

TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR
SILICON N CHANNEL IGBT

GT5J311, GT5J311(SM)

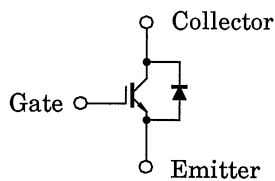
HIGH POWER SWITCHING APPLICATIONS
MOTOR CONTROL APPLICATIONS

- Third-generation IGBT
- Enhancement mode type
- High speed : $t_f = 0.30\mu\text{s}$ (Max.) ($I_C = 5\text{A}$)
- Low saturation voltage : $V_{CE}(\text{sat}) = 2.7\text{V}$ (Max.) ($I_C = 5\text{A}$)
- FRD included between emitter and collector

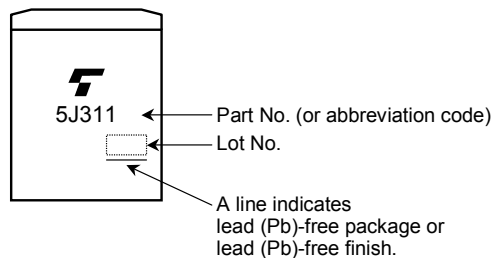
MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	± 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 ($T_c = 25^\circ\text{C}$)		P_C	45	W
Junction Temperature		T_j	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55~150	$^\circ\text{C}$

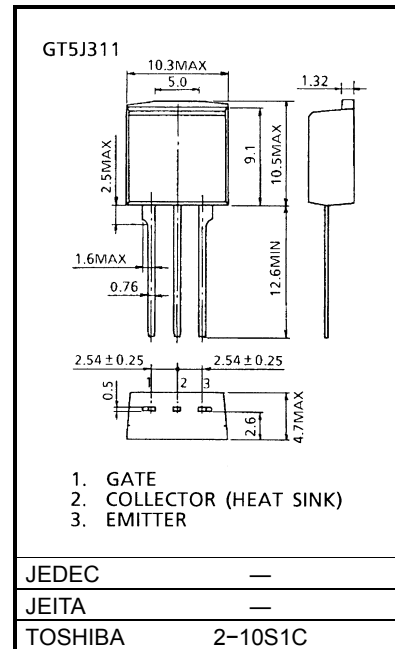
EQUIVALENT CIRCUIT



MARKING

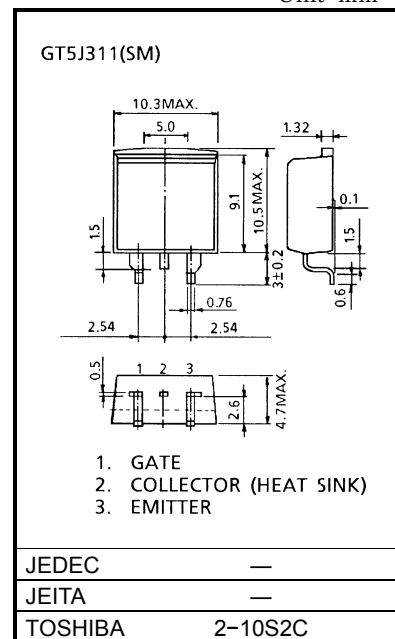


Unit: mm



Weight: 1.5g

Unit: mm

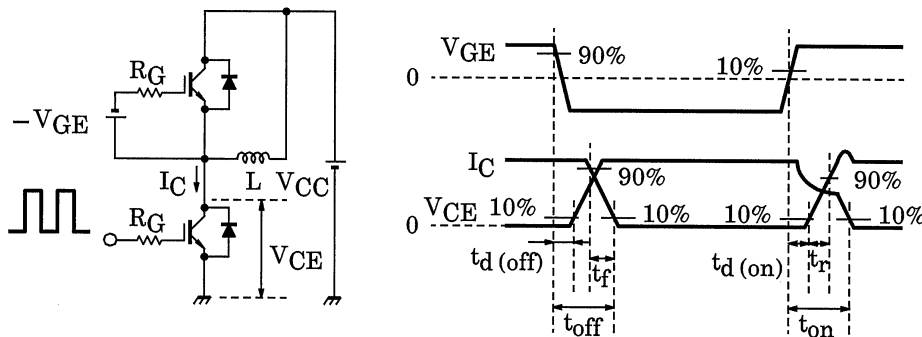


Weight: 1.4g

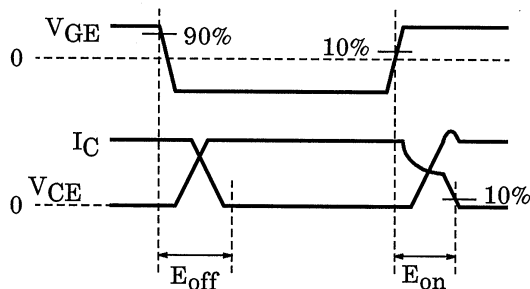
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

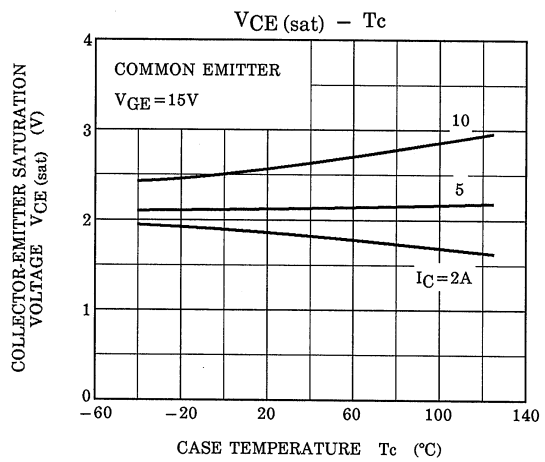
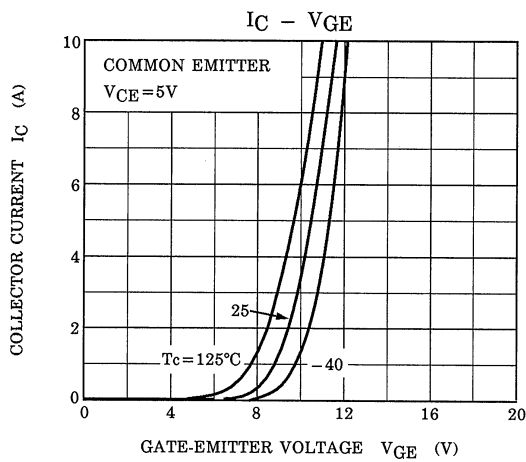
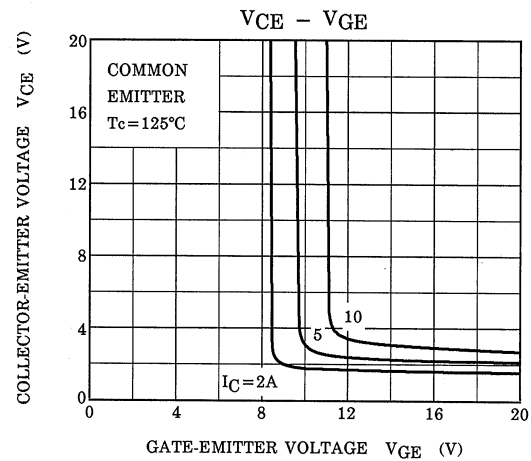
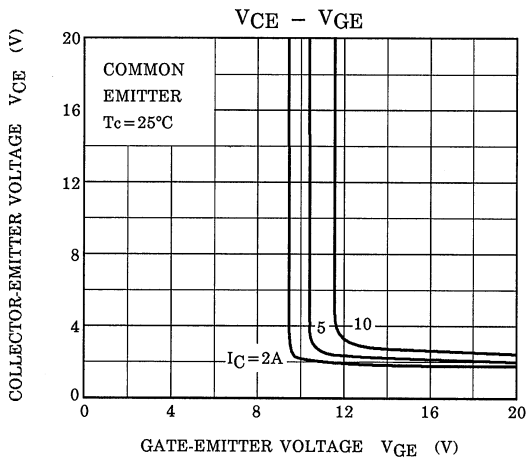
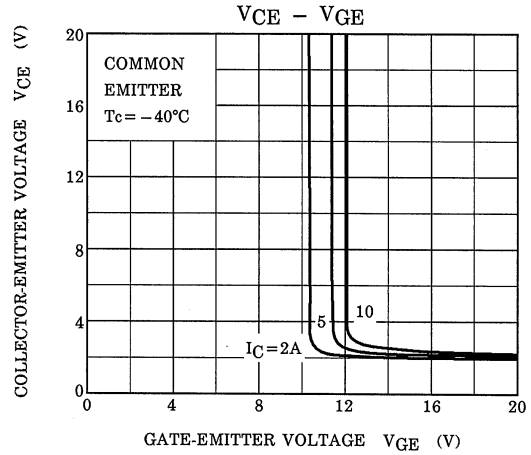
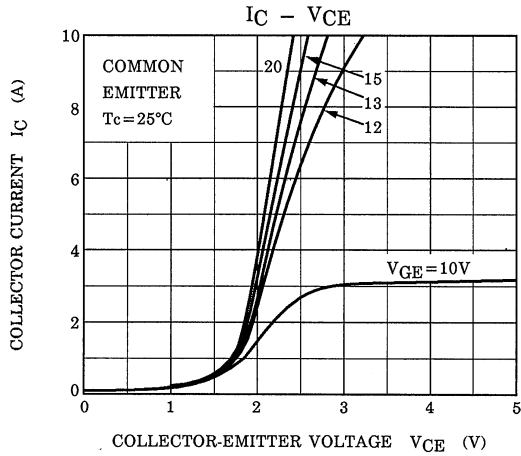
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Gate Leakage Current	I_{GES}	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	± 500	nA
Collector Cut-Off Current	I_{CES}	$V_{CE} = 600V, V_{GE} = 0$	—	—	1.0	mA
Gate-Emitter Cut-Off Voltage	$V_{GE(OFF)}$	$I_C = 0.5mA, V_{CE} = 5V$	5.0	—	8.0	V
Collector-Emitter 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	—	μs
	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	$^{\circ}C/W$
Thermal Resistance (Diode)	$R_{th(j-c)}$	—	—	—	3.76	$^{\circ}C/W$

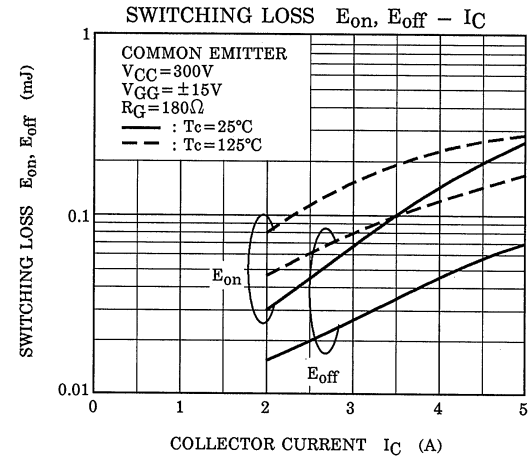
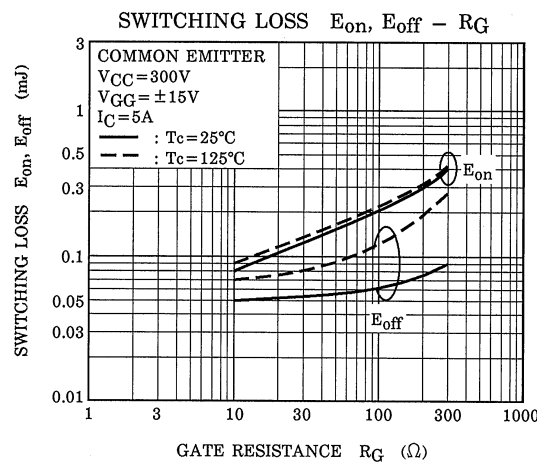
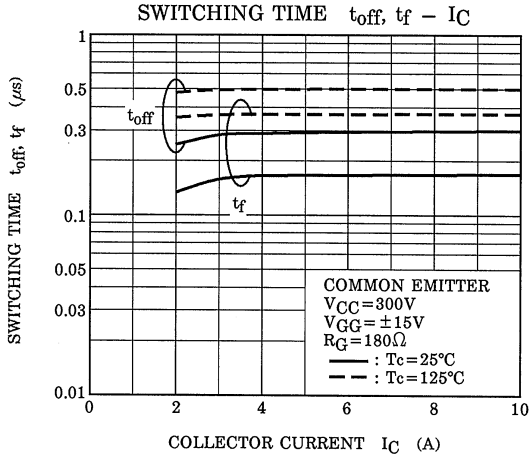
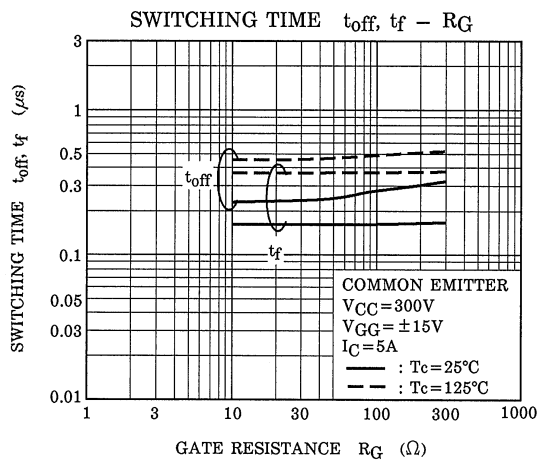
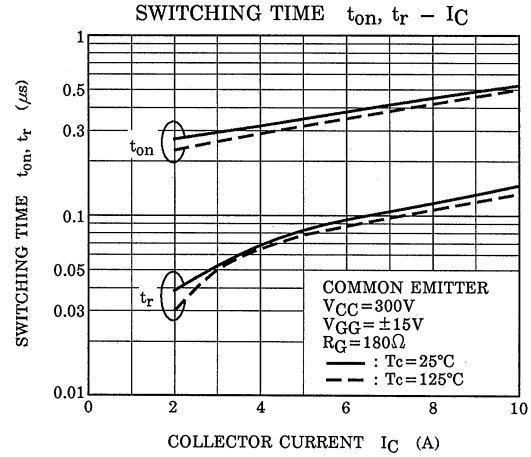
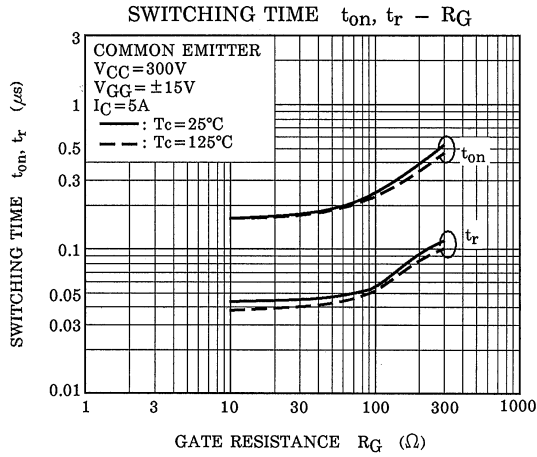
Note 1: Switching time measurement circuit and input / output waveforms

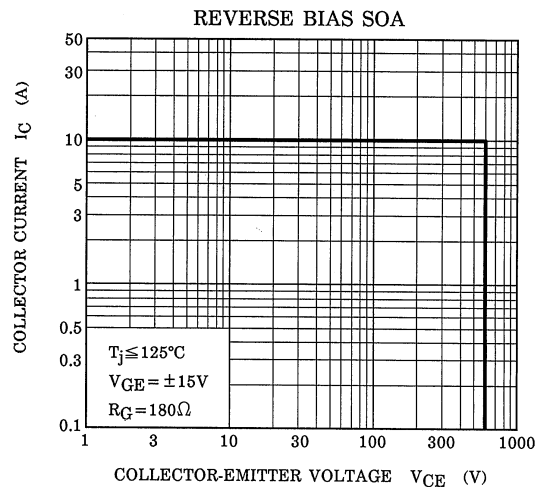
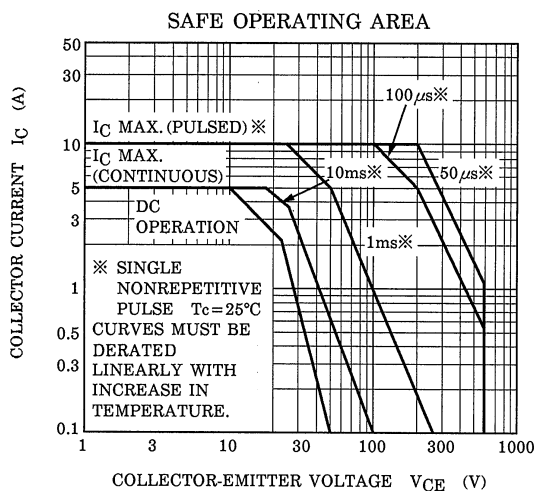
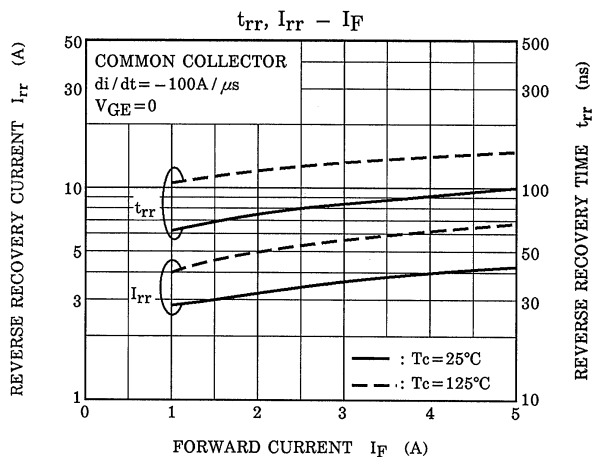
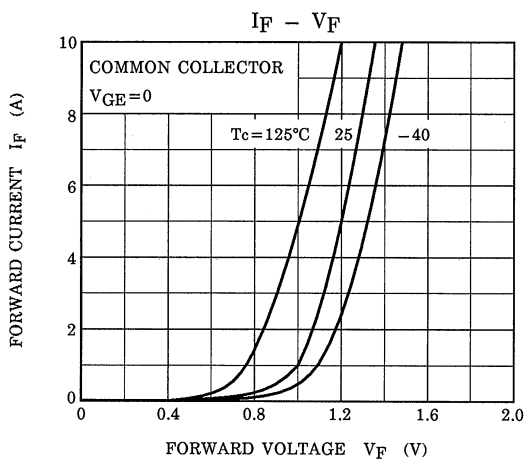
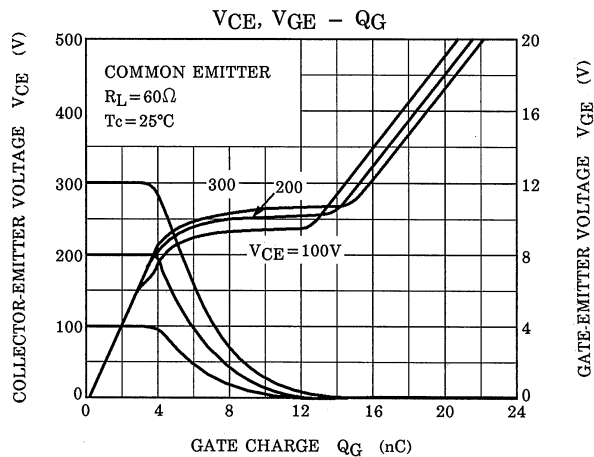
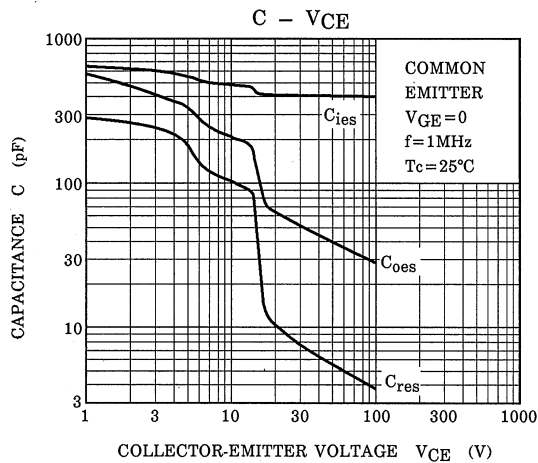


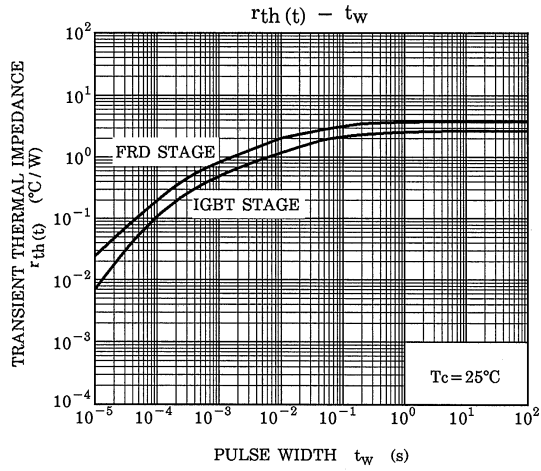
Switching loss measurement waveforms











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