

MITSUBISHI IGBT Module

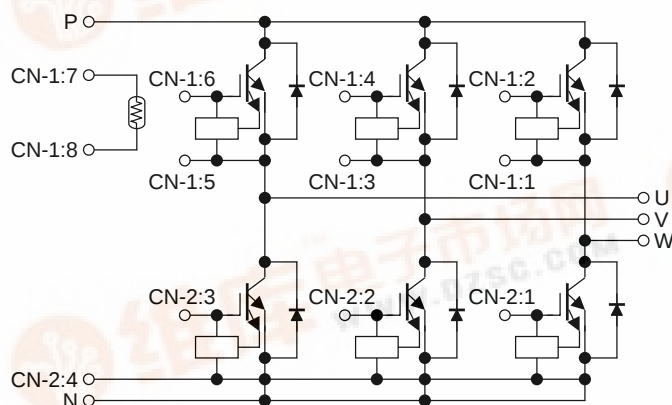
MG200J6ES61(600V/200A 6in1)

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) |
|----------|----------|----------|----------|

Unit: mm



Maximum Ratings (Ta = 25°C)

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

Electrical Characteristics (Tj = 25°C)

1. Inverter stage

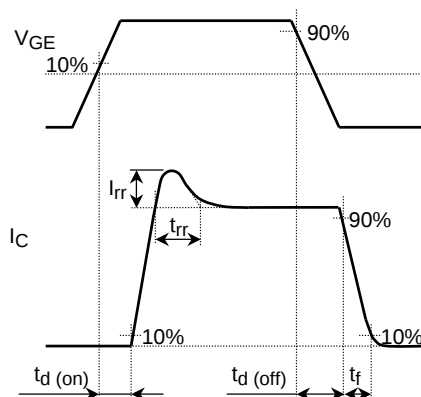
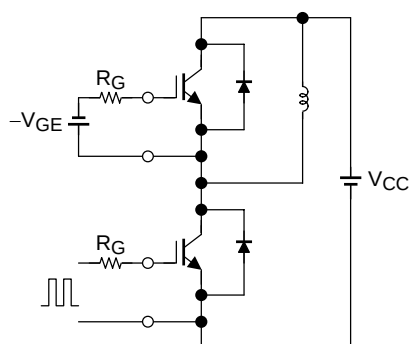
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0$	—	—	± 500	nA
Collector cut-off current		I_{CES}	$V_{CE} = 600 \text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE (off)}$	$V_{CE} = 5 \text{ V}, I_C = 200 \text{ mA}$	5.0	6.5	8.0	V
Collector-emitter saturation voltage		$V_{CE (sat)}$	$V_{GE} = 15 \text{ V}, I_C = 200 \text{ A}$	$T_j = 25^\circ\text{C}$	—	2.0	V
				$T_j = 125^\circ\text{C}$	—	2.6	
Input capacitance		C_{ies}	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	40000	—	pF
Switching time	Turn-on delay time	$t_d (on)$	$V_{CC} = 300 \text{ V}, I_C = 200 \text{ A}$ $V_{GE} = \pm 15 \text{ V}, R_G = 10 \Omega$ (Note 1)	—	—	1.00	μs
	Turn-off time	t_{off}		—	—	1.20	
	Fall time	t_f		—	—	0.50	
Reverse recovery time		t_{rr}		—	—	0.30	
Forward voltage		V_F	$I_F = 200 \text{ A}$	—	2.2	2.6	V

Note 1: Switching time test circuit & timing chart

2. Module (Tc = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Zero-power resistance	R25	ITM = 0.2 mA	—	100	—	k Ω
B value	B25/85	Tc = 25°C/Tc = 85°C	—	4390	—	K
Junction to case thermal resistance	$R_{th (j-c)}$	Inverter IGBT stage	—	—	0.125	°C/W
		Inverter FRD stage	—	—	0.195	
Case to fin thermal resistance	$R_{th (c-f)}$	—	—	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