

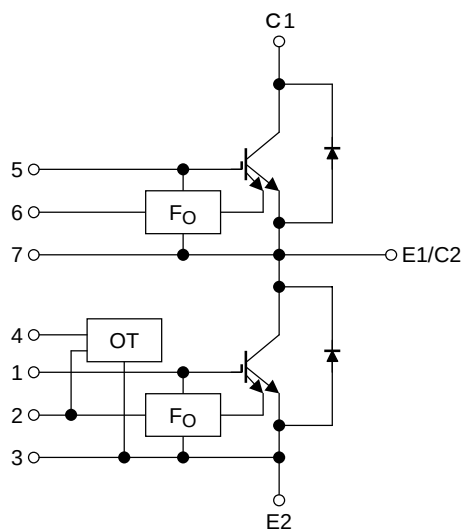
MG200Q2YS60A (1200V/200A 2in1)

High Power Switching Applications

Motor Control Applications

- Integrates a complete half bridge power circuit and fault-signal output circuit in one package.
(short circuit and over temperature)
- The electrodes are isolated from case.
- Low thermal resistance
- $V_{CE(sat)} = 2.4 \text{ V (typ.)}$

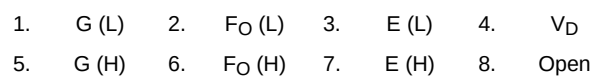
Equivalent Circuit



Signal terminal

1.	G (L)	2.	FO (L)	3.	E (L)	4.	V_D
5.	G (H)	6.	FO (H)	7.	E (H)	8.	Open

Unit: mm



Technical drawing of a rectangular plate with a width of 25.4 ± 0.6 mm. The plate contains eight circular holes arranged in two rows of two. The holes are numbered 1 through 8, starting from the bottom-left and moving clockwise. The distance between the centers of the holes in each row is 2.54 mm. The distance between the centers of the holes in the two rows is 2.54 mm. The holes are numbered 1 through 8, starting from the bottom-left and moving clockwise.

- Weight: 375 g

Maximum Ratings (Ta = 25°C)

Stage	Characteristics		Symbol	Rating	Unit
Inverter	Collector-emitter voltage		V_{CES}	1200	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 (Tc = 25°C)		P_C	2000	W
Control	Control voltage (OT)		V_D	20	V
	Fault input voltage		V_{FO}	20	V
	Fault input current		I_{FO}	20	mA
Module	Junction temperature		T_j	150	°C
	Storage temperature range		T_{stg}	-40~125	°C
	Operation temperature range		T_{ope}	-20~100	°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}	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0$	—	—	+3/-4	mA
			$V_{GE} = +10 \text{ V}, V_{CE} = 0$	—	—	100	nA
Collector cut-off current		I_{CES}	$V_{CE} = 1200 \text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE} \text{ (off)}$	$V_{CE} = 5 \text{ V}, I_C = 200 \text{ mA}$	6.0	7.0	8.0	V
Collector-emitter saturation voltage		$V_{CE} \text{ (sat)}$	$V_{GE} = 15 \text{ V}, I_C = 200 \text{ A}$	—	2.4	2.8	V
			$T_j = 125^\circ\text{C}$	—	—	3.2	
Input capacitance		C_{ies}	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	15000	—	pF
Switching time	Turn-on delay time	$t_d \text{ (on)}$	$V_{CC} = 600 \text{ V}, I_C = 200 \text{ A}$ $V_{GE} = \pm 15 \text{ V}, R_G = 10 \Omega$ (Note 1)	0.10	—	1.00	μs
	Turn-off time	t_{off}		—	—	2.00	
	Fall time	t_f		—	—	0.50	
Reverse recovery time		t_{rr}		—	—	0.50	
Forward voltage		V_F	$I_F = 200 \text{ A}$	—	2.4	2.8	V

Note 1: Switching time test circuit & timing chart

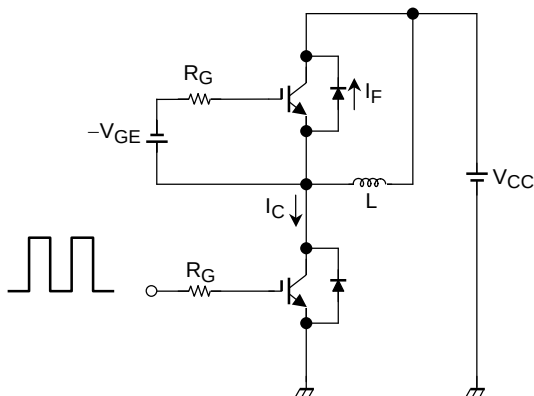
2. Control (Tc = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Fault output current	OC	$V_{GE} = 15 \text{ V}$	240	—	—	A
Over temperature	OT	—	100	—	125	°C
Fault output delay time	$t_d \text{ (Fo)}$	$V_{CC} = 600 \text{ V}, V_{GE} = \pm 15 \text{ V}$	—	—	8	μs

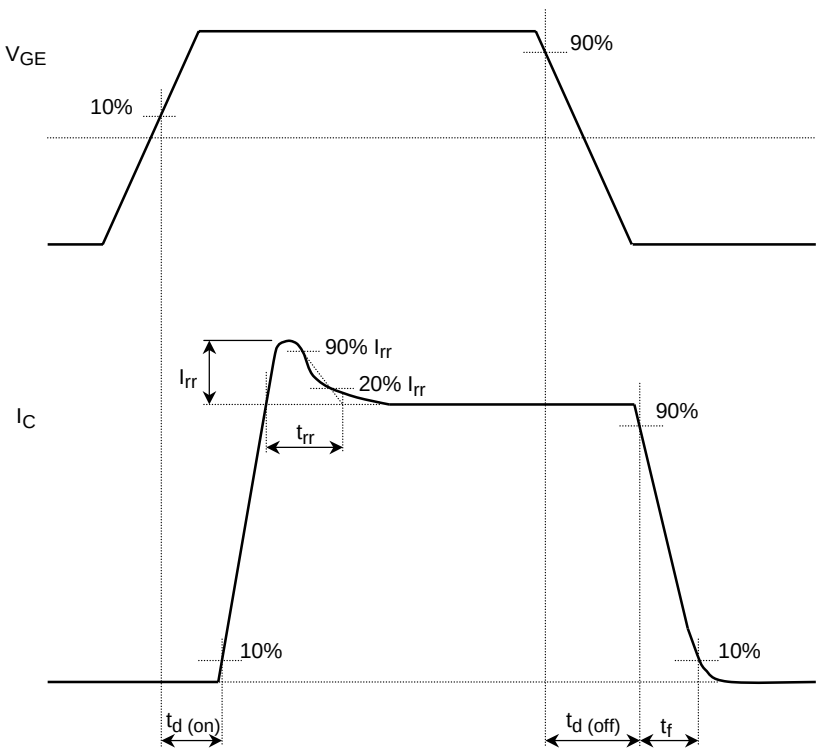
3. Module (Tc = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Junction to case thermal resistance	$R_{th(j-c)}$	Inverter IGBT stage	—	—	0.062	°C/W
		Inverter FRD stage	—	—	0.136	
Case to fin thermal resistance	$R_{th(c-f)}$	With silicon compound	—	0.013	—	°C/W

Switching Time Test Circuit



Timing Chart



Remark**<Short circuit capability condition>**

- Short circuit capability is 6 μ s after fault output signal.
Please keep following condition to use fault output signal.
 - $V_{CC} \leq 750 \text{ V}$
 - $14.8 \text{ V} \leq V_{GE} \leq 17.0 \text{ V}$
 - $R_G \geq 10 \Omega$
 - $T_j \leq 125^\circ\text{C}$

<Gate voltage>

- To use this product, V_{GE} must be provided higher than 14.8 V.
In case V_{GE} is less than 14.8 V, fault signal FO may not be output even under error conditions.

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