

# 6MBI100VW-060-50

**IGBT Modules** 

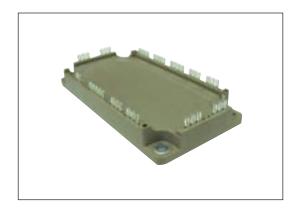
# IGBT MODULE (V series) 600V / 100A / 6 in one package

#### **■** Features

Compact Package P.C.Board Mount Low Vce (sat)

#### Applications

Inverter for Motor Drive
AC and DC Servo Drive Amplifier
Uninterruptible Power Supply
Industrial machines, such as welding machines



### ■ Maximum Ratings and Characteristics

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

Items		Symbols	Conditions		Maximum ratings	Units		
	Collector-Emitter voltage		Vces			600	V	
(	Gate-Emitter voltage		V <sub>GES</sub>			±20	V	
er	Collector current		Ic	Continuous	Tc=80°C	100		
nverter			Icp	1ms	Tc=80°C	200	٨	
'اڪ			-lc				Α	
			-lc pulse	1ms		200		
(	Collector power dissipation		Pc	1 device		335	W	
Junction temperature			Tj			175		
Operating junciton temperature (under switching conditions)			Tjop			150	°C	
Case temperature		Тс	125					
Storage temperature		Tstg	-40 to +125					
Isol	ation voltage	between terminal and copper base (*1) between thermistor and others (*2)	Viso	AC : 1min.		2500	VAC	
Scr	ew torque	Mounting (*3)	-	M5		3.5	N m	

Note \*1: All terminals should be connected together during the test.

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

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

#### ● Electrical characteristics (at Tj= 25°C unless otherwise specified)

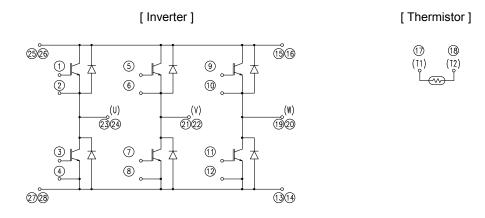
14.0	ms	Cumbala	Conditions		Characteristics			Units
пе	ins	Symbols			min.	typ.	max.	Units
	Zero gate voltage collector current	Ices	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 600V		-	-	1.0	mA
	Gate-Emitter leakage current	Iges	$V_{GE} = 0V$ , $V_{GE} = \pm 20V$		-	-	200	nA
	Gate-Emitter threshold voltage	V <sub>GE (th)</sub>	V <sub>CE</sub> = 20V, I <sub>C</sub> = 100mA		6.2	6.7	7.2	V
	Collector-Emitter saturation voltage	.,	V <sub>GE</sub> = 15V I <sub>C</sub> = 100A	Tj=25°C	-	2.05	2.50	V
		V <sub>CE (sat)</sub> (terminal)		Tj=125°C	-	2.35	-	
		(terrinial)		Tj=150°C	-	2.55	-	
		.,	V <sub>GE</sub> = 15V I <sub>C</sub> = 100A	Tj=25°C	-	1.60	2.05	
		V <sub>CE (sat)</sub> (chip)		Tj=125°C	-	1.90	-	
		(Criip)		Tj=150°C	-	2.10	-	
	Input capacitance	Cies	V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0V, f = 1MHz		-	6.4	-	nF
	Turn-on time	ton	$V_{\rm CC} = 300 \text{V}$ $I_{\rm C} = 100 \text{A}$ $V_{\rm GE} = +15 \text{/} -15 \text{V}$ $R_{\rm G} = 13 \Omega$		-	0.39	1.20	μs
		tr			-	0.09	0.60	
		tr (i)			-	0.03	-	
	Turn-off time	toff			-	0.53	1.00	
	Turn-off time	tf			-	0.06	0.30	
	Forward on voltage		I <sub>F</sub> = 100A	Tj=25°C	-	2.05	2.50	V
		V <sub>F</sub> (terminal)		Tj=125°C	-	1.95	-	
		(terrillial)		Tj=150°C	-	1.95	-	
		.,	I <sub>F</sub> = 100A	Tj=25°C	-	1.60	2.05	
		V <sub>F</sub> (chip)		Tj=125°C	-	1.50	-	
		(GIIIP)		Tj=150°C	-	1.47	-	
	Reverse recovery time	trr	I <sub>F</sub> = ±20		-	-	0.35	μs
tor	Pasiatanas	Ь	T = 25°C		-	5000	-	Ω
Thermistor	Resistance	R	T = 100°C		465	495	520	
교	B value	В	T = 25 / 50°C		3305	3375	3450	K

#### ● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
items		Conditions	min.	typ.	max.	Ullits
Thermal registeres (4 device)	Rth(j-c)	Inverter IGBT	-	-	0.45	°C/W
Thermal resistance (1device)		Inverter FWD	-	-	0.80	
Contact thermal resistance (1device) (*4)	Rth(c-f)	with Thermal Compound	-	0.05	-	

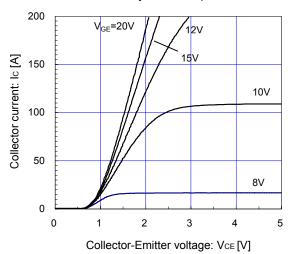
Note \*4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

## **■** Equivalent Circuit Schematic

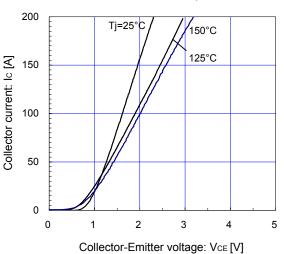


#### ■ Characteristics (Representative)

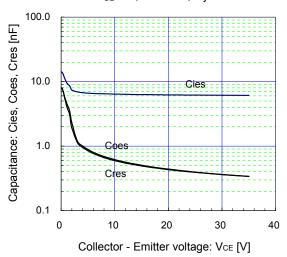
 $\label{eq:continuous} \begin{tabular}{ll} \end{tabular} Inverter \cite{Matter} \cite$ 



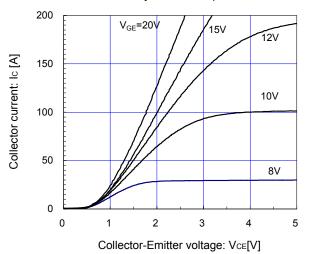
 $[Inverter] \\ Collector current vs. Collector-Emitter voltage (typ.) \\ V_{GE} = 15V / chip$ 



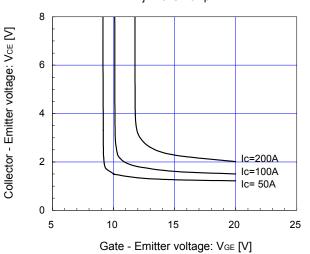
 $[Inverter\ ]$  Capacitance vs. Collector-Emitter voltage (typ.)  $V_{GE} = 0V, \ f = 1MHz, \ Tj = 25^{\circ}C$ 



[ Inverter ] Collector current vs. Collector-Emitter voltage (typ.)  $Tj = 150 ^{\circ} C \ / \ chip$ 



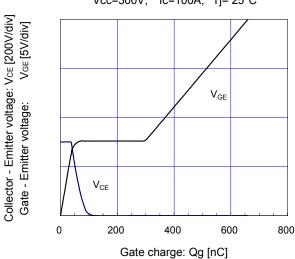
 $\label{eq:continuous} \begin{tabular}{ll} \b$ 



[ Inverter ]

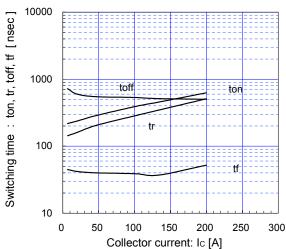
Dynamic gate charge (typ.)

Vcc=300V, Ic=100A, Tj= 25°C

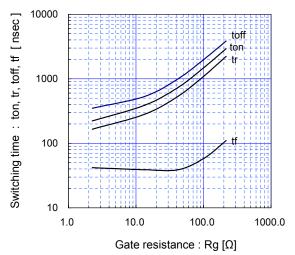


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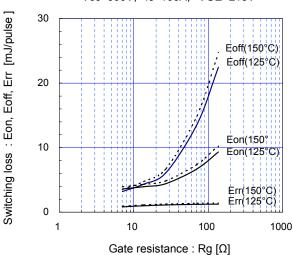
[ Inverter ]
Switching time vs. Collector current (typ.)
Vcc=300V, VGE=±15V, Rg=13Ω, Tj= 125°C



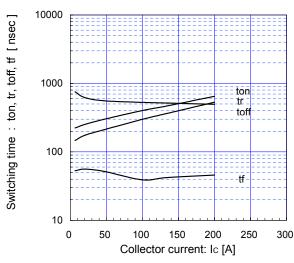
[Inverter]
Switching time vs. gate resistance (typ.)
Vcc=300V, Ic=100A, VGE=±15V, Tj= 125°C



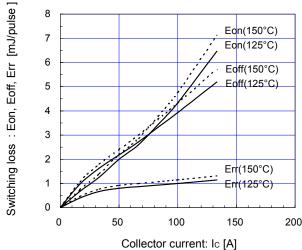
[ Inverter ]
Switching loss vs. gate resistance (typ.)
Vcc=300V, Ic=100A, VGE=±15V



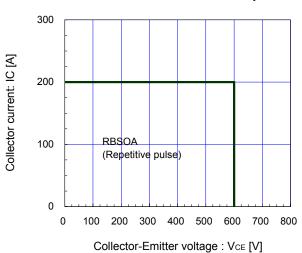
[ Inverter ] Switching time vs. Collector current (typ.) Vcc=300V, VGE= $\pm$ 15V, Rg=13 $\Omega$ , Tj= 150°C

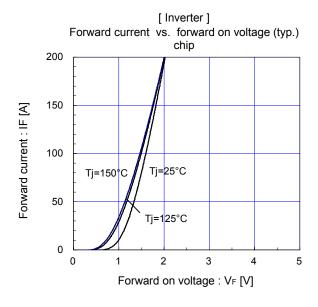


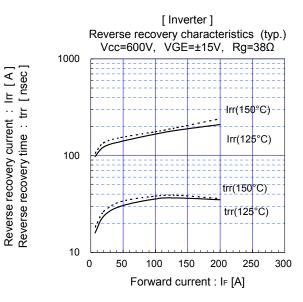
 $[Inverter] \\ Switching loss vs. Collector current (typ.) \\ Vcc=300V, VGE=\pm15V, Rg=13\Omega$ 



[ Inverter ] Reverse bias safe operating area (max.)  $+VGE=15V,-VGE <= 15V, RG >= 13\Omega, Tj <= 125^{\circ}C$ 







Transient thermal resistance (max.)

10.00

FWD[inverter]

1.00

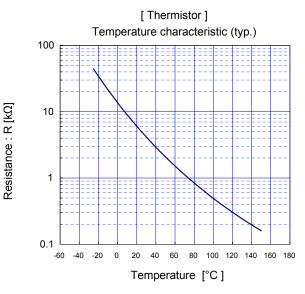
IGBT[inverter]

0.01

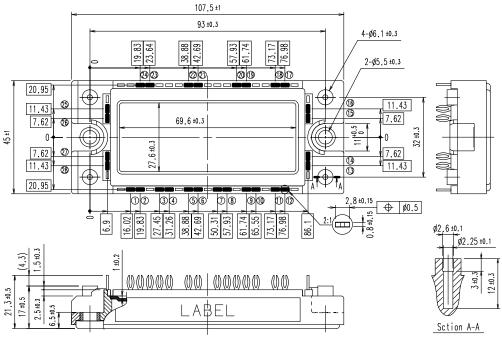
0.001

0.001

Pulse width: Pw [sec]



#### ■ Outline Drawings, mm



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- Measurement equipment

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