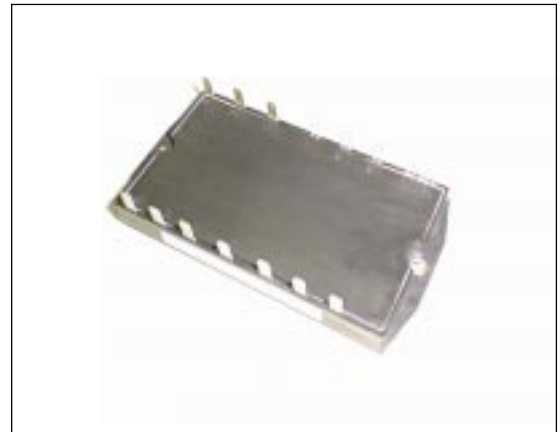


IGBT MODULE

1200V / 25A / PIM



■ Features

- High Speed Switching
- Voltage Drive
- Low Inductance Module Structure
- Converter Diode Bridge Dynamic Brake Circuit

■ Applications

- Inverter for Motoe Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply

■ Maximum ratings and characteristics

● Absolute maximum ratings (Tc=25°C unless without specified)

Item		Symbol	Condition	Rating	Unit
Inverter	Collector-Emitter voltage	V _{CES}		1200	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _C	Continuous	25	A
		I _{CP}	1ms	50	A
		-I _C		25	A
	Collector power dissipation	P _C	1 device	200	W
Brake	Collector-Emitter voltage	V _{CES}		1200	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _C	Continuous	15	A
		I _{CP}	1ms	30	A
	Collector power dissipation	P _C	1 device	120	W
	Repetitive peak reverse voltage			1200	V
	Average forward current	I _{F(AV)}		1	A
Surge current	I _{FSM}	10ms	50	A	
Converter	Repetitive peak reverse voltage	V _{RRM}		1600	V
	Non-Repetitive peak reverse voltage	V _{RSM}		1700	V
	Average output current	I _O	50Hz/60Hz sine wave	25	A
	Surge current (Non-Repetitive)	I _{FSM}	T _j =150°C, 10ms	320	A
	I _{2t} (Non-Repetitive)		T _j =150°C, 10ms	512	A ² s
Operating junction temperature		T _J		+150	°C
Storage temperature		T _{stg}		-40 to +125	°C
Isolation voltage		V _{iso}	AC : 1 minute	AC 2500	V
Mounting screw torque				1.7 *1	N·m

*1 Recommendable value : 1.3 to 1.7 N·m (M4)

● Electrical characteristics (Tj=25°C unless without specified)

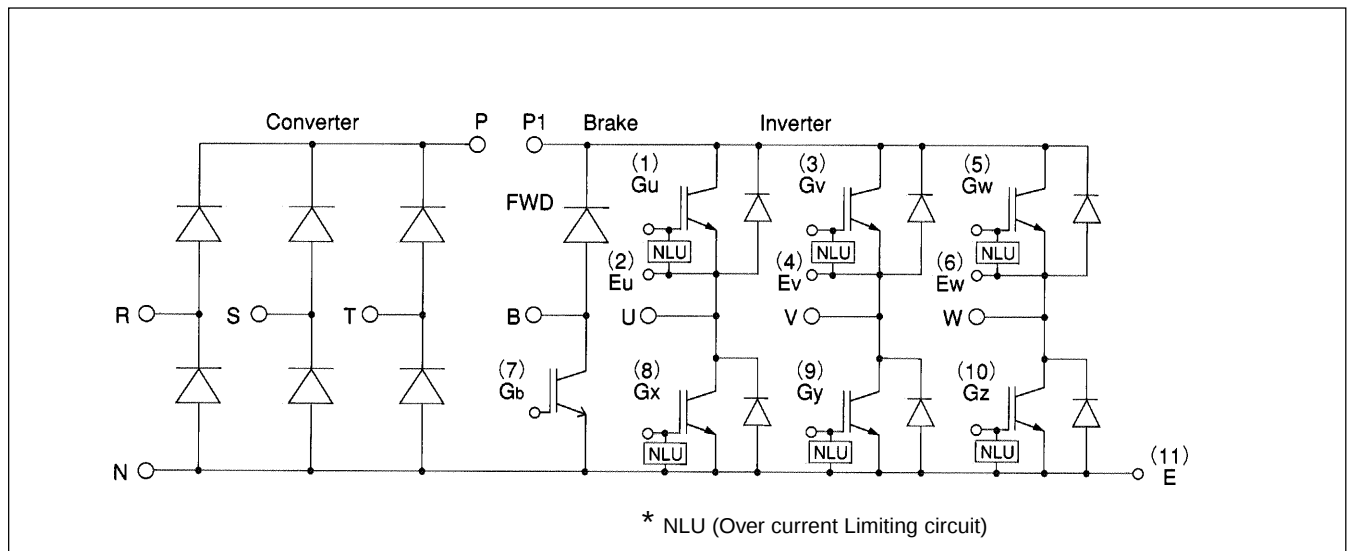
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Inverter (IGBT)	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V			1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V			20	μA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=25mA	4.5		7.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE=15V, IC=25A			3.3	V
	Collector-Emitter voltage	-VCE	-IC=25A			3.0	V
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz		4000		pF
	Switching time	ton	VCC=600V			1.2	μs
		tr	IC=25A			0.6	μs
		toff	VGE=±15V			1.5	μs
		tf	RG=51 ohm			0.5	μs
	Reverse recovery time of FRD	trr	IF=25A			0.35	μs
Brake (IGBT)	Zero gate voltage collector current	ICES	VCES=1200V, VGE=0V			1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V			0.1	μA
	Collector-Emitter saturation voltage	VCE(sat)	IC=15A, VGE=15V			3.3	V
	Switching time	ton	VCC=600V			0.8	μs
		tr	IC=15A			0.6	μs
		toff	VGE=±15V			1.5	μs
		tf	RG=82 ohm			0.5	μs
Brake (FWD)	Reverse current	Irrm	VR=1200V			1	mA
	Reverse recovery time	trr				0.6	μs
Converter	Forward voltage	VFM	IF=25A			1.4	V
	Reverse current	Irrm	VR=1600V			1.0	mA

● Thermal Characteristics

Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			0.63	°C/W
		Inverter FRD			1.70	
		Brake IGBT			1.04	
		Converter Diode			3.40	
Contact thermal resistance *	Rth(c-f)	With thermal compound		0.05		

* This is the value which is defined mounting on the additional cooling fin with thermal compound

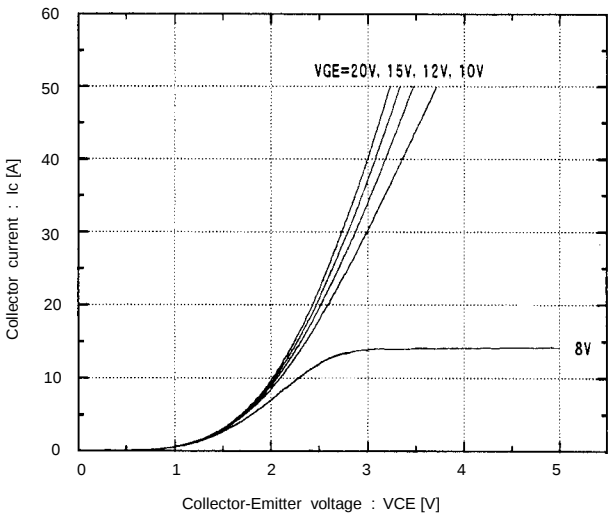
■ Equivalent Circuit Schematic



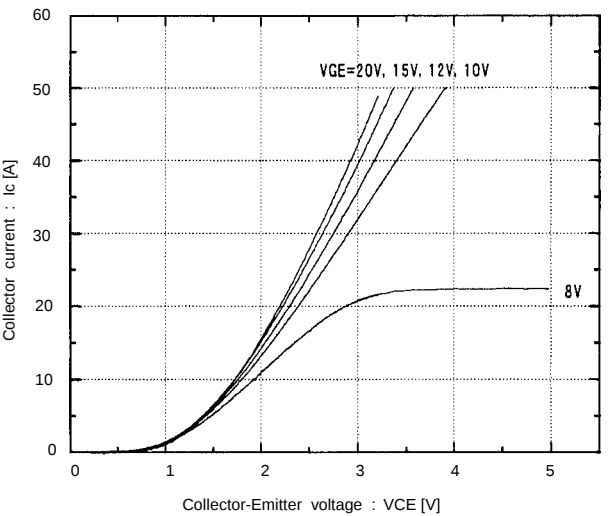
■ Characteristics (Representative)

● Inverter

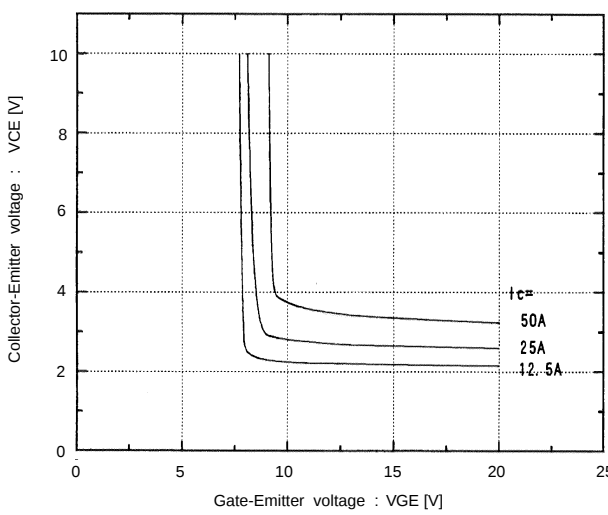
Collector current vs. Collector-Emitter voltage
 $T_J=25^{\circ}\text{C}$



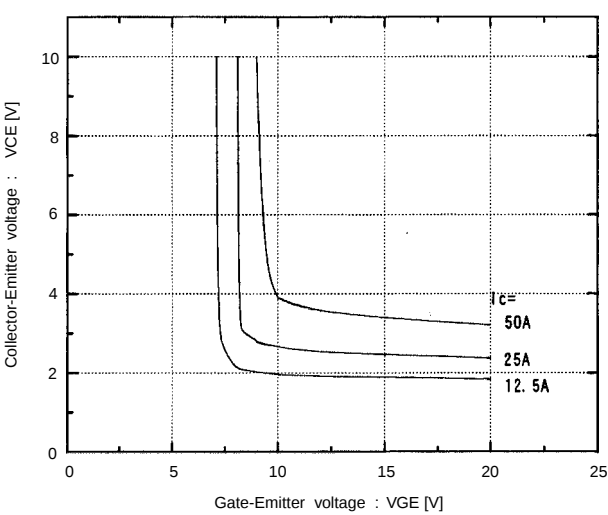
Collector current vs. Collector-Emitter voltage
 $T_J=125^{\circ}\text{C}$



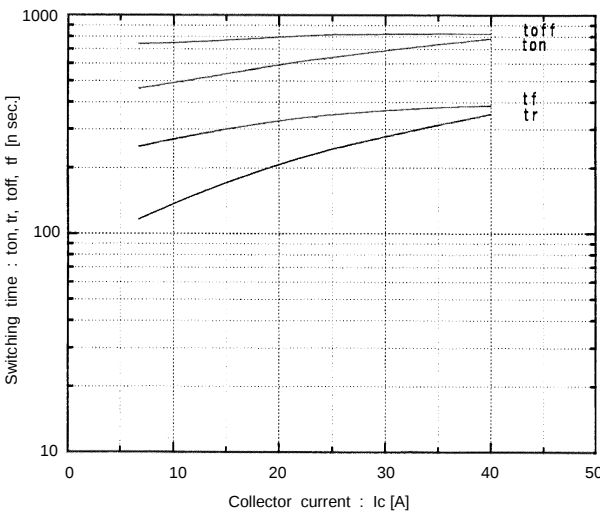
Collector-Emitter vs. Gate-Emitter voltage
 $T_J=25^{\circ}\text{C}$



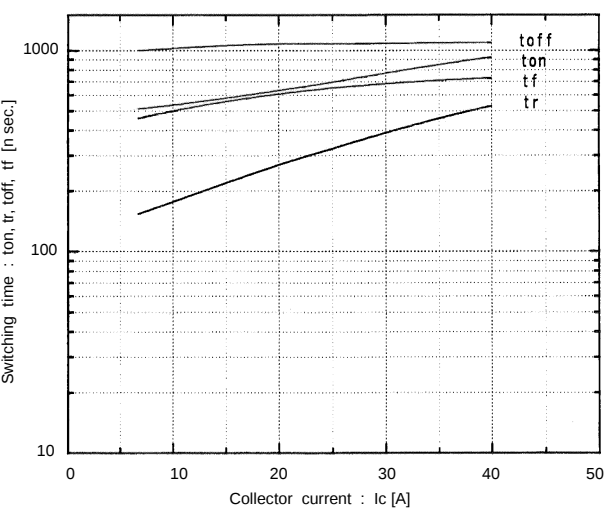
Collector-Emitter vs. Gate-Emitter voltage
 $T_J=125^{\circ}\text{C}$

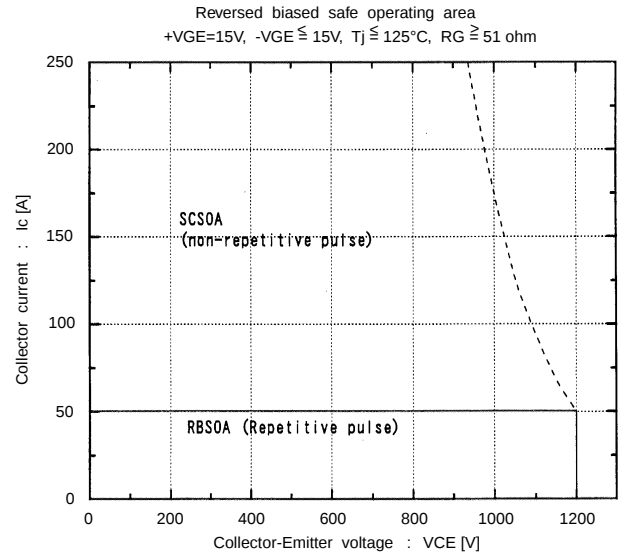
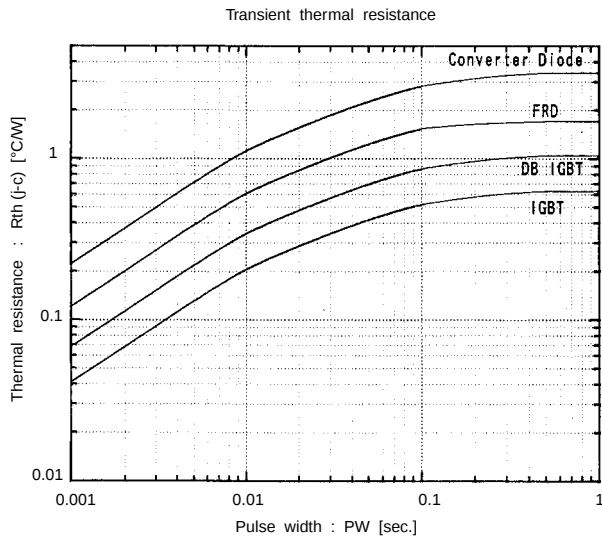
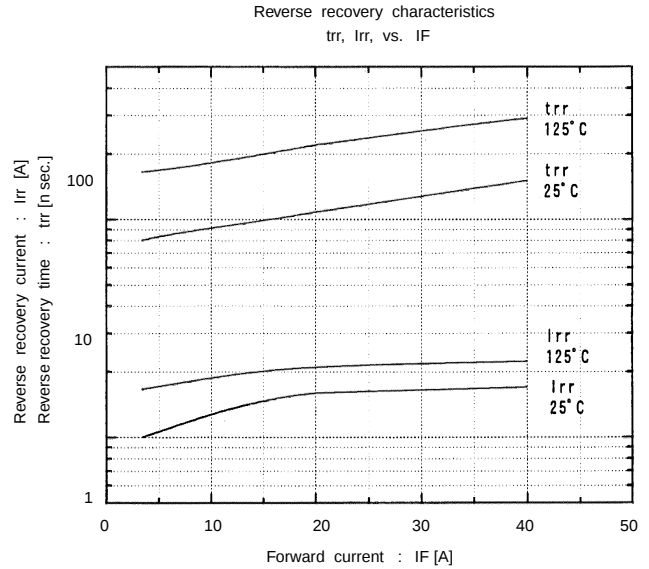
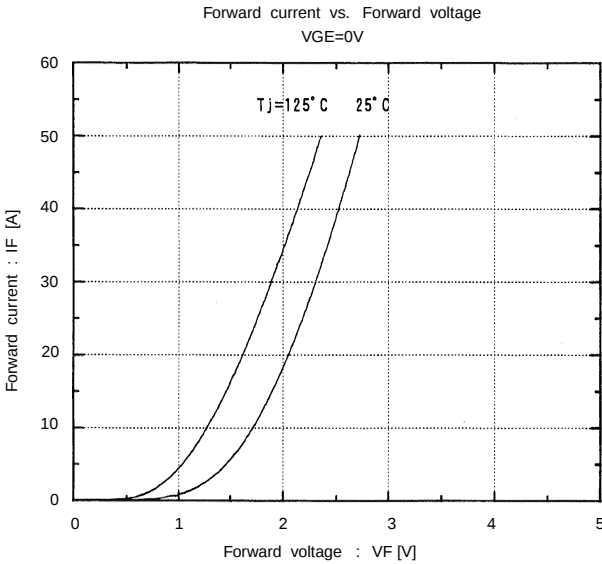
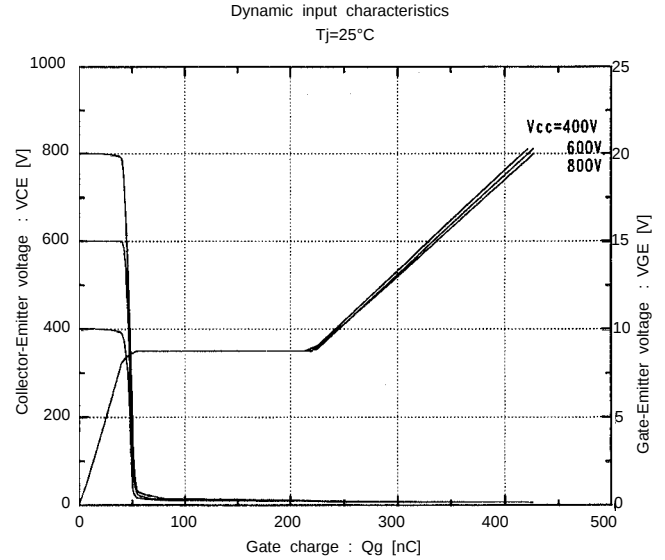
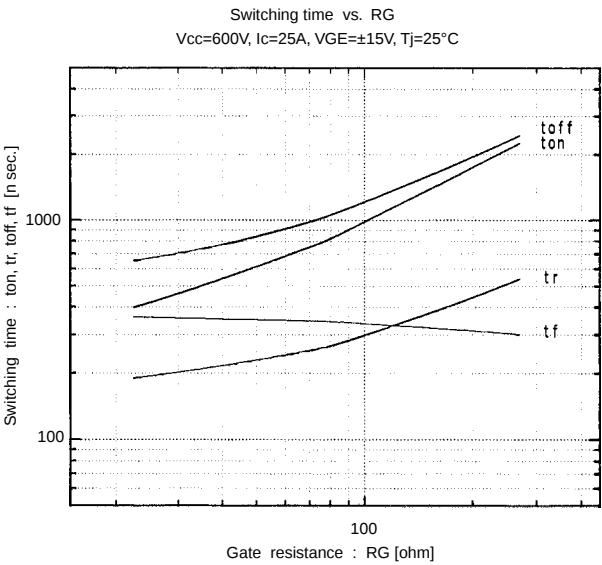


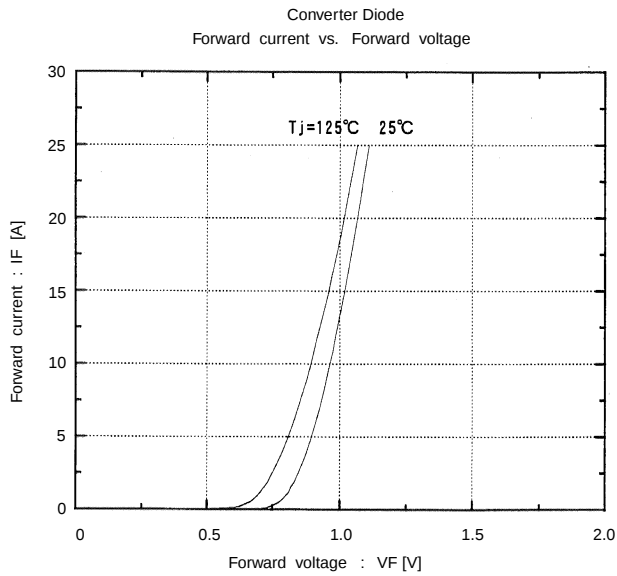
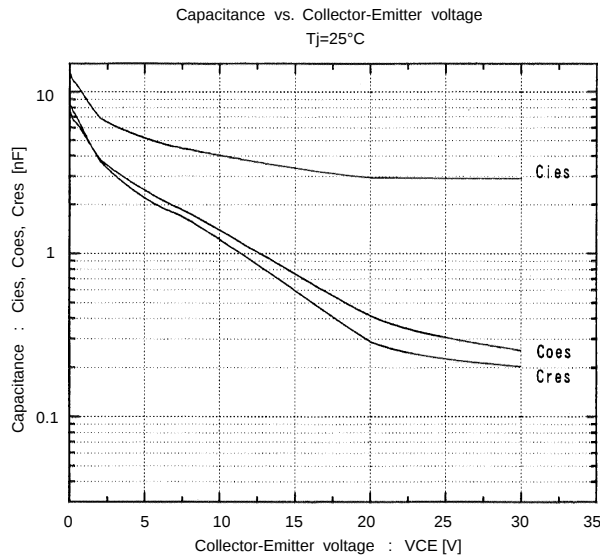
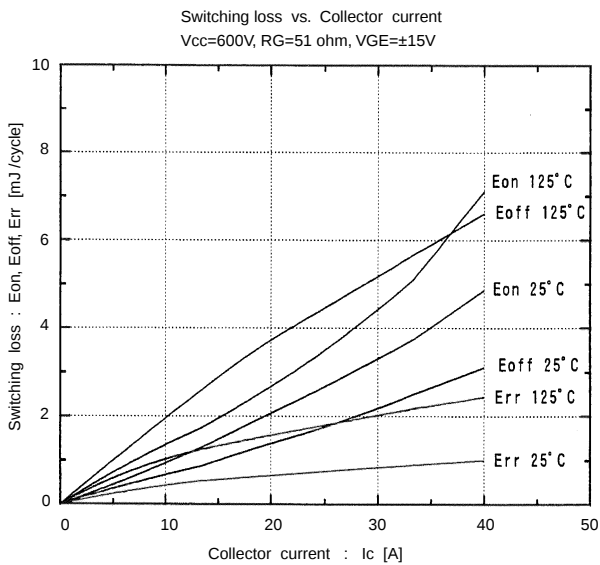
Switching time vs. Collector current
 $V_{CC}=600\text{V}$, $R_G=51\text{ ohm}$, $V_{GE}=\pm 15\text{V}$, $T_J=25^{\circ}\text{C}$



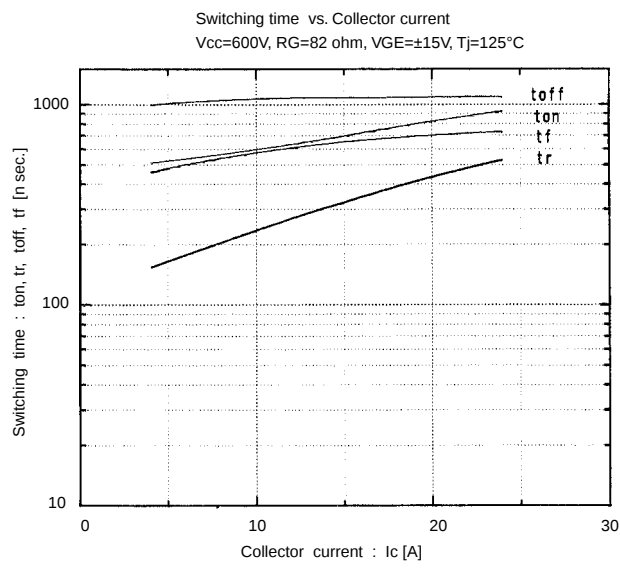
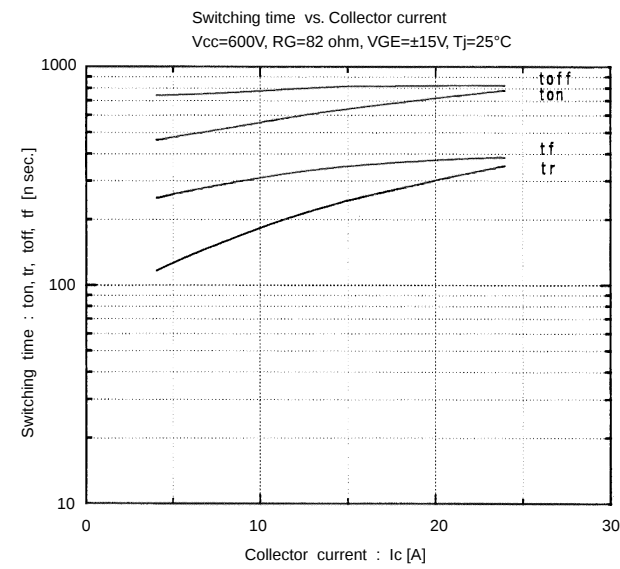
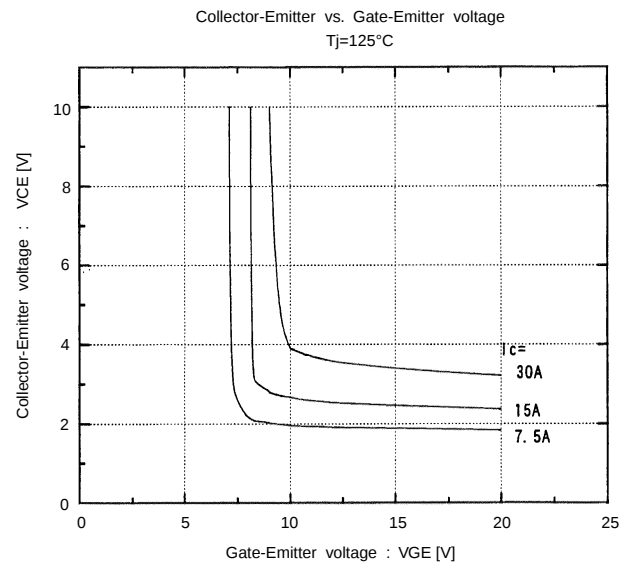
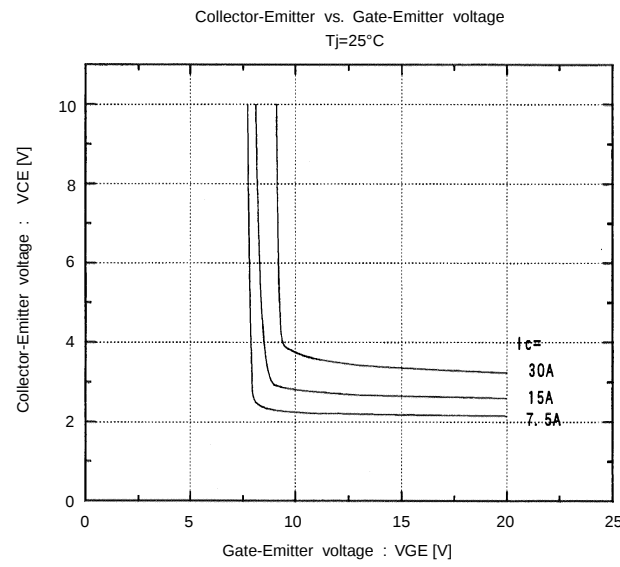
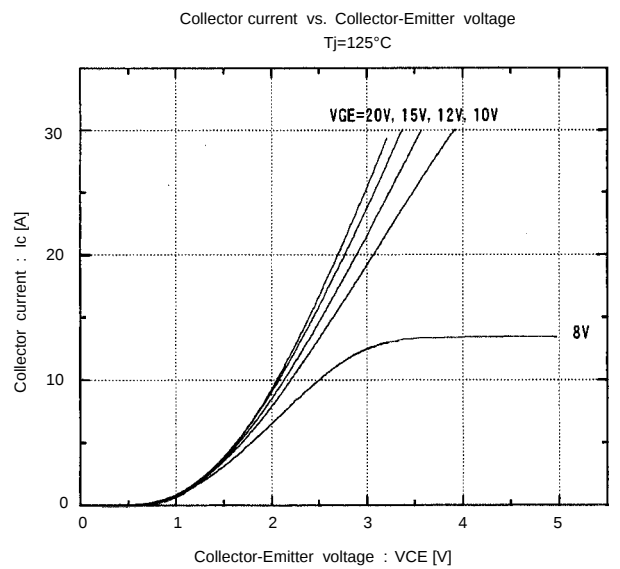
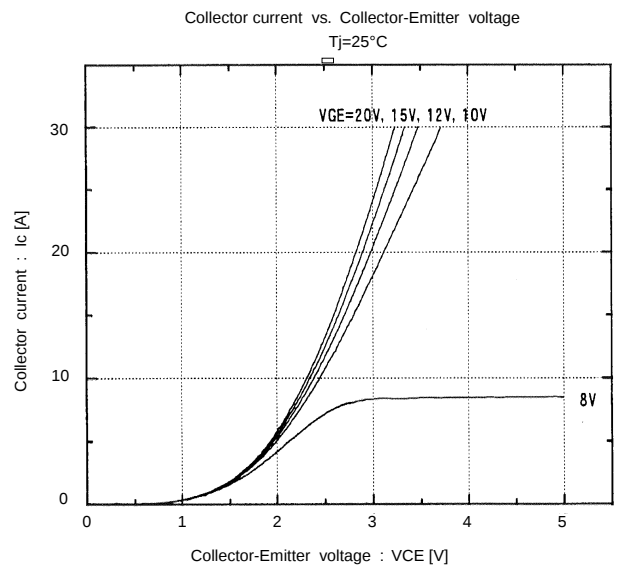
Switching time vs. Collector current
 $V_{CC}=600\text{V}$, $R_G=51\text{ ohm}$, $V_{GE}=\pm 15\text{V}$, $T_J=125^{\circ}\text{C}$



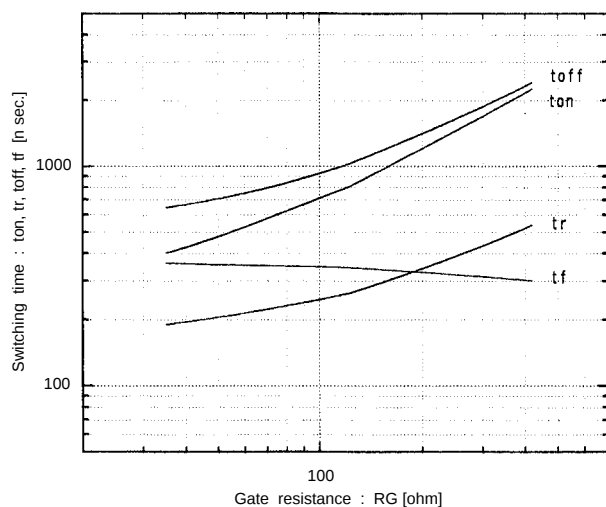




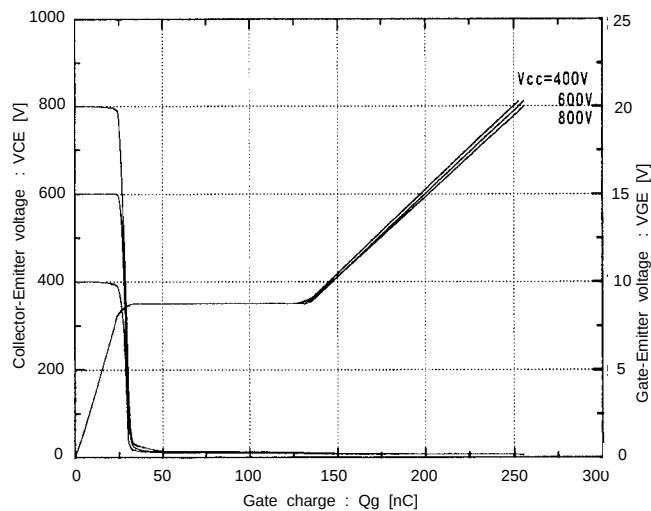
● Brake



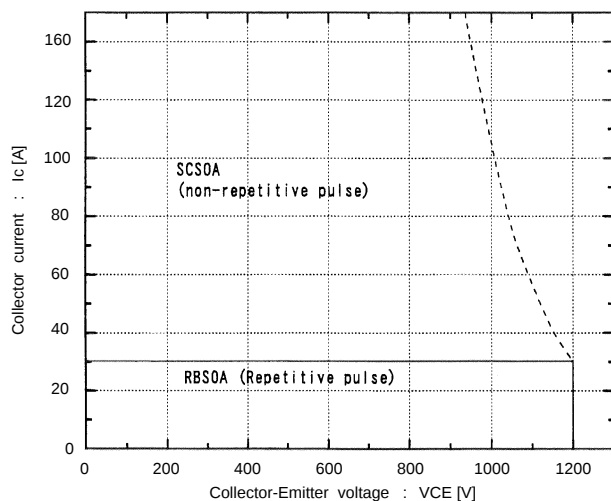
Switching time vs. R_G
 $V_{CC}=600V$, $I_C=15A$, $V_{GE}=\pm 15V$, $T_J=25^\circ C$



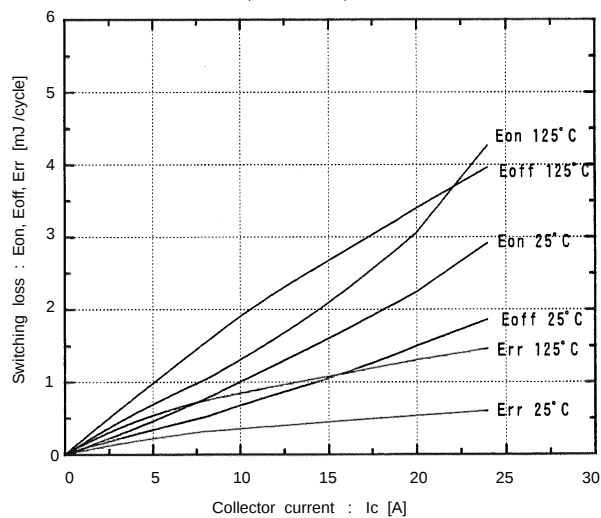
Dynamic input characteristics
 $T_J=25^\circ C$



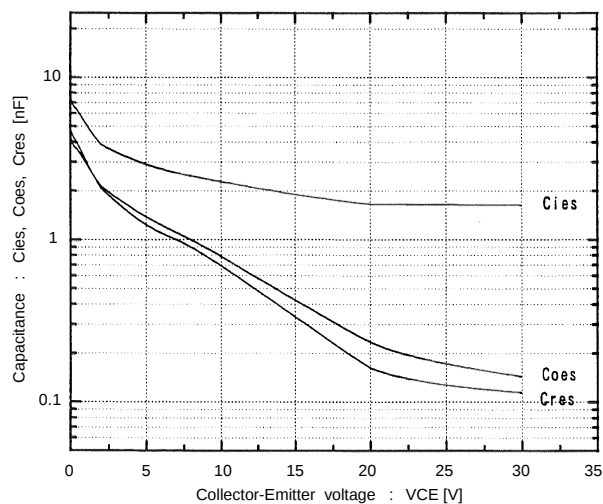
Reversed biased safe operating area
 $+V_{GE}=15V$, $-V_{GE} \leq 15V$, $T_J \leq 125^\circ C$, $R_G \geq 82 \text{ ohm}$



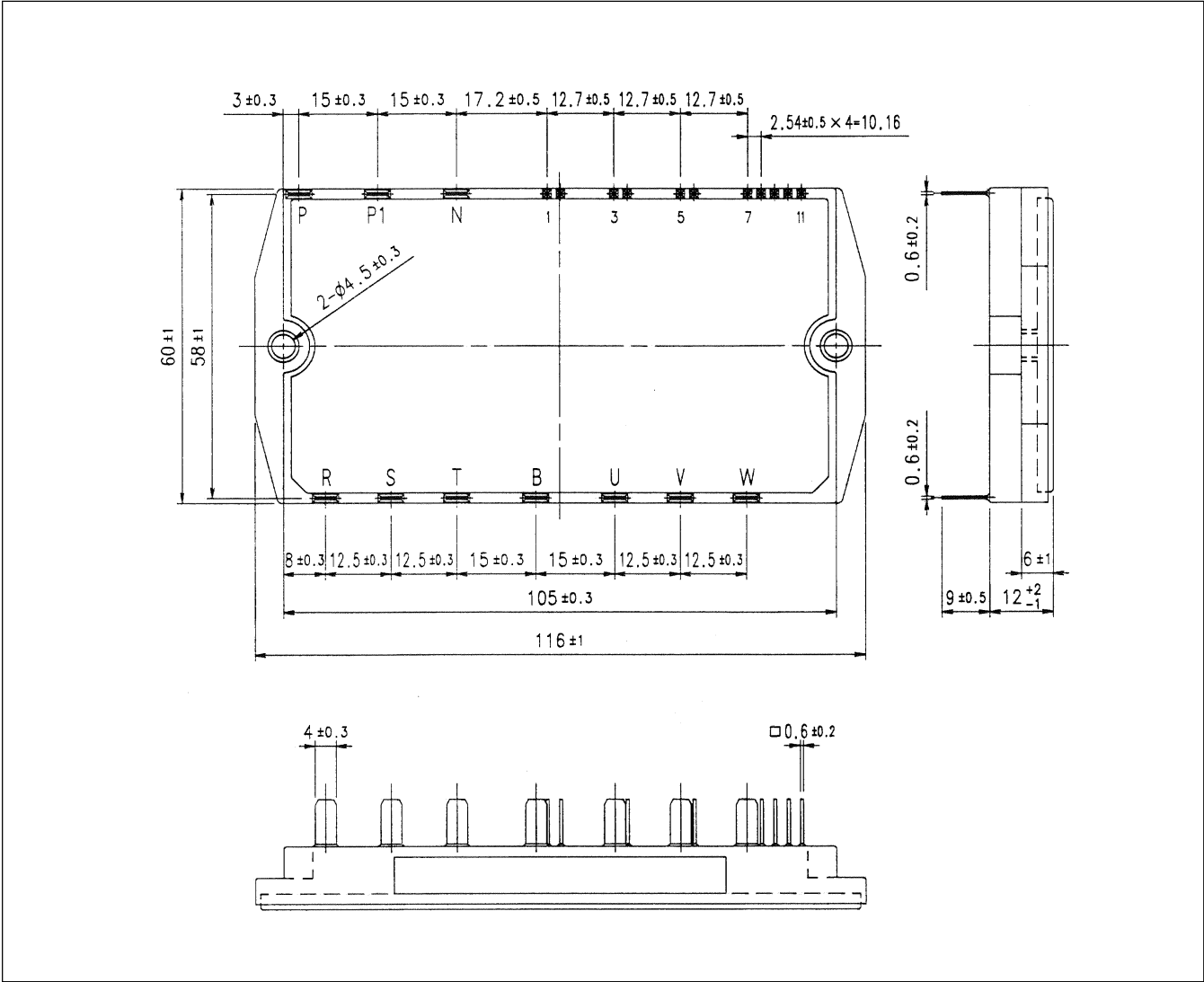
Switching loss vs. Collector current
 $V_{CC}=600V$, $R_G=82 \text{ ohm}$, $V_{GE}=\pm 15V$



Capacitance vs. Collector-Emitter voltage
 $T_J=25^\circ C$



■ Outline Drawings, mm



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