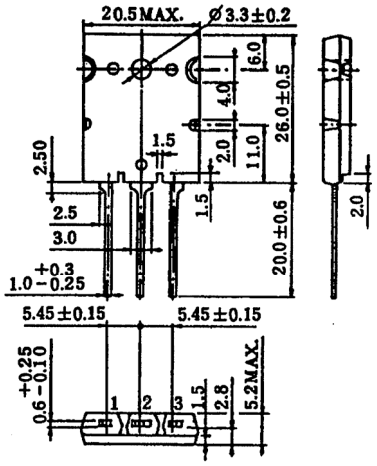
TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL IGBT

GT50J102

HIGH POWER SWITCHING APPLICATIONS
MOTOR CONTROL APPLICATIONS

- Third-generation IGBT
- Enhancement mode type
- High speed. : t_f = 0.30μs (Max.)
- Low saturation voltage. : $V_{CE(sat)}$ = 2.7V (Max.)

Unit: mm



1. GATE
2. COLLECTOR (FIN)
3. EMITTER

JEDEC	—
JEITA	—
TOSHIBA	2-21F2C

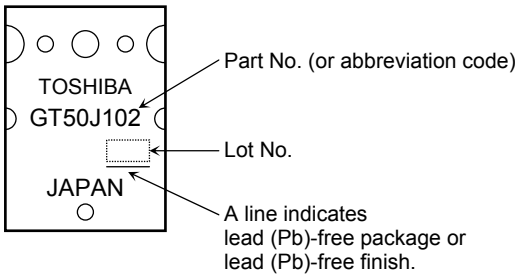
Weight: 9.75 g (typ.)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector−Emitter Voltage		V_{CES}	600	V
Gate−Emitter Voltage		V_{GES}	±20	V
Collector Current	DC	I_C	50	A
	1ms	I_{CP}	100	
Collector Power Dissipation		P_C	200	W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C
Screw Torque		—	0.8	N·m

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

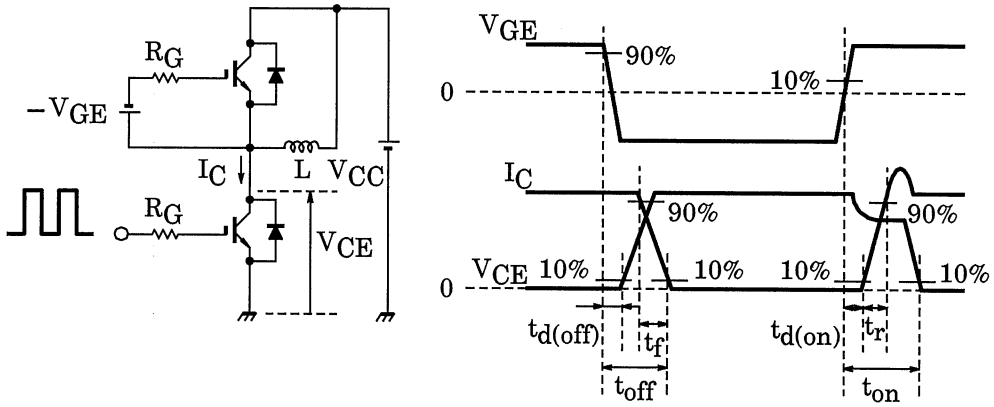
MARKING



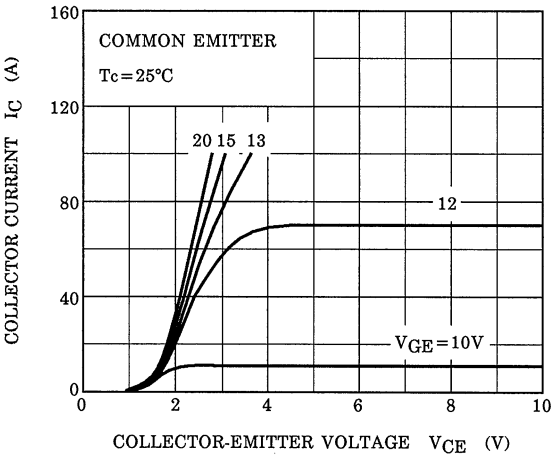
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Gate Leakage Current		I_{GES}	V_{GE} = ±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 = 5mA, V_{CE} = 5V	5.0	7.0	8.0	V
Collector−Emitter Saturation Voltage		$V_{CE(sat)}$	I_C = 50A, V_{GE} = 15V	—	2.1	2.7	V
Input Capacitance		C_{ies}	V_{CE} = 10V, V_{GE} = 0 f = 1MHz	—	4500	—	pF
Switching Time	Turn−on delayTime	$t_{d(on)}$	Inductive Load V_{CC} = 300V V_{GE} = ±15V I_C = 50A R_G = 24Ω (Note 1)	—	0.08	—	μs
	Rise Time	t_r		—	0.12	—	
	Turn−on Time	t_{on}		—	0.40	—	
	Turn−off delay Time	$t_{d(off)}$		—	0.20	—	
	Fall Time	t_f		—	0.15	0.30	
	Turn−off Time	t_{off}		—	0.50	—	
Thermal Resistance		$R_{th(j-c)}$		—	—	0.625	V

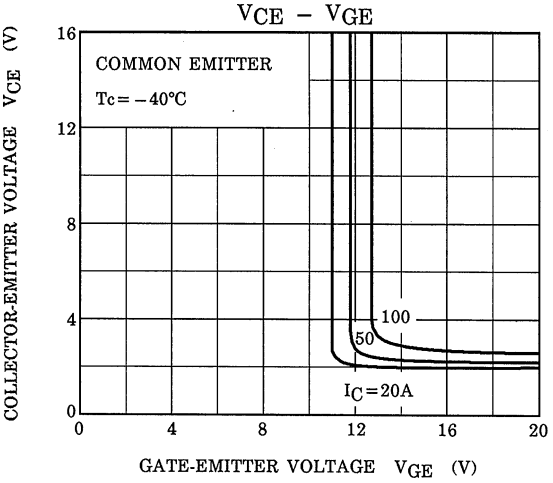
Note 1: Switching. time measurement circuit and input / output waveforms



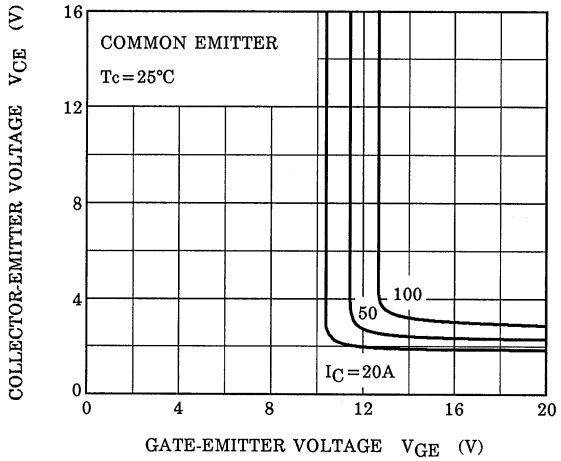
I_C – V_{CE}



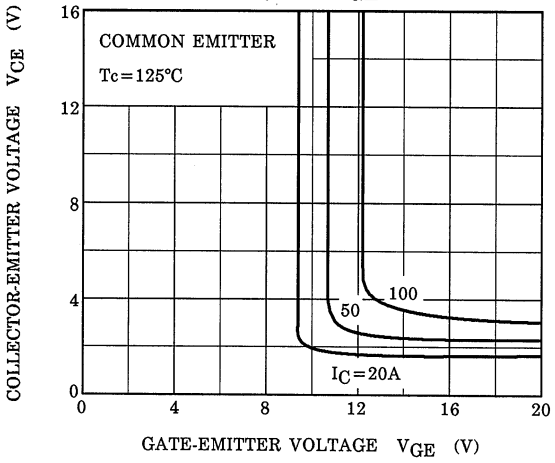
V_{CE} – V_{GE}



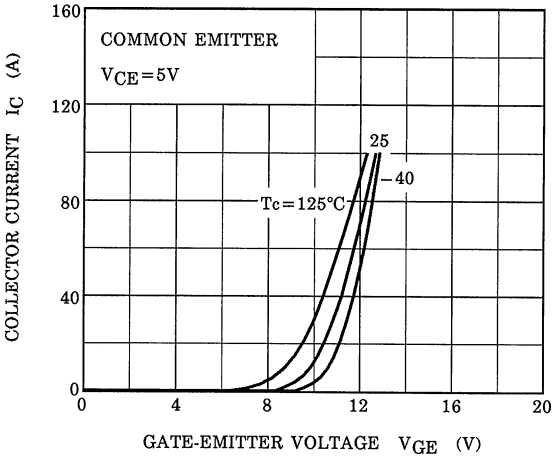
V_{CE} – V_{GE}



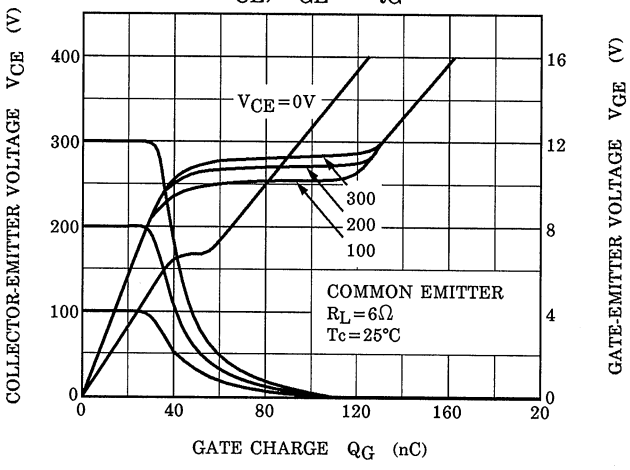
V_{CE} – V_{GE}



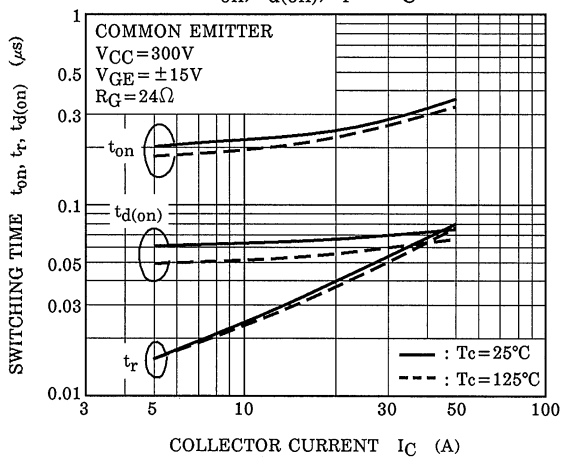
I_C – V_{GE}



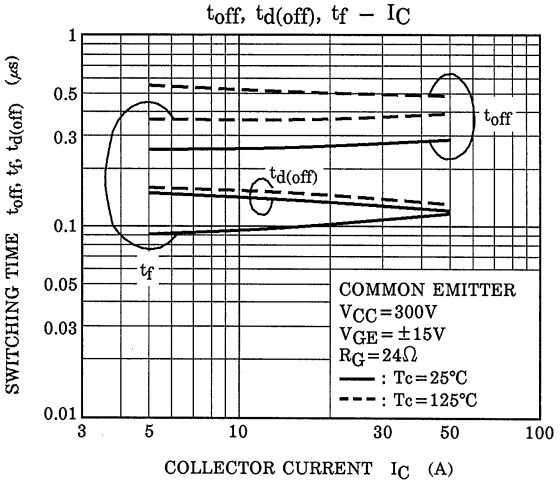
V_{CE}, V_{GE} – Q_G



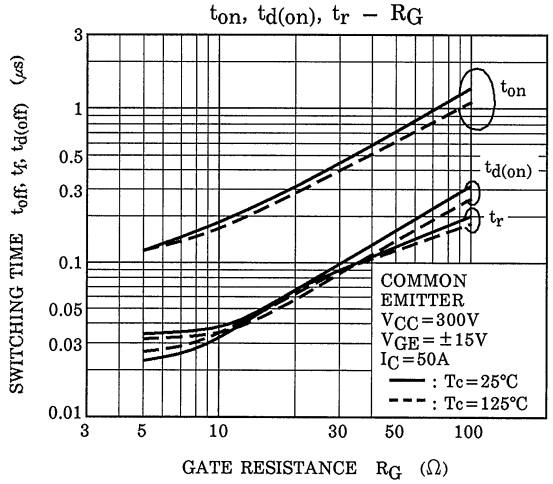
t_{on}, $t_{d(on)}$, t_r – I_C



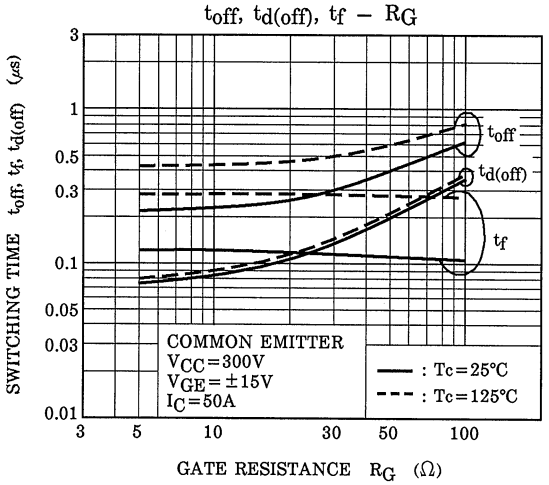
t_{off}, $t_{d(off)}$, t_f – I_C



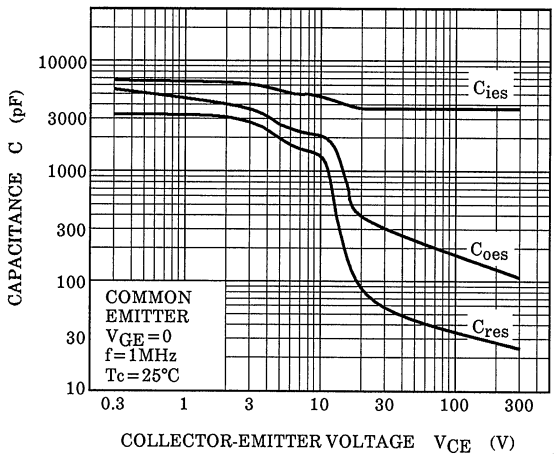
t_{on}, $t_{d(on)}$, t_r – R_G



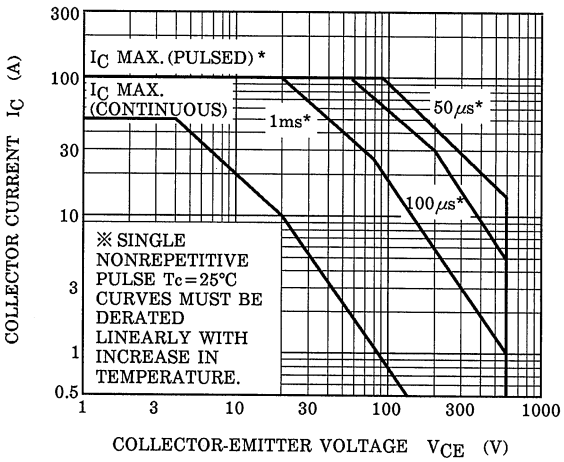
t_{off}, $t_{d(off)}$, t_f – R_G

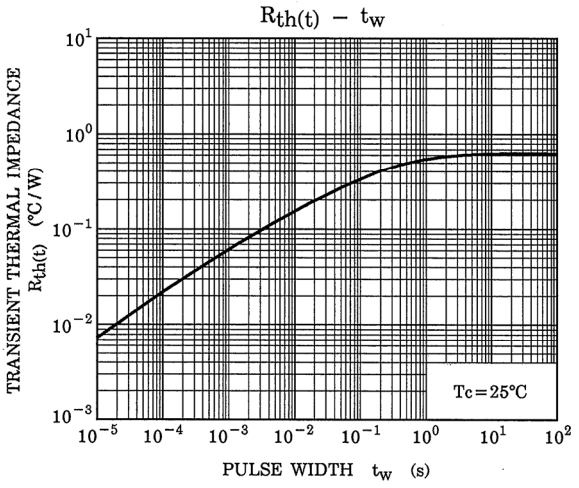


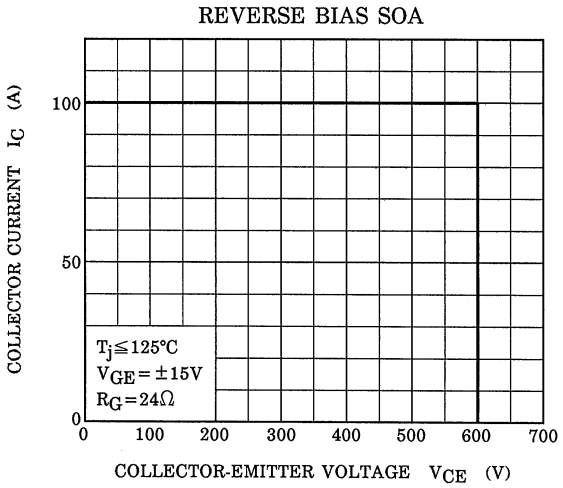
C – V_{CE}



SAFE OPERATING AREA




$R_{th(t)} - t_w$
TRANSIENT THERMAL IMPEDANCE $R_{th(t)}$ (°C/W)
10^1
10^0
10^{-1}
10^{-2}
10^{-3}
10^{-5} 10^{-4} 10^{-3} 10^{-2} 10^{-1} 10^0 10^1 10^2
Tc = 25°C
PULSE WIDTH t_w (s)


REVERSE BIAS SOA
COLLECTOR CURRENT I_C (A)
100
50
0
$T_j \leqq 125°C$
$V_{GE} = \pm 15V$
$R_G = 24\Omega$
0 100 200 300 400 500 600 700
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

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20070701-EN

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