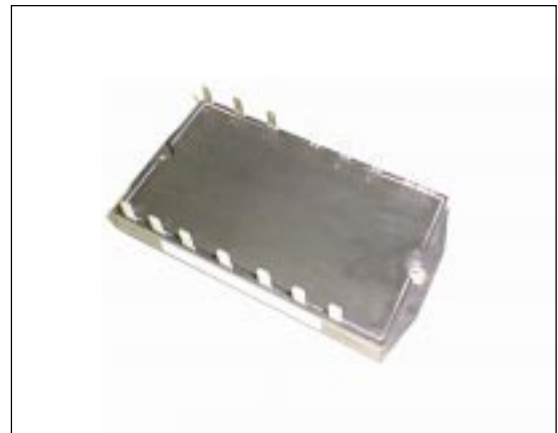


IGBT MODULE

600V / 75A / PIM



■ Features

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

■ Applications

- Inverter for Motor 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}		600	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _C	Continuous	75	A
		I _{CP}	1ms	150	A
		-I _C		75	A
Collector power dissipation	P _C	1 device	300	W	
Brake	Collector-Emitter voltage	V _{CES}		600	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _C	Continuous	50	A
		I _{CP}	1ms	100	A
	Collector power dissipation	P _C	1 device	200	W
	Repetitive peak reverse voltage	V _{RRM}		600	V
	Average forward current	I _{F(AV)}		1	A
Surge current	I _{FSM}	10ms	50	A	
Converter	Repetitive peak reverse voltage	V _{RRM}		800	V
	Non-Repetitive peak reverse voltage	V _{RSM}		900	V
	Average output current	I _O	50/60Hz sine wave	50	A
	Surge current (Non-Repetitive)	I _{FSM}	T _J =150°C, 10ms	350	A
	I ² _t (Non-Repetitive)		T _J =150°C, 10ms	648	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)

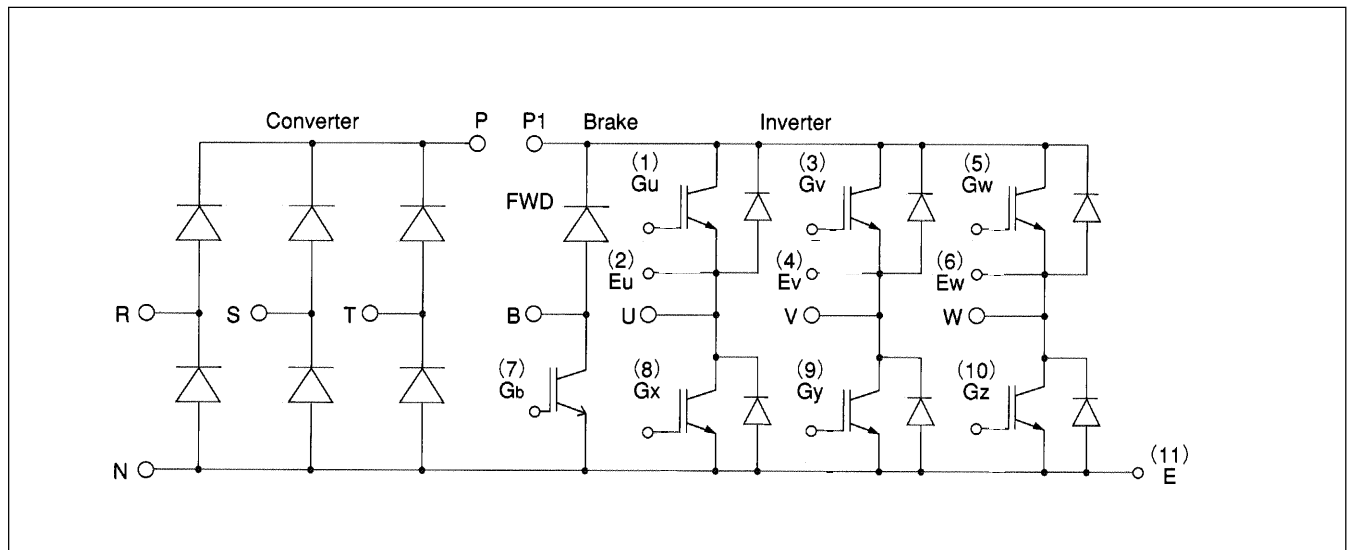
Item		Symbol	Condition		Characteristics			Unit
					Min.	Typ.	Max.	
Inverter (IGBT)	Zero gate voltage collector current	ICES	VCE=600V, VGE=0V				1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				0.2	μA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=75mA		5.5		8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE=15V IC=75A	chip			2.8	V
				Terminal			3.1	V
	Collector-Emitter voltage	-VCE	-IC=75A	chip			3.0	V
				Terminal			3.3	V
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz			6000		pF
	Switching time	ton	VCC=300V				1.2	μs
		tr	IC=75A				0.6	μs
toff		VGE=±15V				1.0	μs	
tf		RG=33 ohm				0.35	μs	
Reverse recovery time of FRD	trr	IF=75A				0.3	μs	
Brake (IGBT)	Zero gate voltage collector current	ICES	VCES=600V, VGE=0V				1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				0.1	μA
	Collector-Emitter saturation voltage	VCE(sat)	IC=50A, VGE=15V				2.8	V
	Switching time	ton	VCC=300V				0.8	μs
		tr	IC=50A				0.6	μs
		toff	VGE=±15V				1.0	μs
		tf	RG=51ohm				0.35	μs
Brake (FWD)	Reverse current	IRRM	VR=600V				1	mA
	Reverse recovery time	trr					0.6	μs
Converter	Forward voltage	VFM	IF=50A				1.55	V
	Reverse current	IRRM	VR=800V				1.0	mA

● Thermal Characteristics

Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			0.42	°C/W
		Inverter FRD			1.10	
		Brake IGBT			0.63	
		Brake FRD			3.57	
		Converter Diode			2.10	
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

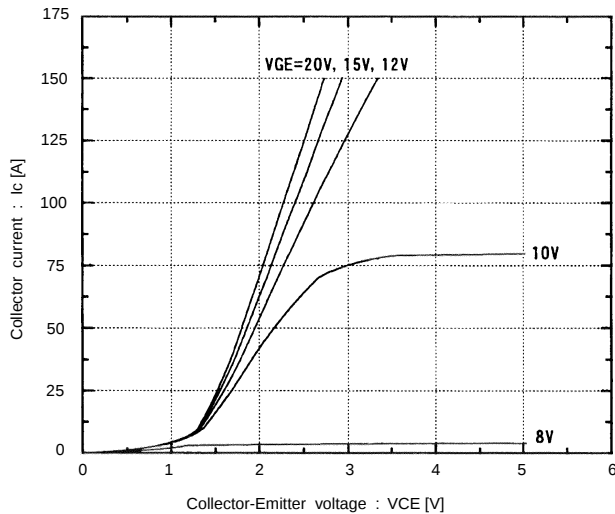
■ Equivalent Circuit Schematic



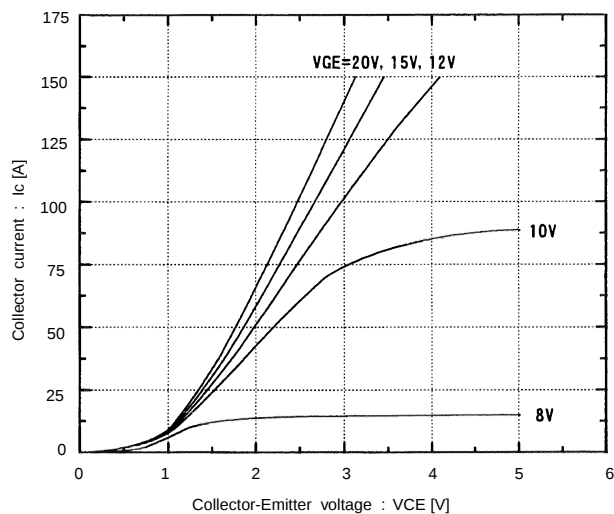
■ Characteristics (Representative)

● Inverter

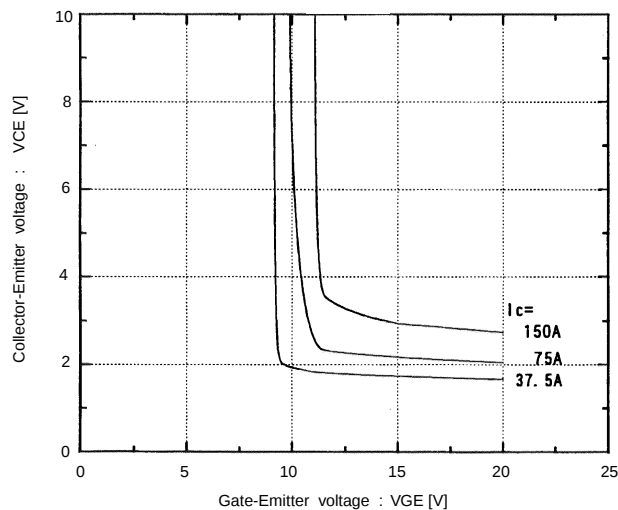
Collector current vs. Collector-Emitter voltage
 $T_J=25^{\circ}\text{C}$



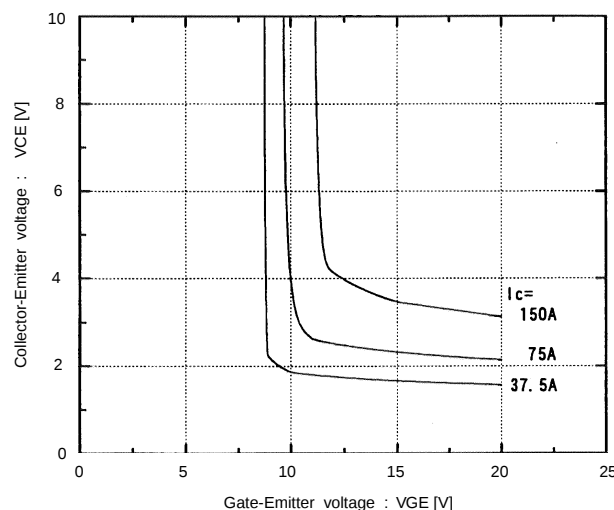
Collector current vs. Collector-Emitter voltage
 $T_J=125^{\circ}\text{C}$



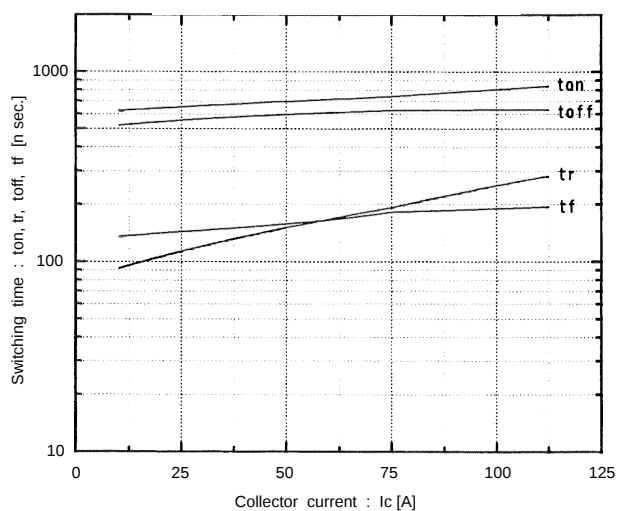
Collector-Emitter vs. Gate-Emmitter voltage
 $T_J=25^{\circ}\text{C}$



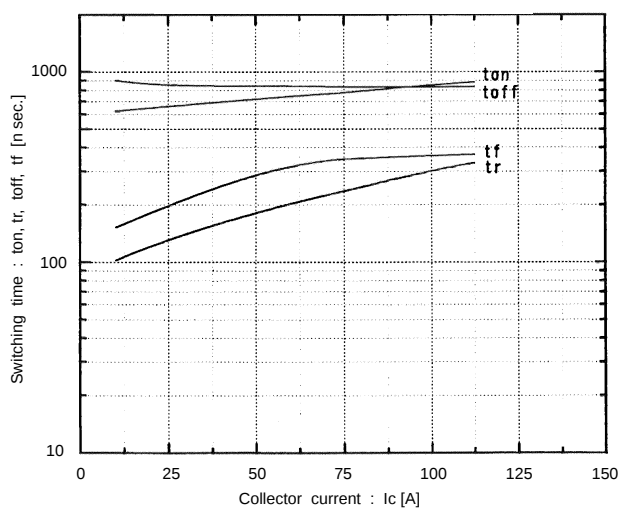
Collector-Emitter vs. Gate-Emmitter voltage
 $T_J=125^{\circ}\text{C}$

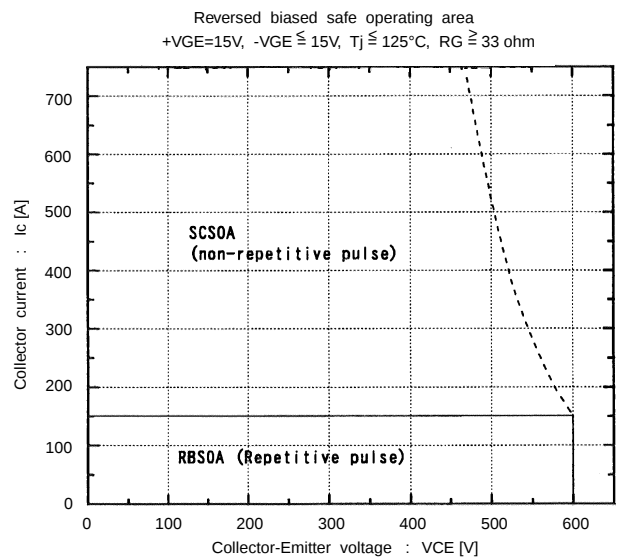
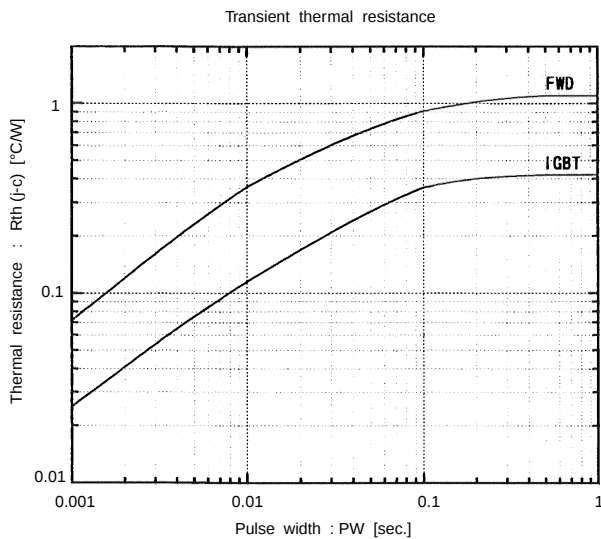
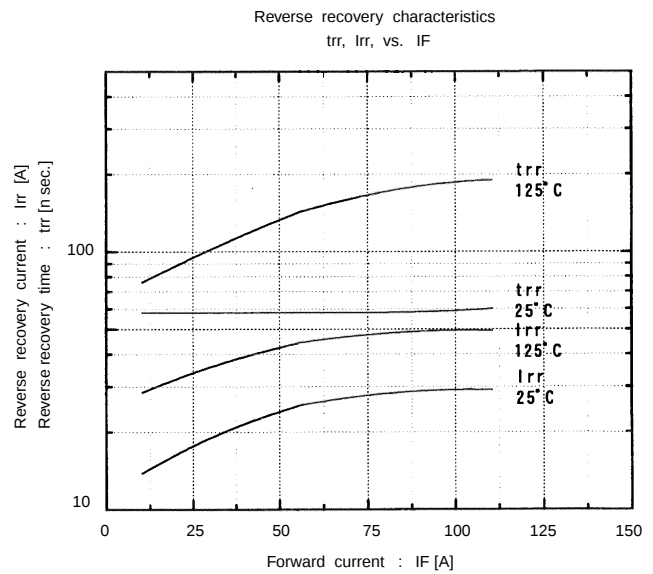
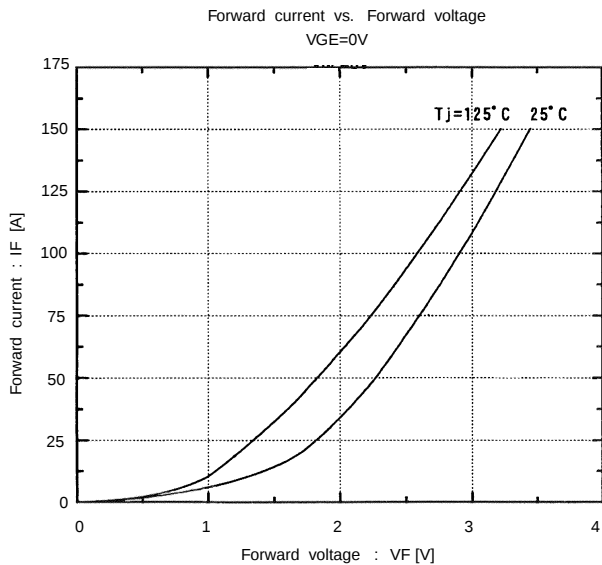
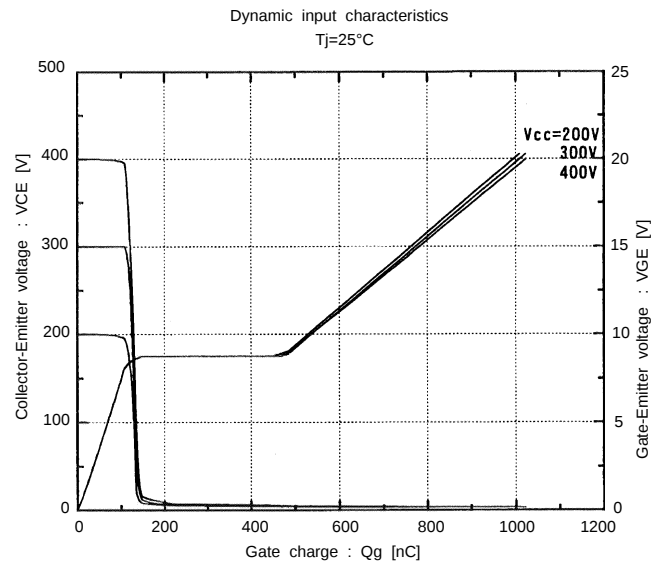
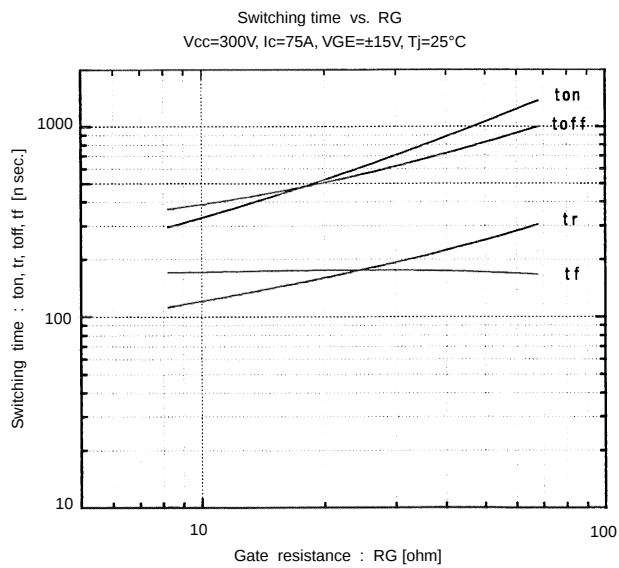


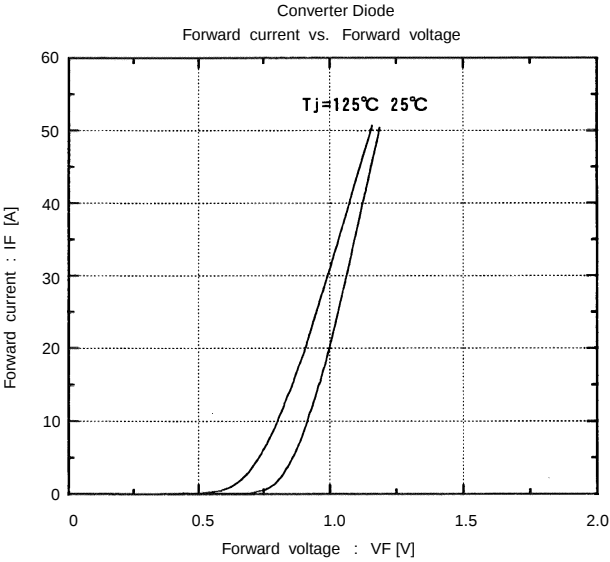
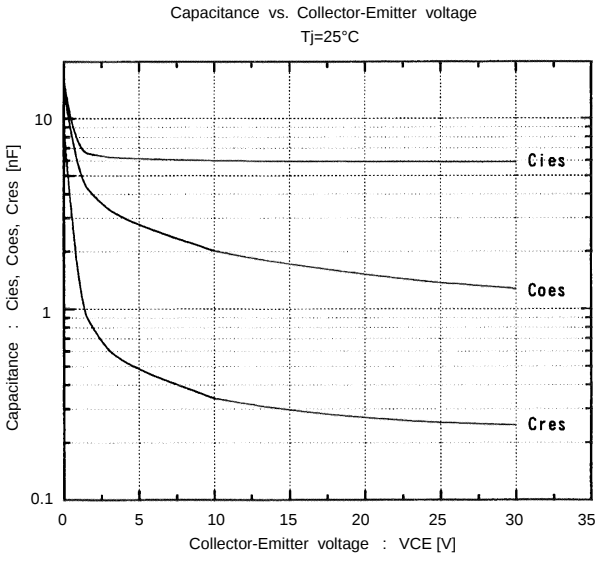
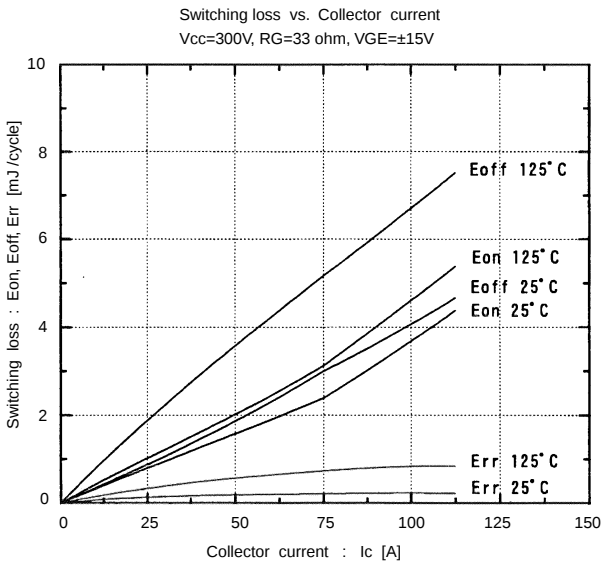
Switching time vs. Collector current
 $V_{CC}=300\text{V}$, $R_G=33\text{ ohm}$, $V_{GE}=\pm 15\text{V}$, $T_J=25^{\circ}\text{C}$



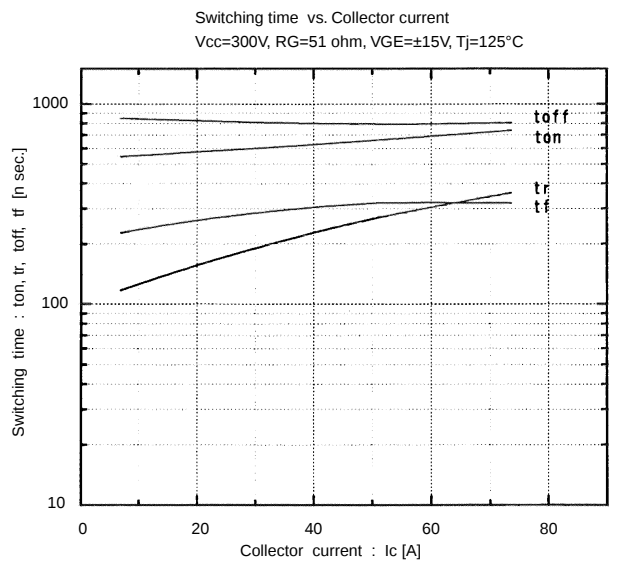
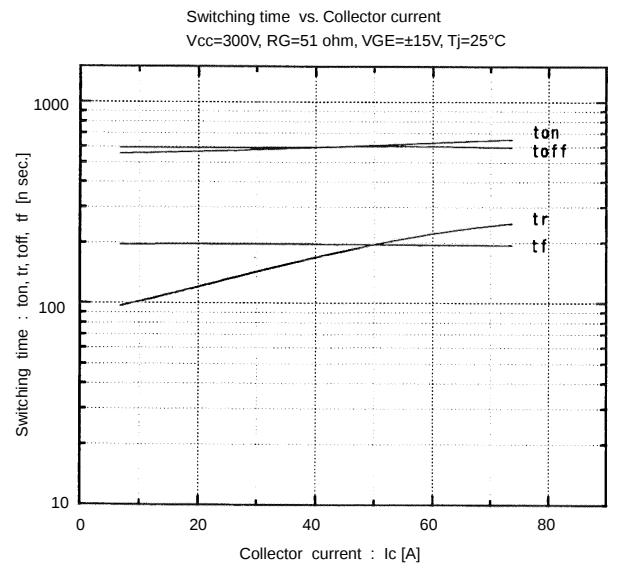
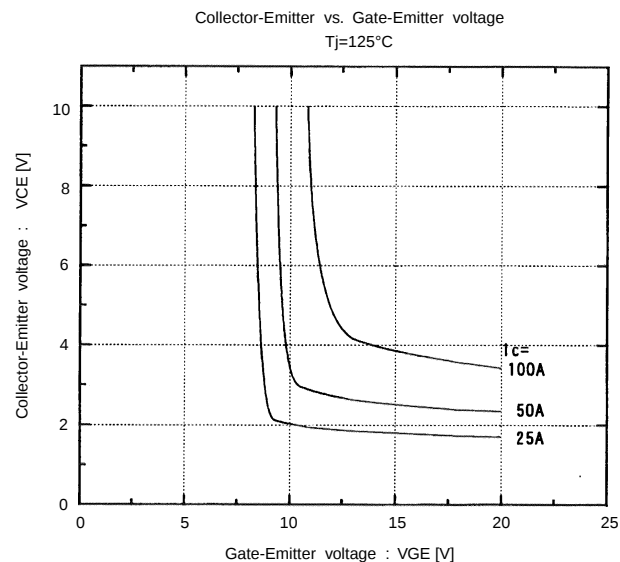
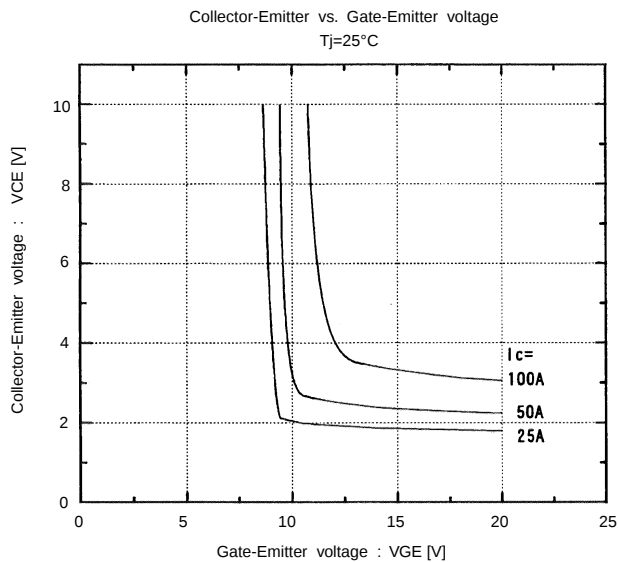
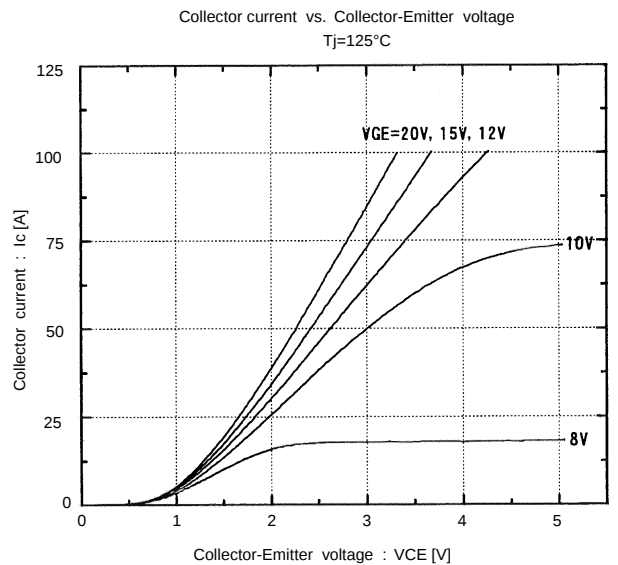
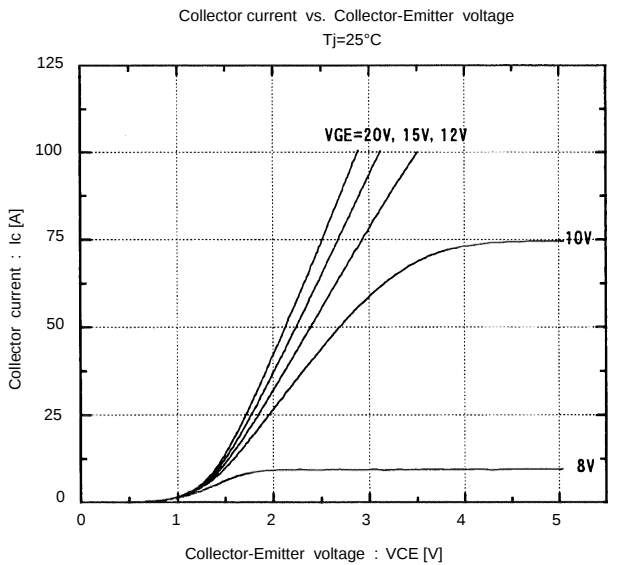
Switching time vs. Collector current
 $V_{CC}=300\text{V}$, $R_G=33\text{ ohm}$, $V_{GE}=\pm 15\text{V}$, $T_J=125^{\circ}\text{C}$

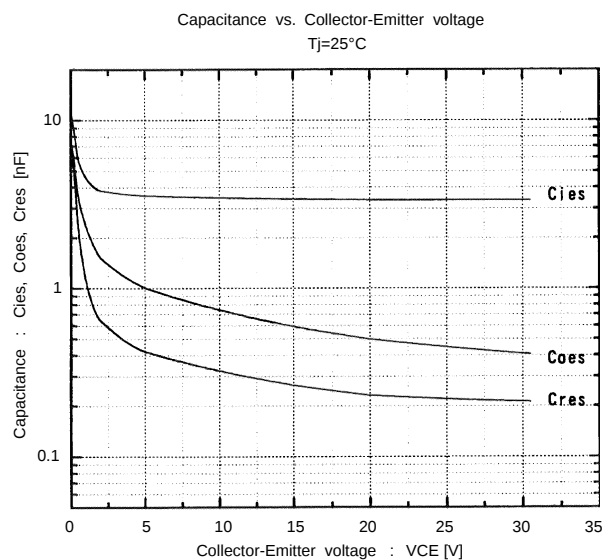
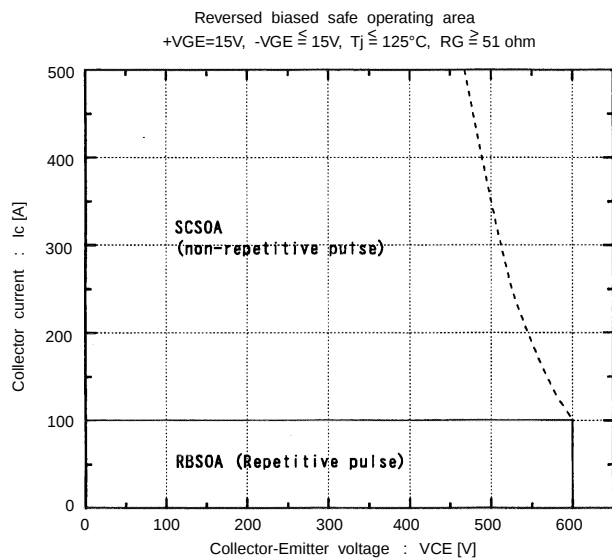
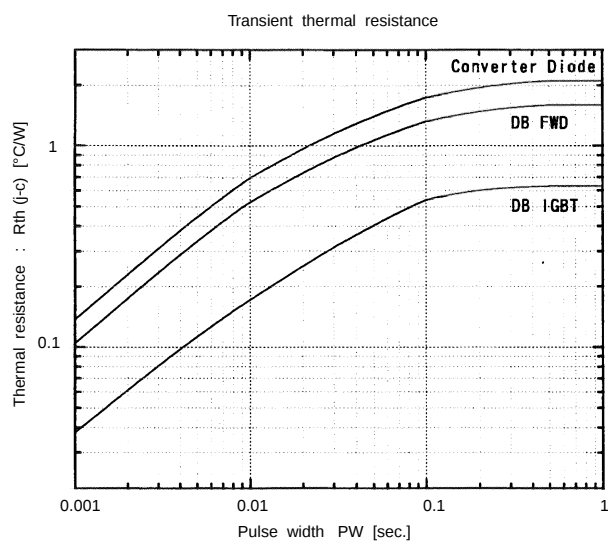
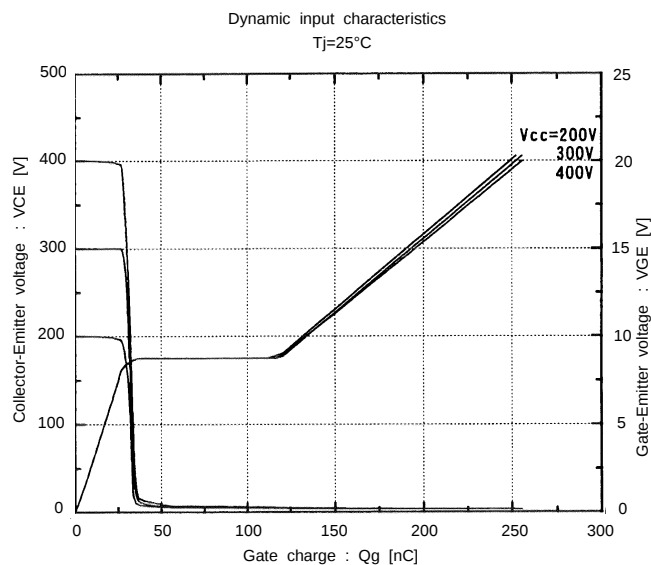
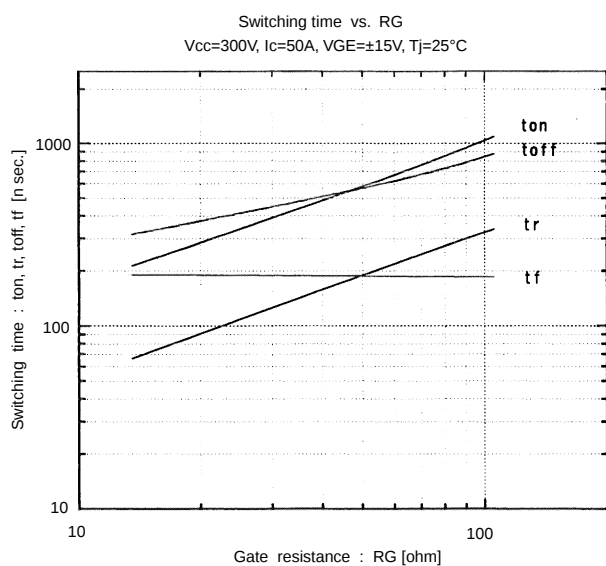






● Brake





■ Outline Drawings, mm

