TOSHIBA GTR Module Silicon N Channel IGBT

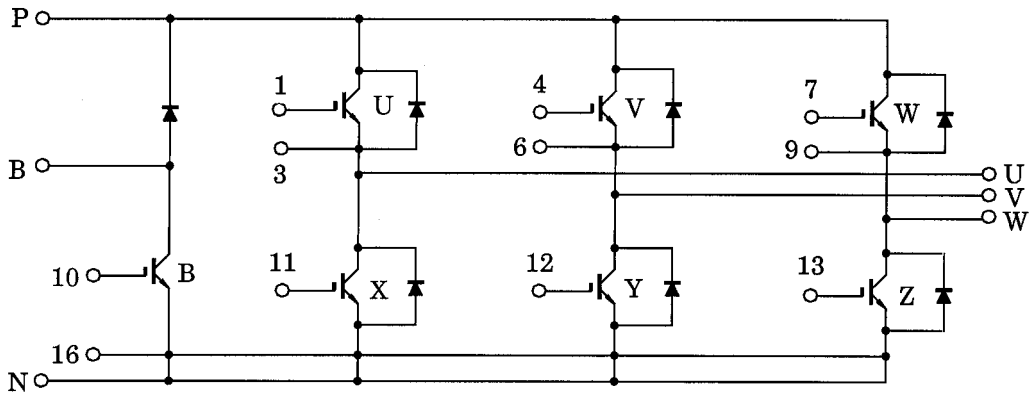
MG150J7KS50

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 : Inverter stage
  : $V_{CE\ (sat)}$ = 2.8V (max) ($@I_C$ = 150A)
  : t_f = 0.5μs (max) ($@I_C$ = 150A)
  : t_{rr} = 0.3μs (max) ($@I_F$ = 150A)
- Outline : TOSHIBA 2-110A1B
- Weight: 520g

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	150	A
	1ms	I_{CP}	300	
Forward current	DC	I_F	150	A
	1ms	I_{FM}	300	
Collector power dissipation (Tc = 25°C)		P_C	320	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} = ±20V, V_{CE} = 0	—	—	±500	nA
Collector-emitter cut-off current		I_{CES}	V_{CE} = 600V, V_{GE} = 0	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE\ (off)}$	V_{CE} = 5V, I_C = 15mA,	5.0	—	8.0	V
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 150A, V_{GE} = 15V	—	2.2	2.8	V
Input capacitance		C_{ies}	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz	—	12.0	—	nF
Forward voltage		V_F	I_F = 150A	—	2.5	3.5	V
Switching time	Rise time	t_r	Inductive load V_{CC} = 300V I_C = 150A V_{GE} = ±15V R_G = 9.2Ω (Note 1)	—	0.15	0.3	μs
	Turn-on time	t_{on}		—	0.23	0.46	
	Fall time	t_f		—	0.25	0.50	
	Turn-off time	t_{off}		—	0.50	1.00	
	Reverse recovery time	trr		—	0.15	0.30	
Thermal resistance		$R_{th\ (j-c)}$	Transistor stage	—	—	0.39	°C / W
			Diode stage	—	—	1.00	
		$R_{th\ (c-f)}$	Case to fin (Note 2)	—	0.05	—	

Note 2: Silicone grease is applied.

Brake Stage

Maximum Ratings (Ta = 25°C)

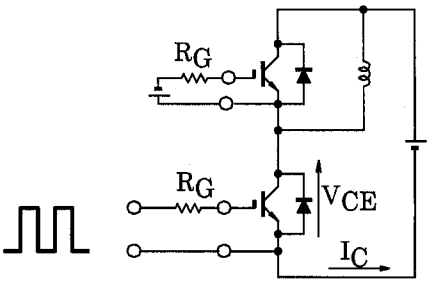
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	600	V
Gate-emitter voltage		V_{GES}	±20	V
Reverse voltage		V_R	600	V
Collector current	DC	I_C	50	A
	1ms	I_{CP}	100	
Forward current	DC	I_F	50	A
	1ms	I_{FM}	100	
Collector power dissipation (Tc = 25°C)		P_C	120	W
Junction temperature		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

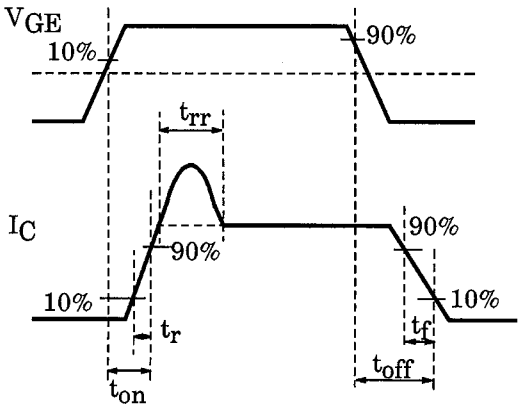
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	UNIT
Gate leakage current		I_{GES}	V_{GE} = ±20V, V_{CE} = 0V	—	—	±500	nA
Collector-emitter 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 = 5mA,	5.0	—	8.0	V
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 50A, V_{GE} = 15V	—	2.0	2.5	V
Input capacitance		C_{ies}	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz	—	4.0	—	nF
Reverse current		I_R	V_R = 600V	—	—	1.0	mA
Forward voltage		V_F	I_F = 150A	—	2.2	2.8	V
Switching time	Rise time	t_r	Inductive load V_{CC} = 300V I_C = 50A V_{GE} = ±15V R_G = 24Ω (Note 1)	—	0.08	0.16	μs
	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	
	Reverse recovery time	trr		—	0.23	0.35	
Thermal resistance		$R_{th\ (j-c)}$	Transistor stage	—	—	1.04	°C / W
			Diode stage	—	—	2.00	
		$R_{th\ (c-f)}$	Case to fin (Note 2)	—	0.05	—	

Note 2: Silicone grease is applied.

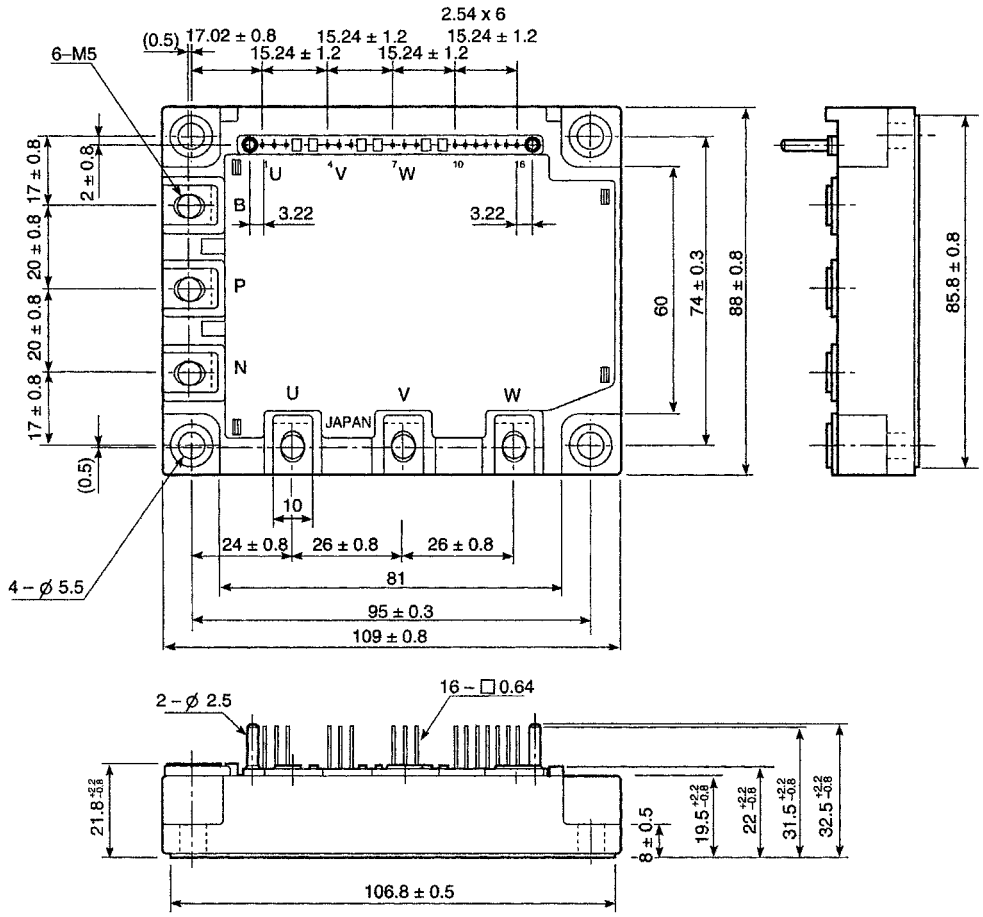
Note 1: Switching Time Test Circuit &Timing Chat

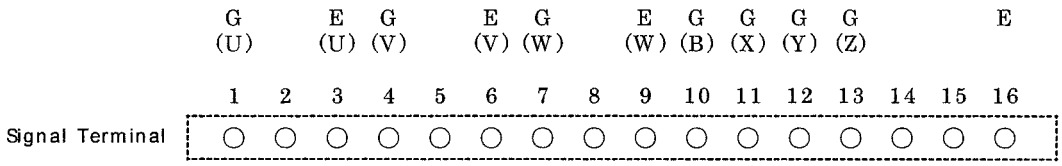




Package Dimensions

TOSHIBA 2-110A1B Unit: mm





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