

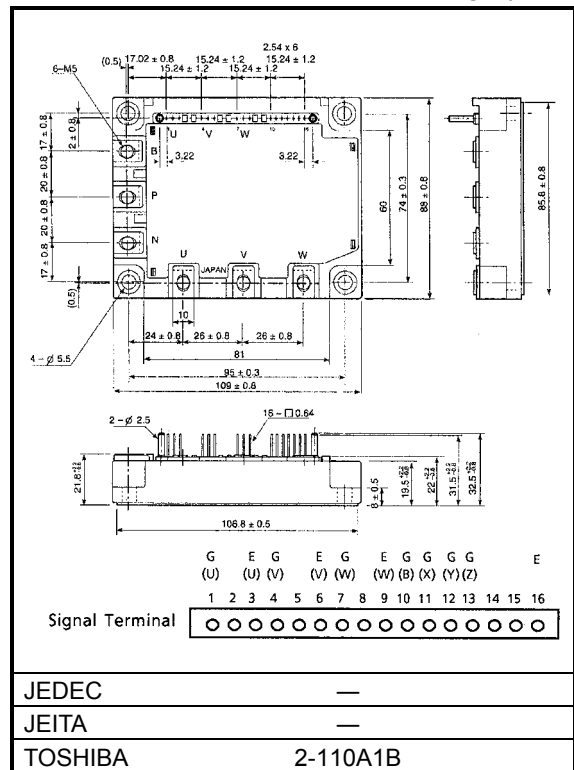
# MG100J7KS50

Unit: mm

## High Power Switching Applications

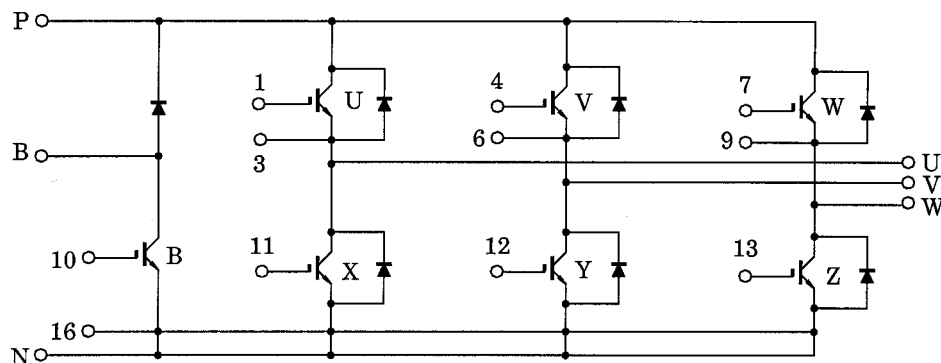
## Motor Control Applications

- The electrodes are isolated from case.
- High input impedance
- 7 IGBTs built into 1 package.
- Enhancement-mode
- High speed type IGBT
  - :  $V_{CE(sat)} = 2.5 \text{ V (max)} (@I_C = 100 \text{ A})$
  - :  $t_f = 0.5 \text{ } \mu\text{s (max)} (@I_C = 100 \text{ A})$
  - :  $t_{rr} = 0.3 \text{ } \mu\text{s (max)} (@I_F = 100 \text{ A})$



Weight: 520g (typ.)

## Equivalent Circuit



Signal Terminal

1 : G (U)	2 : Open	3 : E (U)	4 : G (V)
5 : Open	6 : E (V)	7 : G (W)	8 : Open
9 : E (W)	10 : G (B)	11 : G (X)	12 : G (Y)
13 : G (Z)	14 : Open	15 : Open	16 : E

**Inverter Stage**
**Maximum Ratings (Ta = 25°C)**

Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		$V_{CES}$	600	V
Gate-emitter voltage		$V_{GES}$	±20	V
Collector current	DC	$I_C$	100	A
	1ms	$I_{CP}$	200	
Forward current	DC	$I_F$	100	A
	1ms	$I_{FM}$	200	
Collector power dissipation (Tc = 25°C)		$P_C$	300	W
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-40 ~ 125	°C
Isolation voltage		$V_{isol}$	2500 (AC 1min.)	V
Screw torque (Terminal / mounting)		—	3 / 3	N·m

**Electrical Characteristics (Ta = 25°C)**

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 20V, V_{CE} = 0V$	—	—	±500	nA
Collector cut-off current		$I_{CES}$	$V_{CE} = 600V, V_{GE} = 0V$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE (off)}$	$V_{CE} = 5V, I_C = 10mA$	5.0	—	8.0	V
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_C = 100A, V_{GE} = 15V$	—	2.0	2.5	V
Input capacitance		$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	—	8.5	—	nF
Forward voltage		$V_F$	$I_F = 100A$	—	2.3	3.0	V
Switching time	Rise time	$t_r$	Inductive load $V_{CC} = 300V$ $I_C = 100A$ $V_{GE} = \pm 15V$ $R_G = 13\Omega$  (Note 1)	—	0.12	0.24	$\mu s$
	Turn-on time	$t_{on}$		—	0.45	0.90	
	Fall time	$t_f$		—	0.20	0.50	
	Turn-off time	$t_{off}$		—	0.50	1.00	
	Reverse recovery time	$t_{rr}$		—	0.10	0.30	
Thermal resistance		$R_{th (j-c)}$	Transistor stage	—	—	0.42	°C / W
		$R_{th (c-f)}$	Diode stage	—	—	1.00	
			Case to fin (Note 2)	—	0.05	—	

Note 2: Silicone grease is applied.

**Brake Stage**
**Maximum Ratings (Ta = 25°C)**

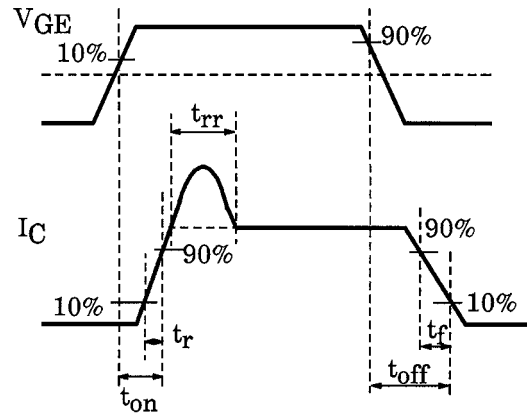
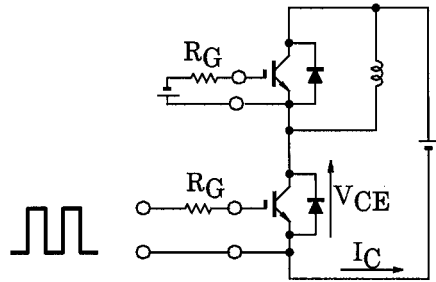
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		$V_{CES}$	600	V
Gate-emitter voltage		$V_{GES}$	±20	V
Reverse voltage		$V_R$	600	V
Collector current	DC	$I_C$	50	A
	1ms	$I_{CP}$	100	
Forward current	DC	$I_F$	50	A
	1ms	$I_{FM}$	100	
Collector power dissipation (Tc = 25°C)		$P_C$	80	W
Junction temperature		$T_J$	150	°C
Storage temperature range		$T_{stg}$	-40 ~ 125	°C
Isolation voltage		$V_{Isol}$	2500 (AC 1 min.)	V
Screw torque (Terminal / mounting)		—	3 / 3	N·m

**Electrical Characteristics (Ta = 25°C)**

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0 \text{ V}$	—	—	±500	nA
Collector cut-off current		$I_{CES}$	$V_{CE} = 600 \text{ V}, V_{GE} = 0 \text{ V}$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE}(\text{off})$	$V_{CE} = 5 \text{ V}, I_C = 5 \text{ mA}$	5.0	—	8.0	V
Collector-emitter saturation voltage		$V_{CE}(\text{sat})$	$I_C = 50 \text{ A}, V_{GE} = 15 \text{ V}$	—	2.0	2.5	V
Input capacitance		$C_{ies}$	$V_{CE} = 10 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$	—	4.0	—	nF
Reverse current		$I_R$	$V_R = 600 \text{ V}$	—	—	1.0	mA
Forward voltage		$V_F$	$I_F = 50 \text{ A}$	—	2.2	2.8	V
Switching time	Rise time	$t_r$	Inductive-load $V_{CC} = 300 \text{ V}$ $I_C = 50 \text{ A}$ $V_{GE} = \pm 15 \text{ V}$ $R_G = 24 \Omega$  (Note 1)	—	0.08	0.16	$\mu\text{s}$
	Turn-on time	$t_{on}$		—	0.10	0.20	
	Fall time	$t_f$		—	0.22	0.44	
	Turn-off time	$t_{off}$		—	0.50	1.00	
	Reverserecovery time	$t_{rr}$		—	0.23	0.35	
Thermal resistance		$R_{th(j-c)}$	Transistor stage	—	—	1.56	°C / W
		$R_{th(c-f)}$	Diode stage	—	—	2.00	
			Case to fin (Note 2)	—	0.05	—	

Note 2: Silicone grease is applied.

Note 1: Switching time test circuit &amp; timing chart



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