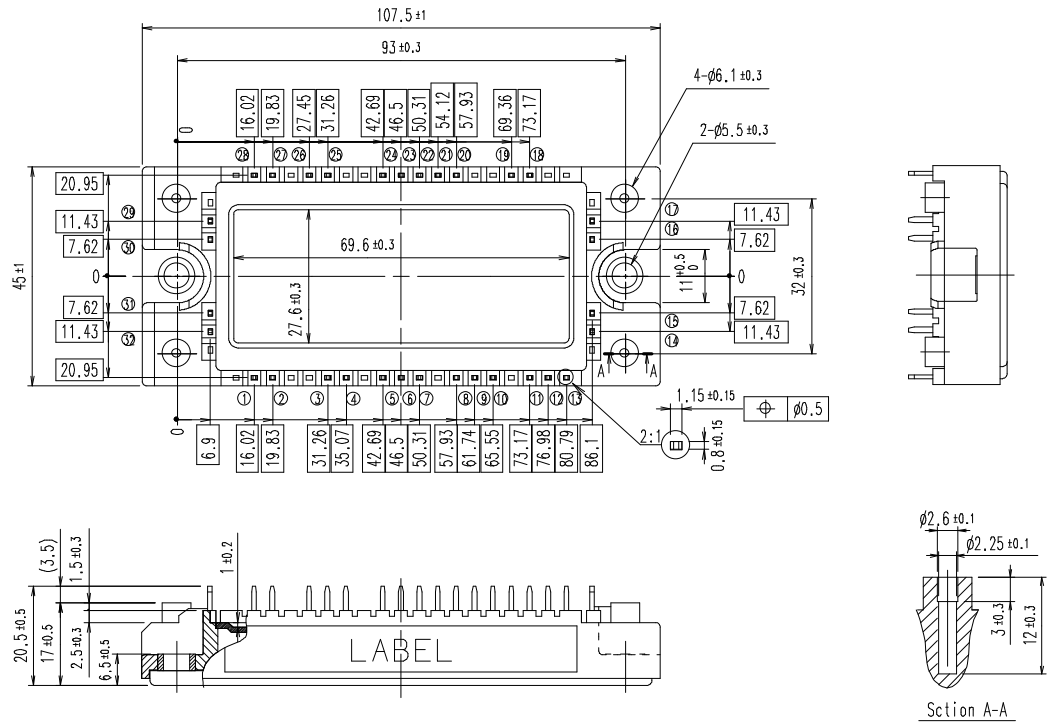


### Target specification 7MBR100VP060-50(Tentative)

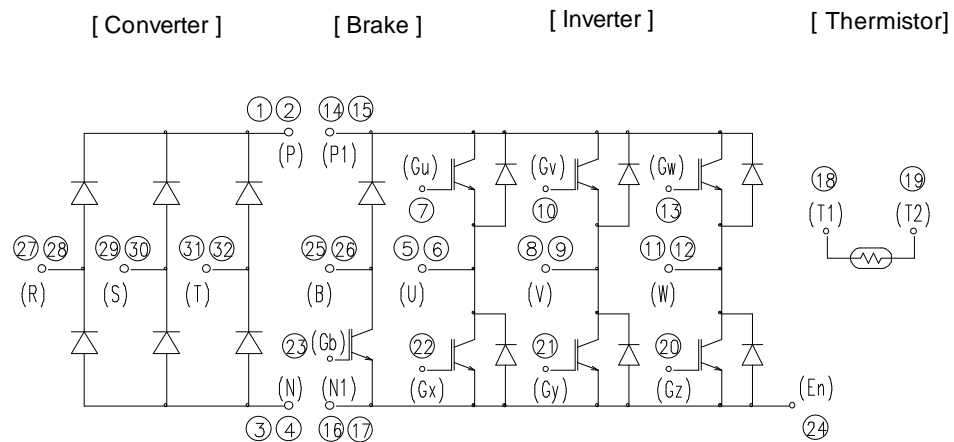
( RoHS compliant product )

#### 1. Outline drawing (Unit : mm) (a)

□ shows theoretical dimension.  
( ) shows reference dimension.



#### 2. Equivalent circuit (a)



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a) Pc, Tjmax, Tjop, Vth and Vf are revised. June-20'08
M.Shiohara, Y.Kusunoki, H.Kakiki, M.Otsuki
REVISIONS

	DATE	NAME	APPROVED
DRAWN	Nov-15-'07	M.Shiohara	O. Ikawa
CHECKED	Nov-15-'07	H.Kakiki	

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### 3. Absolute Maximum Ratings ( at Tc= 25°C unless otherwise specified )

Items		Symbols	Conditions		Maximum Ratings	Units	
Inverter	Collector-Emitter voltage	$V_{CES}$			600	V	
	Gate-Emitter voltage	$V_{GES}$			±20	V	
	Collector current	$I_c$	Continuous	$T_c=80^\circ\text{C}$	100	A	
		$I_{cp}$	1ms	$T_c=80^\circ\text{C}$	200		
		$-I_c$			100		
$-I_c$ pulse	1ms			200			
Collector power dissipation		$P_c$	1 device		430	W (a)	
Brake	Collector-Emitter voltage	$V_{CES}$			600	V	
	Gate-Emitter voltage	$V_{GES}$			±20	V	
	Collector current	$I_c$	Continuous	$T_c=80^\circ\text{C}$	50	A	
		$I_{cp}$	1ms	$T_c=80^\circ\text{C}$	100		
	Collector power dissipation		$P_c$	1 device		200	W (a)
Repetitive peak reverse voltage (Diode)		VRRM			600	V	
Converter	Repetitive peak reverse voltage		VRRM			800	V
	Average output current		$I_o$	50Hz/60Hz sine wave	100	A	
	Surge current (Non-Repetitive)		IFSM	$T_j=150^\circ\text{C}$ , 10ms	700	A	
	$I^2t$ (Non-Repetitive)		$I^2t$	half sine wave	2450	A <sup>2</sup> s	
Maximum junction temperature		$T_{jmax}$			175	°C (a)	
Temperature under switching conditions		$T_{jop}$			150		
Storage temperature		$T_{stg}$			-40 ~ +125		
Isolation voltage	between terminal and copper base (*1)	$V_{iso}$	AC : 1min.		2500	VAC	
	between thermistor and others (*2)						
Screw Torque	Mounting (*3)	-	M5		3.5	N m	

(\*1) All terminals should be connected together during the test..

(\*2) Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

(\*3) Recommendable Value : 2.5-3.5 Nm (M5)

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**4. Electrical characteristics ( at Tj= 25°C unless otherwise specified)**

Items	Symbols	Conditions	Characteristics			Units		
			min.	typ.	max.			
Inverter	Zero gate voltage Collector current	$I_{CES}$	$V_{GE} = 0V$ $V_{CE}=600V$	-	-	1.0	mA	
	Gate-Emitter leakage current	$I_{GES}$	$V_{CE} = 0V$ $V_{GE}=\pm 20V$	-	-	200	nA	
	Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20V$ $I_C = 100mA$	-	6.7	-	V	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (chip)	$V_{GE}=15V$ $I_C = 100A$	$T_j = 25^\circ C$	-	1.83	-	V
				$T_j = 125^\circ C$	-	2.25	-	
	Input capacitance	$C_{ies}$	$V_{CE}=10V, V_{GE}=0V, f=1MHz$	-	4.9	-	nF	
	Turn-on time	$t_{on}$ $t_r$ $t_r(i)$	$V_{CC} = 300V$ $I_C = 100A$ $V_{GE}=+15/-15V$	$R_G = 30\Omega$	-	TBD	1.20	$\mu s$
					-	TBD	0.60	
					-	TBD	-	
	Turn-off time	$t_{off}$ $t_f$	$R_G = 30\Omega$		-	TBD	1.20	$\mu s$
					-	TBD	0.45	
	Turn-on dissipation	$E_{on}$	$V_{CC}=300V, I_C=100A, R_G=30\Omega,$	-	5.0	-	mJ	
	Turn-off dissipation	$E_{off}$	$V_{GE}=+15/-15V, T_j=125^\circ C$	-	4.3	-	mJ	
Forward on voltage	$V_F$ (chip)	$I_F=100A$	$T_j = 25^\circ C$	-	1.75	-	V	
			$T_j = 125^\circ C$	-	1.70	-		
Reverse recovery time	$t_{rr}$	$I_F=100A$	-	-	0.35	$\mu s$		
Reverse recovery dissipation	$Err$	$V_{CC}=300V, I_C=100A, R_G=30\Omega,$ $V_{GE}=+15/-15V, T_j=125^\circ C$	-	0.9	-	mJ		
Brake	Zero gate voltage Collector current	$I_{CES}$	$V_{GE} = 0V$ $V_{CE} = 600V$	-	-	1.0	mA	
	Gate-Emitter leakage current	$I_{GES}$	$V_{CE} = 0V$ $V_{GE}=+20/-20V$	-	-	200	nA	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (chip)	$V_{GE}=15V$ $I_C = 50A$	$T_j = 25^\circ C$	-	1.60	-	V
				$T_j = 125^\circ C$	-	1.90	-	
	Turn-on time	$t_{on}$ $t_r$	$V_{CC} = 300V$ $I_C = 50A$	$V_{GE}=+15/-15V$	-	TBD	1.20	$\mu s$
					-	TBD	0.60	
					-	TBD	1.20	
Turn-off time	$t_{off}$ $t_f$	$R_G = 43\Omega$		-	TBD	0.45	$\mu s$	
				-	TBD	0.45		
Reverse current	$I_{RRM}$	$V_R = 600V$	-	-	1.0	mA		
Converter	Forward on voltage	$V_{FM}$ (chip)	$I_F=100A$	-	1.25	-	V	
	Reverse current	$I_{RRM}$	$V_R = 800V$	-	-	1.0	mA	
Thermistor	Resistance	$R$	$T = 25^\circ C$ $T = 100^\circ C$	-	5000	-	$\Omega$	
	B value	$B$	$T = 25/50^\circ C$	3305	3375	3450		

(a)  
(a)  
(a)

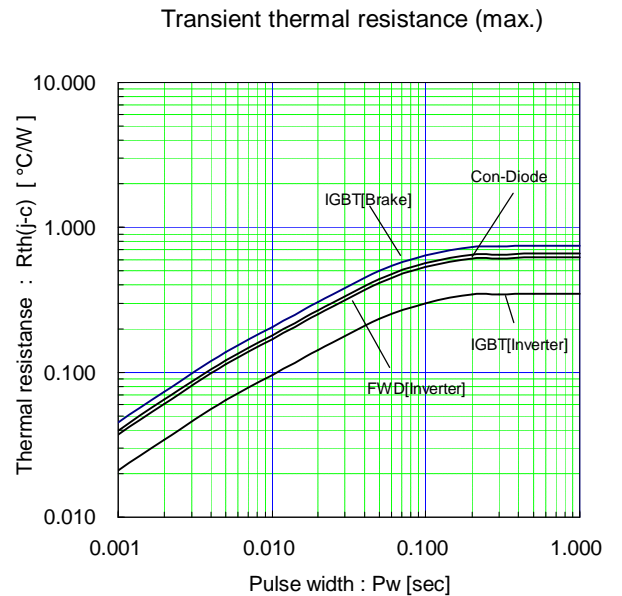
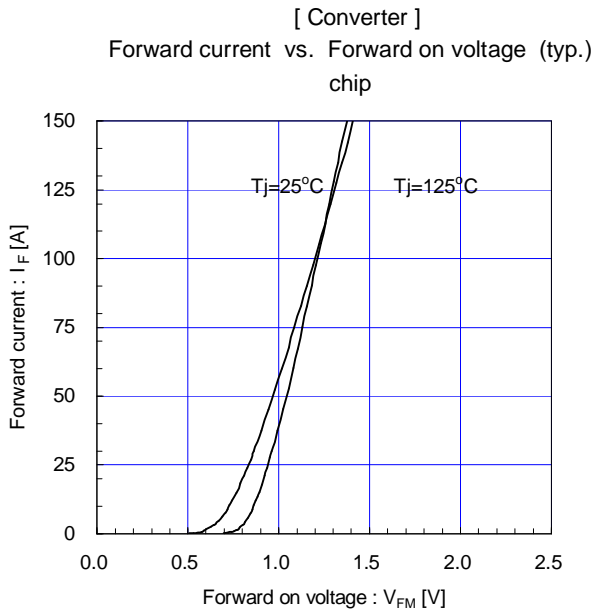
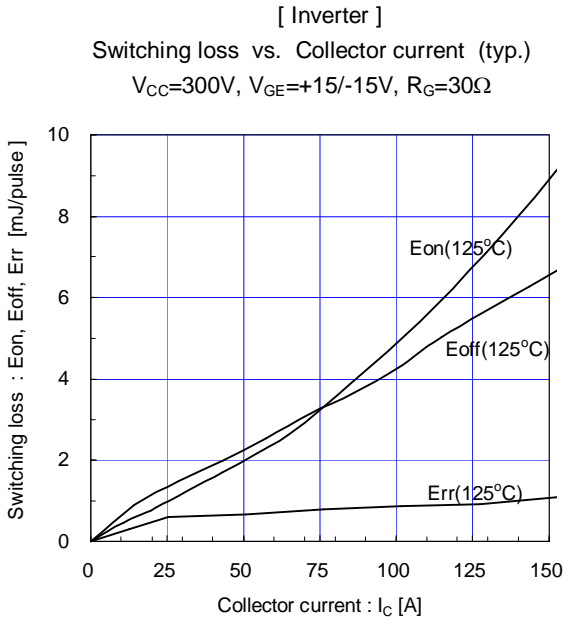
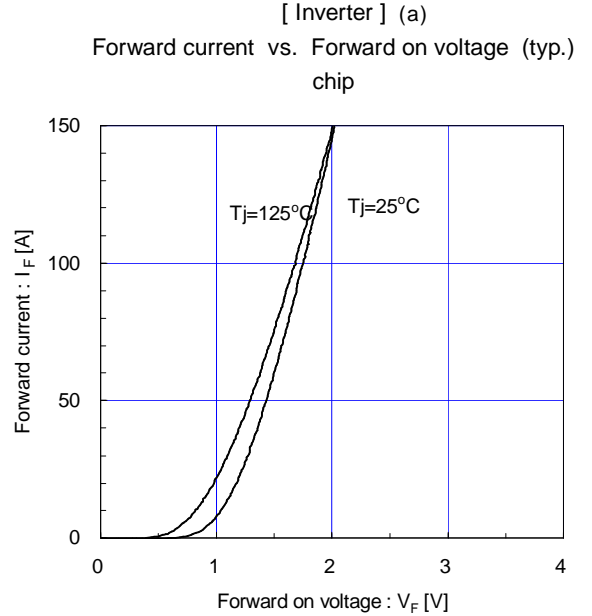
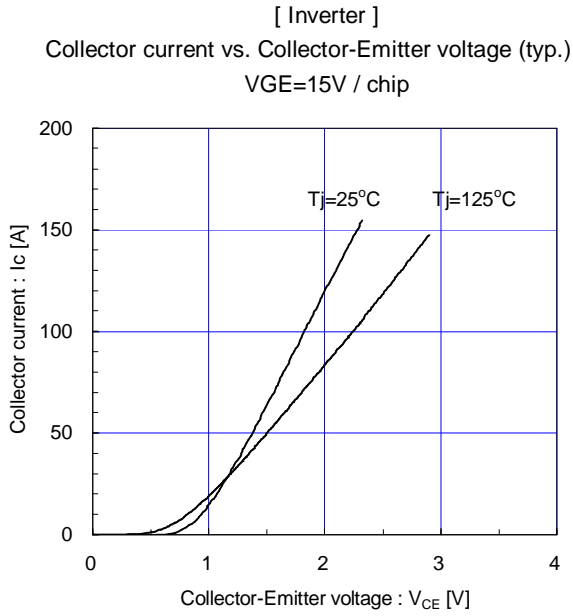
**5. Thermal resistance characteristics**

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	0.35	$^\circ C/W$
		Inverter FWD	-	-	0.62	
		Brake IGBT	-	-	0.75	
		Converter Diode	-	-	0.66	
Contact Thermal resistance (1device) (*4)	$R_{th(c-f)}$	with Thermal Compound	-	0.05	-	

(\*4) This is the value which is defined mounting on the additional cooling fin with thermal compound.

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