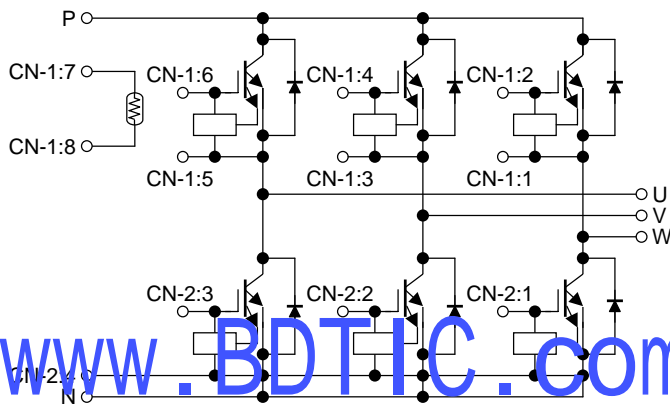


## MG200J6ES61 (600V/200A 6in1)

High Power Switching Applications  
 Motor Control Applications

- Integrates inverter power circuit in to a single package.
- The electrodes are isolated from case.
- Low thermal resistance
- $V_{CE(sat)} = 2.0\text{ V (typ.)}$

### Equivalent Circuit



### Signal Terminal

CN-1

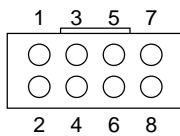
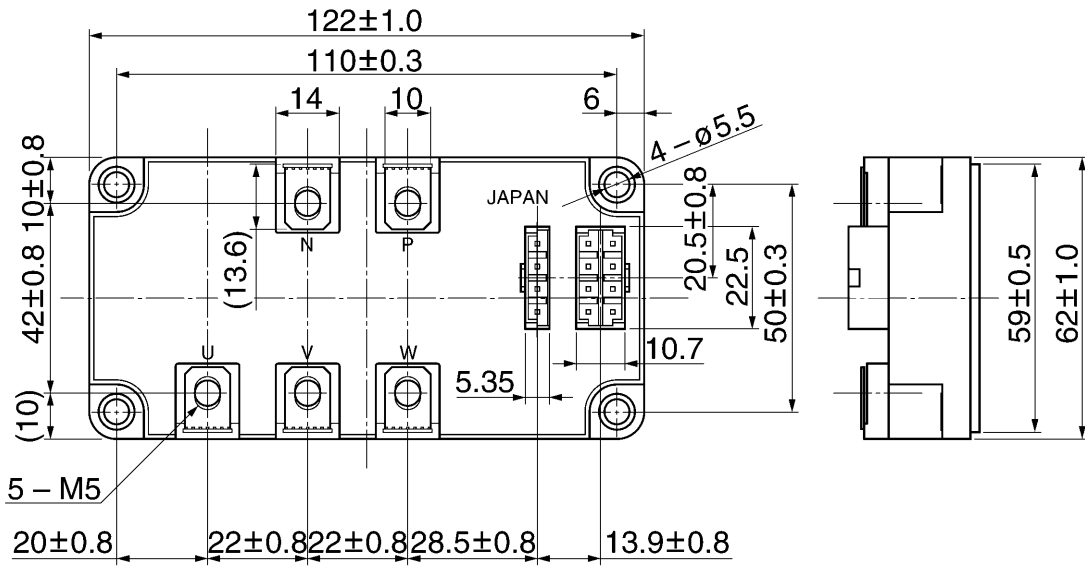
- |          |          |          |          |
|----------|----------|----------|----------|
| 1. E (W) | 2. G (W) | 3. E (V) | 4. G (V) |
| 5. E (U) | 6. G (U) | 7. TH1   | 8. TH2   |

CN-2

- |          |          |          |          |
|----------|----------|----------|----------|
| 1. G (Z) | 2. G (Y) | 3. G (X) | 4. E (L) |
|----------|----------|----------|----------|

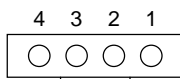
Package Dimensions:

Unit: mm



CN-1

- |          |          |          |          |
|----------|----------|----------|----------|
| 1. E (W) | 2. G (W) | 3. E (V) | 4. G (V) |
| 5. E (U) | 6. G (U) | 7. TH1   | 8. TH2   |



CN-2

- |          |          |          |          |
|----------|----------|----------|----------|
| 1. G (Z) | 2. G (Y) | 3. G (X) | 4. E (L) |
|----------|----------|----------|----------|

## Maximum Ratings (Ta = 25°C)

Stage	Characteristics	Symbol	Rating	Unit	
Inverter	Collector-emitter voltage	V <sub>CES</sub>	600	V	
	Gate-emitter voltage	V <sub>GES</sub>	±20	V	
	Collector current	DC	I <sub>C</sub>	200	A
		1 ms	I <sub>CP</sub>	400	
	Forward current	DC	I <sub>F</sub>	200	A
		1 ms	I <sub>FM</sub>	400	
Collector power dissipation (T <sub>c</sub> = 25°C)		P <sub>C</sub>	1000	W	
Module	Junction temperature	T <sub>j</sub>	150	°C	
	Storage temperature range	T <sub>stg</sub>	-40~125	°C	
	Isolation voltage	V <sub>isol</sub>	2500 (AC 1 min)	V	
	Screw torque	—	3 (M5)	N·m	

## Electrical Characteristics (T<sub>j</sub> = 25°C)

### 1. Inverter stage

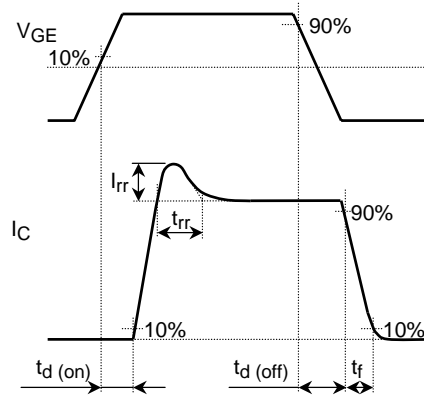
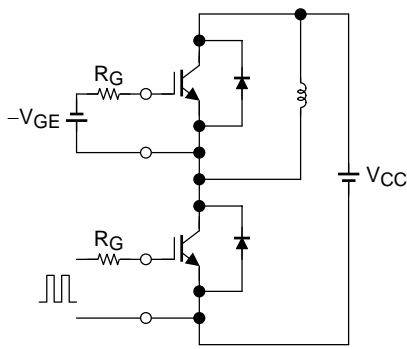
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I <sub>GES</sub>	V <sub>GE</sub> = ±20 V, V <sub>CE</sub> = 0	—	—	±500	nA
Collector cut-off current	I <sub>CES</sub>	V <sub>CE</sub> = 600 V, V <sub>GE</sub> = 0	—	—	1.0	mA
Gate-emitter cut-off voltage	V <sub>GE (off)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 200 mA	5.0	6.5	8.0	V
Collector-emitter saturation voltage	V <sub>CE (sat)</sub>	V <sub>GE</sub> = ±15 V, I <sub>C</sub> = 200 A T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C	—	2.0	2.4	V
Input capacitance	C <sub>ies</sub>	V <sub>CE</sub> = 10 V, V <sub>GE</sub> = 0, f = 1 MHz	—	40000	—	pF
Switching time	Turn-on delay time	t <sub>d (on)</sub>	—	—	1.00	μs
	Turn-off time	t <sub>off</sub>	V <sub>CC</sub> = 300 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = ±15 V, R <sub>G</sub> = 10 Ω (Note 1)	—	1.20	
	Fall time	t <sub>f</sub>		—	0.50	
Reverse recovery time	t <sub>rr</sub>	—		—	0.30	
Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 200 A	—	2.2	2.6	V

Note 1: Switching time test circuit & timing chart

### 2. Module (T<sub>c</sub> = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Zero-power resistance	R <sub>25</sub>	ITM = 0.2 mA	—	100	—	kΩ
B value	B <sub>25/85</sub>	T <sub>c</sub> = 25°C/T <sub>c</sub> = 85°C	—	4390	—	K
Junction to case thermal resistance	R <sub>th (j-c)</sub>	Inverter IGBT stage	—	—	0.125	°C/W
		Inverter FRD stage	—	—	0.195	
Case to fin thermal resistance	R <sub>th (c-f)</sub>	—	—	0.013	—	°C/W

## Switching Time Test Circuit & Timing Chart



### Recommended conditions for application

Characteristics	Symbol	Min	Typ.	Max	Unit
P-N power terminal supply voltage	$V_{CC}$	—	300	400	V
Gate voltage	$V_{GE}$	13.5	15	16.5	V
Switching frequency	$f_c$	—	—	20	kHz

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