

TOSHIBA GTR Module Silicon N Channel IGBT

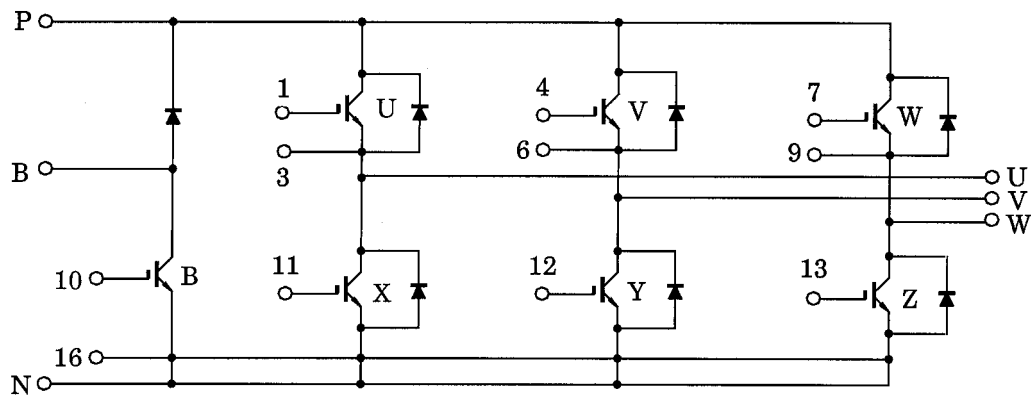
MG150J7KS50

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
 - : $V_{CE(sat)} = 2.8V (max) (@I_C = 150A)$
 - : $t_f = 0.5\mu s (max) (@I_C = 150A)$
 - : $t_{rr} = 0.3\mu s (max) (@I_F = 150A)$
- 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}	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	±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 $V_{CC} = 300V$ $I_C = 150A$ $V_{GE} = \pm 15V$ $R_G = 9.2\Omega$ (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	t_{rr}		—	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)

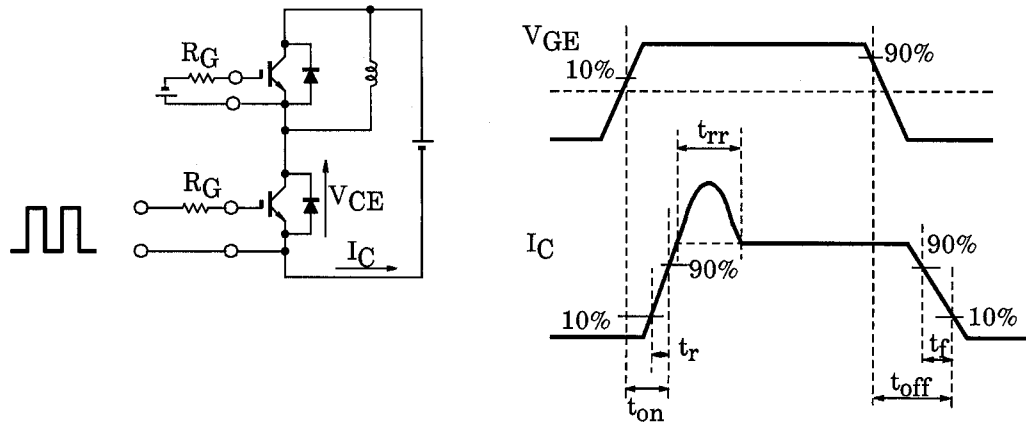
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	600	V
Gate-emitter voltage		V_{GES}	±20	V
Reverse voltage		V_R	600	V
Collector current	DC	I_C	50	A
	1ms	I_{CP}	100	
Forward current	DC	I_F	50	A
	1ms	I_{FM}	100	
Collector power dissipation (Tc = 25°C)		P_C	120	W
Junction temperature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

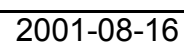
Characteristics		Symbol	Test Condition	Min	Typ.	Max	UNIT
Gate leakage current		I_{GES}	$V_{GE} = \pm 20V, V_{CE} = 0V$	—	—	±500	nA
Collector-emitter cut-off current		I_{CES}	$V_{CE} = 600V, V_{GE} = 0V$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE (off)}$	$V_{CE} = 5V, I_C = 5mA,$	5.0	—	8.0	V
Collector-emitter 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 $V_{CC} = 300V$ $I_C = 50A$ $V_{GE} = \pm 15V$ $R_G = 24\Omega$ (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	t_{rr}		—	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 Chart



Unit: mm



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