by not module but wiring inductance in the equipment, take care of the symmetric circuit design and layout for keeping the inductance balance at parallel use.



APPLICATION NOTE	Prepared by		R E V	A		
	Approved by					

If more than 2 devices are to be paralleled, the current derating factor is determined by the formula, which we have been using to the H, U, F and NF series IGBT module.

$$\text{Derating factor} = [1 - \{(n-1) \cdot (1-X) / (1+X) + 1\} / n]$$

n = number of devices to be paralleled

X = constant number 0.15 for 1200V rating devices

For instance, in the case of four IGBT modules of CM300DY-24A connected in parallel,

$$\begin{aligned} \text{Derating factor} &= [1 - \{(4-1) \cdot (1-0.15) / (1+0.15) + 1\} / 4] \\ &= [1 - (3 \cdot 0.85 / 1.15 + 1) / 4] \\ &= 0.1956 \\ &= 19.6 \% \end{aligned}$$

So, the derated current with 4 parallel of this module is

$$\begin{aligned} \text{Derated current} &= 300\text{A} \cdot (1-0.196) \cdot 4 \\ &= 965\text{A} \end{aligned}$$