

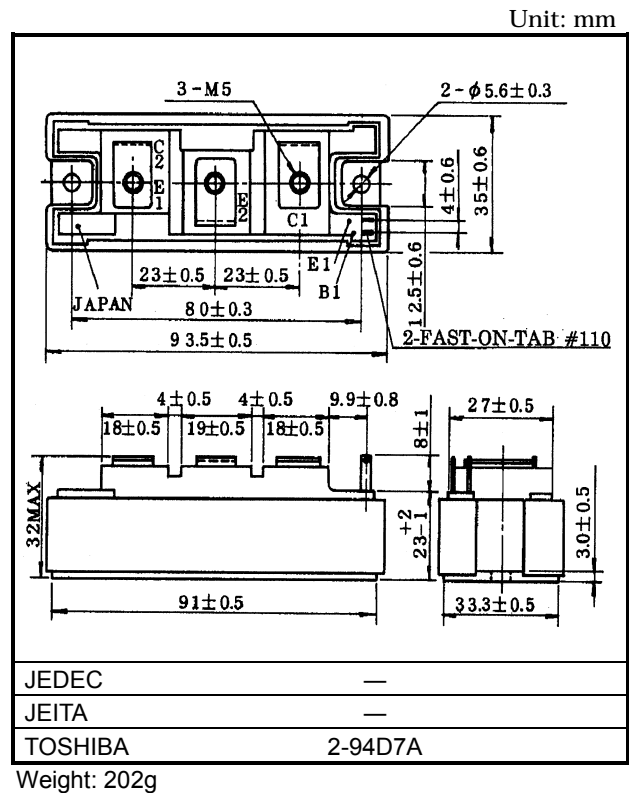
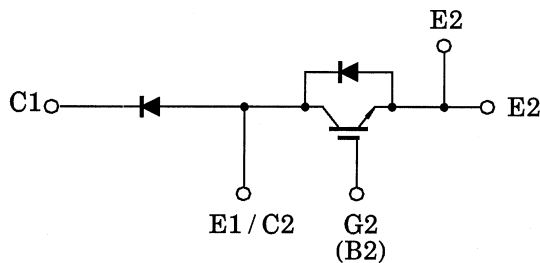
TOSHIBA GTR Module Silicon N Channel IGBT

MG75Q1ZS50

High Power Switching Applications
Motor Control Applications

- High input impedance
- High speed : $t_f = 0.3 \mu s$ (max)
@inductive load
- Low saturation voltage
: $V_{CE(sat)} = 3.6 V$ (max)
- Enhancement-mode
- The electrodes are isolated from case

Equivalent Circuit



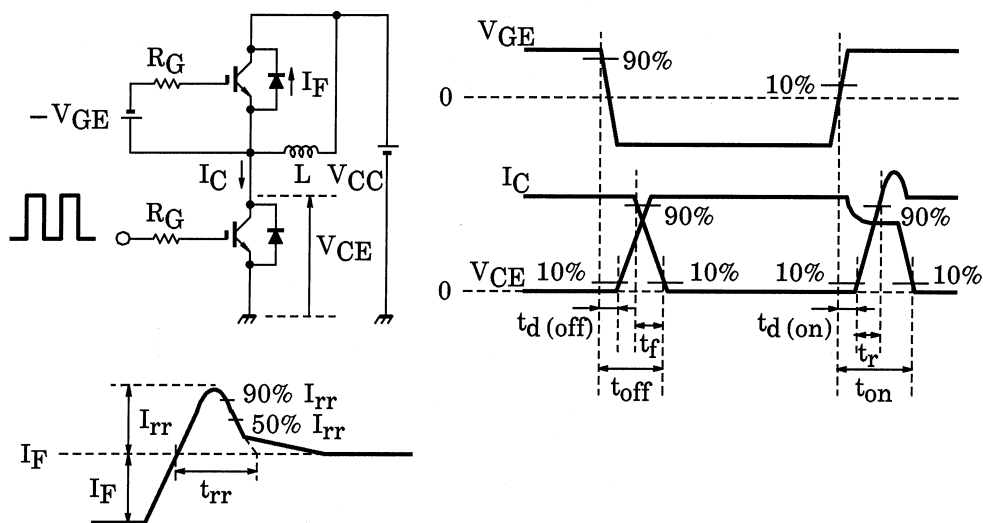
Maximum Ratings (Ta = 25°C)

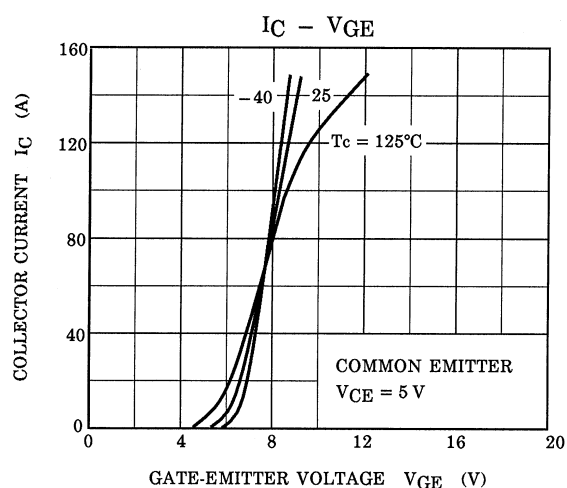
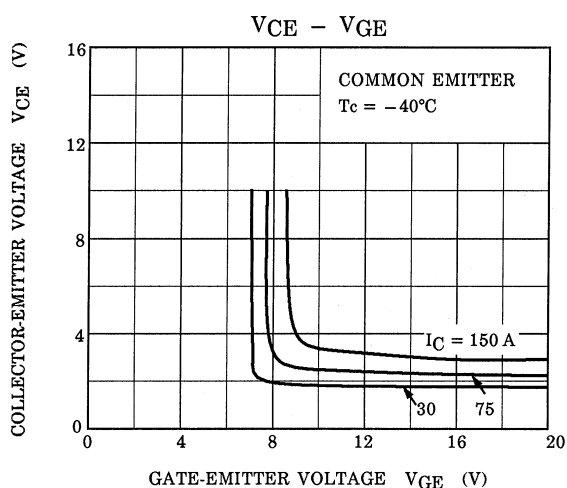
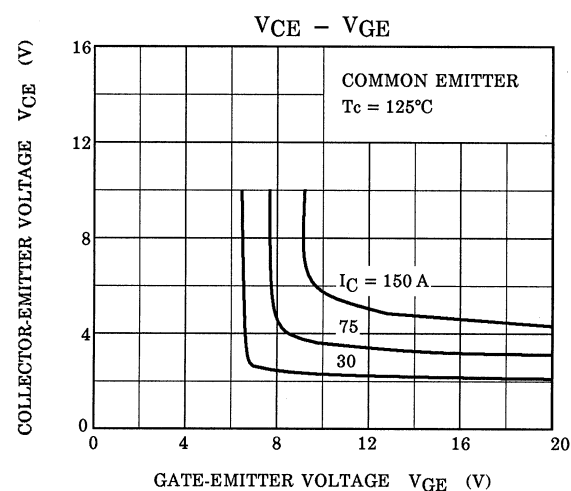
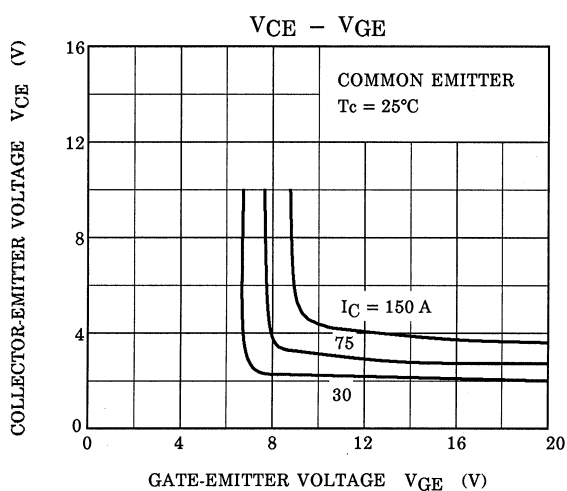
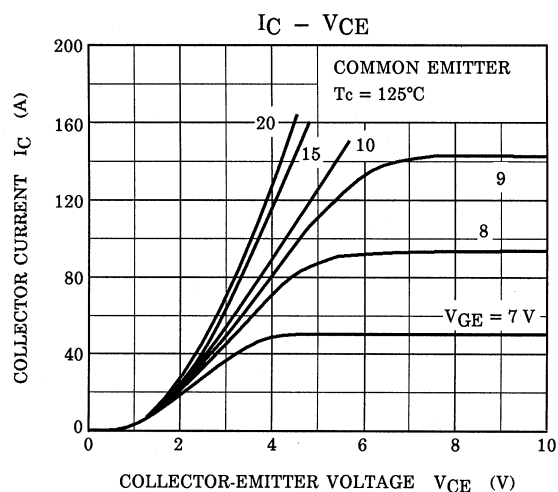
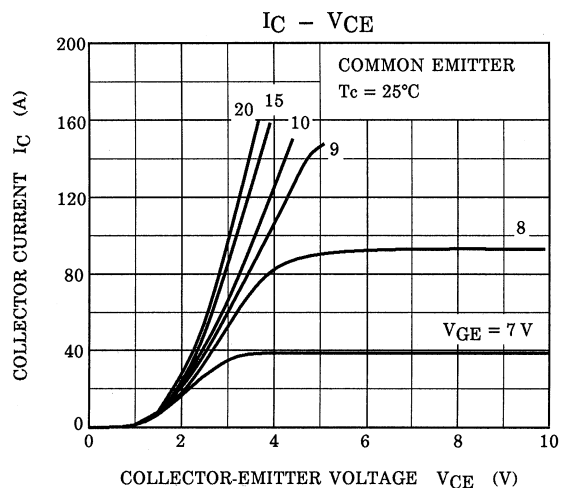
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		V_{CES}	1200	V
Gate-emitter voltage		V_{GES}	±20	V
Reverse voltage		V_R	1200	V
Collector current	DC	I_C (25°C / 80°C)	100 / 75	A
	1ms	I_{CP} (25°C / 80°C)	200 / 150	
Forward current	DC	I_F	75	A
	1ms	I_{FM}	150	
Collector power dissipation (Tc = 25°C)		P_C	600	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	-40 ~ 125	°C
Isolation voltage		V_{isol}	2500 (AC 1 minute)	V
Screw torque (Terminal / mounting)		—	3 / 3	N·m

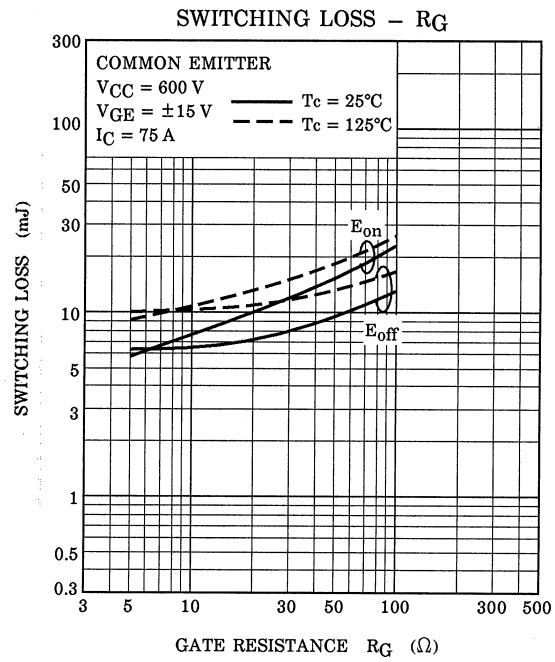
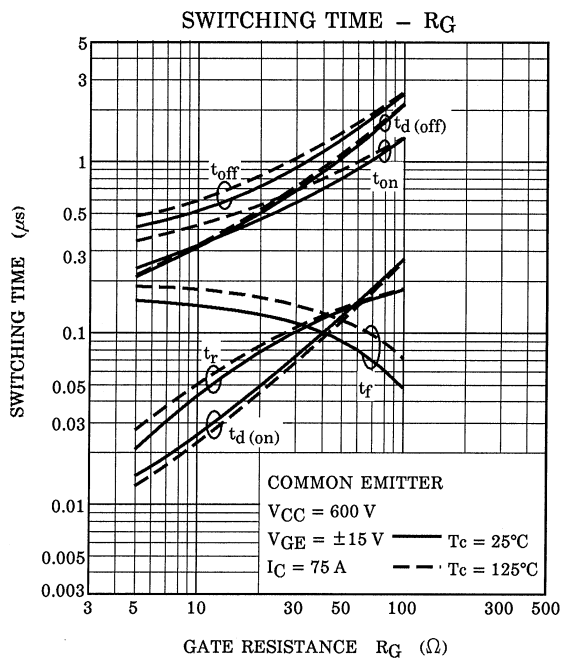
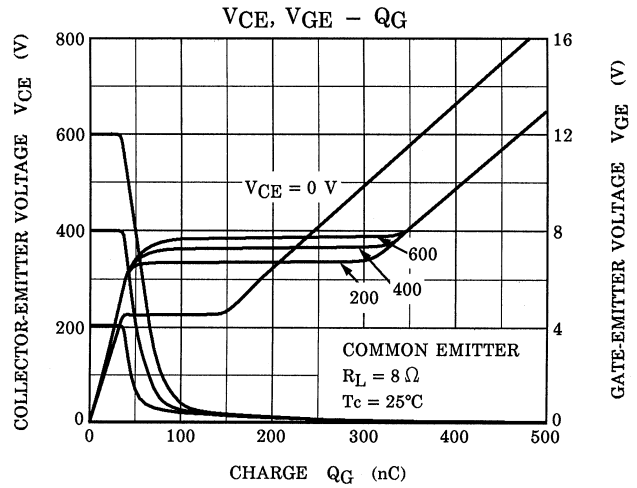
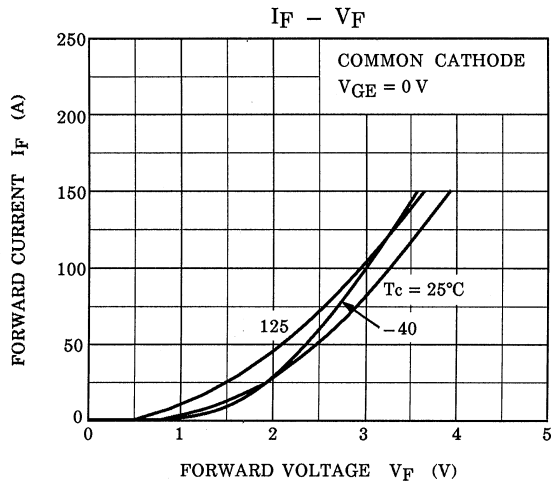
Electrical Characteristics (Ta = 25°C)

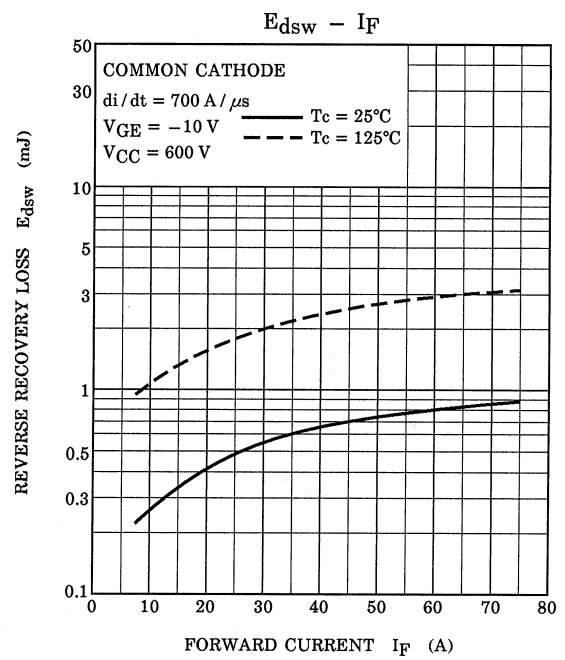
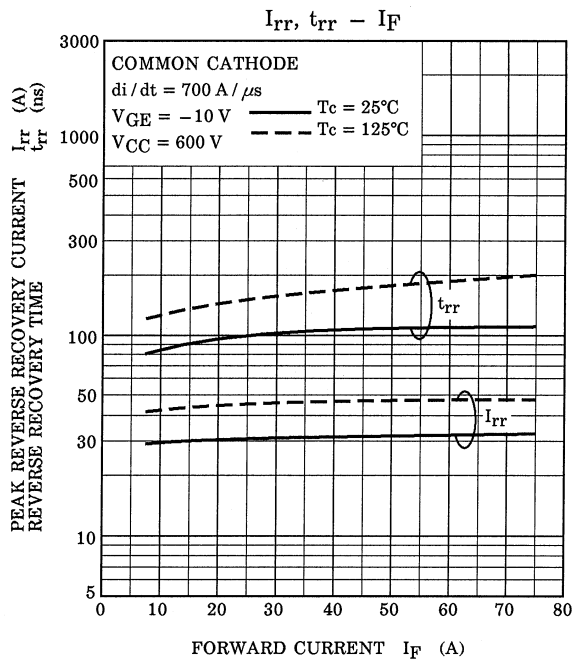
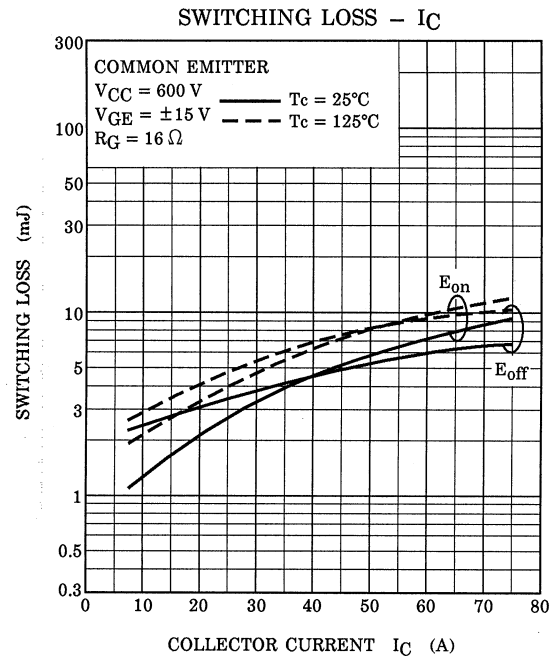
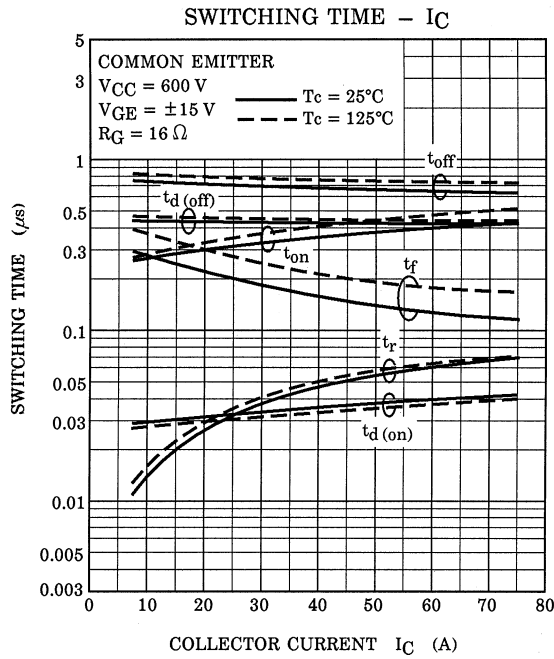
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GES}	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0$	—	—	± 500	nA
Collector cut-off current		I_{CES}	$V_{CE} = 1200 \text{ V}, V_{GE} = 0$	—	—	1.0	mA
Gate-emitter cut-off voltage		$V_{GE}(\text{off})$	$I_C = 75 \text{ mA}, V_{CE} = 5 \text{ V}$	3.0	—	6.0	V
Collector-emitter saturation voltage		$V_{CE}(\text{sat})$	$I_C = 75 \text{ A}, V_{GE} = 15 \text{ V}$	$T_J = 25^\circ\text{C}$	—	2.8	V
				$T_J = 125^\circ\text{C}$	—	3.1	
Input capacitance		C_{ies}	$V_{CE} = 10 \text{ V}, V_{GE} = 0, f = 1 \text{ MHz}$	—	8.5	—	nF
Switching time	Turn-on delay time	$t_{d(\text{on})}$	Inductive load $V_{CC} = 600 \text{ V}$ $I_C = 75 \text{ A}$ $V_{GE} = \pm 15 \text{ V}$ $R_G = 16 \Omega$ (Note 1)	—	0.05	—	μs
	Rise-time	t_r		—	0.05	—	
	Turn-on time	t_{on}		—	0.2	—	
	Turn-off delay time	$t_{d(\text{off})}$		—	0.5	—	
	Fall time	t_f		—	0.1	0.3	
	Turn-off time	t_{off}		—	0.6	—	
Reverse current		I_R	$V_R = 1200 \text{ V}$	—	—	1.0	mA
Forward voltage		V_F	$I_F = 75 \text{ A}, V_{GE} = 0$	—	2.4	3.5	V
Reverse recovery time		t_{rr}	$I_F = 75 \text{ A}, V_{GE} = -10 \text{ V}$ $di/dt = 700 \text{ A}/\mu\text{s}$ (Note 1)	—	0.1	0.25	μs
Thermal resistance		$R_{th(j-c)}$	Transistor stage	—	—	0.2	$^\circ\text{C}/\text{W}$
			Diode stage	—	—	0.47	

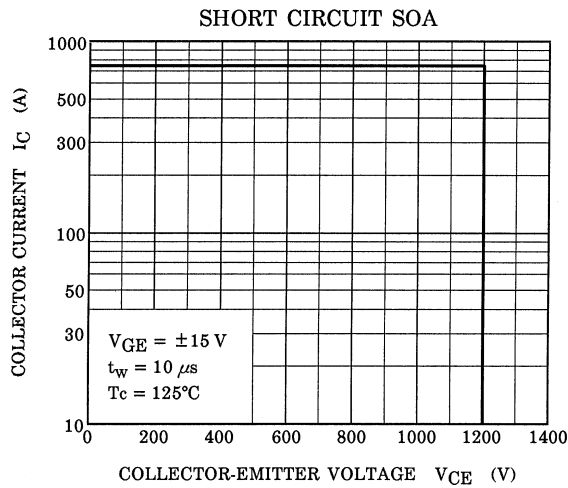
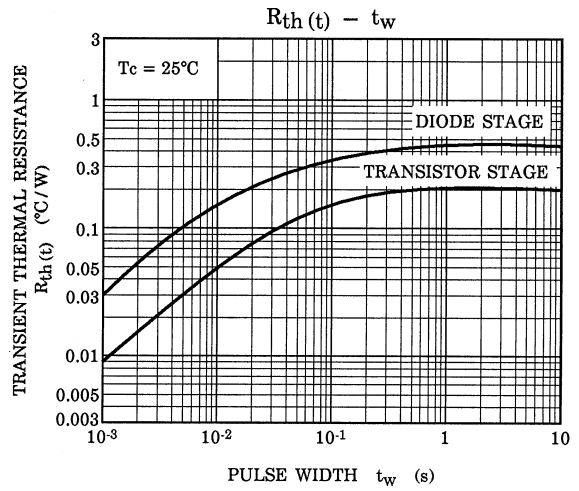
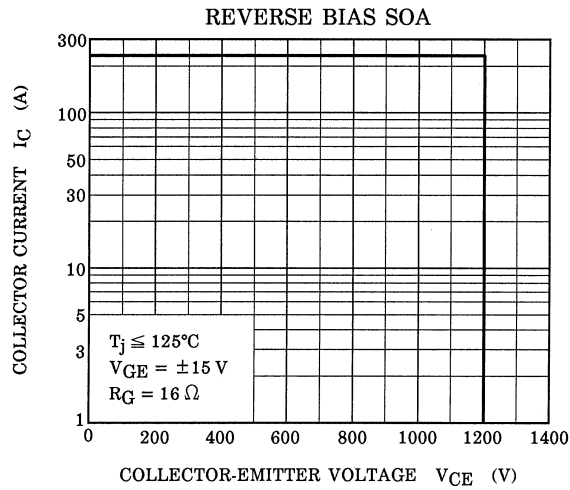
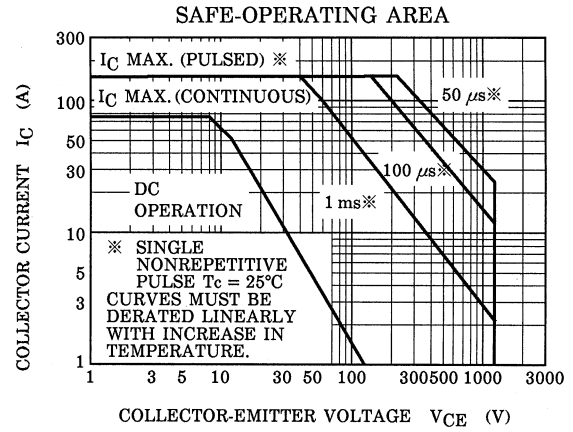
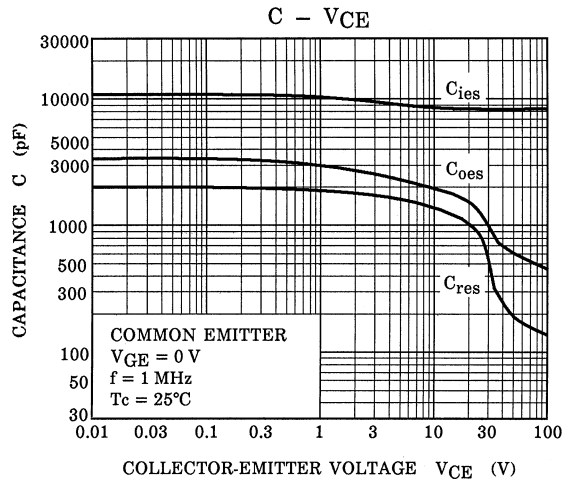
Note 1: Switching time and reverse recovery time test circuit & timing chart











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