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HIGH POWER SWITCHING USE

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

CM110YE4-12F	
<ul style="list-style-type: none"> <li>● <math>I_C</math> ..... 110A</li> <li>● <math>V_{CES}</math> ..... 600V</li> <li>● Insulated Type</li> <li>● 4-elements in a pack</li> </ul>	

## APPLICATION

General purpose inverters

ABSOLUTE MAXIMUM RATINGS ( $T_j=25^\circ\text{C}$ , unless otherwise specified)

B

## 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	$\pm 20$	V
$I_C$	Collector current	$T_C=25^\circ\text{C}$	110	A
$I_{CM}$		Pulse <sup>*2</sup>	220	
$I_E$ <sup>*1</sup>	Emitter current	$T_C=25^\circ\text{C}$	110	A
$I_{EM}$ <sup>*1</sup>		Pulse <sup>*2</sup>	220	
$P_C$ <sup>*3</sup>	Maximum collector dissipation	$T_C'=25^\circ\text{C}$	375	W

## Clamp diode part

Symbol	Item	Conditions	Ratings	Units
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{FM}$	Forward current	$T_C=25^\circ\text{C}$	110	A

## Common rating

Symbol	Item	Conditions	Ratings	Units
$T_j$	Junction temperature		-40 ~ +150	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-40 ~ +125	$^\circ\text{C}$
$V_{iso}$	Isolation voltage	Charged part to base plate AC 1 min.	2500	V

\*1:  $I_E$ ,  $I_{EM}$ ,  $V_{EC}$ , trr and 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 temperature ( $T_j$ ) dose not exceed  $T_{jmax}$  rating.\*3: Junction temperature ( $T_j$ ) should not increase beyond  $150^\circ\text{C}$ .

**CM110YE4-12F**  
 HIGH POWER SWITCHING USE
ELECTRICAL CHARACTERISTICS ( $T_j=25^\circ\text{C}$ , unless otherwise specified)

B

Inverter part

Symbol	Item	Conditions	Min.	Typ.	Max.	Units
$I_{CES}$	Collector cutoff current	$V_{CE}=V_{CES}$ , $V_{GE}=0\text{V}$	-	-	1	mA
$V_{GE(\text{th})}$	Gate-emitter threshold voltage	$I_C=11\text{mA}$ , $V_{CE}=10\text{V}$	5	6	7	V
$I_{GES}$	Gate leakage current	$\pm V_{GE}=V_{GES}$ , $V_{CE}=0\text{V}$	-	-	20	$\mu\text{A}$
$V_{CE(\text{sat})}$	Collector to emitter saturation voltage	$I_C=110\text{A}$	$T_j=25^\circ\text{C}$	-	1.6	2.2
		$V_{GE}=15\text{V}$	$T_j=125^\circ\text{C}$	-	1.6	-
$C_{ies}$	Input capacitance	$V_{CE}=10\text{V}$ , $V_{GE}=0\text{V}$	-	-	30	nF
$C_{oes}$	Output capacitance		-	-	2	
$C_{res}$	Reverse transfer capacitance		-	-	1.1	
$Q_G$	Total gate charge	$V_{CC}=300\text{V}$ , $I_C=110\text{A}$ , $V_{GE}=15\text{V}$	-	680	—	nC
$t_{d(\text{on})}$	Turn-on delay time	$V_{CC}=300\text{V}$ , $I_C=110\text{A}$	-	-	450	A
$t_r$	Turn-on rise time	$V_{GE1}=V_{GE2}=15\text{V}$ , $R_G=17\Omega$	-	-	200	
$t_{d(\text{off})}$	Turn-off delay time	Inductive load	-	-	800	
$t_f$	Turn-off fall time	switching operation	-	-	300	ns
$t_{rr}^{*1}$	Reverse recovery time	$I_E=110\text{A}$	-	-	200	
$Q_{rr}^{*1}$	Reverse recovery charge		-	0.55	-	$\mu\text{C}$
$V_{EC}^{*1}$	Emitter-collector voltage	$I_E=110\text{A}$ , $V_{GE}=0\text{V}$	-	-	3.1	V
$R_G$	External gate resistance		17	-	57	$\Omega$

Clamp diode part

Symbol	Item	Conditions	Min.	Typ.	Max.	Units
$I_{RRM}$	Repetitive reverse current	$V_R=V_{RRM}$	-	-	1	mA
$V_{FM}$	Forward voltage drop	$I_F=110\text{A}$	-	-	2.6	V
$t_{rr}$	Reverse recovery time	$I_F=110\text{A}$ , $V_{CC}=300\text{V}$	-	-	200	ns
$Q_{rr}$	Reverse recovery charge	$V_{GE1}=V_{GE2}=15\text{V}$ , $R_G=17\Omega$	-	0.7	-	$\mu\text{C}$

\*1:  $I_E$ ,  $I_{EM}$ ,  $V_{EC}$ ,  $t_{rr}$  and  $Q_{rr}$  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 temperature ( $T_j$ ) dose not exceed  $T_{jmax}$  rating.\*3: Junction temperature ( $T_j$ ) should not increase beyond  $150^\circ\text{C}$ .

## Thermal resistance

Symbol	Item	Conditions	Min.	Typ.	Max.	Units
$R_{th(j-c)}Q$	Thermal resistance <sup>*4</sup>	Inverter part, IGBT	-	-	0.33	°C/W
$R_{th(j-c)}R$	Thermal resistance <sup>*4</sup>	Inverter part, Free-wheel diode	-	-	0.71	°C/W
$R_{th(j-c)}R$	Thermal resistance <sup>*4</sup>	Clamp diode part	-	-	0.38	°C/W
$R_{th(c-f)}$	Contact thermal resistance <sup>*4*5</sup>	Case to fin, Thermal grease Applied (per 1 module)	-	0.096	-	°C/W

\*4:  $T_C$  measured point is just under the chips.

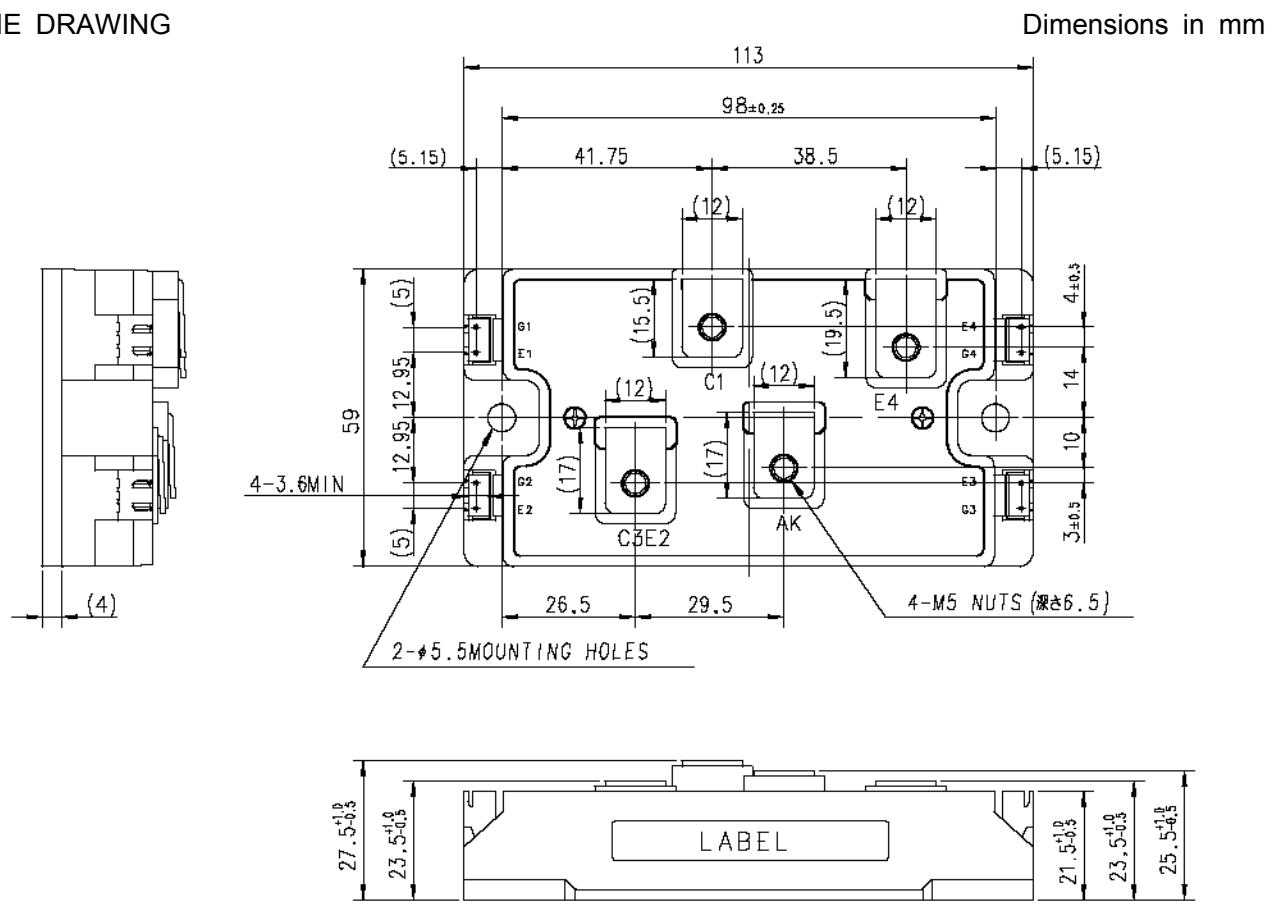
If use this value,  $R_{th(f-a)}$  should be measured just under the chips.

\*5: Typical value is measured by using Shin-Etsu Chemical Co.,Ltd "G-746".

## Mechanical characteristics

Symbol	Item	Conditions	Ratings	Units
-	Torque strength	Main Terminals M5 screw	2.5 ~ 3.5	
		Mounting holes M5 screw	2.5 ~ 3.5	N·m
-	Weight	Typical value	390	g

## OUTLINE DRAWING



## CIRCUIT DIAGRAM

