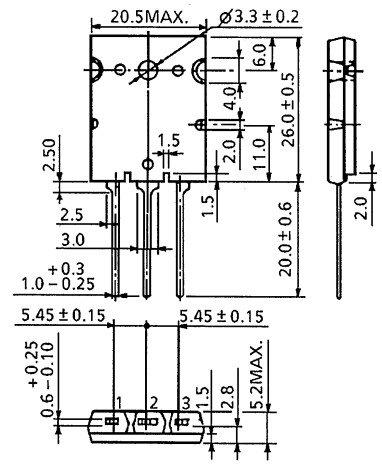
TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL MOS TYPE

GT40T101

HIGH POWER SWITCHING APPLICATIONS

- Enhancement−Mode
- High Speed : t_f = 0.4 μs (Max.) (I_C = 40 A)
- Low Saturation : $V_{CE\ (sat)}$ = 5.0 V (Max.) (I_C = 40 A)

Unit: mm



1. GATE
2. COLLECTOR (HEAT SINK)
3. EMITTER

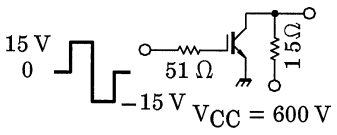
JEDEC	—
JEITA	—
TOSHIBA	2−21F2C

Weight: 9.75g

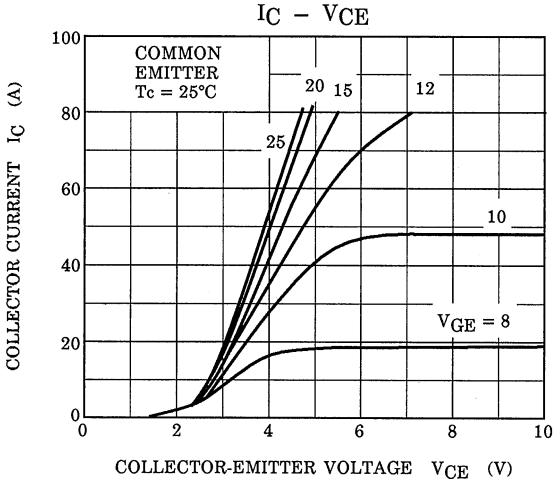
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector−Emitter Voltage		V_{CES}	1500	V
Gate−Emitter Voltage		V_{GES}	±25	V
Collector Current	DC	I_C	40	A
	1ms	I_{CP}	80	
Collector Power Dissipation (Tc = 25°C)		P_C	200	W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

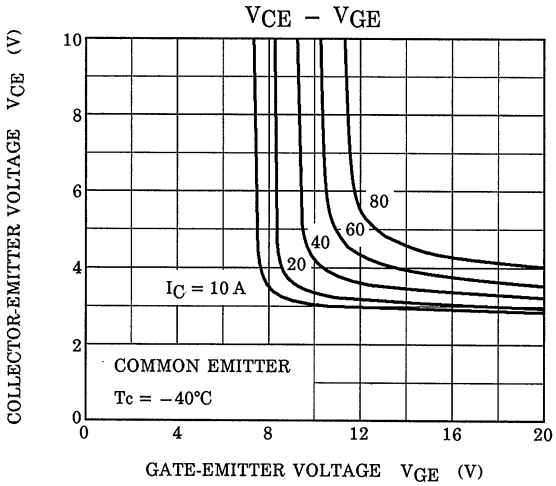
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Gate Leakage Current		I_{GES}	V_{GE} = ±25 V, V_{CE} = 0	—	—	±500	nA
Collector Cut−off Current		I_{CES}	V_{CE} = 1500 V, V_{GE} = 0	—	—	1.0	mA
Gate−Emitter Cut−off Voltage		$V_{GE\ (OFF)}$	I_C = 40 mA, V_{CE} = 5 V	3.0	—	6.0	V
Collector−Emitter Saturation Voltage		$V_{CE\ (sat)}$	I_C = 40 A, V_{GE} = 15 V	—	4.0	5.0	V
Input Capacitance		C_{ies}	V_{CE} = 10 V, V_{GE} = 0, f = 1 MHz	—	3600	—	pF
Switching Time	Rise Time	t_r		—	0.6	1.0	μs
	Turn−On Time	t_{on}		—	0.7	1.1	
	Fall Time	t_f		—	0.2	0.4	
	Turn−Off Time	t_{off}		—	0.5	1.0	
Thermal Resistance		$R_{th\ (j-c)}$	—	—	—	0.625	°C / W

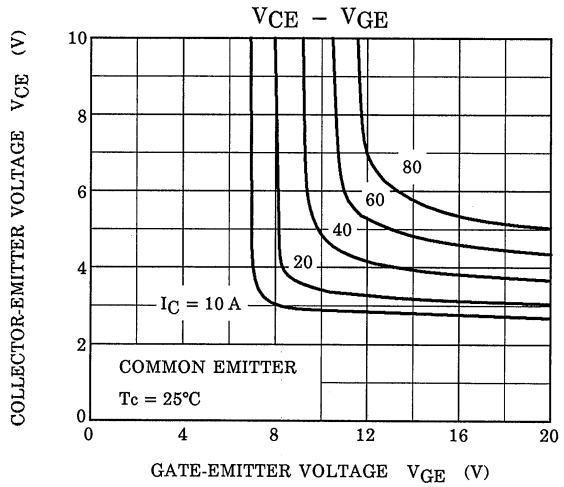
I_C – V_{CE}



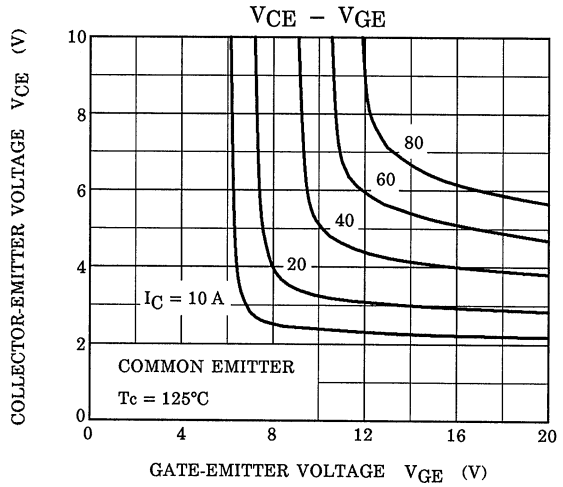
V_{CE} – V_{GE}



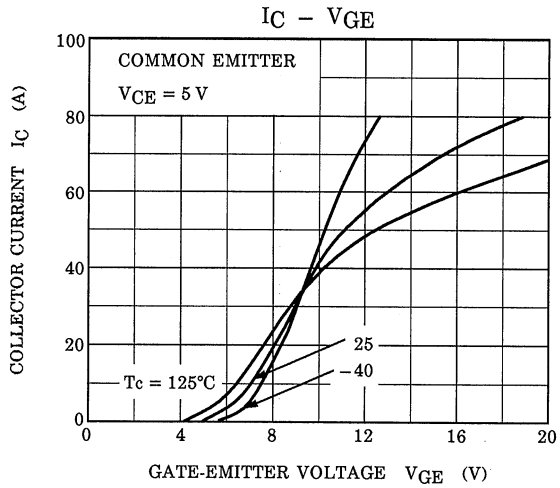
V_{CE} – V_{GE}



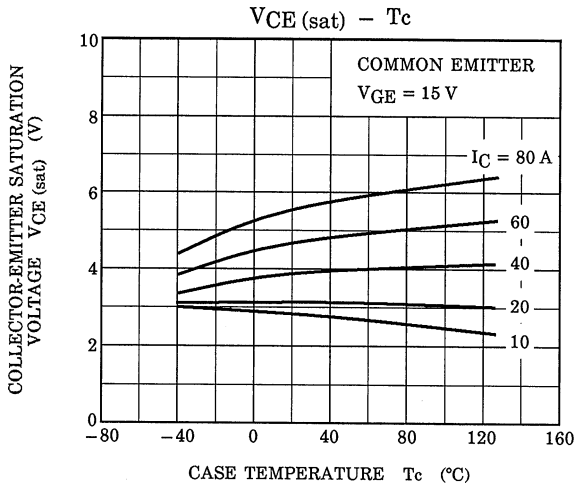
V_{CE} – V_{GE}

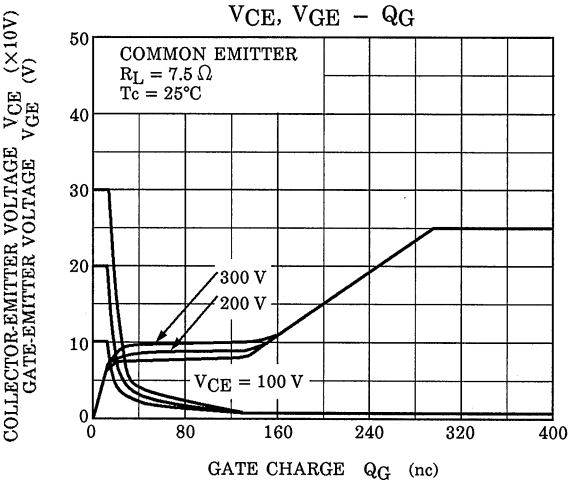


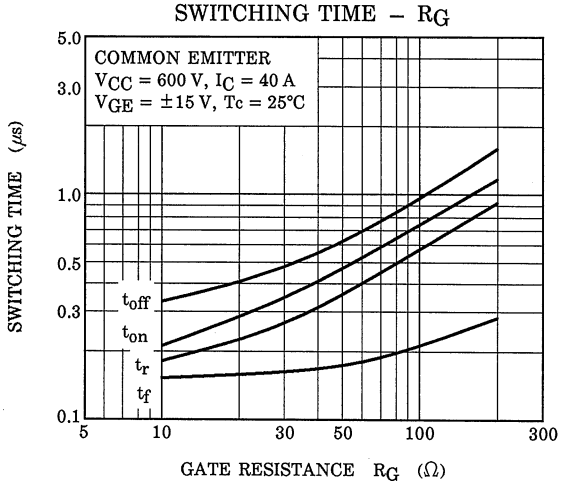
I_C – V_{GE}

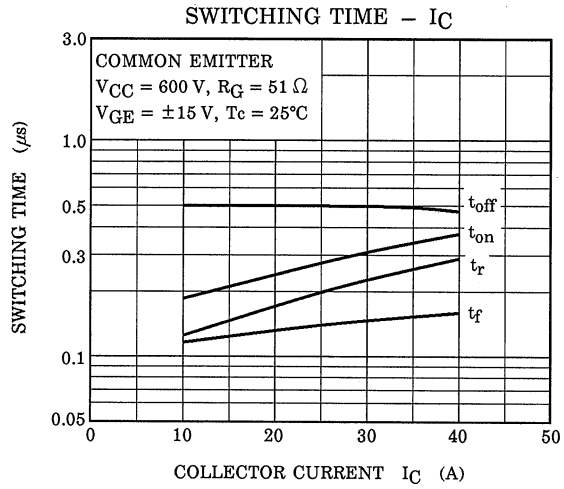


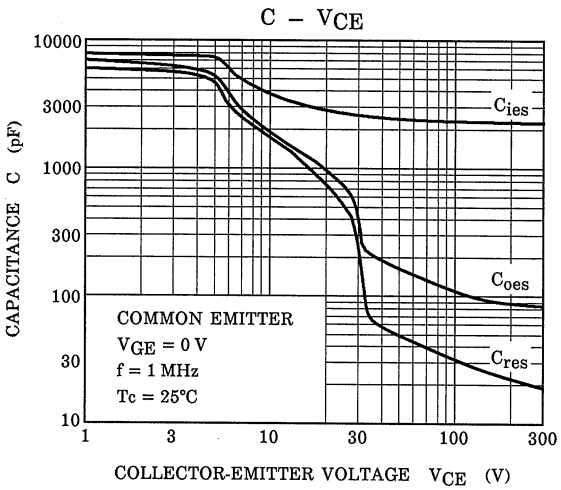
$V_{CE\,(sat)}$ – Tc

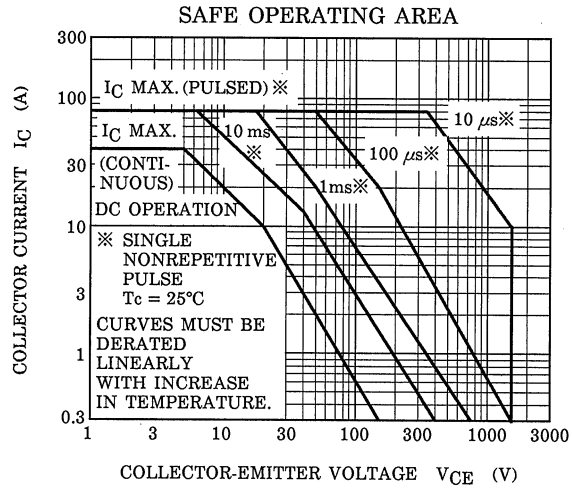


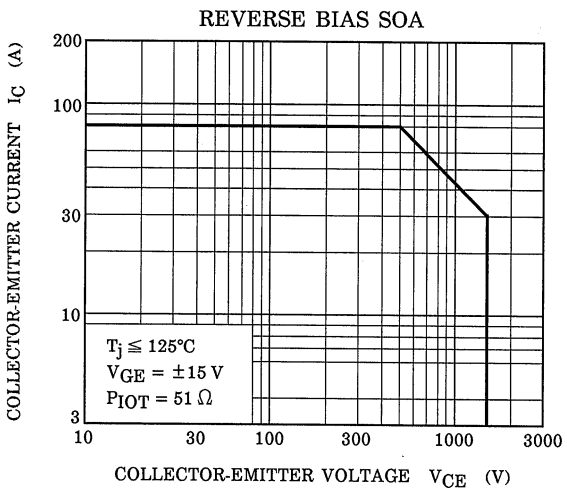

VCE, VGE – QG
COMMON EMITTER
RL = 7.5 Ω
Tc = 25°C
300 V
200 V
VCE = 100 V
COLLECTOR-EMITTER VOLTAGE VCE (×10V)
GATE-EMITTER VOLTAGE VGE (V)
GATE CHARGE QG (nc)

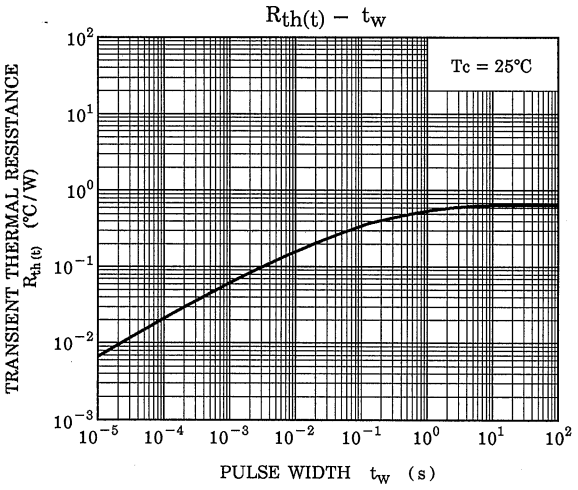

SWITCHING TIME – RG
COMMON EMITTER
VCC = 600 V, IC = 40 A
VGE = ±15 V, Tc = 25°C
toff
ton
tr
tf
SWITCHING TIME (μs)
GATE RESISTANCE RG (Ω)


SWITCHING TIME – IC
COMMON EMITTER
VCC = 600 V, RG = 51 Ω
VGE = ±15 V, Tc = 25°C
toff
ton
tr
tf
SWITCHING TIME (μs)
COLLECTOR CURRENT IC (A)


C – VCE
Cies
Coes
Cres
COMMON EMITTER
VGE = 0 V
f = 1 MHz
Tc = 25°C
CAPACITANCE C (pF)
COLLECTOR-EMITTER VOLTAGE VCE (V)


SAFE OPERATING AREA
IC MAX. (PULSED) ※
IC MAX. (CONTI-NUOUS)
DC OPERATION
10 ms ※
1ms※
100 μs※
10 μs※
※ SINGLE NONREPETITIVE PULSE Tc = 25°C
CURVES MUST BE DERATED LINEARLY WITH INCREASE IN TEMPERATURE.
COLLECTOR CURRENT IC (A)
COLLECTOR-EMITTER VOLTAGE VCE (V)


REVERSE BIAS SOA
Tj ≦ 125°C
VGE = ±15 V
PIOT = 51 Ω
COLLECTOR-EMITTER CURRENT IC (A)
COLLECTOR-EMITTER VOLTAGE VCE (V)


$R_{th(t)} - t_w$
Tc = 25°C
TRANSIENT THERMAL RESISTANCE $R_{th(t)}$ (°C/W)
10^2
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
PULSE WIDTH t_w (s)

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