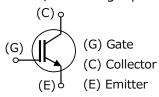


# **PRELIMINARY**

Power Semiconductor IGBT (Insulated Gate Bipolar Transistor)

MI-Series 650V / 150A HighSpeed

# MMJ65A5G00\*\*



#### Outline

IGBT (Bare chip) utilizes various technologies that we cultivated by analog semiconductor device production and is the product which prepared a lineup of the wide high voltage, high current which can contribute to high efficiency and saving energy.

### **Applications**

- ·Industrial Motor Drivers
- Inverter
- Welding
- ·UPS

# Absolute Maximum Ratings

Tj=25deg unless otherwise noted.

Parameter	Symbol	Rating	Unit
Collector-Emitter voltage	VCES	650	V
Gate-Emitter voltage	VGES	±30	V
Collector current *1)	IC	150	Α
Junction temperature	Tj	-40~+175	$^{\circ}$

#### **Features**

- ① Field Stop Trench gate IGBT
- 2 Low Collector-Emitter saturation voltage
- 3 High short circuit capability
- 4 Low swiching losses

## **Die Specification**

Item	Value	Unit
Die thickness	90	μm
Die size	7.9x9.7(76.6)	mm
Front metal(AlSi)	6.5	μm
Backside metal(AlSi/Ti/Ni/Au)	1.25	μm

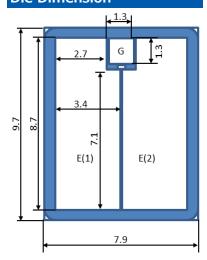
<sup>\*1)</sup>Collector current is limited by Tj(max) and thermal properties of assembly.

## **Electrical Characteristics**

Tj=25deg unless otherwise noted.

Input capacitance Cies - $13000$ - $pF$ VCE=25V,VGE=0V, Reverse transfer capcitance Cres - $170$ - $pF$ f= $100$ kHz $td(on) - 95 - ns Vcc=300V,Ic=150A$ Switching time $tr - 55 - ns td(off) - 220 - ns Inductive load,$	Ty Zadeg diffess otherwise floted.								
Zero gate voltage collector current   ICES   -   -   1   $\mu$ A   $Vce=650V, Vge=0V$   Gate-Emitter leakage current   IGES   -   -   ±500   nA   $Vge=\pm30V, Vce=0V$   Gate-emitter threshold voltage   $VGE(th)$   $VGE(th)$   $VGE=10V, Vce=10V, Vce=1$	Parameter		Svmbol	Specification		Unit	condition		
Gate-Emitter leakage current Gate-emitter threshold voltage VGE(th) 5.20 - 6.60 V Vce=10V,Ic=2.4mA Collecter-Emitter saturation voltage $Tj=25^{\circ}C$ $Tj=150^{\circ}C$ $Tj=175^{\circ}C$ $Tj=17$			5,111501	Min	Тур	Max	0.110		
Gate-emitter threshold voltage $VGE(th)$ 5.20 - 6.60 V Vce=10V,Ic=2.4mA Collecter-Emitter $Tj=25^{\circ}C$ $Tj=150^{\circ}C$ $Tj=175^{\circ}C$ $Tj=175^{\circ$	Zero gate voltage collector current		ICES	ı	-	1	μΑ	Vce=650V,Vge=0V	
Collecter-Emitter saturation voltage $Tj=150^{\circ}C$ $Tj=150^{\circ}C$ $Tj=175^{\circ}C$ $Tj=17$	Gate-Emitter leakage current		IGES	ı	-	±500	nA	Vge=±30V,Vce=0V	
saturation voltage $Tj=150^{\circ}$ $Tj=150^{\circ}$ $Tj=175^{\circ}$	Gate-emitter threshold voltage		VGE(th)	5.20	-	6.60	V	Vce=10V,Ic=2.4mA	
saturation voltage $Tj=150^{\circ}\text{C}$ $Tj=175^{\circ}\text{C}$ $Tj$	Collecter-Emitter	Tj=25℃	VCE	-	1.90	2.25			
Internal gate resistor Rgint - 1.70 - $\Omega$ Input capacitance Cies - 13000 - pF VCE=25V,VGE=0V, Reverse transfer capcitance Cres - 170 - pF f=100kHz  Switching time tr - 55 - ns VGE=-15/+15V, Rg=8.2 $\Omega$ , Inductive load,	saturation	Tj=150℃		-	2.40	-	V	Ic=150A,Vge=15V	
Input capacitance Cies - $13000$ - pF VCE=25V,VGE=0V, f=100kHz  Reverse transfer capcitance Cres - $170$ - pF $f=100$ kHz $td(on) - 95 - ns Vcc=300$ V,Ic= $150$ A  Switching time $tr - 55 - ns td(off) - 220 - ns Inductive load,$	voltage	Tj=175℃	(Sat)	-	2.50	-			
Reverse transfer capcitance	Internal gate resistor		Rgint	-	1.70	-	Ω		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Input capacitance		Cies	-	13000	-	pF	VCE=25V,VGE=0V,	
Switching time $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Reverse transfer capcitance		Cres	-	170	-	pF	f=100kHz	
*Reference characteristics $\frac{\text{ti}}{\text{td}} = \frac{-33}{35} = \frac{-118}{118} \text{Rg} = 8.2\Omega,$ Inductive load,	_		td(on)	-	95	-	ns	·	
*Reference characteristics td(off) - 220 - ns Inductive load,			tr	-	55	-	ns		
15 45 7			td(off)	-	220	-	ns	'	
			tf	-	45	-	ns	Ls≒100nH	
Short circuit withstand time Tsc 5 µs Vcc=400V,Vge=15V,Tj=150℃	Short circuit withstand time		Tsc	5	-	-	μs	Vcc=400V,Vge=15V,Tj=150℃	

## **Die Dimension**



This characteristic is when it is incorporated in a mold package or evaluation board.

Depending on the assembly conditions etc., it may not be satisfied. Please note that it is not a guaranteed value.

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