FUJI ELECTRIC

7MBI 40N-120

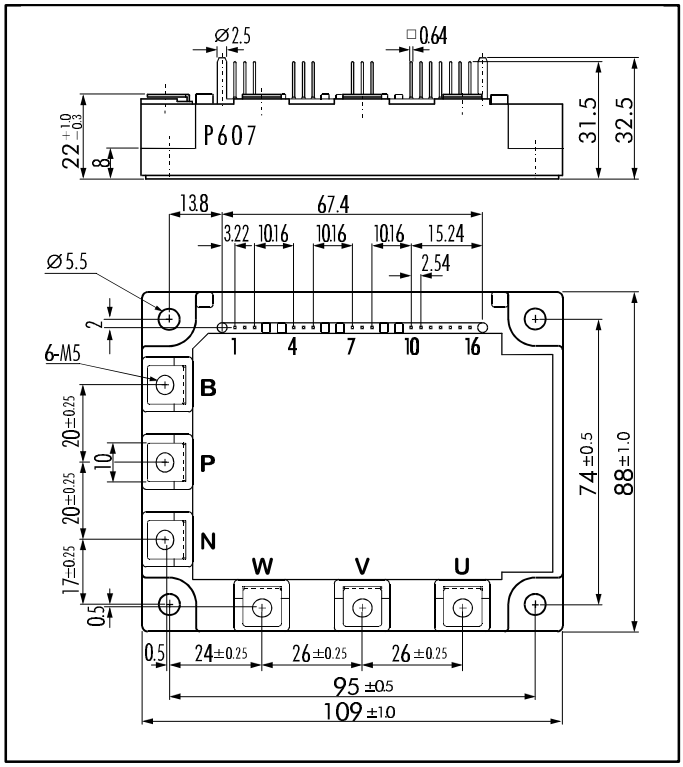
7 in 1 IGBT
1200 V
40 A

IGBT MODULE (N series)

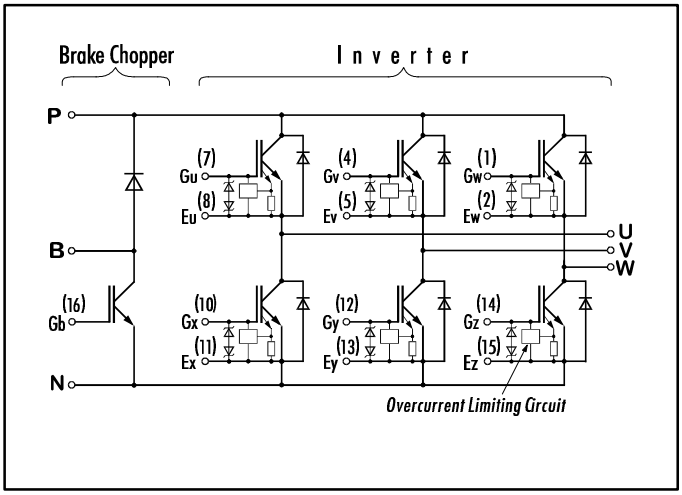
■ Features

- *Including Brake Chopper*
- *Square RBSOA*
- *Low Saturation Voltage*
- *Overcurrent Limiting Function (4 ~ 5 Times Rated Current)*

■ Outline Drawing



■ Equivalent Circuit



■ Absolute Maximum Ratings (T_c=25°C)

	Items	Symbols	Test Conditions	Ratings	Units
Inverter	Collector-Emitter Voltage	V_{CES}		1200	V
	Gate -Emitter Voltage	V_{GES}		± 20	
	Collector Current	I_C	Continuous	40	A
		$I_{C\ PULSE}$	1ms	80	
		$-I_{C\ PULSE}$	Continuous	40	
	Collector Power Dissipation	P_C	1 device	320	W
Brake Chopper IGBT	Collector-Emitter Voltage	V_{CES}		1200	V
	Gate -Emitter Voltage	V_{CES}		± 20	
	Collector Current	I_C	Continuous	15	A
		$I_{C\ PULSE}$	1ms	30	
	Collector Power Dissipation	P_C	1 device	120	W
Brake Chopper FWD	Repetitive Peak Reverse Voltage	V_{RRM}		1200	V
	Average Forward Current	$I_{F(AV)}$		1	A
	Surge Current	I_{FSM}	10ms	50	
	Operating Junction Temperature	T_j		+150	°C
	Storage Temperature	T_{Stg}		-40 ~ +125	
	Isolation Voltage	V_{ISO}	A.C. 1min.	2500	V
	Mounting Screw Torque *1			3.5	Nm
	Terminal Screw Torque *1			3.5	

Note: *1:Recommendable Value; 2.5 ~ 3.5 Nm (M5)

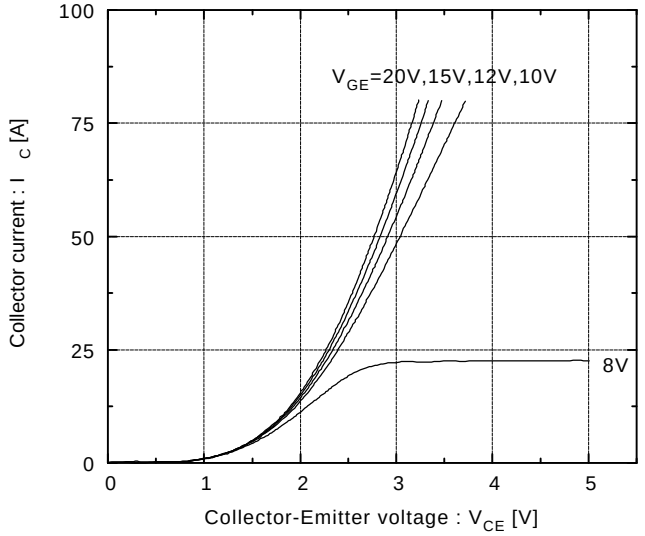
■ Electrical Characteristics(T_j=25°C)

		Items	Symbols	Test Conditions	Min.	Max.	Units
Inverter	IGBT	Zero Gate Voltage Collector Current	I_{CES}	V_{GE}=0V V_{CE}=1200V		3.0	mA
		Gate-Emitter Leackage Current	I_{GES}	V_{CE}=0V V_{GE}=± 20V		15	μA
		Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{GE}=20V I_C=40mA	4.5	7.5	V
		Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V I_C=40A		3.3	
		Input capacitance	C_{ies}	f=1MHz, V_{GE}=0V, V_{CE}=10V	6200 (typ.)		pF
		Turn-on Time	t_{on}	V_{CC}=600V		1.2	μs
				I_C = 40A			
		Turn-off Time	t_{off}	V_{GE}=±15V		1.5	
			t_f	R_G = 24Ω		0.5	
	FWD	Diode Forward On-Voltage	V_F	I_F=40A V_{GE}=0V		3.0	V
		Reverse Recovery Time	t_{rr}	I_F=40A; V_{GE}=-10V; $-di/dt$=120 A/μs		350	ns
Brake Chopper	IGBT	Zero Gate Voltage Collector Current	I_{CES}	V_{GE}=0V V_{CE}=1200V		1.0	mA
		Gate-Emitter Leackage Current	I_{GES}	V_{CE}=0V V_{GE}=± 20V		100	nA
		Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V I_C=15A		3.3	V
		Turn-on Time	t_{on}	V_{CC}=600V		1.2	μs
				I_C = 15A			
		Turn-off Time	t_{off}	V_{GE}=±15V		1.5	
			t_f	R_G = 82Ω		0.5	
	FWD	Reverse Current	I_{RRM}	V_R=1200V		1.0	mA
		Reverse Recovery Time	t_{rr}			600	ns

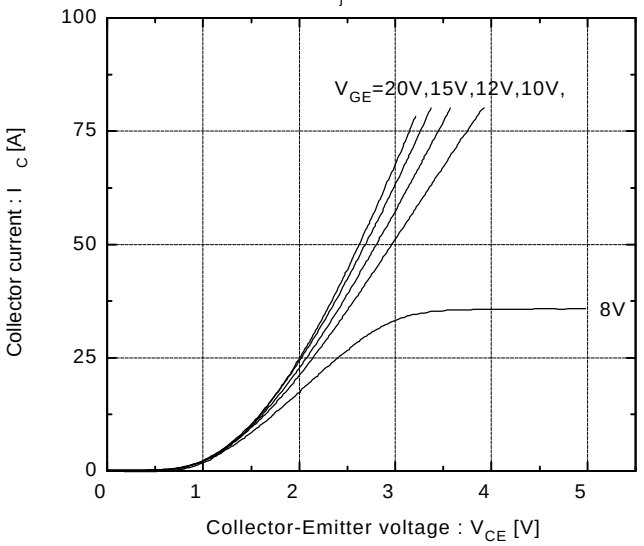
■ Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Max.	Units
Thermal Resistance (1 device)	$R_{th(j-c)}$	Inverter IGBT		0.39	°C/W
		Inverter FRD		0.85	
		Brake IGBT		1.04	
Contact Thermal Resistance	$R_{th(c-f)}$	With Thermal Compound	0.05 (typ.)		

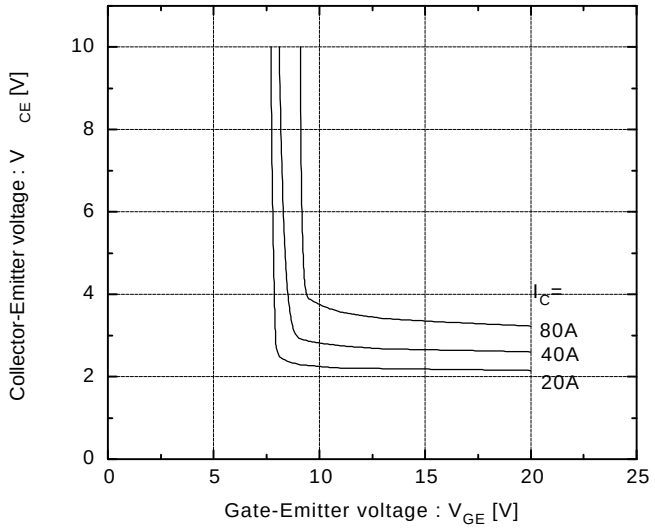
Collector current vs. Collector-Emitter voltage
T_j=25°C



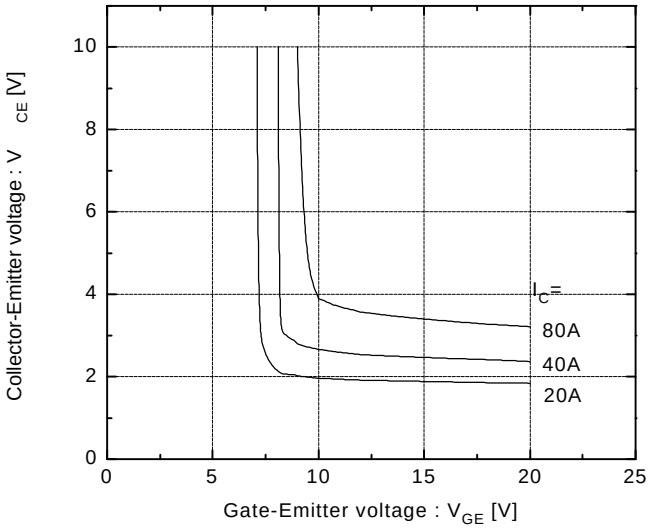
Collector current vs. Collector-Emitter voltage
T_j=125°C



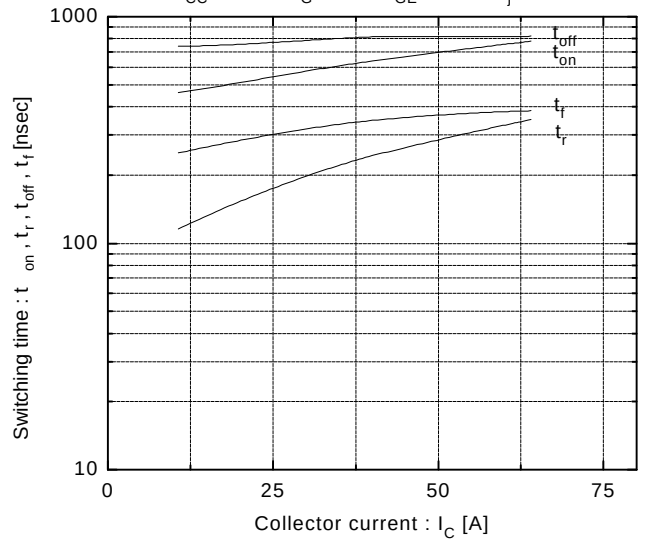
Collector-Emitter vs. Gate-Emitter voltage
T_j=25°C



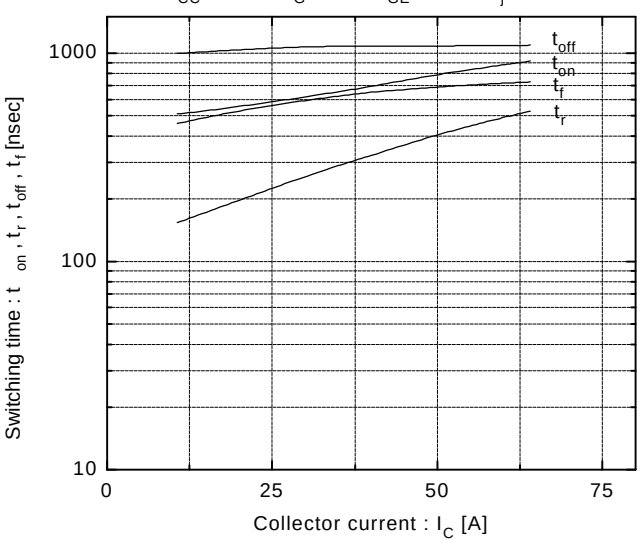
Collector-Emitter vs. Gate-Emitter voltage
T_j=125°C



Switching time vs. Collector current
V_{CC}=600V, R_G=24Ω, V_{GE}=±15V, T_j=25°C

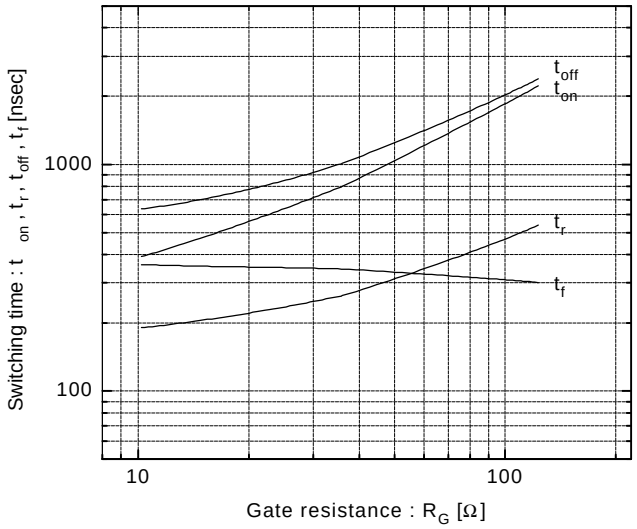


Switching time vs. Collector current
V_{CC}=600V, R_G=24Ω, V_{GE}=±15V, T_j=125°C



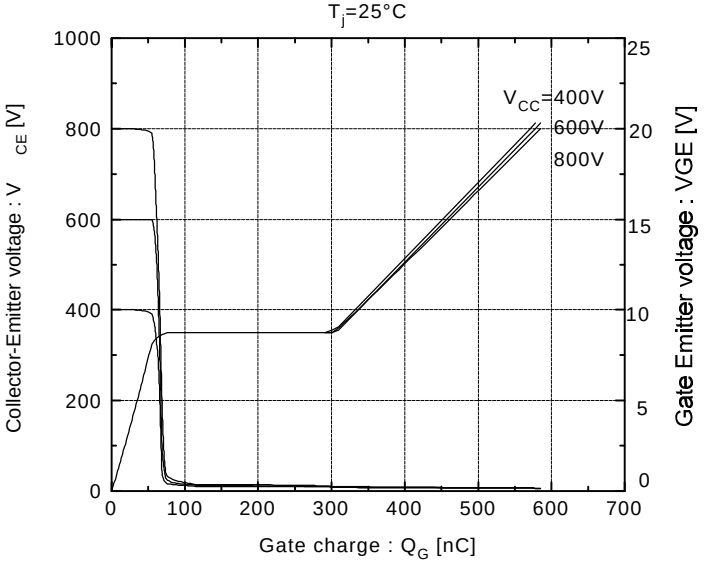
Switching time vs. R_G

V_{CC}=600V, I_C=40A, V_{GE}=±15V, T_j=25°C



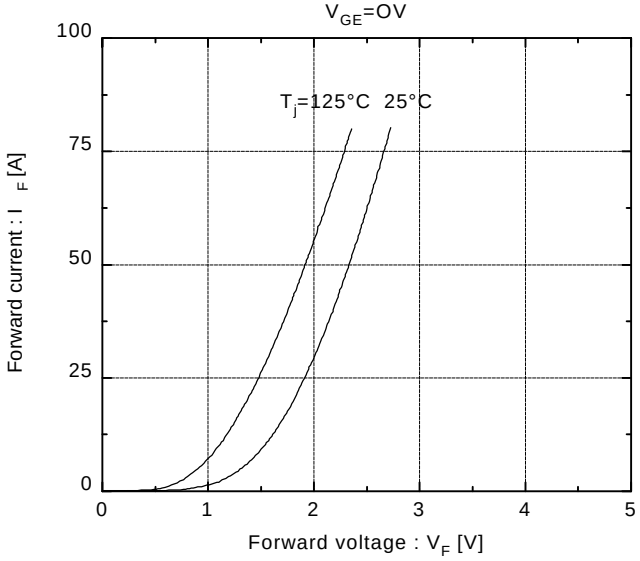
Dynamic input characteristics

T_j=25°C



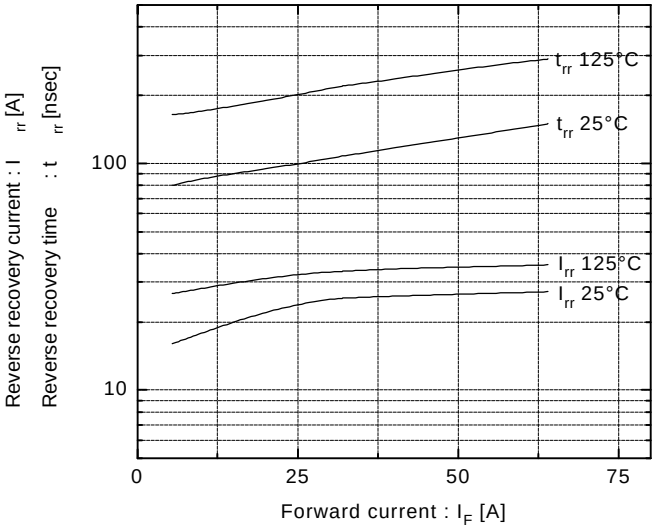
Forward current vs. Forward voltage

V_{GE}=OV

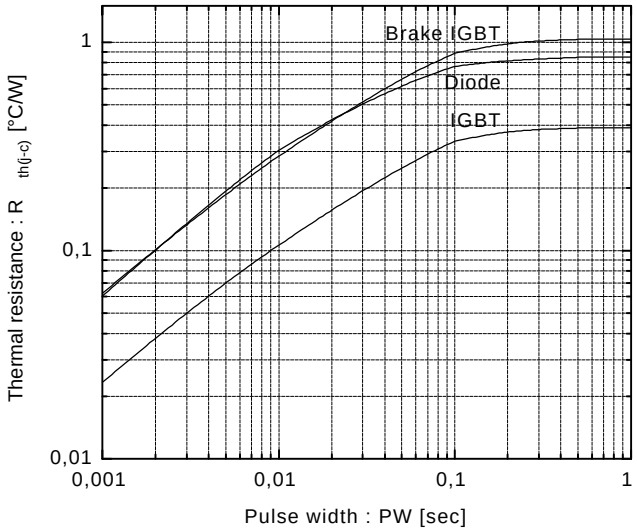


Reverse recovery characteristics

t_{rr} , I_{rr} vs. I_F

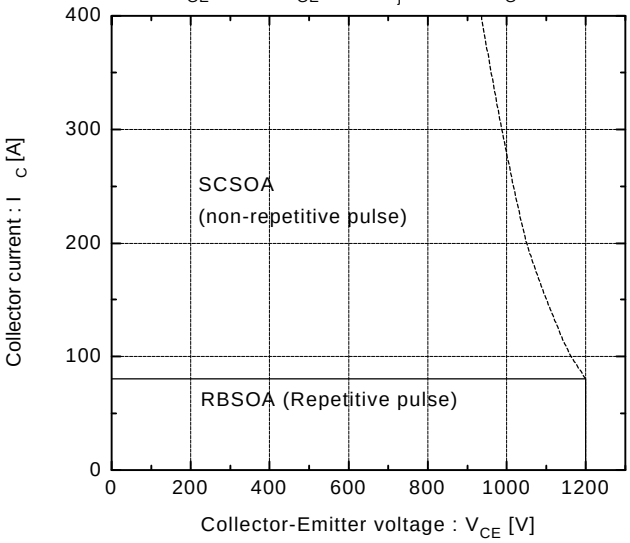


Transient thermal resistance



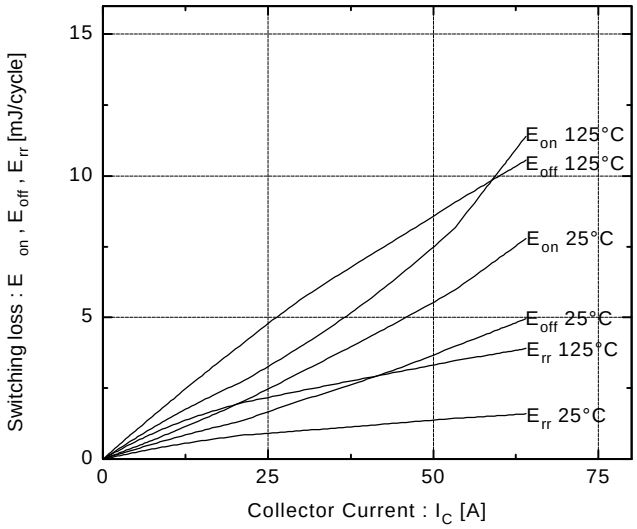
Reversed biased safe operating area

+V_{GE}=15V, -V_{GE}≤15V, T_j≤125°C, R_G≥24Ω



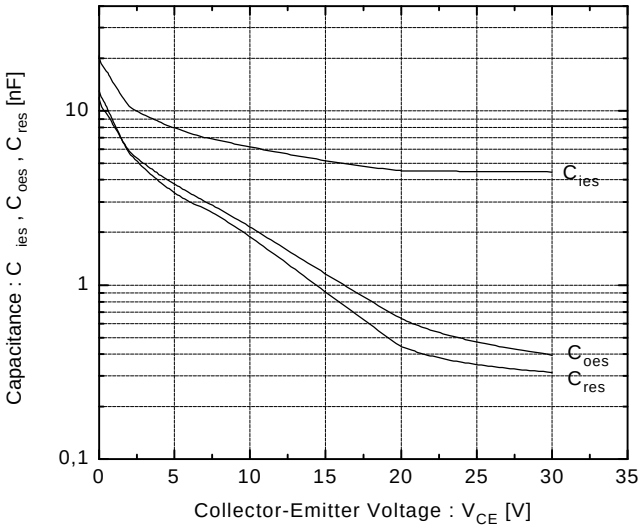
Switching loss vs. Collector current

V_{CC}=600V, R_G=24Ω, V_{GE}=±15V



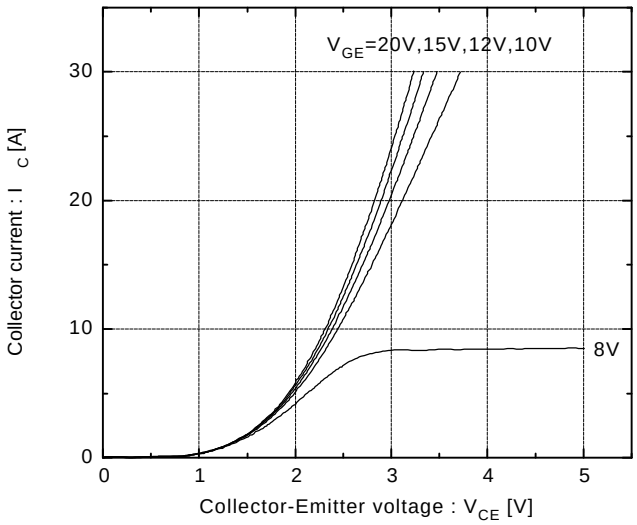
Capacitance vs. Collector-Emitter voltage

T_j=25°C

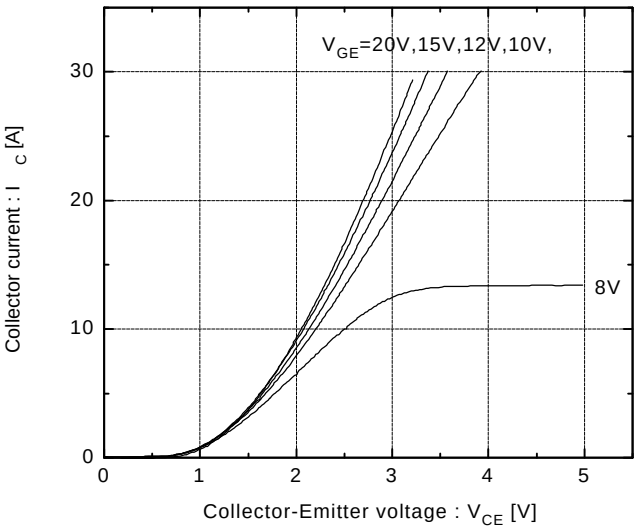


Brake Chopper IGBT

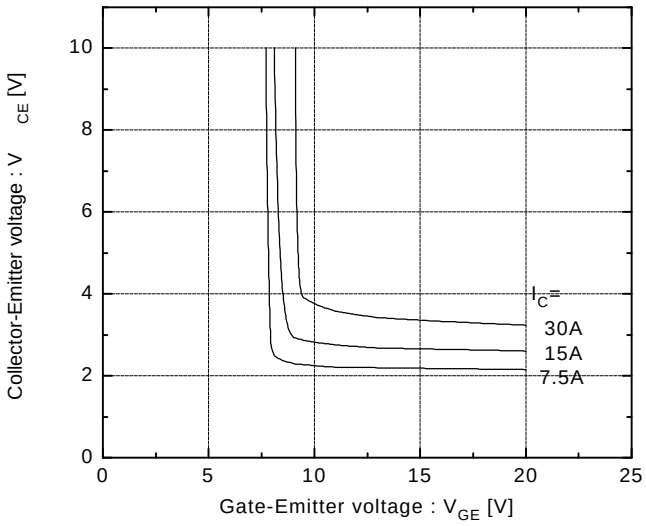
Collector current vs. Collector-Emitter voltage
T_j=25°C



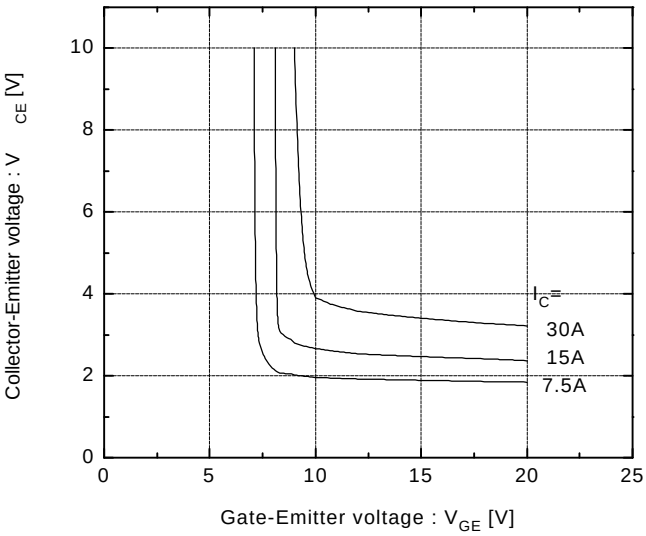
Collector current vs. Collector-Emitter voltage
T_j=125°C



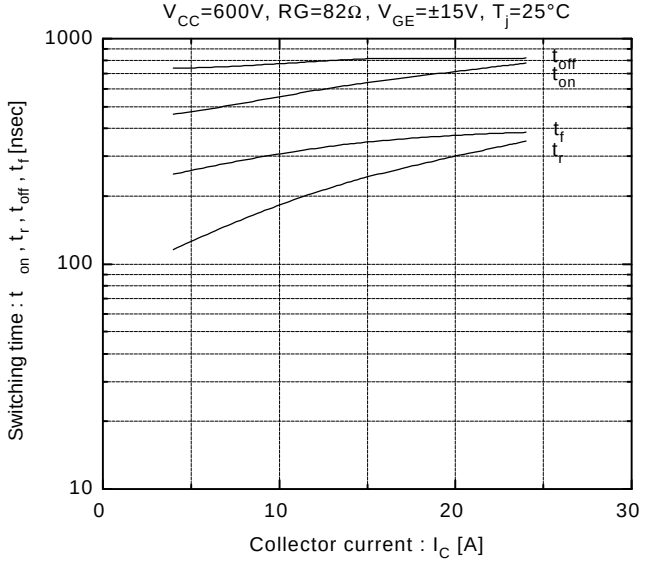
Collector-Emitter vs. Gate-Emitter voltage
T_j=25°C



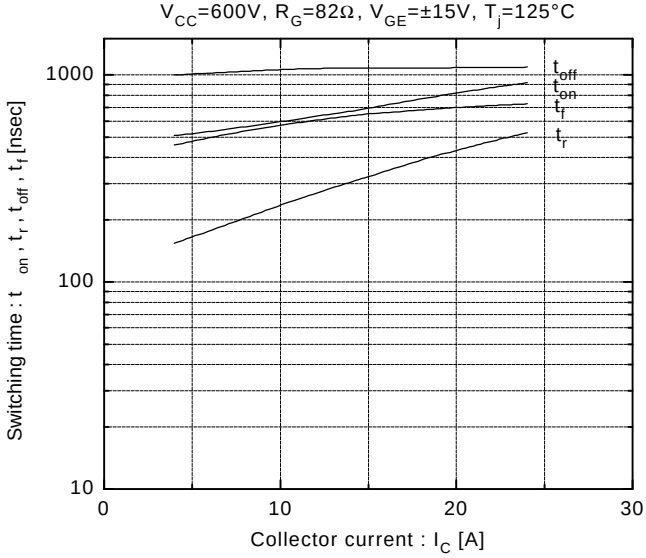
Collector-Emitter vs. Gate-Emitter voltage
T_j=125°C



Switching time vs. Collector current
V_{CC}=600V, RG=82Ω, V_{GE}=±15V, T_j=25°C



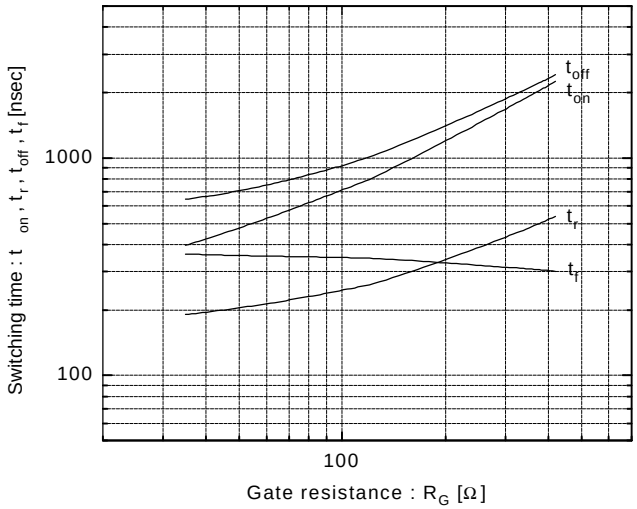
Switching time vs. Collector current
V_{CC}=600V, R_G=82Ω, V_{GE}=±15V, T_j=125°C



Brake Chopper IGBT

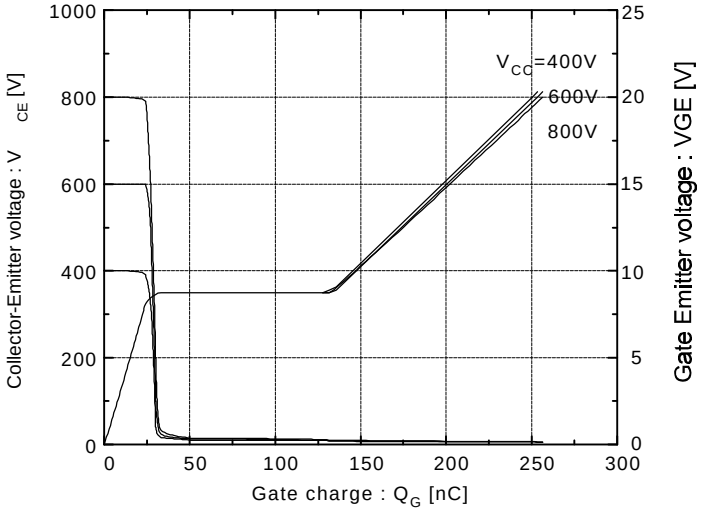
Switching time vs. R_G

V_{CC}=600V, I_C=15A, V_{GE}=±15V, Tj=25°C



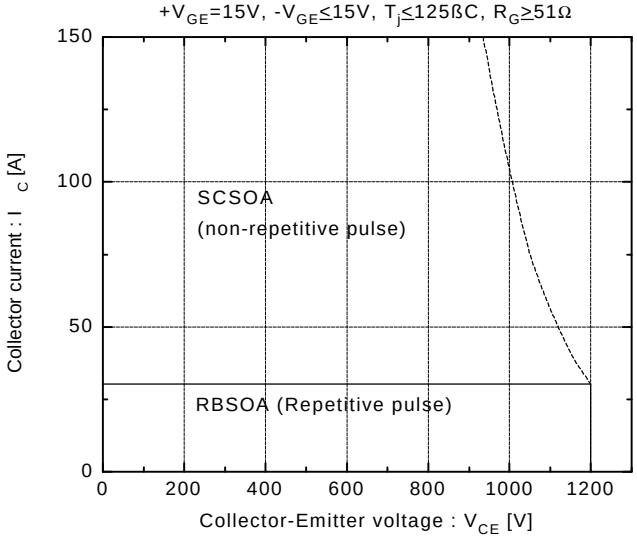
Dynamic input characteristics

T_j=25°C



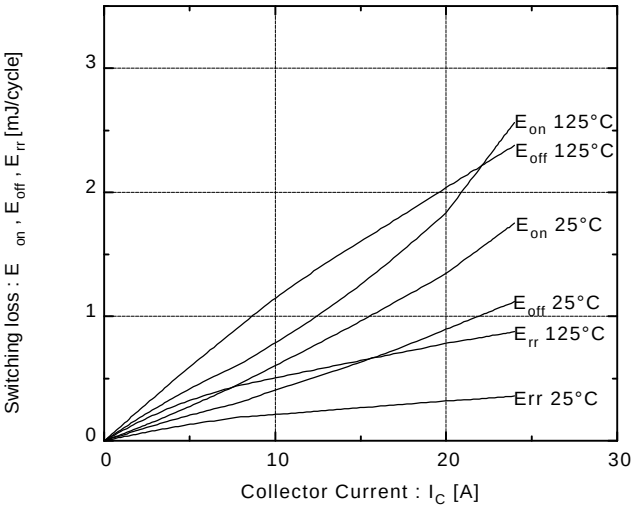
Reversed biased safe operating area

+V_{GE}=15V, -V_{GE}≤15V, T_j≤125ßC, R_G≥51Ω



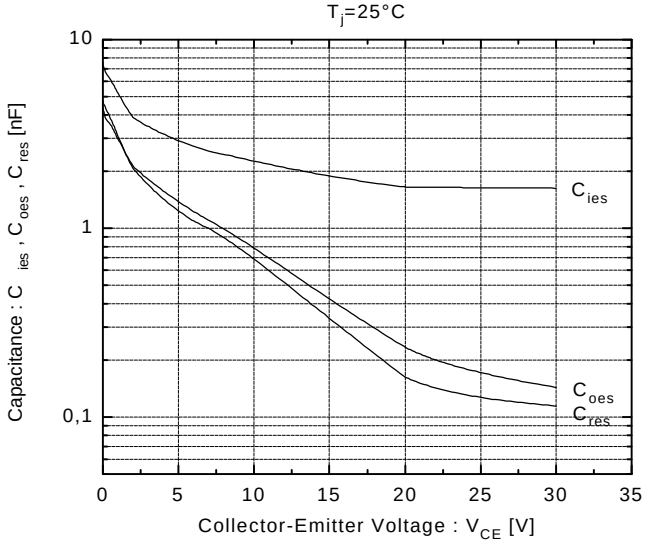
Switching loss vs. Collector current

V_{CC}=600V, R_G=51Ω, V_{GE}=±15V



Capacitance vs. Collector-Emitter voltage

T_j=25°C



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