TOSHIBA IGBT MODULE SILICON N CHANNEL IGBT

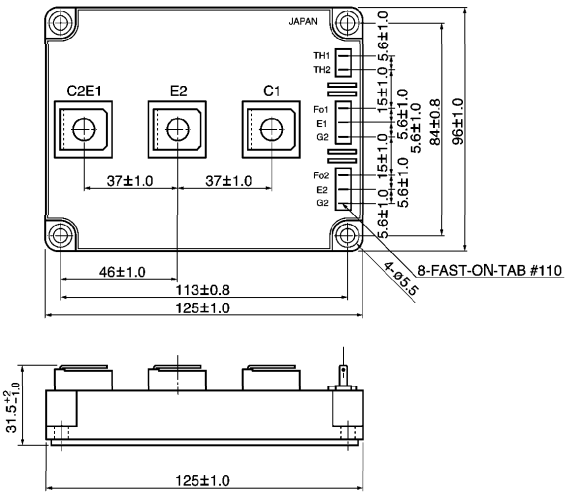
MG400V2YS60A

HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

- The Electrodes are Isolated from Case.
- Enhancement-Mode
- Thermal Output Terminal (TH)

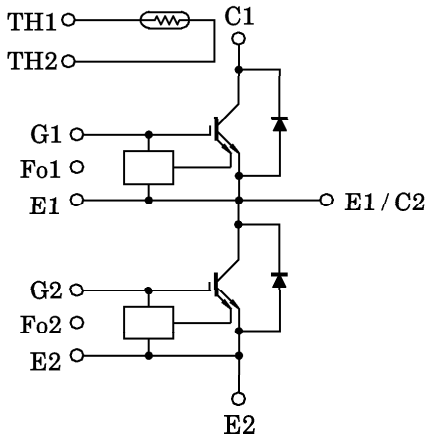
Unit in mm



JEDEC	
EIAJ	
TOSHIBA	2-126A1A

Weight : 680 g

EQUIVALENT CIRCUIT



000707EAA1

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	1700	V
Gate-Emitter Voltage		V_{GES}	±20	V
Collector Current	DC	I_C	400	A
Forward Current	DC	I_F	400	A
Collector Power Dissipation (Tc = 25°C)		P_C	4300	W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	−40~125	°C
Isolation Voltage		V_{Isol}	4000 (AC 1 min)	V
Screw Torque	Terminal : M8	—	10	N·m
	Mounting : M5	—	3	N·m

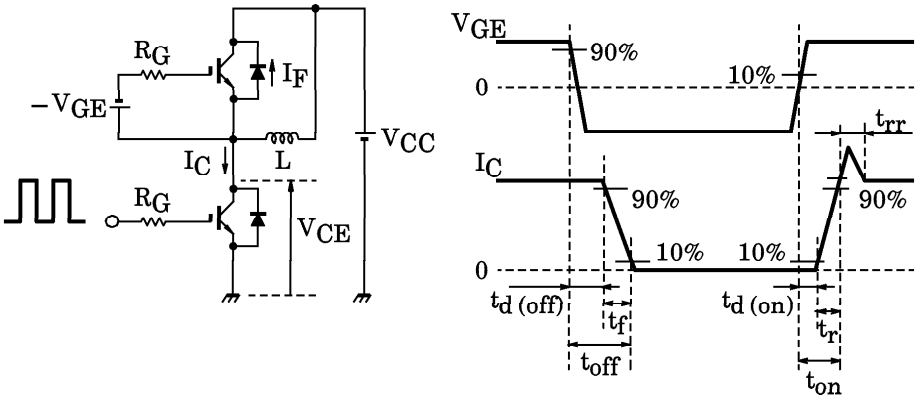
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GES}	V_{GE} = ±20 V, V_{CE} = 0 V		—	—	±10	μA
Collector Cut-Off Current		I_{CES}	V_{CE} = 1700 V, V_{GE} = 0 V		—	—	1	mA
Gate-Emitter Cut-Off Voltage		$V_{GE\ (off)}$	I_C = 400 mA, V_{CE} = 5 V		—	5.5	—	V
Collector-Emitter Saturation Voltage		$V_{CE\ (sat)}$	I_C = 400 A, V_{GE} = 15 V	T_j = 25°C	—	3.0	3.4	V
				T_j = 125°C	—	3.8	4.2	
Input Capacitance		C_{ies}	V_{CE} = 10 V, V_{GE} = 0 V, f = 1 MHz		—	45000	—	pF
Gate-Emitter Voltage		V_{GE}	—		13	15	17	V
Gate Resistance		R_G	—		8.2	—	15	Ω
Switching Time	Turn-On Delay Time	$t_{d\ (on)}$	Inductive Load V_{CC} = 900 V I_C = 400 A V_{GE} = ±15 V R_G = 8.2 Ω (Note)		—	0.35	—	μs
	Rise Time	t_r			—	0.2	—	
	Turn-On Time	t_{on}			—	0.55	—	
	Turn-Off Delay Time	$t_{d\ (off)}$			—	0.9	—	
	Fall Time	t_f			—	0.4	0.6	
	Turn-Off Time	t_{off}			—	1.3	—	
Forward Voltage		V_F	I_F = 400 A, V_{GE} = 0 V	T_j = 25°C	—	3.2	4.2	V
				T_j = 125°C	—	2.4	—	
Reverse Recovery Time		t_{rr}	I_F = 400 A, V_{GE} = −15 V di / dt = 2000 A / μs		—	0.20	0.40	μs
Thermal Resistance		$R_{th\ (j-c)}$	Transistor Stage		—	—	0.029	°C / W
			Diode Stage		—	—	0.056	
RTC Operating Current		I_{rtc}	T_j = 25°C		800	—	—	A

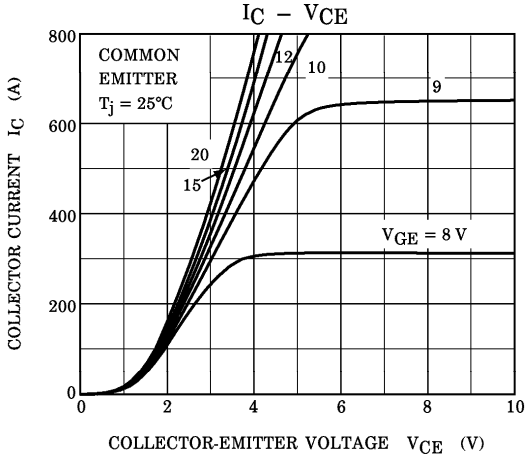
THERMISTOR

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Zero Power Resistance	R25	Tc = 25°C	—	100	—	kΩ
B Value	B25 / 85	Tc = 25°C / Tc = 85°C	—	4390	—	K
Isolation Voltage		Tc = 25°C	2500	—	—	Vrms

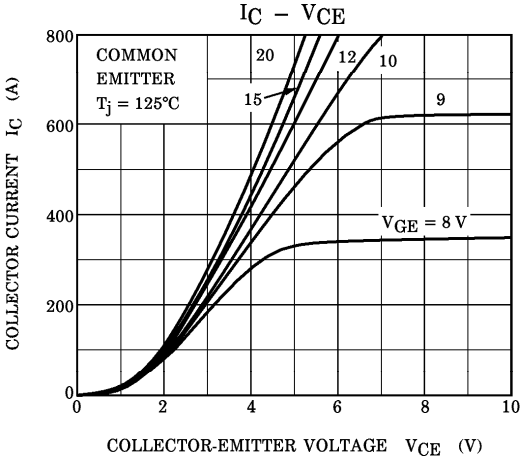
(Note) : Switching time measurement circuit and input / output waveforms



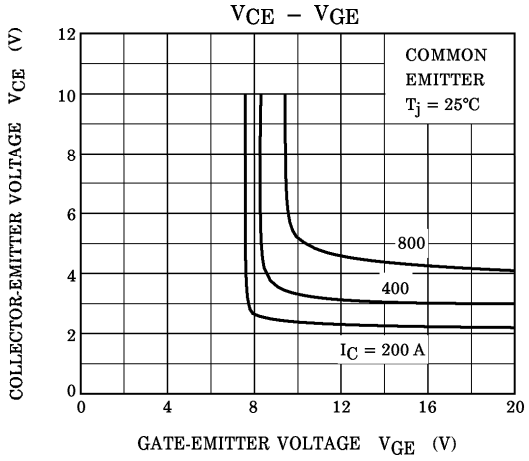
I_C – V_{CE}



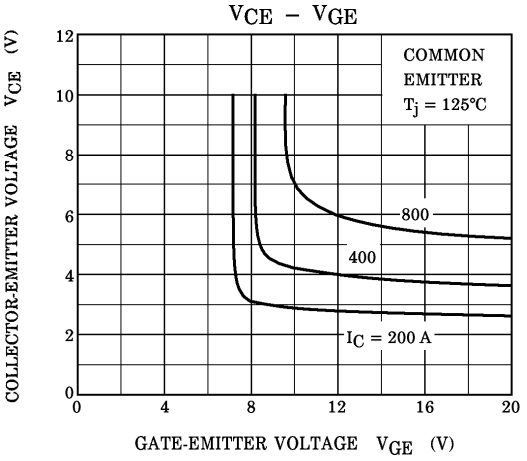
I_C – V_{CE}



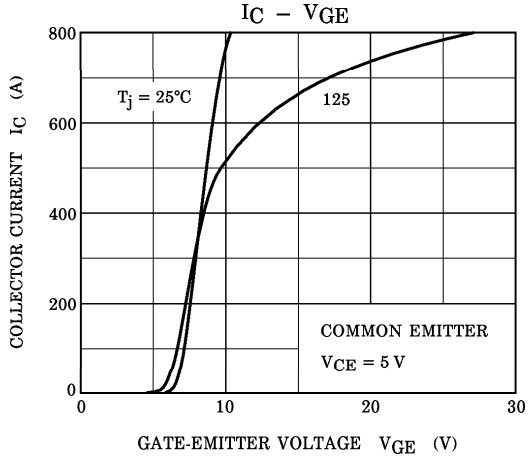
V_{CE} – V_{GE}



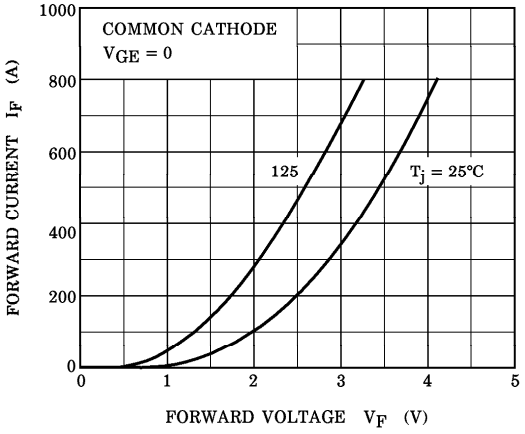
V_{CE} – V_{GE}



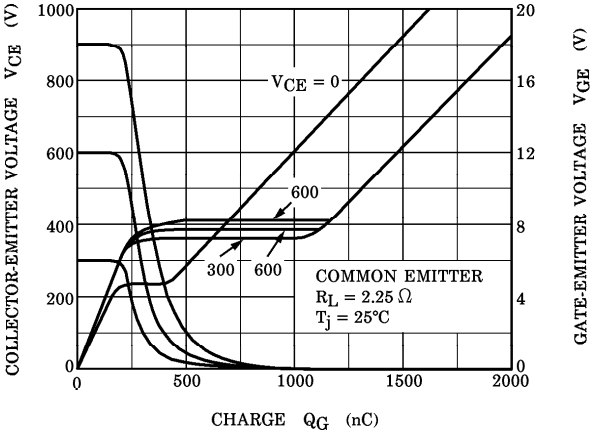
I_C – V_{GE}



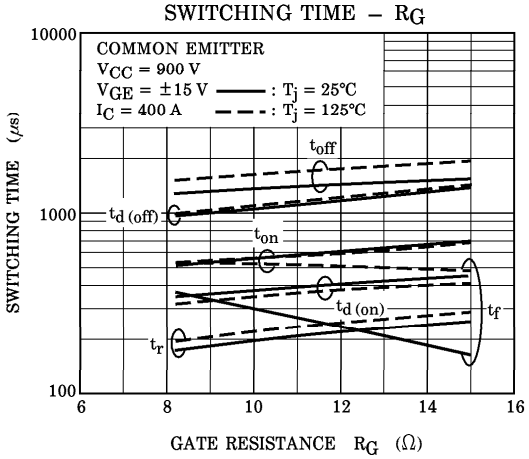
I_F – V_F



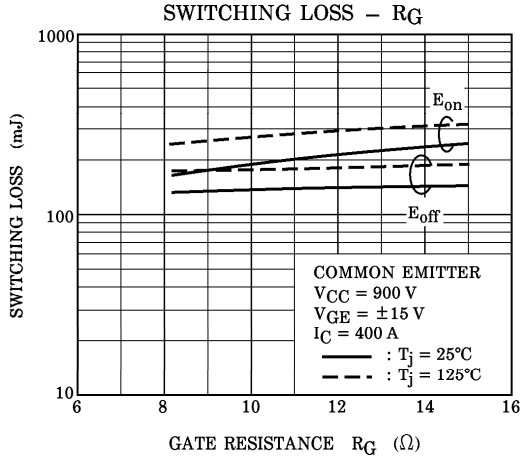
V_{CE}, V_{GE} – Q_G



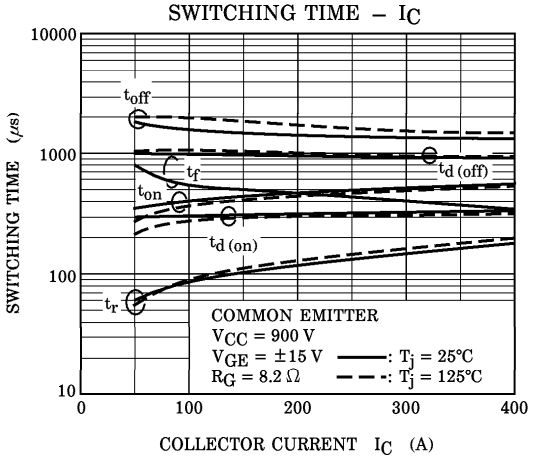
SWITCHING TIME – R_G



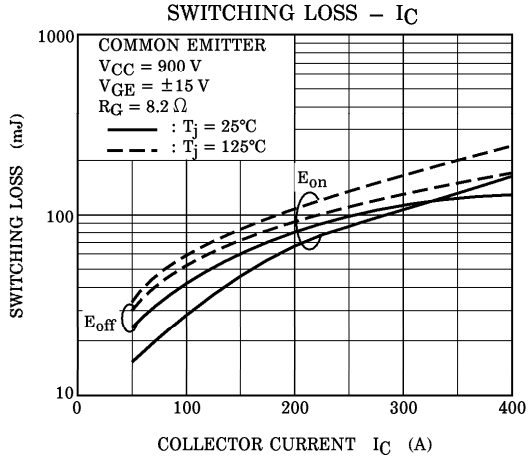
SWITCHING LOSS – R_G



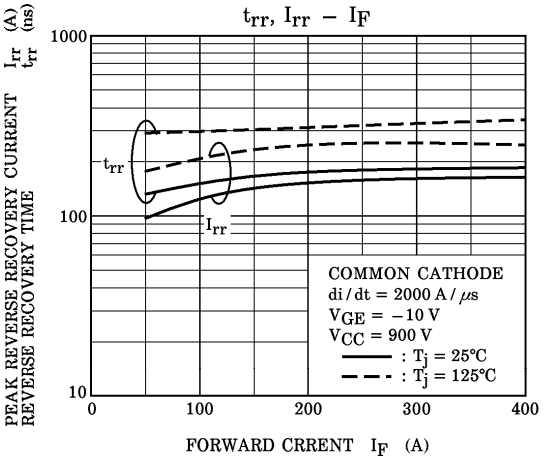
SWITCHING TIME – I_C



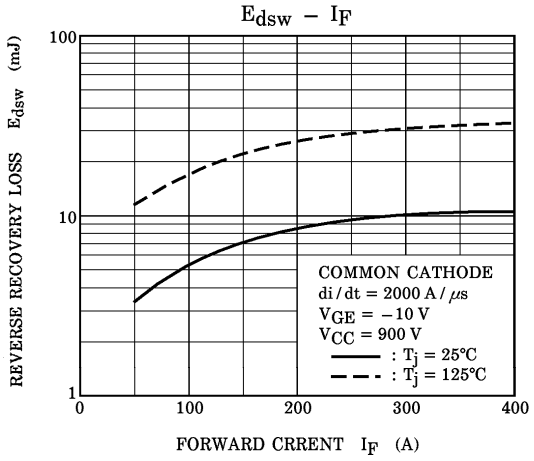
SWITCHING LOSS – I_C



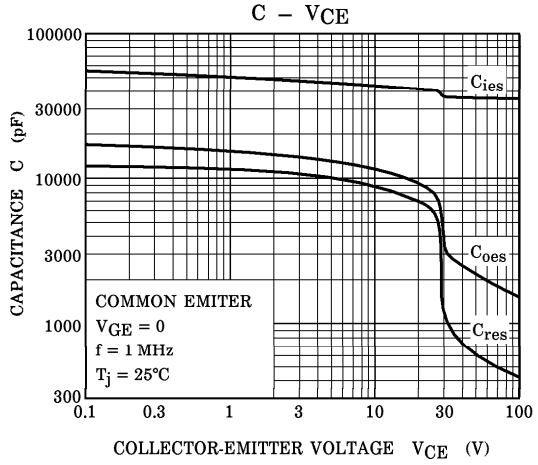
t_{rr}, I_{rr} – I_F



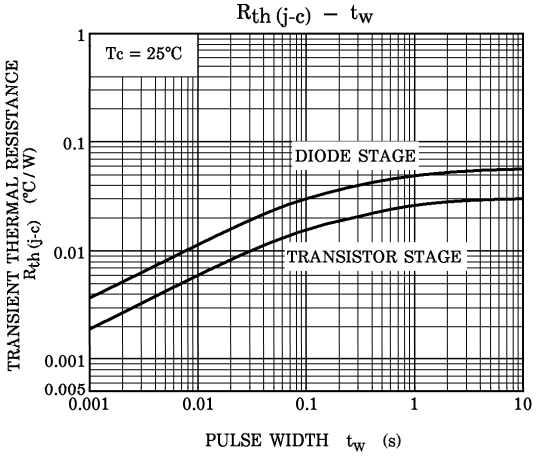
E_{dsw} – I_F



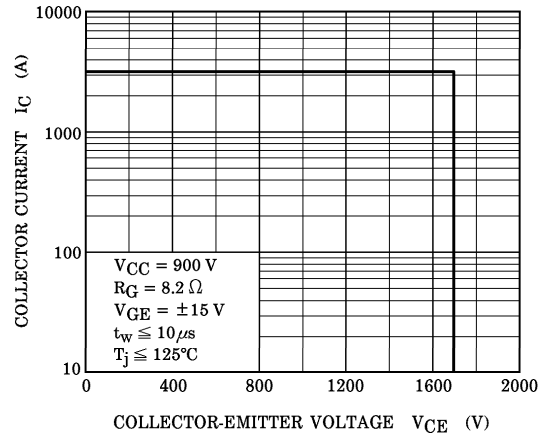
C – V_{CE}



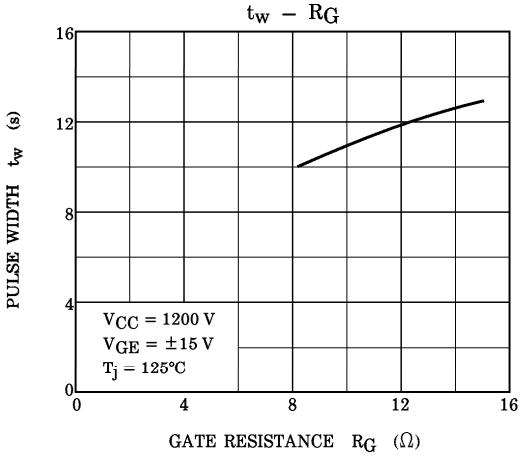
$R_{th\,(j\text{-}c)}$ – t_w



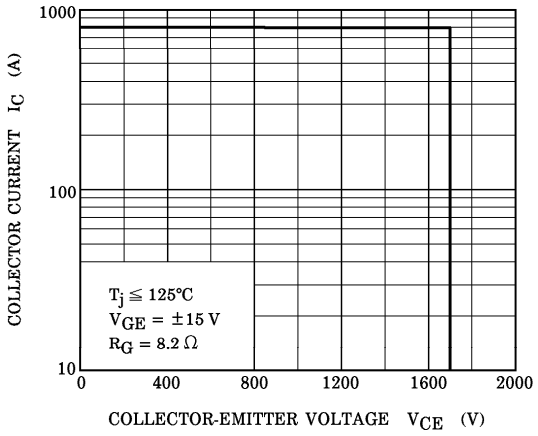
SHORT CIRCUIT SOA



SHORT CIRCUIT
t_w – R_G



REVERSE BIAS SOA



<$V_{CE\ (sat)}$ RANK>
$V_{CE\ (sat)}$

RANK SYMBOL	MIN.	MAX.
29	2.6	2.9
30	2.7	3.0
31	28	3.1
32	2.9	3.2
33	3.0	3.3
34	3.1	3.4

<V_F RANK>
V_F

RANK SYMBOL	MIN.	MAX.
G	2.5	2.8
H	2.7	3.0
I	2.9	3.2
J	3.1	3.4
K	3.3	3.6
L	3.5	3.8
M	3.7	4.0
N	3.9	4.2

<MARK POSITION>