

TENTATIVE TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL IGBT

# GT5J311, GT5J311(SM)

HIGH POWER SWITCHING APPLICATIONS

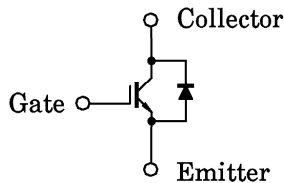
MOTOR CONTROL APPLICATIONS

- The 3rd Generation
- Enhancement-Mode
- High Speed :  $t_f = 0.30 \mu s$  (Max.) ( $I_C = 5A$ )
- Low Saturation Voltage :  $V_{CE(sat)} = 2.7V$  (Max.) ( $I_C = 5A$ )
- FRD included between Emitter and Collector.

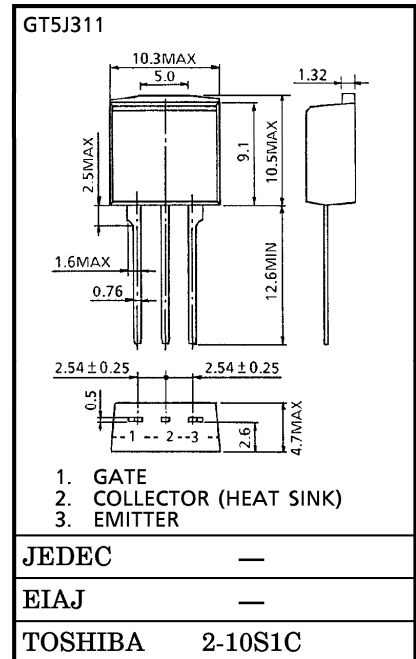
MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Emitter Voltage	$V_{CES}$	600	V
Gate-Emitter Voltage	$V_{GES}$	$\pm 20$	V
Collector Current	DC	$I_C$	5 A
	1ms	$I_{CP}$	10 A
Emitter-Collector Forward Current	DC	$I_F$	5 A
	1ms	$I_{FM}$	10 A
Collector Power Dissipation ( $T_c = 25^\circ C$ )	$P_C$	45	W
Junction Temperature	$T_j$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55~150	$^\circ C$

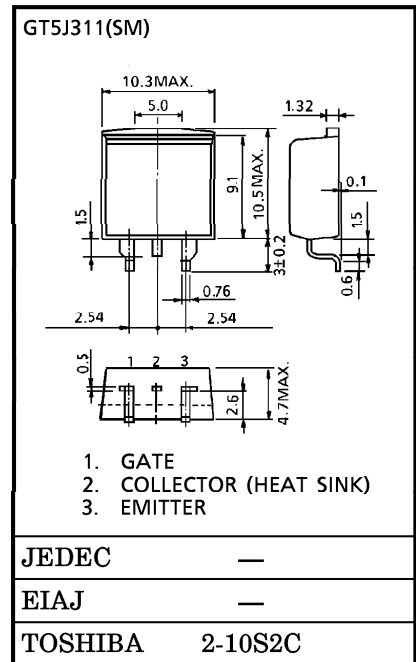
EQUIVALENT CIRCUIT



Unit in mm



Weight : 1.5g



Weight : 1.4g

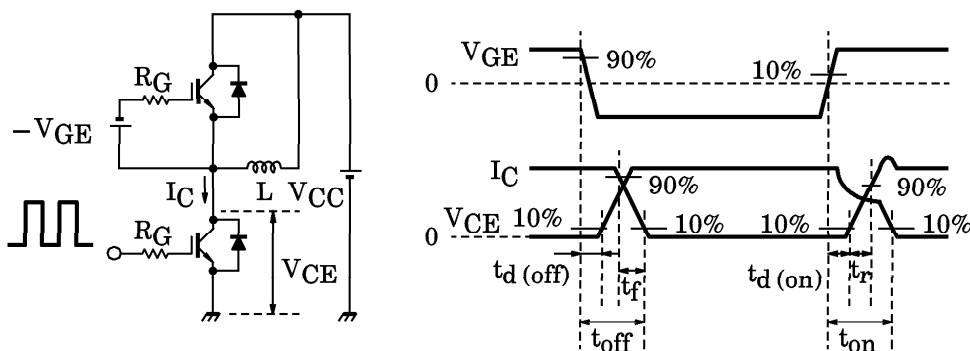
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	$I_{GES}$	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	$\pm 500$	nA
Collector Cut-Off Current	$I_{CES}$	$V_{CE} = 600V, V_{GE} = 0$	—	—	1.0	mA
Gate-Emitter Cut-Off Voltage	$V_{GE} (OFF)$	$I_C = 0.5mA, V_{CE} = 5V$	5.0	—	8.0	V
Collector-Emitter Saturation Voltage	$V_{CE} (sat)$	$I_C = 5A, V_{GE} = 15V$	—	2.1	2.7	V
Input Capacitance	$C_{ies}$	$V_{CE} = 20V, V_{GE} = 0, f = 1MHz$	—	650	—	pF
Switching Time	Rise Time	Inductive Load $V_{CC} = 300V, I_C = 5A$ $V_{GG} = \pm 15V, R_G = 180\Omega$ (Note 1)	—	0.12	—	$\mu s$
	Turn-On Time		—	0.40	—	
	Fall Time		—	0.15	0.30	
	Turn-Off Time		—	0.50	—	
Peak Forward Voltage	$V_F$	$I_F = 5A, V_{GE} = 0$	—	—	1.8	V
Reverse Recovery Time	$t_{rr}$	$I_F = 5A, di/dt = -100A/\mu s$	—	—	200	ns
Thermal Resistance (IGBT)	$R_{th(j-c)}$	—	—	—	2.8	°C/W
Thermal Resistance (Diode)	$R_{th(j-c)}$	—	—	—	3.76	°C/W

(Note 1) Switching time measurement circuit and input/output waveforms



Switching loss measurement waveforms

